

KDDI GREEN PLAN

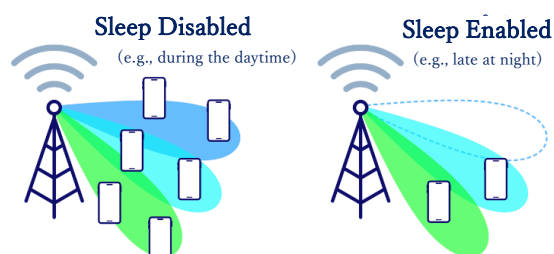
	Reducing risks	Creating business opportunities
Decarbonized society	<ul style="list-style-type: none"> End of fiscal 2025 Making the electricity used at KDDI datacenters around the world net-100% renewable energy <ul style="list-style-type: none"> Excluding the type where the KDDI Group borrows part of other companies' datacenters and facilities to provide services, and datacenters that are scheduled for closure End of fiscal 2030 KDDI Group achieving carbon neutrality Scopes 1+2 End of fiscal 2030 Achieving 50% renewable energy with additionality (KDDI non-consolidated) End of fiscal 2040 KDDI Group achieving net zero Scopes 1+2+3 	<ul style="list-style-type: none"> Helping customers achieve carbon neutrality through DX, LX etc. Producing renewable energy
Circular Economy	<ul style="list-style-type: none"> Pursuing material recycling in business activities <ul style="list-style-type: none"> Material recycling of used mobile phones [1] maintaining a ratio of 99.8% Maintaining zero emissions of withdrawn communication facilities [2] <p>[1] Reusing waste as raw materials by melting them etc. [2] Zero emissions are defined as the final wasted ratio of 1% or less</p>	<ul style="list-style-type: none"> Using our communication network and renewable energy to play a part in creating a circular economy inside society at large and in individual communities
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■ Reduction of CO2 emissions at stations and station buildings

KDDI emits approximately 940,000 tons of CO2 annually due to consumption of energy such as electricity, an amount equivalent to that of about 400,000 ordinary households. 98% of this use is attributable to electricity used at mobile phone stations, telecommunication station buildings, and data centers, and such use is expected to increase further as 5G spreads and communication volumes increase, making efforts to reduce CO2 emissions even more important. To this end, we are taking various measures, such as reducing electricity consumption and switching to renewable energy sources.

■ Improving the efficiency of radio frequency launch control

KDDI has reduced power consumption by up to 30% by putting some of its stations to sleep late at night and at other times when customer communication volume is low.



<Base Station Sleep System>

■ Operation of a sustainable base station, which has virtually zero CO2 emissions 24 hours a day, 365 days a year

In May 2023, KDDI and au Energy & Life began operating a sustainable base station [1] with virtually zero CO2 emissions. The sustainable base station now in operation is autonomously powered by solar energy. On a sunny day, the base station's solar generator can supply all the power needed to operate the base station. In addition, at night and at other times, the system automatically switches over to electricity provided by au Energy & Life's Carbon Free Plan [2], which achieves virtually zero CO2 emissions 24 hours a day, 365 days a year.



<Sustainable Base Station>

[1] [News Release \(June 9, 2023\)](#)

[2] By combining the power supplied by an electric power company with an environmental value certificate, the plan can be considered to provide virtually 100% renewable energy and virtually zero CO2 emissions.

■ Launch of Japan's first base station demonstration using perovskite-type flexible solar cells

Since May 2023, KDDI has been operating sustainable base stations that utilize solar panels. Still, the challenge has been to deploy these base stations to small sites where it is difficult to install solar panels, such as utility pole base stations and building-mounted base stations, which make up the majority of base stations. Therefore, KDDI Corporation, KDDI Research, Inc., and 2018 EneCoat Technologies Co., Ltd. started a demonstration experiment on a sustainable base station [1] in Gunma Prefecture in February 2024. This demonstration experiment used perovskite-type, CIS-type, and CIGS-type flexible solar cells to realize a carbon-neutral base station. This is the first demonstration experiment in Japan [2] in which a commercial base station has been operated using electricity generated by perovskite solar cells. In the demonstration, perovskite solar cells, which are expected to become the next generation of solar cells because of their characteristics as thin, lightweight, and flexible, are being wrapped around poles installed in pole-type base stations. This will enable solar power generation even at pole-type base stations, where the site area is limited, with the aim of expanding the number of sustainable base stations.



<Base Station with Perovskite Solar Cells>

[1] Sustainable base stations are base stations that incorporate elements that contribute to sustainability (e.g., carbon neutrality) to be installed from fiscal 2023, regardless of whether solar panels are part of such installations.

[2] As of the end of November 2023. KDDI research.

■ Start of operation of the au Renewable Energy solar power plant

au Renewable Energy, a company that is involved in the renewable energy power generation business, started commercial operation of a solar power plant in Kumagaya City, Saitama Prefecture in December 2023. In addition to this power plant, au Renewable Energy has begun operating new solar power plants in the Hokkaido, Tohoku, Kanto, Chubu, Kansai, and Chugoku regions.

In the KDDI GREEN PLAN, its medium-term environmental conservation plan which was announced in May 2024, KDDI has set a target of obtaining at least 50% of its electricity from renewable energy sources with additional potential by fiscal 2030. We will continue to accelerate our initiatives towards carbon neutrality by promoting the construction of solar and other renewable energy generation facilities as well as expanding the introduction of renewable energy sources.



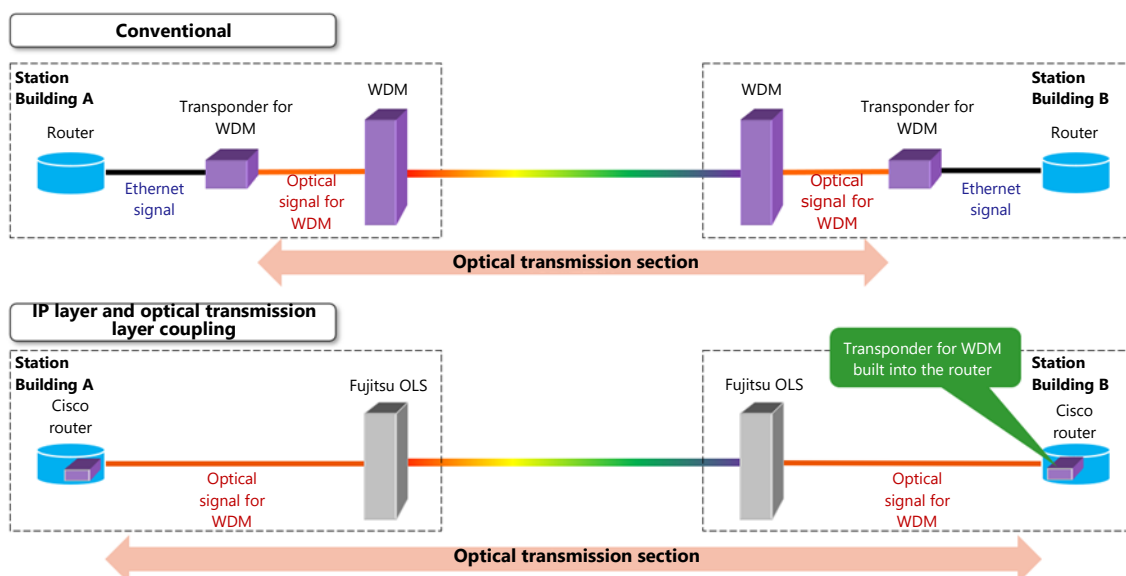
<Exterior View of the Power Plant in Kumagaya City, Saitama Pref.>

■ KDDI, Cisco, and Fujitsu commence full-scale operation of a telecommunications network that reduces power consumption by about 40%

With the nationwide rollout of 5G services, which are now in widespread use, the number of users of video and other data-intensive services is increasing, and communication volumes are growing rapidly. 5G's widespread use and increased communication volumes are expected to further increase the amount of electricity used, making efforts to reduce CO2 emissions even more important. Furthermore, there is an urgent need to quickly expand facilities to cope with the increasing communication volumes. Therefore, in October 2023, KDDI Corporation, Cisco Systems, Inc., and Fujitsu Limited commenced full-scale operation of the Metro Network, a regional intra-network network that integrates the IP and optical transmission layers.

KDDI is proceeding with the construction of an all-photonic network [1] that can achieve high capacity with low power consumption, and the fusion of the IP layer with the optical transmission layer is the first effort toward such an all-photonic network. KDDI will continue to achieve ever lower power consumption and contribute to reducing CO2 emissions.

[1] An all-photonic network is a network that achieves ultra-high speeds, low costs, and low power consumption by transmitting signals as optical signals without optical-electrical conversion.



WDM: A technology that multiplexes and transmits multiple optical signals of different wavelengths over a single optical fiber.

Ethernet signal: An electrical or optical signal for short distances used to connect electronic devices (e.g., PCs).

Transponder for WDM: A "transponder" combines the words "transmitter" and

"responder." A transponder for WDM performs mutual conversion between Ethernet signals and optical signals for WDM.

OLS (Open Line System): Optical transmission equipment that can be connected to equipment provided by various vendors (or manufacturers).

■ Immersion cooling of servers used in data centers

As an initiative to reduce power consumption and achieve decarbonization, from February 2023, KDDI Corporation, Mitsubishi Heavy Industries, Ltd., and NEC Networks & System Integration Corporation (NEC NSSI) have been conducting a demonstration experiment on the use of immersion cooling equipment that liquid-cools IT equipment in a large-scale configuration, aiming to realize a sustainable data center that contributes to decarbonization. As a result, we successfully achieved stable operation at the Tier 4 [1] level for cooling facilities. In addition, compared to conventional data centers, the power consumed for server cooling has been reduced by 94% [2]. In addition, we achieved a PUE value of 1.05 [3], which indicates the data center's power usage efficiency. This experiment is expected to establish a technology to reduce power consumption throughout the data center, thereby meeting the challenge posed by the massive amounts of electricity consumed by data centers while simultaneously curbing carbon dioxide emissions. By collaborating across industry boundaries, KDDI contributes to the development of digital transformation and decarbonization in Japan.

[1] Tier refers to a standard for evaluating and rating data center quality. Tier 4 is the rank indicating that the data center maintains the highest level of quality as a data center due to redundancy of ancillary facilities and other factors.

[2] Compared to the total power consumed by a data center with a PUE value of 1.7 (the PUE value of a typical DC operating today).

[3] PUE stands for "Power Usage Effectiveness" and is a common measure of data center energy efficiency.

It is calculated by dividing the energy consumption of the entire data center (kWh) by the energy consumption of its IT equipment (kWh). The smaller the value, the more energy-efficient the data center is.

[Liquid Cooling of Data Center Servers Achieves a 94% Reduction in Power Used to Cool | KDDI News Room](#)

■ Reduction of CO2 emissions in logistics

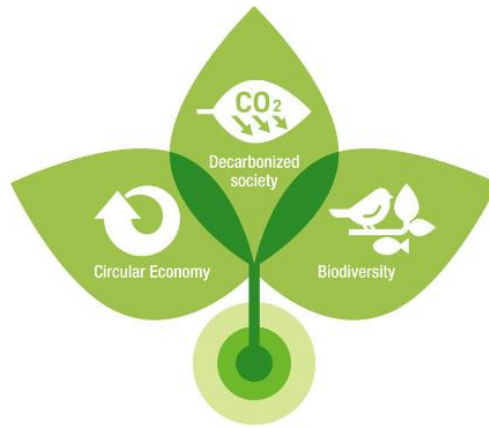
Aiming to reduce environmental impacts and to improve efficiency, KDDI is engaged in a modal shift from truck transport to rail, ship, and other mass transport modes. This shift is attracting attention as a solution to many social issues, such as reducing CO2 emissions by approximately 90% compared to truck transport, addressing labor shortages, and reducing logistics costs for long-distance transport. In particular, such a shift is expected to be effective in combating global warming and is an important strategy for contributing to the realization of a sustainable society.



<Containers Used for Rail Transport>

■ Measures against floods and other types of water damage

As part of our measures to adapt to climate change, we are taking measures to control floods and other types of water damage. At one telecommunication station building in the Chugoku region, we installed watertight doors, installed concrete blocking for the north glass window (watertight wall), raised the supply and exhaust ducts for the generator, and installed backflow prevention valves for the toilets. We finished construction for these measures in June 2022. In addition, watertight doors and waterproof shutters are being installed in a telecommunication station building in the Kyushu region, windows and other openings are being sealed with concrete, and waterproofing measures are being taken for the supply and exhaust vents for the generators. These measures are scheduled to be completed by the end of fiscal 2024.



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■ Promotion of renewable energy

As changes are expected to occur in the energy-related business environment, KDDI is responding swiftly to such changes. With the aim of contributing to the realization of a decarbonized society through our business, KDDI established an intermediate holding company, au Energy Holdings Corporation, in 2022; under its umbrella are au Energy & Life Inc., ENERES Co., Ltd., and au Renewable Energy, Inc.

• au Energy & Life initiatives

Upon the full deregulation of electricity retailing in April 2016, the KDDI Group launched the "au Denki" electricity service, which now has approximately 3.5 million active customers (as of March 31, 2024). In July 2024, au Energy & Life launched three new services: Jitaku Power Plant Service, which provides solar panels and storage batteries at no initial cost and with no flat monthly fee; Smart Power Saving with Nature Green, which automatically controls air conditioners using smart remote controls; and the Power Saving Challenge Program, which encourages customers to reduce their power consumption when electricity supply and demand becomes tight. Through these services, we will contribute to reducing household electricity bills, realizing a decarbonized society through energy conservation, and achieving a stable supply of electricity.

• ENERES initiatives

As a CDP [2] Certified Renewable Energy Provider in Japan, ENERES provides advice to companies and other organizations. In addition, ENERES supports companies in their efforts to decarbonize by proposing concrete solutions to tackle decarbonization, such as switching to renewable energy sources for electricity consumption and providing energy conservation services. Since the amount of electricity generated by renewable energy sources is easily affected by the weather and season, it is important to adjust supply and demand by controlling distributed power sources, including storage batteries. The KDDI Group has been participating in the Ministry of Economy, Trade and Industry's Virtual Power Plant (VPP) [3] Verification Experiment since fiscal 2016, under which we are working to build a VPP that efficiently manages and controls distributed energy resources (e.g., solar power generation and storage batteries) and uses the same to power for supply and for coordination.

[1] The electricity procured by KDDI, which includes hydroelectric, thermal, nuclear, FIT electricity, and renewable energy, is covered by non-fossil certificates that have renewable energy designations to achieve a virtually 100% renewable energy ratio and zero CO₂ emissions.

[2] CDP is an international non-governmental organization (NGO) of British origin that operates a global disclosure system to help investors, companies, nations, regions, and cities manage their environmental impacts.

[3] A system that collectively controls distributed power sources (e.g., storage batteries and cogeneration systems) located on the premises of electric power users, and bundles the power generated there for utilization as if it were from a single power plant.

■ KDDI Green Digital Solution to help companies achieve carbon neutrality

In October 2023, KDDI began offering the KDDI Green Digital Solution, a one-stop support service for corporate customers to achieve carbon neutrality. This solution enables corporate customers to visualize their CO2 emissions, create reports for information disclosure, and reduce such emissions.

In April 2023, KDDI launched Green Mobile, Japan's first telecommunications carrier to disclose actual measured CO2 emissions (primary data) up to provision of telecommunications services to its corporate customers. This visualization of CO2 emissions from corporate customers' use of smartphone services, for which accurate values have been difficult to calculate, aids in setting Scope 3 reduction targets for CO2 emissions throughout the customer's supply chain (supply network), understanding of the emissions reduction status, and information disclosure. Green Mobile received one star in the Sustainable★Selection 2024 organized by Alterna Co., Ltd.

In addition, from March to September 2023, KDDI formed a business alliance with Asuene Inc. which provides Asuene, a cloud service for CO2 emissions visualization, reduction, and reporting. By visualizing CO2 emissions and combining KDDI's ICT/electricity solutions and DX solutions through WAKONX, a business platform for the AI era, KDDI is supporting corporate customers in the processes necessary to achieve carbon neutrality in accordance with their issues and circumstances.



<Image of the Solution>

■ Contribution to reducing CO2 emissions by reducing power consumption with IoT

As the world moves toward decarbonization, one urgent issue is to reduce the consumption of electricity, gas, and other forms of energy in factories. Therefore, processes and facilities with high power consumption must monitor their usage and check whether there are any opportunities for reduction.

Simply by installing sensors in a factory, KDDI's energy visualization solution automatically collects data, stores such data in the cloud, and analyzes power usage per facility.

In August 2022, KDDI Shanghai introduced this solution to Nabtesco's local subsidiary, Shanghai Nabtesco Hydraulics Co., Ltd., and successfully reduced CO2 emissions by reducing the amount of electricity used at the factory.

As the next step in power visualization, we also have a solution for power-saving measures for compressors in factories. This solution has been introduced at Aisin Chemical in Thailand. By converting the amount of air leakage from compressors into data and implementing power-saving measures, we are helping our customers to reduce their power costs and CO2 emissions. The KDDI Group uses these solutions to support our corporate efforts to reduce CO2 emissions globally.

This article is a rewrite of an article that originally appeared in KDDI Corporation's owned media "[be CONNECTED.](#)"

Read the original article here:

<https://biz.kddi.com/beconnected/feature/2023/230419/?oid=1p2407011-kd>

Related links

[Energy IoT Visualization Solution | KDDI China](#)

[AISIN CHEMICAL \(THAILAND\) CO., LTD. | KDDI Thailand](#)



< 工 :<Screen of the Energy Visualization Solution>



< Comprehensive CO2 Emissions Management Screen>

■Rewarding of Ponta points for environmentally friendly initiatives

KDDI participates in the Green Life Point project promoted by the Ministry of the Environment, and we reward Ponta points to customers who use au PAY or au PAY Market to make purchases at merchants that are environmentally friendly. We will continue to increase the number of member stores and to build a system whereby concerned customers can contribute to the realization of a sustainable society by shopping at target member stores.

For more information on the Green Life Point program and to check the participating merchants, click [here](#).



<Image of the service>

■ Offshore wind inspections by drone

To expand our drone business, in 2022 KDDI established KDDI SmartDrone Inc., a consolidated (wholly owned) subsidiary. In recent years, expectations regarding the use of drones as a solution to social issues (e.g., the labor shortage due to the decline in the working-age population) have been increasing. In addition, changes in the drone business environment are occurring due to the development of regulatory frameworks and other factors. We established KDDI SmartDrone Inc. to solve social issues and to respond quickly to changes in the environment.

For example, in conjunction with J-Power Tomamae Winvilla Wind Farm and two other sites, we conducted a demonstration on the effectiveness of automated inspection of wind turbine generators using a drone equipped with auto-flight software (manufactured by Drone Base) that can automatically record video along the blades of wind turbine generators. It has been forecast that wind power generation will be increasingly adopted to realize a decarbonized society. Nevertheless, inspections of wind turbine blades are performed manually, but this special kind of high-altitude work requires skilled personnel, yet only a limited number of such personnel are available. In addition, the inspection work conducted by companies in the industry is concentrated in the summer, when the wind blows less, which presents a further challenge to securing a sufficient number of workers. To address these issues, the two companies conducted a demonstration on the effectiveness of automated blade inspections using drones in order to promote solutions to these problems by making full use of cutting-edge technology.



<Inspection>

* October 7, 2020, News Release

J-Power and KDDI Demonstrate the Effectiveness of Automated Inspections of Wind Power Facilities Using Drones - Autoflight Software Enables Autonomous Flights along Blades for Convenient Inspection Work

■ Energy-saving Services at Home Using Smart Remote Controls

Through the KDDI Green Partners Fund, which invests in startup companies that address environmental issues, KDDI has invested in Nature Inc., which promotes home energy management using IoT products.

As use of renewable energy expands, the stability of the electricity supply has become an issue; demand response, which adjusts electricity demand, is attracting much attention as a countermeasure. Nature Inc. provides the smart remote control Nature Remo and the energy device management system Nature Remo E for households, and the company helps regulate electricity demand through demand response services.

In June 2024, au Energy & Life Inc., which operates the "au Denki" service, and Nature Inc. launched Smart Power Saving with Nature Green, a power-saving service for households that utilizes smart remote controls provided by Nature Inc. This economical, environmentally friendly energy service automatically reduces electricity consumption while maintaining a comfortable temperature, utilizing the automatic air conditioner control function of Nature Remo Lapis, the latest smart remote control provided by Nature Inc.

By providing this service, we will contribute to the realization of a decarbonized and sustainable society through energy conservation, as well as support our customers' household budgets by automatically reducing electricity use.

February 7, 2024, News Release

[Investment in Nature, a Company that Promotes Energy Management for Households](#)

June 26, 2024, News Release

[au Energy & Life and Nature Launch Smart Power Saving with Nature Green, a Power Saving Service for Households - au Energy & Life Corporation \(kddi-el.com\)](#)

■ Endorsement of Initiatives and Group Membership

• RE100

In July 2023, KDDI joined RE100, an international initiative that aims to convert 100% of the electricity used in businesses to renewable energy. RE100 is an international collaborative initiative in which influential companies around the world commit to using 100% renewable energy to power their operations. The goal is to bring companies together to expand the use of renewable energy and to accelerate greenhouse gas emissions reductions. By participating in RE100, KDDI will accelerate its initiatives to realize a decarbonized society and to contribute to global environmental conservation with various partners by connecting people, companies, and society through such activities.



• Japan Climate Leaders' Partnership (JCLP)

In April 2023, KDDI joined the Japan Climate Leaders' Partnership (JCLP), a group of companies committed to realizing a sustainable, decarbonized society. We are committed to decarbonizing society not only through our own decarbonization efforts but through the decarbonization of society at large through our business activities.

JCLP actively disseminates recommendations for policies discussed with member companies, and KDDI participates in these discussions and is involved in the creation of such recommendations.

