

13th UIC Sustainability Conference



Technical development for energy saving
and introduction to a new station



Example of Eco-project in
Maya Station

*Kazutaka Matsumaru
West Japan Railway Company
(Japan Railways Group Paris Office)*

12, 13, 14 October 2016

Corporate overview

● June 1949

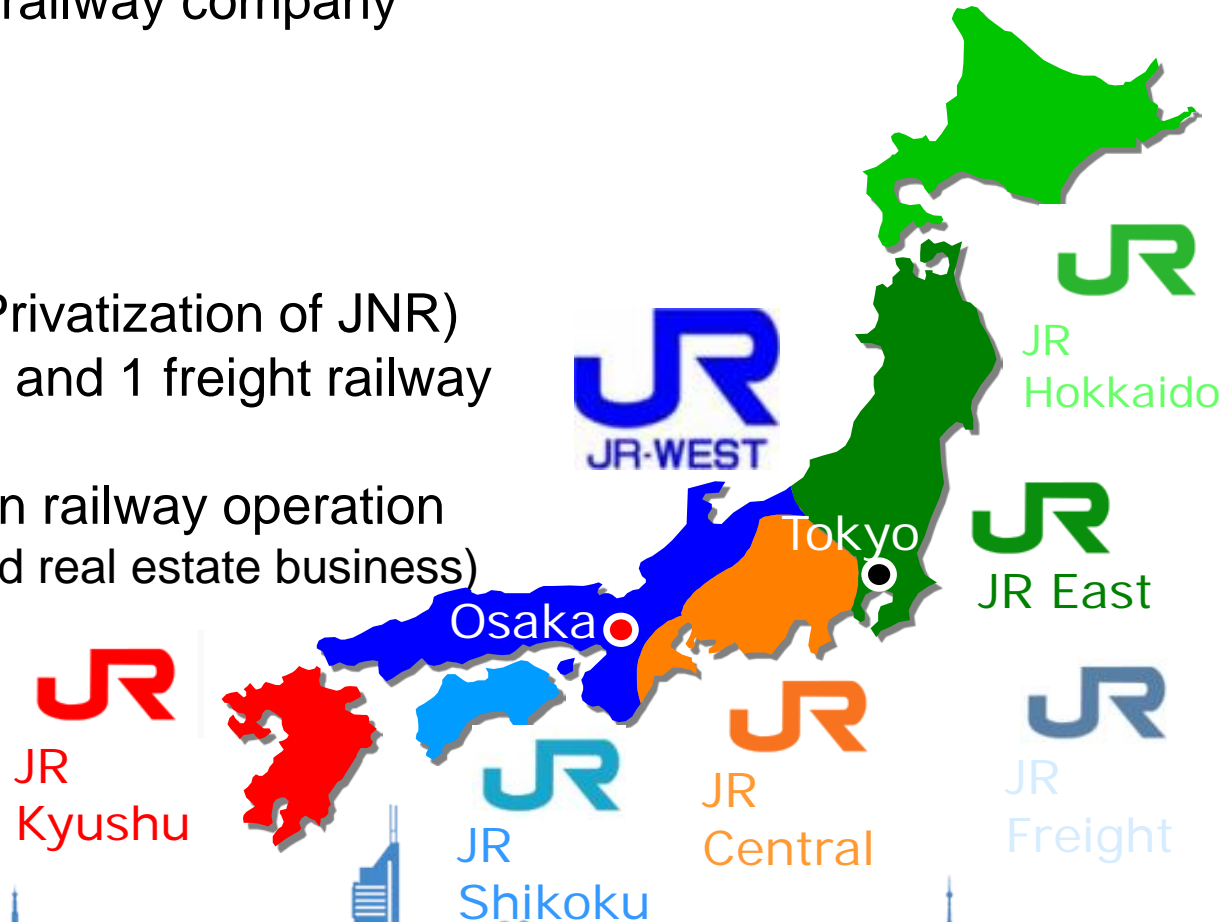
Foundation of Japanese National Railways (JNR)

- Government-owned railway company
- Railway operation

● April 1987

Establishment of JR (Privatization of JNR)

- 6 passenger railways and 1 freight railway
- Railway operation
- Businesses other than railway operation
(e.g.) retail business and real estate business)



Corporate overview



Employees

JR-West 26,886
JR-West Group 47,565

Businesses

- Transport
- Retail
- Real estate
- other businesses

Subsidiaries

144
(incl. 64 consolidated subsidiaries)

Number of passengers
1,837 million/year
(5 million/day)

stations
1,195

passenger cars
6,611

Total route length
5,007.1km



Passenger-kilometers
total (year)
56,078 million

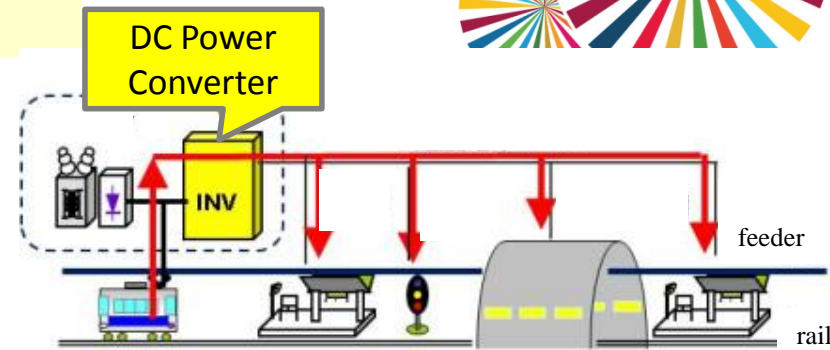


Development for Energy Saving



◎Supply regenerative electric power to stations (DC power converter)

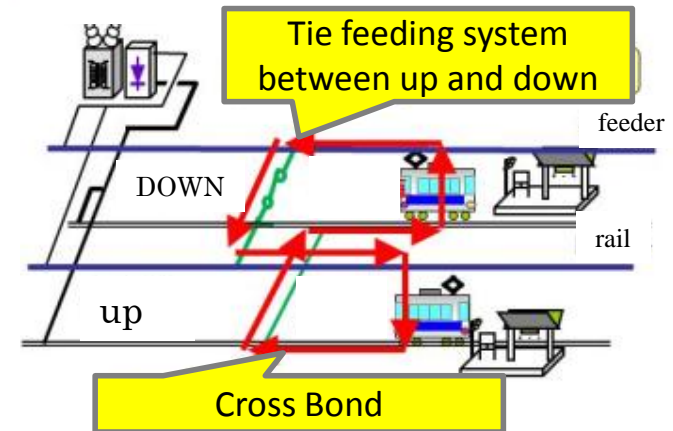
- Supplying DC regenerative electric power to lights in stations and power of signaling etc
- Effective for preventing the loss of regenerative power



◎Tie feeding system between up and down line (change of feeding system)

- Supply regenerative electric power to power running vehicles nearby
- Reduce the loss from regenerative vehicles or traction substations to the vehicles while power running

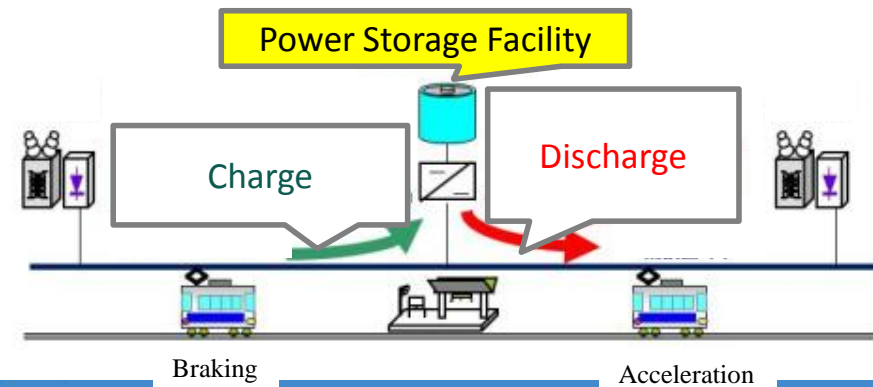
※ 7 systems are applied for 4 lines.



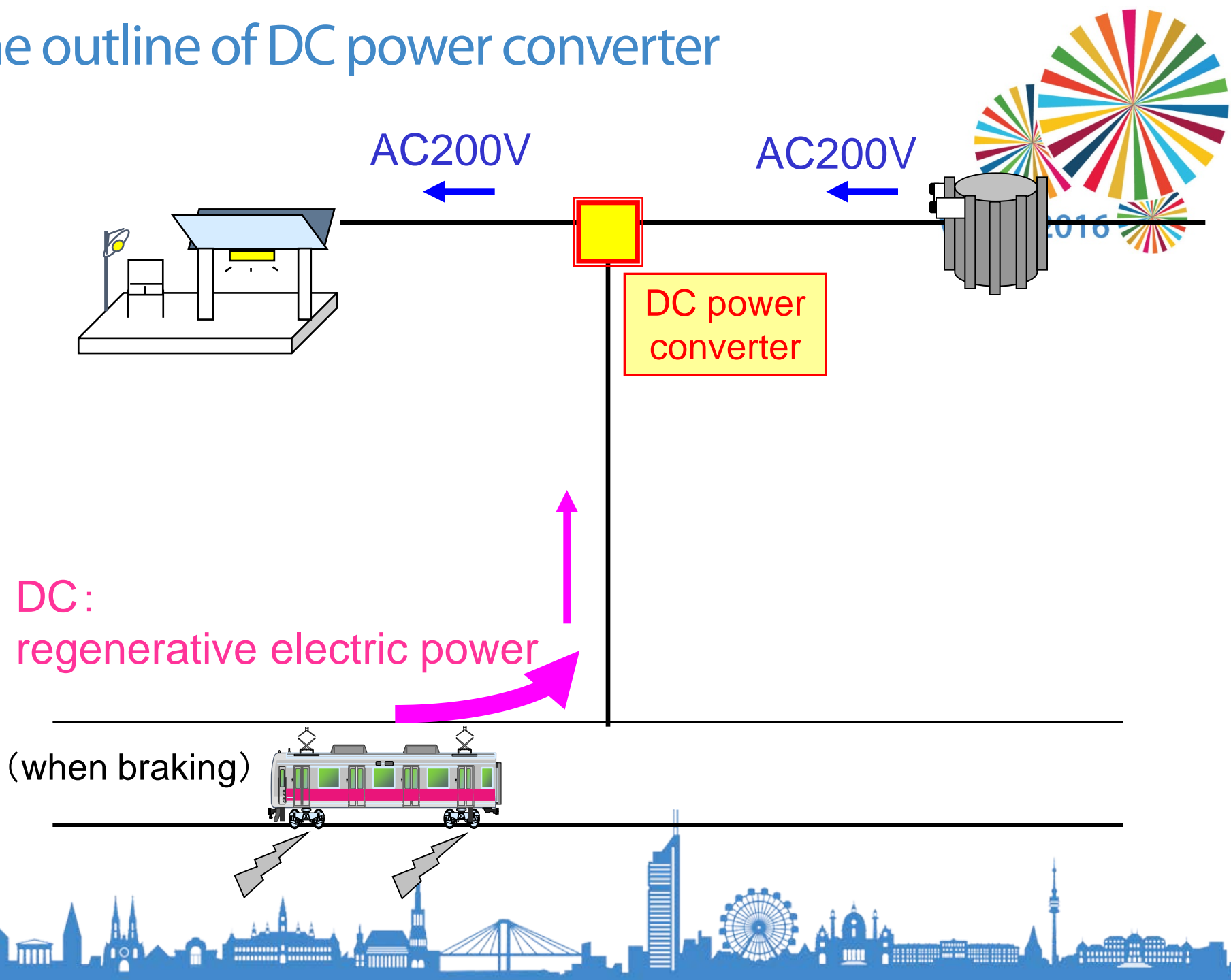
◎Power storage facility

- When braking, regenerative power is saving and used when accelerated running
- Reducing voltage drop and preventing loss of regenerative power
- Use of lithium-iron battery

※Hokuriku line : 1 (Shin-Hikita substation)



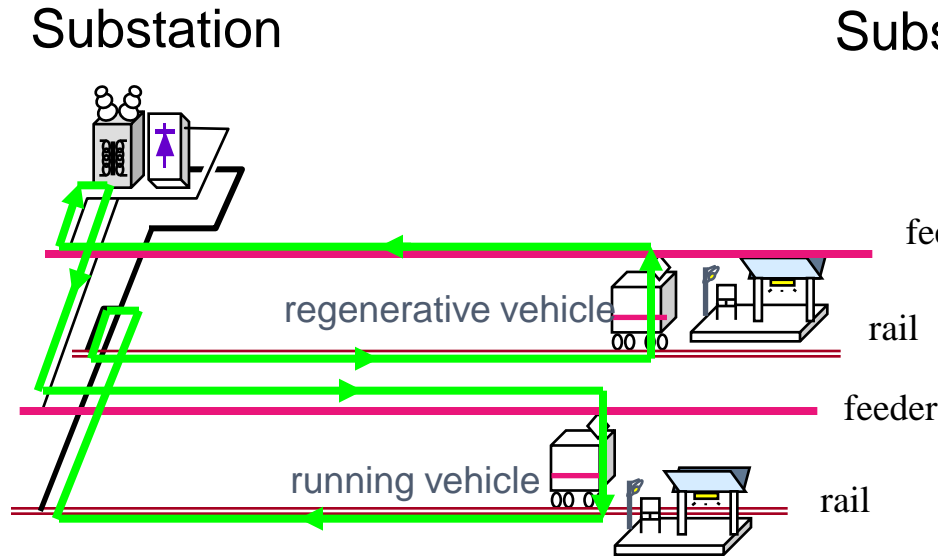
The outline of DC power converter



The outline of tie feeding system between up and down line



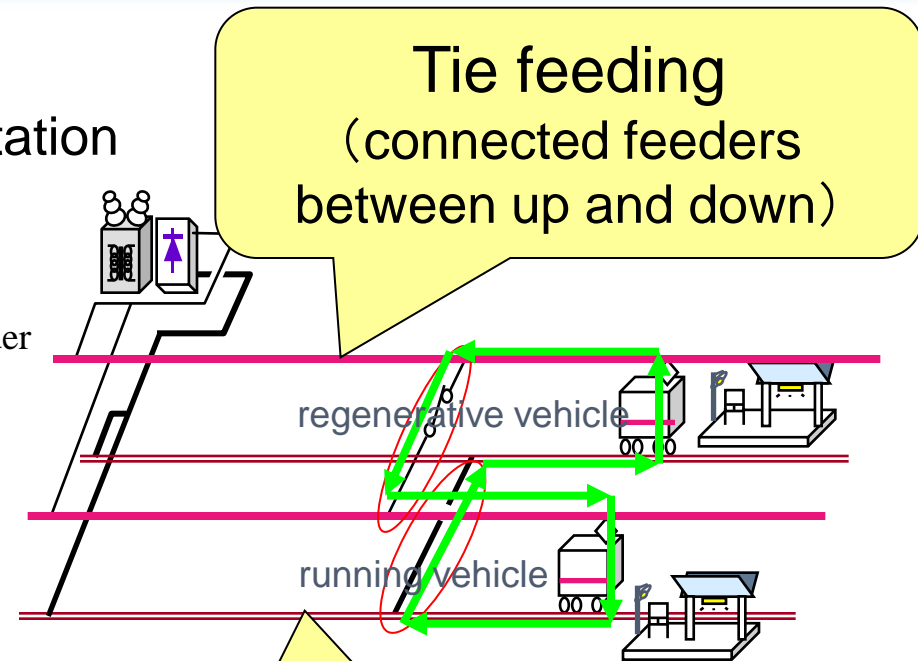
Before



→ The energy flow from regenerative vehicle

Tie feeding system + Cross bond

Substation

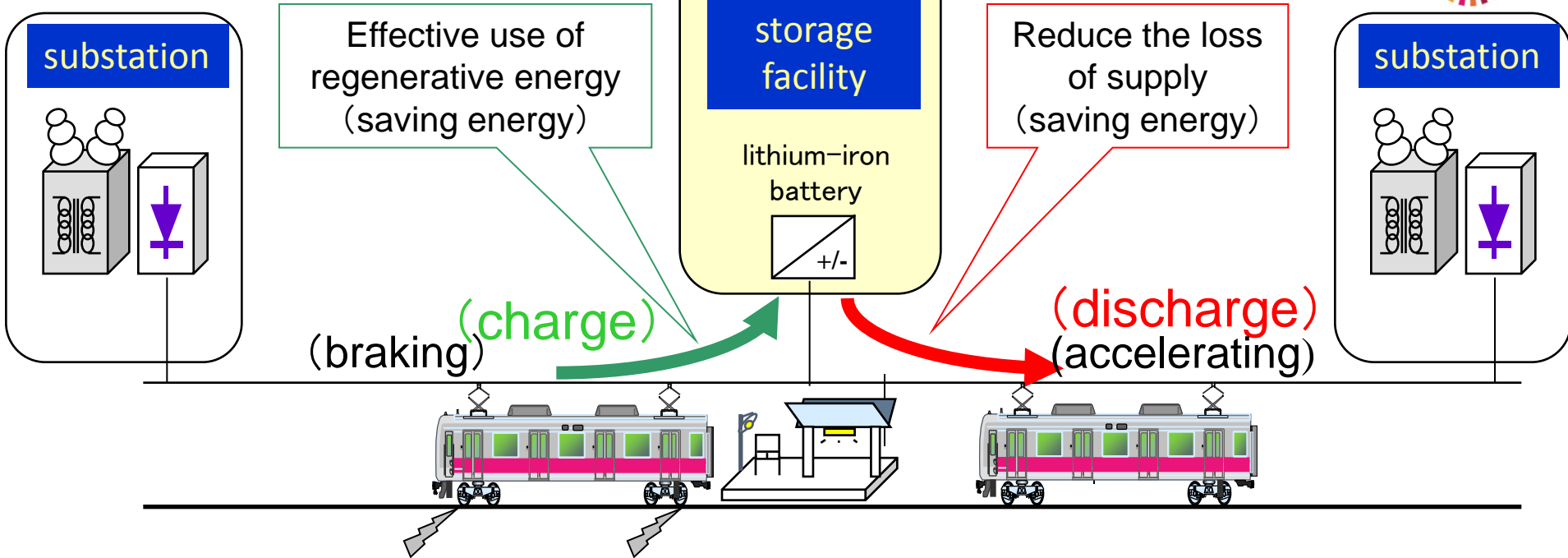


Cross bond
(connected rails between up
and down)

The outline of Power storage facility



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Example of Eco project in Maya Station



Overview(Exterior)



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Heat Exchange
Paint

Exterior
Louver

DC Power Converter

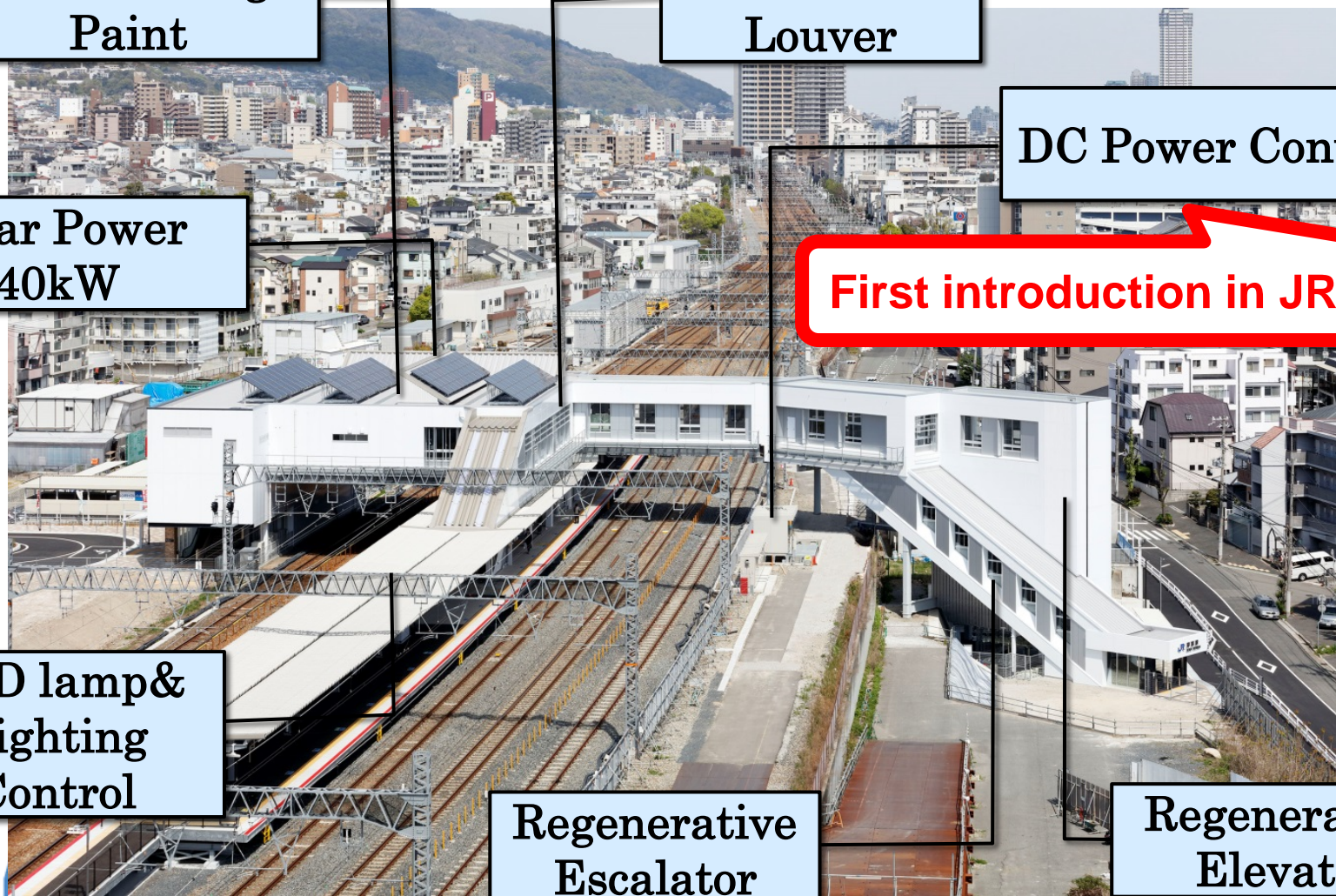
Solar Power
40kW

First introduction in JR-West

LED lamp &
Lighting
Control

Regenerative
Escalator

Regenerative
Elevator



Overview(Concourse)



Overview(Passageway)



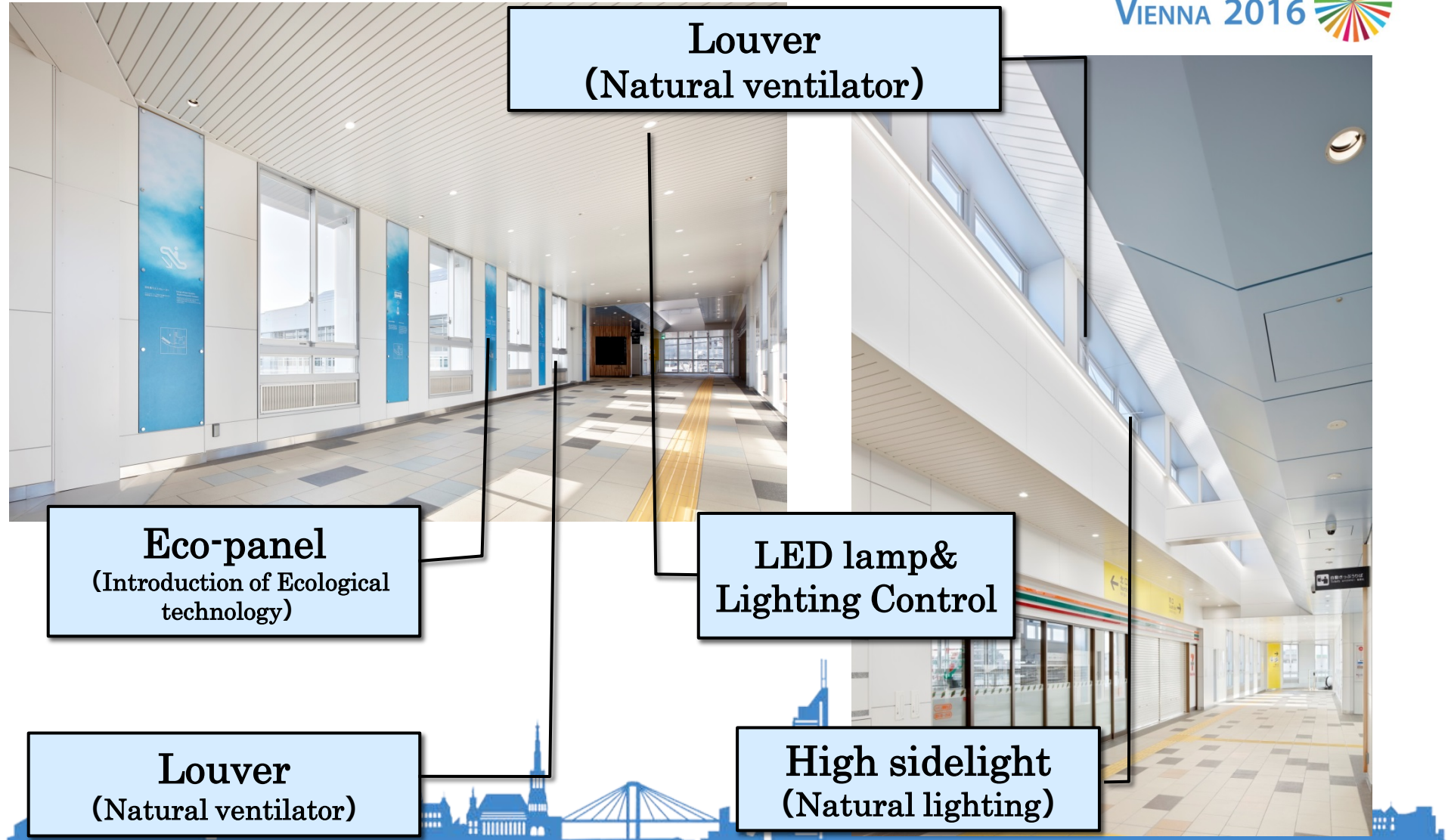
Louver
(Natural ventilator)

Eco-panel
(Introduction of Ecological
technology)

**LED lamp&
Lighting Control**

Louver
(Natural ventilator)

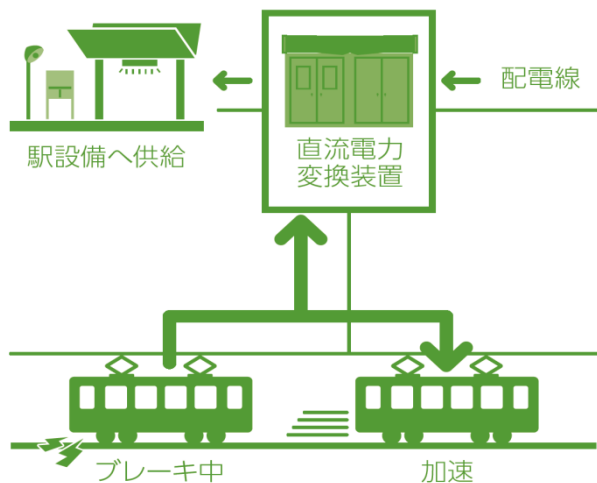
High sidelight
(Natural lighting)



<<Energy Saving>>

◆DC Power Converter(Regenerative Converter)

Regenerative energy(1500V) is converted into energy for station(AC100V,200V) and reused for lighting in station etc.



Convert regenerative energy of train
(Picture from station window)



- The conversion from DC to AC is applied to static inverter (SIV) for rolling stocks.
- The connection to distribution lines outside is applied to power conditioner technology used for solar power (No reverse power flow, individual operation detection)



《Energy Saving》



◆ Regenerative Elevator

Rotation of winch when going up and down is restricted at a regular speed. The rotation energy is reused as regenerative energy.



◆ Regenerative Escalator

Potential energy for going down when crowded is reused as regenerative energy.

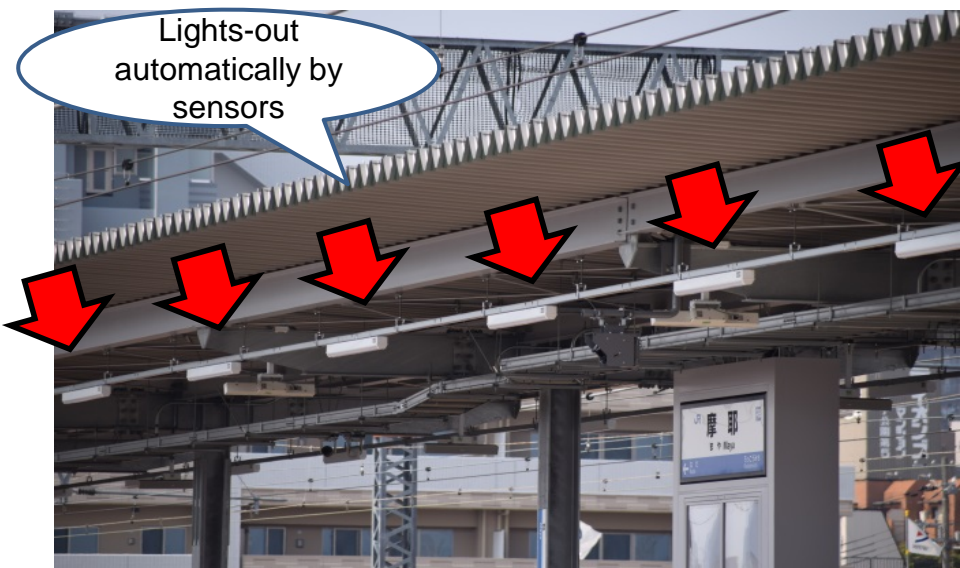


《Energy Saving》



◆LED lamp & Lighting Control

All the lightings are LED lamps.
During daytime, lights-out are automatically controlled by sensors.



◆Heat Exchange Paint

Temperature increase is prevented by the paint on the roof. During summer, solar panels are also prevented being heated.



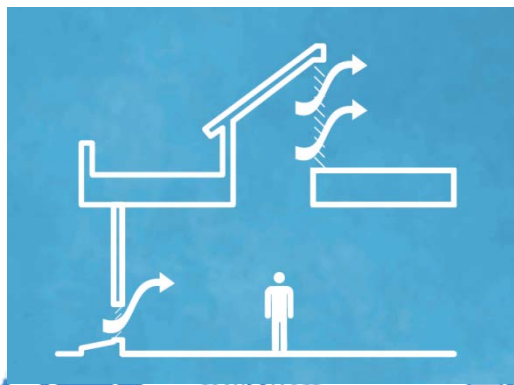
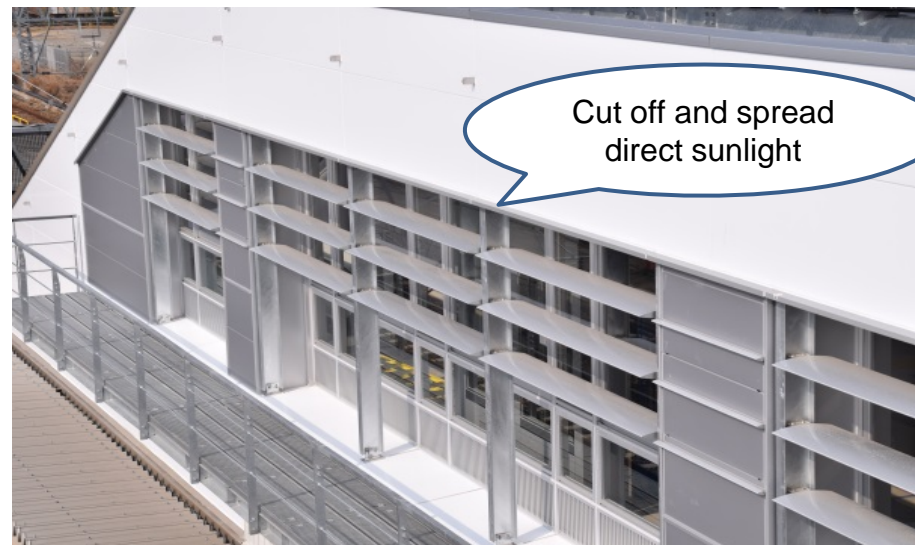
<<Energy Saving>>

◆ High sidelight (High window)

Sunlight from high window and the illuminance is secured.

◆ Louver (Natural ventilator)

Comfortable space by natural window



◆ Exterior Louver

Cut off and spread direct sunlight
Protection against heat
Illuminance is secured



《Generating Energy, Resource Saving》



◆ Solar Power

176 panels(40kW) are set at 4 places



◆ Water Saving Toilet

Water Saving sanitary appliances are installed. 40% water saving



《Conservation of Biodiversity》



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◆Thinned wood

Contribution to generate woods and biodiversity by using thinned wood

Rough design
Natural touch of
wood



“Yosegi”
Design

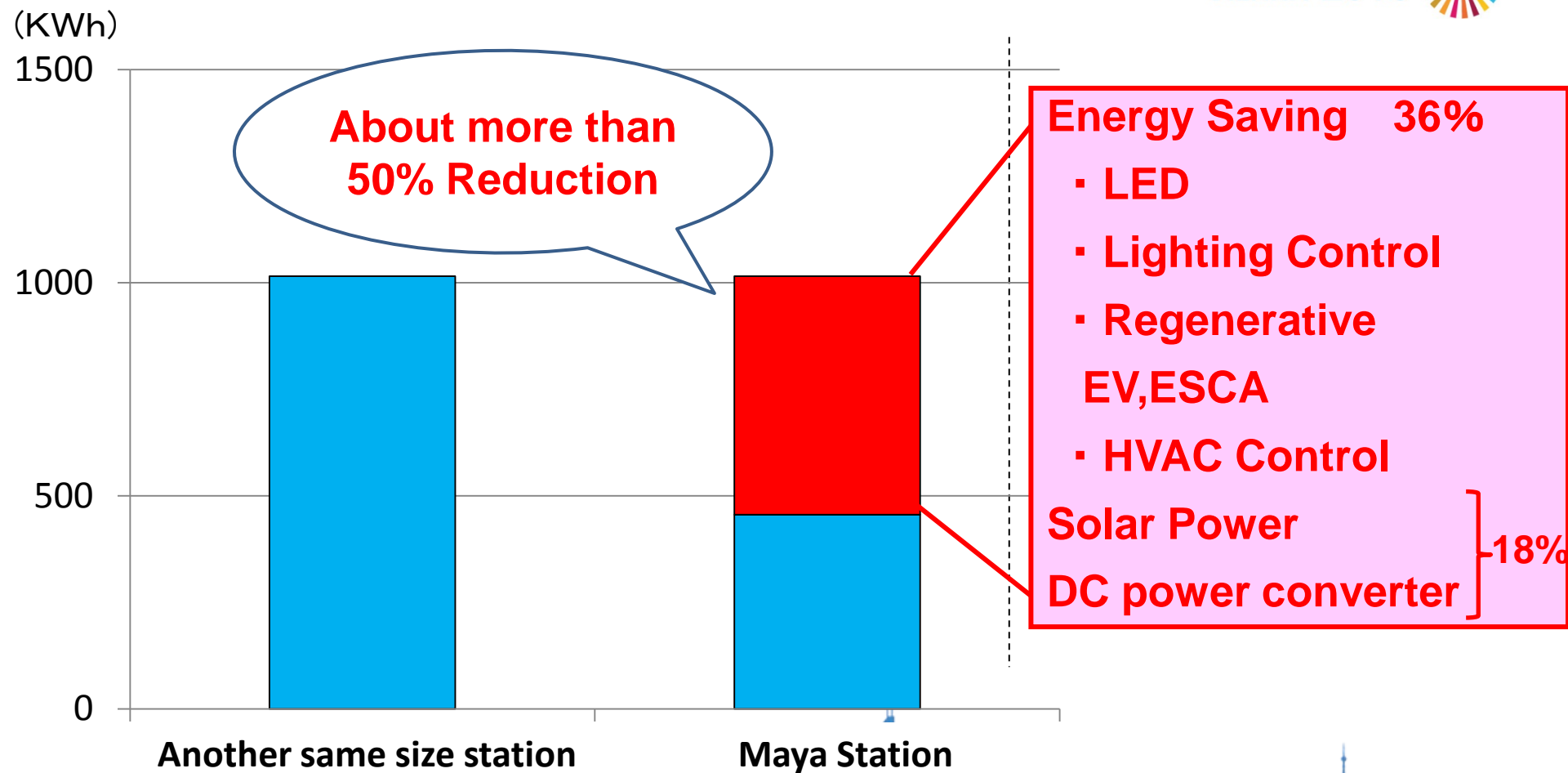


◆Digital Signage

Display in real time about power generation
(regenerative energy, solar power)



Electricity Usage of Maya station



Future Plan

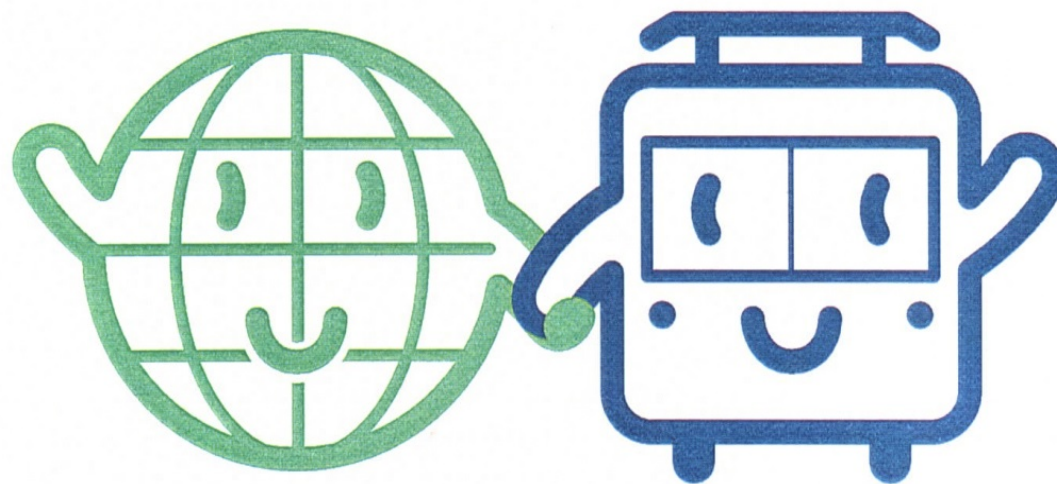


- **Technical development for energy saving will be introduced to some projects**
- **Renovate base stations to eco- friendly stations in view of region, size, and budget**
- **Measure the real power generation, regenerative energy and energy usage in Maya station to confirm the effect of energy saving**





Thank you for your kind attention



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JR西日本

