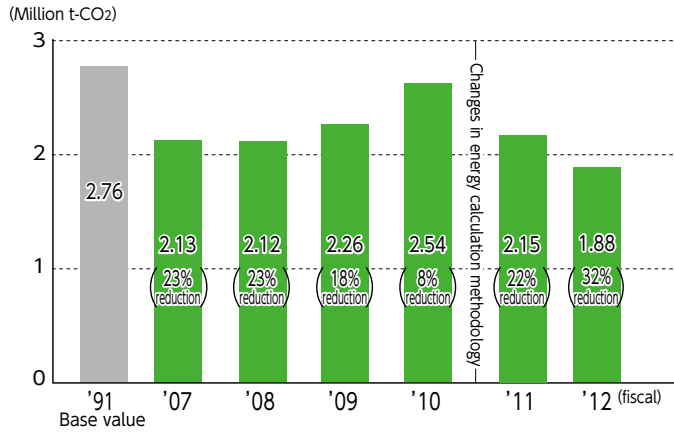


## Measures to Prevent Global Warming

### Trends in CO<sub>2</sub> emissions<sup>☆</sup>

Our CO<sub>2</sub> emissions in the fiscal year ending March 2012 totaled 1.88 million tons, a decrease of 0.27 million tons over the previous fiscal year. This was due to the restart of our own hydroelectric power plant, which resulted in the reduction of the operating rate of our own thermal power plant and eventually in the reduction of CO<sub>2</sub> emissions from it. It was also attributable to energy-saving efforts throughout the company.

#### ■ Trends in JR East's total CO<sub>2</sub> emissions



\*Total CO<sub>2</sub> emissions in FY 2012, when calculated with the same calculation methodology (category and boundary) as that used until FY 2010, are 1.96 million t-CO<sub>2</sub>.

#### \*Boundary:

Energy consumption and CO<sub>2</sub> emissions have been calculated for JR East alone, in principle. Beginning with FY 2011, however, the energy consumption by, and its associated CO<sub>2</sub> emissions from, companies to whom JR East outsources its station operations and other services are calculated as JR East's own energy consumption and CO<sub>2</sub> emissions. Meanwhile, the energy consumption by, and its associated CO<sub>2</sub> emissions from, stores in station compounds operated by group companies are excluded from those of JR East. These changes have been made to calculate the energy consumption and CO<sub>2</sub> emissions associated with JR East's business as a whole more accurately in line with the idea of setting organizational boundaries for transportation and factories in the Act on Rational Use of Energy (Energy Conservation Law). No revision was made to the past data of energy consumptions and CO<sub>2</sub> emissions.

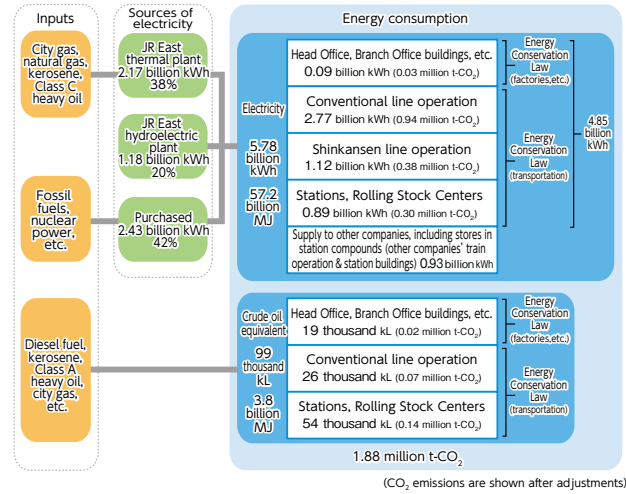
#### \*Calculation Method:

Energy consumption is calculated based on the Energy Conservation Law. As a unit calorific value for the electricity generated at our own hydraulic power plant, 9.76 MJ/kWh is used. The total amount of CO<sub>2</sub> emissions is calculated based on the Act on Promotion of Global Warming Countermeasures (Global Warming Measures Law). However, the emissions attributable to the consumption of electric power purchased outside the company, including that is used for railway transport, are calculated on the basis of post-adjustment emissions coefficient. When the actual emissions coefficient is used, the CO<sub>2</sub> emissions for fiscal year ending March 2012 is 2.02 million t-CO<sub>2</sub> (a decrease of 0.39 million t-CO<sub>2</sub>).

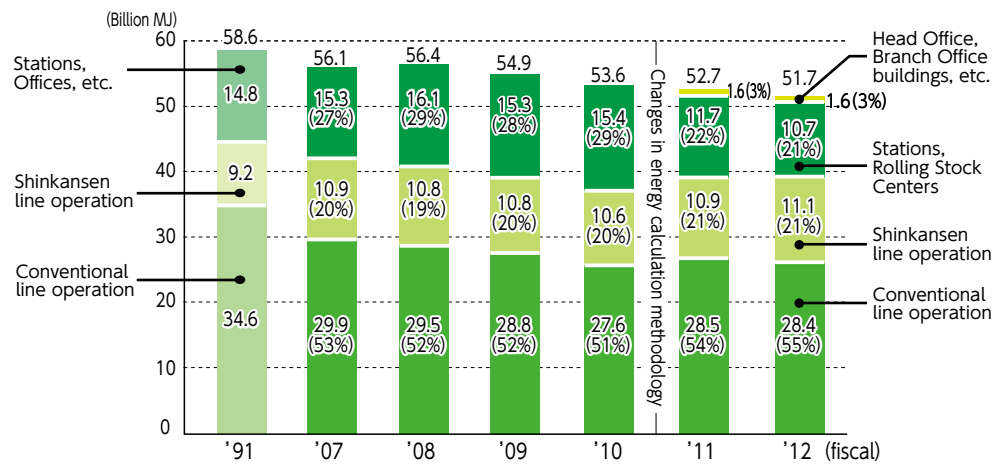
### Energy conservation and CO<sub>2</sub> reduction<sup>☆</sup>

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 for air conditioning at stations and in offices. We will strive to save energy for train operation, which accounts for about 70% of our total energy consumption, and reduce CO<sub>2</sub> emissions in various ways.

■ JR East Energy flow map



■ Composition of energy consumption by JR East



\* Total energy consumption calculated with the same methodology (category and boundary) as that used in FY 2010 is 54.1 billion MJ.

### Reducing energy consumed for train operations<sup>☆</sup>

As of the end of March 2012, JR East had 11,205 energy-efficient railcars in operation. This accounts for 89.5% 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



E5 series: new high-speed Shinkansen railcars that incorporate the highest level of customer service and cutting-edge technology



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. Compared with the current trains, fuel consumption rate has been reduced by about 10% and the noise level of the trains idling at stations and accelerating on departure has been lowered by 20-30 dB. Also, in October to December 2010 we began operating the HB-E300 Series, a new type of resort train equipped with a hybrid system similar to *Kiha* E200 type, in the Nagano, Aomori and Akita areas.



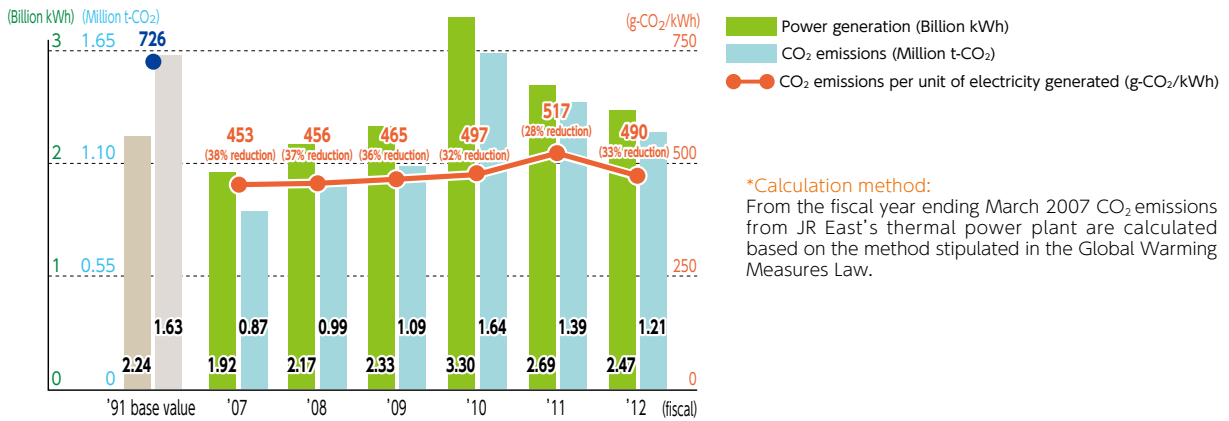
HB-E300 series: A hybrid resort train

### JR East's own power plants☆

JR East operates a thermal power plant in Kawasaki City, Kanagawa Prefecture, with a total capacity of 655 MW. The plant will reduce CO<sub>2</sub> emissions by replacing three units (out of four) with combined-cycle power generation units\* with improved efficiency and by switching fuel from oil to natural gas when the plant is renovated.

\* 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<sub>2</sub> emissions at JR East's thermal power plant



### Utilization of renewable energies

We also promote use of renewable energies, including solar and wind power. Solar panels were installed at Tokyo Station, Takasaki Station, the General Education Center and R&D Center. In March 2004, the number of panels at Takasaki Station was doubled. Panels on the largest scale in JR East were installed at Tokyo Station in February 2011 above the platform for tracks 9 and 10, which serve Tokaido Line trains. Starting full operations as the first ecoste – “eco-station” – Yotsuya Station on the JR Chuo Line began use of solar panels in March 2012. Hiraizumi Station on the JR East Tohoku Main Line, the second ecoste, began to use solar panels in June 2012, to “generate and use energy locally” and to realize “zero emissions,” i.e., no CO<sub>2</sub> emissions on fine-weather days. We will continue to endeavor to introduce technology using renewable energies efficiently.



Solar panels on the main building at the Akasaka Exit of Yotsuya Station



Solar panels at Hiraizumi 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 2012, we had “greened” a combined rooftop area of approximately 20,074 m<sup>2</sup> in 62 projects.



Rooftop greenery at LUMINE Kitasenju

### Rooftop greening by JR Group companies

We have been promoting rooftop greening to make station buildings in the metropolitan area a place of relaxation for the residents of the community as well as for office workers. The “Soradofarm,” which is a vegetable farm rented to subscribers and built alongside the gardens, serves to create a local community, and provide education in farming and environment through people’s experience in cultivating vegetables. It is popular among many customers and these are now also in Ebisu, Ogikubo and Takasaki.



atre Kawasaki



Soradofarm Ebisu

### 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 through physical measures, including the introduction of highly efficient equipment and facilities, and operational measures, including temperature management of air conditioning and diligently turning off lights.

In addition, given the concerns about energy supply and demand since the Great East Japan Earthquake, we have been actively introducing LED lighting apparatus, which is particularly effective as a physical measure.

### Recognition as Global Warming Countermeasures Establishments

Gran Tokyo South Tower, Gran Tokyo North Tower and the JR Shinagawa East Building were newly recognized on February 17, 2012, as Global Warming Countermeasures Establishments (commonly referred to as top-level establishments or quasi-top-level establishments) under the Tokyo Metropolitan Environmental Preservation Ordinance in recognition of their highly efficient facilities, active management efforts for energy conservation, and commendable CO<sub>2</sub> reduction results. JR Shinagawa East Building was raised to a top-level establishment from a quasi-top-level establishment. Together with Sapia Tower, JR Tokyu Meguro Building and Tokyo Building, all recognized last year, six of our buildings have been recognized as Global Warming Countermeasures Establishments.

The JR Minami-Shinjuku Building and JR Kanda-Manseibashi Building, office buildings to be completed this fiscal year (which ends on March 31, 2013), are also environmentally and energy friendly. On March 2, 2012, the JR Kanda-Manseibashi Building was ranked “S,” the top rank in the Comprehensive Assessment System for Built Environment Efficiency (CASBEE), a system put forward at the initiative of the Ministry of Land, Infrastructure and Transport (MLIT).



Sapia Tower, recognized as a top-level establishment



JR Shinagawa East Building, elevated to a top-level establishment



Gran Tokyo North Tower, recognized as a top-level establishment



Gran Tokyo South Tower, recognized as a quasi-top-level establishment

### Saving energy used by information systems

As part of our effort to save energy in office buildings since FY2010, we have been turning off power for certain information systems equipment during non-use hours. The resulting savings were about 140,000 kWh of power in FY2012, which is especially important with the tight energy supply-and-demand situation since the earthquake in 2011. We also reduced the number of servers by combining equipment, worked to introduce energy-saving products and set our business-use PC terminals to power saving mode. We will continue our efforts to reduce energy consumption further.

### Environmental Measures : A case report

#### LED lighting installed on Yamanote Line

Beginning in December 2010, LED lighting – jointly developed by JR East Group companies – was installed in eleven E231-series cars on the Yamanote Line on an experimental basis, for tests of in-car brightness and LED durability. We will use LED lighting for all E233-series cars to be introduced on the Saikyo and Yokohama Lines in and after fiscal 2014. In this way, energy consumption is expected to be reduced by about 40% compared with conventional fluorescent lights. JR East will continue its train operations using cars even more advanced in their friendliness to the environment.



Inside a car of the Yamanote Line

## Intermodal Transportation = Reduction of total CO<sub>2</sub> emissions for transport

### Promoting Park-and-Ride

JR East promotes “Park-and-Ride” services. 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 2012, 90 JR East stations had parking spaces for ten thousand cars\*. This not only spares customers the delays of traffic congestion, but conveys them reliably to their destination through a more environmentally friendly form of travel.

\* **Parking spaces for ten thousand cars at 90 stations:** 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

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 electronic toll collection as standard equipment on rental cars.

\* **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.

### ■ Intermodal transportation

