Engaging in a never-ending quest for new products and services of unchallenged appeal

Resin balls. Compact heat-storage material for home use.

At Kansai EP, R&D is targeted at sustaining a clear competitive edge and generating new demand to drive expanding operations for tomorrow.

Redox-flow battery.

Aiming toward Mutual Benefits

Kansai EP's vigorous initiatives in research and development have two overriding aims: to bring added convenience to users while contributing to environmental enhancement, and to build a solid base for our future operations. Here we introduce just a sampling of our recent efforts and achievements in R&D.

New Heating/Cooling System for the Home

Among Kansai EP's most recent developments targeted at meeting both consumer requirements and environmental needs is an innovative system that stores heat energy for use in home heating, air-conditioning and hot-water supply. By storing heat energy during nighttime hours, when power demands are less stringent and utility charges are lower, and using it during the daytime, the system enables the consumer to reap significant advantages in curbing utility costs. At the same time, the system is also engineered to help reduce CO_2 emissions.

Although similar systems have previously been available for commercial and industrial applications, Kansai EP's newly developed system is the first of its kind for use in the home. It comprises three units: a tank installed below the floor used for air-temperature control and water supply; a heat pump installed outdoors; and a pneumatic radiant cooling and heating unit installed above the ceiling.

New Battery Storage Technology

In a continuing quest to boost the nation's load factor, Kansai EP has been carrying forward research into new battery storage technologies targeted at making positive contributions to load leveling. The latest result is an innovative redox-flow type battery offering significant advantages in terms of structural simplicity, long service life, ease of installation design, quick starts with no waiting loss, easy maintenance, and outstanding operating safety.

Redox-flow batteries, being rechargeable, enable storage of electrical energy from the power system when convenient, for subsequent usage when necessary. To eliminate drawbacks inherent in versions available until now, Kansai EP developed a flexible rubber tank to store the electrolyte solution and devised a system in which the new tank can be installed in a water tank beneath a building structure, thereby broadening the scope of applications. We have already installed a prototype system at an office building site, and we are now monitoring load characteristics as well as feasibility in terms of construction and operation.

Micro Gas Turbines and PEFC

Micro gas turbines have already been brought onto the market by several makers, and their expanding adoption is anticipated in light of their significant advantages, including structural simplicity, light weight, compact size and easy maintenance. In recognition of this growth potential, Kansai EP is now conducting field tests on micro gas turbines to evaluate them from two perspectives: the merits which the user stands to reap and, from the standpoint of a power supplier, their usefulness in diversifying power sources.

We are also conducting tests on polymer electrolyte fuel cells (PEFC). Although improvements are still awaited in technological and cost aspects, PEFCs should one day assume an active role as power sources for electric vehicles and as stationary power supplies.

Micro gas turbine undergoing field test.

New Silicon Carbide Diode

Kansai EP, working in collaboration with Cree Incorporated, an American semiconductor manufacturer, has successfully developed the world's first 12kV diode featuring outstanding voltage resistance and extremely low power loss. These characteristics are achieved through use of silicon carbide (SiC), a material which is expected to play a major role as an element of next-generation power semiconductors.

In contrast with conventional silicon diodes, which are vulnerable to significant power loss during conducting and switching and whose crystals tend to break under the heat generated at high voltages, the use of SiC elements results in only one-fourth as much power loss while also allowing a reduction in bulb volume to approximately one-sixth the size. The superlative voltage withstanding characteristics of SiC elements also enable substantial cost savings since conventional air-cooling can be replaced by simple air-cooling, thereby permitting cooling units of smaller size.

Potential applications of the new SiC diodes include use in back-to-back (BTB) and other equipment linking power systems, and in static var generators (SVG) and similar system-stabilizing equipment. Such applications will make important contributions to the enhancement of supply reliability. Other anticipated applications include use as distributed power supplies in linkage inverters and related equipment.

New silicon carbide diode.