

Facility Solution Contributing to Creation of Low-Carbon Society

Toward Realizing Open Green Facility Systems Using Advanced ICT

ESAKI Hiroshi

Smart Facility Solutions Aiming for Zero-Emission Buildings

NISHIMURA Nobutaka / IINO Yutaka / ADACHI Toshiro

Energy consumption in the consumer sector, which includes business offices and residential buildings, is more than 30% of the total energy consumption in Japan, and it has been increasing year after year, as it has in other developed and developing countries as well. In response to the worldwide demand for the reduction of carbon dioxide (CO₂) emissions and the building of a sustainable society, there is a strong need for effective usage of energy.

With the aim of realizing smart facilities, Toshiba has been engaged in the research and development of highly effective equipment, technologies using renewable energy, and control and management systems for buildings.

Total Energy-Saving Solution for Wide Variety of Buildings

TAKAGI Yasuo / SUYAMA Akihiro / YAMAZAKI Kenichi

There is growing demand for energy-saving solutions for air-conditioning and electricity supply in a wide variety of facilities including buildings and factories. In response to the broad range of needs for energy conservation in recent years, various so-called optimal systems have been put on the market.

Toshiba has developed a total energy-saving solution that is based not only on accurate modeling of the basic characteristics of a building space, but also the sensitivities of the people engaged in activities there. This solution incorporates a simulator that faithfully simulates heat, electricity, and air and vapor phenomena, achieving a superior level of energy saving that has never been realized by more cursory methods. We have also developed a highly reliable maintenance system using thermodynamics, fluid dynamics, and statistical methods.

Quality Control Technology throughout Life Cycle of Power-Supply System

MIYABE Takashi / IINO Yutaka / TAGUCHI Yasuhiro

Continuous, high-quality service has been required by end users in recent years in the field of power-supply systems for various communication network systems, data centers, semiconductor processing equipment, and so on.

To fulfill each user's quality and cost requirements for the power-supply systems supporting their business, Toshiba has been engaged in the research and development of a flexible design methodology that makes it possible to design and propose an optimal system configuration, as well as maintenance and renewal plans, taking into consideration not only the reliability of the commercial power supply and aging degradation but also the reliability of the power-supply system itself, based on optimization of the trade-off between reliability and life-cycle cost.

Solution Applying Image Recognition Technology for Safe, Secure, and Energy-Saving Buildings

BABA Kenji / ENOHARA Takaaki / NAGATA Kazumi

In recent years, both high security and the reduction of total energy consumption have become essential for the operation of office buildings. There is consequently an increasing need for advanced sensing technology to get an accurate grasp of the current state of a building.

Toshiba has developed an image composition sensor using our image recognition technologies, which can be applied to a wide range of applications in buildings, from security to saving energy. This image composition sensor makes it possible to measure conditions of both office environments and human activities, which is very difficult for conventional sensors, and contributes to the construction of building management systems offering safe, secure, and energy-saving services.

Remotely Managed Energy-Efficient Services for Air-Conditioning Systems

IKEDA Koichi / HIRAOKA Yukio / KOBAYASHI Hisashi

Recently high-efficiency and energy-saving equipment has been introduced to realize energy conservation to prevent the increase of energy consumption in public spaces, such as offices and commercial buildings. However, these energy-saving approaches require initial costs that are too high for most building owners to introduce during the current recession.

Toshiba has developed a remotely managed service that can realize high energy efficiency for air-conditioning systems without the initial costs. The distinguishing feature of this service is the exchange of various air-conditioning information to enhance comfort and energy efficiency between each building automation system (BAS) in customers' buildings and our energy-efficiency system via the Internet.

Platform System Technologies Supporting Facility Solutions

MURAI Masahiko / MAEGAWA Tomonori / Ooba Yoshikazu

In order to properly design, operate, and maintain the infrastructures of buildings and factories, such as air-conditioning systems, power supply systems, and physical security systems, Toshiba has been providing a wide variety of solution menus, including total energy-saving solutions, high-quality power supply systems, and integrated security systems, through the following technological advancements: (1) model-based simulation technologies, (2) life-cycle management technologies, (3) remote service platforms based on communication control technologies for efficient collection of building information via a network.

Energy-Saving Technology for Renewal of Air-Conditioning Systems in Office Buildings

HANADA Yuuichi / MURAYAMA Dai

Energy saving has recently become an urgent issue for office buildings in order to prevent global warming and to respond to the growing imbalance between energy supply and demand. There is an increasing need for the replacement of the old equipment in the buildings that were concentrically constructed in the 1990s with energy-saving equipment.

With this as a background, Toshiba has developed a new air-conditioning system that provides both comfort and energy savings and used it to replace the equipment in the Toshiba building that needed renewal work. We used a renewal method that minimizes the disturbance for the tenants in the building.

Solution for Water Cycle and Resource Recycling

Toward Development and Adaptation of Total Solution Technologies for Global Water Issues

TAKIZAWA Satoshi

Trends in System Solutions for Global Water Cycle and Effective Use of Resources

SHINOHARA Tetsuya

Global-scale issues to be addressed include depletion of natural resources, food, water, and energy due to rapid global population growth. Water is consumed in the process of food production, although fresh water is not always available where it is required. Fresh water can be produced from sea water, but this requires energy. Energy is extracted from the burning of fossil fuels, which emits carbon dioxide (CO₂), and this causes global warming and will eventually have significant impacts on the global water cycle. A comprehensive approach aimed at a total optimization system is therefore required to solve the complex interactions of these social infrastructure-related issues.

With these trends as a background, Toshiba is making continuous efforts to provide integrated system solutions using its water treatment and resource recovery technologies as well as energy technologies.

System Technology Contributing to Expansion and Improved Operating Efficiency of Water and Sewerage Plants

HATTORI Dai / SUGINO Toshiharu / YOKOKAWA Katsuya

There is a growing trend toward the expansion of infrastructure in the field of water supply and sewage services due to the merging of municipalities and businesses in recent years. Major waterworks are required not only to adopt centralized control and monitoring systems for operating numerous water facilities but also to realize more effective and economical operations.

To meet these requirements, Toshiba has been providing an advanced supervisory control and data acquisition system for supplying safe drinking water to widespread areas. This system offers several advantages including water distribution network analysis, distribution control simulation, and water operation scheduling technology.

Rainwater Drainage System with Rainfall Radar and Local Torrential Downpour Prediction Technology

KOBAYASHI Yoshitaka / WADA Masakazu

Proper operation of rainwater drainage facilities has become increasingly difficult due to local torrential downpours that have frequently occurred in recent years.

Toshiba has been focusing on the development of rainwater drainage systems based on rainfall radars that can precisely monitor rainfall over a wide range. This system offers users not only more detailed rainfall information but also supporting information to optimize the operation of drainage facilities. Furthermore, we are developing an innovative rainwater drainage system using phased-array radar, which makes it possible to predict local torrential downpours by analyzing cumulonimbus clouds in three dimensions with high time resolution.

Environmentally Friendly Water and Wastewater Treatment Equipment

FUJISAWA Minoru / YAMAMOTO Katsuya / SOMA Takahiro

Countermeasures against environmental problems such as global warming have increasingly become an important issue. For environmental conservation, both the reduction of environmental burdens and the effective utilization of energy are strongly required in the water and wastewater treatment industry.

Toshiba has been providing various kinds of energy-saving equipment and effective operation and control systems for each water treatment process. We have commercialized the TOSALEAR_{TM} ultraviolet (UV) irradiation equipment with a low environmental load, and are developing a non-aeration wastewater treatment system that can achieve energy conservation and waste reduction.

Advanced Reuse Technologies for Biomass Resources

IMAI Tadashi / ABE Hironobu / KOJO Kazutaka

In response to emerging social demand for the effective utilization of various types of biomass, Toshiba is promoting the research and development of a variety of biomass utilization technologies.

In the field of energy applications, we have developed a conversion technology to separate sewage sludge into combustible gas and solid fuel that can be easily transported, with high-temperature burning of the gas providing thermal energy for the process while serving as a means of reducing greenhouse gases. In the field of material applications, we have been researching and developing a technology with a simple system configuration to convert wood into high-performance carbon material.

Water Treatment Technology Using New Adsorbent

YAMANASHI Ichiro / KONO Tatsuoki / YUKAWA Atsushi

Toshiba has developed a water treatment technology using a new adsorbent, called a functional powder, that can be selectively adsorbed to both hazardous substances and valuable materials contained in water and sewage. Each adsorbed material can be recovered as a pure substance and the adsorbent can be reused, unlike conventional single-use adsorbents.

This water treatment technology can therefore contribute to the recovery of resources from inorganic industrial wastewater treatment systems with high concentrations of certain substances by reducing the cost of processing industrial waste.

We have confirmed the effectiveness of this adsorbent in removing lubricating oil from soluble cutting agents through field tests applying it to waste from a machining process.

Greenhouse Gas Reduction Technologies for Water Supply and Sewerage Systems and Environmental Systems

MIKI Isamu / KAZUSAWA Shinya / HATANO Akinori

In response to the growing problem of global warming, there is a strong need for reduction of greenhouse gas emissions in the fields of water supply and sewerage systems and environmental systems.

Toshiba offers solar power generators and small hydroelectric power generators as renewable energy systems for water supply and sewerage facilities. We have developed a microgrid technology for power system stabilization corresponding to the expansion of such renewable energy systems. We are also engaged in Clean Development Mechanism (CDM) projects utilizing technologies for methane recovery and thermal energy production during the process of wastewater treatment.

Retrieval System Using Speech Recognition for Everyday Use

Fast Adaptive Layout Method for Interactive Data Visualization