Hitachi's Electric Power and Energy Systems

Takashi Ikeguchi
CTO, Power Systems
General Manager, Power & Industrial Systems
R&D Laboratory, Power Systems
Hitachi, Ltd.

IN 1910, Hitachi, Ltd. manufactured 5-hp (3.7-kW) electric motors as the company's first product. Today our biggest generator is 1.4 GW, which is about 400,000 times more powerful than that of our first motor. Hitachi has also given the world more than 3,000 water, steam, and gas turbine units of 180 GW or greater. Revolving machines such as generators and steam, water, and gas turbines have been our principal products ever since.

Hitachi has been energetically conducting research and development of large-scale components thanks to the passion and efforts of our young researchers. Since large-scale calculations have become easier with advances in computer technology, we can use CFD (computational fluid dynamics) methods to design more reliable generators and turbines. Although a conventional flow analysis was used to be limited to steady flow of a simple geometric system, today we can analyze unsteady flow of the complex geometric system.

Since fossil fuels will continue to be used as energy sources for the foreseeable future, more efficient means of generating power are urgently needed to reduce CO_2 emissions and the effects of global warming. Hitachi uses the most advanced computer simulation technology to design more efficient and reliable components for energy systems. For example, Hitachi developed an experimental coal pulverizing apparatus with sophisticated instruments to support the development of simulations for complicated combustion phenomena. The accuracy of computer programs is improved dramatically by verifying the results from simulation with those from experiments.

These programs are applied to the combustion reaction of the turbulent flow in a boiler or the burner of a gas turbine to reduce the release of NO_x into the environment.

This issue of the Hitachi Review highlights some of the latest technologies and developments in the areas of electric power and other energy systems. These technologies represent only a small portion of what is being developed at Hitachi. We believe that these developments will support further advancements in power and energy systems. Hitachi will continue in its efforts to provide its customers with the best technologies and solutions.