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## The Challenge of Optimizing Energy in the Agricultural Sector

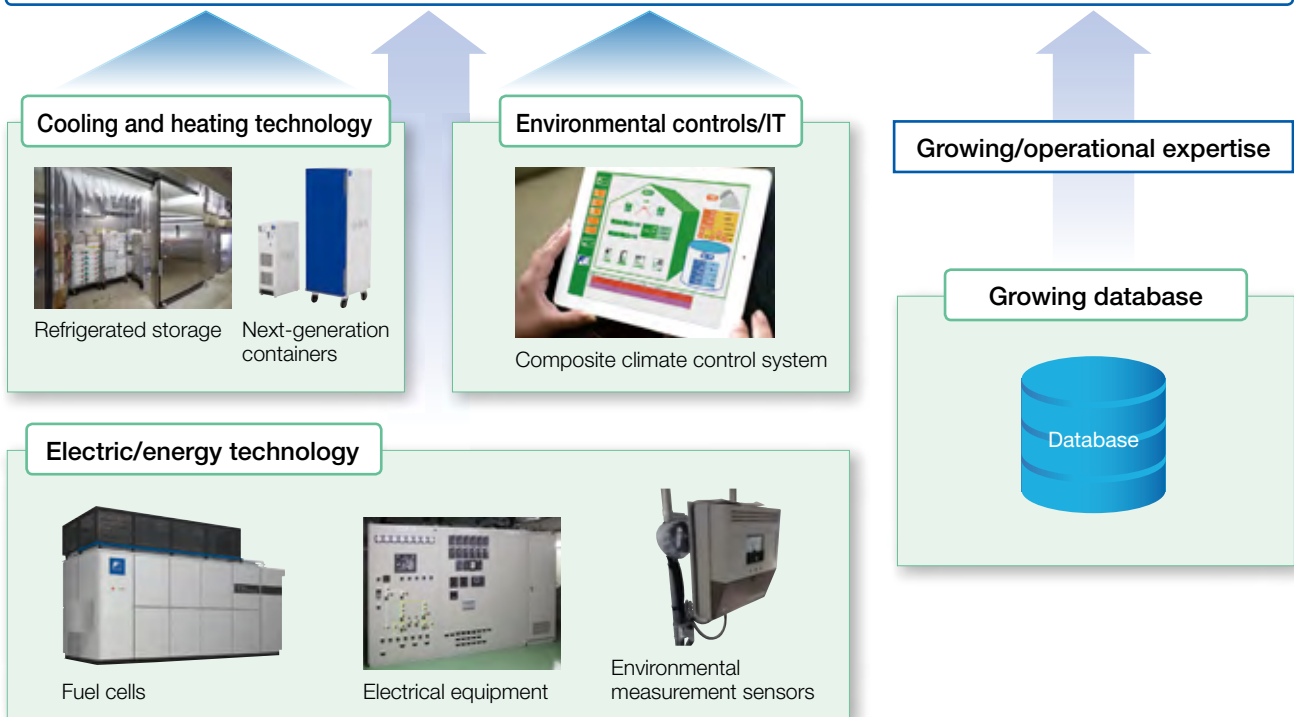
Conditions in Japanese agriculture are changing, with an aging society and falling birthrate, along with a growing awareness of food safety and security. In response to emergent needs in the food and beverage distribution market, new services and business models are appearing. One area attracting considerable attention is plant factories, which make it possible to provide advanced control over growing conditions, ensuring consistent quality and high productivity.

Using our experience in electric and thermal energy and plant control technologies, we are offering proposals for the various facilities, equipment, and information and control systems that support the engineering of plant factories. We also contribute to our customers' businesses by providing complete support for everything from business planning, to construction and operation, including growing and operational expertise.



Smart food distribution chain provided by Fuji Electric

### Plant factory engineering, support and services provided by Fuji Electric



### The Composite Climate Control System Is the Key to Plant Factories

Plant growth is affected by a complex interplay between a variety of environmental factors, including temperature, humidity and amount of sunlight. Our composite climate control system can manage these complex growing environments, enable growers to check the status via PCs and tablet devices, and create the ideal environment for plant growth, resulting in higher yields and improved quality.

Energy savings can also be achieved by adjusting equipment operation flexibly in response to the immediate situation.



## The Optimal Environment for Year-Round Strawberry Cultivation

Tomato Farm Co., Ltd., (located in Tomakomai, Hokkaido) in which Fuji Electric has invested, took advantage of the Ministry of Agriculture, Forestry and Fisheries' "Supportive Projects for Accelerating the Introduction of Next-generation Greenhouse Horticulture" to build a new factory, and in the fall of 2014 began strawberry cultivation. The factory currently raises six different varieties, but in the future, plans to narrow the range down to two or three varieties most suited to cultivation.

Distribution volumes of domestic strawberries decline from summer into autumn, increasing the reliance on imported products. The goal of this cutting-edge growing facility, which is unaffected by climate or weather, is to achieve stable, year-round production and shipments.

The technology required to create the ideal environment for cultivation with minimal use of energy utilizes just the kind of expertise Fuji Electric has developed in its manufacturing business. With a composite climate control system based on our sensor and control technology, crops of consistent quality and volume can be cultivated year-round, while reducing fuel oil, electricity and other energy use by as much as 30% compared to an ordinary greenhouse.

Fuji Electric's entry into agriculture began nearly 20 years ago with the IT sector, but this is our first attempt at engineering a large-scale plant factory measuring two hectares. Plants are living things, and even when handled in a similar fashion, it is not always possible to maintain similar quality. In creating this system, we studied the agricultural expertise needed to create an optimal cultivation environment from the ground up. We also made repeated adjustments to arrive at the ideal combination of Fuji Electric facilities, equipment and



A large-scale, two-hectare greenhouse

systems needed to meet the needs of Tomato Farm. By incorporating feedback from growing data, knowledge, and expertise into the operating and growing process, we are contributing to a stable supply of strawberries that meet the needs of consumers.



Strawberries produced by Tomato Farm are currently being shipped to confectioners and other users in Hokkaido. To provide consumers with the safest, freshest products, Fuji Electric is continuing its efforts to optimize energy use in the agricultural sector too.

### Topic D-BOX Proving Useful in Plant Factories

D-BOX is a next-generation cold storage container launched in 2014. It not only enables constant-temperature distribution control during delivery from the production site to stores and sales areas, but can be used for movement of goods within the plant factory. This helps prevent the deterioration of quality in easily-damaged strawberries, and ensures that safe and highly fresh products are delivered to consumers.



### Voice Message from a Customer



**Seiki Aoyama**  
Director  
Tomato Farm Co., Ltd. (Back row, far left)

Traditionally, agriculture relied largely on experience and instinct. Fuji Electric participated in this project from the initial proposal phase, and worked with us to conceive and build the system. Today, we see enormous potential in the systemization of worker expertise and knowledge through the composite climate control system. We will accumulate more operational data to increase the accuracy of our controls.