

Initiatives to Reduce Environmental Burden and Boost Disaster Preparedness

# Increasing the Number of Tribrid Base Stations and Extending Base Station Battery Life to 24 Hours

The dense blanket of au mobile phone base stations covering Japan accounts for 60% of the total energy consumed by KDDI. Furthermore, expanding our 4G LTE service area is causing this consumption to increase, so we are placing topmost priority on initiatives to reduce the electricity that base stations consume.

Other risks came to the fore in March 2011 when the Great East Japan Earthquake struck, namely the risk of base station power outages. Some 77% of the base stations that ceased to operate in the aftermath of the earthquake (in 6 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.

KDDI has been using 3 types of power—commercial electric power, solar generation, and batteries—for its base stations since 2009. These au mobile base stations employing Tribrid\* Power Control Technology (Tribrid Base Stations) determine the type of power used according to the time of day and changes in the weather. We are using this know-how to reduce environmental impact and ensure disaster preparedness by increasing our number of Tribrid Base Stations and base stations whose battery life has been extended to 24 hours.

\* Term coined to refer to the combining of 3 types of industrial technologies from different fields. Generally, combining 2 types of industrial technology is called "hybrid" and three technologies "tribrid."

## Increasing the Number of Tribrid Base Stations to **100** Throughout Japan

We began installing Japan's first Tribrid Base Stations in December 2009. As of March 31, 2013, the number of these stations throughout Japan totaled 100.

## Reducing CO<sub>2</sub> Emissions by up to **30%**

Base stations that use tribrid power control technology have been verified to cut annual CO<sub>2</sub> emissions by as much as 30% compared with conventional base stations.

## Extending Base Station Battery Life to 24 Hours at **2,000** Base Stations Throughout Japan

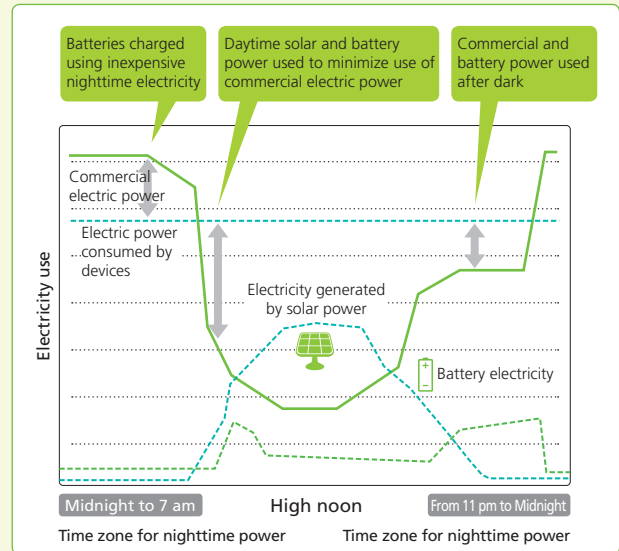
As one of our efforts to combat disaster-related power outages, we had extended the battery life of base stations at 2,000 locations as of March 31, 2013. We plan to increase this number going forward.

## Tribrid Power Control Technology that Uses 3 Types of Power According to 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, combining typical commercial electric power with generation from solar panels and charging batteries with nighttime power. Solar power is used during the day when solar panels provide sufficient power. If insufficient, batteries charged with nighttime commercial electric power provide the remainder. Compared with base stations that only use conventional electric power, Tribrid Power Control is designed to reduce CO<sub>2</sub> emissions by as much as 30%.

In addition to working toward a low-carbon society, KDDI is using this technology to counter the risks of power outages in the event of disaster. As of March 31, 2013, we had increased our installations of a Tribrid Base Stations to 100 locations throughout Japan.

### How Tribrid Power Control Works



## Ensuring Backup Power during Power Outages by Extending Base Station Battery Life to 24 Hours

Batteries installed in au mobile phone base stations in the past were capable of powering this equipment for only around 3 hours if electricity was cut off as the result of a disaster or other event. Because operations at many of our base stations were interrupted due to power outages resulting from the Great



Batteries with life extended to 24 hours

East Japan Earthquake, we have made the extension of base station battery life a priority. Serving as backup in case power is interrupted, KDDI has installed batteries with life extended to 24 hours at 2,000 base stations (as of March 31, 2013) in prefectural and municipal government offices and train stations serving more than 100,000 passengers per day. We plan to continue increasing this number.

### Looking to the Future



**Junnou Matsuishi**  
Head of Planning Group Section  
Mobile Technical Planning  
Department  
Technology Planning Division

We consider Tribrid Base Stations to be a success thanks to their use of technology to conserve power by using renewable energy. We are also fulfilling our responsibilities as a telecommunications operator by continuing to increase the number of base stations with battery life extended to 24 hours at key locations.

In addition to these initiatives, KDDI plans to increase its disaster preparedness even further by making Tribrid Base Stations more sophisticated\*<sup>1</sup> and deploying wireless shipboard base stations\*<sup>2</sup> so that we can restore communications from the sea in the event of a disaster. We will also look into wide-zone base stations that have a broader coverage area than the typical base stations of today.

\*1 Research and Development on Disaster-Resistant Network Management and Control Technology to Ensure Communications Even in the Event of a Large-Scale Disaster, sponsored by the fiscal 2011 supplementary budget, Ministry of Internal Affairs and Communications

\*2 Study Team for Shipboard Installation of Mobile Phone Base Stations for Use in Emergencies, Chugoku Bureau of Telecommunications, Ministry of Internal Affairs and Communications