Technology Outlook

Toshiba's Approach to Development of New Technologies Toward a Return to the Path of Sustained Growth with Steadily Higher Profit

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In order to overcome business downturns like that of the recent global recession, Toshiba Group is making renewed efforts toward a "return to the path of sustained growth with steadily higher profit". We are guided in this by the following management policies, and their application from the standpoint of technological development:

- Assure a stable revenue base and sound financial foundations.
- Transform the company's business structure to become a top-level diversified electric/electronic manufacturer with strong global competitiveness
- Establish Toshiba as one of the foremost eco-companies in the world contributing to a sustainable future for planet Earth.

In realizing these policies, we are promoting technological development in Toshiba four main business domains–Digital Products, Electronic Devices, Social Infrastructure, and Home Appliances–and, from the perspective of the company as a whole, channeling resources to cultivate nine new businesses.

The main technological achievements of the past year are briefly introduced below.

■Corporate Research and Development

In its corporate R&D, with the future clearly in its sights, Toshiba is engaged in development of core technologies for next generation engines of growth.
Research results now contributing to business include creation of the user interface for the CELL REGZA™, technologies for better rendering of video content from the Internet, a Japanese-Chinese-English six-directional speech-to-speech translation system for mobile equipment, low-loss next-generation power semiconductor devices, a variable-magnetic-force motor that delivers both high rotation speed and high torque, a design methodology to make noisy products sound more pleasant, enhancement of commonly used basic technologies, and a host of others.

■Digital Products

In digital products, Toshiba is directing strengths in image processing, compression, and storage technologies, plus security technologies, to the development of mobile and home devices, with the goal of creating a digital society where people can live in safety, security, and comfort.
The CELL REGZA 55X1 digital high-definition (HD) liquid crystal display (LCD) TV, the first TV to incorporate the Cell Broadband Engine™ high-performance multicore processor, offers absolutely outstanding performance, due to such capabilities as the CELL Platform™ super-resolution technology, superb sound from a newly developed speaker unit and multi-amplifier system, and simultaneous recording of up to eight terrestrial digital broadcast channels for as long as 26 hours.
In the portable PC sector, our lineup of high-quality notebook PCs incorporates the latest advanced technologies. Products include the Qosmio™ V65/F60 AV notebook PC loaded with the original SpursEngine™ dedicated media processor, and the PORTÉGÉ™ R600 mobile notebook PC, equipped with a 512 Gbyte solid-state drive (SSD) that simultaneously realizes light weight, a thin profile, and long battery life.
In meeting the needs of the expanding enterprise server market, we have developed SSD storage products based on multilevel cell (MLC) NAND technology that bring high level performance and reliability to data management. We are also making progress in the development of next-generation network terminals that enhance the comfort and convenience of digital life in all kinds of settings–in the office, on the street or at home.

■Electronic Devices

In electronic devices, a key focus is on advances in process technology that secures miniaturization and higher densities in NAND flash memory, where we are an industry leader. We also promote development of analog ICs, complementary metal-oxide-semiconductor (CMOS) sensors, power devices, and low temperature

polysilicon LCDs, among other products.
Toward further increasing the capacity of the NAND flash memories used in mobile equipment and SSDs, we have developed an original bit-cost scalable (BiCS) flash memory technology that produces an array of transistors in a three-dimensional (3D) arrangement, allowing memory cells to be stacked in up to 16 layers. Utilizing this technology, we will offer a lineup of compact, large capacity memory products with excellent price competitiveness.

■Social Infrastructure

In social infrastructure, sectors that we are committed to cover nuclear, thermal, and hydroelectric power generation systems; power grids and transmission systems; rechargeable batteries; railroads; elevators; water supply and sewerage systems; and medical equipment. Through our activities in these areas, we are contributing to stable energy supply, measures to mitigate global warming, and vital public facilities and healthcare systems.
Nuclear power generation has the advantage of generating no carbon dioxide (CO_2) emissions. Toshiba has secured the global No. 1 share(*1) in installed generating capacity, and is also the first Japanese company to be certified as a supplier of nuclear reactors by the U.S. government. Since 2007, we have succeeded in winning 14 orders for new reactors around the world so far, and we anticipate orders for 39 reactors in total by 2015. We are further reinforcing our nuclear power business as a means promote stable power supply while simultaneously reducing CO_2 emissions.
In the thermal power generation sector, where we have taken the No. 1 share in North America(*2) for the seven consecutive years to 2009, we are moving forward with the development of high-efficiency steam turbines. We are also promoting carbon dioxide capture and storage (CCS) technology for CO_2 emissions from thermal power plants, and have developed an absorbent solvent that achieves the industry's highest level of recovery energy efficiency. Since September 2009, we have been conducting tests at a pilot plant with a 10t/day-scale CO_2 recovery rate, and moving ahead we will participate in verification projects planned in Japan and other countries, with the aim of optimizing overall integration with power generation systems.
We continue to enhance our SCiB™ rechargeable battery, which is much superior to standard lithium-ion batteries in recharging, long lifecycle and safe operation. A key application here is onboard batteries for hybrid and electric vehicles.
In recent years, distributed power generation has made progress, as can be seen by growing interest in smart grids. We are responding with technologies for stable control of electric power networks, smart meter technology and more, including application of the SCiB™ as an electricity storage technology. We are also offering facility solutions to electric power consumers, exemplified by our factory energy management system (FEMS) and building energy management system (BEMS).
We currently supply large-scale plants for photovoltaic power generation, utilizing system technologies in such areas as grid connection and power optimization control, but our key strength here is the ability to deliver power conditioner technology that achieves the world's highest level of power conversion efficiency. In fiscal 2009, we received three orders for mega solar systems in Japan. We will continue to develop plant technologies for the construction of mega solar systems for electric power supply and industrial applications, in Japan and around the world.
With regard to vital public facilities and healthcare systems, we have developed the Vantage Titan™ large-aperture, whole-body magnetic resonance imaging (MRI) system with a magnetic field strength of 3 teslas, double that of typical systems, and the Aplio™ MX diagnostic ultrasound system, featuring a compact body equipped with the latest image processing technologies.

■Home Appliances

Toshiba aims to be No. 1 in energy saving and No. 1 in comfort in home appliances through its lineup of "eco style" products. We are contributing to better, easier lifestyles with environmentally friendly products, including refrigerators, drum-type washer-dryers, room air conditioners, and so on.
We are supplying light emitting diode (LED) lighting systems to replace incandescent and fluorescent lamps. Thanks to Toshiba Group's all-round capabilities in devices, materials and development of illuminant, our new LED lighting offers the industry's highest level of overall efficiency. We will further expand our line-up of products for general and industrial lighting applications, and develop new modes of lighting that realize harmony with people and the environment.

The foregoing briefly introduces our recent technological achievements and development approaches. There is much more to see in the contents of this booklet, and I hope you find it both interesting and informative.

(*1) As of December 2009 (as researched by Toshiba)

(*2) As of April 2010 (as researched by Toshiba)