

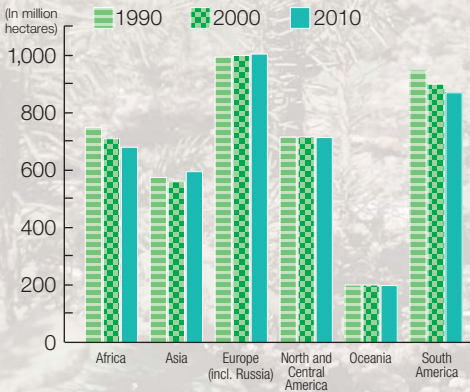
4 We take care of the global environment

Our planet is irreplaceable, and the Cosmo Oil Group recognizes protecting the environment as one of its most important responsibilities.

Statistical Glance at Society

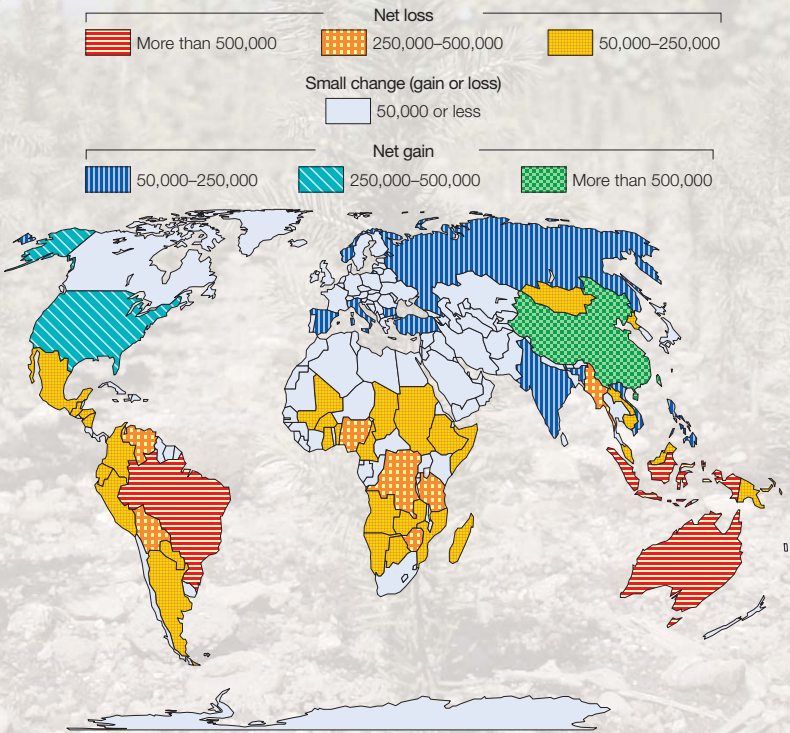
Although some parts of the world are more affected than others, the shrinking of forested areas is of global proportions. While the disappearance of forests is particularly serious in South America and Africa, large-scale forestation campaigns in China and India have increased forested land in Asia. In Oceania, drought has triggered the disappearance of forests. This decline of forest resources is said to impact the global environment in various ways such as contributing to global warming and the loss of biodiversity.

Trends in Forest Area, 1990–2010



Note: Quoted from the *Global Forest Resources Assessment 2010: Key Findings* issued by the UN Food and Agricultural Organization (FAO) in March 2010. (An official report is scheduled to be issued in October 2010.)
Source: *Global Forest Resources Assessment 2010: Key Findings* (UN FAO)

Net Change in Forest Area by Country, 2005–2010 (ha/year)



Note: Quoted from the *Global Forest Resources Assessment 2010: Key Findings* issued by the UN FAO in March 2010. (An official report is scheduled to be issued in October 2010.)
Source: *Global Forest Resources Assessment 2010: Key Findings* (UN FAO)

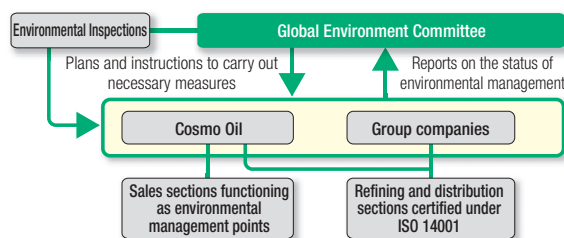
Taking Steps to Protect the Global Environment through Business Activities

In full recognition of the burden that oil places on the environment, the Cosmo Oil Group acts as a responsible corporate citizen by taking steps to conserve the global environment through the course of its business operations. Efforts begin with initiatives such as reducing greenhouse gas emissions in business operations, but also include the action of every single employee who contributes by using less copy paper and practicing energy-saving methods. The Group also develops environment-friendly products while entering into renewable energy businesses. The Cosmo Oil Group will actively continue these efforts as it works toward successful cohabitation with our planet.

Cross-Sectional Environmental Management System

Under a proprietary environmental management system, the Cosmo Oil Group encourages employees to take self-initiated environmental action. Also under this structure, the Global Environment Committee, a cross-sectional body, drafts the Consolidated Medium-Term Environmental Plan, reports on and evaluates plan results, and provides feedback to specified departments. The Cosmo Oil Group shares environmental initiatives throughout the Group, from the front lines to the management level.

Environmental Management System



Third Consolidated Medium-Term Environmental Plan

The Cosmo Oil Group launched its first initiatives under its Consolidated Medium-Term Environmental Plan in fiscal 2002. In fiscal 2008, the Group introduced its Third Consolidated Medium-Term Environmental Plan based on the following

policies: implement global warming countermeasures, minimize environmental impact, develop environmentally friendly businesses and technologies, and share and disseminate environmental information.

Third Consolidated Medium-Term Environmental Plan Fiscal 2009 Initiatives

Degree of achievement: ○ Achieved △ Partially achieved × No progress

	Themes	Major Goals	Fiscal 2009 Initiatives and Results	Achievement of Goal
Third Consolidated Medium-Term Environmental Plan	Implement global warming countermeasures	Improve unit energy consumption at the Group's four refineries, targeting a 15% reduction by 2010 compared to 1990	Achieved energy saving goals: 11.97% reduction in unit energy consumption due to fewer refinery operations as a result of a decrease in domestic demand	×
		Manage greenhouse gas emissions: Expand target workplaces for quantitative assessments (at each stage from oil exploration and production to distribution)	Completed quantitative assessment covering oil exploration and production to distribution (product transportation and storage) by adding Qatar Petroleum Development Co. Ltd. as a target workplace	○
		Promote energy and resource conservation to achieve goals for Team Minus 6% Activities at Offices	Achieved Group-wide goals for reducing amount of copy paper used at offices and amount of electricity consumed at offices; fell short of goal to reduce fuel consumption of Group company vehicles	△
	Minimize environmental impact	Reduce industrial waste, targeting a final disposal rate of less than 0.5% at Cosmo Oil and a total of less than 5.0% at target companies ¹	Achieved final disposal rate for industrial waste of 0.47% at Cosmo Oil and 4.98% in total at target companies Each target company also achieved its respective final disposal rate objective	○
		Adopt stringent measures to ensure soil preservation, reducing risks through preventative and post-response measures tailored to sites, including refineries, R&D Center, service stations, and idle land	Proceeded with plan introduced in previous year for measures at service stations and refineries (soil environment surveys, educational activities, and management improvement)	○
Develop environmentally friendly businesses and technologies	Progress with the commercialization of new environmental businesses	Made steady progress in developing businesses across sectors, including full-scale entry into wind power generation (by acquiring stock in Eco Power Co., Ltd.) and R&D in polysilicon manufacturing technologies for solar-powered batteries	○	
	Conduct R&D related to the oil industry and new industries: • Conduct R&D to improve performance in existing businesses • Seek out new businesses			
Share and disseminate environmental information	Carry out Team Minus 6% Activities for Individuals: 3,300 participants, reducing 2,800kg of CO ₂ per day	5,209 individuals took up the Team Minus 6% challenge to achieve a total CO ₂ reduction of 5,615 kg/day	○	
	Greater cooperation in Cosmo Oil Eco Card Fund: strengthen interactive communication with stakeholders	Continued to provide support for 12 projects as part of Cosmo Oil Eco Card Fund activities; Conducted eco-tour (September 2009)	○	

1. Target companies include Cosmo Oil Co., Ltd., Cosmo Engineering Co., Ltd., Cosmo Matsuyama Oil Co., Ltd., Cosmo Oil Lubricants Co., Ltd., Cosmo Petroleum Gas Co., Ltd., and Hokuto Kougyo Co., Ltd.

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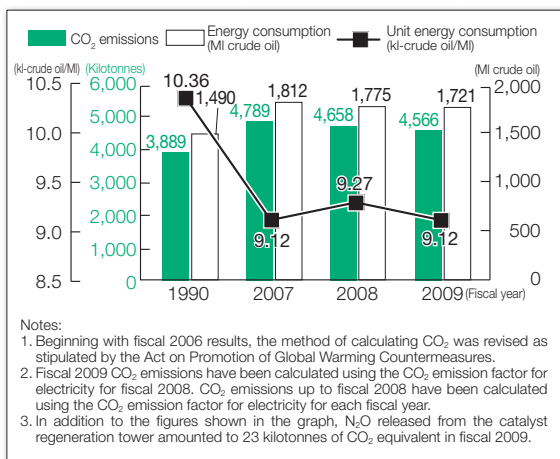
Reducing the Environmental Impact of Business Activities

Oil Refineries Conserve Energy

The Group's refineries conserve energy by implementing measures such as installing high-efficiency equipment and improving operating control. In fiscal 2009, Cosmo Oil took initiatives on production lines to raise efficiency of gas compressors and furnaces. In terms of operational initiatives, the Company reevaluated operating conditions and reduced steam consumption. Unit energy consumption¹ in fiscal 2009 was 9.12 kl-crude oil/Ml, an improvement over the previous fiscal year due to optimal operation in production lines. This level of consumption represented an 11.97% reduction over fiscal 1990.

1. Unit energy consumption is expressed as total energy consumption divided by crude oil equivalent throughput taking into account the complexity of refining techniques. The unit is kl-crude oil/Ml. Note that the total energy consumed is calculated by converting the use of heat, electricity and other types of energy used into a common denominator of kl crude oil equivalent.

Energy Consumption and CO₂ Emissions at Four Refineries



Environmentally Friendly Service Stations

To create environmentally friendly service stations, the Group is installing solar power systems and LED lights at Cosmo Oil service stations. A total of seven service stations in Kanagawa, Tokyo, and Osaka Prefectures have had electric vehicle rechargers installed, and the infrastructure needed for the widespread use of electric vehicles is being put in place. Initiatives designed to make Cosmo Oil service stations globally eco-friendly are being assessed and implemented.



LED-lit sign pole



High-speed recharger for electric vehicles

Saving Energy in Distribution Divisions

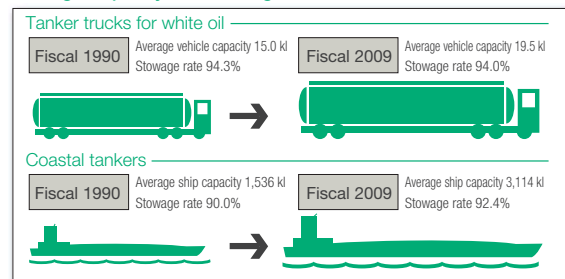
In fiscal 2009, unit energy consumption in transportation¹ at Cosmo Oil alone was 8.85 kl/million tonne-kilometers, a 0.10 kl/million tonne-kilometer improvement over the previous fiscal year. The Company engaged in the transport of 6,237 million tonne-kilometers of freight, or 94.5% of the volume transported in the previous fiscal year.

The Cosmo Oil Group continues to implement energy conservation initiatives in ground transportation by utilizing large tanker trucks and maintaining high stowage rates. The transportation volume per vehicle stood at 17.55 kiloliters per delivery, an improvement of 0.07 kiloliters per delivery, year on year. Energy use in diesel fuel fell significantly by 8.2% compared to the previous fiscal year, while unit energy consumption was 36.93 kl/million tonne-kilometers, an improvement of 0.88 kl/million tonne-kilometers over the previous year. To further conserve energy, the Group will focus on systematic delivery, independent unloading and other means of raising efficiency.

The Group also continues to focus on the use of large coastal tankers and maintaining high stowage rates for maritime transportation activities. Unit energy consumption in maritime transportation, however, remained nearly the same as the previous fiscal year at 6.19 kl/million tonne-kilometers. In fiscal 2010, Cosmo Oil will once again focus on the use of large coastal tankers and improving stowage rates.

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

Average Capacity and Stowage Rate



Promoting Effective 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. To attain these overall goals, each and every employee will engage in initiatives to achieve reduction targets set by each workplace.

Eco Office Activities¹

Targeted Area	FY2009 Goal		FY2009 Results (Compared to Goal)			
	Cosmo Oil	Group companies	Cosmo Oil	Group companies		
Copy paper (thousand sheets)	15,527	20,148	13,501	-13.1%	18,976	-5.8%
Company car fuel consumption (kl)	303	648	295	-2.8%	674	4.1%
Office electricity consumption (MWh)	1,495	2,774	1,381	-7.6%	2,654	-4.4%


1. The "Team Minus 6% Activities at Offices" campaign was renamed "Eco Office Activities" in fiscal 2010.

Environmental Impact of Business Activities

- SOx and NOx figures for "Crude Oil Extraction," "Crude Oil Transportation," and "Product Transportation 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 (JPEC).
- CO₂ emissions for "Refining" and "Product Transportation 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 Cosmo Oil Group website for the methodology and basis of "Product Use" calculations.
 - Detailed information: Environmental accounting http://www.cosmo-oil.co.jp/eng/csr/accounting/ev_calculation.html
 - Energy consumption is calculated in accordance with the stipulations regarding the rational use of energy in the Act on the Rational Use of Energy.
- "Refining" includes data from the Yokkaichi Kasumi Power Station and Cosmo Matsuyama Oil Co., Ltd.
- "Electricity sold" refers to power sold by Chiba Refinery, Yokkaichi Kasumi Power Station, and Cosmo Matsuyama Oil Co., Ltd. CO₂ emissions for "Refining" were calculated after deducting the portion of CO₂ emissions that results from generating electricity sold. Conversely, the purchased power portion of CO₂ emissions is included in "Refining" data.

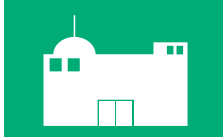
- "Steam sold" refers to steam sold by the Chiba Refinery and Cosmo Matsuyama Oil Co., Ltd. CO₂ emissions for "Refining" were calculated after deducting the portion of CO₂ emissions that results from generating steam sold.
- CO₂ emissions attributable to the construction of facilities are not included in calculations.
- SOx 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 SOx emissions are lower than the estimate.
- With regard to CO₂ for "Product Use," in addition to CO₂ emissions resulting from the use of products, CO₂ emissions attributable to generating electricity and steam sold are estimated separately.
- Naphtha used mainly as a petrochemical material does not directly emit CO₂ or SOx. However, naphtha is included with other petroleum products when calculating CO₂ and SOx 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.

Crude Oil Extraction




▶ INPUT		◀ OUTPUT	
Energy		Emissions into atmosphere	
Fuel	25,292 TJ	CO ₂	1,410 kilotonnes
		SOx	19,441 tonnes
		NOx	3,119 tonnes

R&D Center



▶ INPUT		◀ OUTPUT	
Energy		Emissions into atmosphere	
Fuel	111 TJ	CO ₂	7 kilotonnes

Crude Oil Transportation



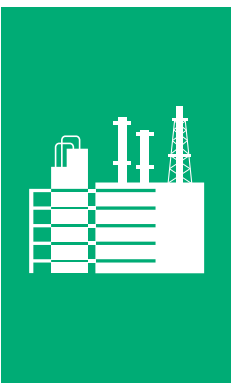
▶ INPUT		◀ OUTPUT	
Energy		Emissions into atmosphere	
Fuel	12,410 TJ	CO ₂	848 kilotonnes
		SOx	18,473 tonnes
		NOx	22,883 tonnes

Offices



▶ INPUT		◀ OUTPUT	
Energy		Emissions into atmosphere	
Fuel	23 TJ	CO ₂	1 kilotonnes

Refining

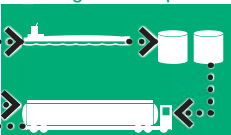


▶ INPUT		◀ OUTPUT	
Raw materials		Water	
Crude oil	26,231 MI	Industrial water	39,350 kilotonnes
Other	1,434 MI	Sea water	361,159 kilotonnes
Energy		Total energy consumption Unit: TJ	
Purchased power	3,116 TJ (321,904 MWh)	Fiscal 2007	73,244
Private-use fuel	66,020 TJ (1,703 MI-crude oil)	Fiscal 2008	71,499
		Fiscal 2009	69,136
		Emissions into atmosphere	
		CO ₂	4,813 kilotonnes
		Private-use fuel	4,330 kilotonnes
		Purchased power	125 kilotonnes
		Hydrogen production process	357 kilotonnes
		SOx	5,437 tonnes
		NOx	3,104 tonnes
		Wastewater	
		Wastewater	371,489 kilotonnes (including 361,159 kilotonnes of sea water)
		Chemical oxygen demand (COD)	110 tonnes
		Nitrogen	59 tonnes
		Phosphorus	2 tonnes
		Industrial waste	
		Generated	53,718 tonnes
		Recycled	21,591 tonnes
		Final disposal	250 tonnes
		PRTR Law designated chemical substances	
		Released	65 tonnes
		Transferred	106 tonnes
		CO₂ emissions Unit: kilotonnes	
		Fiscal 2007	5,063
		Fiscal 2008	4,912
		Fiscal 2009	4,813

Products

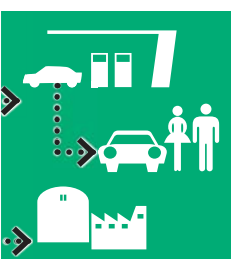
- Production: 26,568 MI
- Sulfur recovered: 239 MI (by-product)
- Electricity sold: 1,436,053 MWh (14,016 TJ)
- Steam sold: 1,730 TJ
- CO₂ sold: 125 kilotonnes

Product Transportation and Storage at Oil Depots



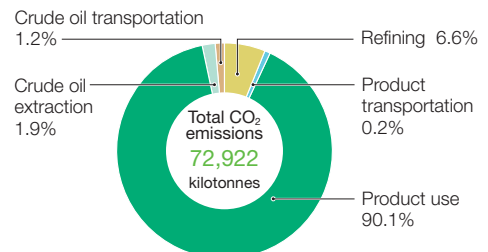
▶ INPUT		◀ OUTPUT	
Energy		Emissions into atmosphere	
Fuel	2,139 TJ	CO ₂	148 kilotonnes
		SOx	1,674 tonnes
		NOx	3,241 tonnes

Product Use



◀ OUTPUT	
Emissions into atmosphere	
CO ₂	65,695 kilotonnes
(The figure above does not include CO ₂ emissions of 962 kilotonnes attributable to generating electricity sold, and CO ₂ emissions of 86 kilotonnes attributable to generating steam sold.)	
SOx	121,252 tonnes
CO₂ emissions Unit: kilotonnes	
Fiscal 2007	73,878
Fiscal 2008	70,736
Fiscal 2009	65,695

CO₂ Emissions Throughout the Oil Lifecycle



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Reducing Environmental Impact of Business Activities

Expanding Bio-Gasoline Sales Area

In fiscal 2007, Japan's petroleum industry launched a distribution demonstration project to offer trial sales of bio-gasoline, a regular gasoline mixed with bio-ETBE, as a part of the biomass-derived fuel introduction project led by the Japanese Ministry of Economy, Trade and Industry. After the

trial sales, the Cosmo Oil Group started a full-scale sales campaign in February 2009 and has introduced the sale of bio-gasoline at 410 service stations as of April 2010.



Developing Hydrogen and Fuel Cells

The Cosmo Oil Yokohama-Daikoku Hydrogen Station launched demonstrations in fiscal 2002, and in fiscal 2008 began 70MPa (700 atmospheric pressure) replenishment experiments to increase hydrogen replenishment capacity. Cosmo Petroleum Gas Co., Ltd. launched sales of LPG fuel cells for household use under the Japanese government's subsidy program for consumer fuel cells introduced in fiscal 2009.



Yokohama-Daikoku Hydrogen Station

Field Testing GTL¹ Technology

Cosmo Oil partnered with five other private sector companies to establish the Nippon GTL Technology Research Association, which is currently working with Japan Oil, Gas and Metals National Corporation to field test GTL technology. Completed in Niigata City in April 2009, the GTL demonstration plant reached production of 500 barrels a day (approximately 80 kl/day) in early June 2009.

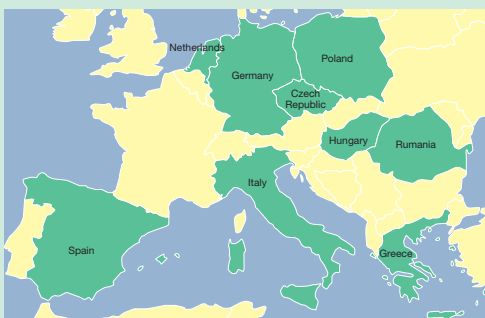
1. GTL technology: This technology is a refinery process that chemically converts natural gas into synthetic gas (mixed CO and H₂ gas). The mixed gas is then converted into liquid fuel using the Fischer-Tropsch process. GTL is an effective technology for providing alternative fuel sources to petroleum and for manufacturing clean fuel.



GTL demonstration plant

ALA Spreads Around the World

The Pentakeep and Penta Garden series of liquid fertilizers containing ALA, which was first globally marketed by the Cosmo Oil Group, are extremely popular both in Japan and in European markets where there has been an enthusiastic shift to high-value-added agriculture. As of May 2010, this series was being commercially marketed in nine European countries. In Japan, fiscal 2009 sales of ALA-containing liquid fertilizers increased by 164%, year on year, responding to demand in the fertilizer sector. Preparations are underway for future sales in the US and Chinese markets with their massive agricultural acreage and expected strong demand.



The Cosmo Oil Group is actively developing new, non-fertilizer uses for ALA. The Group is focusing on a number of different promising sectors, including the use of ALA in pharmaceuticals, cosmetics, health food products, animal feed and pet food. ALA products promise to be a pillar for new Cosmo Oil businesses in the future.

What is ALA?



ALA, or 5-aminolevulinic acid, is an amino acid present in all living organisms, and is believed to have originated with life itself 3.6 billion years ago. Previously, ALA could only be produced through chemical synthesis; however, the Cosmo Oil Group developed a fermentation process that utilizes a photosynthesis bacterium. This method is key to pioneering new technology to mass-produce large volumes of high-quality ALA safely and at a low cost.

User Voice

Consistency in Administering ALA is Key

Cucumber Farmer in the Netherlands

Once I started seriously using Pentakeep S, an agricultural consultant recommended that I use 0.5 liters per hectare each week and that I administer it early in the morning using specialized piping. After administering Pentakeep S three times at these regular intervals, total production output increased to 195 cucumbers per square meter.



The crops that resulted are fresh, healthy and robust throughout the year. Both the fruit and the leaves are a deep, dark green, and the plants are less affected by mold and other diseases. This is a great product all around.



Significant Difference in Growth Mid-Cycle

40-year-old male, living in Tokyo

The difference in plant growth between garland chrysanthemums that are grown in soil treated with Penta Garden PRO and those grown in untreated soil becomes more and more obvious once the plants have grown to 10 cm. The photo at right was taken two months after the vegetables were planted. Both batches of soil contained fertilizer, and I was shocked by just how stark a difference the Penta Garden PRO made.



With Penta Garden

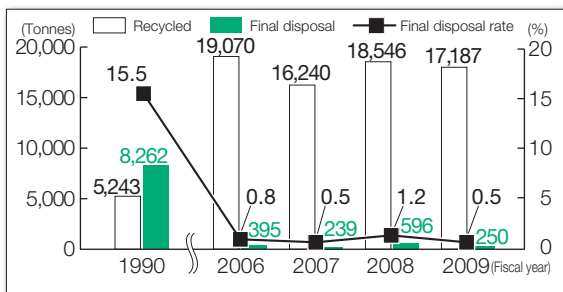
Without Penta Garden

Striving to Achieve Zero Industrial Waste

In fiscal 2009, the final disposal rate of waste from target companies¹ was 4.98%, achieving one of the Third Consolidated Medium-Term Environmental Plan goals. The amount of waste sent for final disposal at Cosmo Oil's four refineries (including Yokkaichi Kasumi Power Station) was 250 tonnes, a 97% reduction from fiscal 1990 and a 0.47% final disposal rate. This fiscal 2009 reduction surpassed the target—94% reduction over fiscal 1990 and a 1.0% or less final disposal rate—set in the Petroleum Association's voluntary action plan.

1. Target companies include Cosmo Oil Co., Ltd., Cosmo Engineering Co., Ltd., Cosmo Matsuyama Oil Co., Ltd., Cosmo Oil Lubricants Co., Ltd., Cosmo Petroleum Gas Co., Ltd., and Hokuto Kougyo Co., Ltd.

Volume of Industrial Waste at Four Refineries



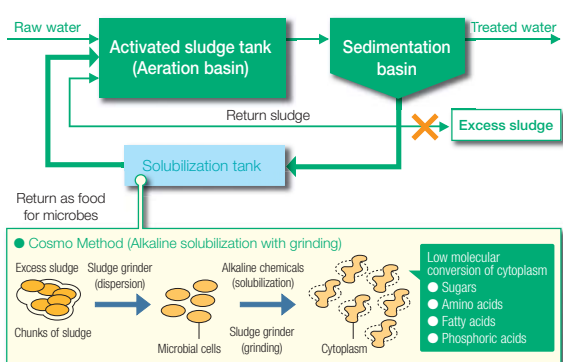
Reducing Excess Sludge

Excess sludge discharged from wastewater treatment facilities accounts for the largest portion of all industrial waste in Japan. Sludge also makes up approximately 50% of industrial waste generated at Cosmo Oil's refineries, which makes managing this sludge extremely important.

The Company has conducted research¹ into technologies for reducing excess sludge generated at refineries and has achieved large reductions in excess sludge at the Chiba Refinery and the Sakaide Refinery.

1. Research is being carried out as a project supported by the Japan Petroleum Energy Center (JPEC).

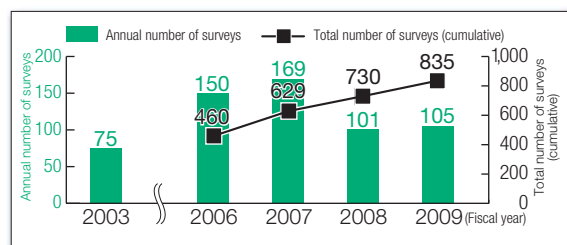
Methods for Reducing Sludge



Reducing Risk from Soil Contamination

To reduce the risk of environmental impact from soil contamination, particularly at service stations, the Cosmo Oil Group takes preventative measures and works to minimize environmental damage in the case of spills and leaks. The Company has been conducting soil environment surveys at its service stations, placing priority on stations with a higher risk profile such as older facilities and those with single-shell tanks. In fiscal 2009, the Company completed soil environment surveys at almost all Cosmo Oil service stations with single-shell tanks by conducting 105 surveys, while expending some ¥1.1 billion on soil preservation measures. The Company plans to conduct soil environment surveys at other service stations as they undergo renovations and to implement the measures that these surveys indicate are appropriate.

Number of Soil Surveys at Service Stations Owned by Cosmo Oil



Promoting VOC Countermeasures

Volatile organic compounds (VOC) are thought to be the cause of photochemical oxidants being released into the atmosphere. Cosmo Oil was already addressing this issue before the Japanese oil industry as a whole first introduced measures in fiscal 2000. As part of its effort to reduce VOCs even more, the Company installed VOC recovery equipment at the Sakaide Refinery in November 2009. Total VOC emissions in fiscal 2009 stood at 2,820 tonnes¹ (a 19% reduction from fiscal 2000). The Company is committed to further reducing emissions to achieve the targets set by the Petroleum Association's voluntary action plan.



VOC recovery equipment

1. The figure includes 1,043 tonnes of VOC emitted from the oil depot which Cosmo Oil had owned at the time of the benchmark year (2000) of the Petroleum Association of Japan's voluntary action plan and then transferred to Tozai Oil Terminal Co., Ltd.

Environmental Accounting

The Cosmo Oil Group introduced environmental accounting in fiscal 2000 to ensure the effective implementation of environmental preservation measures. In fiscal 2009, the Group continued to employ this type of accounting to determine environmental preservation costs and benefits, as well as the economic effects of these measures.

Detailed information: Environmental accounting

http://www.cosmo-oil.co.jp/eng/csr/accounting/ev_accounting.html

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