

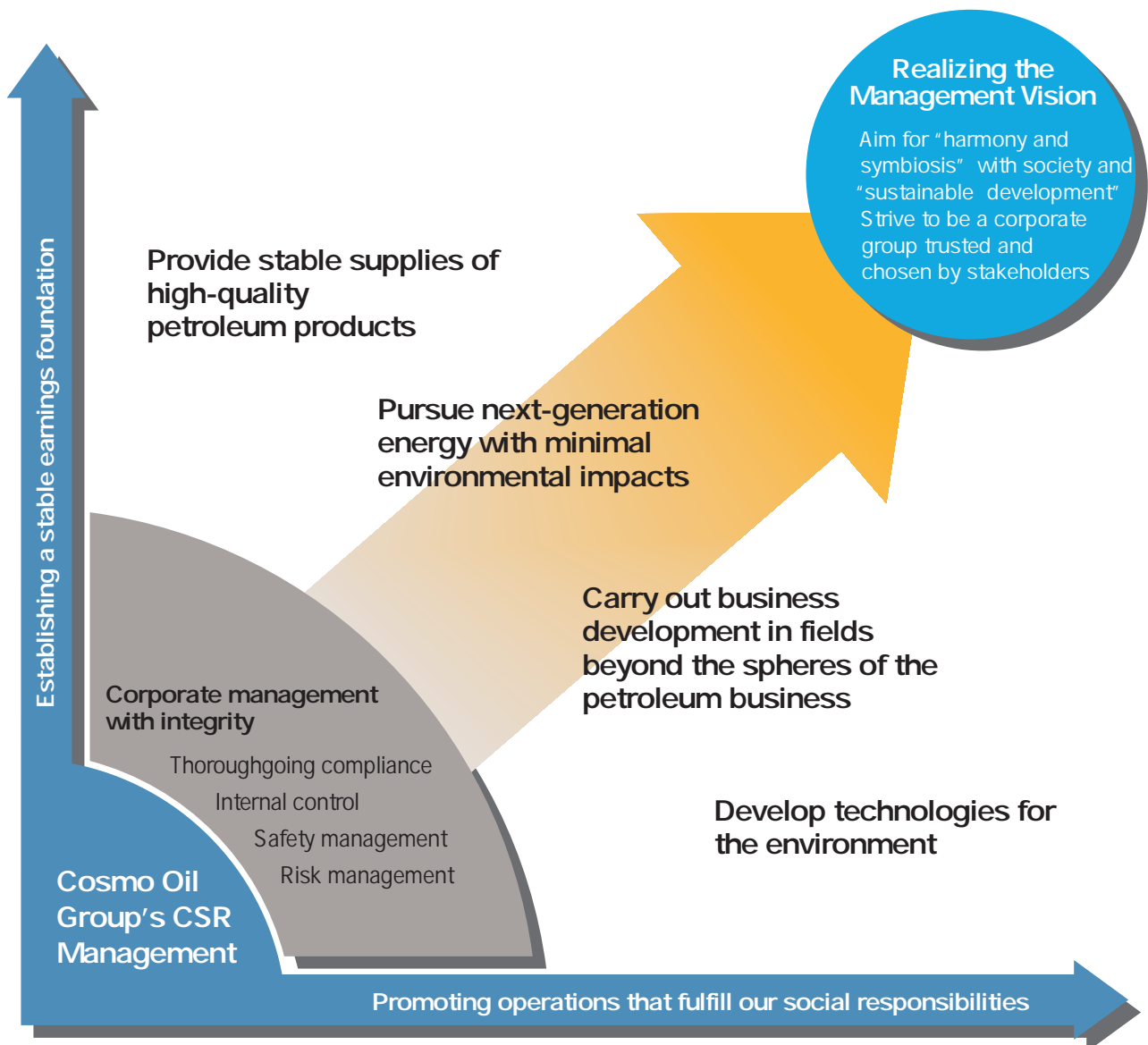
# Toward the Realization of a Sustainable Global Environment

<http://www.cosmo-oil.co.jp/eng/sustainable/07/gov/env01.html>

While efficiently providing stable supplies of petroleum as the foundation of our business, the Cosmo Oil Group is working to reduce environmental impacts and protect the environment on a global scale as it promotes initiatives to realize a sustainable global environment.

## Cosmo Oil Group's Vision

We believe that "establishing a stable earnings foundation" and "promoting operations that fulfill our social responsibilities" will serve as two key pillars of the Cosmo Oil Group's efforts to realize continued growth and development and a sustainable global environment in the years to come. The basis of our business operations is the execution of "corporate management with integrity," a prerequisite for the existence of any company, and we believe we have a major responsibility for creating environmentally conscious products, technologies, and next-generation energy that reduces impacts on the Earth's environment as well as to develop new energy-related businesses. Through such initiatives, we aim to become a corporate group trusted and chosen by stakeholders.



<http://www.cosmo-oil.co.jp/eng/sustainable/07/gov/env02.html>

By strengthening our amicable ties with oil-producing countries and upgrading our oil refineries to respond to changes in the demand structure, we are striving to provide stable supplies of petroleum products that have minimal environmental impacts.

## ▶ Stable Procurement of Crude Oil

The Cosmo Oil Group is working to secure stable supplies of high-quality crude oil by strengthening ties with oil-producing countries and by raising the proportion of equity oil produced. In March 2006, Qatar Petroleum Development Co., Ltd. began crude oil production in Area Block 1, in which we hold an interest, off the southeast coast of Qatar. Reflecting our commitment to environment-friendly operations, all associated gas from extracted oil is injected underground by sour gas injection, a pressurized injection method, rather than being flared into the environment.

In November 2006, Cosmo Oil acquired a 10% equity interest in Laffan Refinery Co. Ltd. from Qatar Petroleum, the national petroleum company of Qatar. Laffan Refinery is constructing a condensate refinery with a refining capacity of 146,000 barrels per day in Ras Laffan Industrial City, aiming for completion of construction in the second half of 2008. Through this equity participation, we will strengthen our amicable ties and partnership with Qatar established through our long-term and stable crude oil transactions and our involvement in exploration and production businesses in that country. In this manner, the entire Cosmo Oil Group is working in unison to ensure energy security for the future.

## ▶ Reducing the Environmental Impact of Gasoline

To reduce the environmental impact of gasoline, from 2000 Cosmo Oil has been promoting such measures as using low-benzene gasoline, reducing gasoline vapor pressure, and cutting the sulfur content of gasoline (supplying sulfur-free gasoline).

### Low-Benzene Gasoline

Recognizing that benzene is a toxic substance that can harm the human body, since January 2000 Cosmo Oil has reduced the benzene content of its gasoline from 5% to below 1%.

### Reducing Vapor Pressure

Determined to reduce evaporative emissions, a cause of photochemical smog, since 2001 we have reduced gasoline vapor pressure of gasoline produced in summer from less than 78 kPa to less than 72 kPa. From 2005, we have been producing gasoline with a vapor pressure of less than 65 kPa.

### Reducing Sulfur Content of Gasoline (Sulfur-Free Gasoline)

Reducing the sulfur content of gasoline provides the dual benefits of cutting air pollutants while maximizing performance of automobile exhaust purifying systems. The Cosmo Oil Group has been supplying sulfur-free gasoline (with a sulfur content of less than 10 ppm) since 2005.

## ▶ Reducing Sulfur in Diesel Fuel Oil

In response to changing restrictions on exhaust emissions, the oil industry has utilized leading-edge technologies to reduce the sulfur content in diesel fuel oil. Cosmo Oil began supplying diesel fuel oil with a sulfur content of 50 ppm in April 2003 and sulfur-free diesel fuel oil (with a sulfur content of less than 10 ppm) in January 2005. Combining the use of sulfur-free diesel fuel oil with environmentally friendly vehicles not only yields reductions in NO<sub>x</sub> (nitrogen oxides) and PM (particulate matter) emissions, but can also help improve fuel efficiency. Accordingly, reducing sulfur content in this manner is expected to be an effective means of cutting CO<sub>2</sub> emissions and contributing to the prevention of global warming.

### Diesel Oil Desulfurization Catalyst

Through participation in a development project by the New Energy and Industrial Technology Development Organization (NEDO) and Japan Petroleum Energy Center (JPEC), Cosmo Oil has independently developed a highly active desulfurization catalyst (c-606A). Beginning in 2004, Cosmo Oil has been successively introducing this catalyst in diesel fuel oil desulfurization units at all its refineries. This technology has garnered numerous awards, including the Fiscal 2006 Industry-University-Government Cooperation Meritorious Service Commendation, Minister of the Ministry of Economy, Trade and Industry Prize.

## ▶ Initiatives for Upgrading Refineries

Growing environmental consciousness, soaring crude oil prices, and the maturing of the Japanese economy have led to a downtrend in domestic demand for petroleum products, especially for heavy fuel oils. Therefore, a crucial task for the petroleum industry is to respond accurately to this changing demand structure to ensure stable supplies of petroleum products. With this in mind, Cosmo Oil is working to upgrade production at its Sakai Refinery through measures that include construction of a heavy oil cracking unit (coker) to be used for converting heavy fuel oil into high value-added products such as naphtha (a raw material for gasoline and petrochemical products), kerosene (jet fuel), and diesel fuel. Our plan for commencing operations of these facilities in 2010 is currently proceeding on schedule.

With the aim of supplying petroleum products to respond to growing demand in overseas markets, mainly in Asia, we are also increasing and strengthening export-related facilities at all our refineries. Concurrently, we are bolstering our structure for producing high-quality petroleum products with minimal environmental impacts that we supply



Sakai Refinery

to Australia and the U.S. West Coast—areas where stringent environmental regulations have been adopted. Looking to the future as well, we will actively upgrade our refineries to provide stable supplies of high-quality products globally.

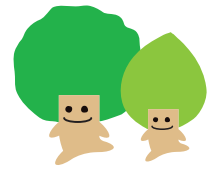
<http://www.cosmo-oil.co.jp/eng/sustainable/07/gov/env03.html>

We are working toward practical applications for a wide array of next-generation energy, which includes developing application technologies for biomass fuels, fuel cells, and GTL fuels.

## ▶ Bio-Gasoline (Bio-ETBE Blend) Distribution Trials

Japan's petroleum industry has commenced sales (distribution trials) of "bio-gasoline (bio-ETBE blend)," a regular gasoline formulated with bio-ETBE, as part of the Ministry of Economy, Trade and Industry's "FY2007 Introduction of Biomass-Derived Fuel Program." The trials began on April 27, 2007 at 50 service stations in the Tokyo area, six of which were Cosmo Oil service stations. Bio-gasoline (bio-ETBE blend) is used in exactly the same way as regular gasoline, but is a regular gasoline with an additive of bio-ETBE that is synthesized from bio-ethanol—grain alcohol derived from such plants as corn or sugarcane—and isobutene, a petroleum-based gas.

The sale of bio-gasoline is aimed at meeting greenhouse gas reduction targets to which Japan made a global commitment under the Kyoto Protocol (international treaty). The oil industry is working in cooperation to meet targets set by the Japanese government. In fiscal 2008, sales will be expanded to 100 service stations, and a full-scale introduction is scheduled for fiscal 2010.



バイオガソリン

## ▶ Wind Power Generation

In December 2004, our first wind power generation plant commenced operation in Sakata City, Yamagata Prefecture. The Cosmo Oil Sakata Wind Power Plant is expected to generate 3.8 million kWh of electric power annually. Wind power is attracting a great deal of attention as a clean energy source, and this plant reduces CO<sub>2</sub> emissions by 1,200 tons annually compared with electric power generated by thermal and other generating methods. Along with continuing to develop new candidate sites for wind power generation facilities, surveys and investigations are being conducted directed toward commercialization.

## ▶ Cogeneration

Cosmo Oil engages in the distributed power supply system business. This business involves both generating and supplying electricity with equipment installed at sites where energy is used, including hospitals, plants, and other locations. Cogeneration systems, which utilize exhaust heat produced during electric power generation to produce hot water or steam, enable increased energy usage efficiency and a reduction in CO<sub>2</sub> emissions. As of the end of June 2007, our distributed power supply system business had concluded contracts for approximately 30,000 kW, of which approximately 6,000 kW is from cogeneration equipment.

## ▶ Fuel Cells



Since fiscal 2005, we have participated in "business for large-scale field trials of stationary fuel cells" and commenced field trials of liquid petroleum gas (LPG) stationary fuel cell systems for general household use. Based on data gathered from these field trials, we are evaluating energy conservation and economy and efficiencies obtained when fuel cells were installed in households and

clarifying issues in the run-up to the widespread use of fuel cells. At the same time, these trials are being used for the commercialization of kerosene-based fuel cells and for the development of related technology.

## ▶ Gas to Liquids (GTL) Technology\*

Cosmo Oil partnered with five other private-sector companies to establish the Nippon GTL Technology Research Association. This entity, in collaboration with Japan Oil, Gas and Metals National Corporation (JOGMEC), commenced verification research on GTL technology. The liquid fuel manufactured through GTL technology is expected to be an environmentally friendly clean fuel. Through this research, we will develop the technology to compete with the major oil companies that have taken the lead in this field as we work toward achieving harmonization between ensuring future stable supplies of energy and preserving the global environment.

\*GTL technology is a refinery process that chemically converts natural gas into synthetic gas (mixed CO and H<sub>2</sub> gas). The mixed gas is then converted into liquid fuel using the Fischer-Tropsch process.

## ▶ Development of Fuel for HCCI Engines

Homogeneous Charge Compression Ignition, or HCCI, is a method of internal combustion in which a mixture of fuel and air is compressed for auto-ignition rather than ignition by a spark plug. This is an environmentally compatible technology capable of simultaneously realizing high efficiency and clean exhaust that is expected to have applications in automobile engines. Currently, in collaboration with automobile makers and universities, we aim to build upon research results attained to the present while progressing with research into next-generation fuels suitable for HCCI engines.

## ▶ Hydrogen Stations



In March 2003, we commenced operation of the JHFC Yokohama-Daikoku Hydrogen Station and are developing hydrogen production and replenishment technologies for fuel cell vehicles. Aiming for the commercialization and spread of hydrogen stations and fuel cell vehicles, we are considering the appropriate form of a hydrogen supply infrastructure and business models. Further, we are participating in the research and development of high-grade fuel in the future with JPEC and developing highly efficient, compact hydrogen production systems to be installed at service stations.

