

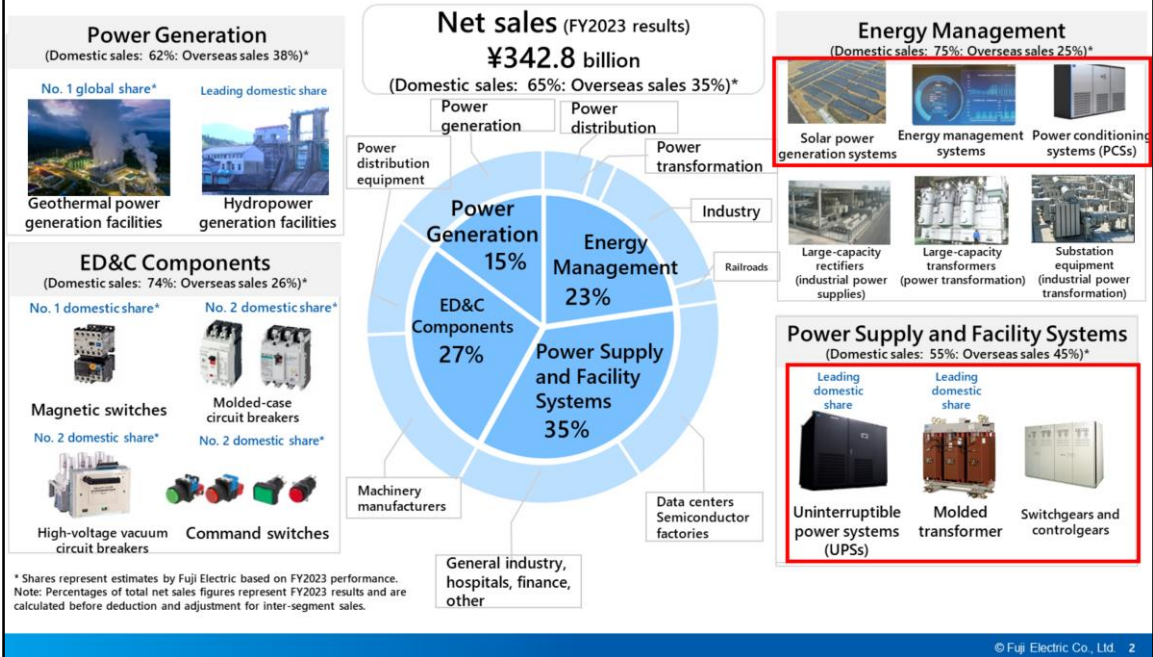
Energy Business Group Research and Development looking toward FY2026

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I am Kentaro Toyama, General Manager in charge of the Development Division in Energy Business Group. I'd like to explain about the Energy Business Group's research and development looking towards FY2026.

Contributions to stable, optimal, and reliable supplies of clean energy

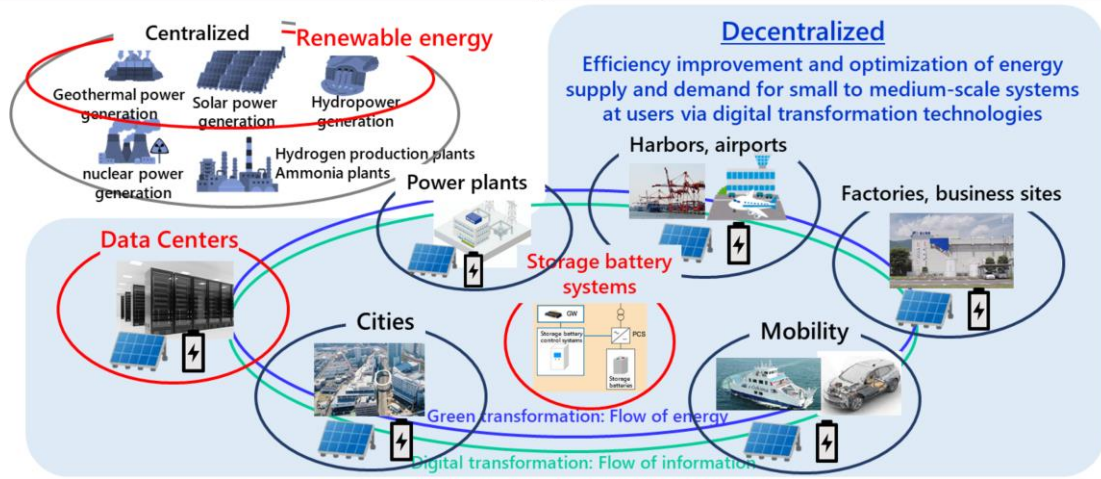


The Energy Business Group aims to contribute to the stable, optimal, and reliable supply of clean energy.

We develop transmission & distribution system to stably supply customers with renewable energy, including geothermal and hydroelectric power generation, through our energy management systems. Power is transmitted through power supply and facility systems, such as uninterruptible power supply systems, transformers, and electrical panels, to ensure that customers always have access to electricity. Also with our ED&C components, we help to provide clean energy that customers can use safely and securely.

Operating Environment and Business Opportunities

Need for decarbonization of both centralized and decentralized power supplies in order to achieve green transformation





- Grid stabilization driven measures in conjunction with spread of renewable energy (electricity storage systems)
- Growing power demand and rising need for reliable power supply stimulated by brisk data center investment amid AI and digital transformation advancements
- Rising need for decarbonization of thermal energy equipment and facilities with high CO₂ emissions

I'd now like to touch upon the operating environment and business opportunities surrounding the Energy Business Group. To realize green transformation (GX), efficient utilization of not only large-scale centralized power sources, such as geothermal, solar, and hydroelectricity, but also small and medium-sized decentralized energy systems on demand side, is absolutely essential to decarbonization. In addition, stabilization of the grid in conjunction with increased uptake of renewable energy is proving to be a challenge.

Under circumstance, owing to advancements in energy storage systems such as grid batteries, and large-scale domestic and international investments in data centers driven by AI, and digital transformation (DX), the demand for power is growing and the need for stable supply is expanding.

Market Outlook and Technical Requirements

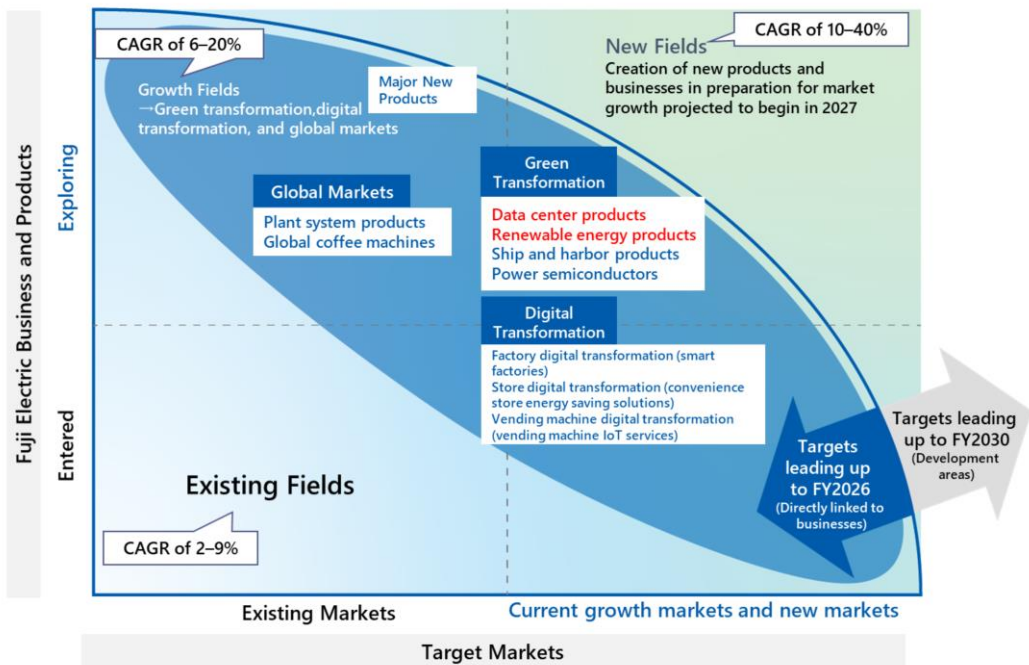
Business	Market Outlook and Technical Requirements (FY2024–2026)		
Energy Management	Renewable energy (Storage batteries)	Market Outlook	<ul style="list-style-type: none"> •Rising grid stabilization (energy storage system) needs simulated by spread of renewable energy •Increase in regions considering adoption of regional microgrids 
		Technical Requirements	<ul style="list-style-type: none"> •Transition toward multi-use application of grid products to accommodate mixed use of various types of storage batteries •Autonomous operation functions that allow storage batteries for power users to act as power supplies during power outages •Focus on power transaction price prediction and risk management in power wholesale, supply–demand adjustment, and other markets
Power Supply and Facility Systems	Data centers	Market Outlook	<ul style="list-style-type: none"> •Ongoing increase in market entries by foreign internet data center operators amid popularization of generative AI •Rises in power consumption due to growth in demand for digital technologies and generative AI 
		Technical Requirements	<ul style="list-style-type: none"> •Need for larger capacities, higher efficiency, and more compact equipment for hyper scaler data centers •Improvement of energy conversion efficiency to reduce CO₂ emissions and running costs •Minimization of mean time to recovery

I'd now like to discuss about the market outlook and technical requirements.

In the energy management business, the widespread adoption of renewable energy has made grid stabilization a significant challenge. Storage battery systems are expected to help stabilize frequency of the grid and are therefore considered to be a growth area. In terms of market trends, there is a need for grid stabilization due to the growing uptake of renewable energy and we expect to see an increase in regions considering the adoption of decentralized microgrids. As for the technical requirements, multi-use application of grid products is needed to accommodate various types of storage batteries, while for power users, storage batteries capable of autonomous operation during power outages are needed as a business continuity plan (BCP) and disaster response measure. For the wholesale electricity market, efficient storage battery control is needed alongside price forecasting and risk management in view of the frequency control market.

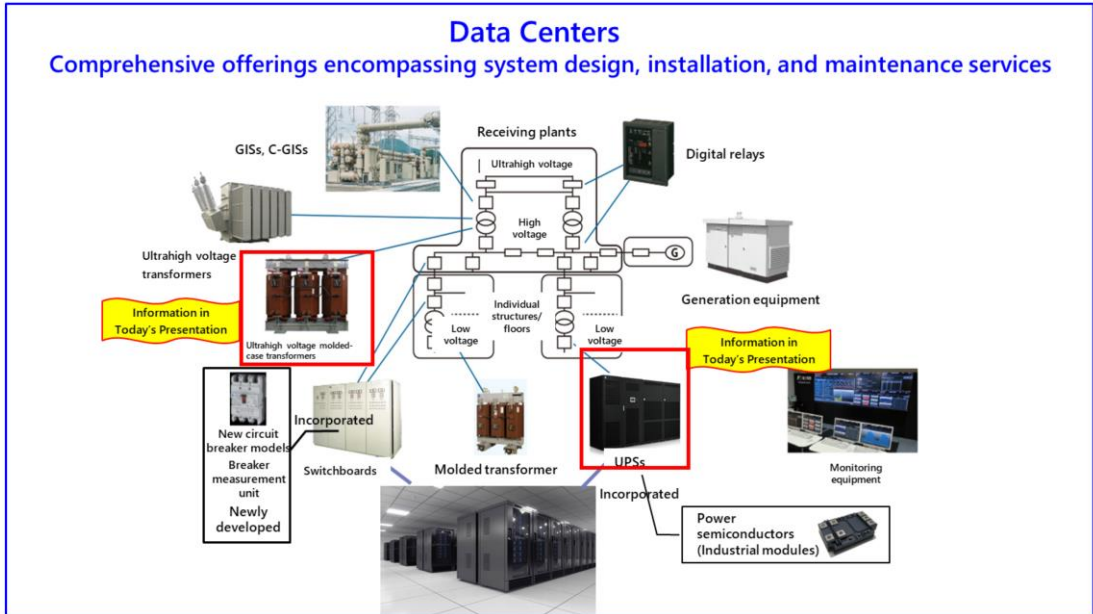
In the power supply and facility systems business, driven by brisk investments in data centers, the technical requirements include larger capacity, higher efficiency, and more compact equipment for hyperscale data centers. Also, owing to the need to reduce CO₂ emissions, improved energy conversion efficiency to lower running costs, along with high availability through minimization of the mean time to recovery (MTTR), are required.

Key Development Themes of FY2026 Medium-Term Management Plan



In our medium-term management plan through FY2026, we have three key development themes: existing fields, growth fields, and new fields. Today, I'd like to focus on products for the growth fields such as GX, DX, and global markets, in particular, our offerings for data centers and the renewable energy market.

Expansion of lineup of products featuring large capacities and increased power density and commercialization of comprehensive electrical equipment offerings



One growth field is solutions for data centers. We can provide comprehensive solutions from power generation to distribution, power stabilization, and blackout countermeasures.

More specifically, our systems supply power to IT equipment including AI servers in data centers from electrical transformers via receiving circuits, transformers, and UPS systems. By providing comprehensive services, from system design to installation, with a product lineup that includes solutions for high capacity and high power density, we specialize in covering all aspects of electrical facilities.

Expansion of lineup of large-capacity UPSs ideal for hyper scaler data centers

Features and Strengths of Large-Capacity UPSs

- Space saving by reducing size of UPSs and peripheral switchgears and controlgears
- Minimization of mean time to recovery through use of unit design
- Reduction of load test costs at time of installation through energy recovery functions



Applicable Fields

- Hyper scaler data centers
- Semiconductor production

Development Focuses

- Maximization of space available for IT equipment (minimization of space used for UPSs)
- High maintainability and availability

Firstly, one of our products for data centers is a large-capacity uninterruptible power supply (UPS). Hyperscale data centers are increasingly handling extremely large amounts of power, which is why we have expanded our lineup of large-capacity UPSs.

Our strength lies in our ability to save space by reducing the size of the UPS unit and its peripheral panels, allowing customers to install more IT equipment such as AI servers. We also employ modular technology to minimize the MTTR. Power can also be transferred among the units.

Load testing is conducted at hyperscale data centers when equipment is being installed, and this process would usually waste a lot of power. Our UPSs are equipped with the function to recover energy between units, thereby significantly reducing load testing costs.

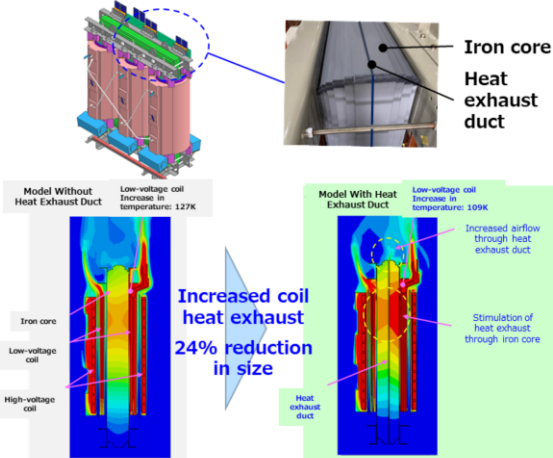
The application fields for our UPSs include hyperscale data centers and other fields that have high power demands, such as semiconductor manufacturing. We expect the market for this product to grow in the future.

The key points in development of this product are compact design that allows more space for installation of numerous IT equipment, and specifications like the MTTR to achieve high maintainability and availability.

Deployment of new products featuring high price competitiveness for Southeast Asia and other global transformer markets

Features and Strengths of Molded-Case Transformers

- More-compact and lighter-weight transformers made possible by increasing insulation and coil heat exhaust levels
- Higher price competitiveness achieved through global part procurement



Applicable Fields

- Electricity distribution equipment for semiconductor factories, data centers, etc.

Development Focuses

- Price competitiveness in Southeast Asian market
- Note: Rapid growth in data centers and semiconductor production projected in Southeast Asia

One of other products for data centers is our cast resin transformer. For this product, we expect to see growth in demand from data centers not only in Japan, but also international markets, particularly in Southeast Asia.

In this field, price competitiveness is crucial. The strength of our product lies in the fact that we have been able to produce a more compact and lighter transformer by improving insulation performance and coil heat dissipation by utilization of analysis techniques. At the same time, we have strengthened price competitiveness through local procurement of the materials.

Similar to our UPS, the fields of application for this product include semiconductor manufacturing and data centers.

The key point in development of this product is to ensure price competitiveness in each region while establishing an agile supply system.

Enhancement of comprehensive offering that respond to rising power demand with unique existing products and new products

Comprehensive Electrical Equipment Offerings



Transformers



Gas-insulated switchgears (GISs)



Molded transformer



Ultrahigh voltage molded-case transformers




Large-capacity rectifiers





Natural ester oil-immersed transformers



Turbine, generators

Newly developed  230 kV / 300 MVA oil-immersed transformers (global specification)

Information in Today's Presentation  22 kV molded-case transformers (global specification)

 Dry air switchgears (GISs, C-GISs)

Newly developed Digital substations

Comprehensive Energy-Saving Offerings



Renewable energy (wind power, solar power, etc.)





Storage battery systems



Energy management systems

Newly developed **Information in Today's Presentation**

 PCSs for 1,500 V DC storage batteries

 Large-capacity string-type PCSs

Incorporated Large-capacity power semiconductor modules for renewable energy applications

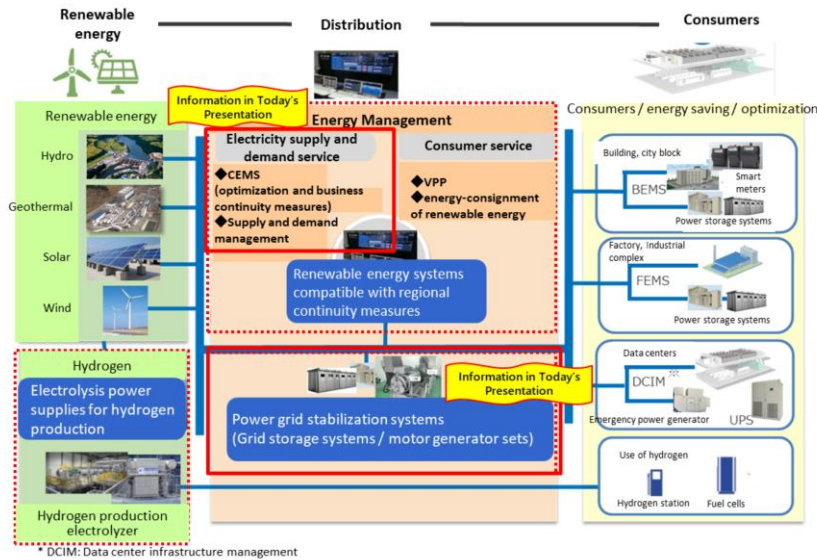


The second growth field is power equipment and products for the renewable energy market.

Given the trends in green transformation (GX), we anticipate further growth in the renewable energy market. To meet rising power demand, we offer a comprehensive lineup of electrical equipment products, including transformers, gas-insulated switchgears, new oil-immersed transformers, compatible with global standards, case resin transformers, and dry air switchgears that do not use SF6 gas.

In the renewable energy sector, we provide comprehensive solutions including power generation equipment such as solar power, storage battery systems, EMSs (energy management systems), and PCSs (power conditioners) that optimize the utilization of storage batteries.

Development of grid stabilization and power transaction support systems to accommodate spread of renewable energy



As adoption of the renewable energy continues to gain momentum, we can expect to see the needs for stabilization of electricity and the activation of power trading market.

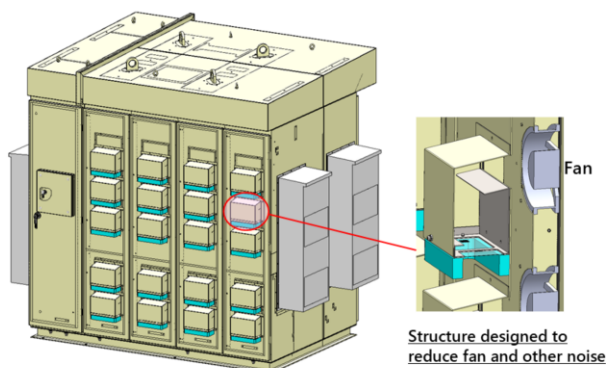
We are pressing ahead with the establishment of a power transaction assist system to assist customers with optimized power transactions and the operation of storage batteries. With this system, we aim to optimize power supply and demand, mainly by managing order timing and storage battery charging and discharging schedules.

Also, as our power stabilization solutions, we propose large-scale storage battery systems that can be connected to the grid, as well as PCSs for storage batteries. With these solutions, we support the stabilization of the entire power system in view of renewable energy expansion.

Use of storage battery PCSs for in-house solar power generation systems and for power transactions in power wholesale, supply–demand adjustment, and other markets

Features and Strengths of Storage Battery PCSs

- Reduction of system costs through use of higher voltages
- Response to diverse needs associated with autonomous operation, power retail, and power use
- Compatibility with wide range of installation environment with high salification resistance and reduced noise



Applicable Fields

- In-house solar power generation systems
- Power wholesale, supply–demand adjustment, and other power transactions
- Storage battery facilities, microgrid systems

Development Focuses

- Expansion of capacity lineup to match customer needs
- Development of autonomous operation functions

Note: Increased use of renewable energy and expansion of storage battery facilities anticipated as part of decarbonization trend

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Firstly, storage battery power conditioners (PCSs). Given the prevalence of solar power generation, trading in the wholesale electricity market and the frequency control market for captive consumption and large-scale power generation will become important after the end of the feed-in-tariff (FIT) scheme.

The strengths of our PCSs lie in reducing system costs through the use of higher voltages, and realizing speedy power transactions at the wholesale electricity and supply-demand adjustment markets. We can keep a lid on system costs with the use of higher voltages, while for captive consumption, our PCSs are capable of operating autonomously. We can also cater to the wide-ranging needs of retail electricity providers. Our PCSs can be installed in various environments as they are relatively quiet and can tolerate high levels of salinity.

The fields of application include solar power generation for captive consumption, wholesale electricity, power systems, storage battery systems, and microgrid systems.

The key point of development here is that by expanding the capacity lineup to meet customer requirements and enhancing the product's autonomous operation functions, we can contribute to the utilization of renewable energy and the increased adoption of storage batteries.

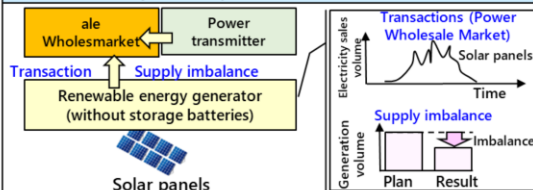
AI-powered prediction and optimization technologies able to accommodate various power transaction needs

Features and Strengths of Power Transaction Support Technologies

- Reduction of imbalance and other risks through use of AI to formulate high-accuracy predictions of power transaction prices
- Contribution to maximized earnings for power generators

Business Model 1

Sale of electricity to solar power wholesale market

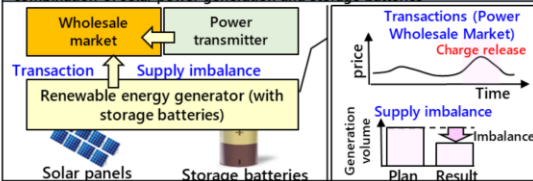


Applicable Fields

- Power wholesale, supply-demand adjustment, and other markets

Business Model 2

Sale of electricity at high prices while preventing imbalance through combination of solar power generation and storage batteries



Development Focuses

- Power transaction price prediction technologies
- Technologies for producing transaction plans that incorporate risks

Now, let's take a look at our power transaction assisting technologies. We are utilizing AI to provide forecasting and optimization systems tailored to various power and transaction needs.

Our strengths are in AI-enabled highly accurate forecast of power trading prices, which reduces the risk of necessary for the introduction of solar power generation.

We aim to maximize earnings for power generators by, for example, having AI learn when trading yields the highest profits. This controls imbalances in market trading and optimizes power generation levels.

The fields of application for this technology are the wholesale electricity and supply-demand adjustment markets.

The key point in its development is the highly accurate forecasting of power trading prices taking into account not only the amount of power generation, but also market trends, as well as the formulation of sophisticated transaction plans by minimizing risks.

This concludes my presentation. Thank you for your attention.

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