

## 6 Environment-related Research and Development

### Research on CO<sub>2</sub>\* sequestration and water purification by algae community

It is generally known that algae forms a community and functions to purify water, adjust CO<sub>2</sub>\* levels and foster the growth of marine animals. However, due to various reasons including global warming\*, rocky-shore denudation, which is a sudden decrease in algae communities, has become a grave issue. Kyushu is one of the areas where severe damage from this problem has been observed. Kyushu Electric Power is conducting research on sea grass cultivation technology as a possible solution to this problem. The technology utilizes a cultivation plate made of coal ash\* from coal-fired thermal power plants and aims for the rehabilitation of the natural environment through reparation and creation of an algae bed.



Cultivation plate (coal ash content over 60%)



Cultivation progress

### Research on CO<sub>2</sub> sequestration by trees

The CO<sub>2</sub>\* Absorption and Sequestration Method\* using the photosynthesis of plants (trees) is a protective measure against global warming\*. Research to date on melia azedarah\*, one of the tree species having an excellent CO<sub>2</sub>\* absorption ability in warm regions, involved the selection of superior family lines\*, the development of technology for mass propagation by tissue culture\*, and trial planting of seedlings obtained by tissue culture\* on the company land. Based on their growth, their CO<sub>2</sub>\* absorption ability was confirmed (average tree growth in height in three years was approximately 2 m/year/tree).

In fiscal 2003, Kyushu Electric Power started to build on these research results and establish technology for

environmental forestation at home and abroad that would bring about CO<sub>2</sub>\* sequestration contributing to the implementation of the Kyoto Mechanism\*. As part of such endeavors, Kyushu Electric Power worked on the development of forestation technologies, aiming to participate in overseas forestation projects, particularly forestation in Loess Plateau in Shanxi Province, China, located in a similar range of latitude to Japan.

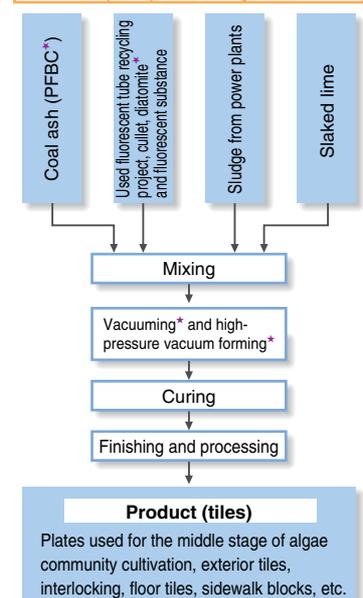


Loess Plateau where no forests are seen (Shanxi province, China)

### Research on eco-materials

With raised awareness towards environmental issues such as air pollution, ozone layer\* depletion, global warming and increasing waste over recent years, the Basic Law for Establishing a Recycling Based Society\* came into complete effect in January 2001. In this context, Kyushu Electric Power is proceeding with the construction of a production system based on complete recycling, by which waste from the production process is recycled and used as a material for another production. Kyushu Electric Power has developed technology for the production of environmentally friendly, composite building material (tiles) from recycled waste, and is conducting research towards its commercialization. The waste utilized includes coal ash\* from coal-fired thermal plants, sludge\* from wastewater treatment facilities and cullet\* from used fluorescent tubes.

#### Production of composite building material (tiles) from recycled waste



Composite building material (tiles) produced from recycled waste

### VOICE ⑦



Research Group Manager  
Agricultural Product Cultivation  
Group, Bioresources Research  
Center, Research Laboratory

Kenji Kamiwaki

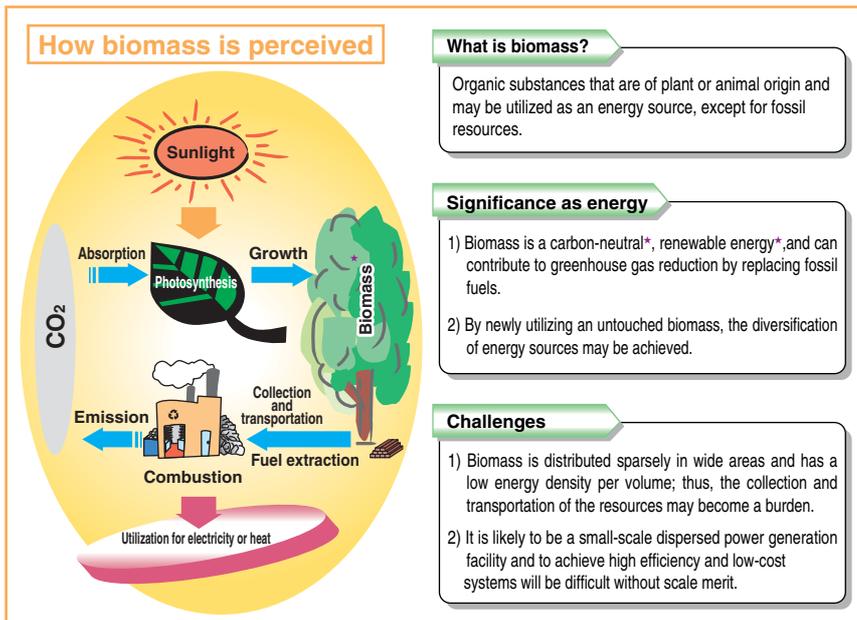
#### I'm dreaming of a green China!

We, the Bioresources Research Center, mainly focus on research related to living creatures and the environment. The main part of our research is to examine how creatures would react to unusual conditions when environmental elements such as the amount of water or sunlight are intentionally changed, and to try to make use of the outcome in growing crops or beneficial organisms\*. The research makes me realize there are close and inseparable relations between living creatures and the environment. We will continue to tackle global environmental conservation by applying our accumulated melia azedarah-related forestation technologies particularly, to the expected forestation in China and Indonesia.

### Research on biomass\* power generation

Biomass\* refers to “organic substances which are of plant or animal origin that may be utilized as an energy source, except for fossil fuels.” This ranges from agricultural resources and waste such as debris from thinning and rice husks, to food waste, construction waste, sludge from sewer systems and animal fertilizer.

Utilizing biomass\* as an energy source helps reduce CO<sub>2</sub> and makes the most of the waste. Kyushu Electric Power engages in research on how and in what areas the biomass\* utilization technology could be used effectively.

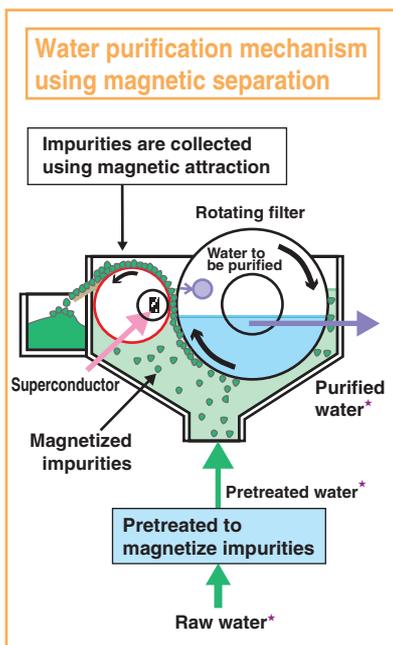


Source: Ministry of Economy, Trade and Industry

### Research on water purification with magnetic separation\* technology

When phytoplankton has overgrown in lakes, dams and reservoirs containing highly eutrophied\* water, and the water environment may be adversely affected by such a phenomenon. Under these circumstances, development of water purification technologies is greatly expected in order to purify such eutrophied water by quickly and effectively removing causative agents from the eutrophied water.

Aiming for the establishment of a water resource cycle, Kyushu Electric Power engages in research on magnetic separation technologies to get rid of substances from unpurified water by applying high magnetic property\* of superconductors\*.



Water purification equipment (prototype)



Water before and after purification process

### VOICE 8



Power Storage Engineering Group, Research Laboratory

#### Water purification technology promises the restoration of the beautiful nature in Kyushu island!

We have mainly worked on the development of the superconducting magnetic energy storage system (SMES)\* that will contribute to a reduction in power transmission costs. In recent years, owing to advancements or improvements in superconducting materials and the downsizing of cooling systems, more accessible application of superconducting magnetic technology is expected. As a matter of fact, the magnetic separator system introduced in this page, is still in the experimental phase. We, the Power Storage Engineering Group, will work hard to enhance and complete the related technologies through ongoing research activities, and hope that the magnetic separator system will be able to help protect the water environment in and outside Japan in the near future.

Takashi Nagafuchi