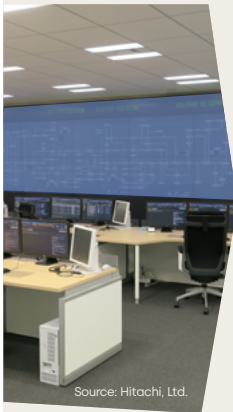


Climate solutions in the energy sector: *An avoided emissions case study*

Social Innovation company Hitachi have developed a cross-regional power balancing system that optimizes renewable electricity generation and reduces the need for fossil-based energy.

→ ~9.9 million t CO₂ eq.

avoided in Japan in 2023 through the use of Hitachi's Cross-Regional Operation System.



Up to 60 million households are powered by Hitachi's Cross-Regional Operation System.

Source: Hitachi, Ltd.

Capturing avoided emissions

— assessment details

- **Functional unit:** Production of 1 kWh of electricity to meet final demand.
- **Impact:** 90.4 gCO₂ eq. avoided per kWh of electricity transferred through the system.
- **Time period:** Year-on-year (2023).
- **Scope:** Japan.
- **System boundaries:** Life cycle emissions of the fossil and renewable share of power generation capacities, interconnection lines, transmission losses, IT equipment, development, operation and maintenance of the system.

Use this document to support your understanding of avoided emissions calculations and disclosure as outlined in the WBCSD Guidance on Avoided Emissions:



The reference scenario

- In any given region of Japan, meeting electricity demand during supply-demand adjustment typically relies mainly on adjusting the output from existing fossil fuel powered thermal power plants.
- It's not possible to transfer renewable electricity from other regions as there is no coordinated nationwide balancing system.
- Additional fossil-based power generation is used for balancing, as surplus renewable electricity goes unused, leading to increased CO₂ emissions.

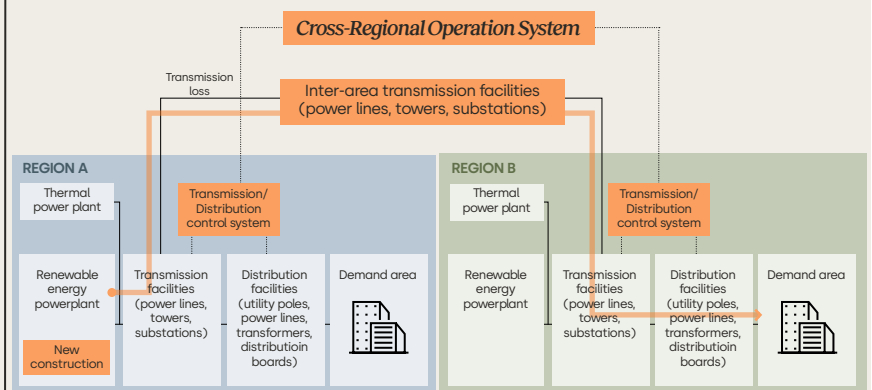
The low-carbon scenario

- The Cross-Regional Operation System enables nationwide supply-demand coordination, so surplus renewable electricity in one region can be transferred to a region where thermal power output can be curtailed.
- The share of renewable power in the total electricity transfers is estimated at 26% – this is Japan's average share of energy production from renewable sources.
- The Cross-Regional Operation System avoids increases in thermal power output because renewable electricity substitutes for fossil-based generation to balance supply and demand.
- By prioritizing the use of renewable energy under Japan's Priority Dispatch Rule, the system helps minimize renewable curtailment and improves overall grid efficiency during supply-demand imbalances.



Source: Hitachi, Ltd.

How it works



The solution reduces Japan's domestic emissions in the energy sector.

WBCSD Avoided Emissions Eligibility Gates

- Gate 1: Climate Action Credibility
- Gate 2: Climate Science Alignment
- Gate 3: Contribution Legitimacy

What share of Hitachi's revenue does this solution represent?

The Cross-Regional Operation System is part of Hitachi's Digital Systems & Services sector, which accounts for approximately 27% of the company's total revenue. While the solution's revenue represents a small share of the business unit's revenue, it serves as a reference case to guide the development of other solutions within the sector and Hitachi overall.

Social and environmental side effects

None.

Third-party verification

None.