

Efforts of Kawasaki City to Achieve Carbon Neutrality

Head of a section, Development Strategy Promotion Department, Coastal Area International Strategy Headquarters, Kawasaki City

Mr. EZAKI Tetsuhiro

Thank you very much for the introduction.

I am Ezaki from Kawasaki city.

Today, I would like to talk about the carbon neutralization efforts that Kawasaki City has been actively working on in the coastal complex at present and in the past.

First, I will give a brief overview of Kawasaki City.

It is located between Tokyo and Yokohama and has the smallest land area among the ordinance-designated cities. It is like a condensed city, being the sixth most populous city and having the second-highest population density, accounting for 1.2% of Japan's GDP.

The coastal complex accommodates petrochemical plants and other energy and logistic facilities, with a life sciences research hub called the King Skyfront area in Tonomachi framed in green next to the complex. It provides highly convenient transportation as the Haneda airport is located close to the north side of the Tamagawa River.

The slide describes the status in numbers. The graph shows that Kawasaki City ranks first in the value of shipments of manufactured goods among ordinance-designated cities, which has now slightly dropped according to the very latest information. Nonetheless, I would like to more emphasize on the pie chart, which explains the coastal complex is truly the center of economy and industry as it accounts for 75% of all the Kawasaki City shipments.

Unfortunately, Kawasaki City also emits the most GHGs in the ordinance-designated cities with a significant portion coming from the Kawasaki Coastal Area. Our goal is to reduce GHG emissions while enhancing industry competitiveness.

Now, we are moving on to the 4 potentials that Kawasaki City has.

First, it has excellent infrastructure for LNG and city gas. There is an import port for LNG and city gas, as well as a thermal power stations.

The power stations would lead to a bright future for hydrogen utilization as they expect to create a high demand for hydrogen for power generation through both single-fuel combustion and multi-fuel combustion.

Second, Kawasaki City expects to become a big supplier as well as demander of hydrogen where it has

already used significant amount of hydrogen.

The hydrogen used here is not only for energy purposes but also for industrial use such as usage in a petroleum process and additives for resin generation.

The Kawasaki Coastal Area is estimated to demand 1/10 hydrogen of Japan, and the city has been constructing a pipeline network to meet the demand.

The Sky Bridge connecting to the Haneda Airport is equipped with a hydrogen pipeline, which has yet to be in working order, however, in the future, could potentially supply hydrogen from the area.

Third, Chemical companies and materials industries are present in the area, with the city accounting for 15% of ethylene purification on the upstream side of the chemical industry, and what is more, a large production of materials on the downstream side.

Fourth, the Kawasaki Coastal Area is Japan's largest plastic recycling hub, with the capacity to recycle approximately 15% of Japan's plastic.

As you can see on the left, there are many material and chemical recycling facilities with various technologies. For example, a company called Resonac applies sophisticated chemical recycling Japan's only technology to gasify waste plastic into ammonia and hydrogen, which is commercialized and in operation.

In this part of the presentation, I would like to talk about our initiatives on hydrogen or CO₂ reduction.

Kawasaki City formulated the Kawasaki Hydrogen Strategy in 2015, two years before the national government's announcement of the Basic Hydrogen Strategy, meaning that city had started working on hydrogen initiatives long before the country.

Even two years before that in 2013, the city commenced a public-private council called Kawasaki Coastal Area Hydrogen Network Council to lead various collaborative projects between the government and private companies.

Let's now turn to two major projects that are crowned as the first in the world.

First, Chiyoda Corporation with AHEAD undertook the world's first supply chain demonstration project.

In May 2020, AHEAD successfully generated power through multi-fuel combustion with hydrogen in MCH form shipped from Brunei.

Together with that, ENEOS executed a technological demonstration to derive hydrogen from MCH at the existing petroleum refining facility in Kawasaki.

Second, TOKYU REI Hotel deploys hydrogen energy sourced from plastic, with Resonac holding the world's first demonstration as I mentioned before.

Resonac demonstrated sending hydrogen from used plastic via a pipeline for 5km to the hotel to utilize it

as electricity or heat through fuel cells on-site at the hotel.

The project had paused temporally but now prepared new fuel cells to restart for implementation.

Public and private sectors have been collaboratively working on these leading projects, while the push for decarbonization, stepping up from low carbon, continues to accelerate globally. As a result, the Kawasaki Coastal Area complex has to promote initiatives for carbon neutralization at a faster pace.

In March last year, the city introduced an initiative of the Kawasaki Carbon neutral Kombinat aimed at achieving carbon neutrality by 2050, envisioning the future picture of the Coastal Area. Presently, the complex emits excessive CO₂ and, at the same time, is the big supply hub of energy and materials. The Kombinat was formed based on the conviction that if the area achieved carbon neutralization while still functioning as a significant supply role, it would contribute to the carbon neutralization of society as a whole.

Now, let me present the current state of the Kawasaki Coastal Area before showing you the future picture. The area has two main functions.

The slide on the left displays the first function as an energy supply hub, where imported fossil fuels such as crude oil and LNG are refined into gasoline or other fuels or used for electricity generation.

The slide on the right highlights the second function as a petrochemical complex, where the complex supplies fossil-sourced materials using naphtha. The naphtha is the raindrop shape you can find in the center, derived from the petroleum refining process.

The complex currently recycles some products, which you can see on the right, but it mostly incinerates them. Please refer to the next slide that shows the complex's targets toward 2050.

Let me explain the process in three parts to explain how it functions.

First, the Coastal Area will serve as the supply hub for carbon-neutral energy based on hydrogen, indicated by the blue frame.

The complex will switch from fossil fuels to CO₂-free hydrogen, which it imports from abroad, refining in the fuel plant and supplying them as fuels like hydrogen, jet fuel and new alternatives to city gas. The hydrogen will also generate CO₂-free electricity.

Second, the Coastal Area will collect carbon wastes like plastic and CO₂ from outside, not within the complex, to supply carbon-sourced materials or products recycling in the chemical plant, as shown in the green arrows. In short, the complex aims to create an industrial complex that recollects and recycles carbon both internally and externally, making it a carbon circulation facility.

The first and second are so-called outbound services as the complex.

Third, the complex will optimize its energy usage locally to strengthen its competitiveness as an industrial location, which the slide presents in orange. It means that the complex will aim to achieve carbon neutrality independently.

The following three slides illustrate the future pictures of how these functions interact with one another in depth. I skip specific explanations on these three slides due to time restrictions today.

In summary, the complex will promote three strategies: Kawasaki hydrogen strategy, carbon recycling strategy, and energy local optimization strategy, considering the gap between the future vision and the present.

So far, I have explained how companies in the Coastal Area get down to carbon neutralization, which functions like a banner showing the direction toward carbon neutrality. Now, Kawasaki City will talk about how it contributes to achieving success in these initiatives as a regional government.

I will divide it into three parts.

First, the city facilitates collaboration among companies.

It is understood that no company can achieve carbon neutralization alone, hence the city initiated a public-private council to develop collaborative networks and promote projects aimed at achieving carbon neutralization. This will serve as a platform for companies to accelerate their collaboration efforts.

Second, Kawasaki City places importance on collaboration with other areas and the national government. Companies operating in the city usually engage in cross-border activities, extending as far as the Tokyo Bay area, Yokohama City, and Tokyo. To ensure the companies' smooth business activity, the city works closely with regional and national governments to prevent any issues or discrepancies that may arise between complexes by sharing regulatory compliance.

Third, the city attracts business to the complex.

If companies require land or facilities to support carbon neutrality initiatives, Kawasaki City will offer them low- or unused land in the complex with well-managed coordination. The city is committed to assisting Japan in achieving carbon neutrality by creating a carbon-neutral model area.

This slide outlines the public-private council called the Kawasaki carbon neutral promotion council established by the city to promote carbon neutral initiatives. The council has its supporting committees to discuss the initiatives in detail.

Now, 79 companies and two organizations form the council, with more companies showing interest in joining.

The council plans to hold a meeting in September this year.

It is one example from the carbon cycle committee showing what committees discuss. As you can see at the bottom, the council requests participating companies for their views on images like CCUS supply chain and infrastructure construction for CO₂ input and output.

The committee does not compile views gained in the meetings, which generally committees of these kinds do, but it tries to diverge each opinion into various directions. It intends to create a new project over the expanded discussions while facing difficulties of technological development.

The slide displays an example of the collaborative initiative involving Kawasaki City, ENEOS, and ENEOS Research Institute, which is funded by NEDO. As previously reported by Mr. Maeda from ENEOS, it is a NEDO project of a study on the potential of hydrogen business utilizing pipeline, which examines the hydrogen demand around the Kawasaki Coastal Area to see the business feasibility of importing hydrogen from abroad to supply it internally and externally through pipeline.

This is another NEDO project that involves six organizations including Kawasaki City, two airport related companies, ENEOS, Ota City, and consulting firm to study the potential for hydrogen business in and around Haneda Airport. This project will give us a clearer insight into the potential of hydrogen utilization in our neighboring area of Haneda Airport and is to be completed by September of this year.

The slide outlines the third initiative where the city collaborates with companies to execute a demonstration project aimed at constructing a liquid hydrogen supply chain for commercialization, supported by the Green Innovation Fund. The import port for this project has been assigned to the Kawasaki Coastal Area.

A technological investigation is currently underway in the project. The aim of Kawasaki City is to enhance the overall process, as the project has the potential to become a commercial-scale import hub in the future, after the initial import port is well strengthened.

Moving on to regional collaboration now. Kawasaki City has signed a partnership agreement with Yokohama City and Ota City in Tokyo individually to increase the utilization of hydrogen. Hopefully, the regional agreements would encourage the initiatives with companies to initiate agreements with as many companies as possible.

What we plan to do for the regional collaboration is to supply hydrogen from the Kawasaki Coastal Area to surrounding municipalities, which will create a positive circulation of an increase in both supply and demand over time. Furthermore, the collaboration would ideally bridge across Tokyo Bay to Keiyo Area to create something like Tokyo Bay Area initiatives, covering the entire area.

This slide provides information about the collaboration between Kawasaki City and the Japanese government. Various manufacturing plants like electricity, petroleum refining, and petrochemistry gather in the Kawasaki Coastal Area, which are expected to have a high demand for hydrogen and ammonia to convert crude oil and LNG. Kawasaki City believes that the area is well-suited to becoming an industrial cluster type carbon neutralization area, as identified by the government. To achieve this, the city aims to promote collaboration between different industries and create a model area for carbon neutralization.

On this slide, we will be discussing international collaboration. Recently, Kawasaki City has become Japan's first member to register with the Transitioning Industrial Clusters towards Net Zero, led by the World Economic Forum. Our activities in this forum include participating in international web meetings, showcasing the Kawasaki Coastal Area initiatives, and exchanging ideas with other members.

The slide introduces our promotional activities. As you may already know, JFE will close its blast furnace in September, which has led to significant industrial development in the Kawasaki Coastal Area.

Consequently, JFE Holdings will work in close collaboration with the city to convert at least 222 ha of the south part of Ogishima land use, and a total of 400 ha, including the surrounding areas.

At the bottom right, there is an advanced area that will operate as a carbon-neutral hub focusing on hydrogen. The aim is to accelerate the process of carbon neutralization by building it.

Before I finish, let me explain how the project goes from now on.

Kawasaki City has conducted some hydrogen strategy leading projects individually, as indicated in the circle frame at the bottom left.

As we move into the second phase, Kawasaki City aims to collaborate with companies to achieve a carbon-neutral society shown at the top right. To reach this goal, the city will build a hydrogen supply hub in anticipation of a high demand for hydrogen for electric generation and promote carbon neutralization by utilizing the industrial cluster, with the vertical arrow on the graph moving upwards. Furthermore, the progress will advance from demonstration to implementation, with the horizontal arrow moving to the right.

That covers everything from me for today.

Thank you very much for your attention.