



## Minimizing Environmental Impact



### Painstakingly reducing environmental impact from business operations

Minimizing environmental impact generated directly from business fields, including plants and offices, is essential in order to contribute to a sustainable society.

In the 2005–2010 Ajinomoto Group Zero Emissions Plan, the Group has specified the environmental impacts that should be reduced, and set numerical targets to be achieved by 2010. The Group is currently moving steadily forward towards the achievement of these targets.

Based on these common targets, the Group is taking a multi-locale approach, using a variety of methods to thoroughly reduce impacts according to the location, scale, and business characteristics of the sites in each region.

#### Main items in the 2005–2010 Ajinomoto Group Zero Emissions Plan

##### Reduce emissions of greenhouse gases

- Convert to clean energy sources, introduce energy-saving technologies and equipment, and improve processes, etc.

##### Reduce possession of chlorofluorocarbons (CFCs)

- Convert to non-CFC equipment and switch to natural refrigerants, etc.

##### Reduce impact of discharged water

- Adopt water saving processes and introduce biological denitrification equipment, etc.

##### Reduce waste

- Improve production efficiency, promote resource recovery, reduce product returns, and improve sales forecast precision, etc.

→ See page 27 for the numerical targets for each item and the status of achievement.

## Zero Emissions Efforts in Various Settings

### ● At production sites (plants)

The Ajinomoto Group is determined to reduce emissions of CO<sub>2</sub>, CFCs, and other greenhouse gases—which are the cause of global warming. Equally, the Group will work toward reducing wastewater, waste, and other sources of impact on the environment. To that end, the Group is introducing large-scale facilities and new technologies that reduce environmental impact and switching to clean energy sources. It is also working on energy and resource conservation and the recycling of waste at production sites.

### ● In offices

In offices, the Group has implemented a “Cool Biz” (no ties, open collars) dress code, and made sure that employees turn off computers, turn the lights off at lunchtime, and take other energy-saving measures. In addition, it is working to reduce the use of paper, which accounts for some 70% of the waste generated by offices, reduce leftovers from its cafeterias, and recycle leftovers. The Group also holds environmental education events to increase employees’ awareness.





## Reducing Emissions of Greenhouse Gases through a Range of Initiatives

The environmental impact of CO<sub>2</sub> emissions is an especially pressing issue. Accordingly, the Ajinomoto Group is taking a multi-faceted approach to this challenge in and outside Japan. Initiatives range from the introduction of large-scale, energy-saving, clean-energy equipment to the accumulated effects of small energy-conservation ideas. In particular, efforts at sites related to production of amino acids by the fermentation process, which causes emissions amounting to nearly 80% of the Group's environmental load, are very important, especially those at plants outside Japan, whose production is expanding especially rapidly.

### Kamphaeng Phet Factory of Ajinomoto Co., (Thailand) Ltd., halving CO<sub>2</sub> emissions through adoption of a biomass boiler

Located in an agricultural region of Thailand with a rich natural environment, the Kamphaeng Phet Factory of Ajinomoto Co., (Thailand) Ltd., is aiming to be a "green factory" and has already achieved the Group's zero emissions goals. Nevertheless, it is moving forward with the adoption and construction of new equipment: a biomass boiler that uses rice husks—a carbon-neutral\* fuel—instead of crude oil, in an effort to make even greater reductions in the emission of CO<sub>2</sub>. The adoption of this rice husk boiler, which is scheduled to begin operation in December 2008, is expected to cut the factory's CO<sub>2</sub> emissions by about half.

Thailand is the world's sixth largest producer of rice, and this factory is located where it is easy to procure rice husks. The biomass boiler will make effective use of rice husks,

which until now had been an unused agriculturally-derived resource. The Kamphaeng Phet Factory, which also makes exhaustive efforts to make use of fermentation by-products in the local agricultural industry, diffuses relevant knowledge and technologies and fulfills a function as a regional center for resource recycling.



Rice husks

**\*Carbon-neutral:** The concept that plants do not cause an overall increase in the CO<sub>2</sub> in the atmosphere, because even though CO<sub>2</sub> is returned to the atmosphere when burned, the plants absorb CO<sub>2</sub> via photosynthesis while they are growing.

### Five main plants in Brazil move to reduce CO<sub>2</sub> by 20% through the adoption of energy-saving MVR process

Brazil emits nearly 10% of the Ajinomoto Group's total CO<sub>2</sub> emissions. The Group's five main plants in Brazil have been pushing the adoption of the highly energy-efficient mechanical vapor recompression (MVR) technique into the production of amino acids by the fermentation process. MVR is a process that achieves energy conservation by mechanically recompressing vapor from the liquid to be concentrated, and reusing it as a heat source during the concentration process. With the completion of new MVR equipment in the Limeira Plant in fiscal 2008, all five

of the main plants in Brazil have finished adopting the process. This effort is anticipated to result in a reduction of as much as 50,000 tons of CO<sub>2</sub> per year, or a decrease of about 20% compared to before adoption of MVR.



MVR in Valparaiso Plant

#### Fermentation plants in Japan

- **Kyushu Plant of Ajinomoto Co., Inc.**  
—Reduced CO<sub>2</sub> emissions per unit of production by 13% through the accumulated effects of energy conservation ideas

As an integral part of the production of amino acids by the fermentation process, the Kyushu Plant uses large quantities of steam and generates large amounts of wastewater. For this reason, it is not easy for it to achieve the Ajinomoto Group's zero emissions goals. Innovative processes and new technology must be adopted and equipment enhanced in order to drastically reduce these burdens. At the same time, however, it is important to accumulate the effects of small energy conservation measures. Employees on the production floor at the Kyushu Plant are taking the initiative and revising processes with a view toward saving energy, and are otherwise energetically developing grassroots activities in an effort to make rapid progress where they can.

This push by employees resulted in more than 300 energy conservation improvement proposals and, in fiscal 2007, led to the achievement of a 13% reduction in CO<sub>2</sub> emissions per unit of production through efforts to conserve steam. In fiscal 2008, these efforts have been expanded to include overall energy usage and wastewater.

#### Food plants

- **Frec Kanto Co., Ltd.**  
—Reduced annual CO<sub>2</sub> emissions by about 600 tons by switching energy sources to LNG

Frec Kanto Co., Ltd., a Group company of Ajinomoto Frozen Foods Co., Inc., switched the crude oil fuel for its boiler and the liquefied petroleum gas (LPG) fuel for its hamburger fryer to liquefied natural gas (LNG). Switching to LNG makes it possible to reduce CO<sub>2</sub> emissions by about 33% compared to crude oil and by about 21% compared to LPG. Frec Kanto expects to reduce its annual CO<sub>2</sub> emissions by approximately 600 tons.

See <http://www.ffa.ajinomoto.com/> (in Japanese only)

# Zero Emissions Activities at the Mojokerto Factory

## —Insistence on thorough resource recovery

The Mojokerto Factory is Ajinomoto Group's main plant in Indonesia for production of the umami seasoning *AJI-NO-MOTO*<sup>®</sup>, the flavor seasoning *MASAKO*<sup>®</sup>, and other products. This factory started serious efforts to minimize its environmental impact in 2002, the year the Ajinomoto Group formulated a global zero emissions plan. As of the end of fiscal 2007, the Mojokerto Factory had already cleared the fiscal 2010 numerical targets for the reduction of CO<sub>2</sub> emissions and the reduction of waste and discharged water.

Of particular note, the factory insists on thorough resource recovery. Its employees have searched for all possible sites of utilization in the region and achieved a complete 100% resource recovery ratio, going beyond the goal of 99%.



### Mojokerto Factory

Zero emissions plan achievements by fiscal 2007

	FY10 goals	FY07 results
<b>Discharged water viochemical oxygen and nitrogen content</b>	BOD ≤ 10 ppm TN ≤ 5 ppm	BOD 6 ppm TN 3.1 ppm
<b>Volume of discharged water</b>	Reduced by 20% or greater per unit of production volume (compared to FY02)	Reduced by 67%
<b>Reduction of waste</b>	Achieve a resource recovery ratio of 99% or greater	100%
<b>CO<sub>2</sub> emissions</b>	Reduce emissions per unit of production volume by 20% (compared to FY02)	Reduced by 44%



### Reducing CO<sub>2</sub> emissions

#### Installation of a cogeneration system

Accounting for approximately 10% of the Ajinomoto Group's CO<sub>2</sub> emissions (2.36 million tons), the Mojokerto Factory's emissions are substantial. The factory installed a cogeneration system that dramatically improves energy efficiency. The system has been in operation since April 2007. A cogeneration system is a highly efficient system that generates extra electricity by driving a steam turbine with steam made in a waste heat recovery boiler by recovering waste heat from a gas turbine power generator. The steam generated in the system is also used as an energy source for production equipment in the factory. Adoption of this combined system brought total energy efficiency up to 90%, and reduced the generation of CO<sub>2</sub> by about 20%.



Gas turbine power generator (7,000 kW class)



Steam turbine power generator

### Reducing discharged water impact

#### Wastewater treatment efforts

The Mojokerto Factory uses two different production processes: one for fermentation to produce amino acids and one for the production of food products such as flavor seasonings. The wastewater discharged during the production of amino acids by the fermentation process is characterized by a high concentration of nitrogen. Accordingly, the factory uses biological denitrification (BDN), a sophisticated wastewater treatment method. Advanced operational control is needed to achieve stable operation of BDN.

The biggest factor that reduces wastewater treatment capacity in the process of food product production is the

amount of animal and vegetable fats and oils derived from the food product materials and found in the wastewater. A large amount of oils in wastewater is also evidence that raw materials are being wasted. At the Mojokerto Factory, the wastewater treatment department makes detailed analyses of wastewater discharged from the production process and keeps in close contact with the production department. In this way the factory made thorough efforts to reduce the amount of oils in discharged water and succeeded in achieving wastewater zero emissions.

Reducing waste to zero

Complete 100% resource recovery achieved

More than anything, the Mojokerto Factory makes painstaking efforts to recycle waste. Unsatisfied with the goal of 99%, the factory insisted on addressing the final 1% and eventually achieved a 100% resource recovery ratio. It had already achieved the goal of 99% in fiscal 2004 by analyzing various unused resources, ranging from the fats and excess sludge recovered from wastewater to the calcium salts (components derived from sugar cane and other raw materials) generated as a by-product of the production of amino acids by the fermentation process, and waste activated carbon. Employees thoroughly separated the remaining 1%, which consisted of such things as paper, plastic, and other general rubbish disposed of through in-house incineration and leftovers from the cafeteria. By contacting industries in the region and finding uses as valuable resources, the factory achieved a resource recovery ratio of 100%.

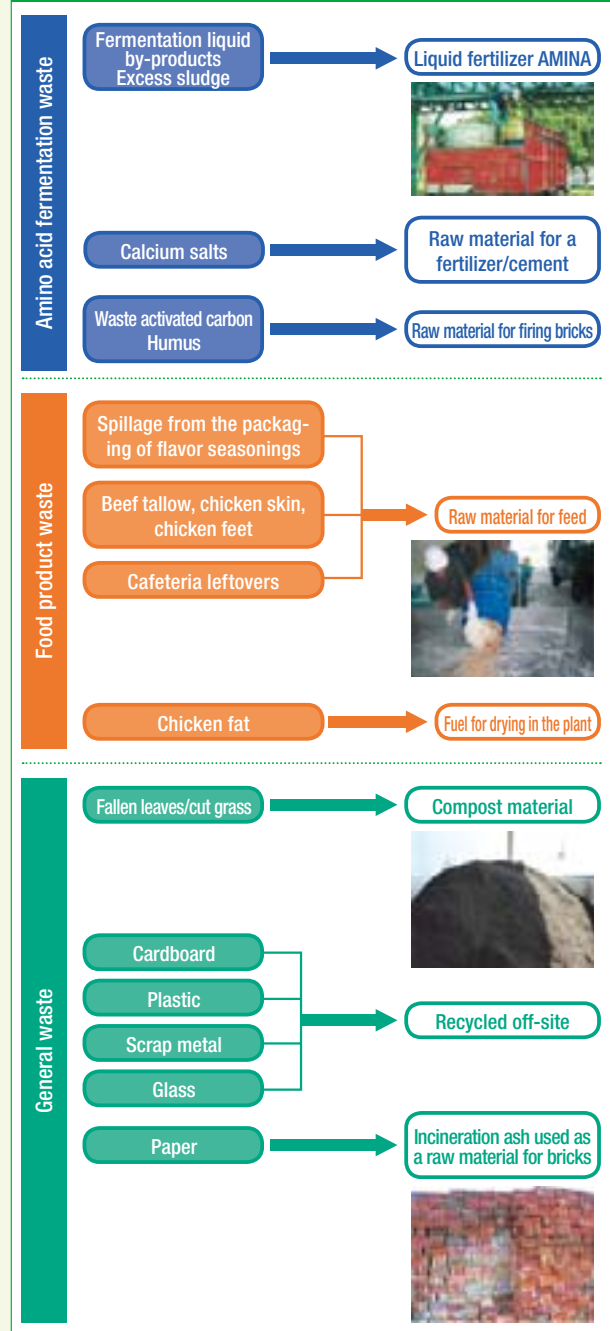
Community-based

This achievement is the result of the factory employees' voluntary, Indonesian-style, community-based efforts to locate sites of utilization for a wide range of by-products within the agricultural industry and local community. Going forward, the local staff is committed to taking the lead in zero emissions activities.



Local staff members in front of a wastewater treatment facility

Effective utilization of waste by the Mojokerto Factory



TOPICS

Ajinomoto Vietnam Co., Ltd. wins award

On June 5, 2008, Ajinomoto Vietnam Co., Ltd. won the Green Brand award in recognition of environmental efforts made at its Bien Hoa Plant. This award is given based on a review of the Vietnam Union of Science and Technology Associations.

Ajinomoto Vietnam's company philosophy is to contribute more to society by pursuing a balance between corporate activities and protection of the natural environment, which it achieves by continuously making eco-friendly improvements. At present, the company is working on executing the Ajinomoto Group Zero Emissions Plan based on ISO 14001.



Deputy President Nguyen Ngoc Hung of Ajinomoto Vietnam Co., Ltd.

