

**The IERE Costa Rica Forum**  
*24-25 November 2003, San Jose, Costa Rica*

<b>Paper Title</b>	Environmental Sustainability in Coal-fired Thermal Power Plants	
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**ABSTRACT**

It is generally considered that coal-fired thermal power plants have high environmental load. However, coal-fired thermal power plants of CEPCO have introduced the most spearheading technologies for exhaust gas treatment and waste water treatment systems, reducing environmental load to the world highest performance. Further, coal ash and waste water made in the power generation process are positively re-used as resources and wastes generated in power generation process are reduced to the world highest performance, by introducing CEPCO unique technologies. With these measures, CEPCO coal-fired thermal power plant has achieved the state of power plant highly favorable to the environment.

Hekinan No. 4 and 5 Thermal Power Units have the environment regulation values quite strict in viewing the world standards. For observing these strict environment regulation values, the exhaust gas treatment system of Hekinan No. 4 and 5 Units have reduced electrical resistance of ash particulates by lowering temperature of the gas treated by the dry-type electrostatic precipitator by setting the GGH heat recovery equipment before the dry-type electrostatic precipitator; thus, adopting the high ability exhaust gas treatment system achieving the stable high dust collection property in all coal types.

Waste water regulation values on water quality of Hekinan Thermal Power Plant No. 4 and 5 Units are also quite strict in viewing the world standard. For observing waste water regulation values, the waste water treatment system of Hekinan Thermal Power Plant No. 4 and 5 Units executes differential recovery for adopting the optimum treatment method for each matter to be treated in the waste water.

In Hekinan Thermal Power Plant, coal is stored in the outdoor coal storage; therefore, air contamination due to flying of coal particulates is carefully prevented. The unique technologies developed by CEPCO have been introduced.

As for the gypsum generated by the desulfurization equipment, density of the ash particulates at the absorber tower inlet to be impurity is quite low to 30 mg/m<sup>3</sup>N or under by adopting the high property exhaust gas treatment system, achieving purity of 95% or above. Water content is not more than 10 wt% by adopting the vacuum type belt feeder enabling high capacity treatment in continuous processing, attaining very high quality. Thus, this gypsum is more easily utilized than natural

gypsum.

Coal ash is divided into two types according to generated places – clinker ash collected at the boiler bottom and fly ash collected by the air pre-heater and electrostatic precipitators. About 90% is fly ash. For effectively using fly ash as reuse resource, physical and chemical qualities of fly ash must be controlled. In considering these conditions, for promoting effective use of fly ash, fly ash quality control system was developed in the No. 3 Unit of Hekinan Thermal Power Plant, and was introduced to the No. 4 and 5 Units of Hekinan Thermal Power Plant. This system has functions of online full-auto sampling, measuring, ash property analyzing and storage silo selecting according to quality, enabling production of fly ash controlled in quality. [1] Road base course material [Ashroban] and [2] culture soil for gardening [Hanameguri Baiyodo] have developed by CEPCO for promoting further effective use of coal ash.

Waste water treated by the waste water treatment equipment above stated is re-used to the uppermost without discharging to outside, realizing further reduction of load to environment

Technologies above introduced can contribute greatly to environment protection in developing countries.

**Key Words:** Thermal power plant, Coal-fired plant, Exhaust gas treatment system, Waste water treatment system, Coal particulate, By-product, Fly ash, Clinker, Waste water re-use, Coal storage, Gypsum, Ash quality control system, Effective use of coal ash, Environment protection