

# **FY2015 Medium-Term Management Plan**

## **Power and Social Infrastructure Business**

**August 26, 2013**

**Fuji Electric Co., Ltd.**

**Power and Social Infrastructure Business Group**

- Business Overview
- Business Targets
- Business Strategies / Priority Measures
  - Power Plant
  - Social Engineering Systems

# Business Overview

## Power Plant

### Thermal power generation

- Medium-capacity thermal power generation
- Combined-cycle power generation
- Biomass power generation

- Focus on medium-capacity thermal power generation systems
- Proven technology based on the experiences from large-scale combined-cycle power generation systems  
Yoshinoura Thermal Power Station (250MW × 2)
- Superior experience from ultra- supercritical steam turbine  
Isogo Thermal Power Station (600MW)

### Hydroelectric power generation

- Large-scale hydroelectric power generation
- Small- to medium- scale hydroelectric power, Micro hydroelectric power

- Cooperation with Voith Hydro of Germany (joint venture)
- Strengths with regard to vertical bulb turbines and other unique low-head hydropower generation technologies

### Renewable energy

- Geothermal power generation
- Solar power generation (mega solar)
- Wind power generation

- 40% global share for flash steam geothermal power generation systems (past 10 years)
- Geothermal power generation technologies accumulated through operational experience over years
- Ability to offer renewable energy systems steeped by incorporating superior power electronics technologies

## Social Engineering Systems

### Power systems

- Smart community
- Electric power systems
- Smart meters

### Social environmental systems

- Social environmental systems

- **Implementation of various smart community proving tests and identification of benefits**

Regional energy management system in Kitakyushu City,  
micro grids for isolated islands

Eco industrial parks and power stabilization in Indonesia

- **Accumulated power transmission and distribution technologies**
- **Public infrastructure construction**

## Social Information

- IT solutions
- Cloud computing

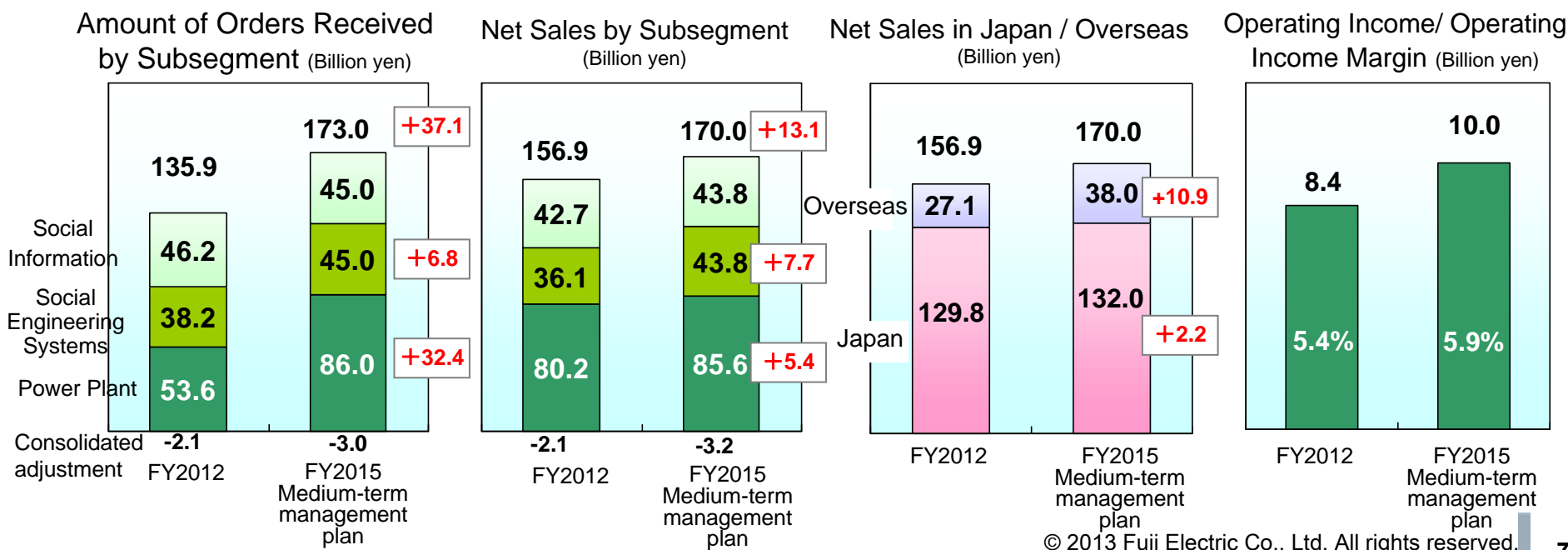
- **Cooperation with Fujitsu**
- **Construction of IT infrastructure for academic, public, financial, and industrial organizations**

# Business Targets

## Basic Policies

**Aim to achieve business growth in conjunction with expanding demand for electricity and social infrastructure development**

- Expand orders and sales in Japan and Asia
- Expand business domains through technological innovation
- Improve profitability through innovation activities targeting production processes and by strengthening purchasing capabilities

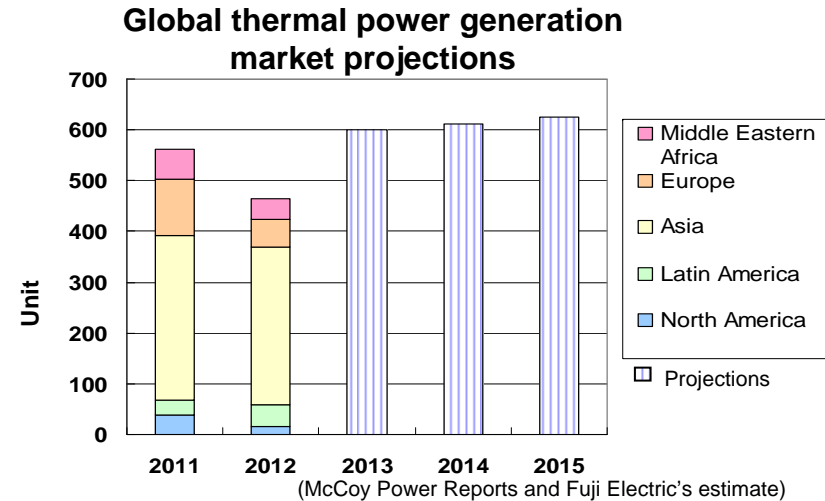
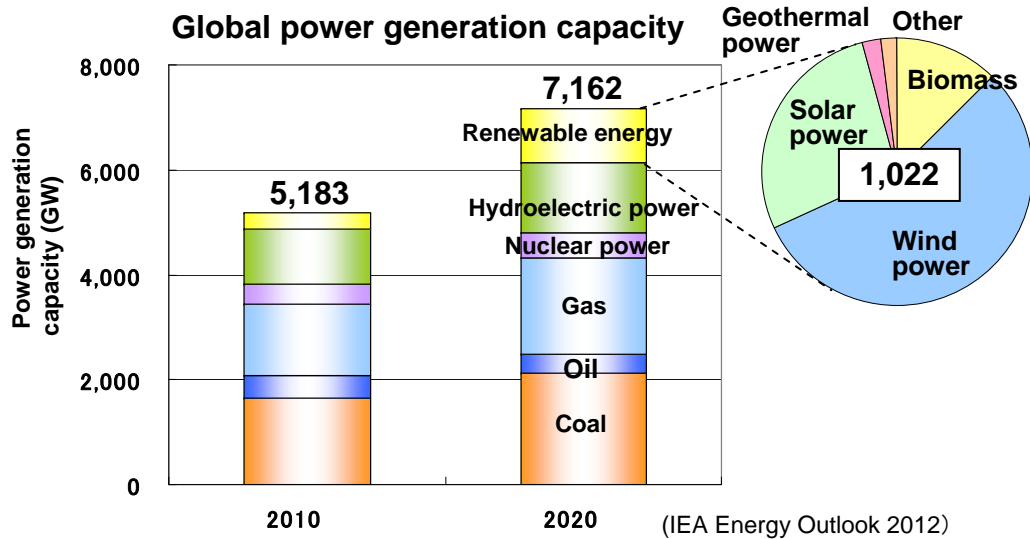


# Power Plant Business Strategies / Priority Measures

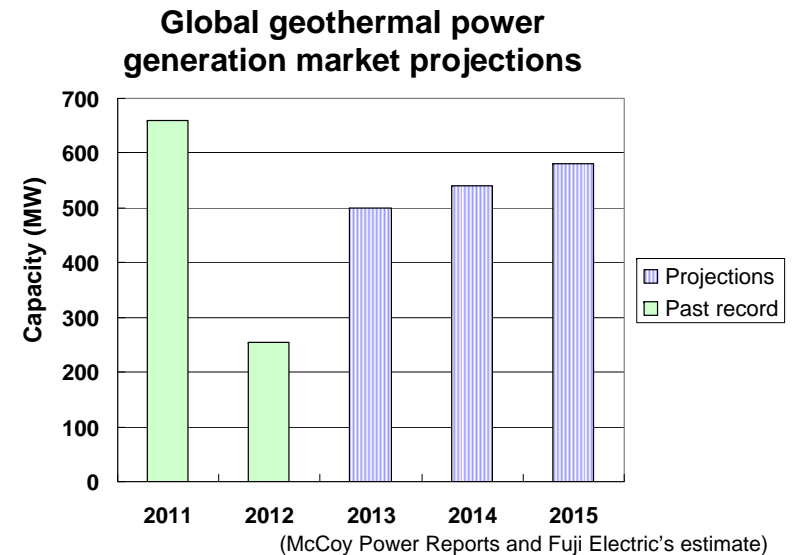


# Power Plant Market Trends (Worldwide)

Ongoing global growth in electricity demand and generation capacity

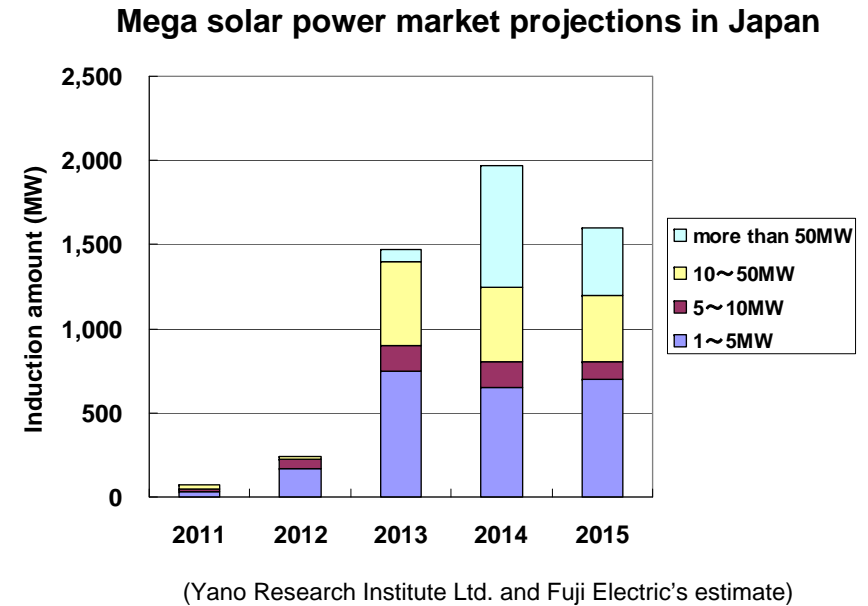
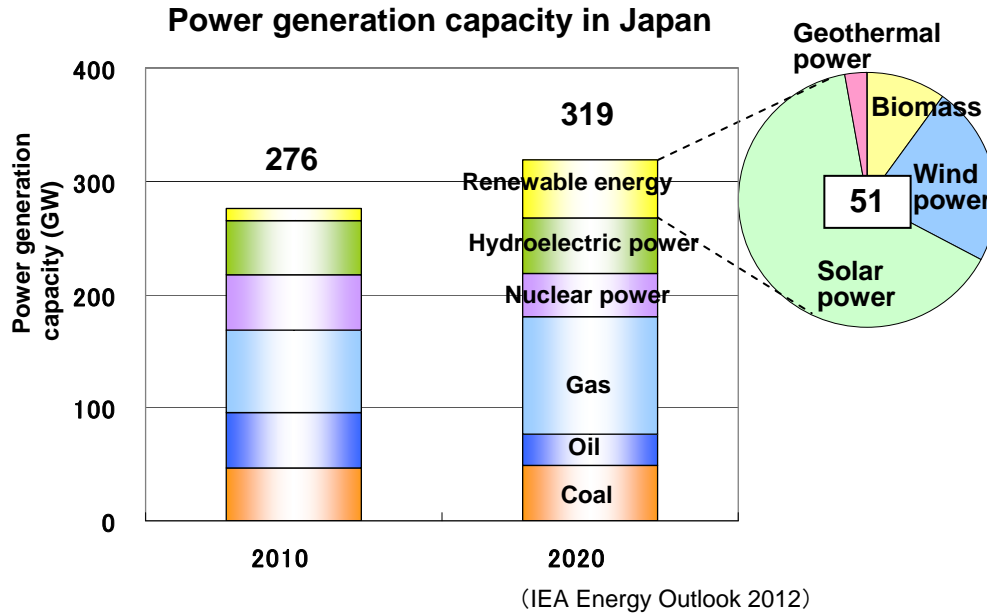


- **Annual growth rate of 2.2% for global energy demand**
  - Developed nations: 0.9% annual growth
  - Emerging nations: 3.3% annual growth
- **Growth in gas usage to reduce CO<sub>2</sub> emissions, also growth in coal usage in pursuit of economic performance**
  - Growth in combined-cycle gas turbine demand centered on developed nations
  - Growth in coal-fired thermal power plant demand centered on Asian and other emerging nations
- **Promotion of geothermal power generation system introduction by government measures and deployment subsidies**
  - Accelerated deployment of geothermal power generation system in Central and South America and Africa, following pace with Indonesia



# Power Plant Market Trends (Japan)

Progressive installation of large-scale thermal power plants and renewable energy systems



## Thermal power generation market trends

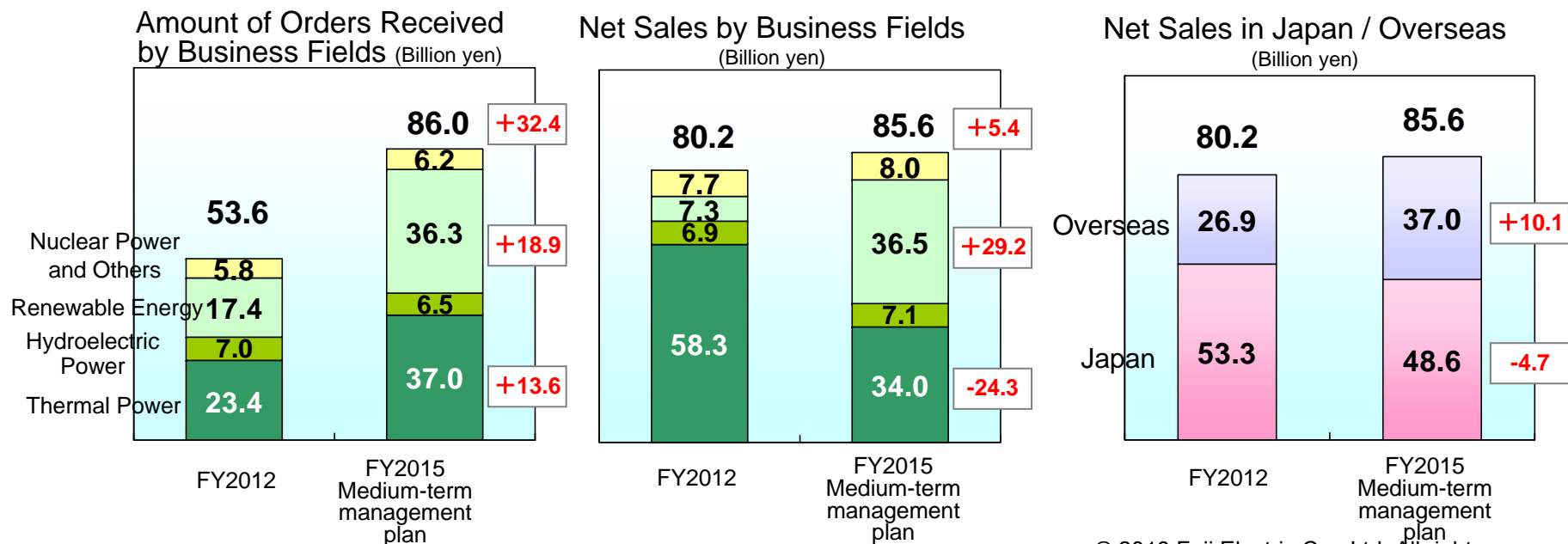
- Reinforcing thermal power generation in ensuring stable supply of electricity
- Progressive installations of highly efficient coal-fired thermal power generation systems using supercritical steam turbines and combined-cycle power generation systems
- Participation by IPPs and PPSs

## Renewable energy market trends

- Progressive installations of solar power generation systems peaking in 2014
- Installation of solar power generation systems and now wind, small- to medium-scale hydro, and geothermal power generation systems

## Aim to achieve business growth in conjunction with expanding demand for electricity

- Expand sales of thermal and geothermal power generation systems in regions with growing electricity demand such as Asia and Near and Middle East
- Increases sales by strengthening mega solar plant engineering capabilities
- Advance business measures for increasing sales for next medium-term management plan
  - Participate in domestic large-scale thermal power generation market
  - Expand orders for wind, small- to medium-scale hydro, and geothermal power generation systems



# Power Plant Priority Measures (Thermal Power)

**Strengthen technological capabilities related to thermal power generation**

- Develop technologies to improve the efficiency and reliability of turbines and generators and boost the competitiveness of such technologies

**Expand orders and sales in regions with growing electricity demand such as Asia and Near and Middle East**

- Expand orders through increased coordination with partners (EPC)

**Participate in domestic large-scale thermal power market**

- Participate in market for coal-fired thermal power generation systems using ultra-supercritical steam turbines (power companies, IPPs)
- Participate in market for combined-cycle power generation systems (power companies, IPPs)
- Introduce Siemens' state-of-the-art high-performance gas turbines

**Strengthen service business and expand sales**

- Develop technologies for modernizing and boosting the output of existing equipment
- Establish local engineering systems for service business



Haiphong Coal-Fired Thermal Power Station in Vietnam



Yoshinoura Thermal Power Station

## Solar power systems

Expand orders and sales of mega solar systems

- Expand orders and sales by leveraging plant engineering capabilities
- Strengthen technological capabilities through cooperation with German solar power generation system engineering company
- Develop operational support systems for solar power generation (cloud-based)
- Boost competitiveness by developing and commercializing SiC-equipped PCSs

## Geothermal power generation systems

Expand orders and sales of large-scale flash geothermal power generation systems

- Continue strengthening operations in Asia, expand orders in Central and South American and African markets
- Strengthen competitiveness through the development of highly efficient and reliable turbines

Participate in binary geothermal power generation market

- Accelerate efforts to capture orders in markets where binary geothermal power generation systems are attracting attention such as the Americas and New Zealand
- Develop technologies for improving the efficiency of hybrid geothermal power generation systems incorporating flash steam power plants and expand orders for these systems
- Leverage technologies and experiences for overseas geothermal power generation systems to capture geothermal orders in Japan (medium-scale facilities, generation from hot springs)

## Wind power / hydroelectric power

Expand orders for wind power and small- to medium-scale hydro electric power generation systems

- Develop and expand orders for generators and PCSs for large-scale wind power generation systems
- Expand orders for low-head hydro electric power generation systems and micro turbines



Mega solar system known as Southern Alps Energy Park at Fuji Electric's Yamanashi Factory



Hachijo-jima Geothermal Power Plant

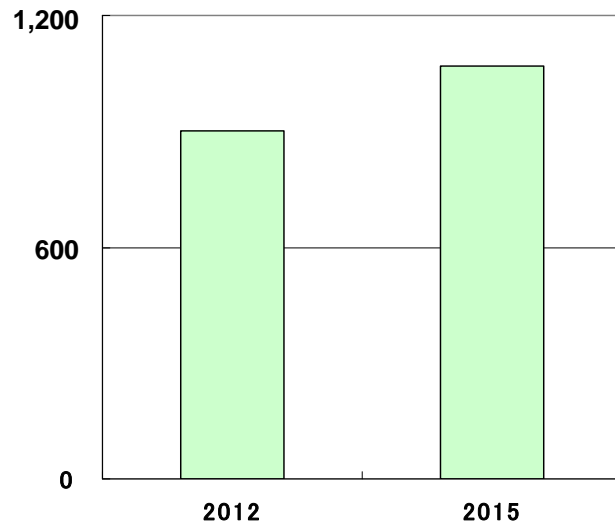
# Social Engineering Systems Business Strategies / Priority Measures

# Social Engineering Systems Market Trends

Progressive development of next-generation electric power systems and expansion of smart community businesses

**Electric power distribution and smart community market projections in Japan**

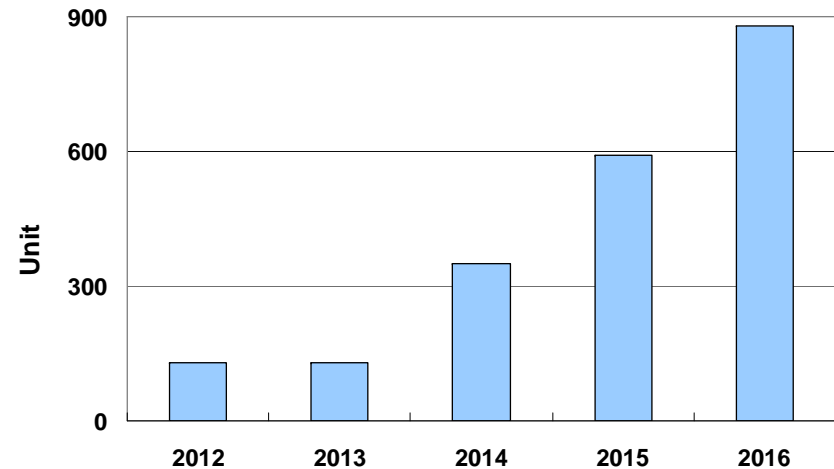
(Billion yen)



(Advanced Management (electric power distribution, EMS and electric power storage))

**Smart meter market projections**

(10,000 units)



(Fuji Electric's estimate)

**Power system market trends**

- Capacity bolstering of power systems and development of next-generation systems in response to rise in renewable energy systems and dispersed power sources
- Introduction of electricity storage systems to stabilize power grids
- Expansion of smart communities  
-Optimal control and efficient operation of energy, energy saving

**Smart meter market trends**

- Introduction of unit-type smart meters commenced in 2012
- Full-fledged introduction of smart meters to start in 2014

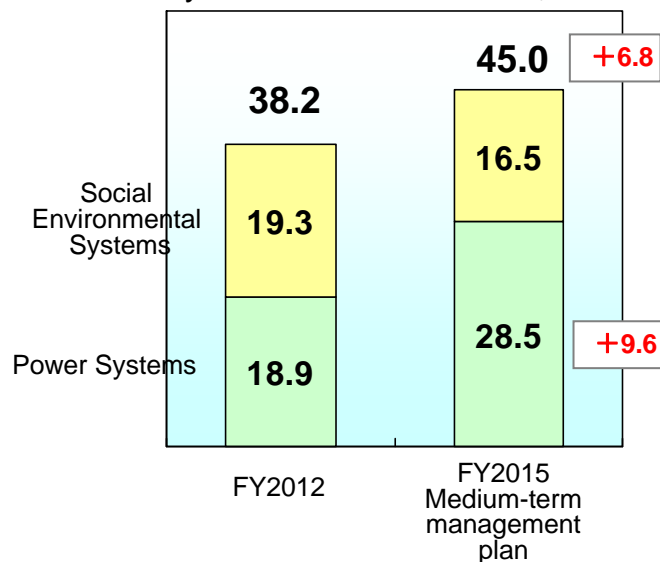


# Social Engineering Systems Business Strategies / Priority Measures

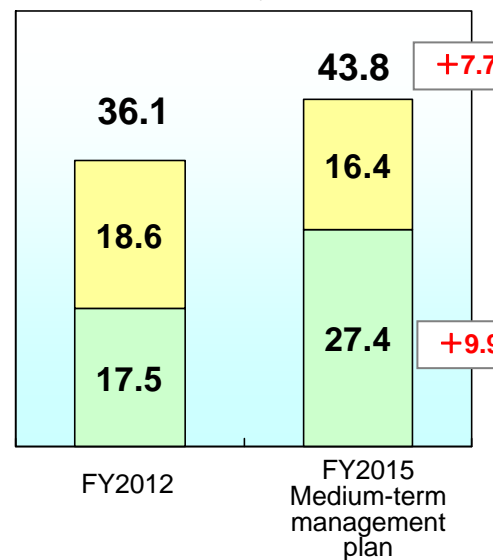
**Aim to achieve business growth against the backdrop of efforts to realize the stable supply of electricity and create a society filled with smart communities**

- Commence full-fledged development of smart community operations
- Strengthen development efforts and increase sales in electric power system operations
- Expand sales of smart meters

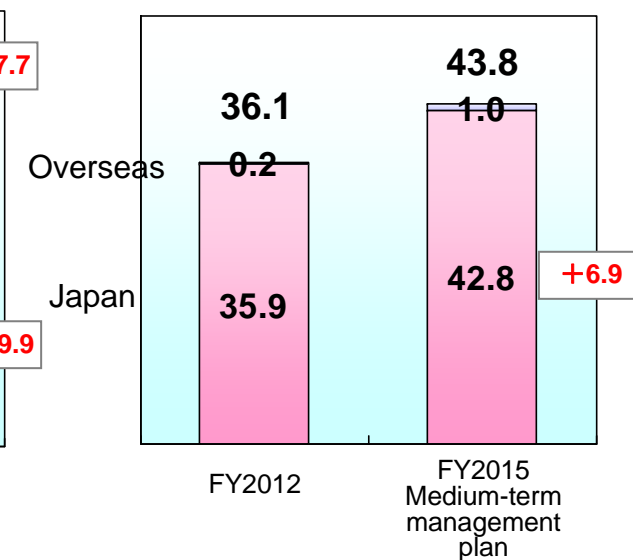
Amount of Orders Received  
by Business Fields (Billion yen)



Net Sales by Business Fields  
(Billion yen)



Net Sales in Japan / Overseas  
(Billion yen)





# Social Engineering Systems

## Priority Measures (Power Systems)

### Smart communities

Commence full-fledged development in Japan

- Construct smart community platforms
- Commence full-fledged development of cluster energy management systems  
Electricity supply-demand balance prediction, demand response, regional dispersed power sources, energy saving
- Expand orders as BEMS, MEMS, and REMS aggregator

Develop operations overseas

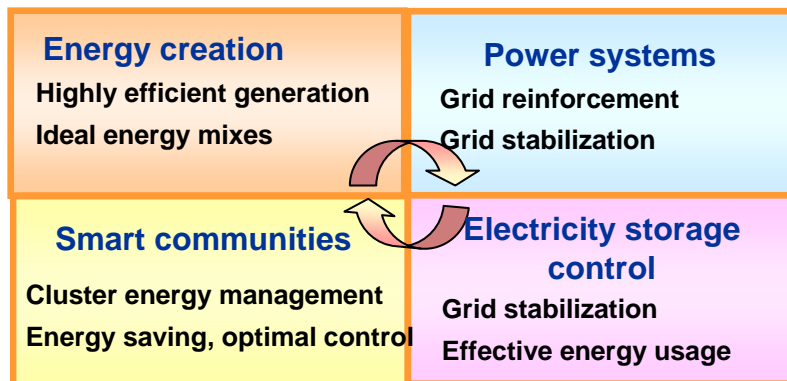
- Expand orders for micro grids for isolated islands and energy supply systems for industrial parks

### Electric power systems

Develop systems and expand orders

- Construct next-generation grid systems by utilizing power electronics technologies
- Develop electricity storage control technologies to stabilize grids
- Develop electricity control equipment utilizing SiC devices

### Spread of Power Systems and Control Systems



Cluster energy management system in Kitakyushu City

# Smart Community Proving-Test Projects

## Proving-test projects

**Nago, Okinawa/mega solar**  
Dispersed power sources / grid stabilization  
Ministry of Economy, Trade and Industry  
Smart power network/power distribution network  
voltage control

**Kitakyushu smart community**  
Regional energy supply-demand optimization  
**Keihanna Science City**  
Building energy management  
**Aizuwakamatsu City**  
City development, electricity supply stabilization

**Six isolated islands in Kyushu**  
Reduced power generation costs  
**Three isolated islands in Okinawa**  
Reduced power generation costs

**Java, Indonesia**  
Eco industrial parks, power stabilization  
**Saudi Arabia / MODON**  
Eco industrial parks, environmental countermeasures  
**Thailand**  
Eco industrial parks, energy saving

**Kumamoto Prefecture:** Eco plastic greenhouses, solar power generation  
**Minamata:** Making farming / fishing operations eco-friendly, CEMS  
**Convenience stores in Japan and overseas:** Eco store

## Full-Fledged Development

**Smart grids**



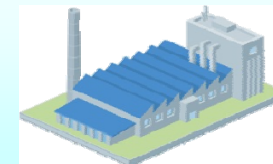
**Smart cities**



**Micro grids**



**Smart industrial parks / factories**



**Smart distribution**



# Social Engineering Systems Priority Measures (Power Systems)

## Smart meters

Expand orders and sales of smart meters

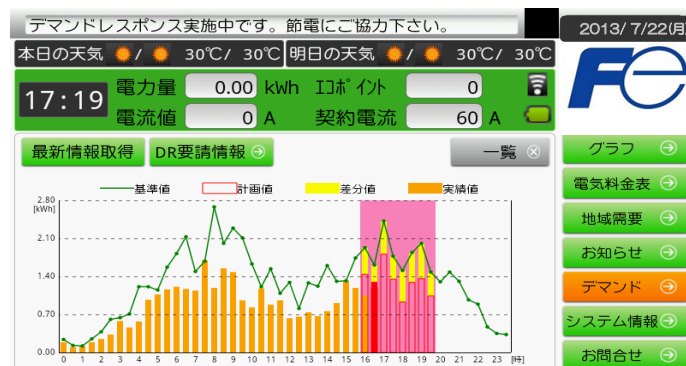
- Develop technologies for and strengthen competitiveness of smart meters
- Invest in production facilities and innovation activities from production process of smart meters

Enter into new fields

- Enter into meter data management system business
- Expand into CEMS, BEMS, and other smart community businesses



Smart meters



CEMS demand control

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