

AISIN Group's Environmental Initiatives

AISIN CORPORATION
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AISIN Group's "Four Initiatives for the Environment"



Establishment of a zero-carbon society

Aim to achieve net-zero CO₂ emissions throughout life cycle of products toward the realization of carbon neutrality



Establishment of a recycling-oriented society

Aim to minimize environmental impact by maximizing resource efficiency



Establishment of a society in which people coexist with nature

Aim to achieve harmony with nature and local ecosystems



Fundamental activities

Aim to create more advanced environmental management systems

Aisin will contribute to building a sustainable society through the four initiatives.

Examples of Global Environmental Activities



Energy saving/renewable energy
(each site)



Wastewater recycling
(each site)



Biotope creation/wildlife
protection (Japan)



Tree planting (Japan, Inner
Mongolia Autonomous Region)

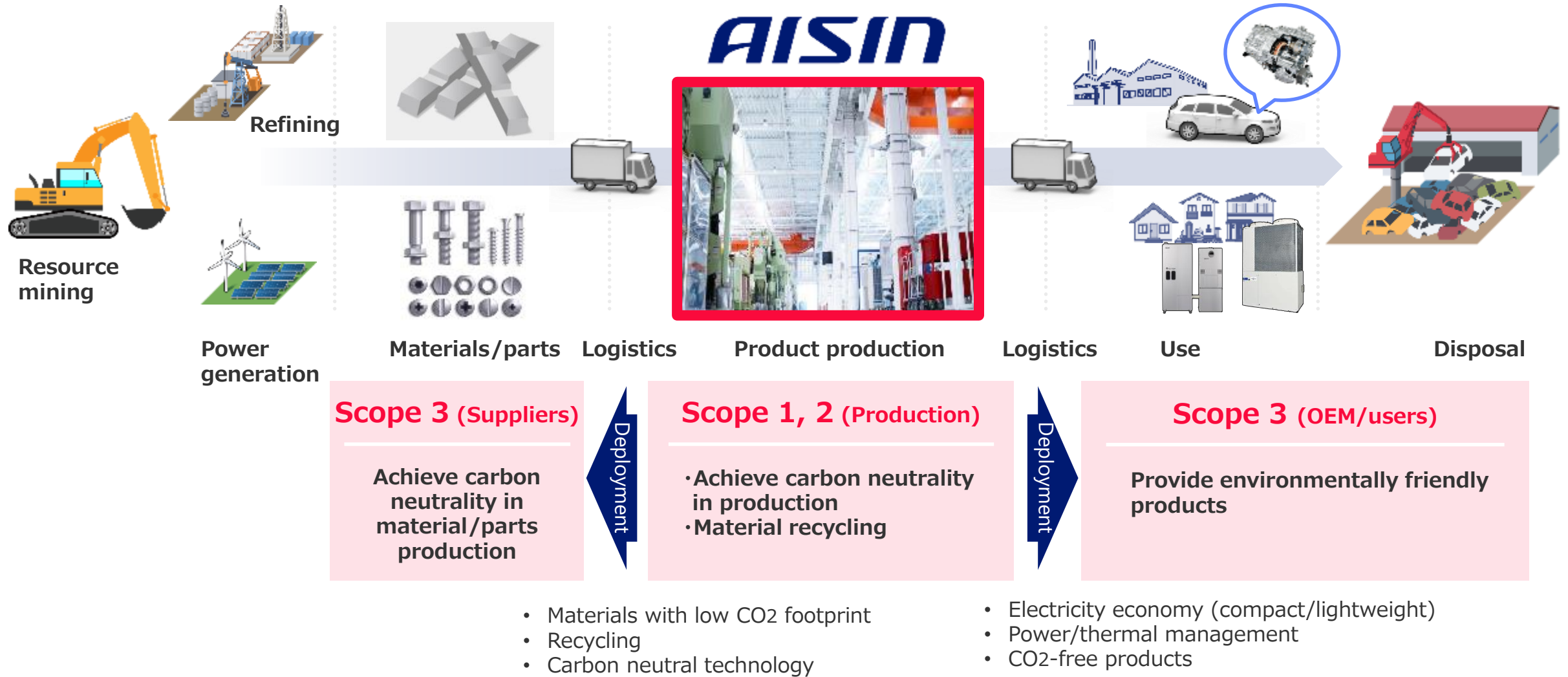


Environmental assessment
(each site)



Carrying out various environmental activities globally

Toward Realization of Carbon Neutrality

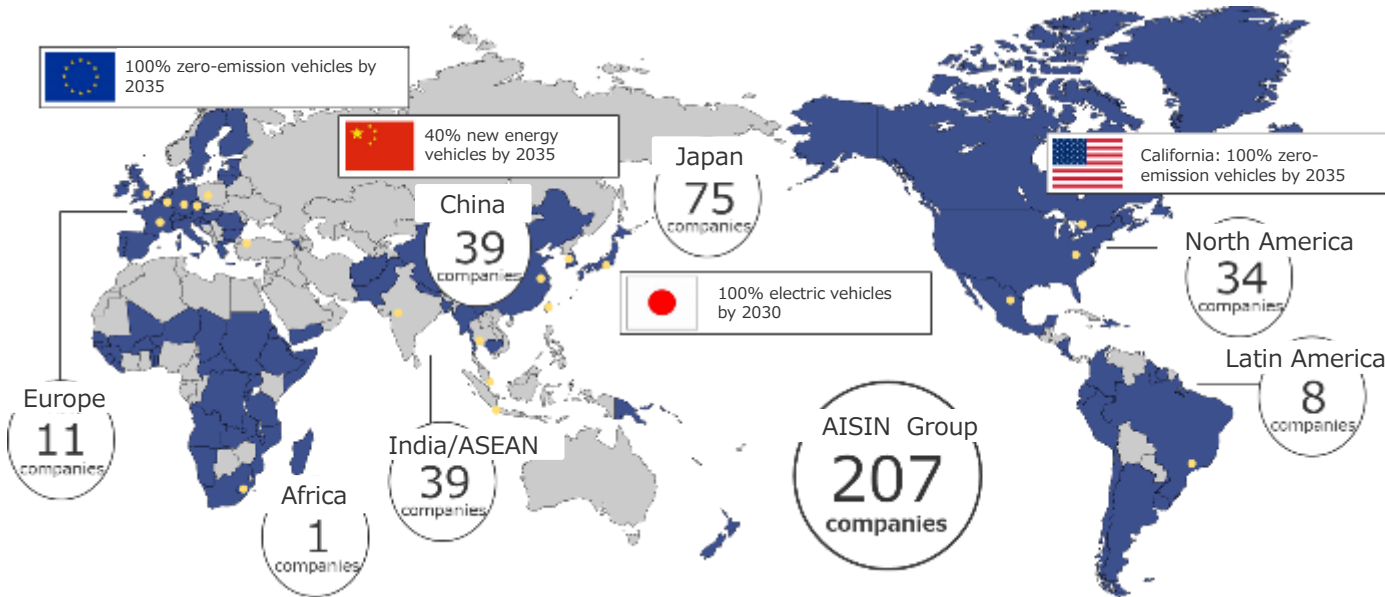


Achieving a carbon neutral society through initiatives in terms of both products and production

AISIN Group's Life Cycle CO2 Emissions



Countries that have declared carbon neutrality targets and Aisin's global bases



The map has been produced by Aisin based on materials from the Ministry of Economy, Trade and Industry. The countries colored in blue are those that have declared their carbon neutrality targets (as of January 2021).

Global CO2 emissions in FY2019

Scope1,2 2.8 million tons-CO2

Scope3 14.5 million tons-CO2

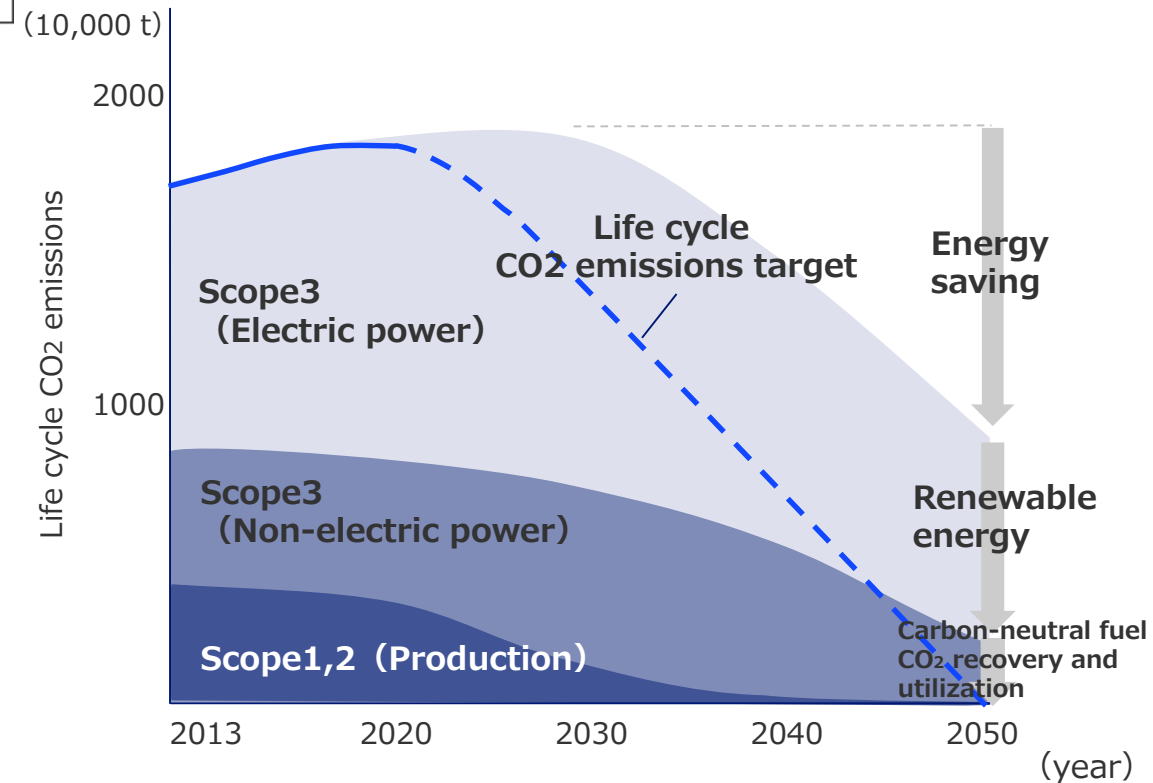
AISIN Group's approach to reduction of life cycle CO2 emissions

Energy saving/renewable energy

- ✓ Power source/heat source/waste reduction
- ✓ Power generation/combustion
- ✓ Improved efficiency of electric units

Introduction and dissemination of innovative technologies

- ✓ 50% reduction of production processes
- ✓ CO2 reuse/carbon neutral fuel/hydrogen
- ✓ CO2-free products



Achieve carbon neutrality for the entire life cycle by 2050

Carbon Neutrality Initiatives in Manufacturing

1. The Path to Achieving Carbon Neutrality

- Overview of Aisin's Efforts towards Carbon Neutrality (Energy/Resource Recycling)
- Zero-emission plants that are kind to the global environment and people
- Global production CO₂ reduction scenario

2. Environmental Technology Initiatives (in Manufacturing)

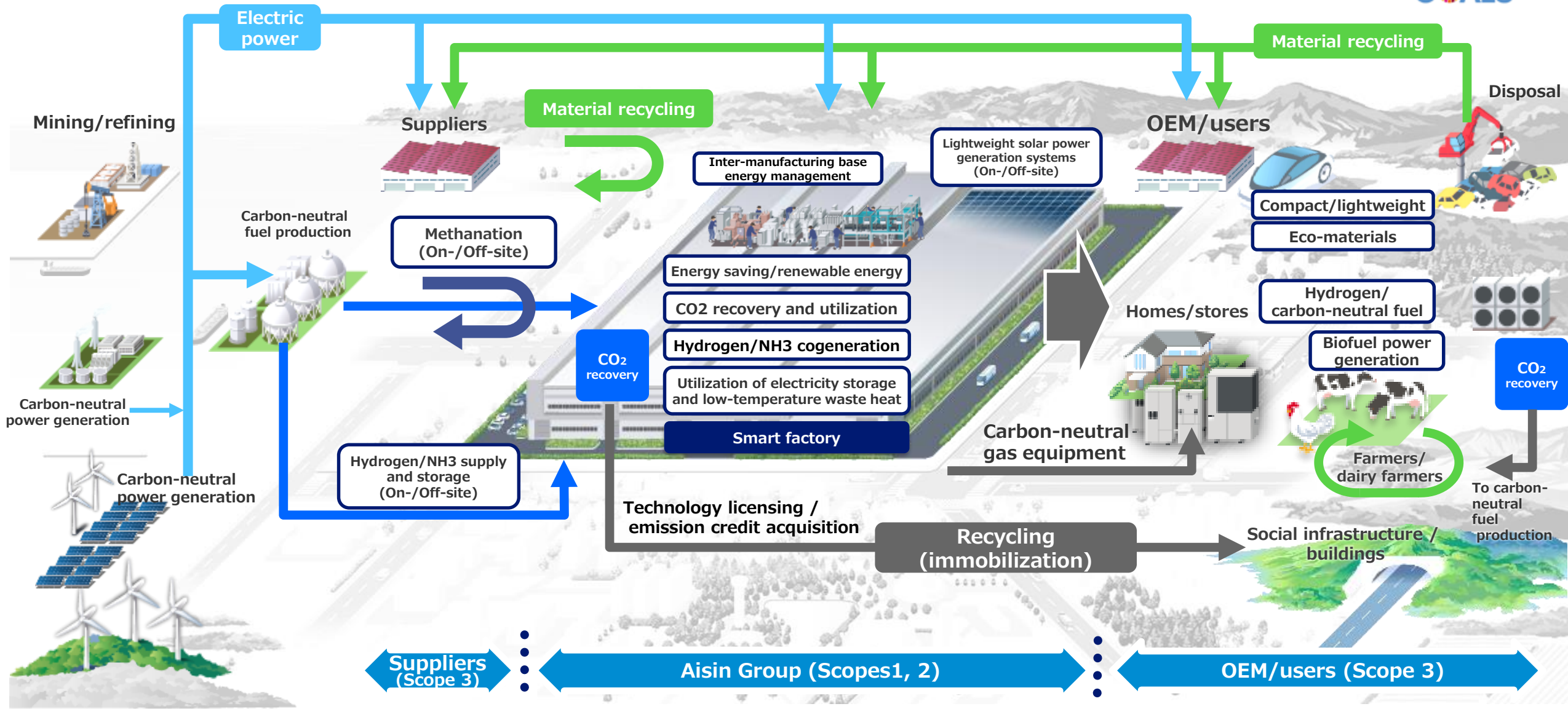
- Reducing production lines by 1/2 (half)
- Activities to reduce CO₂ emissions from melting furnaces
- Development of carbon-neutral technology by using hydrogen
- Lightweight solar power generation technology
- Practical use of CO₂ immobilization technology
- Development of biogas power generation system
- Material recycling technology
- CO₂ reduction in logistics
- Visualization of CO₂

3. Toward Expansion and Dissemination of Carbon Neutrality Activities

The Path to Achieving Carbon Neutrality

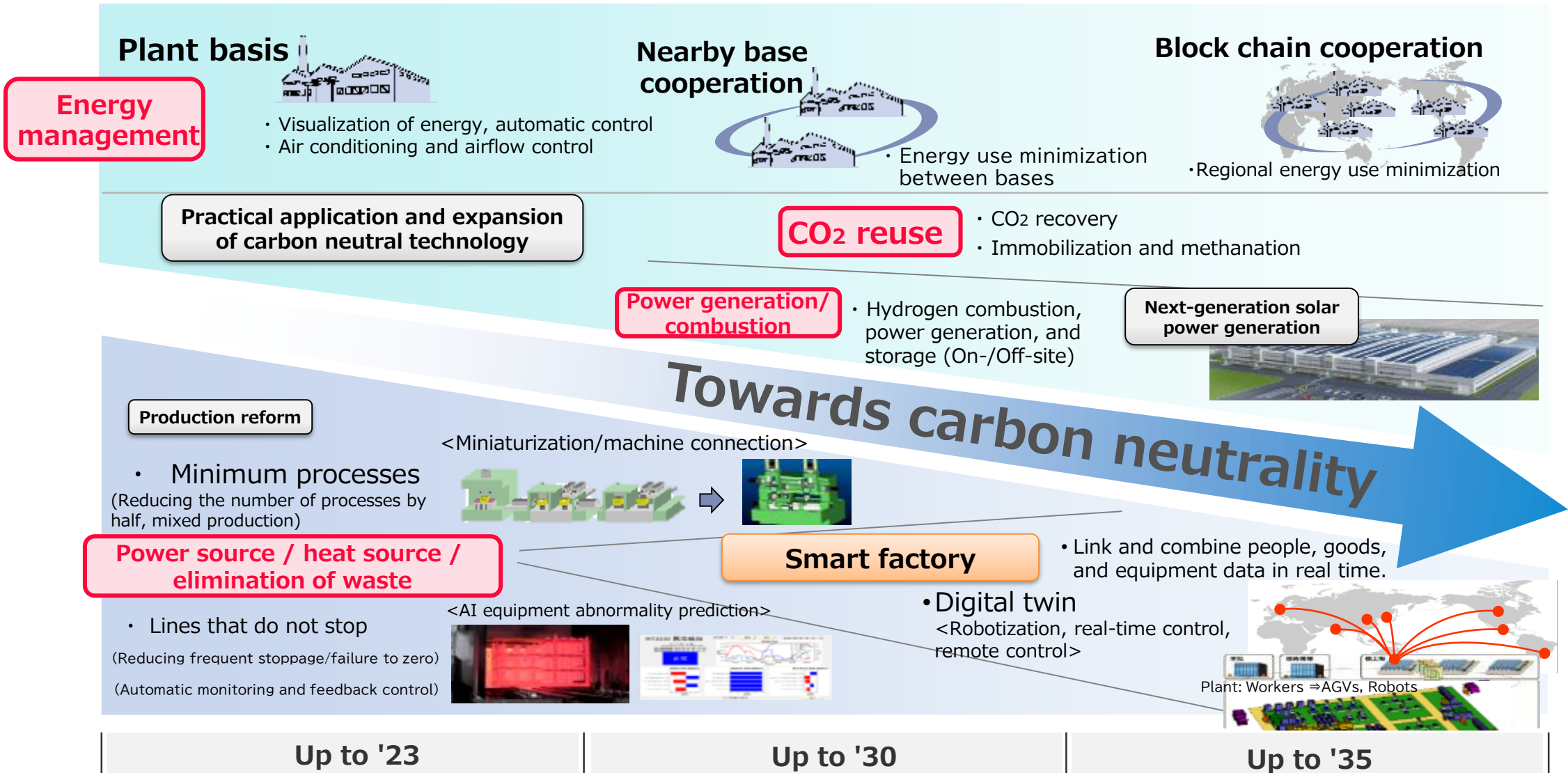
1

Overview of Aisin's Efforts towards Carbon Neutrality (Energy/Resource Recycling)



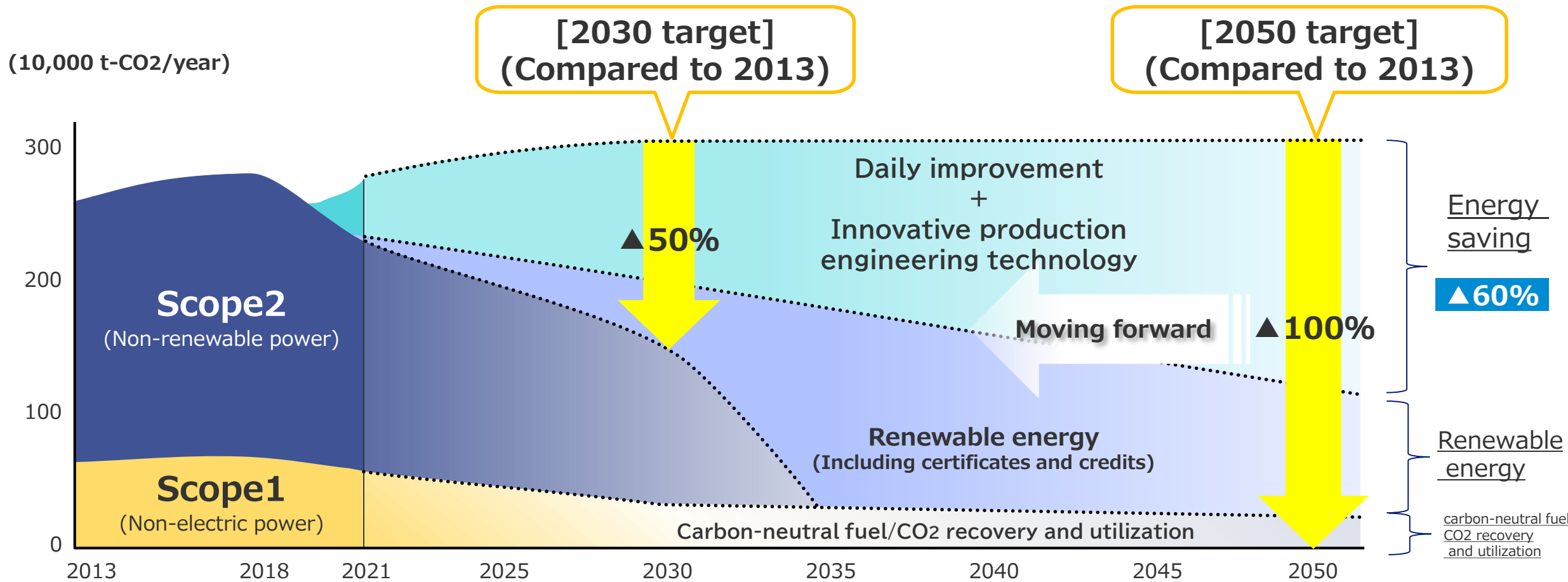
We contribute to the circulation and dissemination of energy and resources in local communities through carbon-neutral activities.

Zero-emission plants that are kind to the global environment and people



Working toward carbon neutrality with four themes as keys

Global production CO2 reduction scenario



Endeavoring to reduce CO2 emissions to achieve carbon neutrality in production as early as possible (by the end of the 2030s).

Commencing the supply of production CO2-free products in FY2021, starting with eAxle.

Environmental Technology Initiatives (in Manufacturing)

2

Reducing production lines by 1/2 (half)

Power source / heat source / elimination of waste

Power generation / combustion

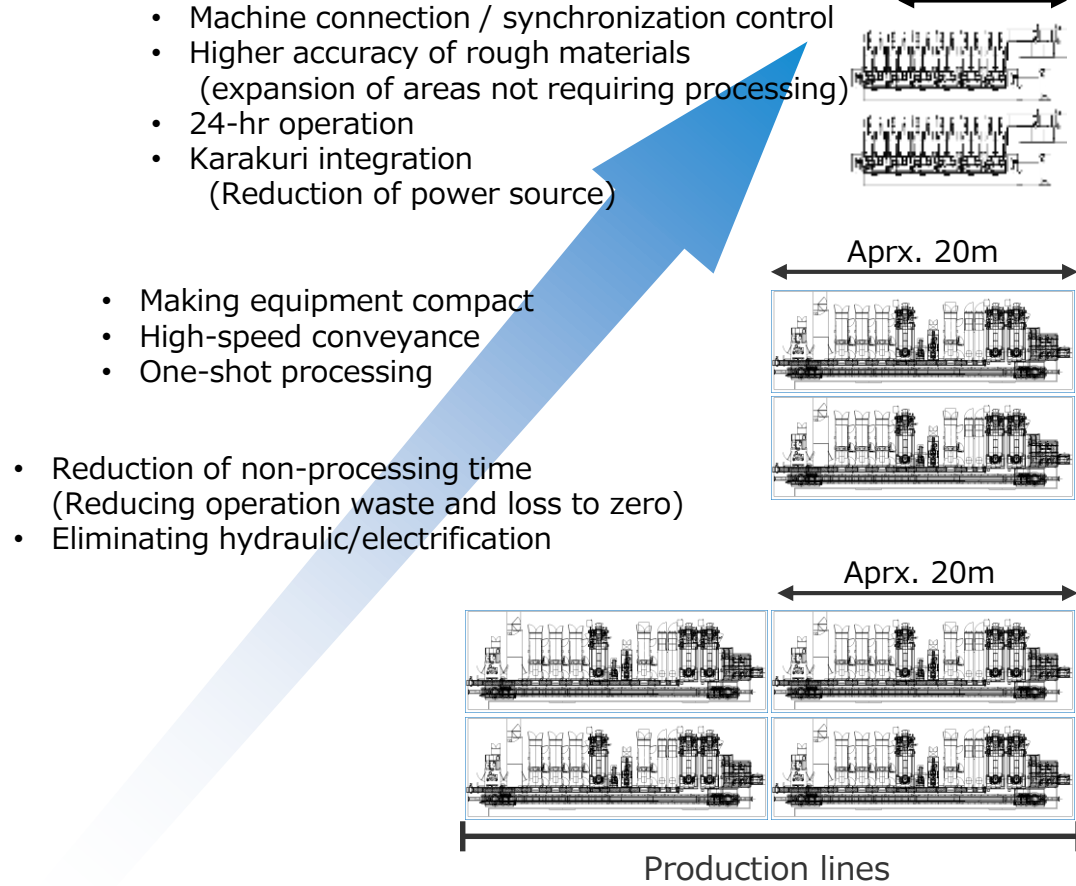
CO₂ reuse



In and after 2026

2020

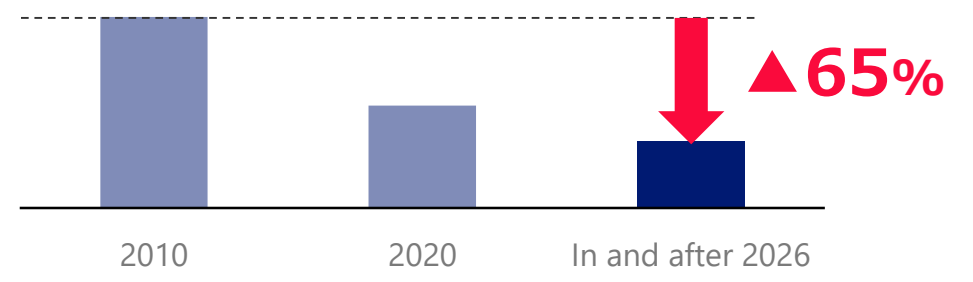
2010



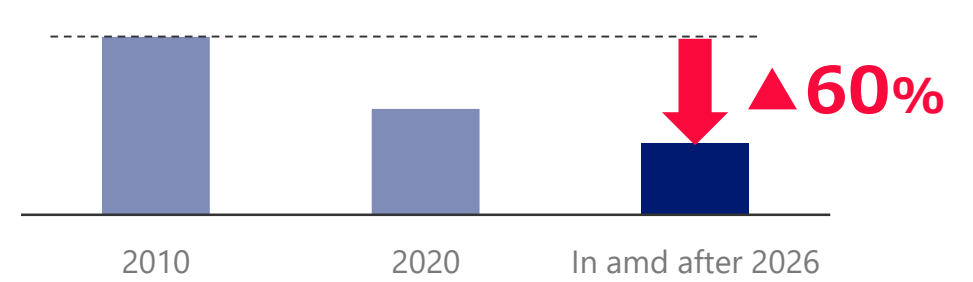
[Super eco-equipment]

Reducing power sources/heat sources by 1/2, downsizing, and high-speed synchronization

■ Number of equipment power sources (index)



■ Energy consumption per pc (index)



Significant reduction of CO₂ by developing and introducing super eco-equipment

Activities to reduce CO₂ emissions from melting furnaces

Power source / heat source / elimination of waste

Power generation / combustion

CO₂ reuse

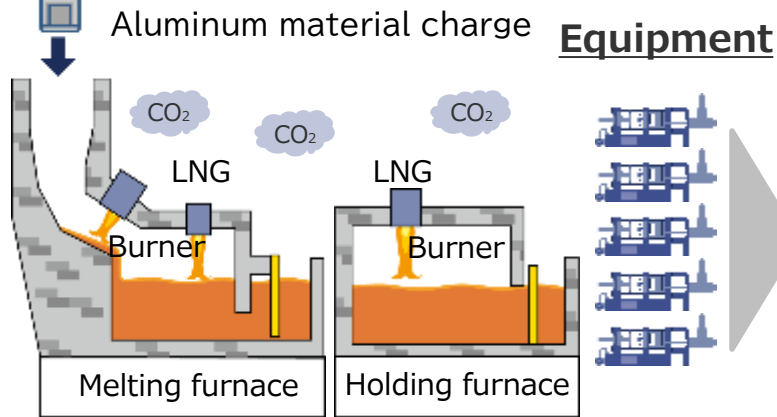


Current situation (up to 2020)

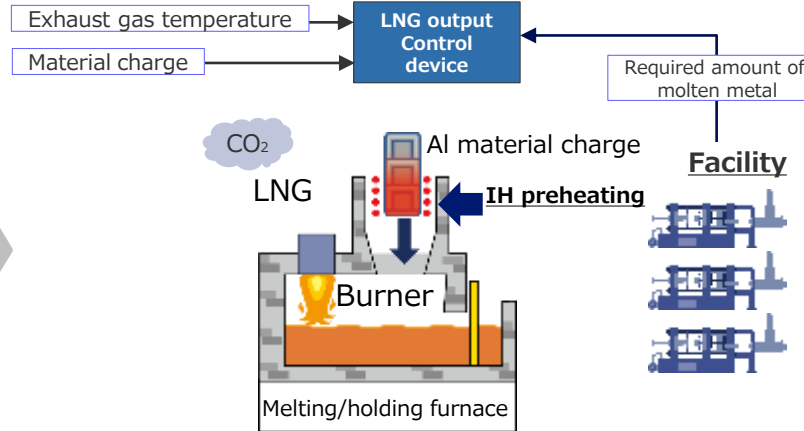
In and after 2025

2030 and beyond

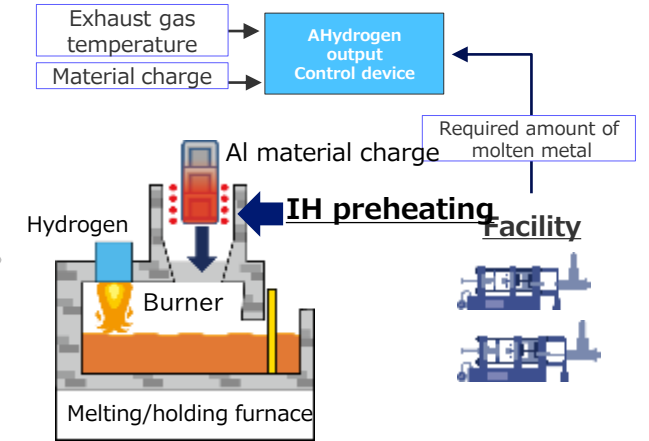
Melting furnace



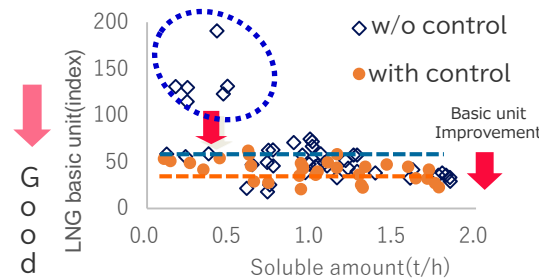
- (1) Synchronous control of material charge rate / exhaust gas temperature and LNG output
- (2) High-speed temperature rise by IH preheating (electric)



Utilization of hydrogen / carbon-neutral fuel

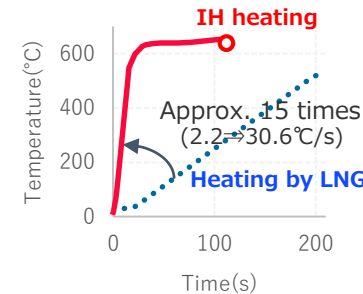


① LNG output control



Introduction started in 2021

② High-speed temperature rise



IH preheating demonstration starts in 2022

Hydrogen burner demonstration started in 2021

CO₂ emissions (Index)

100

63

20

Development of carbon-neutral technology by using hydrogen

Power source / heat source / elimination of waste

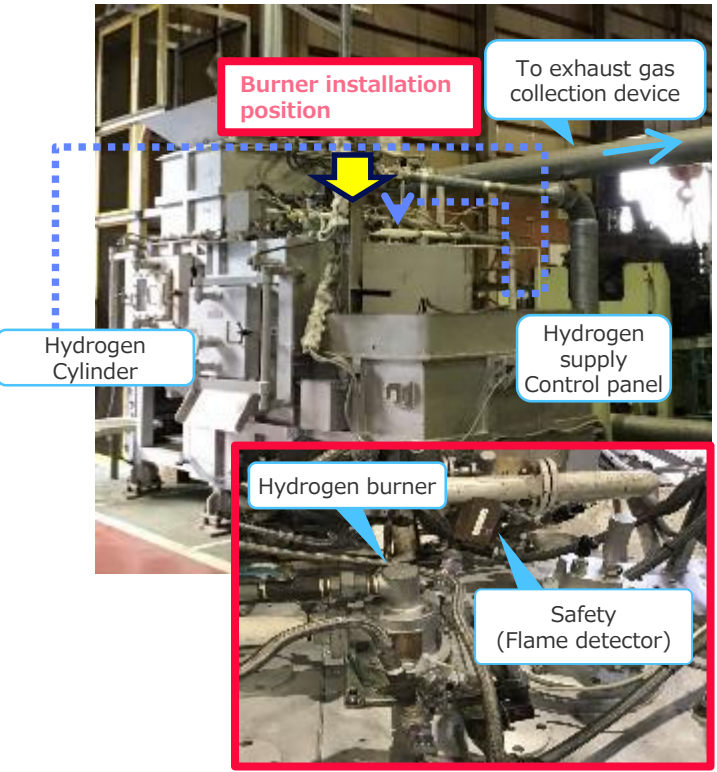
Power generation / combustion

CO₂ reuse



Melting furnace/heat treatment

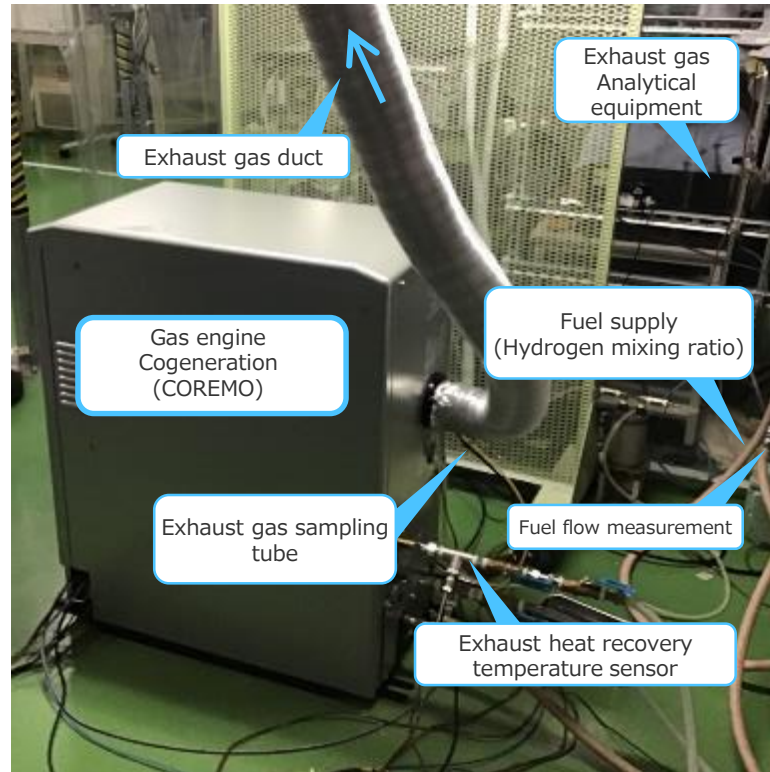
【Hydrogen burner】



Hydrogen burner: under demonstration since 2020

Hydrogen cogeneration / hydrogen SOFC

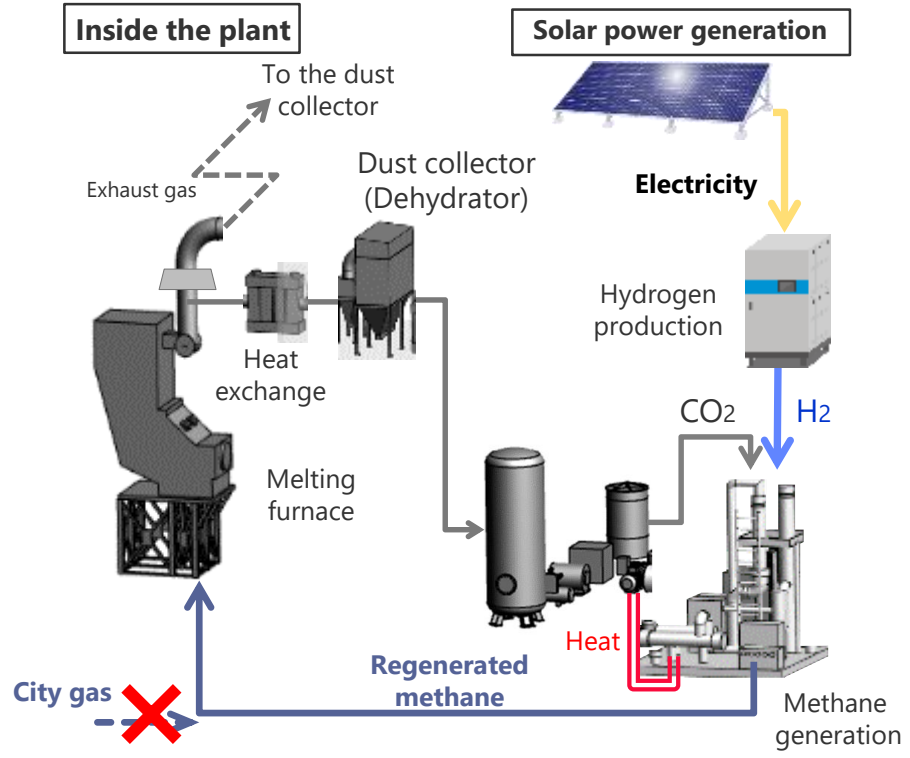
【Mixed firing of hydrogen / dedicated firing】



Hydrogen cogeneration: under demonstration since 2020

Methanation

【Recovery of low-concentration CO₂ for recycling】



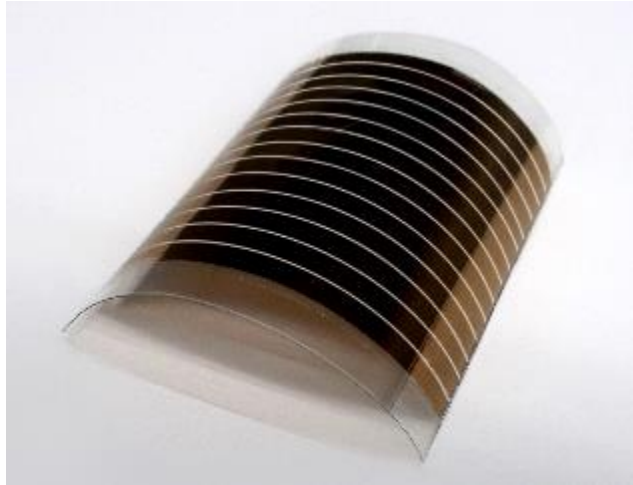
Melting furnace methanation: Scheduled to be demonstrated in 2022

We work toward power generation/combustion technology and methanation by using hydrogen.

Lightweight solar power generation technology

Around 2014: Development of perovskite solar cells

(Green Innovation Fund: application for NEDO approval in pending)

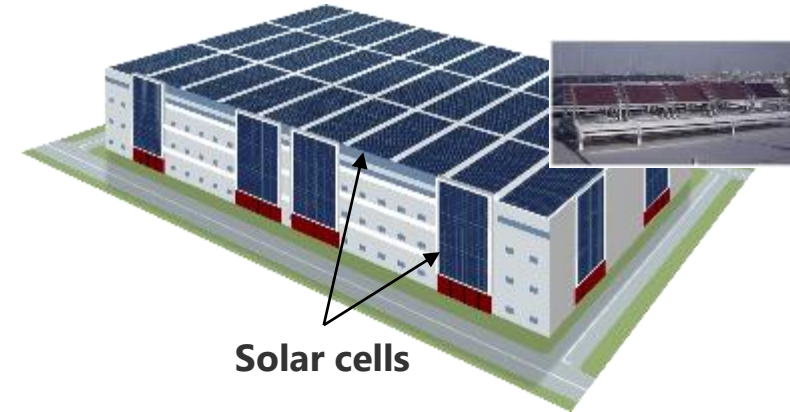


Development target value (in 2025)

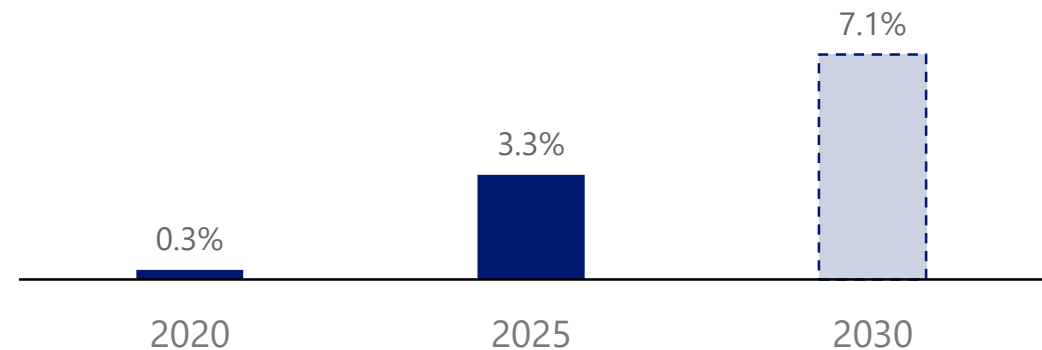
- Conversion efficiency: 20% or more (30 cm x 30 cm)
- Mass: 1/5 (compared to general solar cells)



Can be installed in various existing buildings (expansion of installation areas)



Renewable energy rate by solar power generation (global) (On-site, PPA)



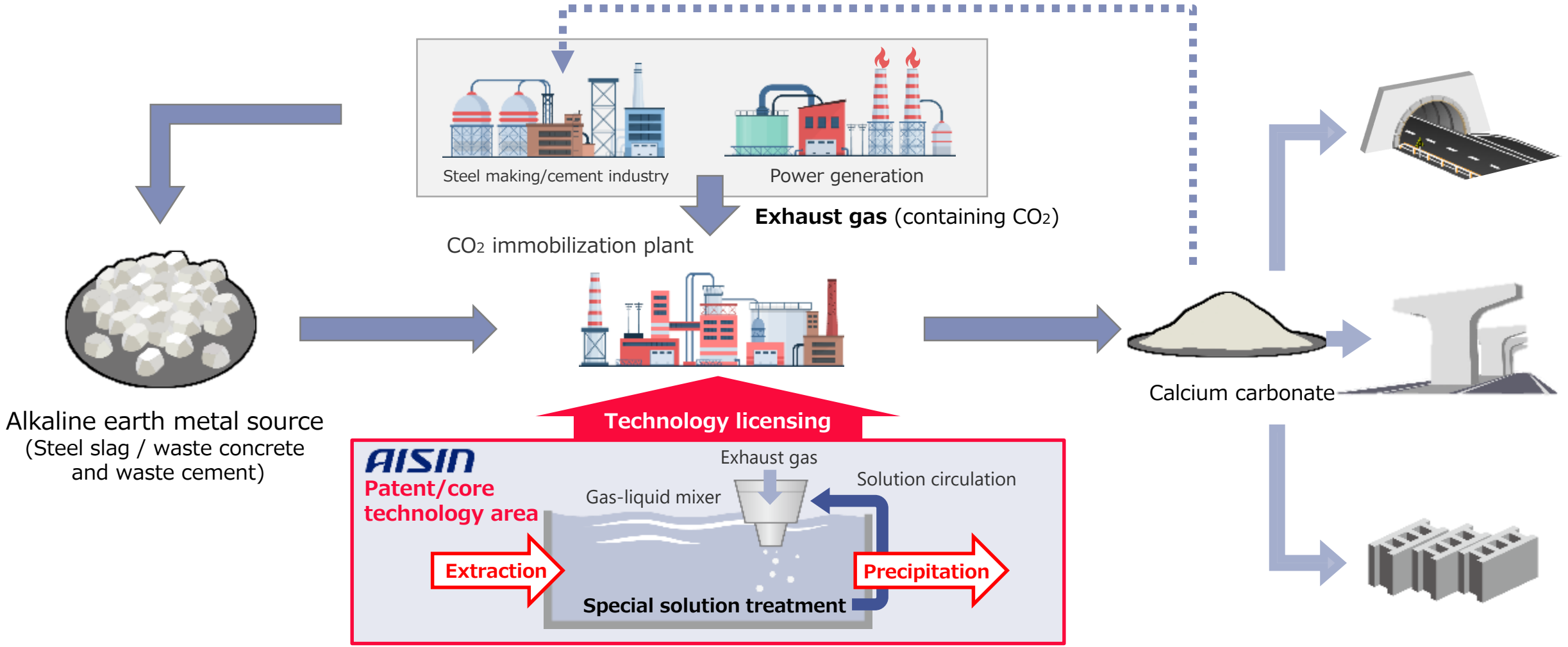
Responding to various installation needs by lightweight solar cell technology, making renewable energy more accessible

Practical use of CO2 immobilization technology

Power source / heat source / elimination of waste

Power generation / combustion

CO2 reuse



Aisin's core technology contributes to the reuse and circulation of "carbon" and "industrial by-products".

Development of biogas power generation system

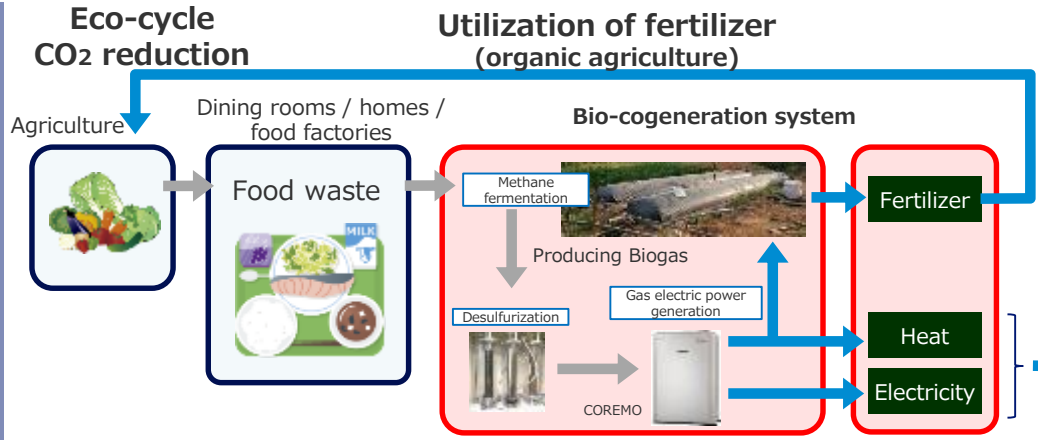
Power source / heat source / elimination of waste

Power generation / combustion

CO₂ reuse

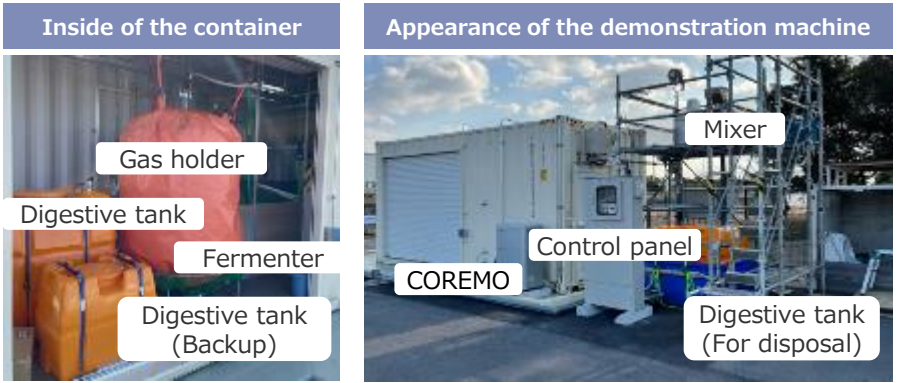


Food residue

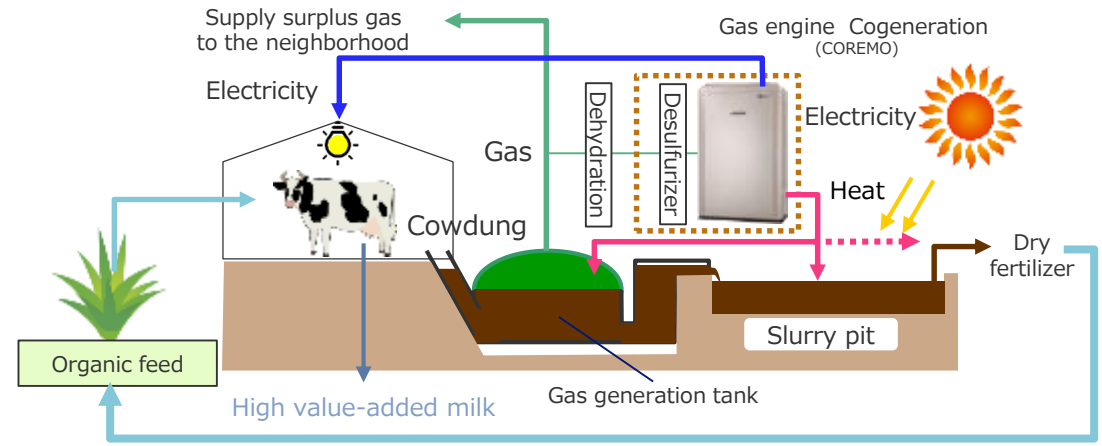


Amount of power generation: 15.2 kWh/day
CO₂ reduction effect: 1.9 t-CO₂/year

Under Demonstration since 2021

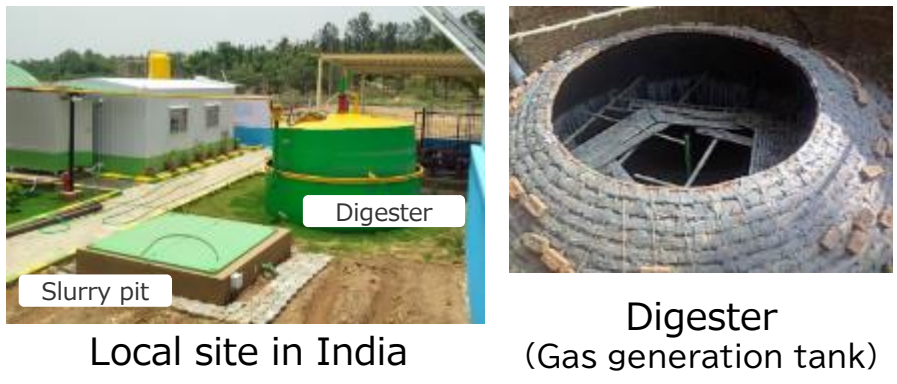


Indian dairy (Use of chicken and beef manure)



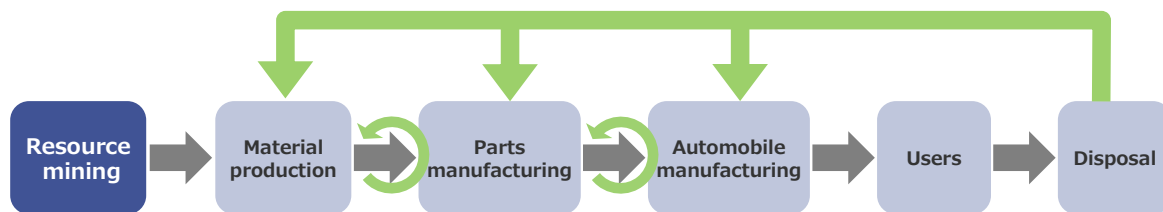
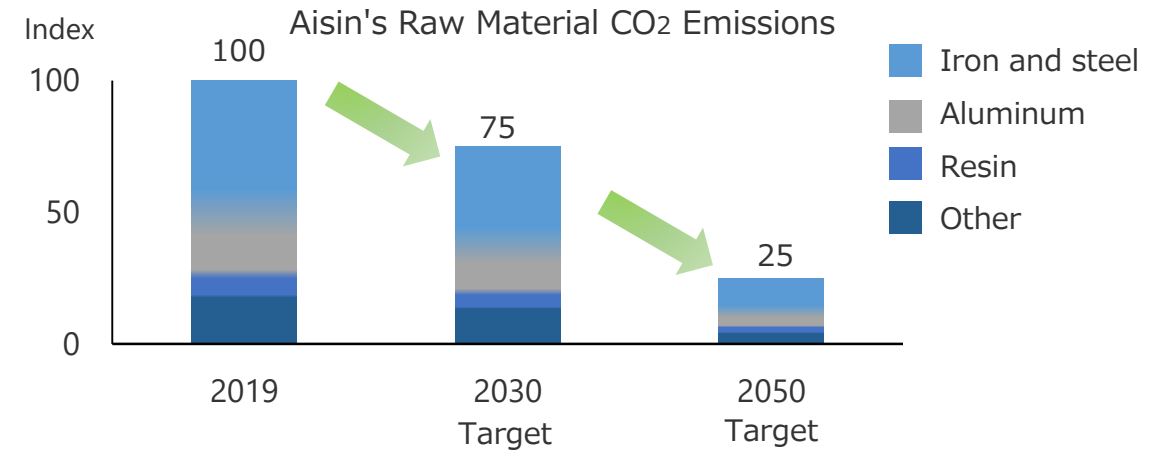
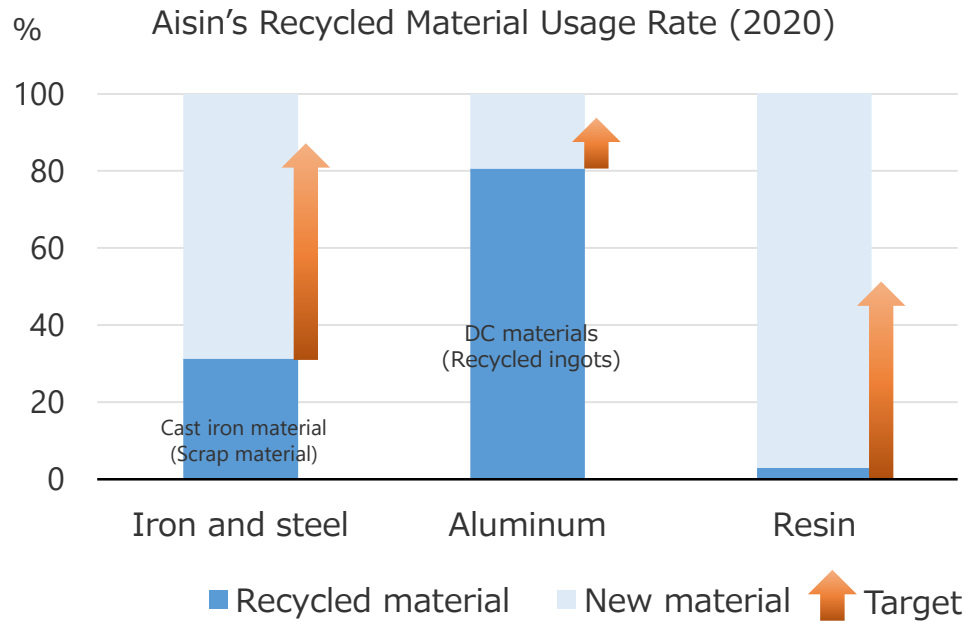
Amount of power generation: 31 kWh/day
CO₂ reduction effect: 8.2 t-CO₂/year

Under Demonstration since 2018



Recycling waste by utilizing household cogeneration technology

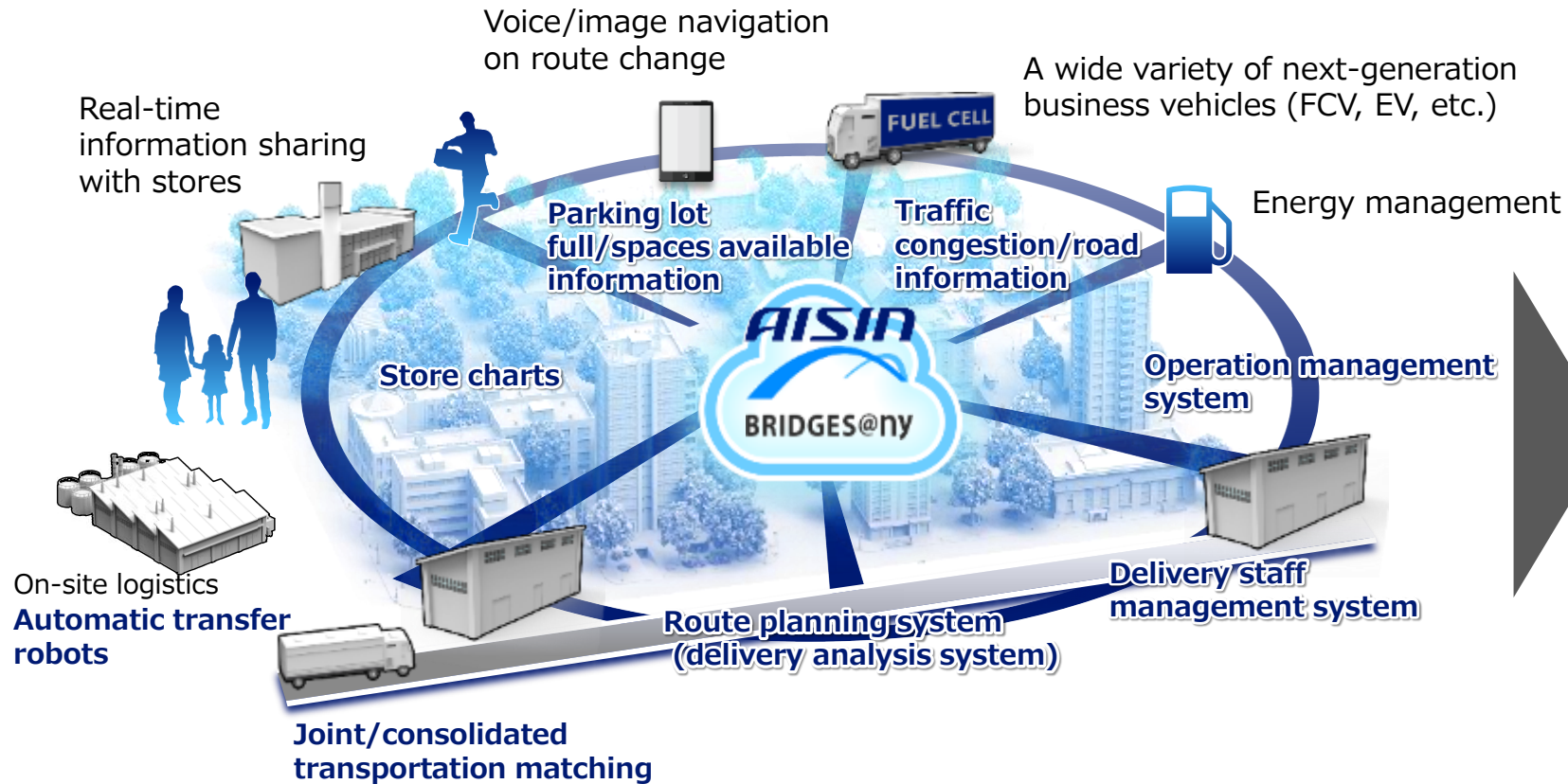
Material recycling technology



Recycling technology

Iron and steel	<ul style="list-style-type: none"> • Increased use of low-grade scrap materials (impurity removal technology)
Aluminum	<ul style="list-style-type: none"> • Increased use of open market scrap (impurity removal technology) • Reduced energy consumption during material production (increased recycling rate of extruded materials)
Resin	<ul style="list-style-type: none"> • Increased recycling rate by utilizing the same type of materials • From thermal recycling to chemical recycling

Aiming to reduce CO2 emissions by recycling waste using various material recycling technologies



Aisin's logistics solution (launched in 2021)

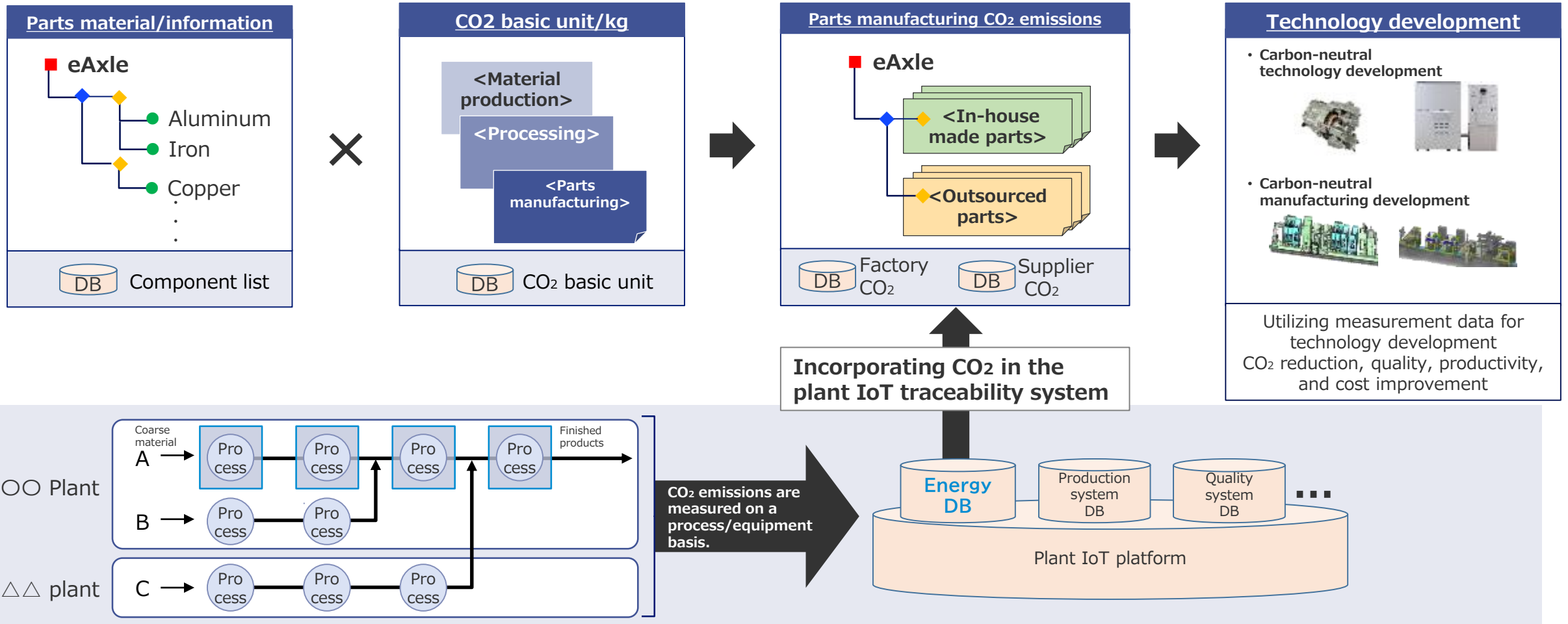
Optimization of delivery operations (vehicle/delivery route/time)

- Linking logistics and commercial distribution data
 - Production and sales forecasts
 - Matching with available vehicles
- Quick development of an optimal delivery plan
 - Safe and efficient route
 - Improved loading rate
- Smooth operation based on real-time data on traffic conditions and congestion
 - Zero standby/adjustment time

Aisin's logistics solution : BRIDGES@ny

Contributing to CO2 reduction by optimizing and streamlining the entire logistics value chain

Visualization of CO₂ (Compliant with a global third-party certification)



Visualization of CO₂ is promoted to respond to the demands of local communities and customers with respect to both products and production.

Toward Expansion and Dissemination of Carbon Neutrality Activities

3

In order to increase international competitiveness, it is essential to establish a recycling-oriented social system at a low cost and socially implement it.

Global deployment

- Apply technologies according to the administrative measures and power source composition of each country or region

Large scale

- Hydrogen/carbon neutral fuel recycling system (compliment to renewable energy, energy storage, distributed power supply)
Produce, transport, use, store and recycle

CO2 emission reduction activities in collaboration with suppliers

- Understand the amount of global CO2 emissions (international LCA rules)
- Deploy low-cost carbon neutral technologies and promote material recycling.



Toward achieving carbon neutrality

Solve issues by participating in collaboration beyond the borders of countries/regions and industries.

We will deliver beauty
to our future earth.

