



Zero Emissions Challenge 2050

New challenge towards a Carbon Free Society

23rd March 2021

Chubu Electric Power Co., Inc.

Chubu Electric Power Group “Zero Emissions Challenge 2050”

Together with communities and our customers, we aim to simultaneously achieve “decarbonization” and “safety, stability and efficiency” through the innovation of the energy infrastructure.

- 2030**
 - We will reduce **CO2 emissions** from electricity sold to customers **by 50% or more compared with FY2013.**
 - In addition, we aim **for 100% electrification***1, 2 of **company** *3 **-owned and operated vehicles**
- 2050**
 - We will take on the challenge of attaining **net zero CO2 emissions** for our entire business to **contribute to the realization of a carbon-free society**

- **Decarbonization of electricity** by maximizing the use of non-fossil energy and making effort to put hydrogen technology, carbon recycling, etc. into commercial application
- **Electrification** and **decarbonization** of energy use together with **communities** and **customers**

Chubu Electric Power Group

- ✓ **Energy Infrastructure** supporting People’s Lives and Industries
- ✓ Energy Saving and Electrification by **Energy Solution Technology**



Chubu Region

- ✓ **Innovative Technologies** by manufacturing
- ✓ Realize **Recycle-oriented society** by leveraging well-balanced industrial structure



Maximize / combine our solution expertise with innovative technologies

*1 Electric vehicles (EV), plug-in hybrid vehicles (PHV), fuel cell vehicles (FCV), etc.

*2 Excludes special vehicles such as emergency and construction-use vehicles not suitable for electrification

*3 Chubu Electric Power, Chubu Electric Power Grid, Chubu Electric Power Miraiz

2050 From Chubu Region to the World

- Taking advantage of the characteristics of the Chubu region, which boasts abundant nature and a **thriving agriculture sector and industries**, we believe it is essential to quickly proceed with the promotion of **a recycling-oriented society and the introduction of self-distributed systems in collaboration with industry, government and academia.**
- The Chubu Electric Power Group will **provide the foundation to support the promotion and introduction of these**, and together with residents of local communities, will **disseminate these initiatives taken in the Chubu region to the rest of Japan and the world.**

Characteristics of the Chubu Region

Balanced industrial structure

Abundant water resources
Abundant land and nature

Concentrated manufacturing industry and advanced technologies

Proximity to work and residences
Situating in the center of the country with key transportation hubs

Potential

- **Foundation for introducing distributed power sources** such as solar power and hydropower
- **Higher-added value such as suburban horticultural agriculture** that utilizes the region's warm climate
- **Possibility of using agricultural biomass**
- Utilization of a **diverse concentration of supply chains** such as those of components manufacturers
- **Innovation such as development of fuel cell components**
- Besides manufacturers, **there are also numerous recycling companies**
- **Utilize a decentralized regional structure** centered on cities
- Create **convective flows and interchanges of people, goods and information**
- **Strengthen collaboration and functions among universities and promote globalization**
- **Strengthen disaster prevention capabilities (resilience) through collaboration among bases and wide-region supplementation**



Promote the introduction of recycling-oriented and self-distributed systems

Optimization of production, consumption and reuse (recycling-oriented society)

Promote the introduction of recycling-oriented and self-distributed system

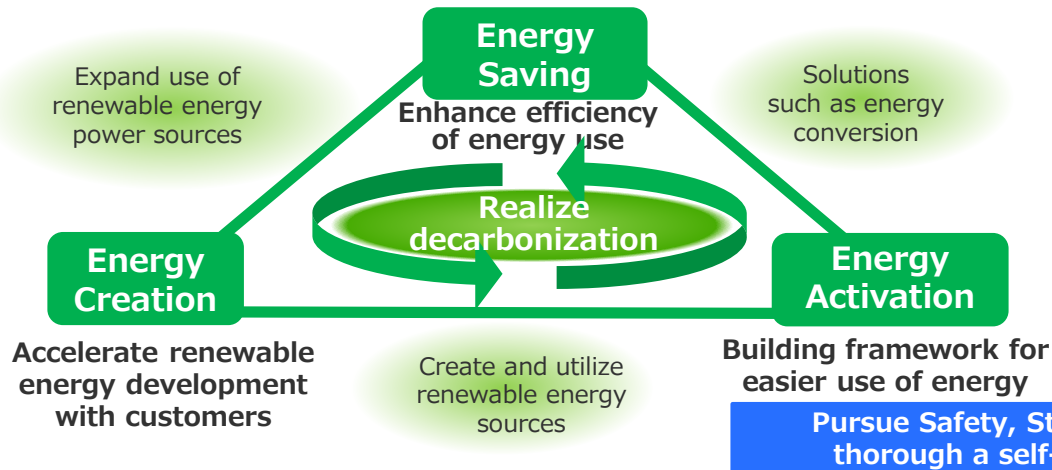
Recycled use of resources and energy (decarbonization)

Efforts for “Zero Emissions Challenge 2050”

Electrification and Decarbonization with communities and customers

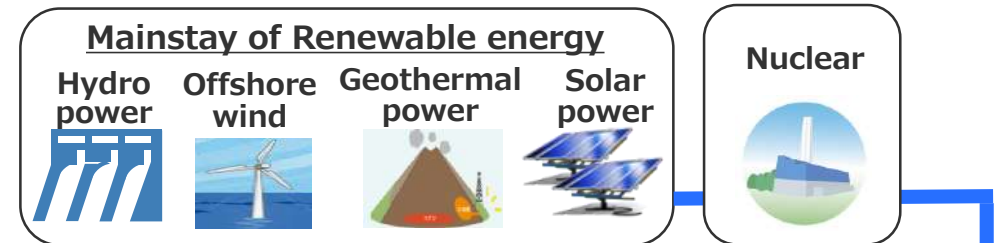
- Promote a balance between “solving issues concerning customers’ enriched lives and their business issues” and “decarbonization” together with communities and customers.

Triad consisting of “Energy Saving”, “Energy Creation”, and “Energy Activation”

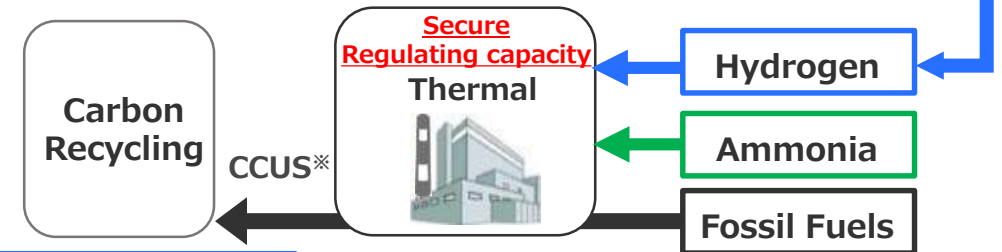


Decarbonization of energy provided

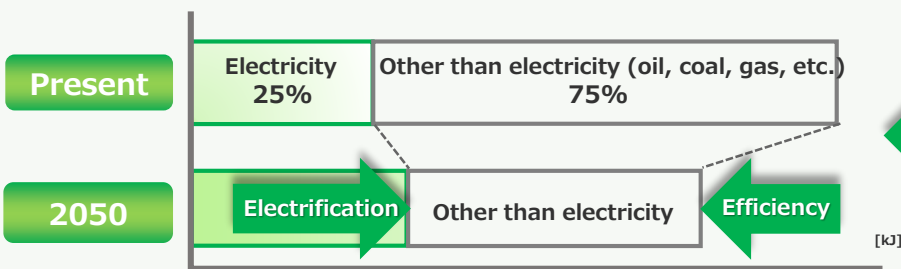
- Maximum use of non-fossil resources



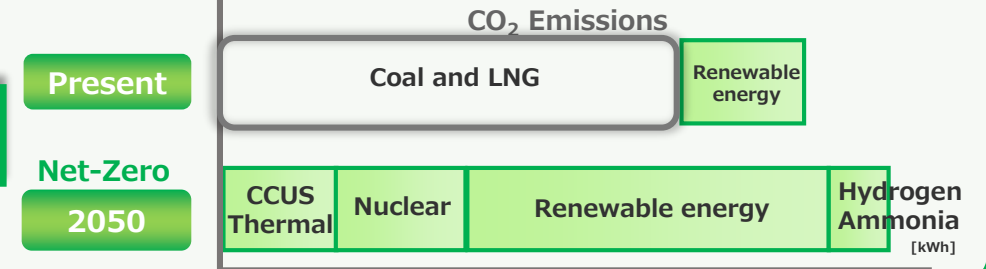
- Commercialization of next-generation technology and decarbonization of fossil fuels



Electrification and Enhanced efficiency of energy consumption

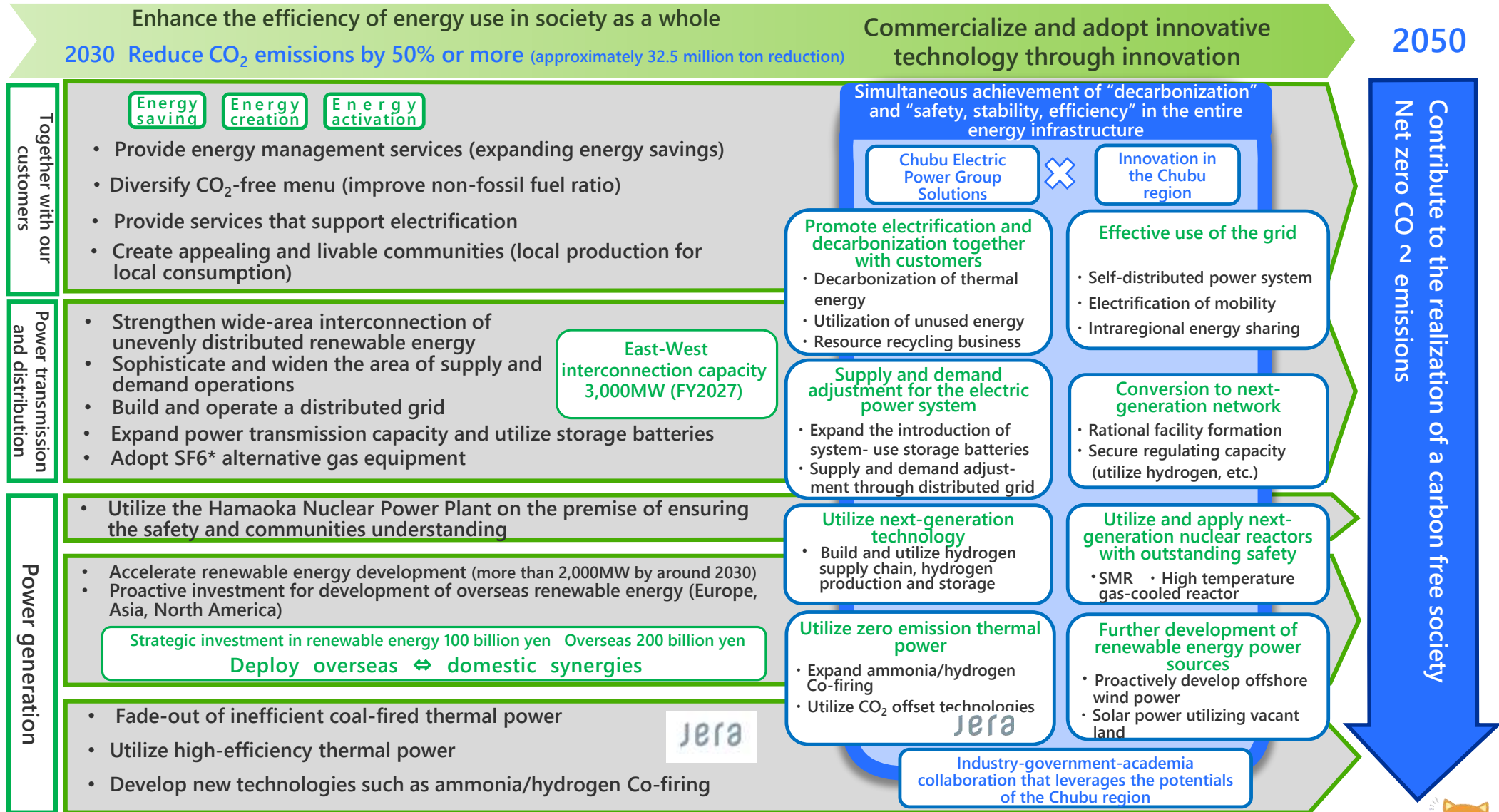


Decarbonization (Composition of generated power)



* Abbreviation of Carbon dioxide Capture, Utilization and Storage technology that separates and recovers carbon dioxide for effective use or storage

Roadmap for Zero Emissions Challenge 2050



* Sulfur hexafluoride A gas used as an insulator such as in substation equipment. Sulfur hexafluoride is designated as a gas subject to global warming prevention and emission controls.

This is a Company initiative based on national policies and the target values may be adjusted in the event the system design is changed in the future. The initiative is also premised on the steady progress of decarbonization technology and economic rationality.



- Each employee of the Chubu Electric Power Group will work together with local communities to realize **a carbon-free society, coexistence with nature, and recycling-oriented society** under **the Chubu Electric Power Group Basic Environmental Policy**.
- We have newly established the **Zero Emissions Committee**, which reports directly to the president, and will further **enhance our corporate governance** for environmental management.
- We will promote technological development for innovation **in collaboration with industry, government and academia**.
- We will actively and efficiently invest and diversify our financing such as **Green Bond** ※ and other means.

Chubu Electric Power Group Basic Environmental Policy

Contributing to the realization of a carbon-free society

Coexistence with nature

- In order to protect a rich natural environment, we will conduct our business activities with consideration for biodiversity and the sustainability of water resources.

Creating a Recycling-oriented Society

- We will strive to minimize the amount of waste disposed of by curbing consumption of resources, controlling the generation of waste, and promoting the reuse and recycling of resources.

Greater environmental awareness

- Deepening communication with local communities
- We will contribute to society by nurturing human resources who can voluntarily act in an environmentally conscious manner.



For detailed achievements, please refer to https of the Chubu Electric Power Group Environmental initiatives(Japanese version)

https://www.chuden.co.jp/csr/environment/env_report/

※Bonds whose use of funds is limited to environmental improvement projects

(Reference) Initiatives in cooperation with communities and customers

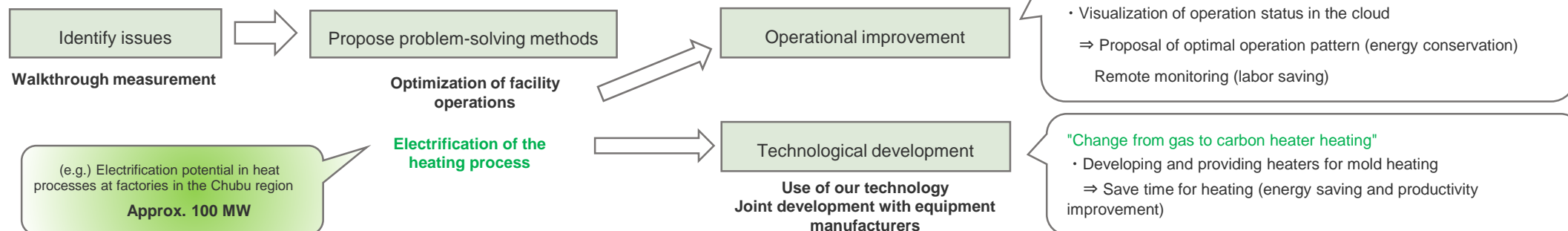
➤ Electrification and Decarbonization with communities and customers

Triad consisting of "Energy Saving", "Energy Creation", and "Energy Activation"

Energy saving

We will improve manufacturing productivity and achieve energy savings, mainly "heat" technology through electrification and "expertise in improving the operation of facilities."

<Examples of solutions with through knowledge of customers' production processes and store operations>



The Chubu Electric Power Group can propose a variety of solutions, including production processes that were previously difficult to electrify.

Energy Creation

Services of Creating Renewable Energy at households, factories, stores, etc.

Achieve the additionality (capacity increase) of renewable energy
⇒ Prepare a price menu that makes it easy to "Energy Creation"



A service to use electricity generated by installing solar panels on the roof of Business customers.

In addition to solar panels, we will also propose services that lead to "Energy Activation" using storage batteries and the use of unused energy source such as waste heat from factories.



Energy Activation

Building framework for easier use of energy

CO2 Free Denki(electricity)

- Providing Local production and consumption services such as "Shinshu Green Denki"
- In addition, developing further Renewable Energy, and contribute to the realization of "Energy Creation" (Additionality)

Demand Response Service for Expanding the use of Renewable Energy












- We will develop systems to expand the use of renewable power sources and provide demand response service utilizing public infrastructure, etc.

Services utilizing EV & Storage Batteries

"TOYOTA GREEN CHARGE"



(Reference) Chubu Electric Power Group's Contribution to "Green Growth Strategy"

<p>Offshore wind power</p> <ul style="list-style-type: none"> ✓ Development 2,000MW or more Renewable Power Plant ✓ Technology Development of Floating Offshore Wind Plant 	<p>Nuclear power</p> <ul style="list-style-type: none"> ✓ Operation of Hamaoka Nuclear Power Station ✓ R&D and Utilization of Innovative Generation Reactors 	<p>Aviation</p> <ul style="list-style-type: none"> ✓ Development of Bio-Jet Fuel Production Technology 
<p>Maritime</p> <ul style="list-style-type: none"> ✓ Utilization of Ammonia for Marine Fuel 	<p>Fuel Ammonia and hydrogen</p> <ul style="list-style-type: none"> ✓ Demonstration and Full-Scale Operation of Co-Firing with Hydrogen and Ammonia 	<p>Carbon Recycling</p> <ul style="list-style-type: none"> ✓ R&D of highly efficient CO2 Separation / Recovery Technologies ✓ Utilization of CO2 Absorbent Concrete 
<p>Resource Circulation</p> <ul style="list-style-type: none"> ✓ Contributing to the Creation of a Recycling-oriented Society through the Reuse, Reduce, and Recycling 	<p>Infrastructure</p> <ul style="list-style-type: none"> ✓ Formation of Mobility Infrastructure <ul style="list-style-type: none"> • e-Mobility Power (charge-system installation) ✓ Construction of Carbon Neutral Port 	<p>Creating Attractive and Comfortable Cities</p> <ul style="list-style-type: none"> ✓ Provision of Energy Management Services <ul style="list-style-type: none"> • Development of "CO2 free menu" and Services Utilizing Storage Batteries 
<p>Semiconductors and ICT</p> <ul style="list-style-type: none"> ✓ Supplying Renewable Energy for Data Centers ✓ Simultaneous Achievement of Energy Savings and Stable Supply 	<p>Mobility and battery</p> <ul style="list-style-type: none"> ✓ Development and Introduction Support of EV Infrastructure <ul style="list-style-type: none"> • Fleet EV Initiative • TOYOTA GREEN CHARGE ✓ 100% Electrification of Company-owned Vehicles 	<p>Lifestyle-related industry Electrification</p> <ul style="list-style-type: none"> ✓ Provision of community support infrastructure <ul style="list-style-type: none"> • Services through the Integration of Energy Platforms and Data Platforms 
<p>Food, Agriculture, Forestry and Fisheries</p> <ul style="list-style-type: none"> ✓ Examination of CO2 Absorption / Fixation Technologies Using Weeds 		
<p>Power Generation</p>	<p>Transmission and Distribution</p>	<p>With Customers</p>

* "Green Growth Strategy Through Achieving Carbon Neutrality" Ministry of Economy, Trade and Industry (December 25, 2020)

