Action by JR-West to Reduce CO_2 Emissions

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Action against global warming

JR-West is pursuing a variety of activities to reduce unit energy consumption in FY2012 by 12% compared with FY1995 with the goal of reducing emissions of greenhouse gases (especially CO_2).

1. Introduction of energy-saving rolling stock

JR-West classes rolling stock equipped with electric power regenerative brake, energy efficient control systems such as VVVF controllers, and new engines as "energy-saving rolling stock." When JR was first formed, such rolling stock accounted for only 8% of the entire rolling stock. As a result of the introduction of new rail cars each year, however, the percentage had risen to 68.2% by the end of FY2009. By the end of FY2012, JR-West aims to raise the percentage of energy-saving rolling stock further to 75%.

Fig.1 N700-series

2. Effective use of electric power regenerative brakes

In order to reduce train energy consumption, which accounts for the bulk of energy consumed, JR-West is developing and introducing new technologies to effectively utilize the regenerative power generated when cars brake. One such technology is an up/down-line tie-feeding system that electrically connects the feeders on the up and down lines of a DC feeding system at a point approximately midway between substations with the aim of eliminating as far as possible transmission loss during regenerative braking. Trials conducted on the JR Gakkentoshi and Takarazuka lines since FY1999 confirm the system yields improvements of approximately 3.4%. It is presently installed at five locations, and is to be phased in at other locations in the future.

3. Survey of power use at stations

Though stations are equipped with a range of facilities that consume electricity, including platform and concourse lighting, automated ticket barriers, ticket machines, office air-conditioning systems, escalators, and elevators, the state of use of power consumed by these facilities had not previously been specifically surveyed.

The present survey was therefore conducted by JR-West to measure power consumption according to use taking as a model Nada Station, which is a station with a typical bridge-type structure located around 28 km west of Osaka Station. It is used by approximately 47,000 passengers per day, and its principal specifications are summarized below.

Station building area	Platform area	Elevators	Escalators	Stopping services
1,056 m^2	1,900 m^2 (2 platforms)	2	4	256

Table.1 Nada Station Specifications

Fig.2 Nada Station concourse

Nada Station's new station building, which entered use in July 2009, is distinguished by the use of high-frequency fluorescent lights, which use 25% less energy than conventional fluorescent lights. These are coupled with illumination sensors so that platform lighting can be reduced during the daytime. Escalators are inverter models, and are equipped with motion sensors to enable them to operate at reduced output when awaiting use. As a result, power use per day has been reduced to 1,053 kWh. As lighting will still account for 42% of the total despite the introduction of energy-saving facilities, though, JR-West will continue to introduce and make improved use of even more energy-efficient lighting.

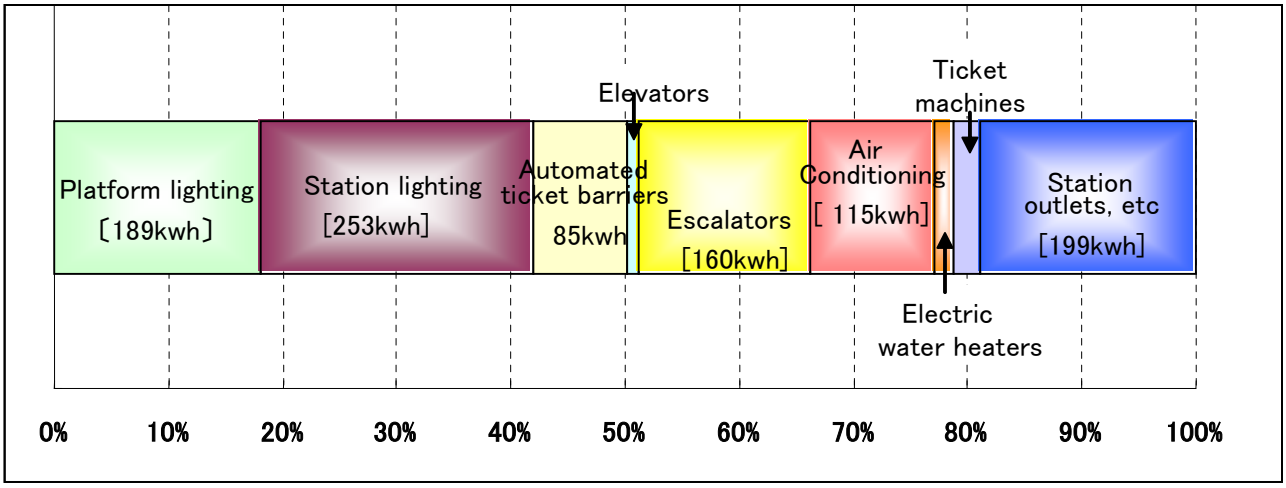

Fig.3 Breakdown of power consumption at Nada Station per day

As a result of this introduction of energy-saving rolling stock and various other measures, energy consumption per wagon-kilometer carried—i.e., unit energy consumption—has steadily declined, falling 12.1% from 24.85 MJ/wagon-km in FY1995 to 21.84 MJ/wagon-km at the end of FY2009. Going beyond simply introducing energy-saving rolling stock, JR-West will continue to rethink energy consumption across the entire railway system in order to reduce unit energy consumption.

4. Future activities and the Osaka Station project

JR-West has extensive plans to establish new stations and renovate existing stations, and will be making active use of energy-saving equipment and lighting when it does so. Existing escalators and elevators will be progressively replaced by energy-saving inverter types, while escalators will be operated in slow mode at reduced output during off-peak periods. At Takarazuka Station, meanwhile, which was converted to a bridge-type structure in February 2010, lighting of the concourse, stairs, toilets, and other areas is now provided entirely by LED lights to further reduce power consumption. The station building also now has a 280 m^2 vegetated roof, which helps to provide insulation.

Elsewhere, JR-West is upgrading Osaka Station and rebuilding the station building ready for opening in spring 2011. Solar power generation systems are being installed on platform roofs, and the Osaka Kita Building is supplied with district heating and cooling by a natural gas cogeneration system to improve the efficiency of air-conditioning facilities. Other environmentally-friendly technologies being installed to reduce energy consumption and lower CO_2 emissions include wind power generation, vegetated roofs, and energy-saving lighting.

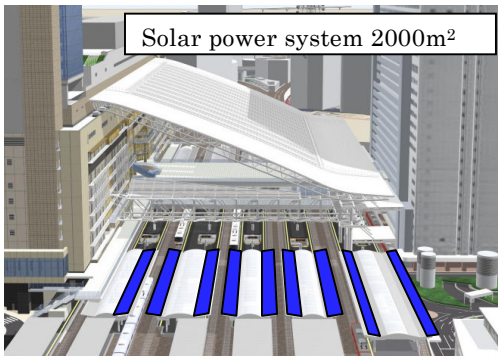

Fig.4 Eco renewal Osaka Station

JR-West will continue to introduce new facilities and its employees will keep on taking concrete action at the individual level to save energy and reduce CO_2 emissions so as to contribute to the development of a sustainable society.