

Promoting Environmental Initiatives

Environmental Initiatives

Fourth Consolidated Medium-Term Environmental Plan (Fiscal 2010–2012)

The Cosmo Oil Group has been enhancing its initiatives on the environment since fiscal 2002. In fiscal 2010, the Group introduced its Fourth Consolidated Medium-Term Environmental Plan and generally achieved the goals it set based on the following policies: respond strategically to

prevent global warming while ensuring continuation of business, reduce environmental impact, and promote environmental contribution activities. The Group will continue these initiatives under the next Consolidated Medium-Term Environmental Plan (Fiscal 2013–2017).

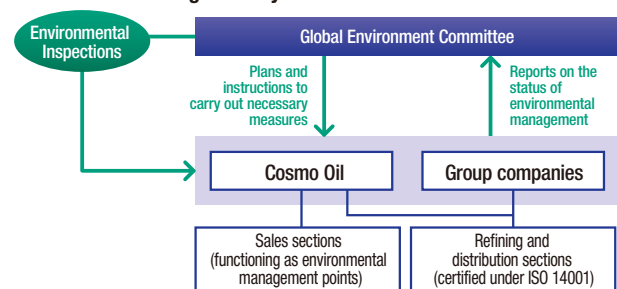
Fiscal 2012 Initiatives and Results under the Fourth Consolidated Medium-Term Environmental Plan Degree of achievement: Achieved (A), Partially achieved (B), Not achieved (C)

Themes		Fiscal 2012 Goals	Fiscal 2012 Results	Achievement of Goal
Respond strategically to prevent global warming while ensuring continuation of business	Reduce CO ₂ emissions	Reduce CO ₂ emissions by 0.22 million tonnes per year compared to level before implementation of measures 1. Reduce CO ₂ emissions in business areas: Energy savings at refineries, use of biogasoline, etc. (Anticipated reduction of 88 kt) 2. Develop wind power business (equivalent to reduction of 146 kt of CO ₂) 3. Conduct environmental technology development and commercialization study aimed at future CO ₂ reductions	Reduced 278 kt of CO ₂ emissions 1. Reduced 117 kt of CO ₂ emissions 2. Reduced 161 kt of CO ₂ emissions through wind power business 3. Conducted bio-fuel development and EV recharger service demonstration projects	A
	Manage greenhouse gas (GHG) emissions	Control the volume of GHG emissions in manufacturing, product transport and storage processing as well as in offices and the R&D Center	<ul style="list-style-type: none"> Continued to control the volume of GHG emissions in the specified areas Submitted report summarizing GHG emissions in accordance with Japan's Act on the Rational Use of Energy and Act on Promotion of Global Warming Countermeasures 	A
Reduce environmental impact	Identify environmental risks that may arise at times of normal operations and times of irregular operations; implement countermeasures	Consider precautions for times of normal/irregular operations at refineries facing risk of regulatory or agreement violation	Identified 10 risks and considered precautions (Precautions completed for 8 risks; consideration suspended for 1 risk and ongoing for 1 risk)	C
	Reduce industrial waste	<ul style="list-style-type: none"> Final disposal rate: Less than 0.5% for Cosmo Oil; less than 5.0% for Group companies Introduce electronic manifests 	<ul style="list-style-type: none"> Final disposal rate: 0.23% for Cosmo Oil; 1.98% for Group companies Introduced electronic manifests at Sakai, Yokkaichi, and Sakaide refineries; consideration ongoing at Chiba Refinery 	A
	Enhance internal/external audits for thorough environmental management	Continue ISO internal/external audits and environmental inspections in each workplace	<ul style="list-style-type: none"> Conducted internal/external audits and environmental inspections Ascertained environmental management conditions using the meeting minutes from environmental management committees at each site 	B
	Adopt rigorous measures to ensure soil preservation	<ul style="list-style-type: none"> Continue environmental monitoring and facilities management at refineries, oil depots, and Cosmo Oil service stations Take action according to equipment renovations at Cosmo Oil service stations 	<ul style="list-style-type: none"> Cosmo Oil service stations: Took action as planned; surveys at 61 stations (51 new and 10 previously surveyed service stations) and soil cleanup at 20 service stations Refineries: Systematically implemented soil cleanup, environmental monitoring, and facilities management based on the environmental impact at various sites 	A
	Promote Eco Office activities	Conduct energy- and resource-saving activities throughout the Cosmo Oil Group	<ul style="list-style-type: none"> Achieved Group-wide targets to reduce the use of copy paper, fuel for company vehicles, and electricity in offices Some Group companies fell short of copy paper reduction target 	A
	Promote green purchasing	Reconsider specified items (office supplies) and require each Group company to purchase only such specified items	Achieved the goals for specified items (office supplies)	A
Promote environmental contribution activities	Promote environmental communication	Promote environmental contribution activities through Cosmo Oil Eco Card Fund	<ul style="list-style-type: none"> Promoted environmental contribution activities in all 14 projects Held eco tour for Cosmo Oil Eco Card cardholders 	A
	Protect biodiversity	<ul style="list-style-type: none"> Survey the level of impact on biodiversity in business areas and prepare new initiatives Conduct initiatives to protect <i>satoyama</i> near workplaces Conduct projects through the Cosmo Oil Eco Card Fund with the aim of protecting biodiversity 	<ul style="list-style-type: none"> Participated in the editing and preparation of Forest Creation Guidelines through intercompany study groups Chiba Refinery, Sakai Refinery, and Cosmo Matsuyama Oil engaged in <i>satoyama</i> preservation activities on 5 occasions Commenced support for projects aimed at preserving biodiversity 	A

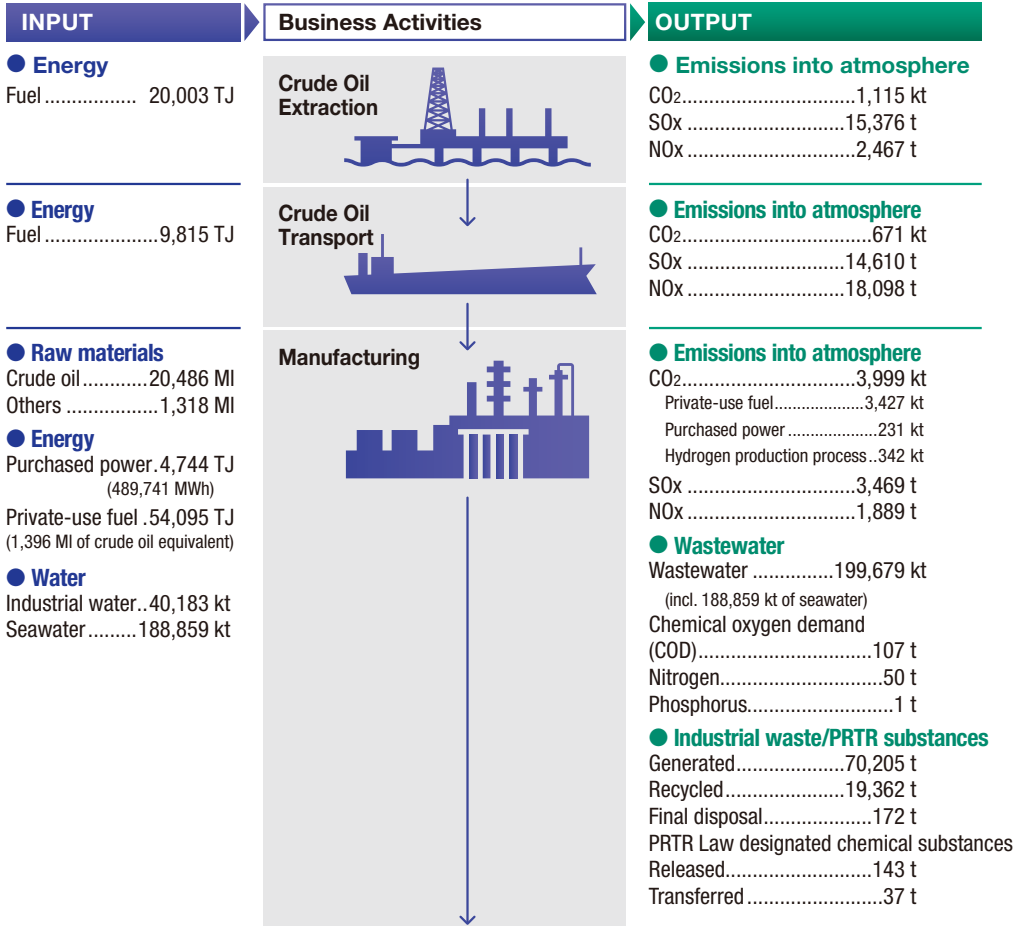
Cross-Sectional Environmental Management Structure

The Cosmo Oil Group has established a unique environmental management system centered on the Global Environment Committee, a body that cuts across the Group and departments. The Global Environment Committee drafts the Consolidated Medium-Term Environmental Plan, reports on and evaluates plan results, and provides feedback to specified departments. Through this structure the Group encourages all employees to voluntarily engage in environmental action and shares actions taken throughout the Group, from the front lines to the management level.

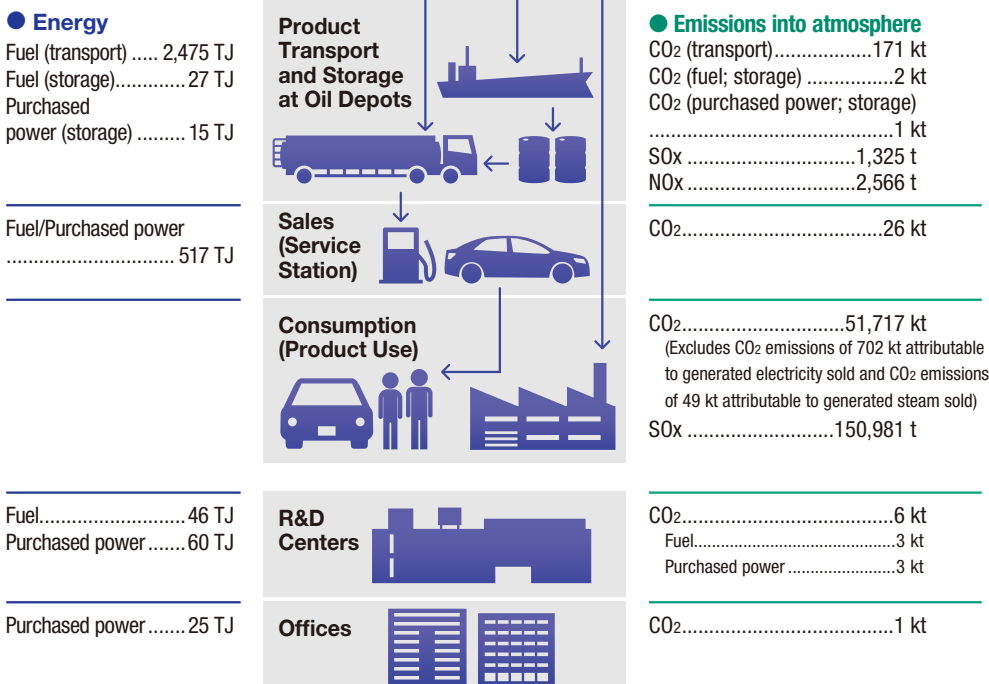
Environmental Management System



Environmental Impact of Business Activities



Products	Production	Sulfur recovered	Electricity sold	Steam sold	CO ₂ sold
	21,031 MI	191 kt (by-product)	1,022,150 MWh	936 TJ	73 kt



- SO_x and NO_x figures for "Crude Oil Extraction," "Crude Oil Transport," and "Product Transport and Storage at Oil Depots" are estimated based on LCI for Petroleum Products by Fuel and Environmental Impact Assessment for Petroleum Products, published in March 2000 by the Japan Petroleum Energy Center.
- For "Manufacturing" and subsequent stages, energy consumption is calculated in accordance with the Act on the Rational Use of Energy.
- CO₂ emissions for "Manufacturing" and "Product Transport and Storage at Oil Depots" are calculated in accordance with the Guidelines for Accounting Greenhouse Gas Emissions from the Industry, published by the Japanese Ministry of the Environment and the Ministry of Economy, Trade and Industry.
- Figures given for "Manufacturing" include data from the Cosmo Oil refineries, Yokkaichi Kasumi Power Station, Cosmo Matsuyama Oil, and Cosmo Oil Lubricants. However, data from Cosmo Oil Lubricants are not included in the figures for water, wastewater, SO_x, and NO_x.
- "Industrial waste" refers to waste generated during business activities, which includes waste that could be sold.
- "Electricity sold" refers to electricity supplied to outside customers by the Chiba Refinery, Yokkaichi Kasumi Power Station, and Cosmo Matsuyama Oil. CO₂ emissions from "Manufacturing" were calculated by deducting the portion of CO₂ emissions attributed to electricity sold. CO₂ emissions from utility (power) were included in the CO₂ emissions from "Manufacturing."
- "Steam sold" refers to steam sold by the Chiba Refinery and Cosmo Matsuyama Oil. CO₂ emissions for "Manufacturing" were calculated after deducting the portion of CO₂ emissions that results from the generated steam sold.
- "Sales (service stations)" is based on data from Cosmo Oil Sales Corp.
- See the Environmental Accounting web page on the Cosmo Oil Group website for the methodology and basis of "Consumption (Product Use)" calculations.
- With regard to CO₂ emissions for "Consumption (Product Use)," CO₂ emissions attributable to generated electricity and steam sold are estimated separately.
- SO_x emissions for "Consumption (Product Use)" are included for reference, and were estimated from the sulfur content of products without accounting for sulfur reduction during use. Accordingly, actual SO_x emissions are lower than the estimate.
- Naphtha used mainly as a petrochemical material does not directly emit CO₂ or SO_x. However, naphtha is included with other petroleum products when calculating CO₂ and SO_x emissions for "Product Use."
- Data for "R&D Centers" includes the R&D Center of Cosmo Oil and the R&D Laboratory of Cosmo Oil Lubricants.
- Figures given for "Offices" include data from the Cosmo Oil Head Office and branch offices.
- In fiscal 2012, the Cosmo Oil Group's total direct (Scope 1) emissions from business activities were 3,714 kt CO₂ equivalent, and its indirect (Scope 2) emissions were 321 kt CO₂ equivalent.

 **Detailed information**
Environmental accounting
http://www.cosmo-oil.co.jp/eng/csr/accounting/ev_accounting.html

Initiatives in Response to Global Warming

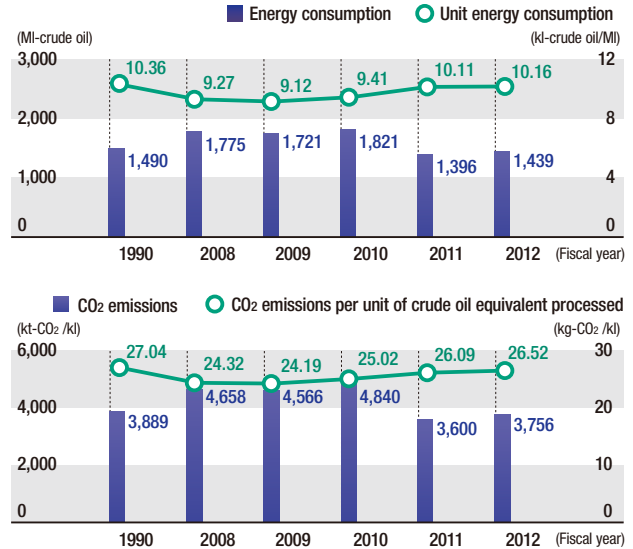
Saving Energy in Refineries

Approximately 60% of the Cosmo Oil Group's CO₂ emissions are generated by refining. The Group is working to reduce this figure and conserve energy by introducing high-efficiency equipment and improving operational performance.

In fiscal 2012, measures such as revising operating conditions for advanced equipment at the Sakai Refinery contributed to CO₂ emissions reduction. The Group reduced 42.9 kilotonnes of CO₂ emissions (crude oil equivalent of 16,390 kiloliters) from its refineries, exceeding the reduction target of 34.2 kilotonnes (crude oil equivalent of 13,150 kiloliters) for fiscal 2012 under the Fourth Consolidated Medium-Term Environmental Plan. At the Chiba Refinery, however, production had been halted for most of fiscal 2012. Consequently, despite a decrease in total energy consumption and CO₂ emissions at the refinery, the unit energy consumption¹ figure deteriorated compared to the regular production year of fiscal 2010 due to preparations for restarting production. After production has been stabilized, the refinery will continue working to execute and improve its energy-saving measures.

1. 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/Ml). Total energy consumption is calculated by converting heat, electricity, and other energy use into the megaliters of crude oil equivalent (Ml-crude oil).

Energy Consumption and CO₂ Emissions at Four Refineries



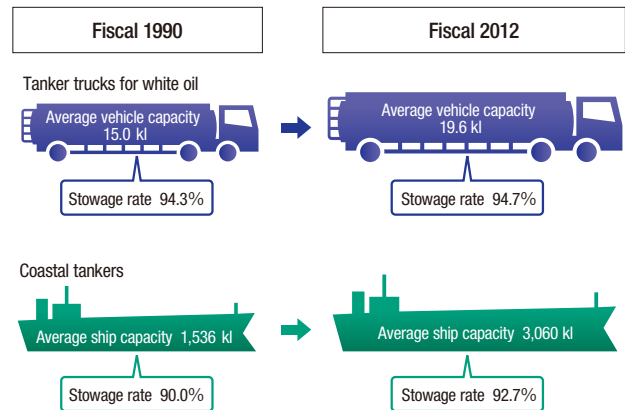
Note: In addition to the figures shown in the graph, N₂O released from the catalyst regeneration tower amounted to 13 kilotonnes of CO₂ equivalent in fiscal 2012.

Reducing Transport-related Energy Consumption

In fiscal 2012, unit energy consumption in the transport¹ sector at Cosmo Oil alone was 8.77 kiloliters per million tonne-kilometers (kl/Mt-km), a 0.16 kl/Mt-km improvement over the previous fiscal year. This is attributable to the Company's ongoing efforts to achieve high stowage rates by using larger trucks and ships. The Company transported 6,833 Mt-km of freight, up 1.4% year on year. However, due to the increased use of railroad and coastal tankers in transport, the total energy consumption was equivalent to 59,915 kiloliters of crude oil, down 0.4% year on year, causing the unit energy consumption to decrease.

For ground transport, the average payload increased to 17.93 kiloliters of freight per trip, an improvement of 0.03 kiloliters year on year, while unit energy consumption also improved to 35.62 kiloliters per trip, an improvement of 0.65 kiloliters year on year. For marine transport involving the use of coastal tankers, unit energy consumption was 6.63 kl/Mt-km on a par with previous year, partly due to the long-term shutdown of the Chiba Refinery.

Average Capacity and Stowage Rate



1. Unit energy consumption in transport (kiloliters/million tonne-kilometer) is calculated by energy consumption (kiloliters of crude oil equivalent) divided by cargo tonne-kilometers (weight in tonnes of material transported multiplied by the number of kilometers transported).

Environmentally Friendly Service Stations

In an effort to create service stations that are friendlier to the environment, the Cosmo Oil Group is making enhancements such as installing solar panels and LED lighting. Electric vehicle (EV) charging stations have been installed at nine service stations, in an active effort to provide necessary infrastructure for the spread of EVs.

In fiscal 2012, the Group began a demonstration project in which a service station acquires all the electricity for its operations, including electricity for an EV recharging service, using a high-speed EV recharger with a storage battery. The storage battery stores and supplies not only power generated by solar panels installed at the station, but also commercial power obtained at night when the

rates are lower. The project will also demonstrate the ability to refuel vehicles during power outages.

High-Speed EV Recharger with Storage Battery System

