

# 4 Environment-Related Research and Development

## Research on the CO<sub>2</sub> fixation 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 such as global warming, rocky-shore denudation or 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 for this problem. The technology utilizes a cultivation plate that is 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> fixation by trees

Absorption and fixation of CO<sub>2</sub> through photosynthesis of plants (trees) is one measure against global warming. The research to date on *Melia azedarah*, one of the tree species with excellent CO<sub>2</sub> absorption ability, involved the selection of superior lines, development of technology for mass propagation by tissue culture, and trial planting of the saplings obtained through 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 2m/year/tree).

Kyushu Electric Power plans to build on these research results and establish technology for environmental forestation for home and abroad, which would bring about CO<sub>2</sub> fixation contributing to Kyoto Mechanism implementation. Examples of such endeavors are the participation in the greening of Loess Plateau in

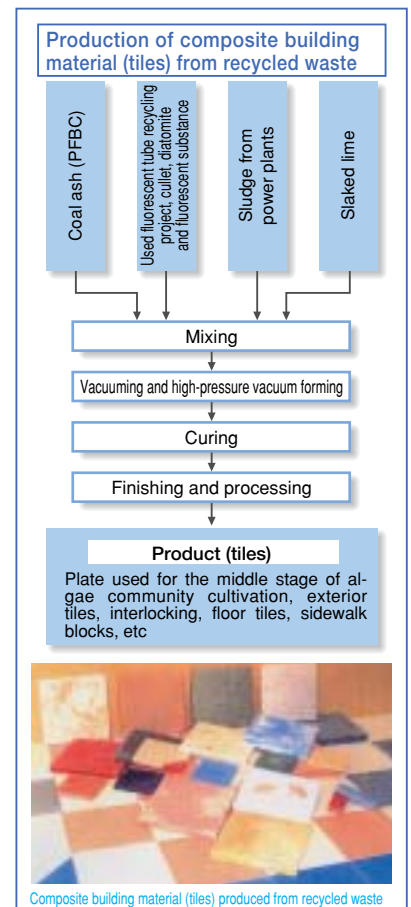
China, whose findings to date can be directly applied to Japan given its similar latitude, and a greening project in Indonesia which aims to rehabilitate and reforest an old coal mining site. Through these activities, Kyushu Electric Power hopes to develop overseas forestation technology and accumulate techniques and knowledge for forestation projects.



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

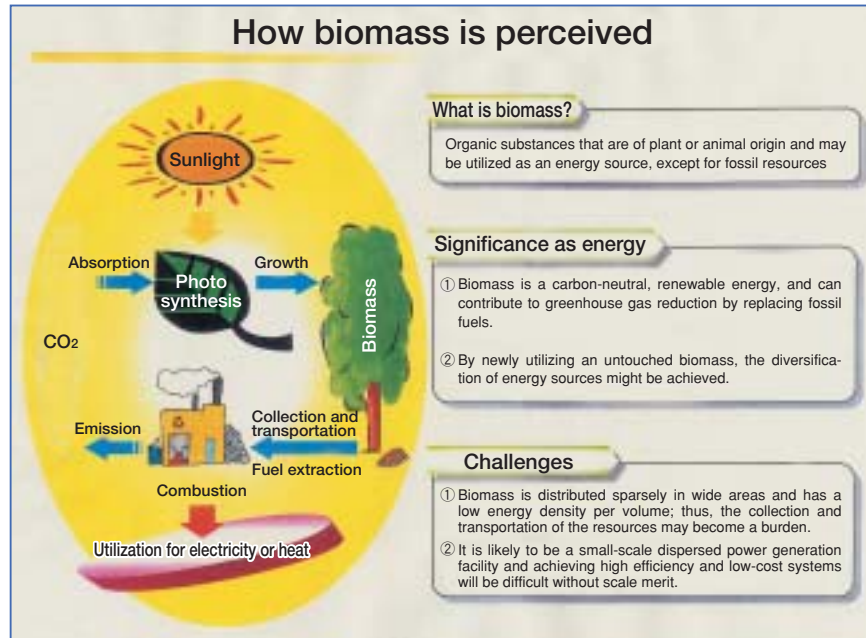
## Research on eco-materials

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, where 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 toward its commercialization. The waste utilized includes coal ash from coal-fired thermal plants, sludge from wastewater treatment facilities and cullet from used fluorescent tubes.



### Research on biomass power generation

Biomass refers to “organic substances that are of plant or animal origin and 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 the biomass as an energy source helps reduce CO<sub>2</sub> and make the most out of the waste. Kyushu Electric Power conducts research on effective applications of biomass utilization technologies such as direct firing, methane fermentation and gasification



Source: Ministry of Economy, Trade and Industry

### Research into organic compost using waste

Kyushu Electric Power has developed a system to produce organic compost from power plant waste such as tree or grass debris, marine animals, and other waste. Our efforts continue for the production of better compost, such as the utilization of coal ash from our coal-fired thermal plants to adjust the moisture content during waste fermentation. The effectiveness of our composting has been confirmed on trees including Benjamin and melia azedarah, grass and brassica campestris at the Bioresources Research Center. Kyushu Electric Power plans to examine the possibility of applying this compost method that we have developed to other power plants which produce different kinds of waste.



Organic compost produced (Matsuura Power Station)

