Semi-conductor Related Industry

Highest Quality, World-Leading Technology : "Made in Hokkaido" Semiconductors to the World

Rapidus's Next-Generation Semiconductor Plants in Chitose, Hokkaido

In February 2023, Rapidus revealed their decision to establish their next-generation semiconductor plants in Chitose City, Hokkaido Prefecture.
The next-generation semiconductors, which Rapidus aims to develop and mass-produce, will bring about major innovations in various fields, including quantum technology and artificial intelligence. It is a crucial core technology for the revitalization and further development of semiconductor industry in Japan, as well as digitization, carbon neutralization, and economic security. Establishing a multi-purpose base for production, research, and human resource development in Hokkaido will lead to progress in the manufacturing and digital industries that the Hokkaido Government has been promoting. Furthermore, "Made in Hokkaido" next-generation semiconductors are expected to contribute to innovations and economic security on a nation-wide level, and will help form a digital talent hub which attracts researchers and engineers from all over the world.
As Rapidus takes initiative in the national project of establishing next-generation semiconductor plants, the Hokkaido Government strives to provide them with timely support.

(Map courtesy of Geospatial Information Authority of Japan)

Construction of Next-Generation Semiconductor Plants

Rapidus

(Courtesy of the official website of Rapidus Corporation)

Date of Foundation
August 10, 2022
Capital Information
¥7,346 million（as of November 2022; including capital reserve）
（Investors）
KIOXIA, Sony Group, SoftBank, DENSO, Toyota Motor, NEC, NTT, MUFJ Bank
Management
HIGASHI Tetsuro: Chairman of Board of Directors
KOIKE Atsuyoshi: President & Representative Director
Main Projects
- Research, development, design, production, and sales of semiconductor devices and electronic parts in IC chips, etc.
- Research and development of eco-friendly and energy-saving semiconductors and semiconductor production technology
- Human resource development in semiconductor industry

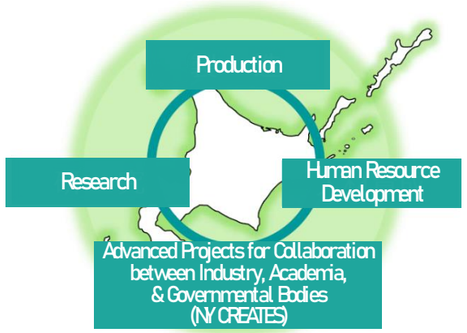
＜Construction Schedule＞

2023 -	Plant construction
2025 -	Pilot line operation
2027 -	Mass production

＜Conceptual Image＞

Image courtesy of Rapidus Corporation, created in cooperation with Kajima Corporation.

Multi-Purpose Base for Production, Research, & Human Resource Development



In anticipation of the full-scale operation of next-generation semiconductor plants, the Hokkaido Government is promoting efforts to establish a multi-purpose base that integrates production, research, and human resource development in cooperation with industry, academia and other governmental bodies.
The Hokkaido Government is committed to stimulating the local economy and leading the sustainable development in Hokkaido by promoting semiconductor-related business clusters, including semiconductor manufacturing bases, raw material manufacturers, and manufacturing equipment manufacturers, as well as by promoting local companies' participation to related business and expansion of their business, promoting R&D projects of related technologies, establishment of new projects, and human resource development to secure a pool of professionals who will lay the foundation for sustainable development of semiconductor-related industries.

Support for the Establishment of Next-Generation Semiconductor Plants

On March 8th, 2023, *Headquarters for the Promotion of Next-Generation Semiconductor Industry Base Establishment in Hokkaido* was established within the Hokkaido Government with the Governor assuming the role of Director-General. The Hokkaido Government built a prefecture-wide support network by organizing the *Council for Cooperation in Next-Generation Semiconductor Industry Base Establishment Promotion in Hokkaido*, in an effort to pursue cooperation with the related agencies in the national government, as well as developing collaborations with the *Committee for the Promotion of Investment in Hokkaido* and *Next-Generation Semiconductor Industry Platform*, both of which aim to promote collaboration with business organizations and corporations.

Challenges
- Infrastructure development (e.g. industrial land/water, energy infrastructure)
- Human resources, training, education, residential support etc.

Rapidus

Support

Schedule

Feb 28, 2023	Press release of plant construction
April 2025 -	Pilot line operation
2027 -	Mass production

Council for Cooperation in Next-Generation Semiconductor Industry Base Establishment Promotion in Hokkaido
(Collaborative network among related public agencies, municipalities, and other related organizations)

Government of Japan
- Hokkaido Bureau of Economy
- Hokkaido Labor Bureau
- Hokkaido Regional Development Bureau
- Hokkaido Regional Environment Office

Headquarters for the Promotion of Next-Generation Semiconductor Industry Base Establishment in Hokkaido
（Cross-department promotion network under the leadership of the Governor）

Chitose City

Cooperation

Cooperation with the Business Communities
(Information Network with Business Organizations and Private Sectors, etc.)

Committee for the Promotion of Investment in Hokkaido

Next-Generation Semiconductor Industry Platform
Agency for New Industry Cluster of Hokkaido (ANC)

Projects on Workforce Training in the Semiconductor Industry

■Council for Promoting the Training for Future Professionals in the Semiconductor Industry

Hokkaido Bureau of Economy, a regional branch of METI, has established a council consisting of industry, academia, and governmental bodies as part of their effort to strengthen the foundations of semiconductor-related industries in Hokkaido.

Founded in June 2023
Administrative Office Hokkaido Bureau of Economy
Main Projects
- Developing and securing human resources
- Stimulating trade in semiconductor-related industries

＜Members＞ (as of June 2023)

Corporations (10)	Semiconductor-related corporations, banks, etc.
Related Organizations (6)	Business organizations, corporations, foundations, etc.
Academic Institutions (12)	Universities, vocational schools
Governmental Agencies (4)	METI, MEXT, Chitose City, Hokkaido Government

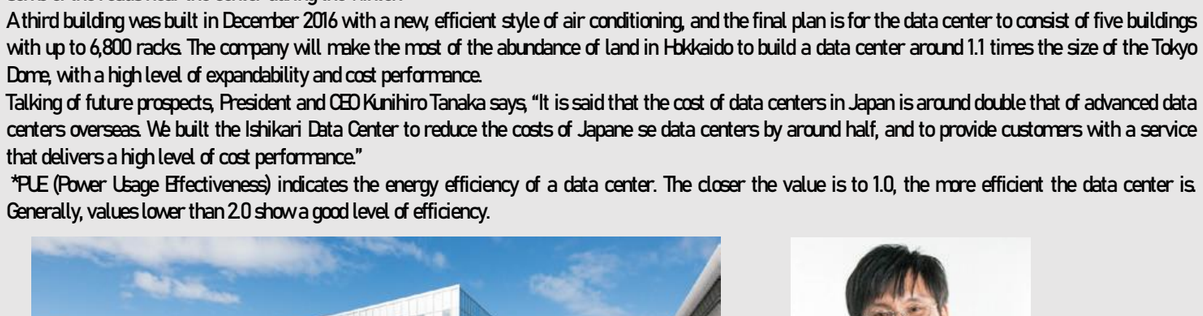
Data Centers

Data Centers – Taking Full Advantage of the Cool Climate

Dramatically Reduced Air Conditioning Costs Through the Use of Snow and Ice Energy and Cool Air

As the demand for data centers continues to expand rapidly, there are increasing concerns for the amount of power consumed. It is said that 40% of the power used by data centers is for air conditioning, and this consumption needs to be drastically reduced. Hokkaido is gaining a great deal of attention as an ideal location for companies that need to reduce air conditioning power consumption because of its naturally cool temperatures, and it is being actively promoted to companies looking to relocate their facilities.

■ Reductions in air conditioning power consumption and CO2 levels through the use of outdoor air, free cooling, and snow and ice (estimation)



(Prerequisites)
Number of server racks: 2,000 racks
Power capacity: 5kVA per rack

* Values estimated by the Hokkaido GEDC Study Group

A Prime Location for Risk Dispersion and as a Backup Center

Many companies, such as SAKURA Internet Inc., NEC Corporation and NTT COMWARE Corporation, have relocated their data centers to Hokkaido. Hokkaido provides such benefits as controlled power consumption through the use of the cool climate, excellent access to the mainland of Japan, and low risk of a disaster occurring in both Hokkaido and regions such as the Tokyo metropolitan area at the same time, all of which are gathering a great deal of attention as the ideal location for data centers.

Stable Communications Infrastructure

There is a substantial communication infrastructure already in place between the Tokyo metropolitan area and Hokkaido, operated by multiple carriers through multiple routes. There are also plans to further reinforce backbone redundancy and diversify communications infrastructure between Hokkaido and the mainland, Honshu. All of the main business areas in Hokkaido including Sapporo, Ishikari, Chitose, Tomakomai, Sorachi and Asahikawa are fully equipped with the necessary backbone lines.

Realization of a data center with low energy consumption through the use of Hokkaido's cool climate: Opening of a large-scale suburban data center that takes advantage of scale merits of the land size

SAKURA Internet Inc. (Head office: Osaka City, Osaka Prefecture)

SAKURA Internet Inc., which has one of the largest backbone networks in Japan and operates internet data centers, opened a new suburban large-scale data center called the "Ishikari Data Center" in the Ishikari Bay New Port Area in November 2011.
The Ishikari Data Center features improved energy efficiency by adopting outdoor air conditioning and harnessing the advantages of its considerable size. With the total adoption of outdoor air conditioning that utilizes the cool climate of Hokkaido, the cost for air conditioning to cool the data center servers has been reduced by around 90%. PUE*, an energy efficiency indicator for data centers, has been decreased to 1.11 simply through using outdoor air conditioning throughout the year. The company aims to make the data center even more energy efficient by using heat generated by the servers in heating offices and some of the roads near the center during the winter.
A third building was built in December 2016 with a new, efficient style of air conditioning, and the final plan is for the data center to consist of five buildings with up to 6,800 racks. The company will make the most of the abundance of land in Hokkaido to build a data center around 1.1 times the size of the Tokyo Dome, with a high level of expandability and cost performance.
Talking of future prospects, President and CEO Kunihiro Tanaka says, "It is said that the cost of data centers in Japan is around double that of advanced data centers overseas. We built the Ishikari Data Center to reduce the costs of Japane se data centers by around half, and to provide customers with a service that delivers a high level of cost performance."
*PUE (Power Usage Effectiveness) indicates the energy efficiency of a data center. The closer the value is to 1.0, the more efficient the data center is. Generally, values lower than 2.0 show a good level of efficiency.

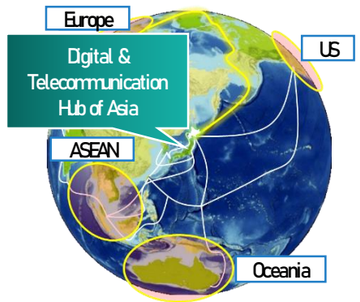

Ishikari Data Center Building 3, built by SAKURA Internet Inc. in Ishikari City in December 2016


Kunihiro Tanaka, President and CEO of SAKURA Internet Inc.

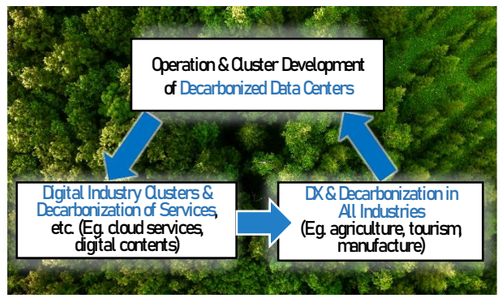
Core Data Center Base to Support & Substitute the Functions of Tokyo and Osaka

Interim Report 2.0 on the Expert Meeting on Domestic Digital Infrastructure Development

Interim Report 2.0 on the Expert Meeting on Domestic Digital Infrastructure Development was published by the Government of Japan in May 2023. The report gives positive evaluations on Hokkaido's high potential for improving resilience against large-scale natural disasters, suitable climate for utilizing decarbonized power sources and saving energy, as well as its close proximity to North America and Europe regarding the project of arctic submarine telecommunications cables. It is shown in the report that the national government is planning to prioritize the development of Hokkaido as a core data center base which may support and replace the functions of Tokyo and Osaka. It is expected that more data centers will be built in Hokkaido in the coming years.



- ✓ Strengthening the domestic digital infrastructure
- ✓ Improving the resilience of telecommunications network in Asia
- ✓ Contributing to economic security

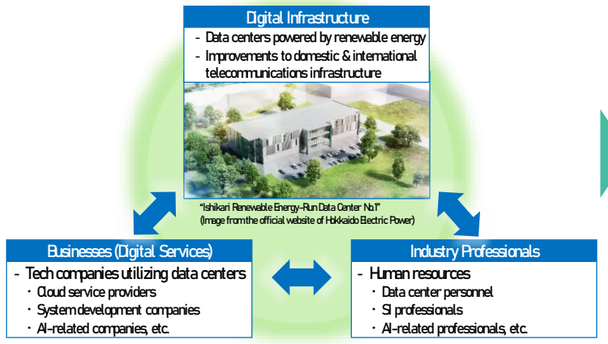


- ✓ Acceleration of digitization and decarbonization utilizing Hokkaido's cool climate and abundant renewable energy

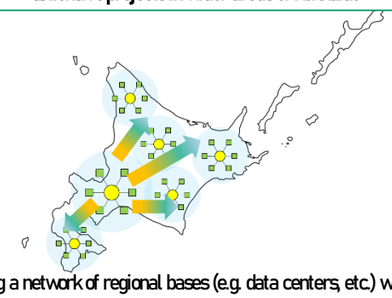
Promotion of Hokkaido Data Center Park

Along with the development of data center clusters utilizing renewable energy, the Hokkaido Government is promoting digital industries and human resources which utilize such data centers. Our aim in this project is to create a "Hokkaido Data Center Park": a major digital industry hub that brings together digital infrastructure, businesses (digital services), and industry professionals.

Positive cycle of integrating infrastructure development & cluster building



Extensive projects in wider areas of Hokkaido



- ✓ Building a network of regional bases (e.g. data centers, etc.) with the central area as its hub

Promotion Policy of Digital Industry Clusters in Hokkaido

The Hokkaido Government formulated the Promotion Policy on the digital industry clusters in July 2023. Taking advantage of the superior qualities of Hokkaido, the Promotion Policy cites development of digital infrastructure, such as data centers, next-generation semiconductors, and international submarine telecommunications cables, as its core projects. The focus of the policy is on the development of diverse and innovative digital industry clusters utilizing the core digital infrastructure mentioned above: projects include development of AI-based advanced computational processing platforms and cloud services, self-driving vehicles, drones, smart agriculture/fishery /forestry, and smart infrastructure.
By establishing a major digital industry hub in Hokkaido in close cooperation with the local municipalities and the national government, the Hokkaido Government is committed to stimulate industries and businesses in the prefecture, as well as to make major contributions to the digital transformation and economic security in Japan.