Summary of Q&A at Energy Transition Presentation (November 30, 2020)

(Responses were based on information available at the time of the presentation.)

Speakers in the live Q&A Session
Mr. Kentaro Hosomi, CEO of Energy Systems
Mr. Akihiko Kato, Head of Nuclear Energy Systems
Mr. Hitoshi Kaguchi, CSO
Mr. Eisaku Ito, CTO
Mr. Hisato Kozawa, CFO
Mr. Masayuki Suematsu, Head of Business Strategy Office
Mr. Ken Kawai, CEO, Mitsubishi Power

Questions regarding overall strategy and investment / capital allocation plans

Q. On page 5 of the " 2021 Medium-Term Business Plan (MTBP) and Energy Transition" presentation by CSO, he explains that MHI aims to achieve revenue of ¥50 billion in the new areas of Energy Transition in FY2023 and ¥300 billion in FY2030. In which area(s) are you particularly looking to increase revenue?

A. (Mr. Kaguchi, CSO) CCUS and hydrogen-related businesses will be the main areas for revenue growth. Fuel conversion for existing facilities, such as hydrogen gas turbines, is not included in the new area, as it is categorized as an existing area. In FY2023, we will mainly handle EPC (engineering, procurement and construction) and equipment supply for CCS systems. In FY2030, we expect to see further revenue growth in these areas and a certain level of hydrogen-related revenue.

Q. How much profit will be generated from the Energy Transition from FY2023 to FY2030?

A. (Mr. Kozawa, CFO) Profit contribution from new business areas presented in the 2021 MTBP or explained in presentations today are not included in the forecast for FY2023. In other words, in FY2023, we do not expect much profit out of ¥100 billion revenue in new businesses. By FY2030, we aim to achieve a level of profit consistent with the average across the entire company as we move forward with commercialization.
(Mr. Hosomi, CEO of Energy Systems) In the long run, it will be difficult for

the existing businesses to survive if we keep operating them the way we do now, so we need to transform our portfolio. We will accelerate our response to the Energy Transition.

Q. According to page 5 of CSO' s presentation material, "2021 Medium-Term Business Plan (MTBP) and Energy Transition", MHI aims to achieve revenue of ¥300 billion in the new Energy Transition area in FY2030. What is the breakdown of revenue between Japan and overseas? Also, how much of this will fluctuate based on governments' net-zero carbon policy trends?

A. (Mr. Kaguchi, CSO) The majority of the ¥300 billion in our revenue target for FY2030 is for overseas. As we move toward a net-zero carbon society in 2050, we will have business opportunities in Japan, but at present we expect revenue to be centered on overseas markets.

Q. Has there been an increase in inquiries and business opportunities for technologies addressing global warming, in light of major changes in recent years, including the coming change of administration in the United States?

A. (Mr. Kaguchi, CSO) As far as CCUS is concerned, inquiries have steadily increased over the past 1-2 years, particularly in the United States and Europe.

<u>Hydrogen society and energy value chain</u>

Q. On page 14 of "Energy Transition - New Frontier for MHI Group" by the CEO of Energy Systems, does the field of "New entry and development" indicated in green mainly consist of utilization of technologies and products that have been cultivated in the "existing products and applications" shown in orange? If so, is no significant additional investment needed? In addition, is this investment included in ¥200 billion investment in the Energy Transition described on page 2 of "Financial Foundation supporting Energy Transition" by CFO?

A. (Mr. Hosomi, CEO of Energy Systems) The field of "New entry and development" shown in green is not a derivative of our existing Group businesses and products, but a field that requires acquisition of new technologies, etc. Therefore, new investments are required. We will also continue to develop the "existing products and applications" fields shown in

orange.

(Mr. Kozawa, CFO) ¥200 billion investment over the three years will be made during the 2021 MTBP period. Some of the fields described on page 14 of the presentation material by the CEO of Energy Systems have already been developed to some extent, and some are to be started, but the ¥200 billion investment targets are generally within the scope shown on this page.

Q. Roughly how many years do you think it will take to build the hydrogen value chain?

A. (Mr. Hosomi, CEO of Energy Systems) If we assume that carbon neutrality will be achieved by 2050, we believe that the basic technological elements will be established by around 2030, and that commercialization based on these elements will be around 2040.

Q. Is there a possibility that how you go about promoting hydrogen technology could be streamlined through collaboration with competitors in the industry and government-led research and development?

A. (Mr. Hosomi, CEO of Energy Systems) We believe that the introduction and spread of hydrogen will take place first in overseas countries where existing infrastructure (gas pipelines, etc.) can be utilized. We will acquire know-how through participation in advanced projects and cooperation with overseas partners. In order to enable widespread use of hydrogen in Japan, we have a transportation handicap, so we would like to overcome the barriers of transportation and storage through partnerships with other Japanese companies.

Hydrogen Production

Q. There are several ways to produce hydrogen. Could you please explain the pros and cons of each of them?

A. (Mr. Hosomi, CEO of Energy Systems) Currently, hydrogen is mainly extracted from fossil fuels, and CO_2 is emitted in the process. Research and development (electrolysis using renewable energy, thermal decomposition using heat sources such as high-temperature gas furnaces, CO_2 recovery, etc.) is being conducted to reduce these emissions. There are various possibilities for commercialization, and we are looking for opportunities in this area.

Ammonia utilization

Q. One of your competitors is focusing on hydrogen carriers, but we understand that MHI expects to transport hydrogen using ammonia. What are the pros and cons of ammonia transportation?

A. (Mr. Hosomi, CEO of Energy Systems) Ammonia has the advantage of being suitable for transportation because it requires less dedicated equipment. Ammonia is a highly toxic gas that requires handling know-how, but it is already commonly transported and used as a fertilizer, so the accumulated knowledge in these areas is widely known.

Q. In relation to transporting hydrogen, how do you view the supply and demand balance of ammonia?

A. (Mr. Hosomi, CEO of Energy Systems) In Japan, there is a certain level of demand for ammonia in the promotion of decarbonization, as exemplified by JERA's efforts in ammonia co-firing at existing coal-fired power plants. Research and development is also underway into the utilization ammonia as a marine fuel and is expected to be verified by FY2030. In this way, we are studying ways to use it not only as a way to transport hydrogen but also in multiple applications as ammonia.

Q. I understand that one way to transport hydrogen is by synthesizing methylcyclohexane (MCH) from toluene like some other companies do. Why do you focus on ammonia?

A. (Mr. Hosomi, CEO of Energy Systems) Ammonia is flexible enough to be used as it is as a fuel for gas turbines. However, there is a possibility that we may see it combined with other companies' methods in the future.

Q. Is there any possibility that ammonia will be in short supply?

A. (Mr. Hosomi, CEO of Energy Systems) We do not have enough ammonia at the moment. We believe that "green ammonia" that uses renewable energy for production and "blue ammonia" where CO_2 emitted during production is captured will add value as decarbonized fuels. Therefore, we would like to work with our partners to develop methods for producing ammonia without emitting CO_2.

The hydrogen gas turbine

Q. What are MHI's technical differentiators in hydrogen gas turbines?

A. (Mr. Ito, CTO) Hydrogen is a fuel that is difficult to burn stably. Specifically, since the combustion speed is high, the flame is more likely to encroach into the machine. The absence of combustion vibrations is another key to ensuring stable combustion. MHI possesses advanced simulation technology and acoustic devices that absorb pressure fluctuations and reduce combustion variations, enabling combustion at some of the highest temperatures operating in the world (greater than 1600°C). Since higher temperatures are the key to increasing power generation efficiency, we are currently aiming for even higher temperatures (1650°C to 1700°C).

Q. If hydrogen generated from renewable energy is co-burned to generate electricity, will the power generation efficiency drop?

A. (Mr. Ito, CTO) If it can be burned stably, the generating efficiency of hydrogen is the same as that of natural gas.

(Mr. Hosomi, CEO of Energy Systems) The power generation efficiency of the hydrogen gas turbine itself is comparable to that of existing natural gas-fired gas turbines. On the other hand, the hydrogen production process uses a large amount of energy, so it is true that the system as a whole is less efficient than one based on fossil fuels; how to improve this is our key challenge. The main theme of Energy Transition is to create a world striving towards net-zero carbon through widespread adoption of hydrogen. Based on a range of technologies that we have developed over time we will reduce the cost of using hydrogen through improvements in the efficiency of the entire hydrogen value chain, from the supply of primary energy necessary for production to transportation, storage and utilization.

Nuclear power

Q. Could you tell me how the nuclear power business is projected in 2021 MTBP and the medium to long-term business scale?

A. (Mr. Kato, Head of Nuclear Energy Systems) In 2021MTBP, we have reflected projections for support for the restart of nuclear power plants including BWRs (boiling water reactor), installation of Specialized Safety Facilities, maintenance work for restarted plants, support for the establishment of fuel cycles at the Rokkasho Reprocessing Plant, and export of components to overseas. The business scale (annual revenue) is expected to be slightly less

than ¥300 billion. In the future, in addition to decommissioning work and maintenance work after the completion of the Rokkasho Reprocessing Plant, full-scale production of casks for both transportation and storage of spent nuclear fuel will begin in earnest, so we expect our business scale to be in a similar range (approximately 300 billion yen) in the medium to long term.

CCUS (CO_2 recovery, utilization and storage)

Q. CCUS has been considered a key technology since the Obama administration. Has it become widespread? What is MHI's position, bottlenecks, and future direction?

A. (Mr. Hosomi, CEO of Energy Systems) MHI has the world's top share in CCUS. In the United States, MHI supplied the world's largest CO_2 recovery plant, which is operated by Petra Nova. At this plant, recovered CO_2 is used for EOR (Enhanced Oil Recovery), but at present EOR is not widely used in the market due to low crude oil prices. CCUS has the potential to play a major role in some industries where CO_2 emissions are unavoidable in the manufacturing process. Policy support such as subsidies will also be necessary, but the key to achieving sustainability in the CCUS market is how to add value to the recovered CO_2. From CO_2, carbon is the main element, and even today it is used in mixed cement, but we will expand the application fields to areas such as carbon recycling. To this end, Our Group will continue to advance technology development.

Q. I understand that MHI has the world's top share in CCUS. What is the size of the market and what is the share of competitors?

A. (Mr. Hosomi, CEO of Energy Systems) We will check the details and answer later.

[Note]

In addition to MHI, we recognize that major players in overseas CCUS projects are Cansolv Technologies, Flour, Aker Solutions, and Carbon Clean. There are no competitors in Japan. In order to achieve carbon neutrality in 2050, it is necessary to recover about 7 gigatons of CO_2 annually by that time. From this perspective, the CCUS-related equipment industry as a whole is estimated to have a market size of 2.4 trillion euros (our company estimation) in terms of capital investment. As for MHI's share at present, of the global CO_2 recovery amount from combustion exhaust gas of approximately 15,000 tons per day (our company estimation), MHI has delivered recovery

equipment for over 10,000 tons (share of over 70%) and is operating on a commercial basis.

Q. If CO_2 emitted from a plant is recovered and used for EOR, can it be considered CO_2 reduction?

A. (Mr. Hosomi, CEO of Energy Systems) Yes. CO_2 used in EOR is stored underground and not released into the atmosphere, making it an effective means of reducing CO_2.