Feature

Data Center Services Supporting DX in Society and Contributing to Carbon Neutrality

NTT Communications supports the ICT infrastructure of society and helps companies promote DX by providing Nexcenter, a safe, secure, and high-quality data center service. This feature looks at the data center services of today and tomorrow as an indispensable infrastructure for the digital age that continues to smartly operate and manage increasingly sophisticated and complex ICT environments.

Data Center Service

Cooling system

Server room

Generator

CCTV system*

Rack

Reception counter

Operation room

UPS (uninterruptible power supply)

Security system

*Closed-circuit television system

## Data Centers Have Become an Indispensable Infrastructure of Society

A data center is a facility dedicated to the installation and operation of servers and network equipment. Customers use these facilities to store and utilize data more safely than by owning and operating their own servers with the advantage of ensuring strong security. NTT Communications has been in the data center business since the 2000s, operating in more than 70 locations in Japan.

Nexcenter is a co-location service that boasts a high level of business continuity through redundant power distribution, a cooling system, and communication facilities in a robust building equipped with seismic isolation, earthquake resistance, and fire protection equipment, in a location with low risk of natural disasters such as earthquakes and floods. The service allows for central management of admission and other applications, requests for remote hands service, confirmation of contracted racks, and inquiries from a web-based customer portal.

It is operated under a thorough security system by staff members with expertise in ICT management to oversee a customer's system infrastructure.

Nexcenter also features low-latency, high-capacity communications and seamless connection with multiple cloud services, allowing for flexible and rapid system expansion. Additionally, it has the advantage of ensuring stable electricity at low cost using energy-efficient equipment.

In recent years, the demand for data centers has expanded in response to the rapid increase in data processing and communication volume. This demand is recognized as an irreversible trend. The use of the latest technologies such as AI, IoT, VR, 5G, and cloud will generate vast amounts of data on networks, which means a significant increase in power usage and the need for even greater processing capacity for data centers. Power consumption in these facilities is estimated to account for 1 to 2% of the
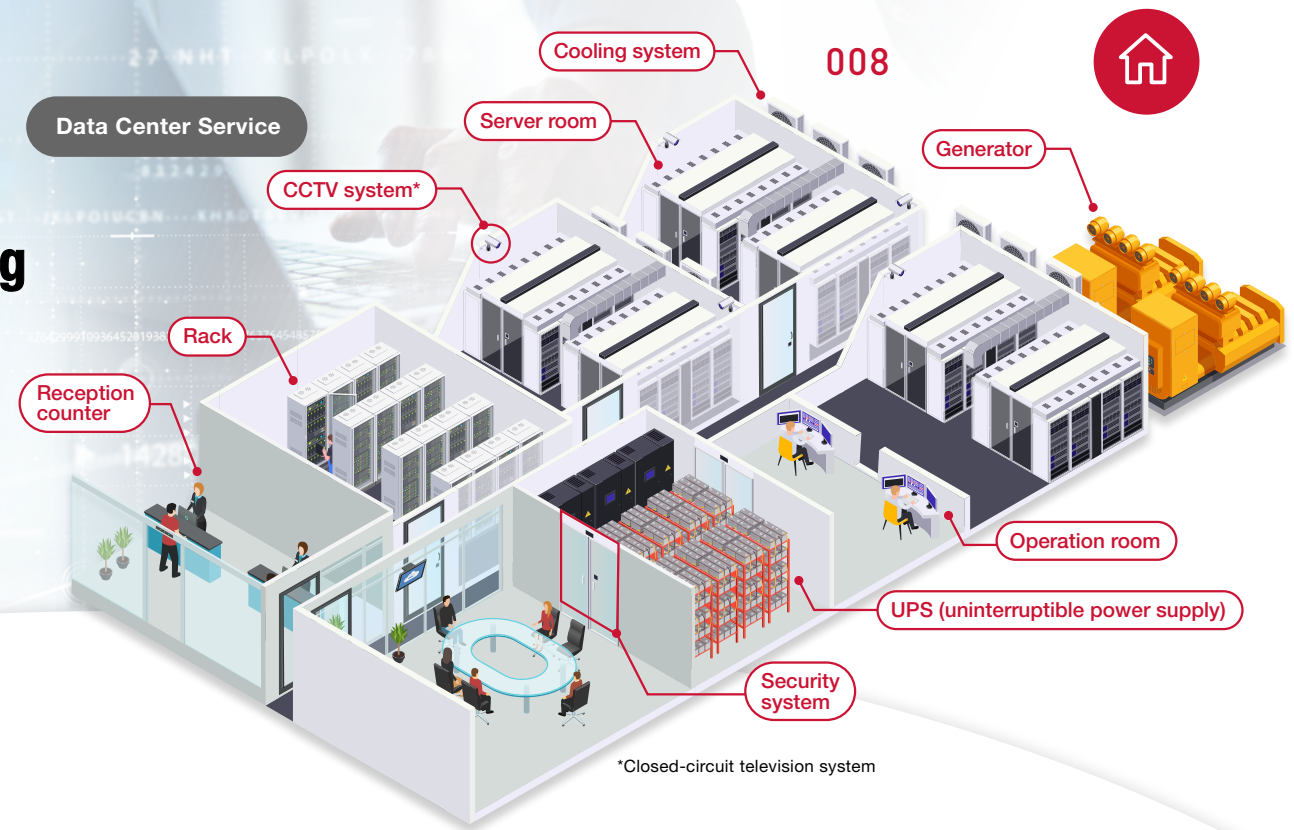
world's total power consumption and is expected to increase 15 to 20 times by 2040, compared to 2022, based on current technology, taking into account the explosive growth expected due to generative AI and other technologies. The rising power consumption in data centers as carbon neutrality targets are being set worldwide is intensifying the urgency of energy conservation in data centers.

Under these circumstances, the NTT Communications Group has set the goal of achieving carbon neutrality by fiscal 2030 (Scopes 1 and 2) and has been working to reduce its environmental impact by promoting energy conservation through the design and construction of state-of-the-art data centers that draw upon its accumulated expertise and introduce advanced technologies. We will continue to pursue technological innovation and enhance our services to contribute to carbon neutrality for all of society.

NTT Communications
Corporation
Sustainability Report

2023

Feature

009

Social Issues Facing Data Centers and NTT Communications Solutions

01 SOLUTION Promoting the Implementation and Development of More Efficient Cooling Facilities

Cooling facilities use approximately 20 to 30% of the enormous amount of power consumed by data centers. In response to the rise of generative AI and GPU clouds, systems have become more powerful, and the rapid increase in the volume of data processing has consumed a vast quantity of power, making equipment cooling and heat removal a challenge for data centers in which ultra-high heat generating equipment is concentrated. NTT Communications is responding to the increased heat generated in customer equipment by adopting liquid cooling systems as well as conventional air cooling systems. It has also significantly reduced power consumption through designs that utilize cutting-edge technologies, such as real-time control of optimal cooling using rack-mounted sensors and an AI engine.
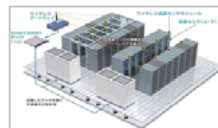
Cooling Wall System
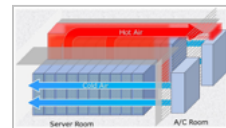
Up to
10%
less power

Cool air is blown directly into the room from an air conditioner installed behind the wall. The complete separation of airflow from the hot air exhausted from racks has improved air conditioning efficiency.

Smart DASH
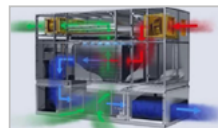
Approx.
30%
less energy than conventional systems

Real-time control of air conditioning by rack-mounted sensors and an AI engine has minimized power waste and reduced air conditioning power consumption by up to 30%.

Solar Power Generation Panels

Large panels are installed on the roof and walls of the data center building to generate electricity in-house. The electricity generated has been used for lighting within the building and air conditioning in offices.

Indirect Evaporative Cooling System

Approx.
60%
less energy than conventional systems

The ultra-efficient air conditioning system switches between three optimal cooling modes depending on outside air conditions, significantly reducing air conditioning power consumption.

## 02 SOLUTION Promoting Green Nexcenter™, a Next-Generation Data Center

In Japan, data centers built during the "IT bubble" of the 2000s are aging and becoming obsolete. Data center power consumption and heat generation has been rising more than ever before due to such advances as generative AI and GPU clouds. The use of data centers is accelerating, requiring equipment that can cool high heat generating equipment with less power, and data centers with older equipment are struggling to respond. NTT Communications is therefore promoting a project that renovates data centers while utilizing as many facilities as possible, such as introducing the latest energy-saving technology with liquid cooling systems. It will also develop Green Nexcenter™, a next-generation service to meet the growing demand for high power, high heat generating servers in new data centers.

Green Nexcenter™ is Japan's first state-of-the-art data center service that combines zero carbon emissions through renewable energy sources and an ultra energy-saving co-location service for high heat generating servers using liquid cooling systems. This service is designed from the ground up to accommodate these servers, such as generative AI and GPU servers, and uses a liquid cooling system, which is more efficient than the conventional air cooling, to achieve excellent power usage efficiency of pPUE[*1] 1.15. The data center will also contribute to decarbonization by using renewable energy for electricity. Yokohama 1 Data Center is scheduled to open in fiscal 2024 as an initial product to quickly meet the needs of the Tokyo metropolitan area by renovating some areas of the existing data center. In the Kansai region as well, the renovation of existing data centers is being considered to transform them into Green Nexcenter™. Since locations suitable for data centers are limited in disaster-prone Japan, using existing locations and buildings presents a significant advantage, and demand for these renovated data centers is expected to continue well into the future. Furthermore, a new Keihanna Data Center (provisional name) that supports the liquid cooling system as standard will open in fiscal 2025. We also plan to develop a data center equipped with IOWN®, a cutting-edge optical transmission technology for ultra-high speed and ultra-low power consumption with minimal fluctuation.

[Features of Green Nexcenter™]

01 Japan's first data center (co-location) service that supports liquid cooling systems

02 Compatible with high heat generating servers such as generative AI and GPU servers

03 Reduces power consumption by approximately 30% (excellent pPUE power usage efficiency)

04 Available in rack units as before

05 Renewable energy available upon request

[Liquid Cooling System]

Cooling equipment
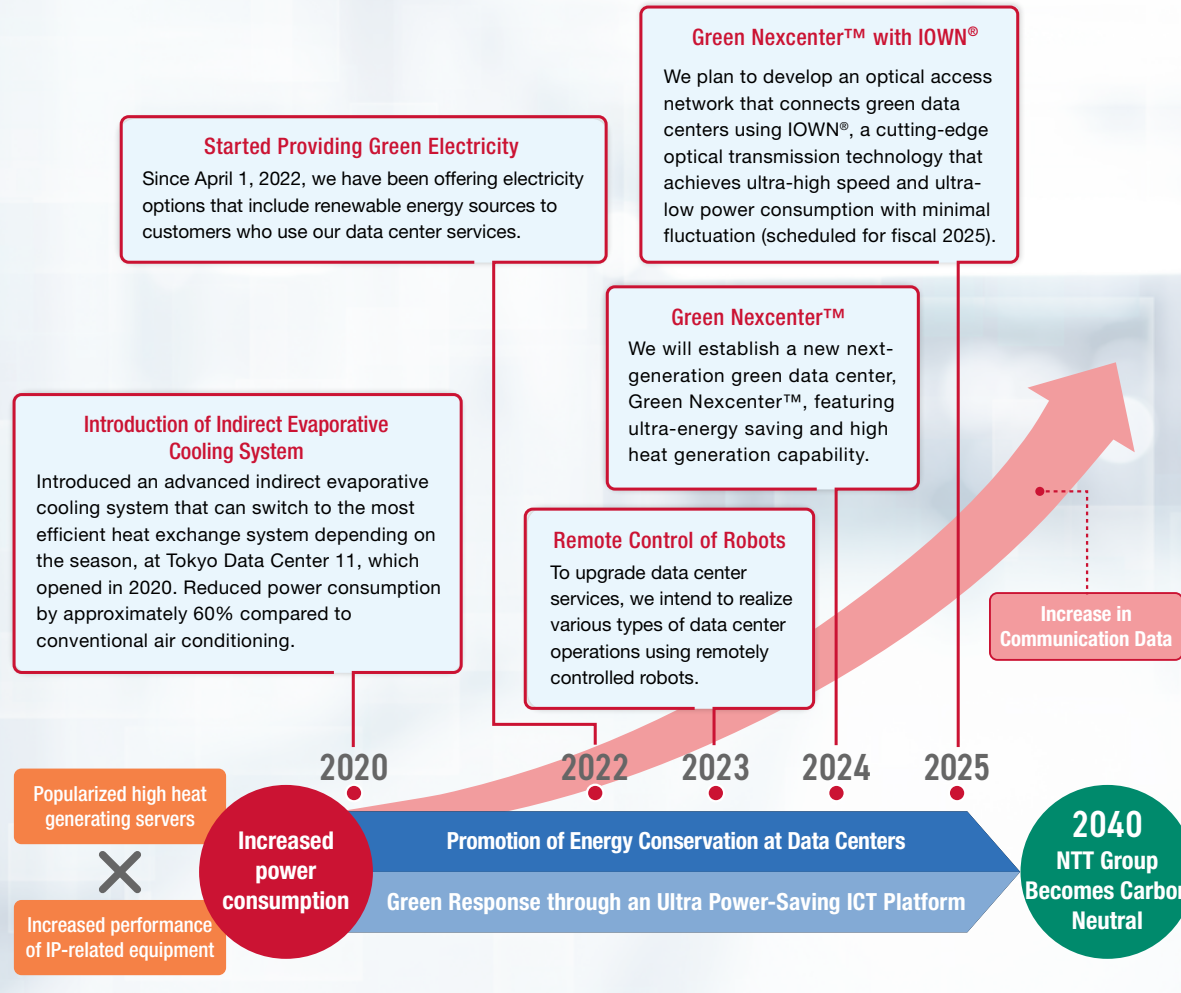
Liquid cooling racks

CDU[*2]
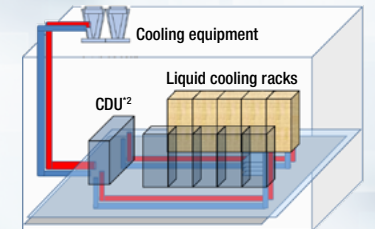
*1 Partial PUE (Power Usage Effectiveness). Indicates the efficiency of power in specific areas such as modules and rooms.
*2 Coolant distribution unit

03 SOLUTION — Contributing to Carbon Neutrality through Green Data Centers

NTT Communications is committed to generating environmental value by providing GX solutions, including green data centers, to enable customers and society as a whole to achieve carbon neutrality.

Started Providing Green Electricity
Since April 1, 2022, we have been offering electricity options that include renewable energy sources to customers who use our data center services.

Green Nexcenter™ with IOWN®
We plan to develop an optical access network that connects green data centers using IOWN®, a cutting-edge optical transmission technology that achieves ultra-high speed and ultra-low power consumption with minimal fluctuation (scheduled for fiscal 2025).

Green Nexcenter™
We will establish a new next-generation green data center, Green Nexcenter™, featuring ultra-energy saving and high heat generation capability.

Introduction of Indirect Evaporative Cooling System
Introduced an advanced indirect evaporative cooling system that can switch to the most efficient heat exchange system depending on the season, at Tokyo Data Center 11, which opened in 2020. Reduced power consumption by approximately 60% compared to conventional air conditioning.

Remote Control of Robots
To upgrade data center services, we intend to realize various types of data center operations using remotely controlled robots.

Increase in Communication Data

2020 2022 2023 2024 2025

Popularized high heat generating servers

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Increased performance of IP-related equipment

Increased power consumption

Promotion of Energy Conservation at Data Centers

Green Response through an Ultra Power-Saving ICT Platform

2040 NTT Group Becomes Carbon Neutral

Voice — Responding to Social Transformation with Advanced Data Center Services

Vice President / DataCenter Product Owner Cloud & Network Services Platform Service Division

Osamu Matsubayashi

It is no exaggeration that the emergence of generative AI will revolutionize daily work styles, business, and IT infrastructure. Going forward, there is a growing possibility that the number of data centers consuming massive amounts of electricity due to generative AI and GPU clouds will rapidly increase and that high heat generating servers will become commonplace. In addition, with the recent emergence of social pressures from surging electricity costs due mainly to geopolitical risks, the increasing frequency of catastrophic disasters associated with global warming, and the growing corporate appetite for ESG investment will further drive momentum toward energy conservation and the realization of a decarbonized society while intensifying the urgency of achieving these goals. For example, on-premise* will need to simultaneously conserve energy and accommodate high heat generating servers, which is likely to increase the cost burden. Until now, NTT Communications has played a role in supporting ICT infrastructure by providing the Nexcenter data center service. However, it can be said that we are now entering a transitional period in which the nature of data centers will dramatically change in light of social transformation. Starting in fiscal 2024, we plan to launch a series of Green Nexcenter™ as next-generation data centers that utilize renewable energy with ultra-power efficiency for handling high heat generation to resolve these concerns. We believe that for companies and other customers, the use of NTT Communications' data centers is directly linked to generating environmental value to assist in promoting ESG management toward decarbonization. The data center service represents a major core business for the NTT Group to achieve carbon neutrality by fiscal 2040, and we will vigorously promote the provision of vital infrastructure that supports the development and sustainability of society as a whole.

*In-house operation of servers and other information systems