

Resources, Energy & Environment Business Area Briefing

IHI

September 27, 2023

株式会社 **IHI**

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Energy domain vision: Create a carbon-neutral future

Provide new solutions so customers and society can become carbon neutral

Decarbonize with customers while efficiently managing existing assets

Core businesses



Power plants



Process plants

Development-focus business (Clean energy field)



Ammonia utilization



Carbon recycling & methanation

Carbon solutions

Power systems

Nuclear energy



Gas and diesel reciprocating engines (RE)



Gas turbines (GT)



Ammonia-fired engines



Ship electrification



Nuclear power plants



Small nuclear reactors

Decontamination and decommissioning

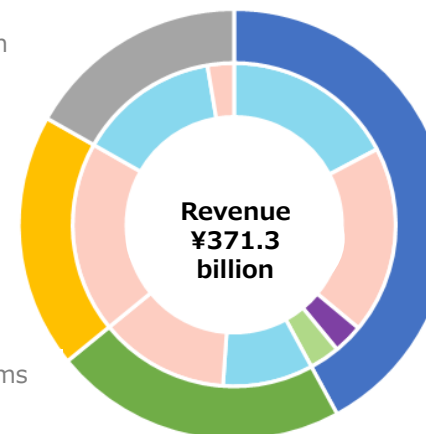
FY2022 sales composition from key products

Asia EPC
¥62.3 billion
17%

Nuclear energy
¥71.0 billion
19%

Power systems
¥81.8 billion
22%

Carbon solutions (CS)
¥156.2 billion
42%



- New builds and main facilities
- Lifecycle businesses
- Ammonia and hydrogen
- Carbon-neutral businesses

Strengths

- Robust engineering capabilities for large structures
- Ample experience in energy industry
- Solid record in marine engines
- Experience in commercializing ammonia utilization, methanation, and other carbon-neutral technologies

Opportunities

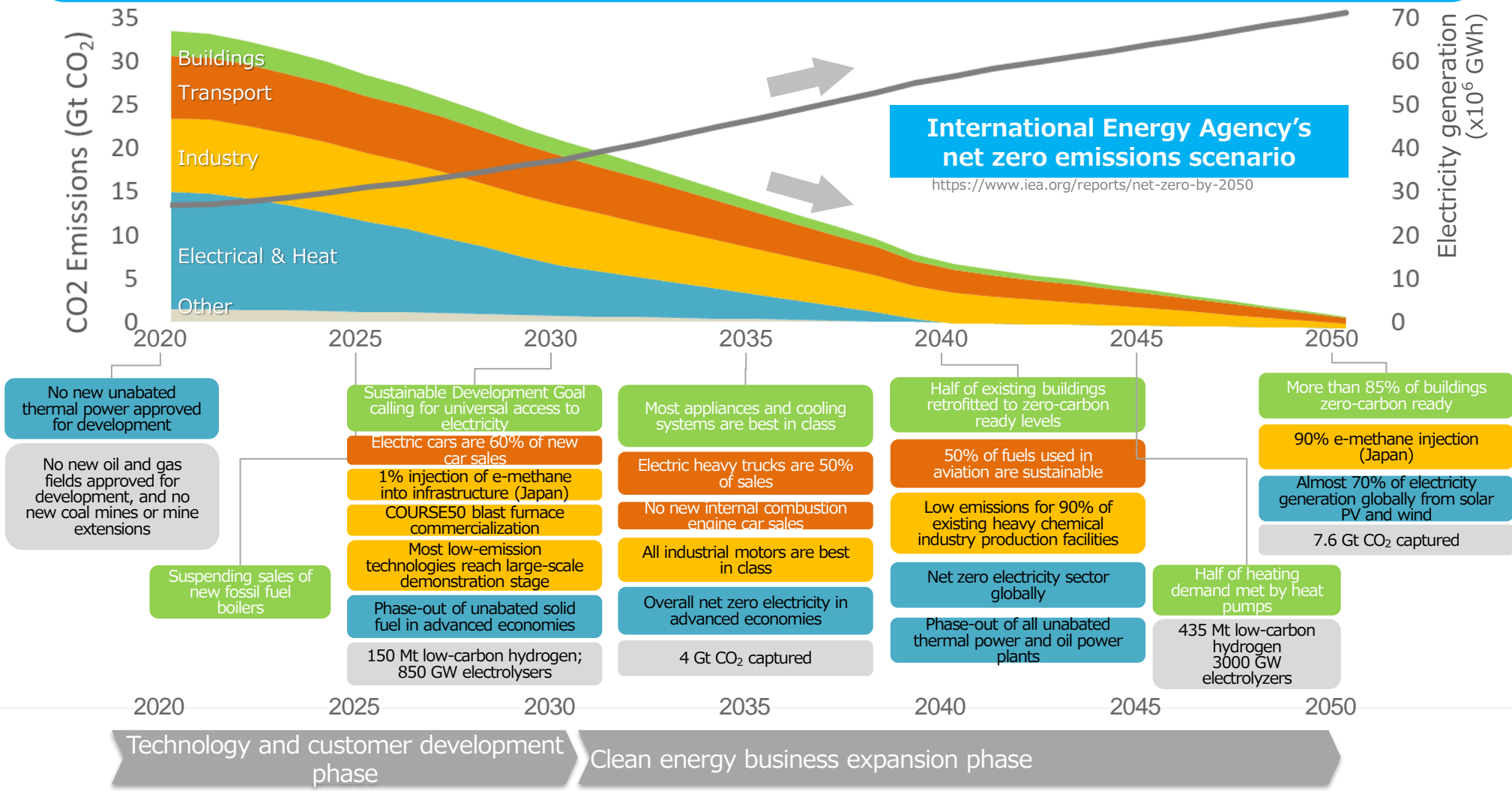
- Expanding energy demand in emerging nations
- Rising demand for clean power and eco-materials in keeping with social needs
- Growing demand for energy management-related infrastructure in line with renewable energy deployment progress
- Expanding demand for distributed power sources

Risks

- Thermal power generation business shrinks swiftly owing to accelerating decarbonization
- Competition intensifies in emerging economies
- Opposition to nuclear power rises over differing views on this power source
- Fast deployments of environmental regulations for ships

2. Business Environment Outlook and Assumptions

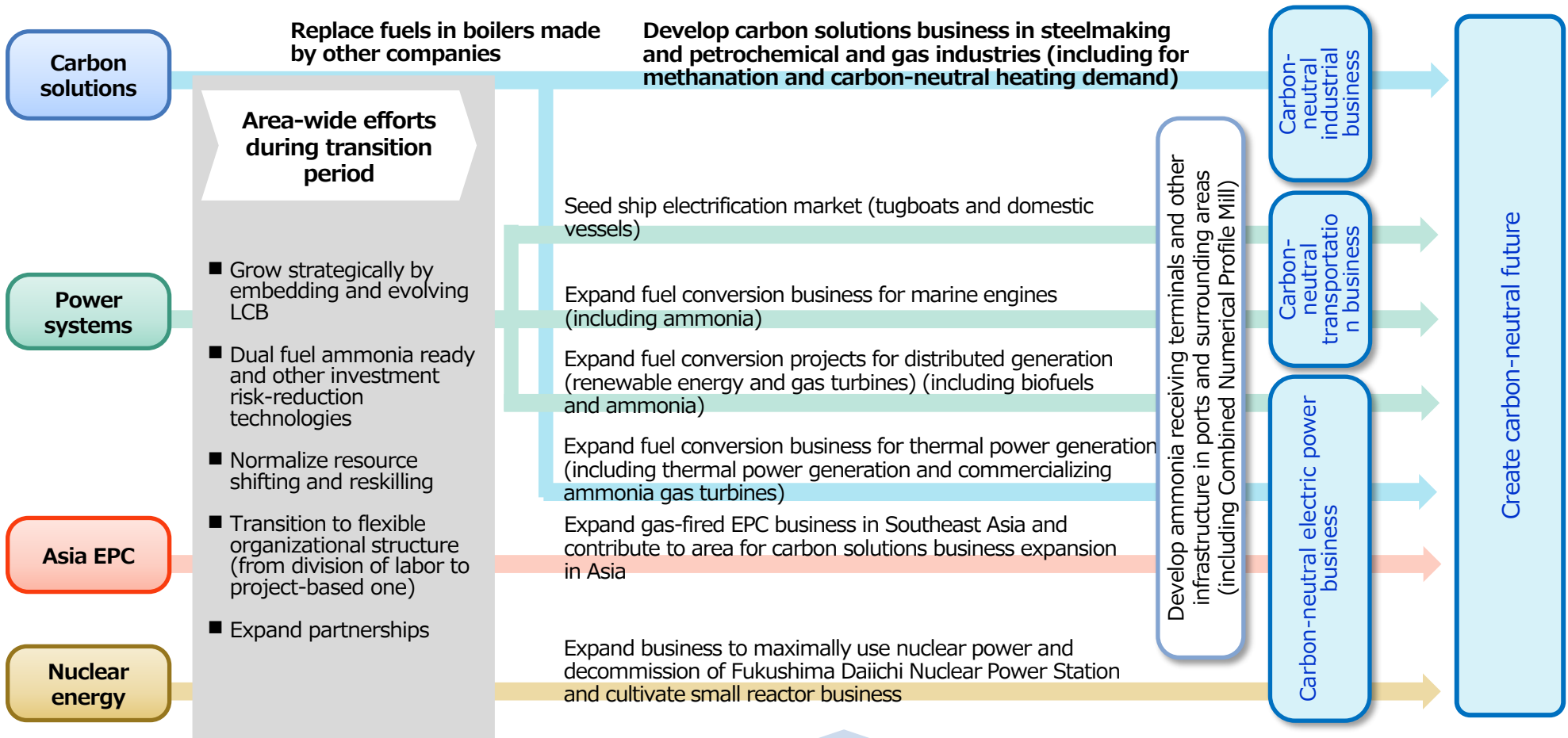
- Electricity demand rising amid global drive toward carbon neutrality
- Development and implementation of decarbonization technologies is progressing mainly in advanced nations, with technology deployments in developing countries also progressing
- Transition to net-zero economy by using renewable energy, energy storage, zero-emission fuels and feedstocks, and carbon capture, utilization and storage



3. Resources, Energy & Environment Business Area Initiatives

(1) General Segment Strategies Based on Group Management Strategies 2023

- ◆ Deploy measures to become carbon neutral in electric power, industrial, and transportation sectors to realize vision in energy domain
 - ✓ Secure carbon-neutral investment resources in core existing businesses, including lifecycle businesses
 - ✓ Reform business structure (business portfolio and profit structure)
 - ✓ Establish, commercialize, and cultivate carbon-neutral business technologies



Secure investment resources by cultivating lifecycle businesses and strengthening earnings base

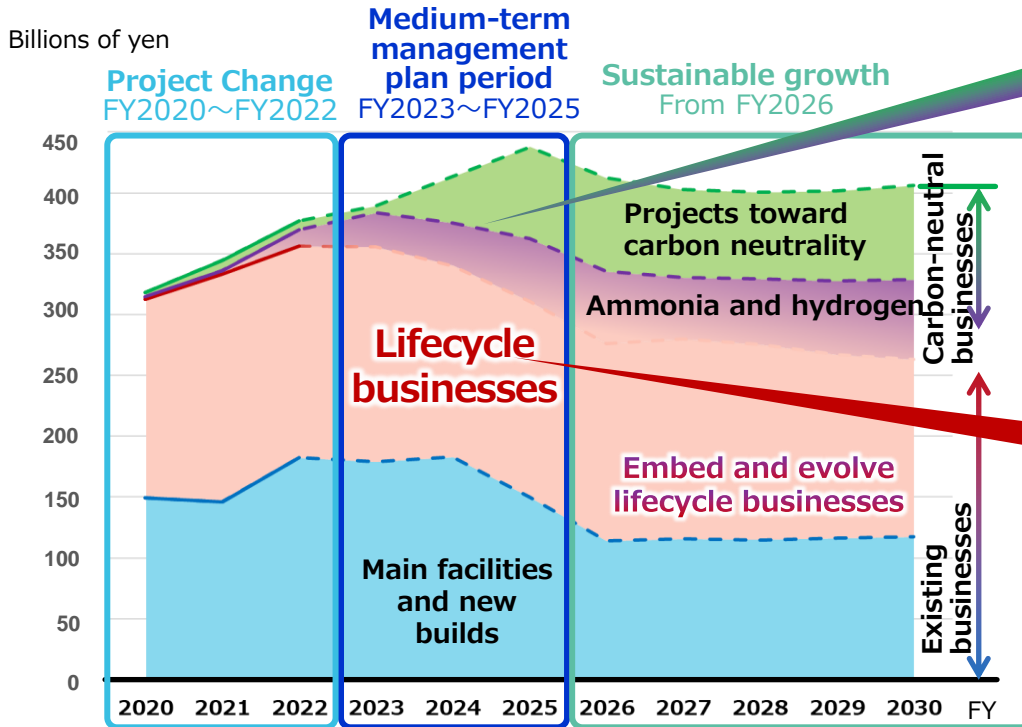
3. Resources, Energy & Environment Business Area Initiatives

(1) General Segment Strategies Based on Group Management Strategies 2023

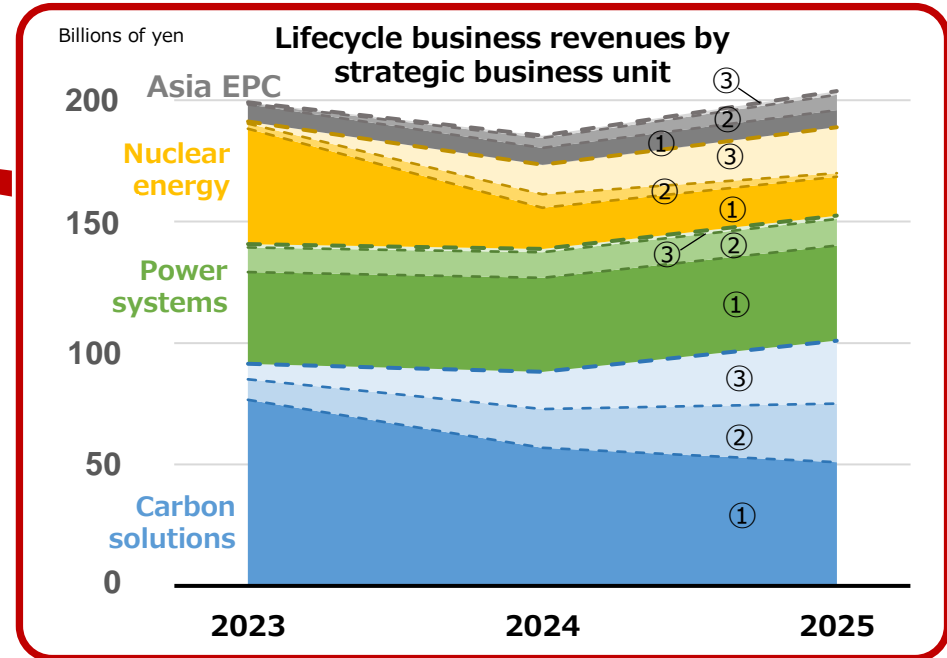
Secure earnings by embedding and evolving lifecycle businesses while expanding revenue in carbon-neutral businesses

Expand carbon-neutral business revenue to make it a revenue pillar
(including ammonia utilization, methanation, and energy management)

Revenue trends by business portfolio



Position existing businesses as core businesses, securing earnings by embedding and evolving lifecycle businesses



- Lifecycle business classifications ①~③
- ① Orders in existing businesses highly likely
 - ② Maintain and expand existing businesses
 - ③ Expand by evolving and embedding

3. Resources, Energy & Environment Business Area Initiatives

(2) Lifecycle Business Revenue Composition and Future Strategies

- Reap rewards in category ① lifecycle businesses and swiftly deploy specific measures for solid orders in categories ② and ③
- For nuclear energy strategic business unit, swiftly seed to maintain profitability
- “Personalize” business to identify and resolve issues by being part of customer lifecycles

Existing lifecycle businesses

Lifecycle business ①

Secure planned orders and provide value, including by undertaking periodic inspections and supplying parts

Lifecycle business ②

Unplanned orders and deals that provide value, such as emergency responses and additional orders

Lifecycle business embedding

Lifecycle business ②

Expand business schemes by leveraging strengths

- Deploy to new customers
- Include products and peripherals from other companies
- Use customer data
- Long-term service and service agreements and operation and maintenance

Lifecycle business evolution

Lifecycle business ③

Create value through new technologies and approaches

- Deploy drones, augmented reality, and other remote technologies
- Quantify and generate credits for carbon dioxide reductions
- Optimize by matching supply and demand
- Create value by using satellite data

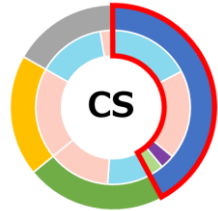
3. Resources, Energy & Environment Business Area Initiatives

(3) Business Portfolio and Earnings Structure: Business Strategies to Reach Targets



■ Carbon solutions business

Start shifting portfolio from coal boilers to ammonia and carbon neutral businesses
 (Including methanation, ammonia utilization and storage tanks, and petrochemicals shift)
 Overhaul engineering organization, production sites, and other areas



Carbon solutions business unit revenue and plans

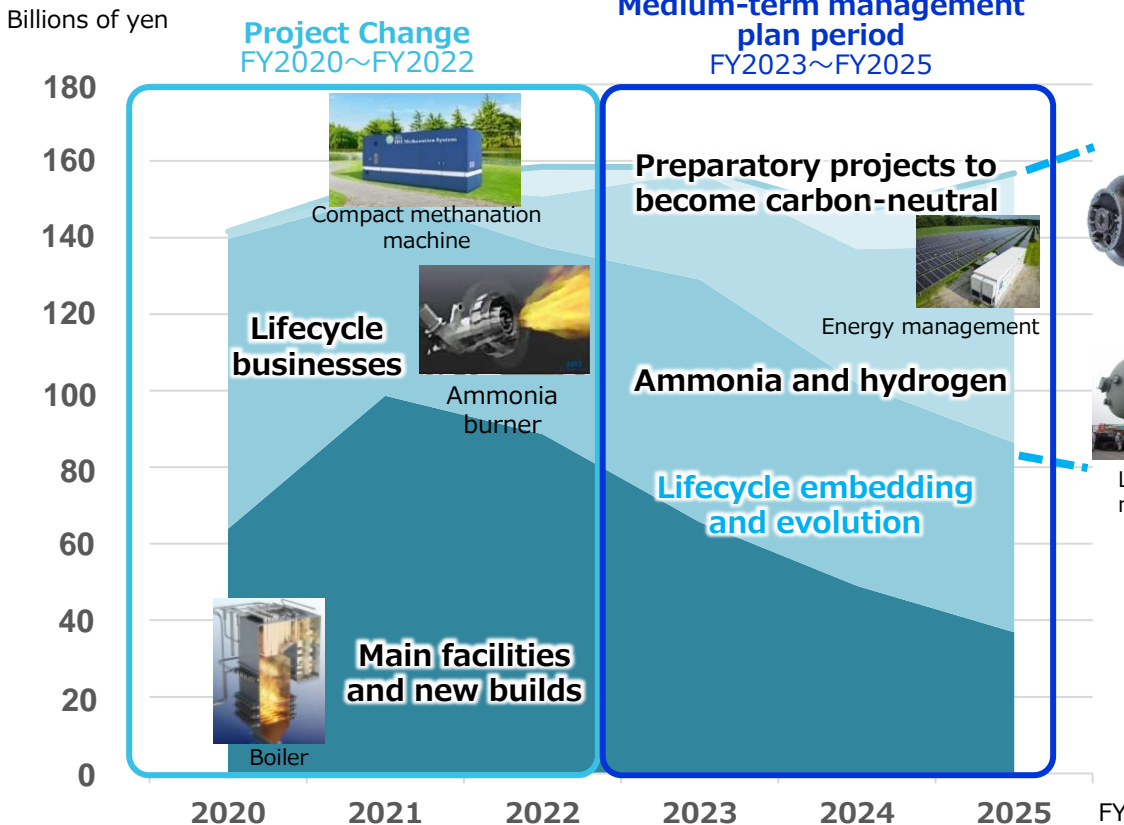
Transform ammonia and carbon neutral businesses into core businesses

Transform engineering organization

- Strengthen and reskill process engineers to drive ammonia, carbon recycling, and gas turbine development
- Acquire gas turbine engineering technology through aviation area collaboration

Transform production sites

- Invest in ammonia and carbon-neutral hardware manufacturing
- Acquire gas turbine manufacturing technology and skills through aviation area collaboration (prepare for ammonia gas turbine production)



3. Resources, Energy & Environment Business Area Initiatives

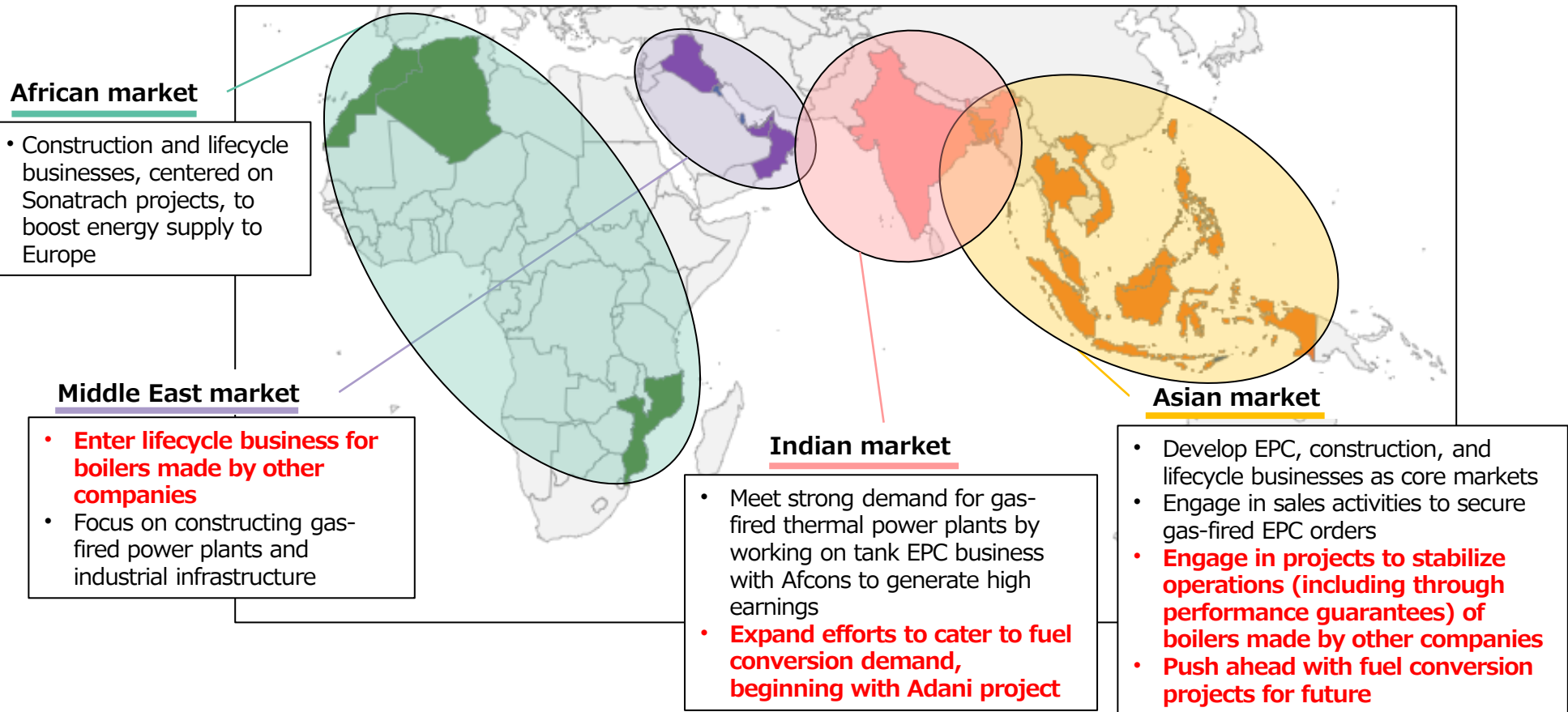
(3) Business Portfolio and Earnings Structure: Business Strategies to Reach Targets

■ Asia EPC business

- Strengthen Jurong Engineering Limited Group's project management and implementation capabilities
- Secure profits by properly executing gas-fired EPC projects (including those by other companies)
- Help expand value chain in Southeast Asia with ammonia fuel substitution and storage technology



◆ Medium-term regional strategy (Jurong Engineering and carbon solutions business)



3. Resources, Energy & Environment Business Area Initiatives

(3) Business Portfolio and Earnings Structure: Business Strategies to Reach Targets

■ Power systems business

Become business entity that secures operating profit during current medium-term management plan

Engage in business and model selection and concentration, restructure businesses, and improve profitability

Become consistently profitable by FY2025

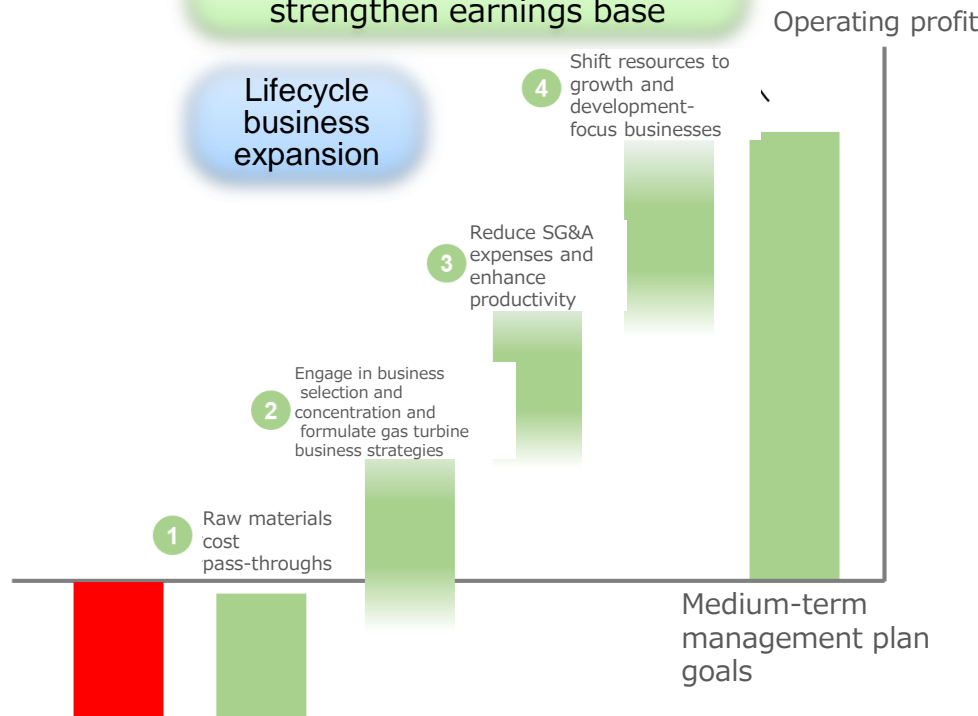
Accelerate carbon-neutrality for ships and internal combustion engines generating stable earnings



Outline for securing operating profit

Reform business structure and strengthen earnings base

Lifecycle business expansion



FY2022 results

Improve profitability to secure investment resources

- Accomplish structural reforms through **selection and concentration** (for models, customers, and businesses)
- Become consistently profitable organization
- Expand lifecycle businesses of existing operations

Accelerate efforts to materialize and deploy development-focus businesses

- Convert to ammonia and other carbon-neutral fuels
- Commercialize power systems

Optimize sales structure to drive carbon-neutrality

- Centralize sales with carbon solutions business unit for power, gas, industrial reciprocating engines, gas turbines, and other offerings

3. Resources, Energy & Environment Business Area Initiatives

(3) Business Portfolio and Earnings Structure: Business Strategies to Reach Targets

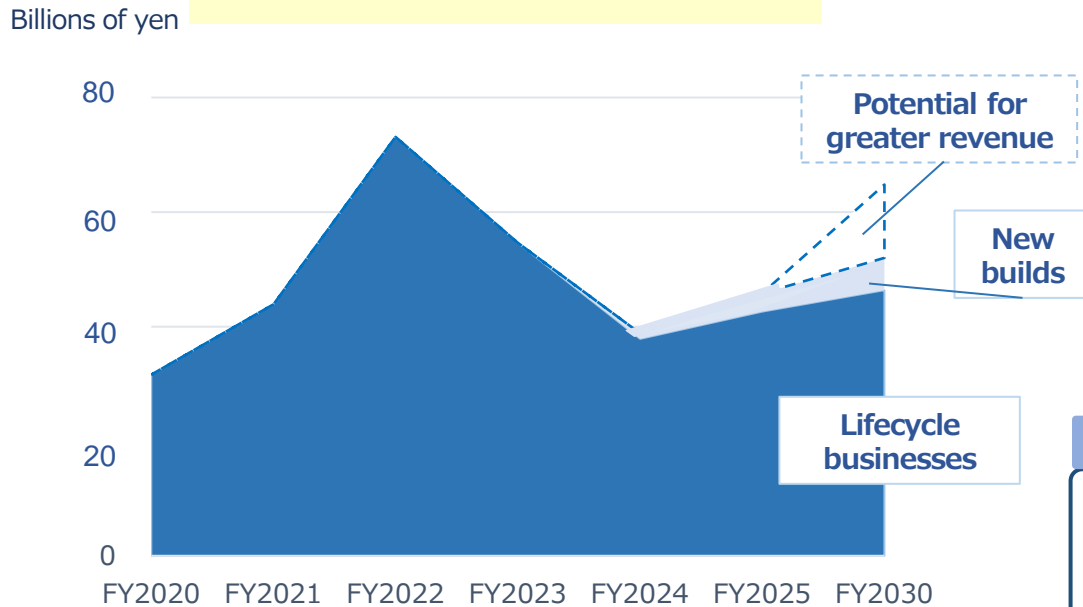


■ Nuclear energy business

- Secured stable revenue base primarily through lifecycle businesses, such as for restarting and extending operating lives of light water reactors
- Helped construct NuScale's first small modular reactor, establishing dominance as next-generation reactor manufacturer



Nuclear energy strategic business unit revenue trends



~FY2040

- Presence in lifecycle businesses and next-generation reactors**
- ✓ Lengthen safe life expectancies for domestic plants
 - ✓ Drive expansion of small modular and other advanced reactors overseas and domestically

~FY2030

- Leverage engineering capabilities to expand partnerships**
- ✓ Boost customer support for plant restarts in Japan
 - ✓ Build cooperative framework for inaugurating first small modular reactor unit

~FY2020

- Extensive boiling water reactor experience and partnerships**
- ✓ Manufacture pressure vessels and other major components
 - ✓ Maintenance at various plants

Keep supporting portfolio transformation in business areas with a stable revenue base

Leverage in-house technology and expand partnerships to develop nuclear energy business

Decontamination/
decommissioning progress at
Decom.Tech*

Operational support and new
additions at Rokkasho
Reprocessing Plant

Expand restarts and life
extensions

Expand overseas small modular reactor projects

New light water reactor construction: Expand
domestic and overseas projects

Reinforce production capacity and organizational structure to support nuclear lifecycle businesses

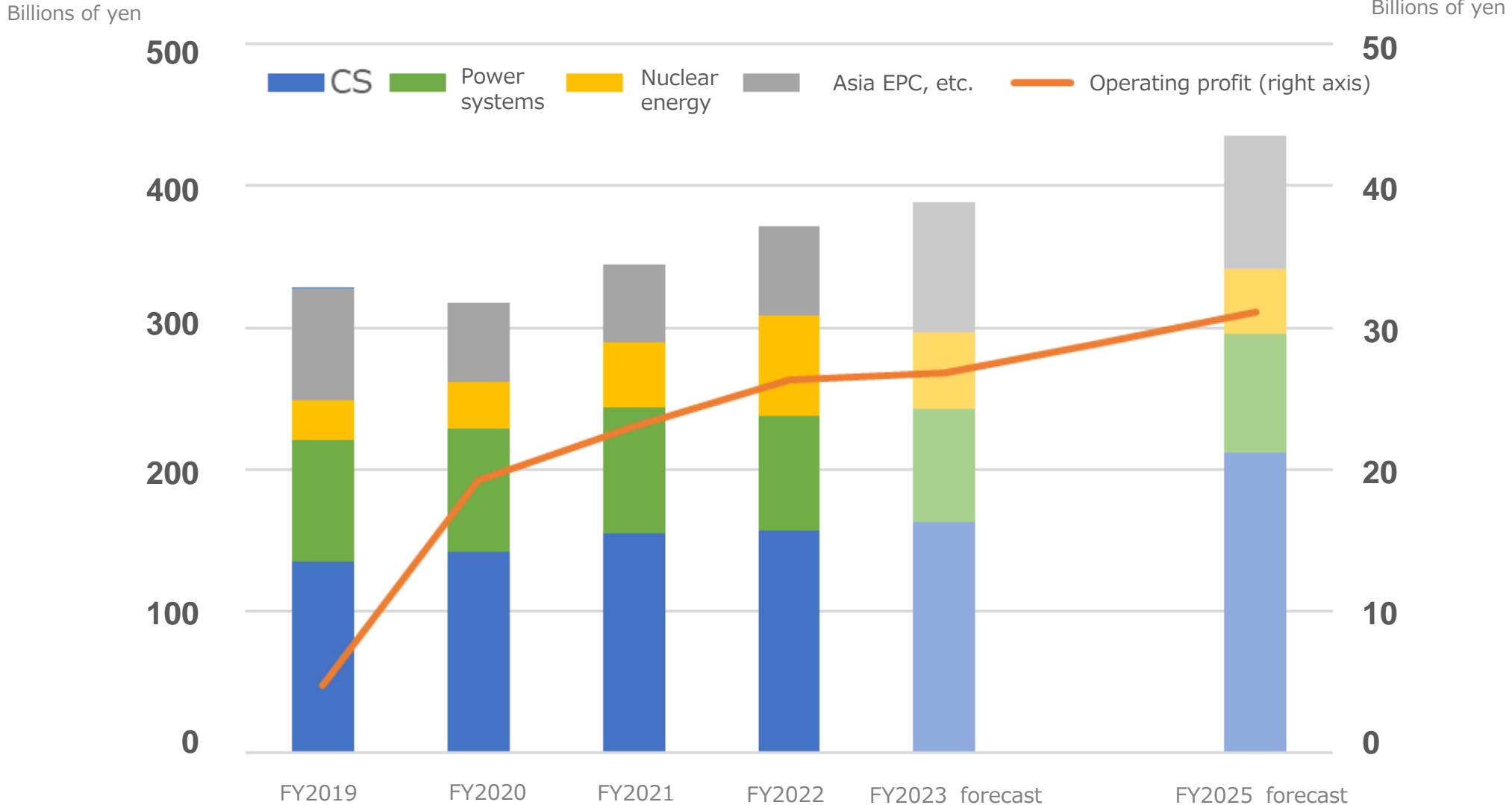
3. Resources, Energy & Environment Business Area Initiatives

(4) Process to Reach Earnings Goals: Medium-Term Management Plan Profit Targets



Expecting to expand business scale on carbon solutions and power systems lifecycle businesses growth while boosting overseas affiliate sales

Revenue trends for FY2019~FY2022 and forecasts for FY2023 and FY2025.

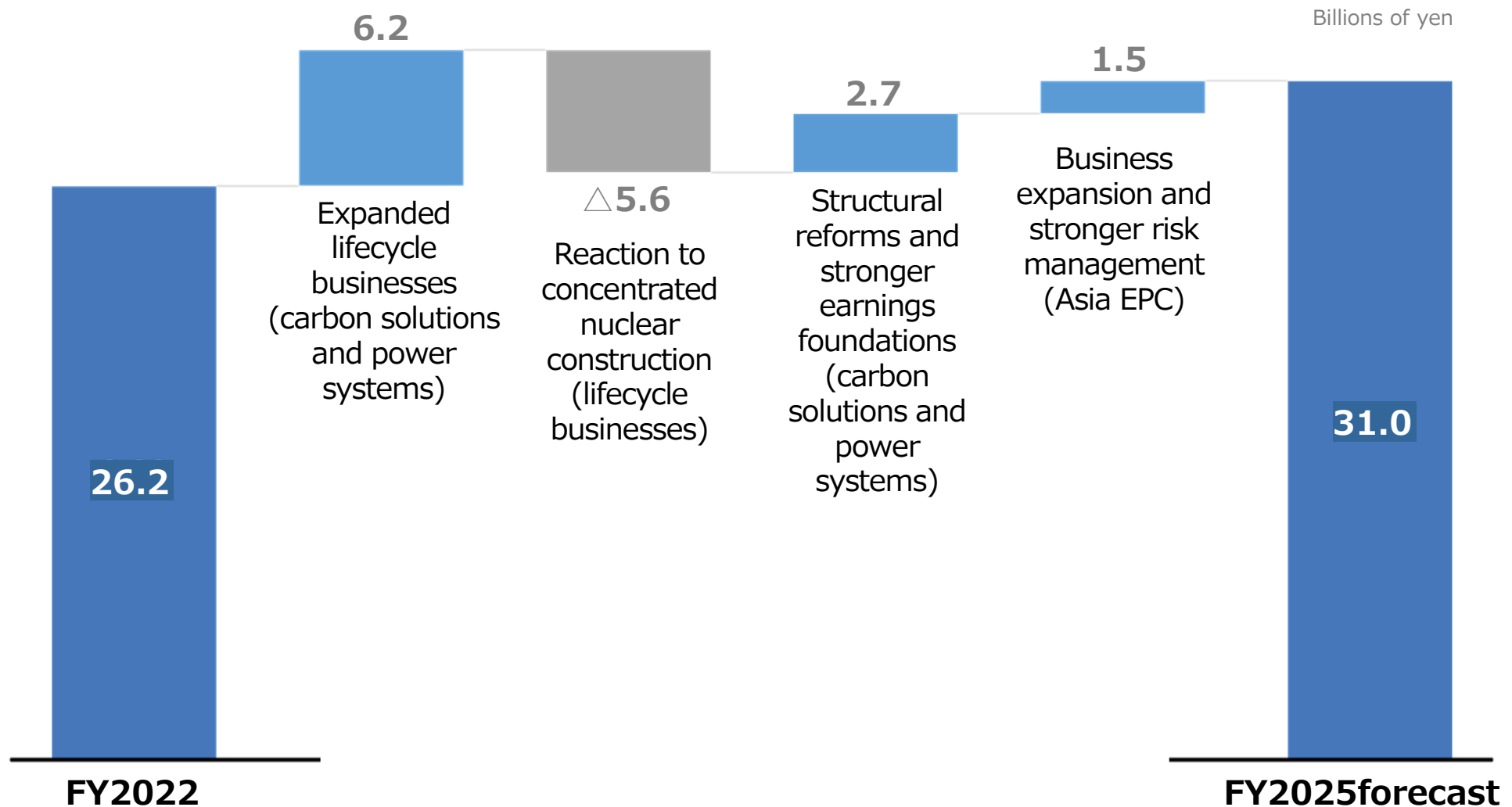


3. Resources, Energy & Environment Business Area Initiatives

(4) Process to Reach Earnings Goals: Medium-Term Management Plan Profit Targets **IHI**

Lift earnings in FY2025 through such improvement steps as expanding lifecycle businesses, undertaking structural reforms, and expanding Asian businesses

Analysis of operating profit changes from FY2022 to FY2025



3. Resources, Energy & Environment Business Area Initiatives

(5) Long-Term Earnings Growth Story: Establish and Commercialize Carbon-Neutral Business Technology

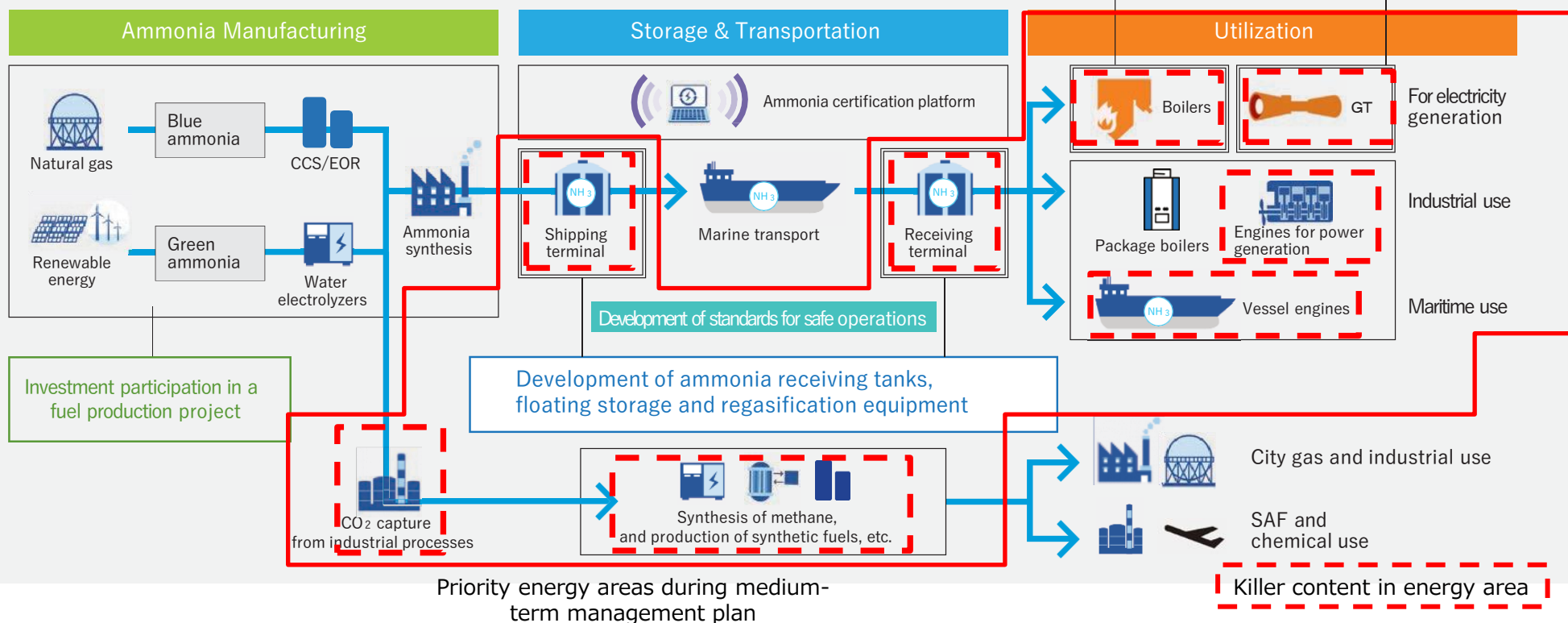
Development-focus business (clean energy)

Swiftly commercialize ammonia utilization and methanation with killer content of carbon-neutral technology, helping create ammonia value chain and materialize carbon recycling

- Building it into a business that will be main pillar as Aero Engines, Space
- We will work to create and improve our entire value chain. This includes power generation equipment such as Gas Turbine that utilizes world-leading ammonia combustion technology, as well as our storage and receiving terminals with top-tier performance.
- While investigating investment in fuel manufacturing projects, we will utilize our engineering capabilities to build a new business model.

Demonstration of ammonia mix-firing in thermal power plants around the world
 Demonstration of mix-firing ratio increase from 20% to 60%

Successful development of ammonia-based Gas Turbine
 Joint development with GE to apply this technology to large gas turbines

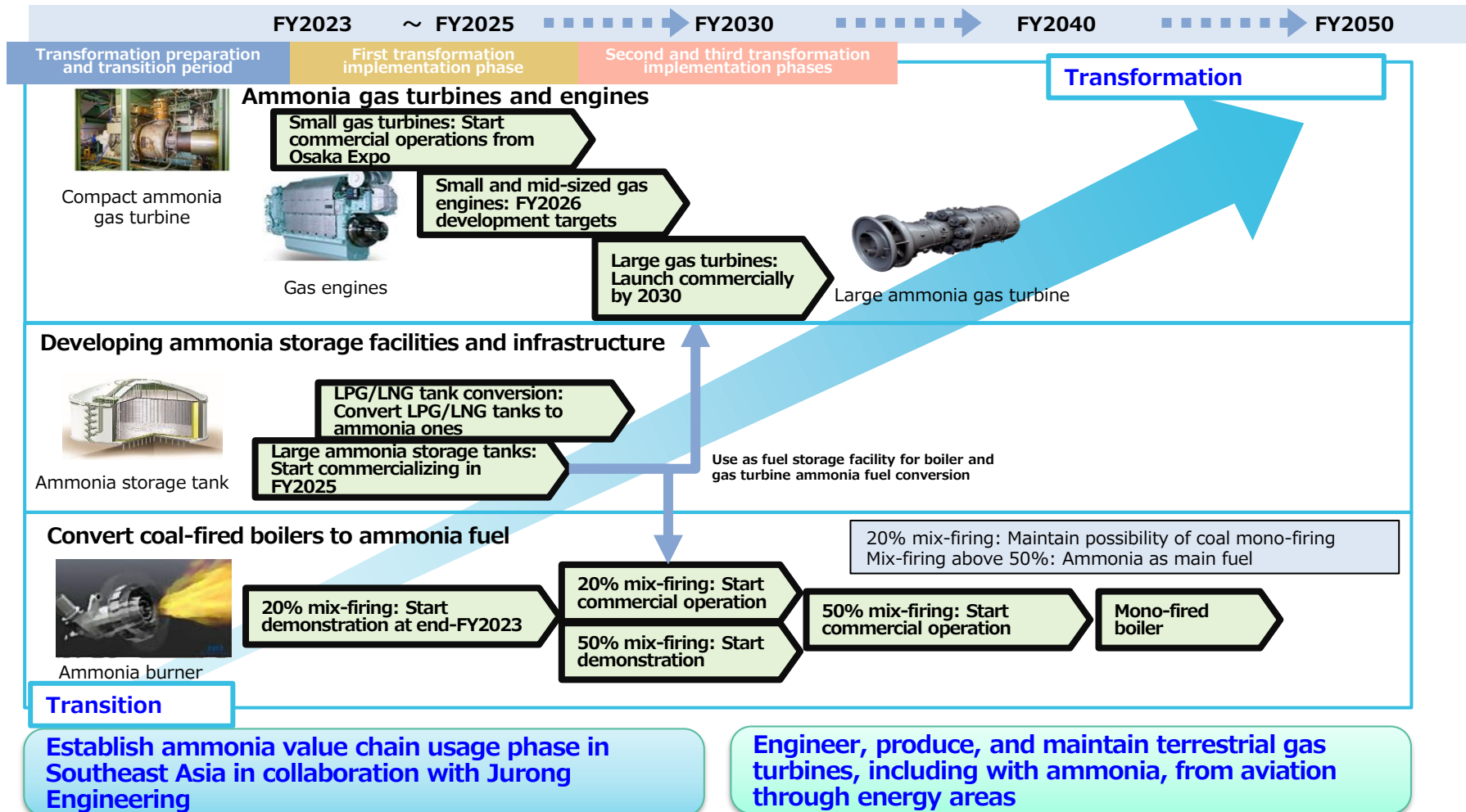


3. Resources, Energy & Environment Business Area Initiatives

(5) Long-Term Earnings Growth Story: Establish and Commercialize Carbon-Neutral Business Technology

Large-scale ammonia utilization

- ◆ Prepare for tomorrow's ammonia gas turbines by expanding utilization and developing ammonia supply infrastructure at foothold of coal-fired power plant fuel conversion
- ◆ Reskill and shift resources with view to transitioning from boiler business
- ◆ Pursue corporate-led business development for producing and supplying ammonia, building value chain in collaboration with other companies



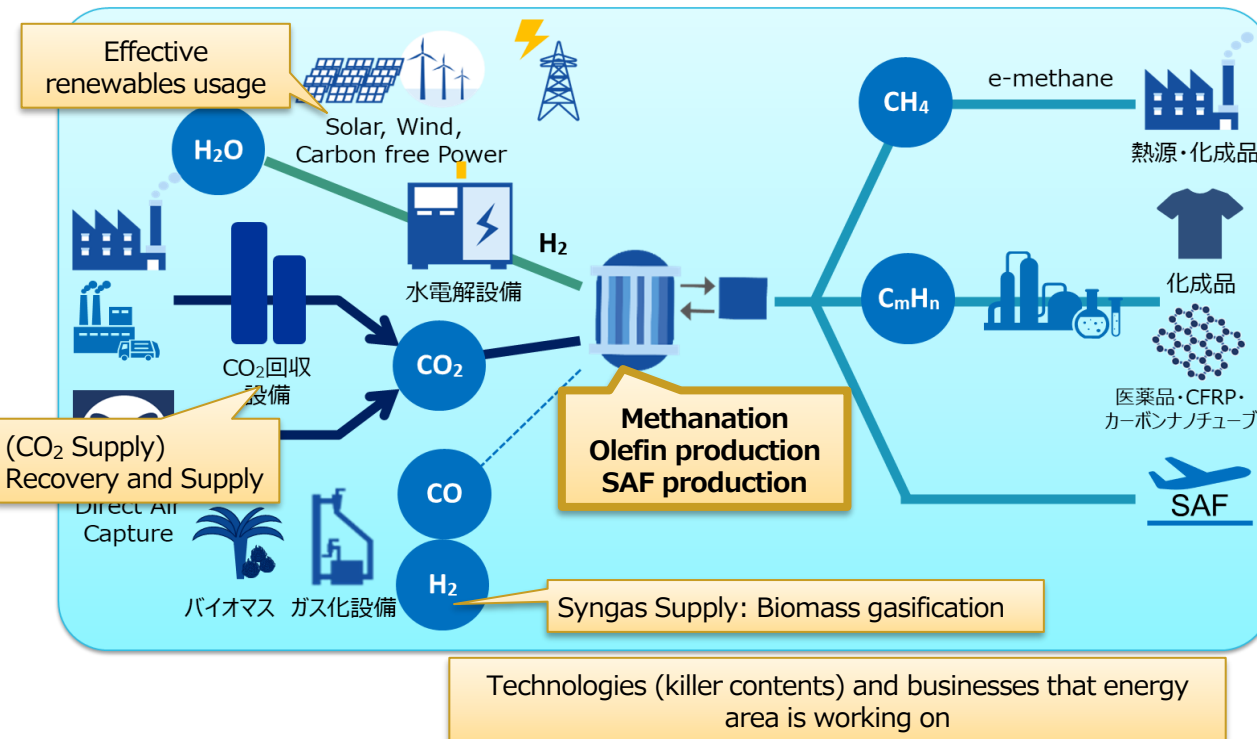
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(5) Long-Term Earnings Growth Story: Establish and Commercialize Carbon-Neutral Business Technology

Carbon recycling and methanation

- Become top runner in methanation technology
- Small facilities: Establish brand image by expanding sales and rentals
- Mid-sized facilities: Starting with demonstration facilities for which we have already received orders, will connect hydrogen and CO₂ source and methane demand to provide value beyond equipment delivery and lifecycle businesses
- Large facilities: Assess business model for large-scale production abroad to replace overseas LNG supply chain
- Accelerate development of innovative technologies to cut e-methane production costs and provide high added value in energy management and digitization

Carbon recycling value chain



Business development scenario

- Top share in methanation equipment
 - ✓ Maximize CO₂ capture and reaction thermal efficiencies
 - ✓ Establish track records in industrial field and other areas
 - ✓ Push ahead to deploy small standard equipment

Provide technology on raw material supplies side

Increase profits through catalyst replacement and other aftermarket operations (including through long-term service agreements)

Provide services related to environmental value that is vital for e-methane usage

Drive expanding carbon recycling market, including with olefins and SAF



Forward-looking figures shown in this material with respect to IHI's performance outlooks and other matters are based on management's assumptions and beliefs in light of the information currently available to it, and therefore contain risks and uncertainties. Consequently, you should not place undue reliance on these performance outlooks in making judgments. IHI cautions you that actual results could differ materially from those discussed in these performance outlooks due to a number of important factors. These important factors include political environments in areas in which IHI operates, general economic conditions, and the yen exchange rate including its rate against the US dollar.

- Create and develop personalized solutions business that taps digital technology to penetrate entire customer lifecycles
- Alongside Industrial Systems & General-Purpose Machinery Business Area, seed lifecycle business development for customers of industrial field and of competitors

Specific example

A customer needed to cut CO₂ emissions, so we analyzed exhaust gases at its plant with our **CO₂ separation and recovery** technology. We proposed a process to transform the recovered CO₂ into a valuable resources through **methanation technology**. **The customer used IHI's solution in its vision for plant decarbonization.**

