

## Pursuing the never-ending quest for new technologies for tomorrow's products and services

Kansai EP engages in a sustained program of R&D to achieve the innovative breakthroughs to drive its future growth and contribute to a better world.



Research into CO<sub>2</sub> separation and fixation at Technical Research Center



Redox-flow battery/New silicon carbide (SiC) diode

### Target Set on Mutual Benefits

Kansai EP's aggressive stance on research and development has two overriding objectives: to provide added convenience to our customers while contributing to environmental protection, and to forge a solid base for the Company's future operations. Here we introduce a sampling of some of our recent initiatives and achievements in R&D.

### Environmentally Friendly Hot-Water Systems

Kansai EP is presently developing heat-pump type water heaters for the home that use CO<sub>2</sub> as the refrigerant. As adoption of CO<sub>2</sub> in this role avoids depletion of the ozone layer, these innovative systems are extremely friendly to the environment. Their superb heating capacity and vastly improved efficiency over traditional water heaters also enable remarkable savings in energy in addition to extraordinarily low running costs. This outstanding combination — environmental friendliness, energy efficiency and economical operation — makes them ideal systems for the 21st century. We expect to bring them on the market before the end of fiscal 2002.

### Technologies to Protect our Earthly Habitat

In conjunction with our initiatives targeting protection of the global environment, we are carrying forward research into high-performance chemical absorbents of CO<sub>2</sub>. Our research program has already yielded tangible results that have obtained patents not only in Japan but also in the United States, Europe and Asia, and our technology has been adopted in a urea production plant in Malaysia. We are also engaged in research into technologies to regenerate tropical rain forests, in order to revitalize the natural environment and expand CO<sub>2</sub> absorption zones.

### New Energy Storage Technology

Kansai EP is also making rapid progress in the development of a new technology for storing energy, targeted at making a significant contribution to load leveling. The redox-flow battery is capable of storing electrical energy for subsequent retrieval as needed. It features a simple structure, light weight, small size and easy maintenance, and it is expected to be extremely effective as a power source for use in emergencies or for compensation against momentary voltage drops.

### High-Performance Micro Gas Turbines

Micro gas turbines hold excellent promise for achieving power-generating systems of increasingly small scale. Their structural simplicity and ease of maintenance enhance the likelihood that micro gas turbines will come to be adopted widely. Currently we are evaluating their cogeneration characteristics, durability, system interconnection properties, and impact on the environment, in order to assess their performance potential as independent power supplies.

### Next-Generation Semiconductor Elements

Kansai EP is conducting basic research into silicon carbide (SiC) diodes, next-generation power semiconductor elements that are expected to enable substantial reductions in power loss. Our research is aimed at applying SiC diodes to the power industry. Unlike conventional silicon elements that cause more power losses and are easily broken under high voltages, SiC diodes are revolutionary in their ability to curb power loss. They also offer outstanding advantages by enabling cooling devices of smaller size.