# Research and Development of Advanced Green ICT

## Our Approach

To expand our contribution to society through our business activities, we must undertake two key approaches: "Green *of* ICT," which seeks to reduce energy and resources consumed by ICT equipment and infrastructure, and "Green *by* ICT," which seeks to reduce environmental burdens through the use of ICT.

Fujitsu Laboratories Ltd., which engages in research and development of advanced green ICT, conducts R&D from an environmental perspective in all related domains, that range from product materials and devices, to facility and system solutions. Thus far, we have prioritized Green *of* ICT mainly for the purpose of strengthening platform technologies for green ICT. Hereafter, we will also focus our efforts on Green *by* ICT, which has a significant ripple effect in society. In particular, we are aiming to drive green ICT in the domain of Social Innovation, the core of the Fujitsu Group's growth strategy.

## Summary of FY 2013 Achievements

**Targets** under the Fujitsu Group Environmental Action Plan (Stage VII) (toward FY 2015)

**Develop innovative technologies** that enable solutions and products to reduce the environmental load

**FY 2013 Key Performance**

Announced **18** key green technologies

## FY 2013 Performance and Results

### Positioning and Highlighting Our Key Green Technologies

To disseminate the Fujitsu Group's advanced green ICT throughout society, and to support its early deployment in businesses, we positioned as our key green technologies "best-in-class" and "world-first" technologies, as well as technologies with notably high environmental contribution. We are also highlighting our technological capabilities by advancing our R&D for these key green technologies and assertively promoting them through press announcements.

In addition, with the aim of creating social innovation that connects and leverages heterogeneous information, such as that generated by corporations, governments, individuals, and sensors, we established a Social Innovation Laboratory within Fujitsu Laboratories Ltd., and engaged in driving and generating green ICT.

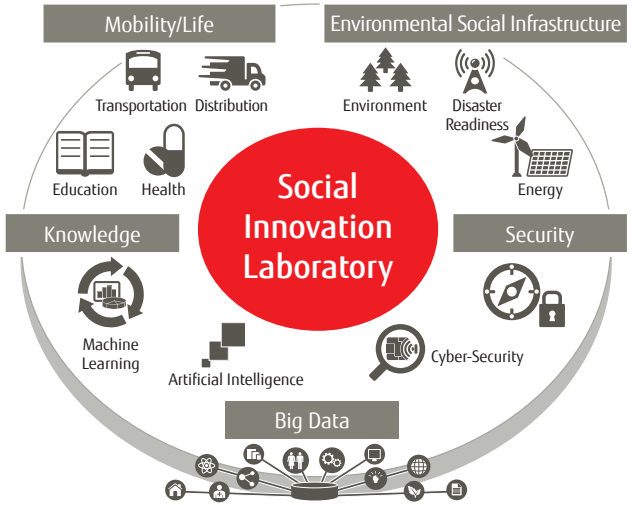
### Announcement of 18 Key Green Technologies

In FY 2013, the Fujitsu Group announced 18 technology development achievements centered on the domains of Green *by* ICT and the domain of Social Innovation: 13 technological developments (including 6 developments in the domain of Social Innovation), while 5 developments were in Green *of* ICT.

#### Development Achievements

- Large-Scale Data Storage and Search Technology for Linked Open Data
- Millimeter-Wave Transceiver Module Technology
- High-Speed Thin Client Gateway Technology
- IaaS Platform Technology for Physical Servers
- High-Speed Homomorphic Encryption Technology
- Transmitter Power Amplifier Circuit Technology
- Low-Noise Signal-Generating Circuit Technology
- Remote File-Access Technology
- Technology for Automatically Linking with Open Data
- Image-Correction Technology for Improving Image Quality
- Wireless Transceiver Technology for Medical Devices
- Glove-Style Wearable Devices
- Social Media Analysis Technology
- Assessment Tool for Visualization of Local Government Characteristics
- Operations-Manual Analysis & Automation-Support Technology
- Wide-Area Network Distribution Technology
- OpenADR 2.0-Standard Demand Response Technology
- Speech Synthesis Technology

#### Fujitsu Laboratories Group – Social Innovation Domains




## FY 2014 Targets and Plans

### Accelerating Creation of Green Solutions

While further enhancing the environmental contribution of our advanced technologies, the Fujitsu Group will accelerate the creation of not only individual technologies, but also the creation of related green ICT that connects such technologies. In particular, in the domain of Social Innovation, we are actively advancing the fusion of green ICT and data that supports it, along with aggressively advancing R&D of our Platform Technologies, as we continue to promote and publicize to society our technological achievements.

## Main Activities in FY 2013

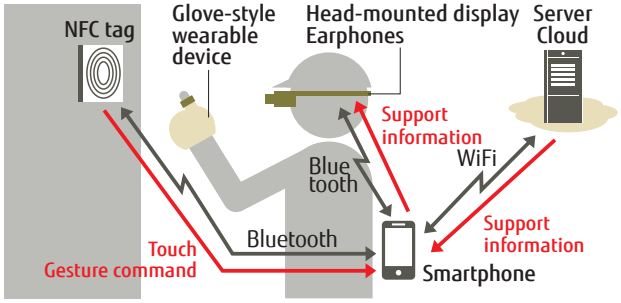
### Development of a Glove-Style Wearable Device that Offers Low Power Consumption and Extended Operational Time

Fujitsu Laboratories Ltd. has developed a glove-style wearable device equipped with a Near Field Communication (NFC) tag reader and gesture-based input functionality. During fieldwork, such as factory or building maintenance, this device makes it possible to provide workers with alerts and with supporting information matched to the work scenario.

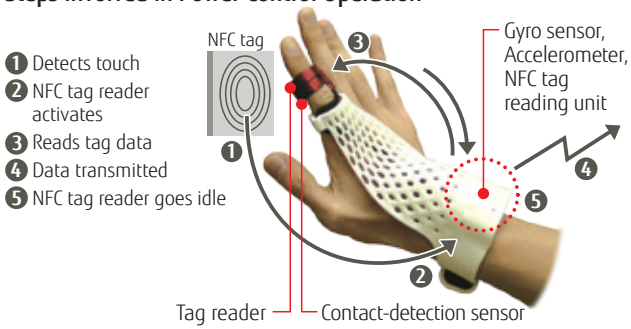
Using the device, a simple touch of the fingertip to NFC tags attached to work objects enables the presentation of relevant information. Moreover, a gyrosensor and acceleration sensor mounted at the wrist enables gesture recognition.

For wearable devices, considerations such as wearability and burden on the wearer prevent the use of large batteries, making low power consumption a prerequisite. Fujitsu's glove-style wearable device mounts contact sensors at the fingertips, and achieves low power consumption by operating the NFC tag reader only during the instant at which touching occurs. This extends the operational time for a glove-style wearable device from 3 hours in the absence of electric power control to 9 hours, achieving operating time sufficient for a day's work.

**Work Support Using a Glove-Style Wearable Device**




**Steps Involved in Power Control Operation**

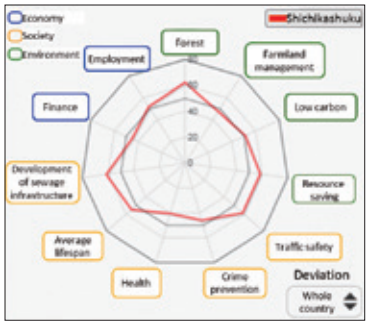



### Fujitsu Develops First-of-Its Kind Assessment Tool that Visualizes Community's Characteristics: Contributes to the Creation of Sustainable Societies

In February 2014, as an industry first, Fujitsu Laboratories Ltd. and Fujitsu Research Institute co-developed the first assessment tool from an ICT company that visualizes a community's characteristics, such as its local government, from multiple perspectives, including the environment and economy.

Existing urban assessment tools can quantify environmental performances, infrastructure functions, and other factors. However, future assessments will need to be more comprehensive, especially for ensuring the sustainability of a community, and will need to take into account a region's particular attributes, including topography, population, and industrial areas.

Utilizing more than 1,200 categories of public data from government statistics and other sources, this project selected 50 items for evaluation related to regional revitalization needed to create sustainable societies. These were chosen in accordance with quality of life and stability, safety and security, prosperity, and other factors for 3 regional revitalization policies, as benchmarks associated with the environment, economy and society. Based on these policies, the newly developed tool visualized the strengths and challenges of local communities by performing comparative assessments of local governments that share similar characteristics in terms of population, industrial structure, and other representative regional attributes. In addition, Fujitsu Laboratories and Fujitsu Research Institute conducted field trials of the tool in cooperation with the town of Shichikashuku in Miyagi Prefecture, Japan. Based on the results, Fujitsu Research Institute proposed to Shichikashuku that a "forest and water experience project" and a "forestry, biomass, and solar power project" be taken as measures for a regional revitalization program.




Municipal evaluation tool-based visualization of characteristics and resource valuation of Shichikashuku town, Miyagi Prefecture, Japan