

# Eco-factories

We are promoting efforts to reduce the environmental impact of our factories through efficient use of resources, reduction of greenhouse gas emissions, reduction and improved management of chemical substances, reduction and recycling of industrial waste, and implementation of environmental risk management.

## Efficient Use of Energy

**Our energy strategy comprises activities to promote efficient use of energy.**

The NEC Electronics Group is currently working to reduce the amount of energy it consumes in Japan to 72% or less of the fiscal 1991 level in terms of real production units by fiscal 2011. Thus far, we have actively participated in efforts by the semiconductor industry to use energy efficiently by working to eliminate wasteful use of energy, and reexamining our manufacturing processes. We also work closely with production facility and incidental facility industries to promote energy conservation activities.

Also, in recent years we have been promoting energy-saving measures from the standpoint of improved productivity.

\*One real production unit equals the amount of CO<sub>2</sub> emissions divided by (output divided by the Bank of Japan's Domestic Corporate Goods Price Index figure for electrical machinery and equipment).

The amount of CO<sub>2</sub> emissions is the total of emissions from our business facilities and factories in Japan.

### Improving efficiency of existing manufacturing lines

The NEC Electronics Group has prepared a booklet of energy-saving measures that is used and applied by all group companies.

In fiscal 2007, we achieved implementation of 92% of the measures in our companies in Japan. The booklet is updated every year; the latest update in February 2007 added two new energy-saving measures. At present, we have completed implementation of 66 of the 83 tasks and are at work on the remaining 17 tasks. Also, we have experts from outside the company come in to conduct energy-conservation diagnoses and the results of these diagnoses are reflected separately.

#### Some of the energy-saving measures implemented by manufacturing lines

1. Introduction of high-efficiency turbo chillers and an optimal control system
2. Use of FFU (filter fan unit) air conditioning systems (a fan installed in each ceiling panel to enable fine-tuned control of air amount)
3. Use of localized clean chambers (cleaning only of areas where products are handled to conserve energy used for producing clean air)
4. Introduction of energy-saving through-flow boilers
5. Introduction of energy-saving exhaust-treatment method
6. Introduction of inverter pumps and fans
7. Energy supply control during idling

### Upgrade of chillers

The NEC Electronics Group plans to upgrade all factory chillers that contain specified CFCs. Besides using these ozone-depleting substances as refrigerants, conventional chillers are outdated and thus are unsatisfactory in terms of energy efficiency.

Upgrading is anticipated to result in 20% or more improvement in energy efficiency per unit. This will help prevent depletion of the ozone layer while also contributing to energy conservation. Upgrading in group companies in Japan is almost complete. Plans call for completion of upgrading in all group companies in and outside Japan by fiscal 2010.

### Energy-conservation diagnosis

To verify the appropriateness of our energy-saving activities thus far and uncover new energy-saving measures, group companies have been undergoing energy-conservation diagnoses by experts from outside the company since fiscal 2007. In fiscal 2007, NEC Kansai and NEC Yamaguchi underwent a diagnosis; both companies are now examining possible application of additional energy-saving measures. Also in fiscal 2007, NEC Fukui began examining whether to undergo an energy-conservation diagnosis.

In fiscal 2008, we will start developing the energy-saving measures that were suggested in fiscal 2007 in our production bases in Japan as we continue to promote energy-conservation diagnosis.

### Improving efficiency of newer manufacturing lines

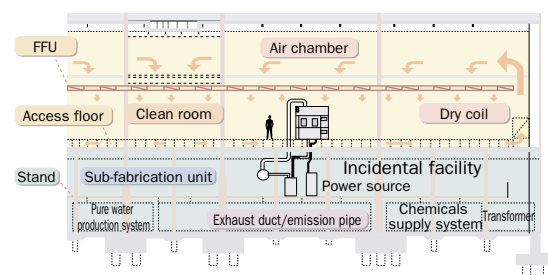
Recently, a mini-environment system was employed for a newly installed semiconductor manufacturing line. The system maintains a high level of cleanliness within a limited area of the clean room where products are handled, while lowering the cleanliness level of other areas of the clean room to increase energy efficiency. This system, combined with effective utilization of waste heat and outside air, helped cut energy consumption by 20% or more compared to a conventional system. The technology is also employed for the 8-inch line at NEC Kansai and the 300-mm wafer fabrication line at NEC Yamagata.

#### Some of the energy-saving measures implemented by new manufacturing lines

##### Introduction of high-efficiency systems and equipment

1. Large clean room and mini-environment system
2. Use of the latest energy-saving-type manufacturing equipment
3. Use of the latest model oilless vacuum pumps

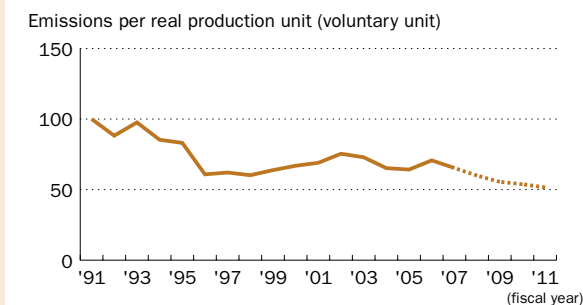
### Schematic diagram of a new manufacturing line



### Transitions in CO<sub>2</sub> emissions

In fiscal 2007, we implemented measures to save an equivalent of approximately 7,000 tons of energy. However, CO<sub>2</sub> emissions rose as a result of expansion of NEC Yamagata's 300-mm wafer line. An increase in production output caused emissions per real production unit to decrease by 6 points.

### Fluctuation in CO<sub>2</sub> emissions per real production unit



\*Until fiscal 2002, we used the CO<sub>2</sub> conversion factor specified by Japan's Ministry of the Environment. Since fiscal 2003, we have used a fixed value (0.4t-CO<sub>2</sub>/MWh) to evaluate activity results.

### Compliance with obligations of transporters established by the revised Law concerning the Rational Use of Energy

In fiscal 2007, NEC Electronics transported 17 million ton kilometers of goods and all group companies in Japan transported 5 million ton kilometers or less. The total amount transported by the entire group was 26 million ton kilometers. We were able to verify that no company in the NEC Electronics Group qualified as a specified transporter of over 30 million ton kilometers under the revised Law concerning the Rational Use of Energy.

Based on the obligations of transporters established by the law, the NEC Electronics Group promotes reduction of energy consumed for transport with the support of NEC Logistics, a distribution management company.

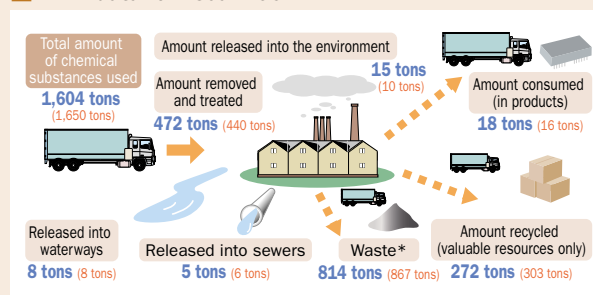
### Strategies to Regulate Chemical Substances in Production Processes

**We promote substitution and reduction of chemical substances based on usage conditions and PRTR input/output data.**

The chemical substance database built by NEC Electronics contains a wide range of information concerning green procurement as well as laws and regulations. We refer to this database when conducting assessments. This makes it possible to identify the total amount of chemical substances in use and manage chemical substances from the viewpoint of toxicity, which serves as the foundation for R&D activities intended to create green products and eco-factories. In 1998, NEC Electronics joined a pilot PRTR scheme, under which we provide information required by law (such as reporting the use of chemical substances in amounts of five tons or more per year until March 2003, and one ton or more per year from April 2003). We also perform more precise chemical input/output numerical control for risk management. In addition, we are strengthening management of volatile organic compounds (VOC), which we now manage in the same way as PRTR-targeted substances.

Besides reporting, we also analyze the data and relay feedback to enhance efforts to introduce substitutes for and minimize the use of hazardous chemical substances. The progress of these activities, our database, and other information is available on our company website (in English and Japanese) to facilitate global information sharing by our subsidiaries in Japan and overseas.

### PRTR data for fiscal 2007



\*Includes recycling paid for by NEC Electronics.  
Fiscal 2006 results are indicated in parentheses.

### Activities to reduce VOC emissions

Until now, we have treated organic gas emissions containing VOCs to detoxify emissions released into the atmosphere by our factories.

In the future, in addition to this measure, we will continue to actively work on reducing VOC emissions by optimizing gas usage conditions in the manufacturing process for development in our high-volume production facilities.