FY 2017 ESG Presentation
Fujitsu’s Environmental Initiatives

March 20, 2018
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Topics in Today’s Presentation

- Global trends relating to climate change
- Fujitsu’s Vision (Vision2050)
- Business-based environmental initiatives
- Expanding use of renewable energy
- Resolving social issues
- Future-focused technology R&D
- Outside evaluations of Fujitsu environmental and CSR activities
1 Recognizing Risks at a Global Level

The Global Risks Landscape 2018

https://www.weforum.org/reports/the-global-risks-report-2018
1.2 Mapping the Interconnections of These Risks

The Global Risks Interconnections Map 2018

→ Environmental and natural resource problems cause issues to ripple throughout society
2 The UN Sustainable Development Goals (SDGs)

- **Sustainable Development Goals** *Adopted in September 2015*
  - A set of common goals for international society through 2030
  - The UN set of 17 goals focused on the important issues of sustainability and the elimination of poverty
2.2 SDGs Progress by Goal

1. No Poverty
   - Achieved: 68%
   - Gap to target: 32%

2. Zero Hunger
   - Achieved: 58%
   - Gap to target: 42%

3. Good Health and Well-being
   - Achieved: 68%
   - Gap to target: 32%

4. Quality Education
   - Achieved: 55%
   - Gap to target: 45%

5. Gender Equality
   - Achieved: 37%
   - Gap to target: 63%

6. Clean Water and Sanitation
   - Achieved: 45%
   - Gap to target: 55%

7. Affordable and Clean Energy
   - Achieved: 77%
   - Gap to target: 23%

8. Decent Work and Economic Growth
   - Achieved: 68%
   - Gap to target: 32%

9. Industry, Innovation and Infrastructure
   - Achieved: 33%
   - Gap to target: 67%

10. Reduced Inequalities
    - Achieved: 24%
    - Gap to target: 76%

11. Sustainable Cities and Communities
    - Achieved: 48%
    - Gap to target: 52%

12. Responsible Consumption and Production
    - Achieved: 48%
    - Gap to target: 52%

13. Climate Action
    - Achieved: 68%
    - Gap to target: 32%

14. Life Below Water
    - Achieved: 41%
    - Gap to target: 59%

15. Life on Land
    - Achieved: 6%
    - Gap to target: 94%

16. Peace and Justice, Strong Institutions
    - Achieved: 60%
    - Gap to target: 40%

17. Partnerships for the Goals
    - Achieved: 33%
    - Gap to target: 67%
2.3 Paris Agreement Global Warming Countermeasures Take Effect

Paris Agreement = International rules
3 Fujitsu’s Vision (Global Warming Countermeasures)

“Climate & Energy Vision 2050” (Published May 2017)

Fujitsu accepts the challenge of this great transformation by innovating from within itself.
3.2 Three Pillars of the Fujitsu “C&E Vision 2050”

「CO₂ 0」 「Mitigation」 「Adaptation」

Photo source: www.city.hiroshima.lg.jp/shobou/bousai/260820
3.3 Fujitsu’s Gross CO₂ Emission Volume (by category)

- Accelerating changes in business structure
  Manufacturing → services, connected business development → emissions from datacenters and outside Japan grow proportionally

- Renewable energy usage: 7.5% (currently)

Total for FY 2016: 1.345 million tons
3.4 Reducing Emissions through Full Utilization of Cutting Edge ICT

- **Temperature prediction and optimized control using AI**
  - Predicting local weather an hour in advance
  - Integrated control of ICT devices, air conditioning power, etc.
  - Automatic diagnosis of the causes of heat accumulation (deep learning)
### 3.5 Developing Next-Generation Supercomputers

- **Supercomputers are also shifting focus from computing performance to energy-saving performance**
- We aim to make Post-K 30-40 times better performing than the K computer
- Comparison of the computing performance and energy consumption of the fastest supercomputers in Japan

<table>
<thead>
<tr>
<th>Supercomputer</th>
<th>Computing performance</th>
<th>Power consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>K computer</td>
<td>10.5 quadrillion computations per second</td>
<td>12.7 megawatts</td>
</tr>
<tr>
<td>Post-K</td>
<td>30-40 megawatts</td>
<td></td>
</tr>
</tbody>
</table>

Post-K is planned for 2020.
3.6 Energy-Saving Server Development

- Fujitsu receives Environment Minister Award (November 2017)

**PRIMERGY CX600 - Reducing CO₂ emissions using a water cooling system** -

- By adopting a water cooling model using outside air for cooling, power consumption is **reduced by 47%**, contributing to reduced CO₂ emissions

- The Oakforest-PACS supercomputer (jointly operated by the University of Tokyo and the University of Tsukuba), which uses this model, earned **6th place** in the Green500 rankings of energy-saving performance (November 2016)

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Senior Vice-Minister of the Environment Naomi Tokashiki presenting the award
3.7 Enhancing Supply Chain Initiatives

**Goals**
- Reduce supply chain **environmental burden**, manage **business risks**
- Operate in a unified **global format**, increasing the **efficiency** of survey, analysis and **management**

**Participation in the CDP [supply chain program]**

**Program summary**

*Fujitsu has consistently responded*

- **Suppliers**
  - Number of respondents: ~5,000 companies
  - Number of requests: ~10,000 companies

- **Suppliers program members**
  - 96 companies including BT, Cisco, HP, and Microsoft

- **Request**
  - Data
  - Evaluation results

- **Answers**
  - Questionnaires
  - Support in answering

**Review subjects**
- **FY 2018**: 70% by procurement volume, particularly for components and SI services (About 50 companies)
- **FY 2019**: At least **the top 80% by procurement volume**

**Fujitsu will participate beginning 2018**
(Climate change and water)
4 Promoting Adoption of Renewable Energy

- Fujitsu’s renewable energy usage status: 7.5% (forecast for FY 2017)
- **123 companies** have committed to the **RE100 initiative** (as of January 2018)

Major ICT companies in the US and Europe have taken the lead over other companies, and are transitioning to renewable energy.

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### Renewable energy consumption by member companies (2014)

<table>
<thead>
<tr>
<th>Company</th>
<th>Renewable energy usage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>93</td>
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<tr>
<td>Adobe</td>
<td>30</td>
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<tr>
<td>BT Group</td>
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</tr>
<tr>
<td>HP</td>
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<td>Microsoft</td>
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</tr>
<tr>
<td>Facebook</td>
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</tr>
<tr>
<td>Salesforce</td>
<td>43</td>
</tr>
</tbody>
</table>

As of November 2016

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Fujitsu’s renewable energy usage status: 7.5% (forecast for FY 2017)
4.2 Renewable Energy Deployment Plan (Locations outside Japan)

- Purchase renewable energy certificates (RECs) in regions where the cost is low
- Purchasing plan: 70% (by 2020)

REC ≥ $5/MWh (2021～) 30%

REC < $5/MWh (~2020) +33% = 70%

REC prices by country (as of Feb 2018)

Power consumption (outside Japan) 433GWh

Renewable energy in use 37%

Australia 28%
UK 18%
USA 9%
Germany 13%
Finland 5%
Malaysia 10%
Taiwan 1%
Korea 1%

Purchasing plan:
- 70% (by 2020)

Countries and their renewable energy usage percentages:
- Australia: 18%
- USA: 9%
- Germany: 13%
- Finland: 5%
- Malaysia: 10%
- UK: 18%
- Taiwan: 1%
- Korea: 1%

Graph showing REC prices by country with Australia, UK, USA, and Germany having the highest usage percentages.
4.3 Renewable Energy Deployment (On-Site Power Generation)

- Large scale solar panel installation (leased roof and land)
  Shimane Fujitsu – Power generation: 3,980 kW
4.4 Expanding the Deployment of Renewable Energy (Locations in Japan)

- Joint research on **regional energy connection** (Kawasaki City, 2017-present)
- Building up technology in order to expand the negawatt market (cost incentive for saved electricity) (METI’s field trial for preparation of demand response, VPP, 2015-present)

**Developed based on its own GIFOCUS tool**
By focusing efforts on the shift to services in ICT, we strengthen innovation through co-creation with customers.
5.2 Potential CO₂ Reduction

- It is possible to reduce projected total global CO₂ emissions for 2030 by **about 20%** through **full utilization of ICT**

* Mobility solutions consider ICT-enabled improvements to private and commercial mobility and additionally consider the reduced need to travel from various sectors, including health, learning, commerce, etc.

Ref. Smarter 2030 GeSI
5.3 Fujitsu’s Approach to Issues in Society

Social Innovation

Integration and Service

Human Centric Innovation

MetaArc

Digital Business Platform

SDCI

Analytics

IoT

Energy

Food and Agri

Education

Marketing

Security

Retail

Finance

Manufacturing

Mobility

Quality of Life

Public

Cloud

Mobile

Integrated Computing
5.4 Fujitsu’s AI Strategy
Example 1: Smart Factory

- **Production efficiency improved by 25%** due to a real-time grasp of factory data
- Customer issues: Integrated management of a variety of KPIs, including production, quality, efficiency, cost, and energy consumption, aimed at creating a smart factory
- Intelligent Dashboard – processing and analysis of hundreds of thousands of data points in real time, visualization of productivity for the factory as a whole

Selected as one of the model factories for the 2016 Smart Manufacturing Project
Example 2: Smart Mobility and City Monitoring

- Fujitsu can not only provide **monitoring of traffic congestion**, but also **prevent crimes in advance** through detection of people and vehicles using deep learning.
- Customer issues: **Traffic congestion** in developing countries due to the advance of urbanization leads to **air pollution and global warming**.
- Real time, **highly accurate detection of things like traffic and accidents** using **AI**-based image recognition technology (accurately estimating the position of vehicles even at night, through air pollution, or in fog).

- Anomaly detection based on characteristics and changes in vehicle movement.
- Characteristics are recognized, detecting the appropriate vehicle.

**Human Centric AI**

**Zinrai**
Example 3: Smart Mobility (Ships)

- **Fuel consumption improved by about 5%** through accurate prediction of operating data

- **Customer issues:** Designing safe and economical ships, selecting an optimal course based on climate and weather factors at sea
  - CO₂ emissions due to oceanic shipping: 900 million tons (about 3% of global emissions)
  - Annual fuel costs: On the order of several hundred billion yen

- **Accurately estimating factors such as ship performance, fuel consumption, and travel time using AI**
Example 4: Global Weather Forecasting

- Monitoring and simulation using HPC
  - Customer issue: **High-speed, highly precise real-time rainfall monitoring**
  - Reduce damage and economic losses from extreme downpours
  - Manage important fresh water resources
  - Combined with observational data from multiple satellites, create **hourly rainfall maps for the entire globe**
6 Future Technology: Artificial Photosynthesis

- Synthetically produce oxygen and energy from sunlight, water, and CO₂
  → **Decarbonization technology** that uses CO₂ as the raw material for making energy, plastics
- Increases oxygen-producing efficiency by more than 100-fold (November 7, 2016 press release from Fujitsu Laboratories)
6.2 Hydrogen Society: Stable Storage and Transport Technology

- Technology for efficiently liquefying hydrogen energy (for storage and transport) to enable it to be easily accessed for use
  - Apply to hydrogen stations, fuel cell vehicles, hydrogen generators

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**Microwave organic hydride method**

- **Green energy**
- **Organic hydride (stable storage and transport)**
  - **Safely transport**
  - **Highly effective hydrogen disengagement**

**Use cases**
- Distributed power generation
- Green base stations

**Diagram**

- **GaN power amp**
- **Local heating**
- **Bulk heating**
- **Pt/AC**
- **MW**
- **OCH**
- **Microwave heating**
- **Conventional heating**
7 Environmental and CSR Activities: Results of External Evaluations

- **DJSI**: Top score in the industry in the environmental area for three consecutive years

- **FTSE**: Blossom Japan Index newly established; 4Good Fujitsu has second-highest overall score in Japan

- **CDP**: Received A list designation in two categories this fiscal year (only 6 companies in Japan)

- **Nikkei**: Ranked 12th (No. 1 rank in electronics area)

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Fujitsu</th>
<th>Hitachi</th>
<th>Toshiba</th>
<th>NEC</th>
<th>Mitsubishi Electric</th>
<th>Panasonic</th>
<th>Sony</th>
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<tr>
<td>DJSI</td>
<td>○</td>
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<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>FTSE Blossom Japan</td>
<td>4.4</td>
<td>-</td>
<td>-</td>
<td>3.8</td>
<td>3.2</td>
<td>3.6</td>
<td>3.9</td>
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<tr>
<td>CDP Climate change</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>A-</td>
<td>A</td>
<td>A-</td>
<td>A</td>
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<tr>
<td>CDP Water</td>
<td>A</td>
<td>B</td>
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<td>B</td>
<td>A</td>
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<td>A</td>
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<tr>
<td>Nikkei</td>
<td>12th</td>
<td>20th</td>
<td>54th</td>
<td>46th</td>
<td>37th</td>
<td>15th</td>
<td>16th</td>
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Won Grand Prize in the 26th Global Environment Award

- Overview of the Award
  - Sponsored by Fujisankei Group, with support from five ministries, it is Japan’s largest environmental award

- Award Description
  Overall Environmental Activities
  - Environmental management direction and implementation organization, environmental initiatives
  - Achievements of Fujitsu Group Environmental Action Plan (Stage VII)
  Special Item
  - Development of world’s most efficient AC adapter using GaN-HEMT
7.3 Received **Two** Japanese Environment Minister's Awards in FY2017

- Global Warming Prevention Activity
- Grand Award of Global Warming Countermeasures Report

**FUJITSU Server PRIMERGY CX600 M1**

*Your platform for highly parallel computing*

- 2.5x performance improvement
- Water-cooled model employing latest "hot water cooling" technology added to line of coolers
Shaping Tomorrow with You
shaping tomorrow with you
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- Rapid technological change, fluctuations in customer demand and intensifying price competition in IT, telecommunications, and electronic device markets in which Fujitsu competes;
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