

Realizing a Low-Carbon Society by building Smart Communities

Norio Sasaki

Director President and Chief Executive Officer,
Toshiba Corporation

<http://www.toshiba.co.jp/index.htm>

1. Introduction

The global economy continues to recover from the September 2008 financial crisis but it still lacks the resilience necessary for sustained growth. The 20th century enjoyed the benefits of science and technology driven by a linear vision that stressed speed, accuracy, low cost and simplicity.

However, the experience of the developed countries shows that economic growth does not necessarily indicate improved quality of life. Although GDP increases, peoples' lives are negatively affected by issues related to the global environment and resource conservation.

Today we need an economic model that doesn't see environmental preservation and economic growth as trade-offs, and that can secure environmental conservation while improving the quality of life. In this respect, "Innovation and ICT" are essential to building a low-carbon society and realizing a sustainable economy.

The ITU is leading the way in realizing metrics for greenhouse gases and emission reductions in ICT activities. This is essential for developing the means to visualize the effects of reductions in environmental impacts, to improve market understanding, and to promote ICT solutions.

2. Building of 21st-century Smart Community

In order to achieve low carbon societies that fully utilize ICT, we must drive forward R&D and pilot projects and share the results among both the developed and emerging countries. Low carbon infrastructure and environmentally sustainable communities will require cutting-edge technologies such as Smart Grids, Smart Facilities and Smart Communities.

A "Smart Community" integrates energy, water, transportation, ICT and medical solutions and protects the environment while maintaining comfortable living conditions. The infrastructure must range from the supply side, including nuclear power plants and renewable energy, to the demand side and consumer products such as air-conditioning systems, heat pumps, energy-efficient lighting systems, and home solar power generators.

3. Key factors for realizing reliable and stable low-carbon society

Projections for Smart Grid technologies indicate that sensors and devices will see 18% annual growth with ICT software and hardware for management and control growing 21% annually, the telecom sector 22% and Smart Meters growing 24% annually.

As it is necessary to network these sensors and devices in order to popularize Smart Grids and related services, it will therefore be necessary to ensure the safety of as well as the higher performance of and stable operation of the key infrastructures on which ICT relies.



Toshiba Group contributes to the sustainable future of planet Earth.

Toshiba is conducting the proof-of-concept introduction of a micro-grid in a pilot project with Okinawa Electric Power Co. We are demonstrating that the infrastructure for Smart Grids meets all operational requirements.



Alongside this, innovation in security technology is also becoming important and progress is being made here too. In April last year, Toshiba's Cambridge Research Laboratory led the world in successfully demonstrating continuous operation of quantum key distribution with a secure bit rate exceeding 300 kilobits a second over 45 km of optical fiber.

Quantum cryptography does not rely on the computational complexity used in factorization into prime numbers but on the uncertainty principle of quantum physics and it is impossible to intercept. Beyond that, the key to success for Smart Grids lies in killer applications and we need to take the initiative to create international standards for this technology in the near future.

On the demand side, Advanced Metering Infrastructure (AMI) Technology, which focuses mainly on Building Energy Management Systems (BEMS) and Home Energy Management Systems (HEMS), is a new technology. We also have Smart Meters which can input data for controlling domestic electrical appliances and I see these as killer applications.

Beyond this, the management of the enormous amounts of data that will be generated by Smart Meters, home information appliances and other equipment will require control technologies based on the newest algorithms.

These advances don't just apply to the energy field, but also to home medical care, nursing and security. In this field, our Echonet (Energy Conservation and Homecare NETWORK) efficiently carries out systematic management as the core technology standard for HEMS. Japan should propose HEMS as a global standard and promote it worldwide.

4. Summary

The telecoms industry has seen tremendous advances through deregulation and liberalization, technological progress and the current situation where information consumers are becoming information producers. In addition, we can anticipate even more dynamic changes in the energy field in the future.

In order to create a global mechanism for sustained social and economic development, I would like to propose that we reach a consensus on the foundations of an ICT framework.

Low-carbon infrastructure needs to be a complete and self-contained system and the Toshiba Group has the potential to develop new technologies in this field that improve its affordability. We will make continuous efforts to lead the development of global social infrastructure by means of our Process and Value innovations.