

# Global environment



## Looking ahead to the next 30 years of environmental change

### Responsibility for the global environment and our strengths

Amid growing interest in the Sustainable Development Goals (SDGs) and dramatic change in the corporate business environment, in 2020 the Paris Agreement gathered momentum and companies are now expected to voluntarily adopt initiatives to protect the global environment, in areas including energy, natural resources and biodiversity. Spurred on by the EXPO 2025 OSAKA, KANSAI, JAPAN, the Kansai region in particular is likely to become the focus of further calls for companies to take a lead in addressing environmental issues.

Railways have good energy efficiency and are environmentally sound compared to other modes of transportation. However, as moves toward a post-carbon, circular society accelerate, our responsibility as a Group that uses a significant amount of energy to provide transportation services will only increase. We also recognize that the whole Group must work together to resolve environmental challenges associated with business sustainability, including addressing increasingly severe natural disasters and making effective use of sustainable natural resources.

At the same time, JR-West Group is uniquely positioned to help reduce CO<sub>2</sub> emissions across the entire transportation network by encouraging even more customers choose to travel by rail, which has a low environmental footprint. The whole Group is committed to working together to protect the global environment and contribute to the realization of a society in which sustainable development is possible.

### Steadily advancing initiatives to achieve environmental targets

As well as our existing initiatives such as making further energy savings in railcars and station facilities, promoting low-energy operation of trains, and recycling and other measures to build a circular society, we are promoting initiatives to cut waste, including reducing food loss. We are also working hard to achieve the environmental targets established in conjunction with the JR-West Group Medium-Term Management Plan 2022, including mitigating the impact of our operations on the natural environment and ecosystems.

It goes without saying that we will need to continue steadily achieving our environmental targets, while also deepening consideration from a long-term perspective, incorporating the supply chain.

### Setting even higher targets to help realize a post-carbon, circular society

We recognize that in future, we will need to formulate longer term targets and strategies, and deepen environmental consideration in the supply chain. We will contribute to realizing a circular society through mitigation<sup>1</sup> and adaptation<sup>2</sup> initiatives that take account of climate change over the medium- to long-term, and measures to eliminate plastics and cut food loss, including in the supply chain.

The novel coronavirus pandemic has already brought about a shift to a “new normal.” Looking ahead to changes in the business environment that will occur over the next 30 years, we will continue to draw on our strengths as we protect the global environment and help to realize a sustainable society through our business activities.

<sup>1</sup> Mitigation: Action to reduce and offset greenhouse gas emissions

<sup>2</sup> Adaptation: Preventing and reducing the impacts of climate change, and promoting use of the new climate conditions

### Environmental targets

<b>Energy consumption intensity (vs. FY2014)*</b> <b>FY2023 target</b> <b>FY2020 actual</b> −3.0%    −4.1%	<b>Percentage of energy-efficient railcars</b> <b>FY2023 target</b> <b>FY2020 actual</b> 88.0%    89.2%	<b>Station and onboard garbage (recyclable) recycling rate</b> <b>FY2023 target</b> <b>FY2020 actual</b> 96.0%    99.3%
<b>Railway material recycling rate (facility construction)</b> <b>FY2023 target</b> <b>FY2020 actual</b> 97.0%    98.6%	<b>Railway material recycling rate (rolling stock)</b> <b>FY2023 target</b> <b>FY2020 actual</b> 92.0%    95.5%	<b>Promote environmentally friendly stations and office facilities</b>

\* One unit is the amount of energy used to move a train car one kilometer. Tracking these units enables us to gauge our energy efficiency

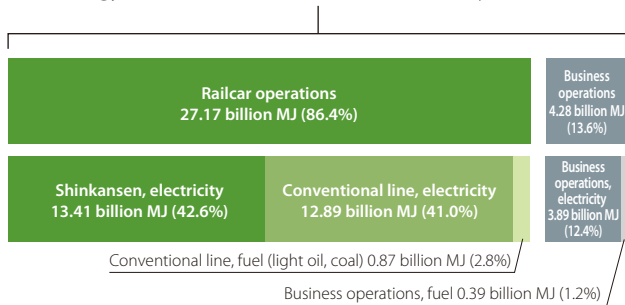
## Encouraging Think-and-Act eco-mindsets among individual employees

### Promoting energy-saving operation by enhancing driving skills

Energy-saving driving involves reducing the time trains spend accelerating, as much as possible, in order to save the significant amount of energy expended, while lengthening the distance traveled using inertia, thereby cutting energy consumption. To help reduce the energy used for train

#### ● JR-West overall energy consumption in the railway business (FY2020)

Total energy consumed **31.45 billion MJ** (o/w electricity: 30.18 billion MJ)



operation, which accounts for most energy consumption in our railway business, we will introduce highly energy-efficient trains while also striving to achieve energy-saving driving.

We have drawn up manuals stipulating details including the timing of acceleration and braking within the travel time between different stations, and improving the operating skills of drivers will result in energy savings. When drawing up these manuals, discussions in the workplace provide an opportunity for the drivers to share their own skills and devise ways of improving driving techniques. This results in optimal driving methods, in terms of safety and travel comfort as well as energy conservation. We are also promoting a system that enhances driving skills in a spirit of friendly competition, with each driver disclosing their own driving skills on a forum within the internal network.

The promotion of energy-saving driving by each employee helps to reduce the energy consumed for train operation without relying solely on the energy-saving performance of trains or equipment.

#### Making energy-saving driving part of the workplace DNA

##### Yasuhiro Hanato

Train Driver, Morinomiya Train Driver's Unit, Osaka Branch,  
Kansai Urban Area Regional Head Office

We verify the optimal energy-saving driving methods and create inter-station manuals.

While it's possible to make desktop calculations using operation data output by the train, even a difference of a few seconds in actual operation leads to wide differences in driving methods. Because of this, the manuals are created based on trial-and-error feedback from many drivers, with adjustments being made to the theoretical figures.

The hard part is making sure everyone is familiar with the manual. Simply enforcing driving in accordance with the manual doesn't allow the driver to incorporate their own experience and ideas. While using the manual as a guide, we do things like raising the topic in conversation so that each person repeats their own process of trial and error, and we regularly establish inter-station segments in which to strengthen energy-saving operation, and inform drivers about this. After 10 years of steady activities, I feel that energy-saving operation has now become part of the workplace's DNA.



Going forward, we will keep up our efforts to make further advances in energy-saving operation, using driving data to encourage quantitative improvements at the individual level.

#### Sharing expertise to improve Shinkansen team skills

##### Shinya Takechi

Train Driver, Osaka Shinkansen Driver's Unit,  
Shinkansen Operations Division

With safety at the foundation, we are working hard to achieve energy-saving operation while taking into consideration factors such as the weather conditions and the operation status of other trains. To improve my own energy-saving driving skills, I review my own experience and repeat a process of trial and error by exchanging information with my colleagues, and in this way, I've built up expertise in this area.



I think it's important for more and more drivers to promote energy-saving driving, and I actively share related information with my colleagues and encourage them to consult with me.

I've also been able to use the forum on the internal network to share expertise with other workplaces. Also, we receive feedback from the back-office section about energy consumption volumes, and knowing how we're helping to protect the environment acts as further encouragement. The Shinkansen team will continue working together to practice energy-saving operation, through cooperation both within our own workplace and with other sections.

## Initiatives to prevent global warming (energy-saving)

### Eco stations

#### Active use of the Eco Station Design Guidelines

Efforts in recent years to make our stations more accessible with barrier-free facilities and safer with automated platform gates have tended to increase the amount of electricity needed to operate the stations. To address this, we created our own Eco Station Design Guidelines in order to define the “eco station” and share environmental awareness. As a result, employees from different departments/divisions are able to share awareness of eco stations, and we are promoting the building of comfortable, environmentally sound eco stations with features such as energy-saving lighting, solar power generation, rainwater use and green roofs.

The JR Kobe Line’s Maya Station, which opened for operation in March 2016, operates on roughly half the amount of electricity of other stations of its size. Going forward, we will seize opportunities to open and enhance stations, and continue in our efforts to realize eco stations while actively employing the Guidelines.



Eco Station Design Guidelines

#### Realization of Zero Energy Station (ZES)

In December 2019, Higashihama Station on the San-in Main Line, which is a stop for the Twilight Express Mizukaze luxury train, became the Company’s first Zero Energy Station (ZES). The ZES is a type of station defined by the Company that only uses natural energy to power station equipment on sunny days,\* such as lighting and air conditioning. A solar cell and storage battery installed near the station building provide the entire power needed for the station’s equipment, equivalent to around two typical households (20 kWh/day).



Solar cell powering a ZES

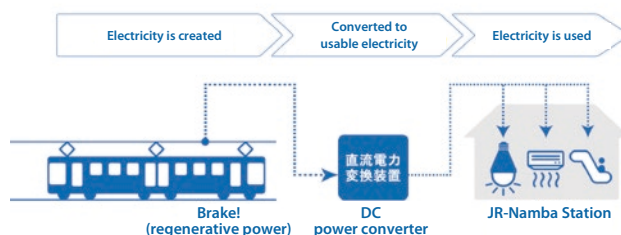
\* Sunny day: A day on which the hours of sunlight are at least 40% of the possible hours of sunlight (sunrise to sunset) (Japan Meteorological Agency definition)

#### Active use of regenerative electric power

In February 2020, following on from Maya Station, we installed a second DC power converter at JR-Namba Station on the Yamatoji Line. JR-Namba is an underground station that is constantly in operation, day and night. This device converts the regenerative power (direct current) generated by train braking into power (alternating current) that can be used by the station, and by making effective use of the power lost as heat, energy

usage is cut by the equivalent of around 40 typical households (400kWh/day). An eco monitor installed close to the ticket gate also allows customers to see the energy conservation benefits.

#### Visual image of regenerative power use



#### Eco monitor



#### Working to create environment- and employee-friendly equipment

**Yohei Sonoda**

Innovation Department  
(now Assistant Manager, Fukui Electric Construction Office)

However small its impact on the environment, equipment that requires complex construction or maintenance is not desirable. When designing Higashihama Station, we coordinated the specifications and configuration of the facilities through a dialogue with local operations, Group companies and partner companies in order to minimize the impact of construction work and future maintenance. Since the press release, we have also received more inquiries from other companies. I can really sense how these initiatives have been propelled forward.

When deploying additional eco stations in the future, it will be important to broaden our vision by rethinking the approach to the equipment itself in order to achieve a total reduction in energy, rather than simply switching to equipment with low power consumption. Besides energy conservation, my aim is for us to develop technology that can resolve multiple issues at the same time, including saving labor.



## Contributing to a circular economy (resource preservation)

### Cutting food losses to as close to zero as possible

At Hotel Granvia Okayama Co., Ltd, a large number of meals are served at banquets and in the restaurant. In an initiative to cut food waste that started in 2010, we ask customers in detail beforehand about the type and quantity of food they require for their banquet, and the restaurant then orders an appropriate quantity based on the envisaged food preferences and volumes, taking into account factors such as the age range of the guests. Methods are also devised to make sure that just the right amount of food is served without any being left over: for example, only taking out and preparing the required quantities of ingredients, which are stored in small portions, based on the number of people on the day and the volume of food remaining. In addition, information is provided to customers about the 3010 Movement,\* which aims to reduce the volume of leftovers, and all staff are making concerted efforts to cut food loss.

In order to make more effective use of food waste in future, we will deliver food waste to a biomass power generation facility that a local operator plans to launch in 2021, to be employed in biomass power generation using methane fermentation. With this initiative, we hope to recycle 100% of food waste. We will continue working hard to cut food losses to as close to zero as possible.

\* 3010 Movement: A campaign that aims to reduce the amount of food waste at banquets and parties. It encourages guests to establish a time specifically for eating and enjoying the food that is served, in the first 30 minutes and final 10 minutes of the event.

### Cutting food loss through collaboration and ingenuity

**Shota Takahashi**

Chief of Planning Section, Planning Department,  
HOTEL GRANVIA OKAYAMA CO., LTD.

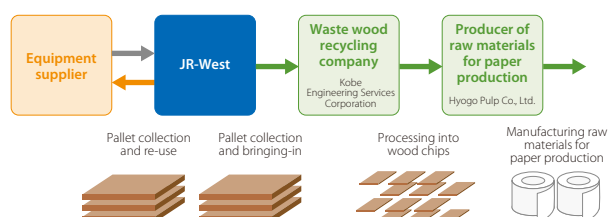
Our company is organized with reducing food loss in mind. For example, we have a Preparation Department, which is rare for hotels of this size. However, for this to be effective in practice, it is essential for information to be shared quickly and accurately between departments, and for each employee to devise their own creative methods. When we started this initiative 10 years ago, the Sales Department didn't ask customers in detail about their food requests, and the Cooking Department had insufficient awareness of the cost of ingredients. I provided information about the social importance of cutting food loss, as well as the reductions achieved in electricity, gas and waste, using notice boards and other means, and encouraged each individual employee to implement the initiatives being tackled throughout the hotel. This has been an accumulation of slow and steady efforts, and in fiscal 2020 we reduced food waste by about 35% compared with fiscal 2011. Currently,

there are fewer banquets and parties taking place due to the coronavirus pandemic, but we intend to think about what we can do now and take action accordingly.



### Recycling and reuse in cooperation with the supply chain and local businesses

Business partners who supply materials/equipment used in the Group's railway business are asked to protect the environment in their business activities and cooperate with our Green Procurement Guidelines. As well as the supply chain, we are working with local businesses to re-use the wooden pallets used to transport equipment for the railway business, or to recycle them as the raw material for pulp production. In this way, we are making effective use of resources while cutting costs.



### Helping to build resource circulation systems in cooperation with communities

**Akinobu Kato**

Manager, Finance Department



Wooden pallets have occasionally been incinerated, which has both an environmental and economic impact. To address this, we collect wooden pallets from local work units and Group companies affiliated with the Truck and Structure division, and recycle them as wood chips for pulp production in cooperation with related business operators, thereby mitigating the environmental impact. Also, in collaboration with Kyodo Printing Co., Ltd., who supply us with train tickets, we are promoting effective use of resources, such as re-using the wooden pallets used to deliver products, wherever possible.

Consideration for the environment is an important issue, but it means little without sustainable systems. Having pursued cost benefits in our day-to-day operations, we have achieved a cost reduction of around 80%. We aim to expand our initiatives to other divisions and promote the inclusion of the supply chain in these initiatives, and over time help to build resource circulation systems in cooperation with local communities.