JFE Holdings, Inc.

JFE Group ESG Briefing
Summary of Q&A Session on October 8, 2020

Note: For ease of comprehension, some statements have been reordered.

Q. With international moves to decarbonize intensifying, most prominently in Europe, how do you view the international competitiveness of your decarbonization technology?

A. Some media reports suggest that the development of innovative technologies in Europe is far ahead of that in Japan, and that while the technologies are highly feasible, they are applicable only to limited production volumes within specific infrastructure. We think that achieving a scale of production sufficient to meet global steel demand will be extremely difficult. Reports also suggest that the investments are of the order of several trillion yen, but our understanding is that the development costs disclosed were calculated with government support and the like in mind, and that it is unclear at this point whether the investments will actually go ahead.

ArcelorMittal's European business has announced that it aims to reduce CO_2 emissions by 30% by 2030 and be carbon neutral by 2050, with the 30% reduction by 2030 to come from the increased use of scrap and direct reduced iron (DRI) produced using natural gas. The company itself has stated that it will not be possible to put hydrogen-reduction ironmaking into commercial production by 2030, and that it instead plans to work toward using the technology in commercial production over the period from 2030 to 2050. Also, procuring large amounts of hydrogen inexpensively is likely to be a prerequisite for deploying the technology in commercial production. So we do not think that our goal of being carbon neutral as soon as possible after 2050 is much different, either in terms of the goal itself or the timeframe.

ArcelorMittal has also announced plans to open a hydrogen-DRI pilot plant in Germany in 2023 with an annual production capacity of 100,000 tons, but our ferro coke manufacturing facility also has a daily production capacity of 300 tons, or 100,000 tons annually, with tests set to start this year. We will work to expand daily production levels to five-times that, or 1,500 tons, and for it to be economically viable by the time it goes into commercial use, with CO_2 emissions from the ironmaking process reduced by 10%.

The Japanese steel industry opened a blast furnace test facility and began developing technology under the COURSE 50 initiative several years ago. Hydrogen is actually injected into the blast furnace at this facility, with data currently being collected and analyzed. One of the technology development themes for the hydrogen-DRI pilot plant ArcelorMittal plans to build is to obtain hydrogen by separating it from natural gas and waste gas. Japan started working on waste gas separating technology 3–4 years ago under the COURSE 50 initiative, with Japanese steelmakers opening test furnaces that use physical absorption technology and chemical absorption technology, both of which have achieved their initial development objectives. They are already at the point where they can be put into practical use, and in that sense, we believe that Japan's R&D efforts are ahead in terms of the component technologies. But as you point out, overseas players are also stepping up their technology development efforts, led by Europe, and naturally we are aware that competition will intensify. The next process in COURSE 50 involves pilot studies with support from the Japanese government and New Energy and Industrial Technology Development Organization (NEDO), and we will be working to ensure that Japanese steelmakers retain their technological advantage.

Q. European steelmakers seem to be focused on DRI and hydrogen-reduction ironmaking in an effort to reduce CO_2 emissions. Could you explain why JFE's emphasis is on ferro coke and COURSE 50?

A. DRI is a technology by which natural gas is used to reduce fine ore in the form of pellets to iron in a solid state. This method of ironmaking is popular in areas where cheap natural gas is available. But because it uses rare high-grade iron ore as a feedstock, it is not suited to mass production. Annual production using this method is only around 60 million tons, compared with over a billion tons for blast furnace methods. An electric arc furnace is also required to melt the reduced iron, so the technology is also not economically feasible unless electric power is available cheaply. For these reasons, we believe the technological and economic hurdles to making iron reduction a core technology for reducing CO_2 emissions in Japan are extremely high.

The European hydrogen reduction technology is designed to produce DRI using hydrogen instead of natural gas. It requires large amounts of hydrogen to be procured cheaply; a further issue is that because hydrogen-DRI production is endothermic, a separate carbon-free heat source is required to heat the gas. Our view is that it will be difficult to meet world steel demand with the CO_2 reduction technology being developed in Europe alone.

Meanwhile, JFE and Japanese steelmakers are developing technology to significantly reduce CO_2 emissions with blast furnace and converter methods which are suited to mass production and capable of meeting world steel demand. The first step is ferro coke technology that uses feedstock readily available in large quantities at low cost. We are also pursuing the development of next-generation technology under COURSE 50 to enable hydrogen-based reduction in blast furnaces.

Q. Please update us on your efforts with respect to the technologies shown in your roadmap to carbon neutrality. Also, do you think hydrogen-reduction ironmaking will be essential to achieving carbon neutrality?

A. Of the technologies shown in the roadmap (p.18 of the handouts), we envision the technologies in the dashed box (AI / data science-based technologies, scrap utilization technologies, highly energy-efficient equipment, ferro coke) being available by 2030. We cannot achieve carbon neutrality with these technologies alone, however, so we will need to put innovative and super-innovative technologies into commercial use as well. This is in line with the scenario for achieving carbon neutrality provided in the long-term vision that the Japan Iron and Steel Federation unveiled two years ago.

We realize that hydrogen reduction is the ultimate zero-carbon steelmaking technology, and we are engaged in R&D aimed at making the necessary technologies available by 2050. COURSE 50 aims to develop technologies for hydrogen reduction in conventional blast furnaces using hydrogen from the internal source. The Super COURSE 50 initiative is aimed at expanding hydrogen usage in blast furnaces by the use of external sources. However, large amounts of cheaply available hydrogen are needed to make hydrogen-reduction ironmaking a reality, and it is impossible to tell when infrastructure that will make it possible to supply that hydrogen will be available. Japan’s national hydrogen strategy does contain 2030 and 2050 step goals for hydrogen supply, so the scenario ahead involves the steel industry developing hydrogen reduction technology in step with the progress that is made, and deploying the technology in the field if and when the prerequisites are satisfied.

That said, we should not bet our future on hydrogen reduction alone, so we are also engaged in R&D into Carbon dioxide Capture and Storage (CCS)/ Carbon dioxide Capture and Utilization (CCU) technologies to separate and reclaim the CO_2 emitted from blast furnaces and to put it to effective use. As part of these efforts, we are working with RITE to develop technology allowing the synthesizing of a valuable substance—methanol—from blast furnace CO_2. At present, it is not possible to guarantee that CCS/CCU technologies will completely eradicate CO_2 emissions, but we do have hopes that they will feasibly offer the prospect of taking us beyond the 20% CO_2 reduction target for 2030.

At present, we believe it is necessary to pursue these options in parallel.

Q. Roughly what will it cost to put ferro coke into use in production equipment and to develop super-innovative technologies like CCS/CCU?

We plan to conduct detailed studies of the amount of investment and the changes in costs associated with efforts to reduce CO_2 by 20% or more by 2030 and to become carbon neutral by 2050. We are unable to provide specific amounts at this time. However, in the process of setting CO_2 reduction targets for individual companies for 2030, we will be conducting primary analyses of the effects and cost impact of the various measures, and we believe the investments required for these measures are at a level we can tolerate quite adequately.

As for the construction cost of ferro coke plant, the cost of the medium-sized test facility with a daily production capacity of 300 tons we built in the Fukuyama district was around 15 billion yen. We plan to scale up to around 1,500 tons a day per furnace by the time we move to commercial use, but the construction costs do not rise in proportion to scale of production, so the construction costs per ton will come down. In addition to a 10% reduction in CO_2, we also expect the use of ferro coke to have the effect of reducing costs per furnace (with daily production capacity around 1,500 tons) by around 6 billion yen a year through reductions in energy consumption and greater use of low-grade feedstock. So we expect the investment to be feasible in economic terms.

Q. Although you have led the domestic industry in AI-based blast furnace control, you seem to be slightly behind competitors in China and South Korea. How do you view your competitiveness at present?

A. We believe we have an advantage within the Japanese market, but it is true that some Asian competitors began working on the use of AI and ICT in production management quite early on. However, using AI to improve production technology is not as simple as collecting large amounts of data and recursively calculating solutions to yield results in short order. A series of processes must be followed. Simulations are run based on advanced theoretical models, including physical models and chemical models, and fed back into blast furnace operations, and the operational data is then used in the AI processes. When it comes to building these advanced theoretical models, Japanese steelmakers have a large lead over those in other countries, so we believe we are capable of taking the lead in AI-based control of blast furnace operations as well.

Q. Looking at the scenario analysis, please explain how the introduction of fair carbon pricing will maintain the competitiveness of steel.

A. Our scenario analysis looks at our company's positioning in a world that has achieved the IEA 2°C scenario. The IEA 2°C scenario is premised on the introduction of a uniform global carbon price. Put another way, this suggests that the 2°C scenario cannot be achieved in a world where high carbon prices are imposed on some countries and regions. Based on this scenario, our analysis is that we will retain our international competitiveness and that steel will be at an advantage over other materials such as aluminum and carbon fiber since it has a smaller carbon footprint, so we have estimated the risk at the time of the introduction of carbon pricing as neutral.

Q. Will the impact of carbon pricing be different for blast furnaces and electric furnaces?

A. If carbon pricing is introduced, we expect a rise in electricity prices due to increases in natural gas and coal prices, and the shift toward renewable energy power sources. Although CO_2 emissions from the electric furnace production process are small, the introduction of carbon pricing may drive up the cost of electricity substantially, so while we cannot say so unequivocally, the competitiveness of electric furnaces could decline.

From a cost competitiveness standpoint, electric furnaces are run on nighttime electricity, but with renewable energy levies adding around 30% to the cost of electric power, we think conditions are extremely tough in this space. If the introduction of carbon pricing drives up the cost of electricity further, this creates a life-or-death scenario in terms of international competitiveness, so we are appealing to the Japanese government through the Japan Iron and Steel Federation. In Germany, where carbon pricing was introduced earlier, electricity prices have risen 30–40%, but the country has countered this by, for example, granting a 90% exemption from the renewable energy levy in electricity-intensive industries. Our understanding is that other countries are also struggling with the issue of how to cope with the increase in energy costs that results from the introduction of carbon pricing.

Q. Your scenario analysis in line with the TCFD recommendations says that both an increase in converter steel production and an expansion of electric furnace steel production are opportunities. What is the outlook for blast furnaces and electric furnaces, and what is JFE's strategy?

A. Japan exports 7–8 million tons of scrap a year. This is because the proportion of steel demand accounted for by applications that require blast furnace steel, like automobiles and household appliances, is high in Japan, unlike in Asia, where construction accounts for a high proportion. At present, blast furnace steel accounts for around 80% of Japan's crude steel production, with the remainder being electric furnace steel. So it is impossible to use all of the scrap generated domestically, and the balance is therefore exported to Asian countries that are investing heavily in infrastructure. Over the long term, Japan's in-use steel stock will increase beyond current levels, and the in-use steel stock across Asia as a whole will also rise as infrastructure investment continues. The issue for us under these circumstances is to use more scrap to make the high-grade steel needed for automobiles and household appliances.

We have the technology to improve thermal efficiency by augmenting our existing converters and to use more scrap in high-grade steel production. We have already put this into production use in our Fukuyama and Keihin districts, and we plan to implement it in Kurashiki and Chiba over the next two years. This scrap utilization technology is included in the scenarios for developing technologies to reduce CO_2 emissions by 20% by 2030.

Q. Is it possible that the shift toward using multi-materials will accelerate as part of automakers' lightweighting efforts?

A. This multi-materialization is likely to advance in the production of luxury cars, but we expect it to be very limited in mass-market autos, and we therefore believe the impact on steel demand will only come from around 5% of overall auto demand. Meanwhile, we think demand for high-value-added high-end products, such as electrical steel sheet, will definitely increase in conjunction with the shift toward EVs, which will present significant opportunities for the steel business. We will continue to develop technologies to ensure we do not miss these opportunities.

Q. According to Research Institute of Innovative Technology for the Earth (RITE)'s estimates of energy intensity by country made in 2015, the Japanese steel industry has the highest energy efficiency in the world (p.7 of the handouts), but I think South Korean and Chinese producers are catching up. Has that situation changed at all lately?

A. RITE publishes its comparison of steel industry energy efficiency once every five years. It has released three such data comparisons since 2005, with the latest based on 2015 data. The study of changes between 2015 and 2020 will be available next year or sometime later, but given their installation of heat-removal and energy-saving equipment, we think Taiwanese and South Korean steelmakers will probably be largely on a par with Japan in terms of energy efficiency. As for Chinese steelmakers, the state-of-the-art facilities they have opened over the last five years have energy-saving equipment installed, and while they were 10% or more behind in terms of energy efficiency in the past, we understand that they have now narrowed the gap to within single digits.

Q. You have set KPIs for material CSR issues. Is the achievement of these KPIs used as an incentive in employee and executive remuneration?

A. Determining how much each individual employee has contributed to achieving KPIs is difficult, so we do not currently plan to reflect this in our employee remuneration structures. We do not currently envision incorporating it into executive compensation either, but we are well aware that some companies are now introducing incentives based on ESG outcomes. Our remuneration committee continually discusses what our executive compensation structure should look like, taking account of the trends unfolding across society as a whole.

Q. Your lost-time injury frequency rate (LTIFR) recently looks high relative to industry peers. Can you explain this?

A. LTIFRs fluctuate from year to year at steelmakers in general, and while we are aware that some companies recently have excellent safety records, this does not mean that any particular company is exceptionally good or bad. Through steel industry associations and such, we hope to study what sort of initiatives were taken to achieve this level of safety. JFE Steel's FY2020 target for the LTIFR KPI is 0.1 or below, which would be the best achievement based on the track records of Japanese steelmakers. To further reduce our LTIFR, we believe we need a change in mindset so that each individual employee takes the initiative to protect their own safety and that of their colleagues, instead of relying solely on the company to ensure safety or taking a "just doing as I'm told" attitude toward safety. From that perspective, we are taking steps that incorporate DuPont's safety practices, which includes ensuring that our skilled workers pass on their know-how. This is producing results, but we will also be looking at what we can do further.

Q. Please explain the vitalization of board of director deliberations you mention in the section about evaluating board of director effectiveness. Also, you are currently structured as a Company with an Audit & Supervisory Board, but has there been any discussion about changing the board of director format, such as by switching to a Company with Committees structure?

A. Our outside directors and corporate auditors have highly diverse backgrounds, and the auditors are as actively engaged in board discussions as the directors, which makes board discussions very lively. Discussions solely among internal personnel are prone to focusing only on an unwritten, shared understanding of issues, but incorporating the views of outside personnel with diverse backgrounds makes for deeper discussions, and we believe this is making us a better company.

In addition, because the JFE Group has companies in a wide variety of industries and business categories, we have appointed corporate auditors to each company and established internal auditing departments that work closely with the corporate auditors to manage risks. Through these and other activities, we are pleased to say that we function very effectively as a Company with an Audit & Supervisory Board. So we are not considering any changes to our board structure.