Railway Energy Management Systems

Toshiba’s Railway Energy Management System provides customers with a total solution of the overall power system that facilitates the utilization of regenerative power which is achieved by total planning and train control. Further energy improvements can be achieved by the analysis and matching your business philosophy and energy consumption target.

Toshiba responds to these demands utilizing highly efficient components, highly available regenerative power and renewable energy, and energy storage using onboard and wayside batteries.

Toshiba offers innovative energy solutions for Environment-friendly energy solutions are key global demands. Such solutions are also required for railway systems, which are already considered as one of the most energy matching your business philosophy and energy consumption target.

What do you want to use your energy for?

Find out more on http://toshiba-railway.com
Toshiba’s Innovative Railway Energy Management Systems

Environment-friendly energy solutions are key global demands. Such solutions are also required for railway systems, which are already considered as one of the most energy efficient transportation systems.

Toshiba responds to these demands utilizing highly efficient components, highly available regenerative power and renewable energy, and energy storage using onboard and wayside batteries.

Toshiba also offers “Traffic-Energy Coordination” that consists of Operation & Control and Energy System. Operation & Control is accomplished by energy conscious traffic planning and train control. Further energy improvements can be achieved by the analysis and monitoring of actual operational data. Energy System is accomplished by total planning of the overall power system that facilitates the utilization of regenerative power which is the remarkable feature in railway Systems.

Toshiba’s Railway Energy Management System provides customers with a total solution matching your business philosophy and energy consumption target.
Operation & Control

Energy-conscious operation planning and control

Planning
Transportation and Power Supply Planning
The system provides energy-conscious transportation planning, which matches the business philosophy of our customers while at the same time conforming to occasional operating limits such as power restrictions.

Target
Train Traffic Target
Energy Consumption Target

Control
Train Traffic Control
EE (Energy Efficient)
Train Traffic Control
Running curves are adjusted in real-time to save more energy. For example, the scheduled margin times at stations are adjusted to use less traction power and energy, while still maintaining punctual train operation.

Power Supply Control
Power Voltage Control
Proper Voltage Control is achieved by coordination with Train Traffic Control. Such voltage control encourages effective regeneration.

Energy Efficiency Improvement
Feedback from Traffic-Energy Analysis can be used to improve timetables, running curves and power supply plans.

Analysis
Traffic-Energy Analysis
Analyses of actual traffic and energy consumption data identify opportunities to improve the efficiency of system operations and railway facilities.

Train Operation
Rolling Stock Energy Management System

Railway Energy Management System

1) TCMS: Train Control and Monitoring System, 2) PMSM: Permanent Magnet Synchronous Motor, 3) APS: Auxiliary Power System

4) SCiBTM is a rechargeable battery. Its features include safety, long life of more than 6,000 charge-discharged cycles, rapid charging, high power output performance, and good cryogenic operation.

Deceleration / Regenerative Braking
Acceleration / Powering

Transportation and Power Supply Planning

Energy-conscious operation planning and control

Control
Train Traffic Control
EE (Energy Efficient)
Train Traffic Control
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Energy System

Total planning of regenerative power and energy storage

Onboard Energy Storage
Regenerative power can be used effectively by charging Regenerated Power at the onboard batteries. The charging power can also support catenary-less train operation.

Smart Grid
Information from the Smart Grid can be used to effectively manage railway energy.

Toshiba offers wayside batteries for energy storage to be used for traction power which batteries alleviate drops in voltage to enable stable operations and save energy.

Renewable Energy
Wind Turbine
Photovoltaic Power

Regenerative power can be used effectively by installing batteries and regenerative power inverters at train stations. Also photovoltaic renewable energy sources can be used to power station equipment such as lighting and air-conditioning systems.

Energy Storage

Station
Energy Management CLOUD

Regenerative Power Inverter

Substation

Energy Storage

Deceleration / Regenerative Braking
Acceleration / Powering

1) TCMS: Train Control and Monitoring System, 2) PMSM: Permanent Magnet Synchronous Motor, 3) APS: Auxiliary Power System
4) SCiB™ is a rechargeable battery. Its features include safety, long life of more than 6,000 charge-discharged cycles, rapid charging, high power output performance, and good cryogenic operation.
What do you want to use your energy for?

Toshiba offers innovative energy solutions for smart rail transportation.

Environment-friendly energy solutions are key global demands. Such solutions are also required for railway systems, which are already considered as one of the most energy efficient transportation systems.

Toshiba responds to these demands utilizing highly efficient components, highly available regenerative power and renewable energy, and energy storage using onboard and wayside batteries.

Toshiba also offers "Traffic-Energy Coordination" that consists of Operation & Control and Energy System. Operation & Control is accomplished by energy conscious traffic planning and train control. Further energy improvements can be achieved by the analysis and monitoring of actual operational data. Energy System is accomplished by total planning of the overall power system that facilitates the utilization of regenerative power which is the remarkable feature in railway systems.

Toshiba's Railway Energy Management System provides customers with a total solution matching your business philosophy and energy consumption target.

Toshiba’s Innovative Railway Energy Management Systems

Find out more on http://toshiba-railway.com

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Train Traffic Target
Energy Consumption Target

Train running curve
speed
Time
Reduction of total energy consumption
Energy saving
Time
The maximum speed is reduced
Departure times are the same
Arrival times are slightly changed
Energy saving is effective

Energy Management CLOUD
Station EMS
Photovoltaic System
Facilities in station
Re-Generative Power
Storage battery
Railway Energy Management Systems
Operation & Control
Power Supply Control
Regenerative Power Inverter
Onboard Energy Storage
Photovoltaic Power
Wind Turbine
Regenerative power can be used effectively by charging Regenerated Power at the onboard batteries. The charging power can also support catenary-less train operation.

Energy Storage
Toshiba offers wayside batteries for energy storage to be used for traction power which alleviates drops in voltage to enable stable operations and save energy.
Renewable energy sources can be used to be environment-friendly.

Station Energy Solution
Regenerative power can be used effectively by installing batteries and regenerative power inverters at train stations. Also photovoltaic renewable energy sources can be used to power station equipment such as lighting and air-conditioning systems.

Rolling Stock Energy Management System
EE (Energy Efficient) Train Traffic Control
Running curves are adjusted in real-time to save more energy. For example, the scheduled margin times at stations are adjusted to use less traction power and energy, while still maintaining punctual train operation.

Power Voltage Control
Proper Voltage Control is achieved by coordination with Train Traffic Control. Such voltage control encourages effective regeneration.

Train Operation
Energy-conscious running guidances adjusted by EE Train Traffic Control are transmitted to trains. Thus enabling train operations with reduced energy consumption.

Transportation and Power Supply Planning
The system provides energy-conscious transportation planning, which matches the business philosophy of our customers while at the same time conforming to occasional operating limits such as power restrictions.

Energy Efficiency Improvement
Feedback from Traffic-Energy Analysis can be used to improve timetables, running curves and power supply plans.

Traffic-Energy Analysis
Analyses of actual traffic and energy consumption data identify opportunities to improve the efficiency of system operations and railway facilities.

TCMS1)/ATO
Traction Inverter
APS3)
Battery
Air-Conditioning System
LED Illumination

System Cooperation
Total planning of regenerative power and energy storage
Energy-conscious operation planning and control

1) TCMS: Train Control and Monitoring System, 2) PMSM: Permanent Magnet Synchronous Motor, 3) APS: Auxiliary Power System

SCiBTM is a rechargeable battery. Its features include safety, long life of more than 6,000 charge-discharged cycles, rapid charging, high power output performance, and good cryogenic operation.

AC / DC
Deceleration / Regenerative Braking
Acceleration / Powering

Information from the Smart Grid can be used to effectively manage railway energy.

Intelligent Traction Energy Solution
Substation
Energy Management System
Air-Conditioning
System
LED Illumination

Information from the Smart Grid can be used to effectively manage railway energy.

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