CLAIMS

1. A station-building power supply device that supplies power to a station load using both AC power supplied from an AC system and surplus regenerative power generated by trains, the station-building power supply device comprising:

a feeding-voltage detection unit that detects a feeding voltage;

a capacitor unit that stores therein the surplus regenerative power;

an SOC (State Of Charge) detection unit that detects an SOC of the capacitor unit;

a first power conversion unit that performs DC/DC power conversion in both directions between a feeder and the capacitor unit;

a second power conversion unit that converts DC power supplied from the capacitor unit to AC power and supplies the AC power to the station load; and

a control unit that controls the first power conversion unit and the second power conversion unit on the basis of the feeding voltage and the SOC, wherein

the control unit

controls the first power conversion unit such that power is supplied from the feeder to the capacitor unit when the feeding voltage exceeds a predetermined first voltage threshold, and

controls the second power conversion unit such that power is supplied from the capacitor unit to the station load when the SOC exceeds a predetermined first SOC threshold.

2. The station-building power supply device according to claim 1, wherein

the control unit controls the second power conversion

unit such that an amount of power supplied from the capacitor unit to the station load is substantially constant.

3. The station-building power supply device according to claim 1, wherein

the control unit controls the first power conversion unit such that power is supplied from the capacitor unit to the feeder when the feeding voltage falls below a second voltage threshold that is smaller than the first voltage threshold and also when the SOC exceeds a second SOC threshold that is larger than the first SOC threshold.

CLAIMS

1. A station-building power supply device that supplies power to a station load using both AC power supplied from an AC system and surplus regenerative power generated by trains, the station-building power supply device comprising:

a feeding-voltage detection unit that detects a feeding voltage;

a capacitor unit that stores therein the surplus regenerative power;

an SOC (State Of Charge) detection unit that detects an SOC of the capacitor unit;

a first power conversion unit that performs DC/DC power conversion in both directions between a feeder and the capacitor unit;

a second power conversion unit that converts DC power supplied from the capacitor unit to AC power and supplies the AC power to the station load; and

a control unit that controls the first power conversion unit and the second power conversion unit on the basis of the feeding voltage and the SOC, wherein

the control unit

controls the first power conversion unit such that power is supplied from the feeder to the capacitor unit when the feeding voltage exceeds a predetermined first voltage threshold,

controls the second power conversion unit such that power is supplied from the capacitor unit to the station load when the SOC exceeds a predetermined first SOC threshold, and

controls the first power conversion unit such that power is supplied from the capacitor unit to the feeder when the feeding voltage falls below a second voltage threshold that is smaller than the first voltage

threshold and the SOC exceeds a second SOC threshold that is larger than the first SOC threshold.

2. The station-building power supply device according to claim 1, wherein

the control unit controls the second power conversion unit such that an amount of power supplied from the capacitor unit to the station load is constant.

3. A station-building power supply device that supplies power to a station load using both AC power supplied from an AC system and surplus regenerative power from trains, the station-building power supply device comprising:

a feeding-voltage detection unit that detects a feeding voltage;

a capacitor unit that stores therein the surplus regenerative power;

a first power conversion unit that performs DC/DC power conversion in both directions between a feeder and the capacitor unit;

a second power conversion unit that converts DC power supplied from the capacitor unit to AC power and supplies the AC power to the station load;

an SOC detection unit that detects an SOC of the capacitor unit in a state where the capacitor unit is charged from the feeder via the first power conversion unit, a state where discharging from the capacitor unit to the feeder is performed via the first power conversion unit, or a state where discharging from the capacitor unit to the station load is performed via the second power conversion unit; and

a control unit that controls the first power conversion unit and the second power conversion unit on the basis the feeding voltage and the SOC, wherein

the control unit

controls the first power conversion unit such that power is supplied from the feeder to the capacitor unit when the feeding voltage exceeds a predetermined first voltage threshold and

controls the second power conversion unit such that power is supplied from the capacitor unit to the station load when the SOC exceeds a predetermined first SOC threshold.