

Panasonic

Initiatives in Hydrogen Business

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Notes: 1. This is an English translation from the original presentation in Japanese.
2. In this presentation, "Fiscal 2024" or "FY3/24" refers to the year ending March 31, 2024.

To Achieve Our Target Vision for 2030

The best partner that balances

Maintain and improve well-being and Solving social and global issues

(Well-being) (Sustainability)

Value

Society

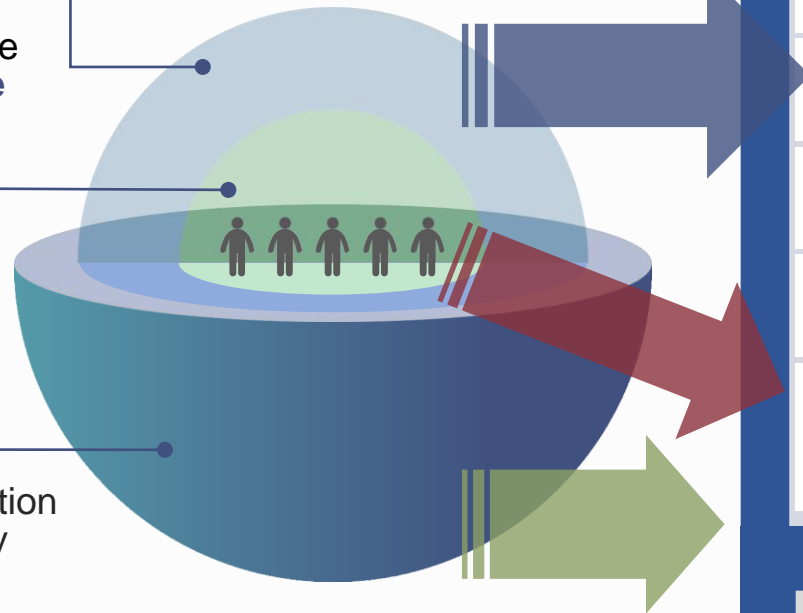
Providing safe and secure Lifestyle Infrastructure

People

Improving the Quality of Life for each person

Planet

Contributing to decarbonization and the circular economy



Necessary businesses to realize our target vision

B2B business	■ (1)HVAC system	New areas, new businesses	
	■ (2)Overseas electrical construction materials ■ (5)Electrical construction materials in Japan		
	■ (3)Energy solutions (incl. hydrogen business)		
	■ (4)CO ₂ refrigeration system ■ (6)Display cases		
	B2C business		■ (7)Home appliances in Japan ■ Home appliances in China, Asia, other regions ■ Age-free services (elderly-care) ■ Electric bicycles, etc.
			Each business achieving well-being and sustainability
<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid gray; padding: 5px;"> Life tech& ideas People-oriented technology and value proposing capabilities </div> <div style="border: 1px solid gray; padding: 5px;"> Panasonic Brand Trust and Foresight </div> </div>			

Global Trends and Social Issues

Transition to a **'Decentralized Society'** is required to address global challenges

Global Energy Trends

To combat global warming and needs on decarbonization (carbon neutral), energy shift to renewables (solar, wind, etc.) is accelerating globally.
Decoupling fossil fuels accelerates energy security needs.

Countries Declared Carbon Neutral



Source: Ministry of Economy, Trade and Industry in Japan (2021)

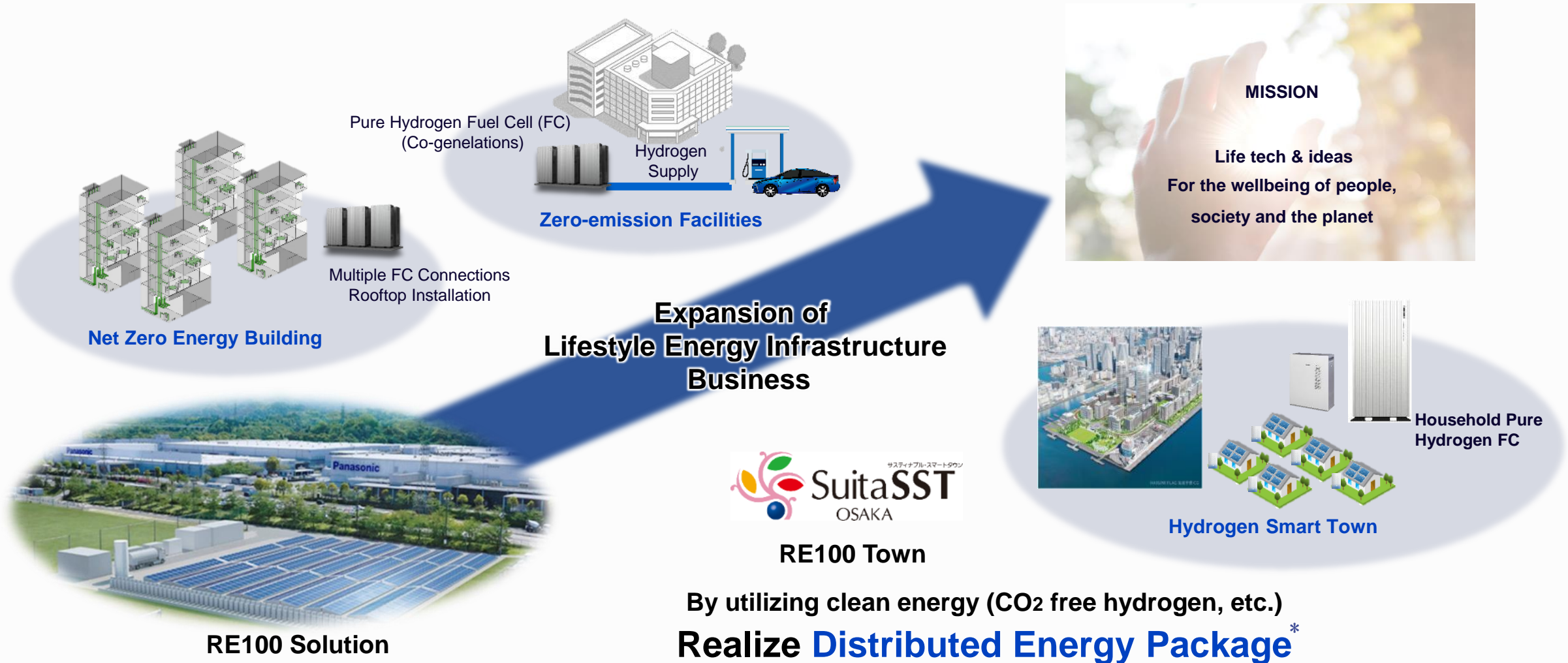
Social Issues

Strengthening the resilience of local infrastructures (**transition to a 'Decentralized Society'**) is required as a countermeasure to increasing negative impacts caused by climate change and natural disasters such as earthquakes



(Case) Damage to roads and power lines caused by earthquakes and large typhoons: prolonged large-scale power outages in urban areas

Panasonic's Commitment to Solving Social Issues



Hydrogen Business Opportunities

Distributed hydrogen-related Market: 2030 approx. 6 trillion yen

Large Scale Centralized Energy

Renewable Energy Power Generation

Mega solar power generation
Large-scale wind power generation



Hydrogen Production

Large-scale hydrogen production plant and equipment



Int'l Long Distance Transportation

Marine and intercontinental hydrogen pipeline transportation



Domestic Delivery and Supply

Natural gas infrastructure, trucking supplies



Supply & Demand Control

Use (Fuel Cell)

Services



Factory



Buildings



Smart Town



Mobility

Renewable Energy Power Generation

Small-scale renewable energy power generation in the adjacent land



Hydrogen Production and Energy Storage

Energy system for local production and consumption
Using small storage batteries and hydrogen generators



On-site Hydrogen Production Equipment



Storage Battery

*1 EMS:Energy Management System

Distributed Energy

Target area: Distributed Energy Package

2030
Estimated
Market Size

Distributed energy *2: Approx. 6 trillion yen

Distributed energy package (under 1MW, Europe and Japan) *2: Approx. 650 billion yen

Distributed Energy Package Use Cases

Aiming to establish a competitive advantage
in the small- and medium-scale (1 MW or less) areas that are close to people's lives



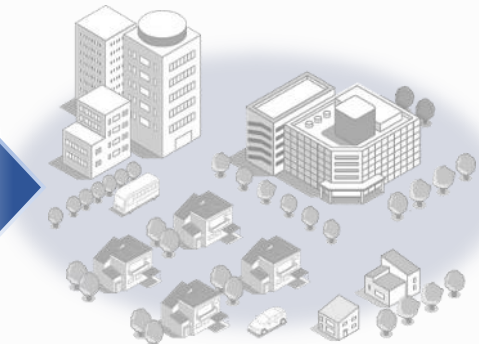
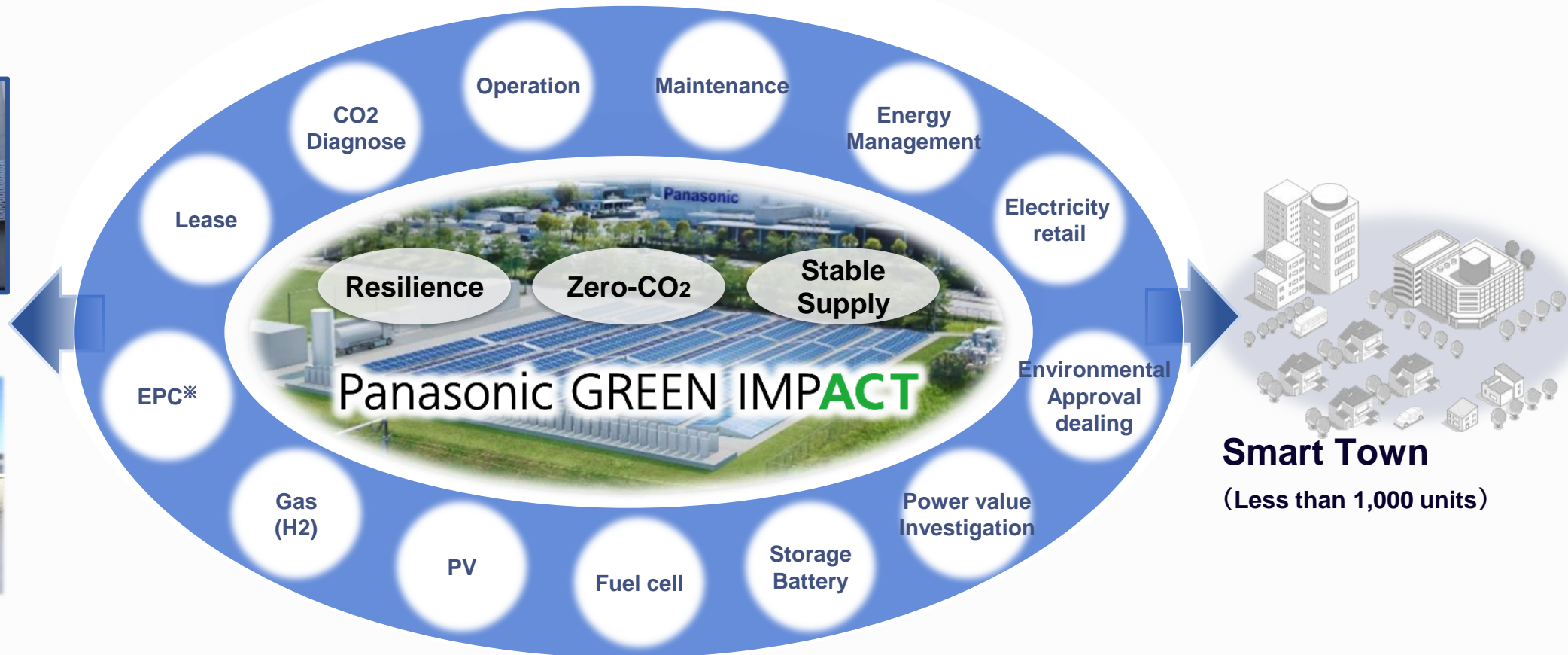
Kusatsu factory

Factories



Rooftop Installation

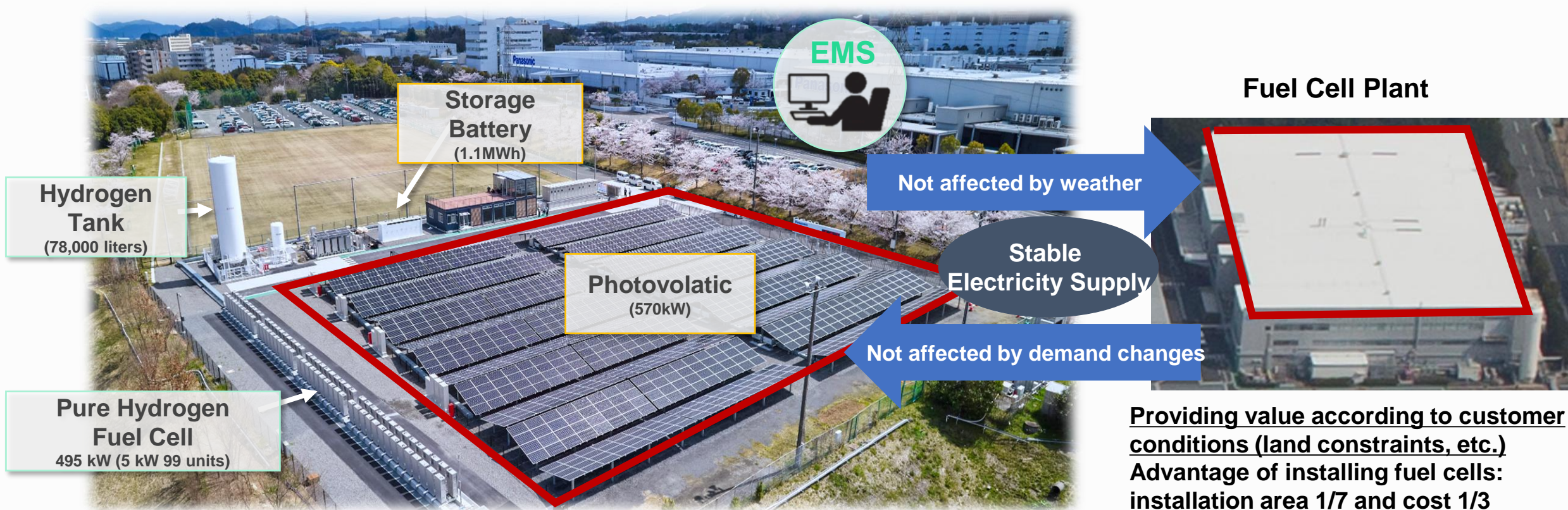
Buildings and Commercial Facilities



Smart Town (Less than 1,000 units)

The World's First RE100 Solution Overview

Through RE100 Solution of “3 Battery Collaboration + EMS”,
Achieving decarbonization, efficient energy use and resilience



Customer Value Update

Approx. 450 companies visited RE100 solution and obtained valuable feedback from various customer's needs

Customer's Voice

- Request for transition and response to decarbonization from suppliers are increasing

- Stable energy supply (such as electricity and heat) is concerns
- Need to strengthen business continuity (resilience)

- Requests for packaged proposals which include hydrogen supply and EMS
- Needs for total cost reduction, including installation, construction and maintenance

1: Decarbonization and creation of environmental value

Accumulation and utilization of data/
visualization of CO₂ emissions

2: Secure and stable energy self-sufficiency

Autonomous power self-sufficiency through three batteries
stable heat supply

3: TCO * Optimization * Total cost of ownership

Lower total energy costs



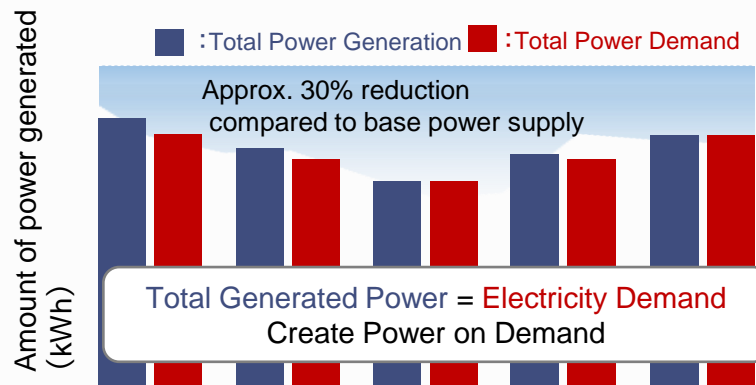
Achievements in Demonstration

Developing our unique EMS and core technologies through demonstration of RE 100 solutions

Realization of Local Production and Consumption (Upgrade of EMS Function)

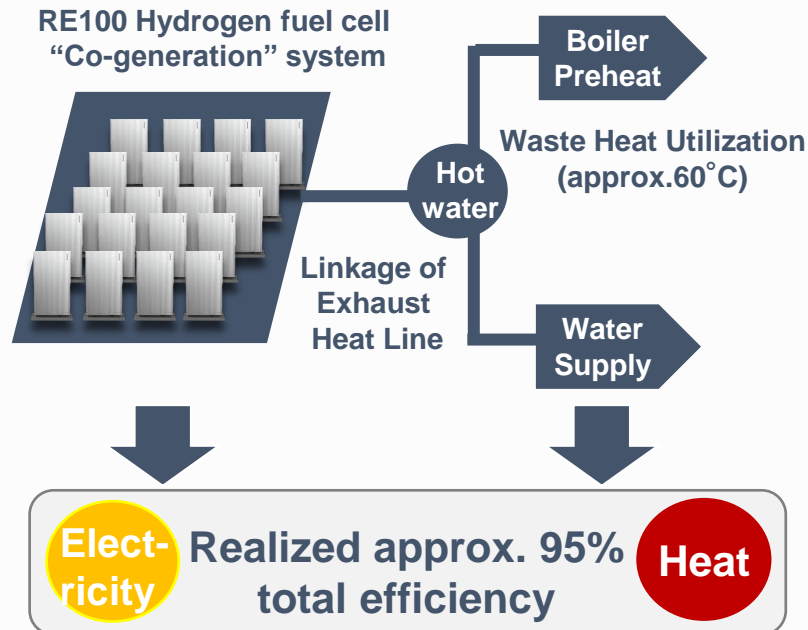
Upgrading EMS through RE100 Solution

- Power purchase control rate : increase to 98%
- Total base power generation : 30% reduction



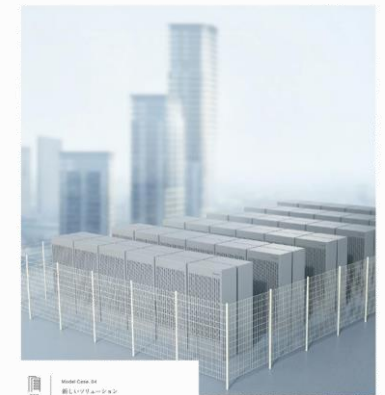
Utilization of Electricity + Heat

Appealing environmental value by utilizing electricity + heat
Achieved 95% overall primary energy use



Evolution of Pure Hydrogen Fuel Cells

Strengthening cost competitiveness, developed with "Ene-farm" and evolution of reliability (high resilience) by linking multiple units of equipment



つくりだすところに、発電所をつくる。
事業活動で使用する電力を100%再生エネルギーにすることで目指す。産業用燃料電池「RE100」のRE100に
加えて、再生エネルギーを100%再生エネルギーに活用。その実現を促すに「Ene-farm」を構築し、再生
エネルギーの供給を確保し、再生エネルギーの活用を促進すること。結果、CO2削減に貢献し、再生エネルギーの
普及を促すことが期待されます。

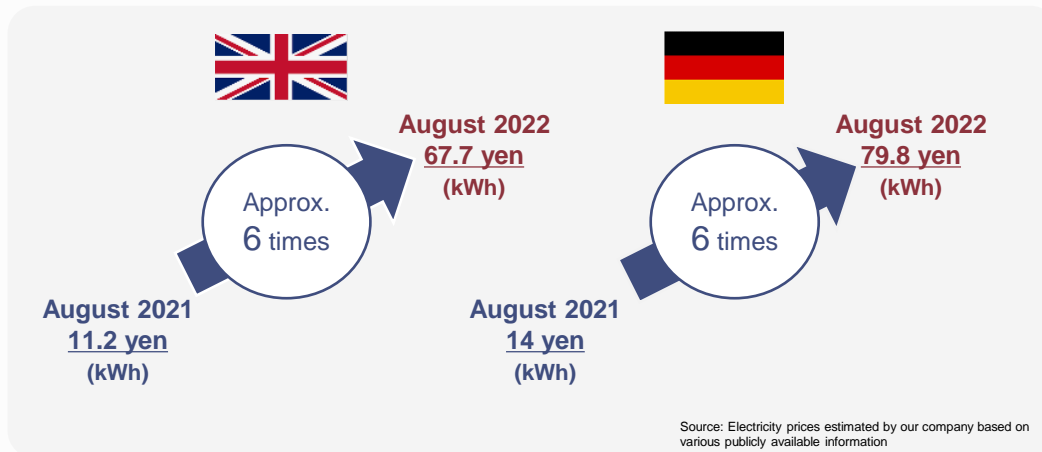
H2 KIBOU

Trends in Europe

Acceleration of de-fossil fuels raise further interest in hydrogen

Social Issues

Facing Challenges: Stable electricity prices and supply as the electricity prices rose



Acceleration of transition from fossil fuels (e.g. natural gas) to hydrogen

Business Opportunity

The President of Germany, government officials along with approx. 80 business delegate visited the Kusatsu H2 KIBOU FEILD site



Scale of Investment RE100 Demonstration Launches in Europe

Focal Investment in "strengthening core technology development in Japan" and
"launching Proof of Consent (PoC) in Europe"

A foothold to attract customers in Europe, where interest and marketability is high.



Investments and Costs (Hydrogen business overall)
Approx. 20 billion yen (FY23 -24 total)

Medium- & Long-term KPI

Business Development

Focusing on Europe and Japan,
Target to increase customer and commercialization of RE100 solutions in the next mid-term period

■ **Aimed Business Scale:** **100 billion yen or above**

Cost Competitiveness

Strengthen overall cost competitiveness by developing EMS algorithm and fuel-cell Hardware

■ **Total Energy Cost * (per kWh):**

FY26**- 30%****FY31****1/3**

(Compared to current status)

*Pure hydrogen fuel cell hardware, control system, hydrogen raw materials, etc.

Panasonic

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