

**Shizuoka Gas Group**

**Carbon Neutral Vision 2050**

**August 2021  
Shizuoka Gas Co., Ltd.**

Shizuoka Prefecture is an area blessed with rich natural resources, and boasts a variety of industries, such as food and paper manufacturing. We at the Shizuoka Gas Group will tackle the challenge of achieving carbon neutrality by 2050 alongside our customers and our local communities, while taking advantage of the area's unique strengths. In addition, we will build out our expertise gained here into Southeast Asia and other regions, contributing to problem-solving in each of these areas.

## Shizuoka's Unique Characteristics

### 1) Rich natural resources

- Abundant forest resources (approx. 65% of prefecture land is forest)
- Ample groundwater and other water resources
- Izu Peninsula Geopark
- Mild climate

Environment and forest conservation

### 2) Diverse industries

- Hub of energy-intensive industries: E.g. Paper, beverage industries (#1 in shipment volume nationwide)

High energy demand

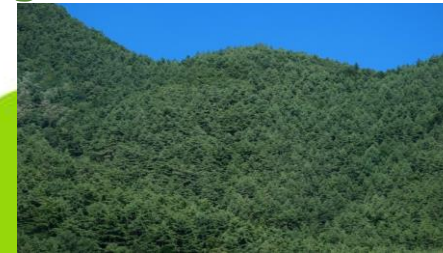
### 3) Robust infrastructure, close to home

- Community-based city gas company
- High-pressure gas pipeline connected to major metropolitan areas
- Advancing toward 100% earthquake proof gas pipelines

Building a resilient region offering a comfortable lifestyle

- Conservation of the environment and forest resources
- Contributions to achieving a carbon neutral society from forest CO2 absorption

- Spreading cogeneration systems amid energy demand
- Maximizing utilization of local renewable energy through distributed energy systems



Forest resources



Fuji area paper industry



Long-term partnership agreement



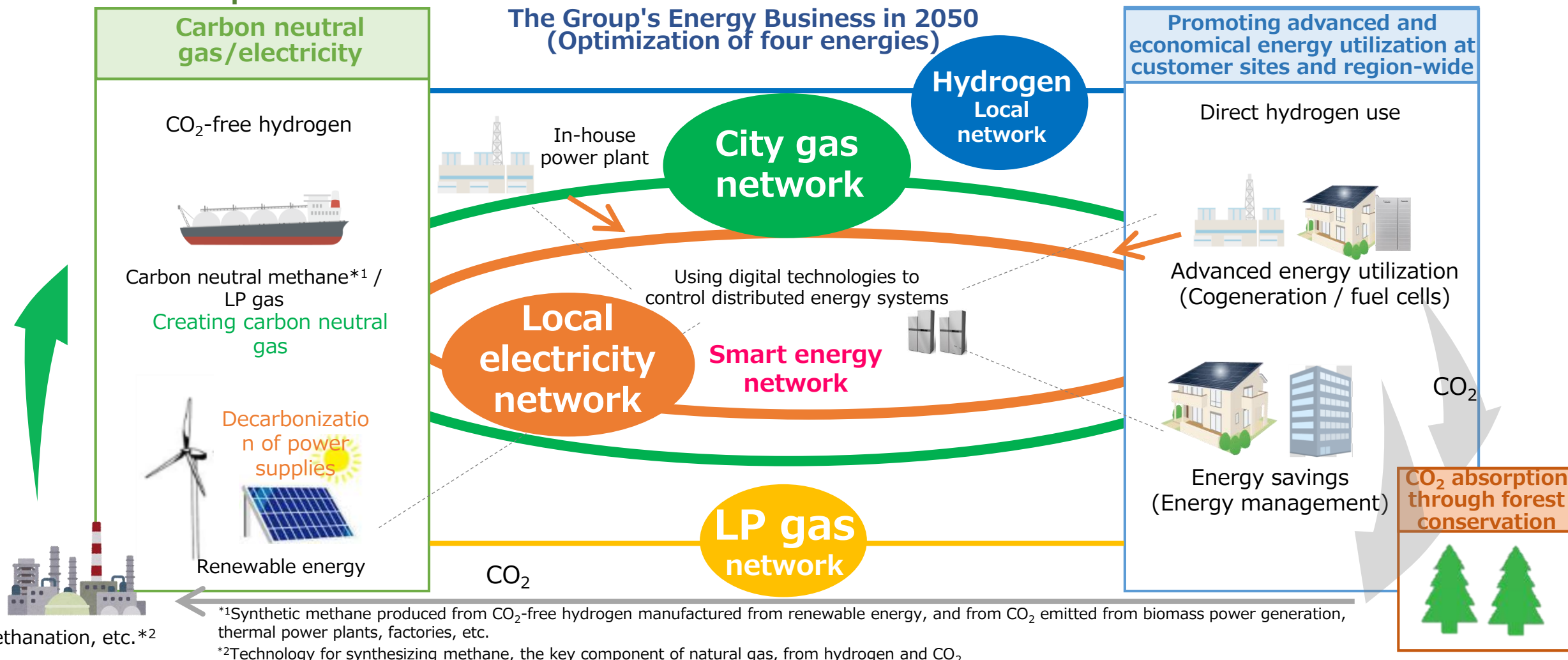
Shimizu LNG Co., Ltd., Sodeshi Terminal



Transferring expertise to Southeast Asia and other overseas regions (Overseas Businesses)

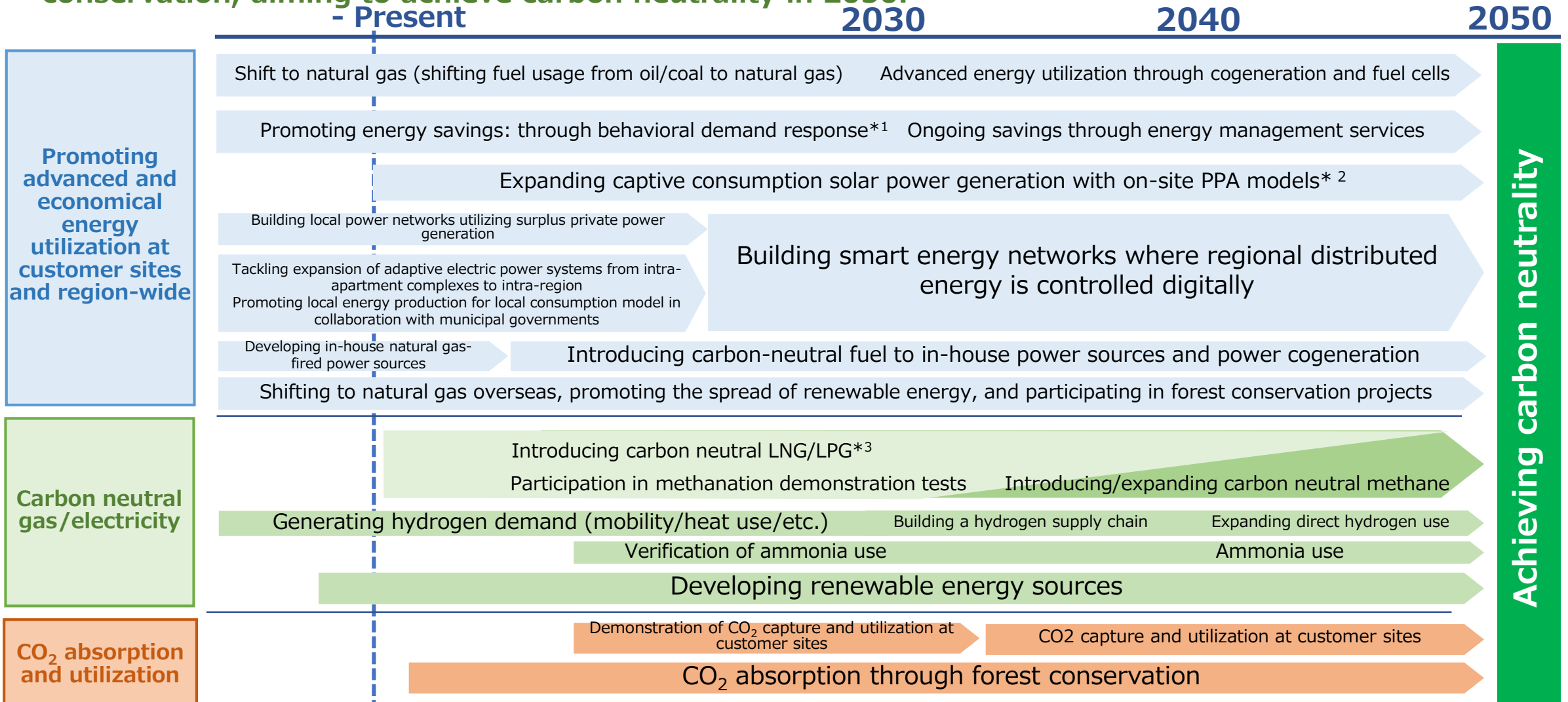
# Shizuoka Gas Group's Energy Business

The Shizuoka Gas Group has implemented a number of measures to help achieve a low-carbon society, including the shift to natural gas and more advanced and economical energy utilization through cogeneration and fuel cells. In addition to these measures, we will also promote the use of innovative technologies to make gas carbon neutral, the development of renewable energy sources, the construction of smart energy networks, and the absorption of CO<sub>2</sub> through conservation of forests in Japan and overseas.



# Roadmap towards Carbon Neutrality

We will work alongside our customers to accelerate efforts toward reduced carbon footprints, and tackle the challenges of utilizing carbon-neutral methane, hydrogen, and ammonia. We will also promote the development of renewable energy power sources and CO<sub>2</sub> absorption through forest conservation, aiming to achieve carbon neutrality in 2050.

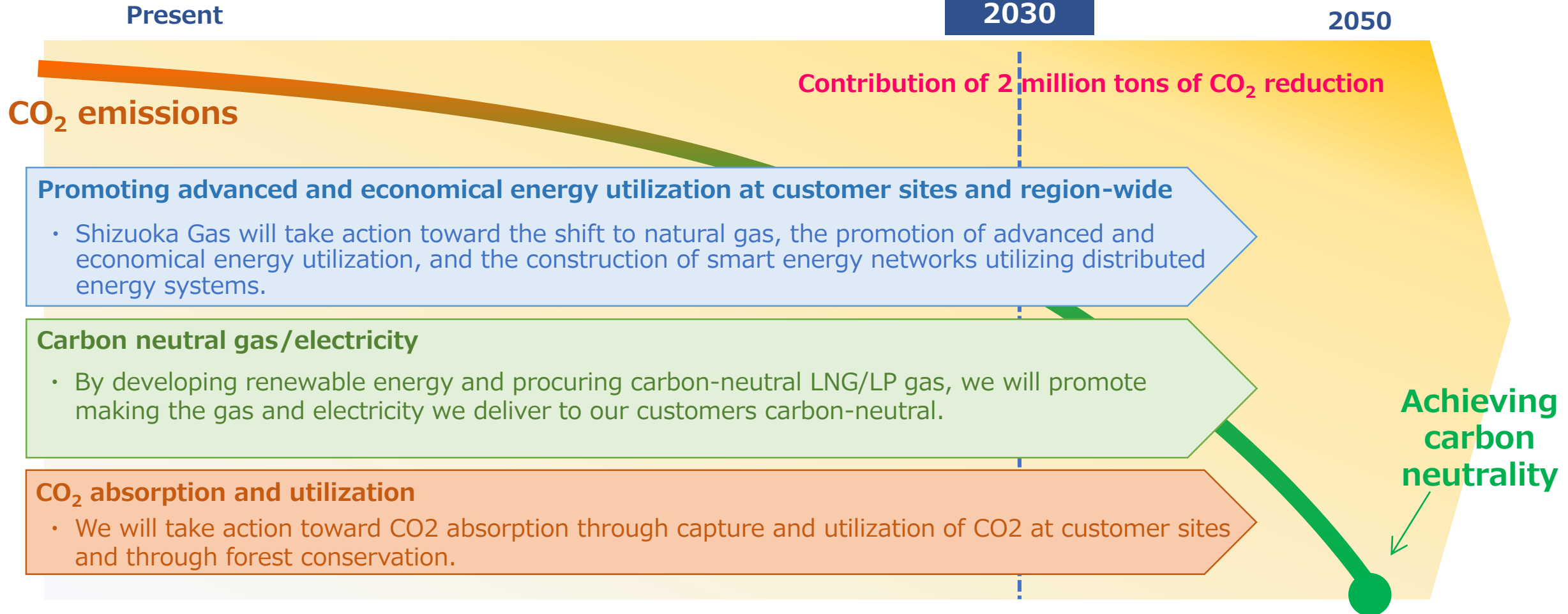


\*<sup>1</sup>Efforts to encourage voluntary customer electricity conservation (behavioral changes) targeting lower electricity demand \*<sup>2</sup>A mechanism whereby solar power generation equipment is installed on customer premises at the operator's expense for provision of generated energy to customers \*<sup>3</sup>LNG/LPG in which greenhouse gases generated in the process from mining to combustion are offset by CO<sub>2</sub> reductions from reforestation support, etc.

# Tackling the Challenge of 2 Million Tons\* of Reduction in CO<sub>2</sub> Emissions by 2030

Rigorous CO<sub>2</sub> emission reductions are key in the transitional phase until practical implementation of innovative technologies. The Shizuoka Gas Group will take a variety of actions to contribute to CO<sub>2</sub> reductions through 2030.

## Initiatives in the Transitional Phase

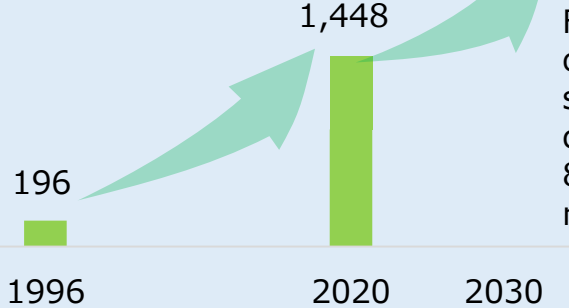


\*Amount of contribution to CO<sub>2</sub> reductions through Shizuoka Gas Group business activities in 2021 and thereafter

- We will accelerate the reduction of carbon footprints among customers using oil, coal, and other fuels by helping them shift to natural gas.
- We will work alongside our customers to reduce their carbon footprints by promoting energy conservation through methods like advanced energy utilization and demand.

## Shift to natural gas

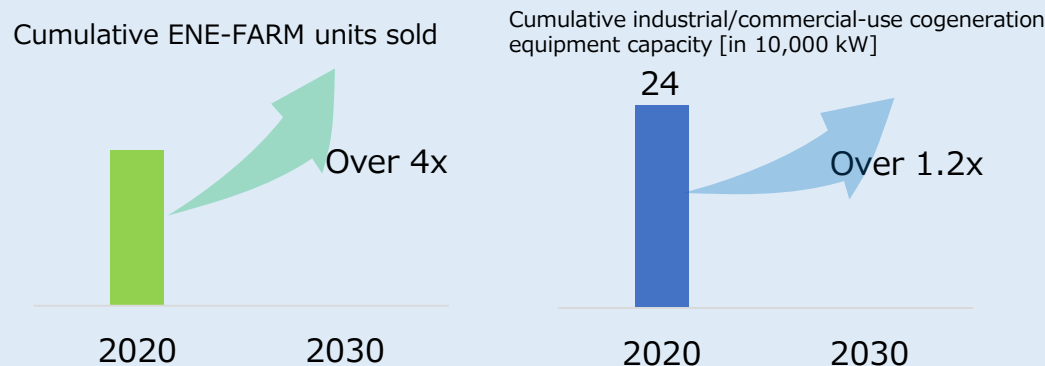
City gas sales volume (non-consolidated)  
(million m<sup>3</sup>)



From the 1996 introduction of natural gas to 2030, the shift to natural gas has contributed to a total of 800,000 tons of CO<sub>2</sub> reductions

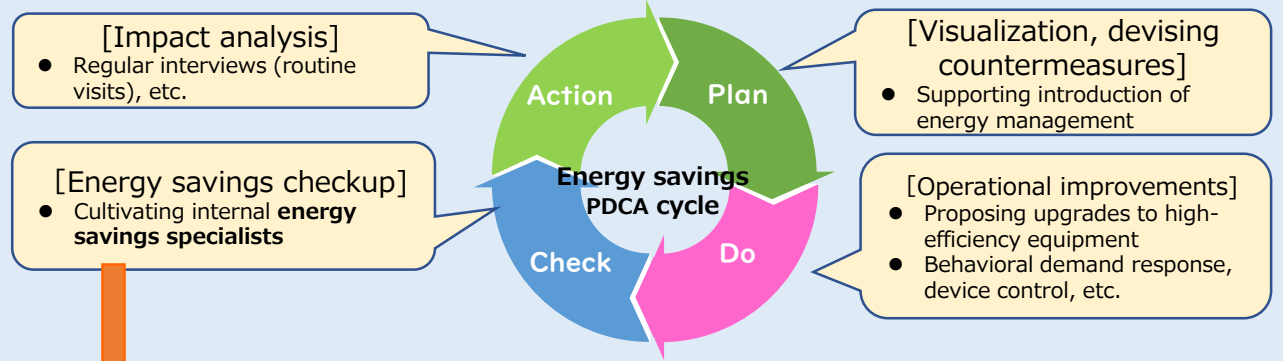
## Promoting advanced energy utilization

We will accelerate the spread of ENE-FARM (residential use), cogeneration equipment (industrial/commercial use), high-efficiency air conditioners (gas engine-driven heat pumps, absorption chiller-heaters), and etc.



## Promoting energy conservation

We will achieve cost and energy savings through long-term engagement with customers through utilization of demand response and other methods.

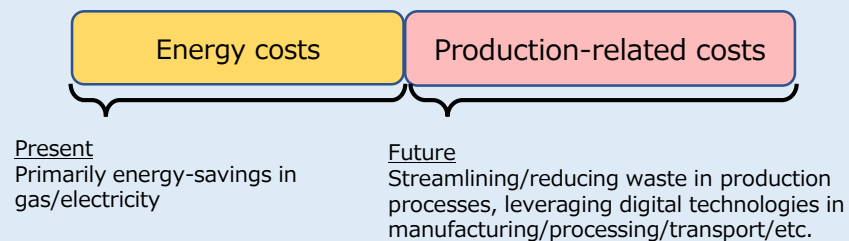


### Energy savings specialists

Specialized talent supporting municipalities with carbon-neutral educational activities and supporting customer issue resolution.

### Industrial customers

In addition to energy source-based savings, we will also strive toward higher efficiency in the production processes beyond.



- Renewable energy is impacted by changes in weather; in order to maximize use of this power source, we will promote the spread of ENE-FARM, cogeneration, and storage batteries, which have the capability of adjusting for shortfalls.
- We will deploy control technologies developed toward tackling the challenge of building efficient and resilient smart energy networks through blanket control at the regional level.

## Distributed energy system

### Ongoing initiatives

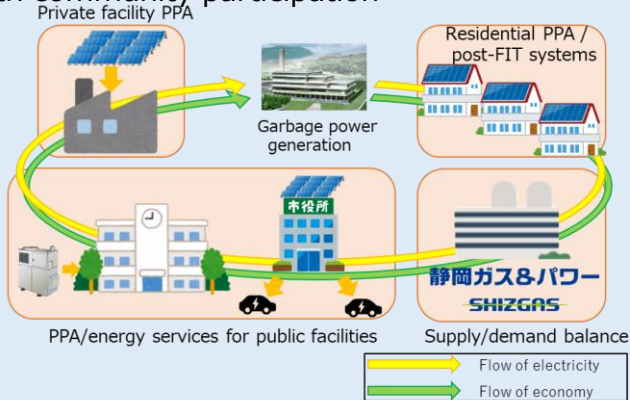
- The T-Grid System\* adaptive electric power system for apartment complexes



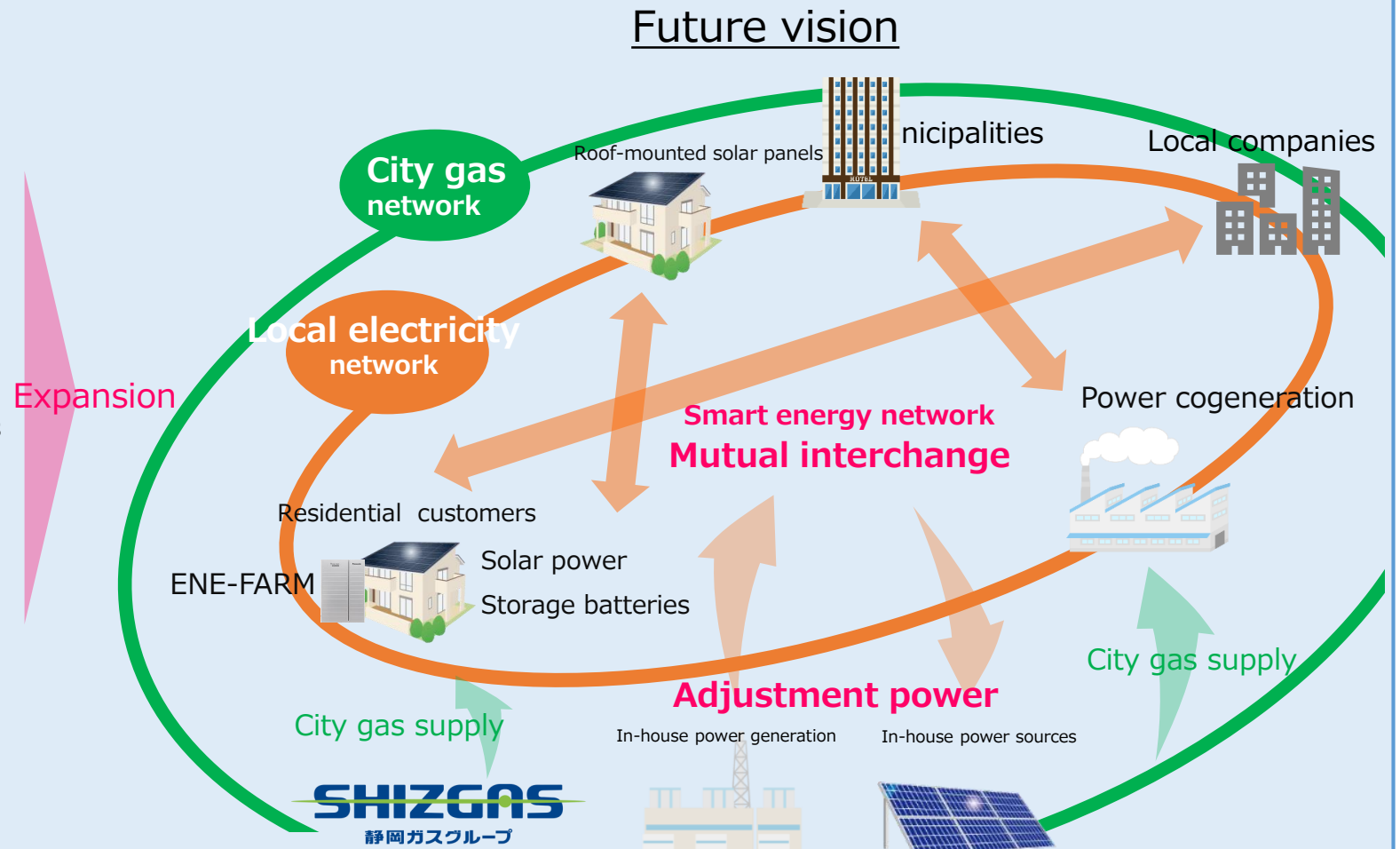
Chalier Nagaizumi

\*Technology for interchange of power within an apartment complex by combining collective power reception and ENE-FARM units, enabling greater energy savings and CO<sub>2</sub> reduction and greatly reducing electricity purchase volumes from external providers

- Example local production for local consumption models with community participation



We will begin by leveraging systems on an **intra-regional level**, then expand to **cross-regional** use



# Specific Initiatives (3) Hydrogen and Ammonia Use, Taking on Methanation

- We will work to expand use of hydrogen and ammonia.
- We will take steps to verify methanation technologies in partnership with a broad set of stakeholders.
- We will utilize carbon-neutral LNG during the transitional phase until methanation is achieved.

## Use of hydrogen and ammonia

Present



Hydrogen Station Shizuoka

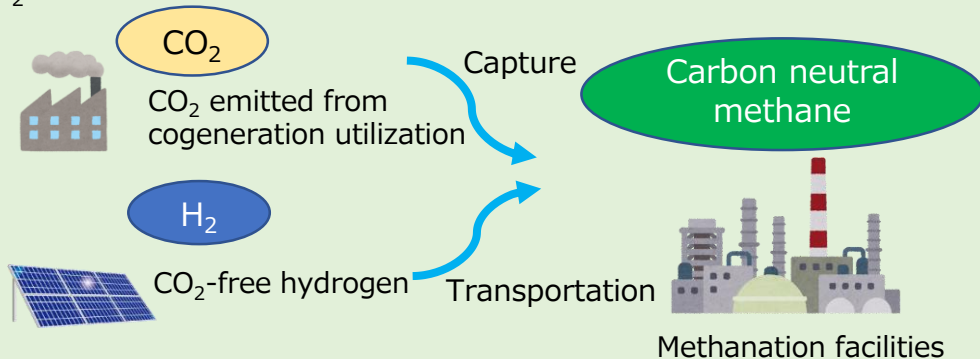
Future



Cogeneration Fuel cells Industrial furnaces

## Methanation

In partnership with stakeholders, we will work to demonstrate methanation technology that can generate methane from hydrogen and CO<sub>2</sub>.



## Carbon-neutral LNG

We will procure and provide customers with carbon-neutral LNG during the transitional phase until methanation is put into practical use.

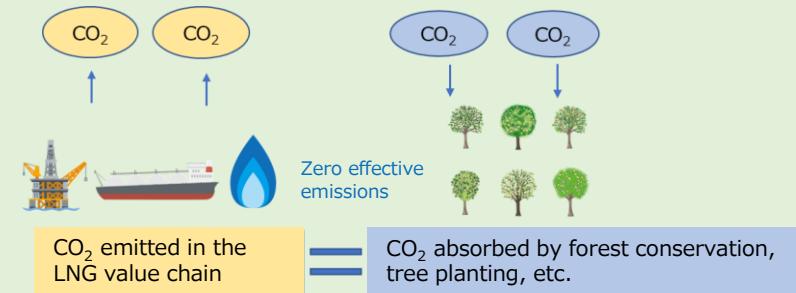
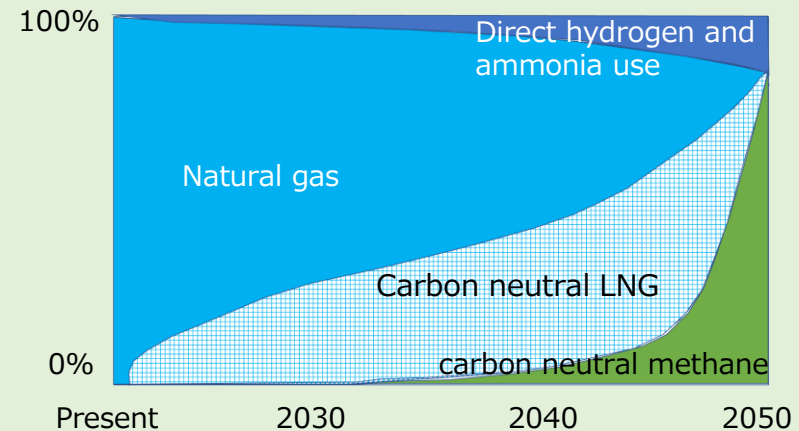


Illustration of transition to carbon neutrality by 2050

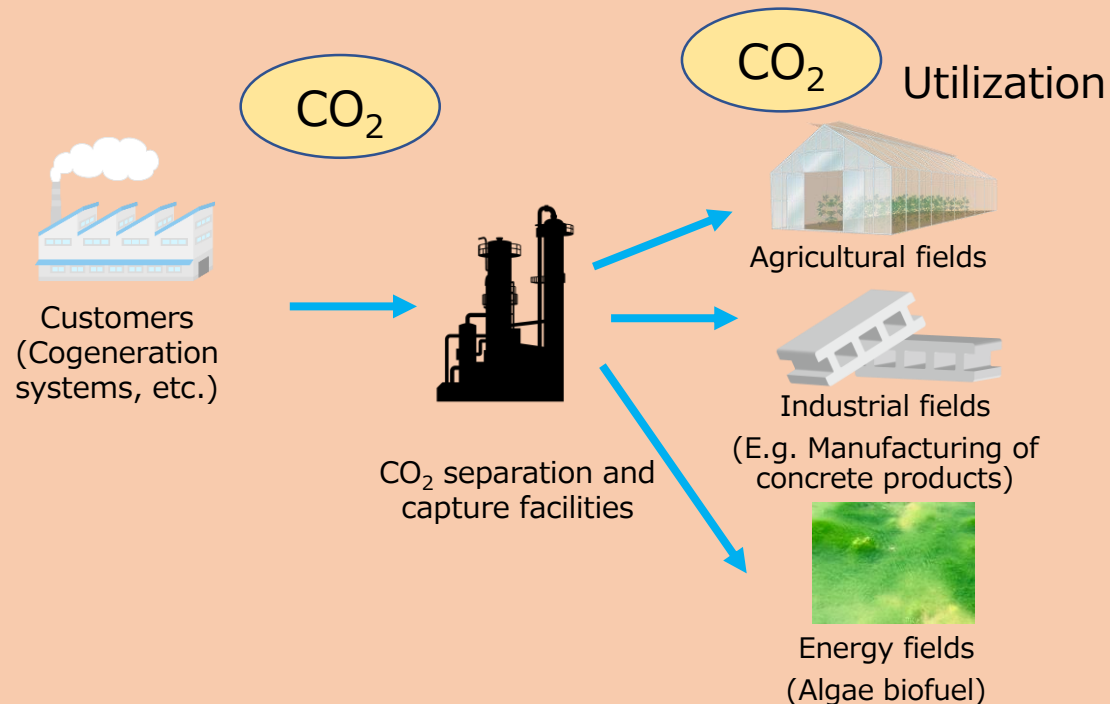




- We will work to verify CO<sub>2</sub> capture and utilization technologies (CCU) at customer sites in partnership with a broad set of stakeholders.
- We will contribute to CO<sub>2</sub> absorption through forest conservation in cooperation with forestry management organizations and others.

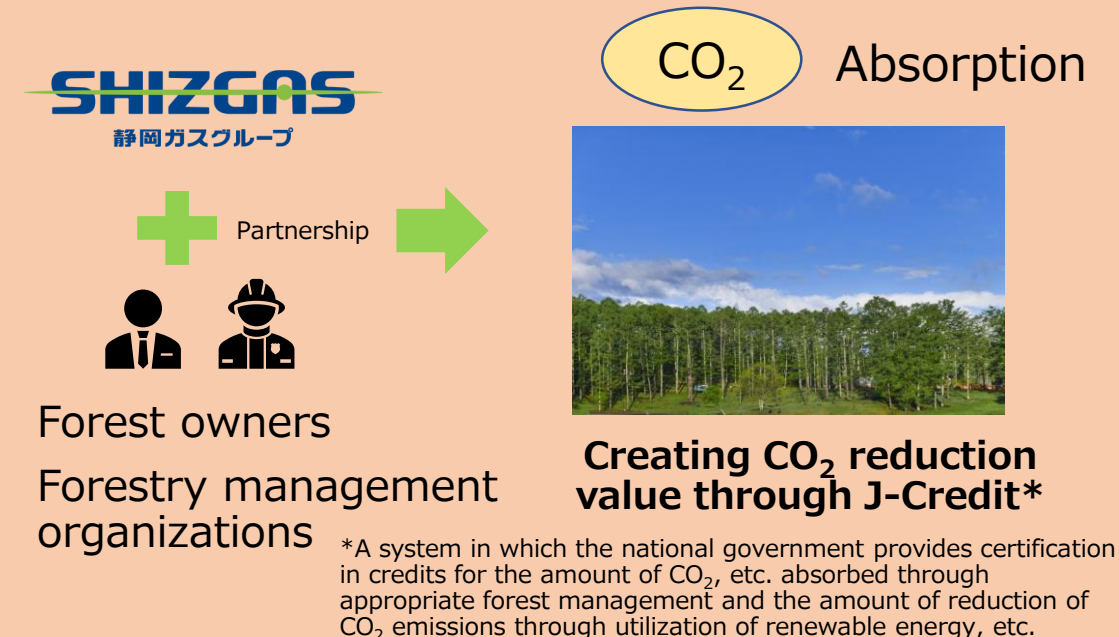
## CO<sub>2</sub> capture and utilization at customer sites

With our perspective of considering CO<sub>2</sub> as a resource, we will work with a broad set of stakeholders to verify CO<sub>2</sub> capture and utilization technologies (CCU). We will promote use of absorbed CO<sub>2</sub> in a variety of fields.



## CO<sub>2</sub> absorption through forest conservation

We will work toward sustainable forest management in partnership with local forest owners and forestry management organizations, contributing to CO<sub>2</sub> absorption.

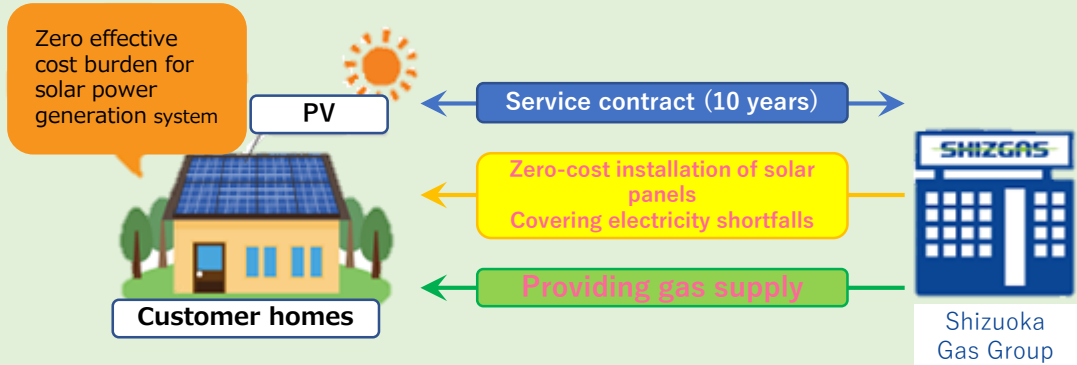


- We will promote development of renewable energy sources, such as solar and biomass.
- We will also promote the development of regional power sources such as solar power generation under PPA models and solar sharing.

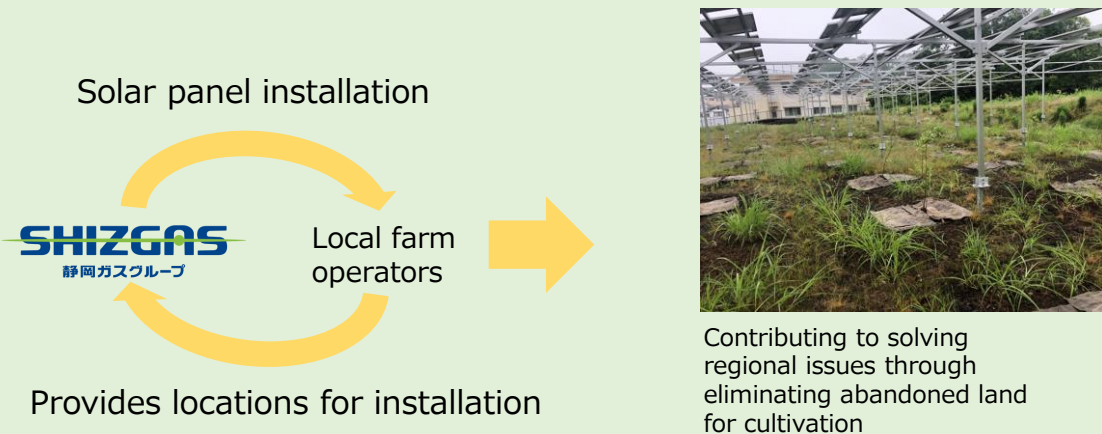
## Developing local power sources through PPA\* models (third-party ownership)

\*PPA: Power Purchase Agreement

### ■ Roof-mounted solar power generation

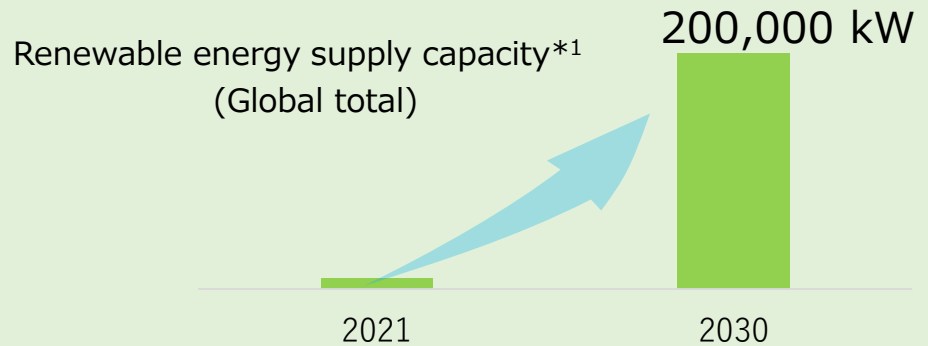


### ■ Agricultural solar power generation (solar sharing)



## Developing renewable energy sources

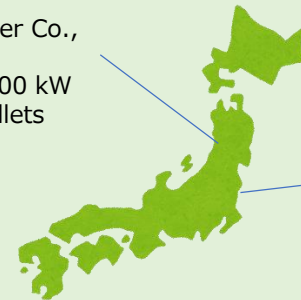
We will promote development of renewable energy sources, focused on solar and biomass.



\*1Including FIT power and procured power

### ■ Participation in biomass power generation business (currently ongoing)

Chokai-Mimami Biomass Power Co., Ltd.\*2  
 Output scale (planned): 52,900 kW  
 Main fuel: Imported wood pellets



Higashimatsuyama Biomass Power Generation, LLC\*3  
 Output scale (planned): 1,990kW  
 Main fuel: Pruned tree branches



\*2Joint investment with Tohoku Electric Power Co., Inc. and Olympia Corporation

\*3Joint investment with Mitsubishi Estate Co., Ltd. and Prospec AZ Inc.

- Utilizing the expertise we have developed, we will promote the shift to natural gas and the spread of renewable energy overseas, mainly in Southeast Asia, and contribute to reduced carbon footprints and decarbonization around the world.
- We will also participate in overseas forest conservation projects.

## Overseas initiatives

### Ongoing efforts

- Natural gas power generation business and solar power generation business in Thailand



Rajabhat Mahasarakham University (2021)

- Gas energy business in Indonesia



Collaboration with Mitra Energi Persada (MEP) in Indonesia (from 2017)



Southeast Asia

### Future

- Promoting the shift to natural gas
- Expanding capacity and types of renewable energy sources
- Participating in forest conservation projects

Contributing to CO<sub>2</sub> reduction by utilizing bilateral credit systems\*

Area expansion

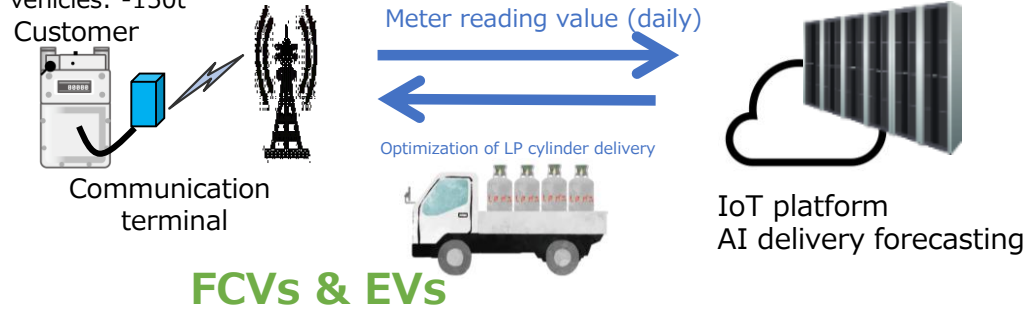


\*A system in which Japanese companies utilize superior decarbonization technologies to implement projects to reduce greenhouse gas emissions in developing countries, with reduction impact shared between the target country and Japan

- In the LP gas business, we will work to improve LP gas delivery efficiency through the use of smart meters.
- We will work to conserve energy and utilize FCV\*/EV vehicles in our fleet to reduce emissions from Shizuoka Group business locations and company vehicles.

## ● Efficiency improvements in LP gas delivery from using smart meters: -150t

- ▣ Reductions from higher efficiency in LP gas delivery and use of FCVs/EVs for delivery vehicles: -150t



## ● Manufacturing / supply: -20,000t

- ▣ Manufacturing: -18,000t

- ✓ Further efficiency increases in manufacturing operations
- ✓ Introduction of power-efficient equipment

- ▣ Supply: -2,000t

- ✓ Streamlining gas pipe laying work
- ✓ Streamlining gas pipeline maintenance through use of digital technologies



## ● Business sites / company vehicles: -2,300t

- ▣ Business sites: -1,600t

- ✓ Installing solar power generation equipment
- ✓ Upgrading to energy-efficient equipment

- ▣ Adopting FCV/EV company vehicles: -700t



## ● Commuting / business trips: -170t

- ▣ Commuting: -80t

- ✓ Changing commuting modes
- ✓ Reducing movement of personnel due to promotion of telecommuting and establishment of satellite offices

- ▣ Reducing business trips: -90t

- ✓ Utilizing webconferencing, etc.



\*FCV: Fuel cell vehicle