

Special Reports

Advanced Technologies for Nuclear Power Plants

Contributing to Preservation of the Global Environment and Energy Security

IGARASHI Yasuharu

Realization of a Nuclear Renaissance with Westinghouse Electric Company

SHIGA Shigenori

Trends in Advanced Nuclear Power Technologies

MAEKAWA Osamu / SHIOIRI Akio

The construction of numerous nuclear power plants is being planned in various countries with the aim of mitigating global warming and securing stable energy supplies. With this as a background, Toshiba has been contributing to the establishment of the full range of technologies related to nuclear power—including the development of next-generation and future nuclear power plants, maintenance technologies for aging plants, nuclear fuel cycle technologies from front-end to back-end systems, and fast breeder reactor technologies—to meet the requirements of users throughout the world. In addition, we are engaged in the research and development of advanced energy technologies such as superconductivity, hydrogen production by nuclear plants, nuclear fusion reactors, and particle accelerators.

New Lineup of Light Water Reactors

OKAMURA Kiyoshi / OSHIMA Koichiro / KITSUKAWA Keisuke

Toshiba is promoting technical studies for upcoming nuclear power plants based on its large accumulation of experience in boiling water reactor(BWR) design, manufacturing, construction, and maintenance. Our goal is to achieve higher reliability, lower life-cycle costs, and better competitiveness for nuclear power plants compared with other energy sources. In addition, we are developing a new light water reactor (LWR) lineup featuring the safest and most economical LWRs in the world as next-generation reactors aimed at new construction and replacement in the Japanese and international markets expected to start from the 2020s.

We are committed not only to developing BWRs with the world's highest performance but also to participating in the pressurized water reactor(PWR) market, taking advantage of the synergistic effect of both Toshiba's and Westinghouse's experience.

Enhancing the Value of Nuclear Power Plants by Plant Reconstruction™

HATAZAWA Mamoru / YAMAMOTO Tetsuo / SUZUKI Shigeru

The number of nuclear power plants in Japan that have been operating for more than 30 years since their commissioning is increasing.

Toshiba has developed a high-quality maintenance technology called Plant Reconstruction™, for the preventive maintenance of aged nuclear power plant equipment. The use of this technology for maintenance makes it possible to improve the operating rate of a nuclear power plant and achieve as much as 60 years of stable operation. Plants to be reconstructed with this technology are considered in terms of various aspects including improvement of reliability and performance, compliance with new regulations, reduction of radioactivity, and improvement of maintainability,thereby contributing to enhancement of the value of the plant and realizing a high return on investment.

Latest Nuclear Fuel Cycle Technologies

IIKURA Takahiko / TOYOHARA Masumitsu / NAKAKUKI Isao

The Rokkasho Reprocessing Plant of Japan Nuclear Fuel Ltd., which is the first commercial reprocessing plant in Japan, is now undergoing final commissioning tests with real spent nuclear fuels.

Toshiba has designed and manufactured major components of this plant including the uranium-plutonium mixture microwave-heated denitration system, low-level concentrated waste processing system, and large-scale instrumentation and control systems. We are also promoting the research and development of advanced reprocessing technology to realize the next-generation nuclear fuel cycle for sustainable energy. In addition,as a total nuclear plant supplier, we have been developing and supplying many front-end and back-end systems such as conversion systems; fuel pellet and pin inspection systems; and radioactive waste volume reduction, solidification, and inspection systems.

Fast Reactor and Other Advanced Energy Technologies

KOBAYASHI Masahiko / OZAKI Akira / SATO Kiyokazu

Toshiba has been making continuous efforts in the development of fast reactors, from the Joyo and Monju projects to commercial plants. We are now actively participating in current development programs such as the Fast Reactor Cycle Technology Development (FaCT) project in Japan and the Global Nuclear Energy Partnership (GNEP) project in the United States. As a part of these promotional activities, we are constructing a new sodium test loop to contribute to the research and development efforts in these projects.

In addition, we are working on the commercialization of advanced energy technologies such as nuclear fusion, accelerator systems, applied superconducting systems, and hydrogen production facilities to contribute to the next generation of nuclear technology.

Westinghouse Technologies and Integration with Toshiba

NODA Tetsuya / TANAZAWA Takeshi / YOSHIDA Hiroyuki

With Westinghouse Electric Company (WEC) now a member of the Toshiba Group, Toshiba is capable of supplying both boiling water reactor (BWR) and pressurized water reactor (PWR) systems. WEC is well experienced worldwide in the nuclear business and by integrating the technologies of both Toshiba and WEC, Toshiba will be able to provide a greater range of services in the global market. We will build a cooperative structure not only for the maintenance service and fuel businesses but also for the development of innovative reactors while aiming for global expansion with the AP1000 PWR, the most advanced PWR in the nuclear power plant business.

We will continue making efforts so as to be able to provide all types of products and services as one-stop solutions regardless of the type of reactor.

Feature Articles

Self-Healing Technique Based on Shared Operation Knowledge for Autonomic Computing

ZENMYO Teruyoshi / YOSHIDA Hideki / KIMURA Tetsur

Self-healing functionality, from detecting system failures to troubleshooting, is a promising technique for reducing the management cost of information systems. However, the adoption cost is very high because a variety of operation knowledge related to failures is necessary.

Toshiba has been developing a technique that promotes the efficient construction of self-healing systems by reusing operation knowledge. The improvement of reusability makes accumulation and sharing of operation knowledge possible, facilitating the efficient construction of self-healing systems.

Model 912T W-CDMA Cellular Phone

FUCHIGAMI Takeshi / SHIBUYA Makoto

The demand for small and thin cellular phones has increased recently, even in high-end models. Toshiba released the model 911T slim slider type W-CDMA cellular phone in March 2007.

We have now developed the model 912T slim swivel type W-CDMA cellular phone. The model 912T can handle almost all mobile services of the 911T in a compact chassis of approximately 50 mm in width, 104 mm in height, and 17 mm in thickness, which was made possible by laying out all of the antennas in the lower unit. The stainless steel upper frame of the 912T creates a high-grade ambiance. The 912T also features enhanced image-processing technologies such as color correction of face images by thebeautiful skin□ camera function, as well as gamma-correction processing and outline-emphasis processing for one-segment TV images.

dynabook SS RX1 Thin and Light Mobile PC with Long Battery Life

SHIMAMOTO Hajime / TSUJI Hiroyuki

Toshiba has released the dynabook SS RX1 thin and light notebook PC with long battery life. In developing the RX1, we thoroughly researched the requirements of mobile users with a view to providing new mobile PCs embodying the design concept of "true mobility." To realize mobile PCs with the world's lightest and thinnest design and longest battery life, we developed higher density mounting and thinner body technologies. Moreover, we developed a 12.1-inch transreflective liquid crystal display (LCD) offering excellent visibility both indoors and outdoors, and a thin DVD super multi drive unit only 7 mm in thickness.

DME-Fueled Chemically Recuperated Gas Turbine System

TAKAHASHI Takeo / OHASHI Yukio / YAMANAKA Susumu

The utilization of exhaust heat from gas turbines offers opportunities to improve cycle thermal efficiency. The dimethyl ether (DME)-fueled chemically recuperated gas turbine system is based on reforming DME fuel with steam by means of an endothermic reaction. The exhaust gas from a gas turbine is used to effect this reaction.

Toshiba has carried out a demonstration test of the DME-fueled chemically recuperated gas turbine system. The results of the demonstration test show that this system is a very promising technique for the development of high-performance gas turbine system

New Reward Card System for Railway and Bus Users

UEHARA Futoshi

Toshiba has developed a new reward card system in which holders of the "PASMO" card receive points when they pay train or bus fares. Routing and riding frequency are taken into account using a sophisticated methodology when reward points are counted. Accrued points are already usable by cardholders for discounts at shops operated by affiliated companies of the railway companies involved, including department stores and other group member stores.

TOSNIC™-8200 Uninterruptible Power Supply System

SUEYOSHI Akira / MATSUOKA Kazumasa

The stable operation of network servers and communication equipment forming information and communication systems has become indispensable for the functioning of society in recent years. Any sudden stoppage of these systems will have an immeasurable effect on society. Uninterruptible power supply (UPS) systems have therefore come to play an important role in supporting this social infrastructure, and must provide not only high reliability but also space-saving and reduced life-cycle cost. In response to these social requirements Toshiba has developed the TOSNIC™-8200 UPS system featuring abundant system variations, compactness, and light weight for space-saving, high efficiency, and ease of maintenance to reduce the life-cycle cost.

Frontiers of Research & Development

Low-Power-Consumption LCD Technology for Long Battery Life of Mobile PCs