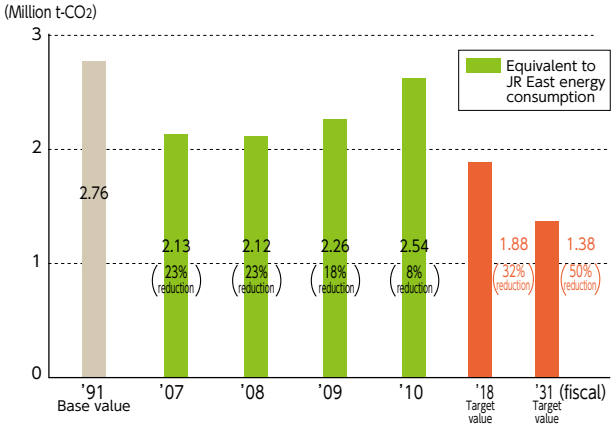
Measures to Prevent Global Warming

CO_2 emissions and reduction measures

Our CO_2 emissions in the fiscal year ending March 2010 totaled 2.54 million tons, an increase of 0.28 million tons over the previous fiscal year. The reasons for the increase include the operating rates of our own thermal plants which were designed to compensate for the suspension of operations at our hydroelectric power plants. We are determined to continue to reduce energy used for train operation, which accounts for 70% of the total energy we consume.

We will also undertake a range of measures to reduce CO_2 emissions, including energy conservation actions for which new targets are being set for stations and offices.

■Trends in total JR East CO_2 emissions



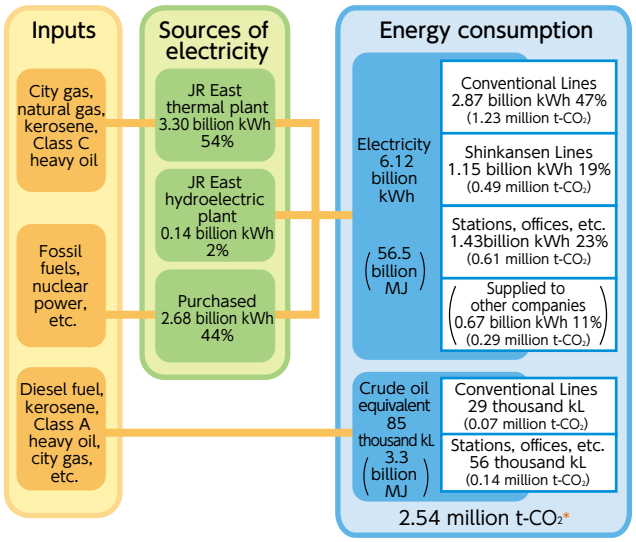
*Calculation methods

Beginning in the fiscal year ended March 2007, energy consumption and CO_2 emissions were calculated based on the Act on the Rational Use of Energy (Energy Conservation Law) and the Act on Promotion of Global Warming Countermeasures (Global Warming Measures Law), respectively. Since the end of the fiscal year ended March 2010, however, CO_2 emissions from electricity usage have been calculated based on post-adjustment emission coefficients by electricity providers, published by the Ministry of Environment in its official journal. These changes have been instigated because, under the Federation of Electric Power Companies of Japan's Environmental Action Plan promulgated by the Japanese Electric Utility Industry, the major management target values reflect the Kyoto mechanism credits in the way designated in the Global Warming Measures Law. Using the actual emissions coefficients, emissions for the fiscal year ending March 2010 stood at 2.82 million t-CO_2 (an increase of 0.56 million t-CO_2 compared to the fiscal year ending March 2009).

Energy conservation and CO_2 reduction

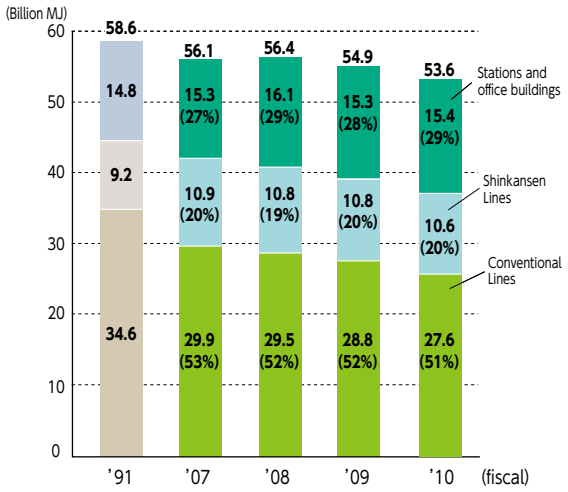
The electricity consumed by JR East for train operations as well as for lighting and air conditioning at stations and in offices is supplied by JR East's own power plants and by electric power companies. Besides electricity, we also use diesel fuel and kerosene for diesel train operation and air conditioning at stations and in offices. We will strive to save energy in various ways and reduce CO_2 emissions.

■JR East Energy flow map



* 2.54 million t-CO_2 Excluding supply to other companies

■Composition of energy consumption by JR East



Reducing energy consumed for train operations

As of the end of March 2010, JR East had 10,883 energy-efficient railcars in operation. This accounts for 88% of our railcar fleet.

We are putting into service more new-generation energy efficient railcars, with features such as regenerative brakes, which can convert kinetic energy during deceleration into electric energy, and variable voltage variable frequency (VVVF) inverters, which control motors without wasting electricity.

E233 series
State-of-the-art cars introduced on the Chuo Line in December 2006.

E2 series
VVVF inverter railcars used for Shinkansen "Asama" and "Hayate" trains.

E231 series
VVVF inverter cars for commuter and suburban transportation.

Diesel-powered, electric-motor-driven hybrid railcars and new resort trains

The Kiha E200 Type cars, which entered service on the Koumi Line in July 2007, are the world's first diesel-powered, electric-motor-driven hybrid railcars. A similar hybrid system will be employed on new resort trains that will enter service in the fall of 2010. This is expected to reduce fuel consumption rate by about 10% and nitrogen oxide (NOx) exhaust emissions by about 60%, in comparison with current trains. Also, the level of noise when idling at stations and when accelerating on departure is expected to be lower by 20-30dB.

A hybrid resort train

New electric railcars introduced on the Keiyo Line

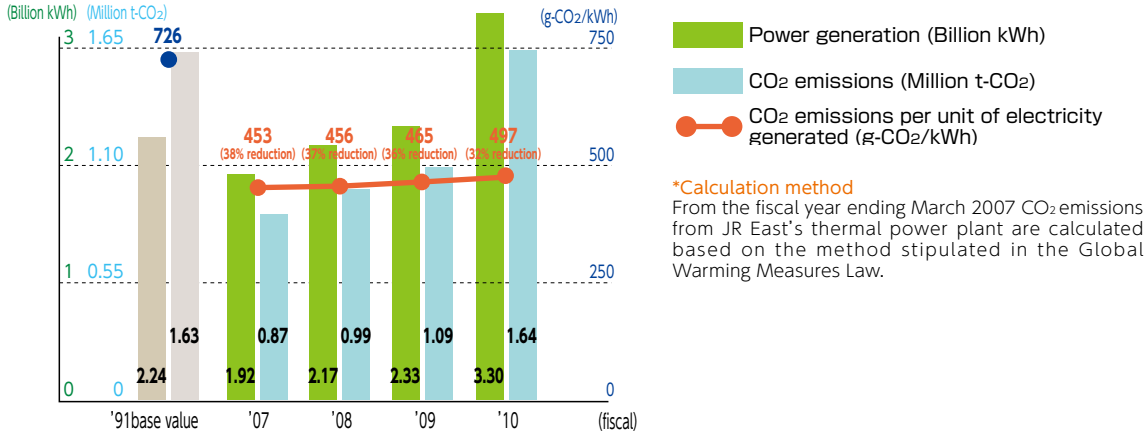
Following their successful introduction on the Chuo Rapid, Ome-Itsukaichi, Keihin Tohoku, Tokaido, and Joban Local Lines, the E233 series railcars were further developed and introduced on the Keiyo Line as replacements for the outmoded 201 and 205 series. In addition to the features of the E22 series introduced on the Chuo Rapid Line, the new Keiyo Line wine red banded cars facilitate the broadcasting of video advertisements, news and weather reports via WiMAX (high-speed wireless communication), and, furthermore, offer Keiyo Line-specific security devices.

JR's own power plants

JR East operates a thermal power plant in Kawasaki City, Kanagawa Prefecture, with a total output of 655 thousand kWh. At the plant, we replaced three of its four generating units with combined-cycle power generation units* with improved generating efficiency. In June 2006 we replaced kerosene with natural gas as fuel for the No.3 generation unit. In an effort to further reduce CO_2 emissions, we will replace the last steam-powered generation unit using heavy oil with a combined-cycle generation system using natural gas in 2013.

* A combined-cycle power generation unit is a power generation unit that combines gas turbines propelled by combustion of gas with steam turbines driven by steam from the exhaust heat.

■Power generation and CO_2 emissions at JR East's thermal power plant



*Calculation method
From the fiscal year ending March 2007 CO_2 emissions from JR East's thermal power plant are calculated based on the method stipulated in the Global Warming Measures Law.

Utilization of natural energy

We also promote use of natural energies, including solar and wind power. Solar panels are installed at Tokyo Station, Takasaki Station, General Education Center, and R&D Center. Takasaki Station doubled its solar panels in March 2004.

In addition, solar panels will be installed at Tokyo Station above the platform serving Tokaido Line tracks No. 9 and 10, and are scheduled to be operational during the fiscal year beginning April 2010. Also, in preparation for employing wind-power generation, we will carry out research to determine whether there are effects when electricity generated by wind power (which fluctuates according to wind velocity) is routed to a transformer substation.

Solar panel installed atop platform roofs at Takasaki station.

Installation of solar panels is planned also at Tokyo station.

Greening rooftops

We have been promoting the planting of greenery on JR East-owned station and office building rooftops with the aim of reducing the heat island effect and decreasing the need for air-conditioning. As of the end of March 2010, we had "greened" a combined rooftop area of approximately 14,900 m^2 in 45 projects.

Rooftop greenery at Lumine Kitasenju

Ebisu Green Garden: The birth of a rooftop garden in JR Ebisu

We provided an oasis for local residents and office workers with the April 29, 2009 opening of Ebisu Green Garden, a spacious rooftop garden rich in greenery with many herbs and other plants. We also have supported the local community through the launch of Soradofarm, a rental vegetable garden (opened in September 2009) that allows local residents to experience agricultural and environmental education through the delights of vegetable planting and care. Both areas (a total of 2,100 m^2 of which 500 m^2 is occupied by the vegetable garden) have been highly appreciated by visitors.

Environmental management at large underground stations

When we began our equipment renewal work at Ueno Station and the underground Keiyo Line area in Tokyo Station to eliminate the use of CFCs, we reviewed the capacity of cooling equipment for air conditioning and employed inverter controls. We also endeavor to reduce energy by monitoring operations and exercising optimum operating control based on diagnosis using our Building Energy Management System (BEMS). As a result, in the fiscal year ending March 2010, energy consumption by air conditioning units was down by 50% (from the level of the fiscal year ending March 2005 and March 2008 for Ueno and Tokyo Stations, respectively).

Saving energy in office buildings

In response to revisions to laws and regulations, saving energy in office buildings has become increasingly important. We work hard on reducing energy consumption both in hardware, including the introduction of highly efficient equipment and facilities, and in software, including temperature management of air conditioning and diligently turning off lights.

Environmental Measures: A Case History

JR East's Sapia Tower has been awarded S Rank certification, the highest CASBEE (Comprehensive Assessment System for Built Environment Efficiency) assessment.

Sapia Tower, a part of Tokyo Station City, is the first JR East facility to obtain CASBEE's* highest assessment. The tower's following attributes were highly evaluated: Facility performance including the adoption of highly efficient equipment and measures for building longevity; consideration for street scenes and landscapes; re-use of rainwater and drainage and separated collection and reduction of garbage; and interior amenities.

*CASBEE (Comprehensive Assessment System for Built Environment Efficiency)
The CASBEE evaluation system is based on levels of environmental efficiency advocated by the Ministry of Land, Infrastructure, Transport and Tourism, including the quality of the environment and performance improvements such as interior amenities and consideration for landscapes, in addition to environmental impact reductions including energy/resources conservation and recycling capabilities based on a comprehensive assessment of environmental efficiency.

Environmental Measures at ecute Nippori

Ecute Nippori is an example of how JR East is actively working toward the reduction of global environmental burdens through the following measures:

1. The greening of the station rooftop which is within view of Yanaka Reien cemetery, an area rich in greenery, was aimed at allowing the station to blend in with its surrounding neighborhood, as well as reducing heat emissions from the roof during hot summer days and bringing about a reduction in air conditioning demand, while, at the same time, providing a comfortable station space.
2. By equipping the building totally with LED lighting, the annual electricity consumption was lowered dramatically, the number of lights actually necessary was reduced, and due to lower heat emissions produced by the lights, the air conditioning burden was considerably lessened.
3. Thorough separation of waste food was implemented resulting in a food recycling ratio of 100% with biomass energy.

Greening of a station rooftop

Saving energy used by information systems

Energy consumption by information systems has increased dramatically over the past several years and has become a genuine social problem. In order to respond to this issue, JR East succeeded in reducing electricity usage by 6,400kWh by switching off the power consumption of certain information system equipment when not in necessary use. In the fiscal year ending in March 2011 we intend to make further reductions by expanding the scope of target equipment.

Intermodal Transportation = Reduction of CO_2 emissions by the entire transportation system

Promoting Park-and-Ride

We are adding parking spaces in front of stations in order to promote park-and-ride schemes so that our customers with tickets for the Shinkansen or limited express trains can drive their cars from home to nearby stations and use the train network from there. By the end of March 2010, 91 JR East stations had parking spaces for ten thousand cars*. Not only can people get to their destinations safely and surely, without getting bogged down in traffic congestion, but they can travel with less impact on the environment.

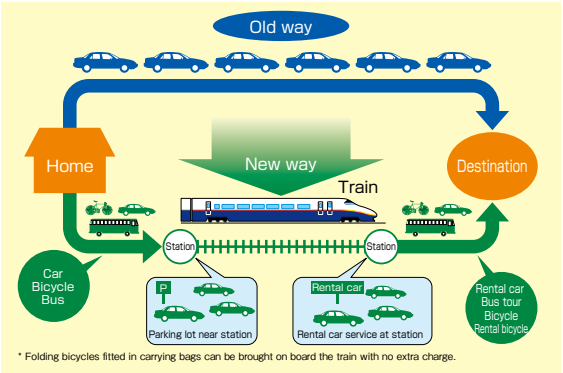
*Parking spaces for ten thousand cars. Parking spaces include those developed by JR East, and those managed by JR East Group companies or in cooperation with local municipalities.

At 10 stations between Tomobe and Iwaki on the Joban Line, parking charges are free for express train customers going farther than a specified distance.

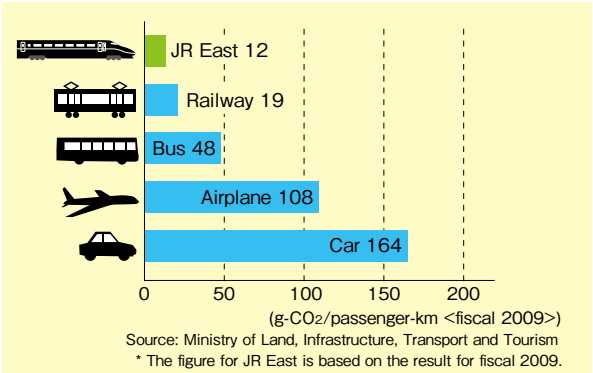
Promoting rail and car rental

To suggest to our customers travel plans that use a combination of railways and automobiles, JR East has been offering a car rental service called “Train-ta-kun” since 1995, with discounted rental charges. We are facilitating intermodal transportation* by introducing new classes of automobiles, such as light cars, offering attractive rates, and installing car navigation systems and ETC as standard equipment on rental cars.

■Intermodal transportation



■CO_2 emissions by mode of transportation



*Intermodal transportation Intermodal transportation refers to a transportation system which allows a person to get from an origin point to a final destination by connecting between different modes of transportation.

Environmental Measures: A Case Study

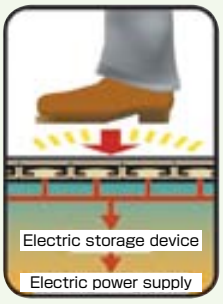
Toward the Achievement of Environment-friendly Stations

As part of our goal of dramatically reducing our energy needs in stations and offices, since January 2009 we have been actively introducing flat screen LED information displays which use 60% less energy than traditional products. To date we have installed 2,438 such displays at 175 stations, mainly in the Tokyo metropolitan area (as of April 1, 2010), and we intend to continue to decrease our energy consumption levels in stations.

Power-generating floor demonstration experiment

We have conducted three experiments at Tokyo Station ticket gate areas to confirm the generation capacity and durability of a form of flooring that generates electricity from the pressure of people walking on it. The system generates electricity from the vibrations caused by the deformation of piezoelectric elements under the floor as people walk on it. After its initial test success, we are continuing with research and development in cooperation with JR East Consultants Company, with the aim of its eventual widespread introduction to stations and office buildings.

Demonstration experiment at Tokyo Station



Mechanism of the power-generating floor system