

Fourth Consolidated Medium-Term Environmental Plan

The Cosmo Oil Group launched the first initiatives under its Consolidated Medium-Term Environmental Plan in fiscal 2002. In fiscal 2010, the Group introduced its Fourth Consolidated Medium-Term Environmental Plan based on the following policies: respond strategically to prevent global warming while ensuring continuation of business, reduce environmental impact, and promote environmental contribution activities.

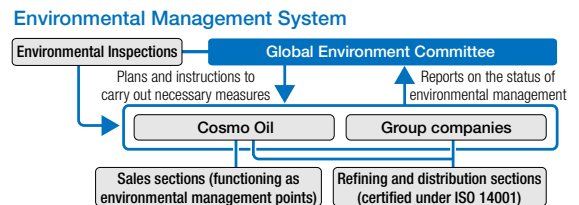
Fiscal 2011 Initiatives and Results under the Fourth Consolidated Medium-Term Environmental Plan

Degree of achievement: ○ Achieved △ Partially achieved × Not achieved

Themes		Fiscal 2011 Goals	Fiscal 2011 Results	Achievement of Goal
Respond strategically to prevent global warming while ensuring continuation of business	Reduce CO ₂ emissions	Reduce CO ₂ by 241 kt per year compared to level before implementation of measures 1. Reduce CO ₂ in business areas (energy savings at refineries, use of biogasoline, etc.) (Anticipated reduction of 95 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 274 kt of CO ₂ emissions 1. Reduced 112 kt of CO ₂ emissions (39 kt from energy conservation and 66 kt from biogasoline use) 2. Reduced 161 kt of CO ₂ emissions through wind power generation	○
	Manage greenhouse gas emissions	Control the volume of greenhouse gas 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 greenhouse gas emissions in the specified areas 3.60 million tonnes of CO₂ emissions from refinery operations (down 1.24 million tonnes year on year) 	○
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 5 risks and consideration ongoing for 5 risks)	○
	Reduce industrial waste	<ul style="list-style-type: none"> Final disposal rate: less than 0.5% for Cosmo Oil; less than 5.0% for entire Group Introduce electronic manifests 	<ul style="list-style-type: none"> Final disposal rate: 0.4% for Cosmo Oil; 5.0% for entire Group Conducted survey to introduce electronic manifests at refineries that were not using them during current medium-term plan 	○
	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; environmental management was generally good 1 case of air pollution exceeding regulatory values, and 3 cases of air pollution exceeding treaty values. The violations were reported to local authorities and corrective measures were taken. 	△
	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 47 service stations and cleanup at 26 service stations) Refineries: Action being taken in sequence 	○
	Promote Eco Office activities	Conduct energy- and resource-saving activities throughout the Cosmo Oil Group (Group-wide goal: Reduce copy paper by 9%, company car fuel consumption by 6%, and office electricity consumption by 6% from the averages of fiscal 2007–2009)	Significantly surpassed the goals by reducing copy paper consumption by 10.9% and reducing fuel consumption from company vehicles by 19.6%. Significantly reduced electricity consumption at offices by 23.6% for business locations serviced by Tokyo Electric Power and Tohoku-Electric Power, particularly from July to September.	○
	Promote green purchasing	<ul style="list-style-type: none"> Reconsider specified items (office supplies) and require each Group company to purchase only such specified items Follow-up through reexamination of suppliers 	<ul style="list-style-type: none"> Achieved the goals, with the exception of replacement purchases after the earthquake Followed up on 45 major "non-green" suppliers 	○
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 15 projects Held eco tour for Cosmo Oil Eco Card Fund members: creating biotopes, restoring <i>satoyama</i> (managed woodlands near populated area) 	○
	Protect biodiversity	<ul style="list-style-type: none"> Promote preservation of biodiversity in the Group's business areas Conduct initiatives to protect <i>satoyama</i> near workplaces Conduct projects through the Cosmo Oil Eco Card Fund with the aim of protecting biodiversity (Newly solicited project) 	<ul style="list-style-type: none"> Conducted biodiversity surveys in areas of Cosmo operations through intercompany study groups Sakai Refinery and Cosmo Matsuyama Oil engaged in <i>satoyama</i> preservation activities on 4 occasions Commenced support for 4 new projects aimed at preserving biodiversity and 1 project aimed at supporting recovery from the Great East Japan Earthquake 	○

Cross-Sectional Environmental Management Structure

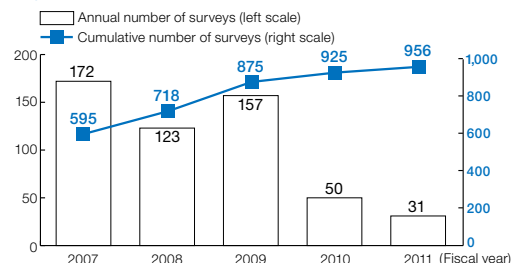
The Cosmo Oil Group has established a unique environmental management system centered on the Global Environment Committee, a body that cuts across the Group and departments. The Global Environment Committee drafts the Consolidated Medium-Term Environmental Plan, reports on and evaluates plan results, 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.



Reducing Environmental Risk in Soil

To reduce the risk of soil contamination from a petroleum leak at service stations or business locations, the Cosmo Oil Group takes preventative measures and works to minimize impact on the surrounding environment in the case of spills and leaks. In fiscal 2011, surveys were conducted at 47 service stations owned by Cosmo Oil in conjunction with equipment renovations (of these, surveys at 31 stations were new). Soil decontamination was conducted at 26 service stations, including those that were still ongoing from the previous fiscal year, and completed at 15 stations. The Group will continue to conduct soil environment surveys at other service stations as they undergo renovations and will keep striving to minimize the risk of soil contamination.

Number of Soil Surveys at Service Stations Owned by Cosmo Oil



Reducing Transportation-Related Energy Consumption

In fiscal 2011, unit energy consumption in the transport¹ sector at Cosmo Oil alone was 8.93 kiloliters per million tonne-kilometers (kl/Mt-km), a 0.17 kl/Mt-km improvement over the previous fiscal year. The Company transported 6,739 Mt-km of freight, up 9.8% year on year. As a result, the total energy consumption was equivalent to 60,175 kiloliters of crude oil, up 11.9% year on year, causing the unit energy consumption to increase.

For ground transport that mainly relies on tanker trucks, the Company is continuing its efforts to achieve high stowage rates by using larger trucks and improving order management. The average payload increased to 17.90 kiloliters of freight per trip, an improvement of 0.05 kiloliters year on year, while unit energy consumption also improved to 36.26 kiloliters per trip, an improvement of 0.15 kiloliters year on year. Actual energy consumption from diesel oil was up 1.0% year on year, but the total freight volume increased significantly, so that the unit energy consumption improved year on year. The Company will continue striving to achieve further energy reductions through efficiency improvements centering on systematic and driver-controlled deliveries.

For marine transport involving the use of coastal tankers, the Company is making ongoing efforts to maintain high stowage rates and use larger tankers. However, due to circumstances such as accidents at the Chiba Refinery and production stoppages during the Great East Japan Earthquake, unit energy consumption from marine transport was 6.62 kl/Mt-km, up 0.48 kl/Mt-km, or 7.8% year on year. The Company will continue working to reduce energy consumption in fiscal 2012, taking into account the fact that production will resume at the Chiba Refinery.

Average Capacity and Stowage Rate

Tanker trucks for white oil



Coastal tankers



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 eight service stations in Kanagawa Prefecture, Tokyo, Osaka Prefecture, and Shizuoka Prefecture, in an active effort to provide necessary infrastructure for the spread of EVs. LED lighting is being used at nine service stations, including those with LED lighting for canopies only, while new service stations are being designed to incorporate all-LED lighting including in signage. The Cosmo Oil Group will continue to examine and find ways to make service stations more eco-friendly.



High-speed recharger for electric vehicles

Eco Office Activities

The Cosmo Oil Group conducts "Eco Office" activities to reduce the amount of copy paper used, the amount of fuel consumed by company vehicles and the amount of electricity consumed at its offices. Every employee is engaging in initiatives to achieve reduction targets set by each workplace.

The Group achieved each goal established for fiscal 2011, with targets being set by taking the average performance for the fiscal years from 2007 to 2009 and multiplying it by the reduction rate. Notably, the Group attained a significant reduction of electricity consumption at offices in response to energy-savings campaigns instituted after the Great East Japan Earthquake, as offices in areas serviced by Tokyo Electric Power and Tohoku-Electric Power raised their reduction goals.

Eco Office Activities


Targeted Area	Fiscal 2011 Goal		Fiscal 2011 Results (% Compared to Goal)			
	Cosmo Oil	Group companies	Cosmo Oil		Group companies	
Copy paper (thousand sheets)	12,955	19,030	12,772	-1.4%	18,621	-2.1%
Company car fuel consumption (kl)	277	808	205	-26.2%	728	-9.9%
Office electricity consumption (MWh)	1,012	2,216	764	-24.5%	1,884	-15.0%

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).

The Environment

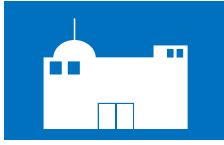
Environmental Impact of Business Activities

Crude Oil Extraction




▶ INPUT		◀ OUTPUT	
Energy		Emissions into atmosphere	
Fuel	18,856 TJ	CO ₂	1,051 kt
		SO _x	14,494 t
		NO _x	2,325 t

R&D Center



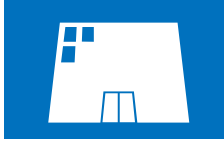
▶ INPUT		◀ OUTPUT	
Energy		Emissions into atmosphere	
Purchased power and fuel	99 TJ	CO ₂	5 kt

Crude Oil Transport



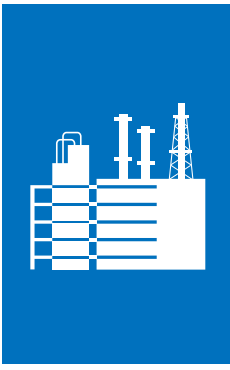
▶ INPUT		◀ OUTPUT	
Energy		Emissions into atmosphere	
Fuel	9,252 TJ	CO ₂	632 kt
		SO _x	13,772 t
		NO _x	17,060 t

Offices



▶ INPUT		◀ OUTPUT	
Energy		Emissions into atmosphere	
Purchased power and fuel	24 TJ	CO ₂	1 kt

Manufacturing



▶ INPUT		Water		◀ OUTPUT	
Raw materials		Industrial water	40,505 kt	Emissions into atmosphere	
Crude oil	18,990 MI	Sea water	197,848 kt	CO ₂	3,865 kt
Others	1,374 MI	Total energy consumption (TJ)		Private-use fuel	3,372 kt
Energy		Fiscal 2009	69,136	Purchased power	157 kt
Purchased power	4,519 TJ (466,504 MWh)	Fiscal 2010	73,358	Hydrogen production process	335 kt
Private use fuel	52,577 TJ (1,356 MI of crude oil equivalent)	Fiscal 2011	57,096	SO _x	3,473 t
				NO _x	1,801 t

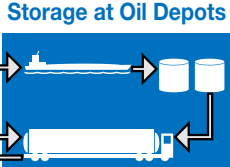
Industrial waste	
Generated	64,032 t
Recycled	20,501 t
Final disposal	262 t
PRTR Law designated chemical substances	
Released	132 t
Transferred	52 t
CO ₂ emissions (kt)	
Fiscal 2009	4,813
Fiscal 2010	5,093
Fiscal 2011	3,865

Wastewater	
Wastewater	206,521 kt (including 197,848 kt of sea water)
Chemical oxygen demand (COD)	96 t
Nitrogen	46 t
Phosphorus	1 t

Products

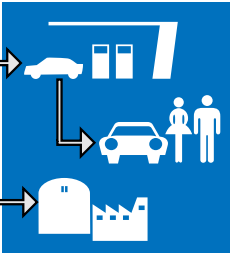
- Production: 19,739 MI
- Sulfur recovered: 185 kt (by-product)
- Electricity sold: 1,311,666 MWh
- Steam sold: 341 TJ
- CO₂ sold: 75 kt

Product Transport and Storage at Oil Depots



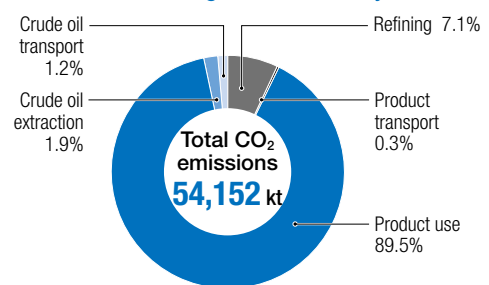
▶ INPUT		◀ OUTPUT	
Energy		Emissions into atmosphere	
Fuel	2,494 TJ	CO ₂	173 kt
		SO _x	1,244 t
		NO _x	2,408 t

Product Use



◀ OUTPUT	
Emissions into atmosphere	
CO ₂	48,431 kt
<small>(Excludes CO₂ emissions of 906 kt attributable to generated electricity sold and CO₂ emissions of 19 kt attributable to generated steam sold)</small>	
SO _x	133,039 t
CO ₂ emissions (kt)	
Fiscal 2009	65,695
Fiscal 2010	63,909
Fiscal 2011	48,431

CO₂ Emissions throughout the Oil Lifecycle



- 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.
- 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.
- See the Environmental Accounting web page on the Cosmo Oil Group website for the methodology and basis of "Product Use" calculations. Energy consumption is calculated in accordance with the stipulations regarding the rational use of energy in the Act on the Rational Use of Energy.
- Figures given for "Manufacturing" include data from the 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, NO_x, and CO₂ emissions in fiscal 2009 and 2010.
- "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.
- SO_x emissions for "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.
- With regard to CO₂ emissions for "Product Use," CO₂ emissions attributable to generated electricity and steam sold are estimated separately.
- 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."
- "Industrial waste" refers to waste generated during business activities, which includes waste that could be sold.
- Figures given for "Offices" include data from the Cosmo Oil Head Office and branch offices.
- Data for "R&D Centers" includes the R&D Center of Cosmo Oil and the R&D Laboratory of Cosmo Oil Lubricants.

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