

Low-Carbon Society

Activity and Results

Green by ICT

■ Providing Services Approved for Environmental Eco Label

The Environmental Eco Label is provided to services that contribute to reducing the environmental burden of customers and society (reducing carbon dioxide emissions) through the use of ICT services offered by KDDI.

Services approved for the Environmental Eco Label are indicated by the KDDI Eco Mark.



<KDDI Cloud Platform Service>

KDDI has provided the KDDI Cloud Platform Service since July 2012.

KDDI conducts the operation and maintenance of the platform through this service, enabling customers to increase and decrease server capacity remotely from their own office, without having to travel to the data center where the servers are located.

Furthermore, customers can reduce the amount of CO₂ that they generate by moving the servers that they install, operate, and maintain by themselves (on-premises environment) to the KDDI Cloud Platform Service. With the KDDI Cloud Platform Service, server operations are performed with an economy of scale that only a telecommunications operator can provide, enabling an approximately 38% reduction in CO₂ emissions per server per year, compared to when customers operate their servers individually.



KDDI Cloud Platform Service

Results of verification

Equipment	Annual amount of CO ₂ emissions (kg-CO ₂ /year)		
	On-premises	KDDI Cloud Platform Service	Reduction
Streamlining of remote work environment	276.6	172.9	△ 103.7
Improvement of task accuracy through introduction of integrated monitoring and early warning detection functions	368.8	230.5	△ 138.3
Reduction in number of physical units	6,994.4	4,367.1	△2,627.4
Simplification of air flow design	125.6	78.5	△ 47.1
Use of high-efficiency batteries	0.5	0.3	△ 0.2
Use of Energy Star certified products	0.8	0.5	△ 0.3
Use of low-loss cables	0.3	0.2	△ 0.1
Total	7,767.0	4,850.0	△2,917.0

Greenhouse gas emissions

Reduction of 2.9 t-CO₂/year per server (△38%)

<TELEHOUSE Data Center Services>

The TELEHOUSE data centers provided by KDDI are equipped with high-capacity electric power, and they incorporate the latest in energy-saving technology, such as highly efficient and reliable power supply equipment, energy-efficient air conditioning, LED illumination, and outdoor lighting that uses wind and solar power, in an effort to reduce power consumption, achieve low PUE, and provide significantly lower CO₂ emissions than conventional data centers.



TELEHOUSE Data Center Services

	Conventional Data Center	TELEHOUSE
Air conditioning for ICT equipment	Air conditioning for ICT equipment	Air conditioning for ICT equipment (Optimized temperature settings)
Interior lighting	Fluorescent lighting	High-efficiency light fixtures and LED lighting
Motion sensors	Normally equipped with manually operated lighting	Motion sensors
Street lighting outside buildings	Fluorescent lighting	Lights that use wind and solar power

*1 Measured values of FY2010 Green IT Promotion Council

*2 Design values of TELEHOUSE OSAKA 2

Results of evaluation

Equipment	Annual amount of CO ₂ emissions (t-CO ₂ /rack)		
	Conventional Data Center	TELEHOUSE	Reduction
Air conditioning	40.2	20.1	△20.1
Interior lighting	0.1	0.1	△0.0
IT equipment	54.3	54.3	△0.0
Total	94.6	74.5	△20.1

* Calculated based on design values of TELEHOUSE OSAKA 2

Low-Carbon Society

Greenhouse gas emissions

Reduction of 20.1 t-CO₂/year per rack (△21%)

<Note on third-party verification>

To increase the credibility of calculations for the reduced environmental burden (reduced carbon dioxide emissions) of the services approved for the Environmental Eco Label, KDDI receives third-party verification from Waseda Environmental Institute Co., Ltd.



Third-party verification received from Waseda Environmental Institute Co., Ltd.

Activity and Results

Green of ICT

Reducing Power Consumption in Base Stations and Undertaking Disaster Measure Initiatives

The dense blanket of mobile phone base stations covering Japan accounts for 60% of the total energy consumed by KDDI, and reducing the power that base stations consume is a topmost priority.

Furthermore, 77% of the base stations that ceased to operate in the aftermath of the Great East Japan Earthquake that struck in March 2011 (in six Tohoku prefectures, as of March 12, 2011) did so because of power outages. Clearly, disaster preparedness measures that address power outages are a pressing topic.

In regard to these issues, KDDI has promoted initiatives combining reduction of environmental impact and disaster preparedness measures by increasing the number of Tribrid Base Stations and extending the life of base station batteries to 24 hours.

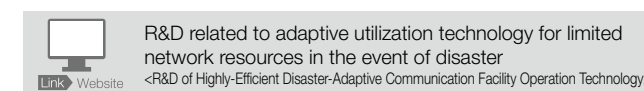
Tribrid Base Stations are base stations that employ tribrid power control technology to determine which of three types of power to use depending on the time of day and changes in the weather. Tribrid power control involves the use of technology to efficiently control the source of electric power by the hour, combining typical commercial electric power with generation from solar panels and charging batteries with nighttime power. Compared with base stations that only use conventional electric power, Tribrid Base Stations have been proved to reduce CO₂ emissions by as much as 30% a year. As of March 31, 2016, 100 Tribrid Base Stations were installed throughout Japan.

Furthermore, serving as backup in case power is interrupted, KDDI has installed batteries with life extended to 24 hours, focusing on prefectural and municipal government offices and train stations serving more than 100,000 passengers per day. As of March 31, 2016, extended life batteries have been installed at 2,200 base stations throughout Japan. We will continue installing extended life batteries while measuring the effect on the reduction of environmental load.



Tribrid Base Stations

A video about the advancement of Tribrid Base Stations is available for viewing (Japanese).



Together with “Research and development related to variable-capacity optical network control systems” and “Research and development of obstruction estimation in times of disaster and restoration plan analysis and calculation technology,” the “Study on advancement of Tribrid Base Stations” (KDDI project name) forms part of the “Research and development of management and control technology for disaster-proof networks guaranteeing communications even during large-scale disasters,” sponsored by the FY2011 supplementary budget of the Ministry of Internal Affairs and Communications.

Portable Batteries

In FY2013, KDDI introduced and utilizes portable batteries with reduced environmental impact at five maintenance bases throughout Japan as a substitute for the mobile power supply vehicles used in the past to power mobile phone base stations during electricity outages.

In the portable battery trial conducted in FY2012, assuming a power outage of approximately 10 hours per base station and wireless device power consumption of 1kW,



Portable batteries

Low-Carbon Society

whereas a mobile power supply vehicle would consume 8.2 liters per time (equivalent to 21.5kg of CO₂ emissions), a portable battery required 10kWh per time (equivalent to 4.1kg of CO₂ emissions). Given this 17.4kg difference in CO₂ emissions, we expect an approximate 80% reduction in emissions compared with mobile power supply vehicles. KDDI plans to expand the number of portable batteries introduced in readiness for the future increase in base stations and to continue to work toward reduction in CO₂ emissions.

Renewable Energy (Internal use)

In order to actualize even better energy conservation and CO₂ emissions cuts at KDDI, a portion of the electric power used at large scale communications stations like the Yamaguchi Satellite Earth Station, Oyama Network Center No. 2 and Tokyo Technical Center, and almost all electrical power at six mobile telephone base stations including Hokkaido and Aomori come from natural energy sources such as solar power. We have been making progress in introducing renewable energy, establishing 100 Tribrid Base Stations (base stations utilizing tribrid electric power control technology to efficiently supply three kinds of electric power - ordinary commercial power, power generated by solar panels, and midnight power saved in storage batteries - according to the time of day and changes in the weather) throughout Japan. The amount of natural energy produced by each Tribrid Base Station is approximately 4.2 kWh/day,* accounting for 18% of the power used by every device. Furthermore, by utilizing midnight power, we are predicting that CO₂ emissions will reduce 20 to 30%*



Large scale communications station using natural energy

* Includes values researched by KDDI where average energy production is predicted from 6 solar batteries installed in test stations during clear skies

Renewable Energy (Solar power generation business)

KDDI launched its solar power generation business on November 18, 2013, with the aim of contributing to reduction of CO₂ emissions. We constructed solar power generation facilities on some idle land owned by KDDI in three locations around the country, and we sell the power generated to electric power companies based on the Feed-in Tariff Scheme for Renewable Energy. Total power generation (total power sales) amounted to 3,034MWh in FY2013, 14,403MWh in FY2014 and 13,674MWh in FY2015. In FY2016, KDDI plans to expand its solar power generation facilities to provide approximately 3,000MWh of additional power per year.

Location of solar power generation facilities	Start of operation	Site area	Generating capacity
KDDI Oyama Network Center (Oyama, Tochigi Prefecture)	February 26, 2014	Approx. 41,000m ²	Approx. 3,500kW
Adjacent to KDDI Yamata Transmitting Station (Koga, Ibaraki Prefecture)	January 24, 2014	Approx. 57,000m ²	Approx. 3,300kW
Former site of Kitaura Receiving Station (Namegata, Ibaraki Prefecture)	November 18, 2013	Approx. 78,000m ²	Approx. 2,000kW

Road Heating that Uses Waste Heat

The Sapporo Technical Center in the KDDI Hokkaido Building is contributing to the reduction of CO₂ through a road heating system that uses water heated by the waste heat generated in communications equipment rooms (unlike conventional road heating systems that use heating oil and natural gas). Road heating systems

consist of underground pipes that circulate hot water to warm the roads and sidewalks and prevent the accumulation of snow and ice, thereby contributing to the prevention of accidents such as pedestrians slipping and falling.



Road heating facilities

Activity and Results

Green by ICT

Environmental Monitoring that Uses M2M/IoT

The KDDI M2M Cloud Service is a secure one-stop cloud service solution for configuring essential M2M/IoT business functions, such as collecting and compiling data from sensors and displaying data reports. For example, by installing temperature and humidity sensors in their offices or shops, customers can record the temperature and humidity and visualize the usage conditions, which can then help in the implementation of plans for optimizing and improving the energy efficiency of the air conditioning.

By providing M2M/IoT-related services, KDDI helps customers improve their work efficiency, consolidate their IT resources through the cloud, improve their energy efficiency, and save resources through the shared use of facilities. Moving forward, KDDI will continue to provide ICT services that aim to solve customer issues while also reducing the environmental impact of society.