

III-3 Other activities related to the environment

III-3-1 Biodiversity

▶ Hometown Forestation Program

In 2004, in order to protect biodiversity and contribute to a sustainable society, while cherishing our sense of gratitude for nature, we began the Hometown Forestation Programs to plant trees native to each region and revitalize the forests.

We undertook these programs with the cooperation of Fukushima Prefecture from 2004 to 2009 and with the cooperation of Niigata Prefecture, the town of Tsunanmachi and Tokamachi and Ojiya Cities in the prefecture from 2010 to 2014 (In 2015, the program was held scheduled for Osaki City, Miyagi Prefecture, but cancelled due to heavy rain). In addition, in other areas served by JR East, we are planting native trees and we shall continue to do the same in the future.



Shinanogawa River Hometown Forestation Program in September 2014

▶ Forest development along railway lines☆

Beginning in 1992, we have been organizing tree planting activities along JR East railway lines. By FY2016 a total of approximately 49 thousand people had participated in planting about 341 thousand trees. Today, planting has gone beyond the trackside and is done in cooperation with local communities.

▶ Development of railway trees

Along some JR East railway lines, we have planted railway trees to shield the tracks from blowing snow and wind. The first railway trees were created in 1893 for disaster prevention. As living disaster prevention facilities, railway forests are playing their role.

JR East now owns approximately 5.8 million railway trees on a total of about 3,900 hectares along our lines at approximately 1,080 locations. The trees absorb 15 thousand tons of CO₂, equivalent to 0.7% of the CO₂ that JR East emits (this is the actual amount in FY2016). In this way, they also contribute to preserving the environment. In 2008, after fundamentally reviewing the role of railway trees from the viewpoints of both disaster prevention and environmental preservation, we launched a new project to plant trees to replace those that will require replacement over the coming 20 years.



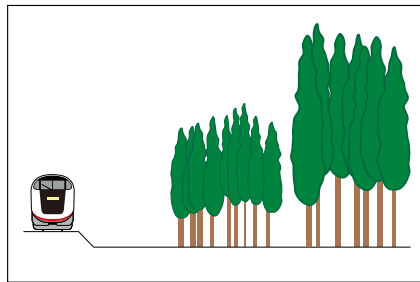
Sashimaki No.1 railway forest on the Tazawako Line (forest to protect against blizzards)



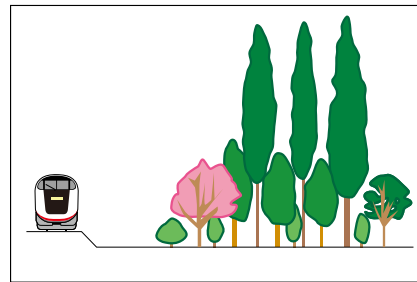
Tenoko No.6 railway forest on the Yonesaka Line (forest to protect against snow slides)

■ Railway trees — From single to multi-variety forests

Traditionally, railway trees were of a single variety, primarily cedar trees, because another function, in addition to protecting against natural disasters, was to generate profits through the production of timber. This has recently been less successful, however, as the demand for domestic timber has declined. In future tree replacement, we will plant several varieties suitable for the local climate and develop them to be more sustainable and ecologically resilient.



Conventional railway trees (single variety such as cedar trees)



New railway trees (mixture of different varieties of trees)

■ Planting new railway trees

Ceremonies for the planting of new railway trees have been held in various locations, as shown in the table below, starting with the Kakizaki No. 1 railway forest in September 2008. During these ceremonies, native tree species were planted, with many local residents and participants from organized tours participating.

Date	Location
September, 2008	Shin-etsu Main Line, Kakizaki No. 1 railway forest
July, 2009	Ōu Main Line, Okitama No. 2 railway forest
May, 2010	Ōu Main Line, Jinguji No. 2 railway forest
September, 2012	Tazawako Line, Ōkama No. 1 railway forest
September, 2013	Ōu Main Line, Sekine No. 1 railway forest
September, 2014	Uetsu Main Line, Hirakida No. 3 railway forest
September, 2015	Ōu Main Line, Kado No. 6 railway forest

Past Tree Planting Ceremonies



Tree planting ceremony for Kado No. 6 railway forest on Ōu Main Line (September 5, 2015)

III-3-2 Basic thoughts on noise reduction

▶Improvement of the environment along railways

In the operation of trains, noise is created by the train cars moving through the air, by the wheels travelling on the rails, by the motors, and by other sources. In order to reduce noise, we are working in various ways to improve both the trains and our ground equipment.

JR East also endeavors to reduce noise during maintenance work on track and structures to further improve the lineside environment.

▶Measures for the Shinkansen

In accordance with the Japanese government's Environmental Quality Standards for Shinkansen Superexpress Railway Noise, JR East has taken many steps to reduce this noise, such as with the installation of soundproof walls and sound-absorbent materials, rail grinding*1 and the modification of our railcars to operate more quietly. We have already completed the implementation of measures to reduce noise levels to 75dB or lower in densely populated residential areas along our railway lines. At present, we plan countermeasure construction for the other areas in incremental steps. Also, based on the knowledge gained from running tests using the Shinkansen "FASTECH" test train, JR East is working to improve the environment even as we increase train speed, including further reduction of noise and micro-pressure waves in tunnels*2.

*1 Rail grinding A measure to smooth out uneven places in rails caused by wheel movement. This reduces noise by controlling car vibration.

*2 Micro-pressure waves in tunnels An explosive sound caused by forced air compression.



E5 Series trains have low-noise pantographs

▶Measures for conventional lines

We have implemented measures for conventional lines to minimize noise, such as installation of long rails*1, rail-grinding and wheel-truing*2. We also comply with the Japanese government's Policy on Noise Measures for Construction of New Conventional Railways or Large-Scale Remodeling when we engage in this kind of construction or modification of our conventional lines.

*1 Installing long rails Rail joints are welded such that the length of a single rail becomes more than 200 meters. With fewer rail joints, these rails reduce noise produced at joints when trains pass.

*2 Wheel truing A measure to grind the unevenness of wheels caused by wear, to restore their circular shape.

▶Measures for maintenance work

As maintenance work is usually done during the night, we give advance notice to residents in surrounding areas about the schedule and details of the work. We also make utmost efforts to minimize noise by using modified equipment that produces lower noise. Furthermore, by using a track that is designed to resist deformation, JR East is reducing the volume of required maintenance work.

III-3-3 Improvement of the Environment along Railway Lines

▶ Restricting use of herbicides

Safe train operations require regular removal of weeds along railway lines. While we generally remove them manually, we also use a certain amount of herbicide. We keep the usage of herbicides to a minimum in both volume and range of use. When selecting herbicides for use, we select those from the safest of the three levels of toxicity to humans and animals, and from Category A, the safest of the five levels of toxicity to fish.

▶ Harmony with the landscape

Given that construction of a large-scale railway facility or its remodeling greatly affects the local area and surrounding environment, JR East endeavors to harmonize its completed facilities with surrounding landscapes and natural environments. In the fiscal year ended in March 2012, Agatsumagawa Bridge No. 3 received the Tanaka Award (for excellent bridge work or bridge engineering) from the Japan Society of Civil Engineers, in recognition of a landscape in harmony with the surrounding environment and the national road parallel to the bridge. Our efforts are indeed well recognized outside of the company.

For the Senseki Line, which resumed full operation in May, 2015, we gave extra consideration to the design, such as incorporating very wide spans for bridge piers and curving the under-beams so as to match the special scenic beauty of Matsushima in the relocated and restored section.



Agatsuma Line Agatsumagawa Bridge No. 3



Senseki Line (between Nobiru and Rikuzen-Ono)

III-3-4 Chemical substance management

▶ Compliance with laws and regulations and reduction of chemical substances

When using chemical substances, the effects on human health and ecological systems must be fully considered. The JR East not only rigidly adheres to established standard values, but restrict the use of such substances and adopt substitutes that have less impact on the environment

▶ Reducing and replacing ozone depleting substances☆

We endeavor to reduce the use of substances specified as controlled substances under the Ozone Layer Protection Law and adopt substitutes that have less impact on the environment. Moreover, The Act for Rationalized Use and Proper Management of Fluorocarbons (The Revised Fluorocarbons Recovery and Destruction Law) came into effect on April 1, 2015 requiring regular inspections, reporting of leakage amount, etc. We have been responding appropriately in accordance with the intent of the revised law. Under the Act for Rationalized Use and Proper Management of Fluorocarbon, we reported a leakage amount of around 6 thousand t-CO₂e for FY2016.

- Cooling units (large refrigerators) – Having steadily replaced air conditioning units using specified chlorofluorocarbons (CFCs) with systems that do not use them, we completed the removal of such units from buildings by the end of FY2008.
- Rolling stock – Except for some diesel railcars, all of our cars use CFC substitutes. As of the end of March, 2016 we were using 1.2 tons of CFCs and 86 tons of CFC substitutes. We routinely check for gas leaks, and collect the refrigerants when scrapping retired railcars in accordance with applicable laws and regulations.
- Fire-extinguishing agent – Although 70 tons of halon gas was still in use as a fire-extinguishing agent as of the end of March, 2016, we have it under proper control and are replacing it with non-halon agents (such as powder agents and CO₂) when building new facilities or renovating existing ones.

▶ Chemical substance management☆

As JR East uses chemical substances primarily for painting and repairing our railcars, we take rigorous steps for their use and management in order to prevent spills. We are a company that handles a certain amount of specified chemical substances, and 15 JR East facilities submitted the data regarding the release and transfer of these substances to relevant authorities in FY2016, pursuant to the PRTR System.

We have also been introducing stainless steel railcars that do not require painting. At the end of FY2016, as many as 86.1% of the 10,579 cars operated on our conventional lines were stainless steel railcars. Beside their use for railcars, we used 429 tons of organic solvents for painting railway facilities and stabilizing track beds in FY2016.

*PRTR system A system where companies notify their releases and transfers of chemical substances as required by the PRTR Law. It encourages the monitoring and control of toxic chemical substances emitted into the environment and measures to prevent negative impact on the environment.

■ Amount handled, released and transferred from 15 reporting-required facilities (kg)

Chemical substance	Handled	Released into air	Released into sewerage	Transferred to other facilities
1,2,4-Trimethylbenzene	83,072.7	1,205.3	0.0	2,079.4
Xylene	79,438.1	6,872.0	0.0	180.1
Chromium and Chromium(III) compound	2,967.8	0.0	0.0	59.0
Styrene	1,100.0	1,100.0	0.0	0.0
Toluene	15,387.0	6,490.0	0.0	86.2
Nickel	3,401.6	0.0	0.0	0.0
n-Hexane	2,574.0	310.0	0.0	0.0
Methylnaphthalene	68,906.3	342.4	0.0	0.0
Molybdenum and its compounds	1,428.6	10.0	0.0	0.0
Total	258,276.1	16,329.7	0.0	2,404.7

▶ Management of PCBs (polychlorinated biphenyls)

Equipment containing PCBs is securely stored in exclusive storage locations and reports on it are filed as required by the Law Concerning Special Measures against PCB waste. We render this equipment harmless to the extent that can be done by PCB waste treatment facilities. In the fiscal year ended March 2016, we had equipment such as transformers and capacitors treated at PCB waste treatment facilities.

III-3-5 Environmental Communication

▶ Railway Museum Environment Seminar

Since 2011, we conducted the "Seminar on Environmentally Friendly Railways" for elementary school children at the Railway Museum. Along with learning about global environmental problems, they were shown the importance of recycling by separating trash at a station and on the train.



Seminar on Environmentally Friendly Railways at the Railway Museum

▶ Development of Environmental Education by Delivering Lectures on Request

In the fiscal year ending March 2010, to contribute to the development of a sustainable society, JR East initiated environmental education programs for children. They will lead the next generation and they need to understand environmental issues and their relationship to society. The program aims to help children understand the environment and life through materials related to railways. In FY2016, the program was implemented at 61 schools, primarily elementary schools, in the JR East area. We intend to continue the program.



Delivering Lectures



※As of August 1, 2016. The area names have been created for JR East internal use. Photos are the contact persons for each area.

► Environmental Events in Cooperation with Other Companies

We cooperate with other firms to stage environmentally themed events, for the purpose of explaining JR East's environmental preservation activities, and communicating directly with customers. In February 2016, we held an event in collaboration with NTT Group which successfully appealed to a large number of customers through a variety of activities, including panel displays introducing both companies' environmental initiatives, participatory events that enabled people to learn about the environment while having fun, and model exhibits

► Initiatives for: environmental activities of the Shinanogawa Power plant

In July, 2016, we opened the "Citizen house; Ojiya Shinanogawa Hydraulic Plant House" as a part of popularization activities for the Shinanogawa Hydraulic Power Plant to give the opportunity to learn about the mechanism of hydraulic power generation which is a source of clean energy. On top of that, we continue the release of juvenile fish as a part of initiatives to harmonize the water usage and the river environment of the Shinanogawa river with the people of the local community.



Ojiya Shinanogawa Hydroelectric Plant House

► Public Relations on Environmental and Societal Activities

To present JR East's activities for the environment and society in an accurate, easy-to-understand manner, we published our first Annual Environmental Report in 1996. Its title was changed to "Sustainability Report" in 2002, and to "CSR Report" in 2013. We also communicate about our environmental activities through newspapers, magazines, and other media, as well as JR East's websites, posters and pamphlets.



Advertisement – poster with overview of "Environmental initiatives"



Pamphlet – "Eco-Station model station"



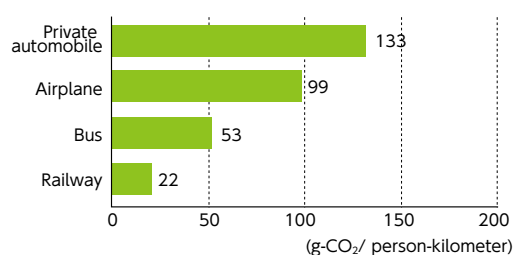
Website – "Environmental activities"

Environment superiority of railway

Among the transportation sectors, the railway is a transportation method having environmental superiority because its CO₂ emission rate is low compared to its transportation volume. In FY2015, CO₂ emission volume per unit transportation volume, for private automobile was 133g-CO₂/ person-kilometer, and for railway it was 22g-CO₂/ person-kilometer.

From now on, JR East pursues improving the environmental superiority of railways for customers through various environmental events, and promotes railway usage. And we contribute to the establishment of a sustainable society.

■ CO₂ emission volume per unit transportation (passenger)

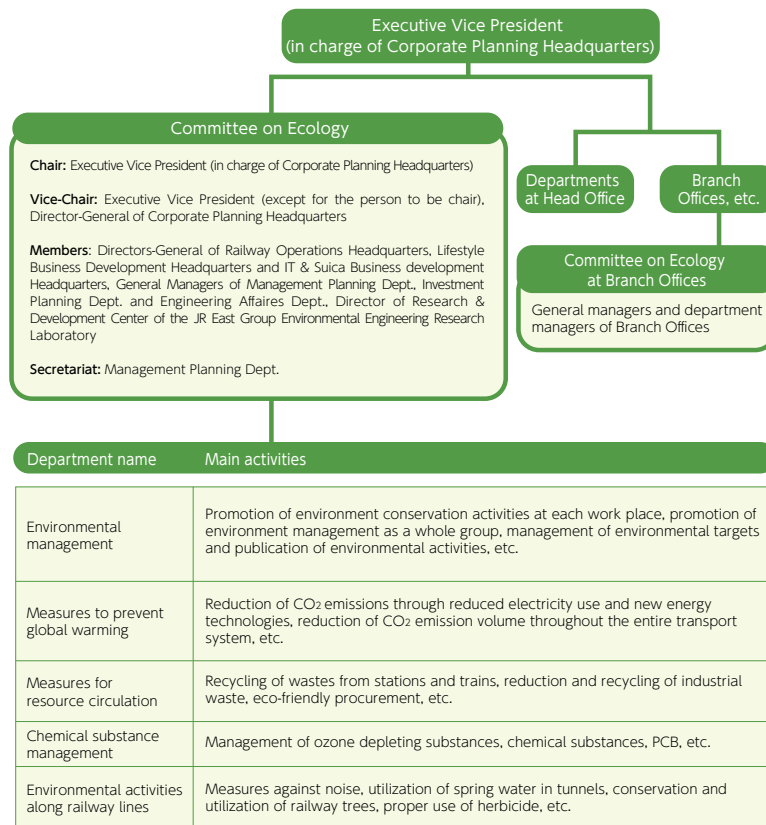


Source: Ministry of Land, Infrastructure, Transport and Tourism (MLIT) website (FY2015)

III-3-6 Environmental Management Structure

Established in 1992 as a top management organization to promote environmental activities and chaired by the executive vice president of JR East, the Committee on Ecology Promotion surveys the environmental impact of business activities, sets environment-related targets, implements environmental conservation activities and monitors progress toward target achievement, which is also examined by top management. In July 2010, the "Environmental Management Office" was established in our Management Planning Dept., and oversees environmental management for the entire JR East Group.

Organizational structure to promote environmental management (as of April 1, 2016)



▶ Creating an environment-conscious culture

JR East believes that it is important to promote environmental activities with clear goals established for the entire JR East Group, and to have every employee actively involved. We are expanding the scale of our environmental activities by promoting "JR East Eco Activities" at each work place, developing leaders through environmental education, and sharing recognition of outstanding environmental efforts through the presentation of awards.

Concrete example of initiatives (Green curtain activity conducted by employees)



Shinkansen concourse of Kumagaya station



Maebashi station



shin-Maebashi transport area

▶ In-house environmental education

For effective environmental management, it is essential that all employees have appropriate knowledge on environmental issues. We provide environmental education lectures to our employees in training in order to develop environmental activists in the local organization of JR East and group companies. Through these lectures, we aim to expand the scale of our environmental activities. In FY2007, to enhance environmental activities at each group company, we began an "Environmental management training" program for people in charge of environmental matters in those companies.

■ Environmental education & training system

Education of environmental-activity promoters at organizations of JR East and group companies
Environment management expert training
<ul style="list-style-type: none"> ● Persons trained: those responsible for environment at local organizations, etc. ● Objective: improvement of ability in environment-related matters as trainers to field offices, etc. ● Number of participants: 14
Environment countermeasures of Shinkansen practical training
<ul style="list-style-type: none"> ● Persons trained: those responsible for environment at each Branch Office ● Objectives: learning of basic knowledge about relevant rules and regulations for noise and vibration ● Number of participants: 8
JR East Group Environmental Management Promotion Conference
<ul style="list-style-type: none"> ● Persons participating: those in environmental departments at all group companies ● Objective: promotion of environmental management for the entire JR East Group
Implementation of training and lectures in Branch Offices

▶ Internal environmental audits

At our General Rolling Stock Centers and others which obtained ISO 14001 certification, in-house auditors are trained through external training programs, and conduct routine audits at the centers in order to evaluate environmental activities.

■ ISO14001-certified facilities

Certified facilities	Year and month of certification	Certified facilities	Year and month of certification
(JR East)		(Group companies)	
Kawasaki Thermal Power Plant	Mar-01	East Japan Eco Access Co., Ltd.	Nov-99
Tokyo General Rolling Stock Center	Mar-01	Nippon Restaurant Enterprise Co., Ltd. (CK headquarters)	Sep-02
Omiya General Rolling Stock Center	Feb-02	JR East Mechatronics Co., Ltd.	Mar-08
Shinkansen General Rolling Stock Center	Nov-02	East Japan Marketing & Communications, Inc.	Aug-08
Koriyama General Rolling Stock Center	Dec-03	JR East Rail Car Technology & Maintenance Co., LTD.	Dec-10
Nagano General Rolling Stock Center	Feb-05	Japan Transport Engineering Company	Oct-14
Akita General Rolling Stock Center	Jul-05		

▶ Compliance with environmental laws and regulations

There were no major violations of environment-related laws and regulations resulting in penalties in FY2016.