

Global Warming Prevention Initiatives

As reported in Sustainability Report 2008, the former Kyowa Hakko Group set a fiscal 2010 target of an 8% reduction in CO₂ emissions from the fiscal 1990 level and engaged in CO₂ reduction activities at its business sites. As a result, in fiscal 2007 the Group achieved a 14.6% reduction from the fiscal 1990 level and surpassed the fiscal 2010 target. In fiscal 2008, the Kyowa Hakko Kirin Group actively continued wide-ranging environmental activities.

Activities Target

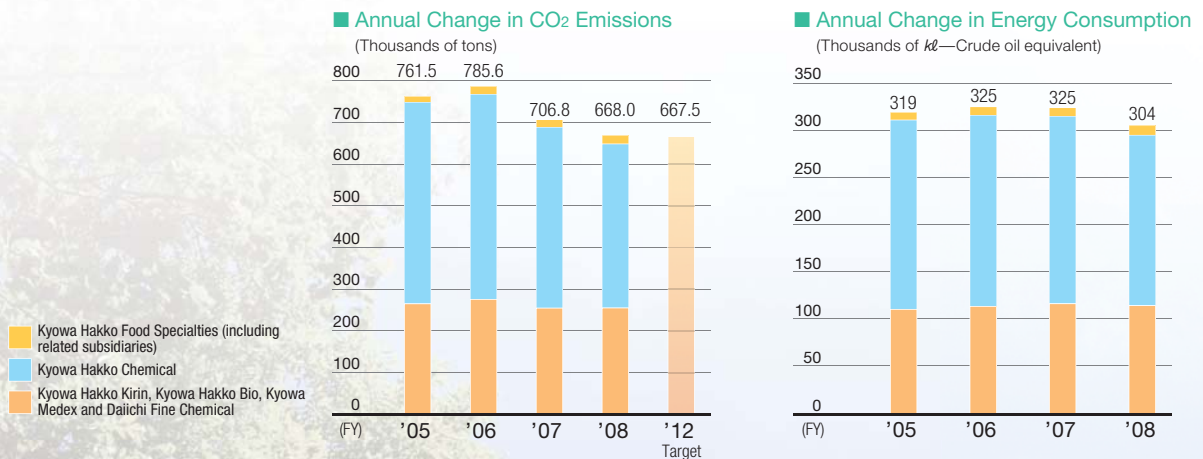
A 3% group-wide reduction in CO₂ emissions in fiscal 2012 (from the fiscal 2007 level)

New CO₂ Emissions Reduction Initiatives

Following the establishment of the Kyowa Hakko Kirin Group in October 2008, the Group set a new target for fiscal 2012 of a 3% reduction in CO₂ emissions from the fiscal 2007 level. The Group emitted 668,000 tons CO₂ in fiscal 2008, a reduction of 5.5% year on year. However, low plant operation rates in the chemicals industry as a result of the global economic recession had a significant impact on this performance, and unit energy consumption worsened from 183 liters of crude oil per ton of products in fiscal 2007 to 195 liters per ton in fiscal 2008. However, the Group is steadily implementing energy conservation activities centered on the Eco-project, including the equalization of plant steam consumption (Yamaguchi Pro-

duction Center Hofu), a plan to convert boiler fuel to gas (Kyowa Medex), the installation of a high-efficiency package boiler (Yamaguchi Production Center Ube) and the introduction of a utilities monitoring system (Sakai Plant). In December 2008 the Group commenced participation in Japan's trial emissions trading scheme as a chemical industry member and is determined to achieve the 2012 target without fail.

In response to Kirin Group's goal of becoming a low-carbon corporate group, we are considering policies and measures in preparation for the inclusion of greenhouse gas emissions control targets and methods to extend throughout the supply chain in the next medium-term plan (for fiscal 2010 to 2012).



The 2012 target covers Kyowa Hakko Kirin, Kyowa Hakko Bio, Kyowa Hakko Chemical, Kyowa Medex and their subsidiaries.

The Use of Renewable Energy

In October 2008, the Fuji Plant converted the light source for its advertising signboard from neon tubes to high-brightness light emitting diodes (LEDs). Since the power consumption of the LEDs is approximately one-third that of the neon tubes,

the advertising signboard was reborn as an eco-friendly, energy-efficient structure. Thanks to a photovoltaic power generation system (using solar panels) installed in 2008, nearly all of the electric power used for the signboard is clean solar energy.



Photovoltaic power generation system



The Fuji Plant's advertising signboard

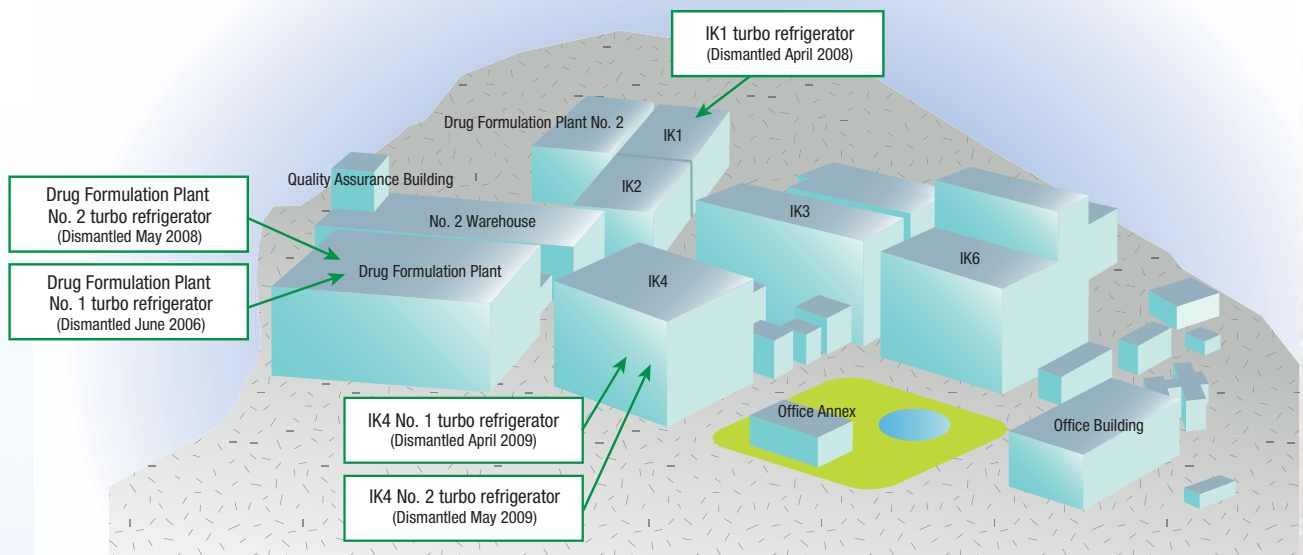
Energy Conservation and Ozone Depletion Prevention through Refrigerator Replacement

Owing to the special cooling and dehumidification requirements of drug formulation, the Fuji Plant previously used five refrigerators, with chlorofluorocarbon (R-11) as a refrigerant for air conditioning. The plant stored 1,420 kilograms of this chlorofluorocarbon, which has a high ozone depletion factor. Since June 2006, the plant has systematically proceeded with the dismantling and replacement of these refrigerators and chlorofluorocarbon destruction. It completed the removal of all chlorofluorocarbon (R-11) in June 2009. The plant selected chlorofluorocarbon substitutes* that do not destroy the ozone

layer for use in the new refrigerators and achieved an energy-saving effect of approximately 35 kiloliters of crude oil per year through adoption of highly energy-efficient facilities and operating methods.

Protection of the global environment is essential for the survival of all living things. The Fuji Plant will continue to contribute to the creation of a safe, livable global environment by striving to eliminate environmental impact factors.

★ 1R-134a and R-407c



Environment-friendly Products and Technologies

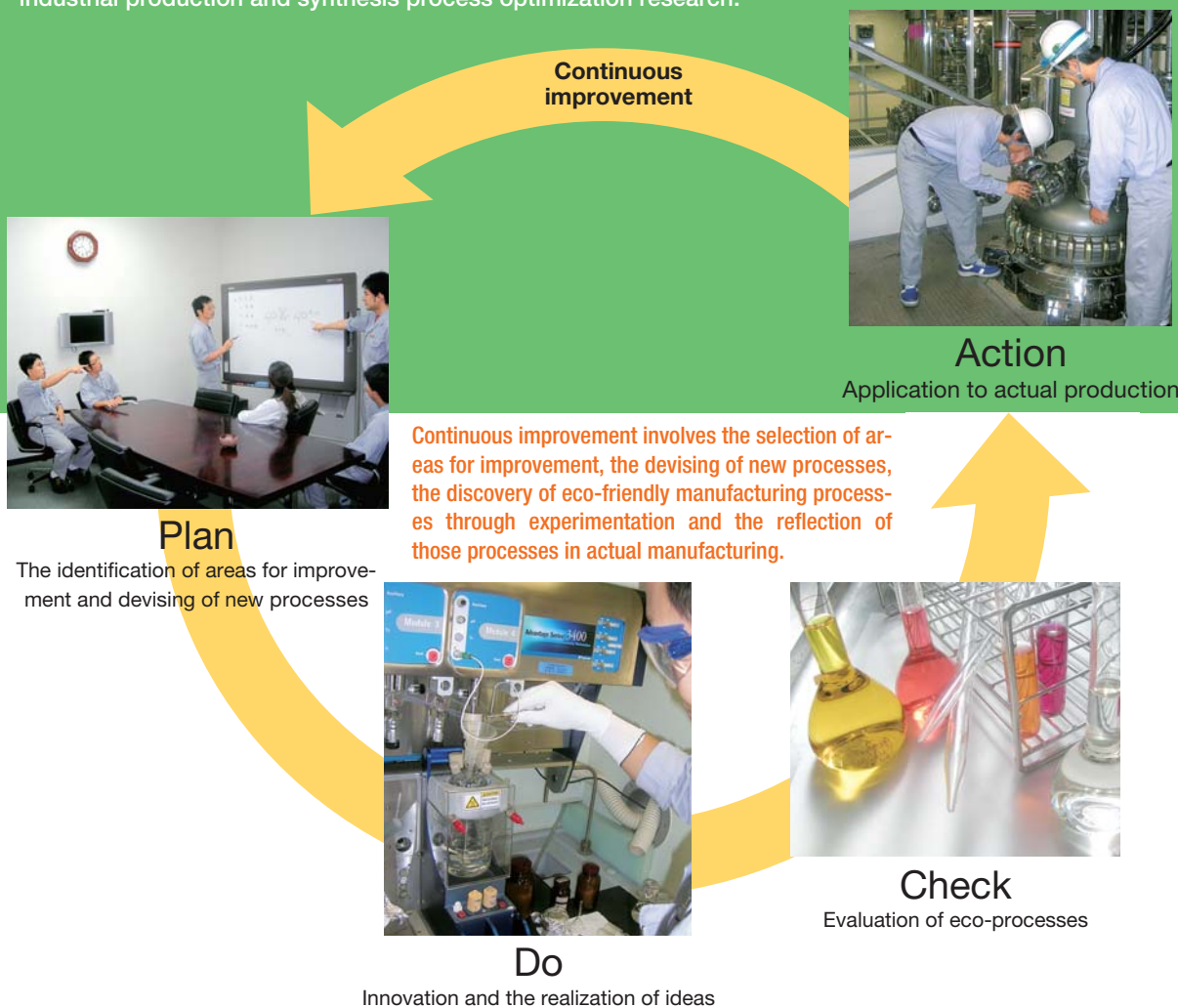
Chemical Process Research and Development Laboratories
Toward a Future Global Environment Supported by New Technologies

Ecology-minded synthesis process development

The active ingredients of pharmaceutical products (bulk pharmaceuticals) include antibody drugs and other bio-derived substances as well as organic compounds synthesized by combining a variety of chemical reactions. The Chemical Process Research and Development Laboratories develops effective methods for synthesizing new drug candidate compounds discovered in exploratory research and engages in wide-ranging research necessary for the manufacture of bulk pharmaceuticals, such as scale-up research for industrial production and synthesis process optimization research.

Environmental Performance

Environment-friendly Products and Technologies



Ordinarily, bulk pharmaceuticals are manufactured through complex, multi-stage synthesis processes. Each process requires large quantities of organic solvents in addition to the compounds that are the raw materials, and the chemical reactions generate many additional byproducts (waste). Also, large amounts of energy are required for heating, cooling and agitation operations during reactions. In the development of synthesis processes for pharmaceutical raw materials, the Chemical Process Research and Development Laboratories strive to ensure the quality of bulk pharmaceuticals and pro-

cess safety, and also devise measures for quantitatively assessing the environmental impact of processes and ensure the eco-friendliness of future bulk pharmaceutical manufacturing. An example of this effort is process reduction by reviewing synthesis methods, reducing use of organic solvents and using safe reactants.

We aspire to ensure the effective use of resources in future bulk pharmaceuticals manufacturing and reductions in energy use and CO₂ emissions through the development of synthesis processes having lower environmental impacts.

Kyowa Hakko Chemical**Refrigerator Lubricant Raw Materials for Non-ozone Layer Depleting CFC Substitutes (HFCs)****ISONONANOIC ACID (KYOWANOIC-N) and
2-ETHYL HEXANOIC ACID**

Specified chlorofluorocarbons (HCFCs, R-22) have been used as refrigerants in air conditioners for home and commercial use and in commercial refrigerators and freezers. However, international activities to prevent ozone layer depletion have been undertaken since the second half of the 1980s, and complete abolition of specified chlorofluorocarbons (HCFCs) in 2010 is planned in Japan and the U.S. For compressors in air conditioners, large freezers and other equipment that use non-ozone layer depleting CFC substitutes

(HFC R-407C, R-410A, etc.), lubricating oil (refrigerant oil) that is highly soluble with CFC substitutes is necessary. With the aim of contributing to preservation of the global environment, to meet this demand, during fiscal 2008, Kyowa Hakko Chemical increased production capacity for synthetic fatty acid refrigerant oil raw materials (Isononanoic Acid and 2-Ethyl Hexanoic Acid) to 60,000 tons per year, among the highest in the world.

 <http://www.kyowachemical.co.jp/eng>

Kyowa Hakko Bio**The Promotion of an Environment-friendly Livestock Industry****Feed Additive Amino Acids, Enzymes and Microbial Materials**

Nitrogen, phosphoric acid and other environmentally hazardous substances directly or indirectly discharged into rivers by the livestock industry are said to promote the eutrophication of lakes and enclosed bays and contribute to environmental damage such as red tide and water bloom.

Kyowa Hakko Bio decreases the nitrogen and phosphorous content of feed through the use of lysine, threonine and other feed additive amino acids and phytase, a phytic acid decomposing enzyme. We have developed environment-friendly feeds that can reduce the excretion of nitrogen and phosphorous by up to 40% in com-

parison with previous feeds and are promoting the use of these feeds by formula feed manufacturers and livestock-producing farmers. Furthermore, we have recently pursued the development of technologies to enable the efficient utilization of animal feed produced from recycled food waste, an initiative promoted by the Ministry of Agriculture, Forestry and Fisheries. We are also jointly developing CompoDash KYOWA, a microbial material that promotes composting, to assist in the processing of livestock excrement.

 <http://www.kyowahakko-bio.co.jp/english>