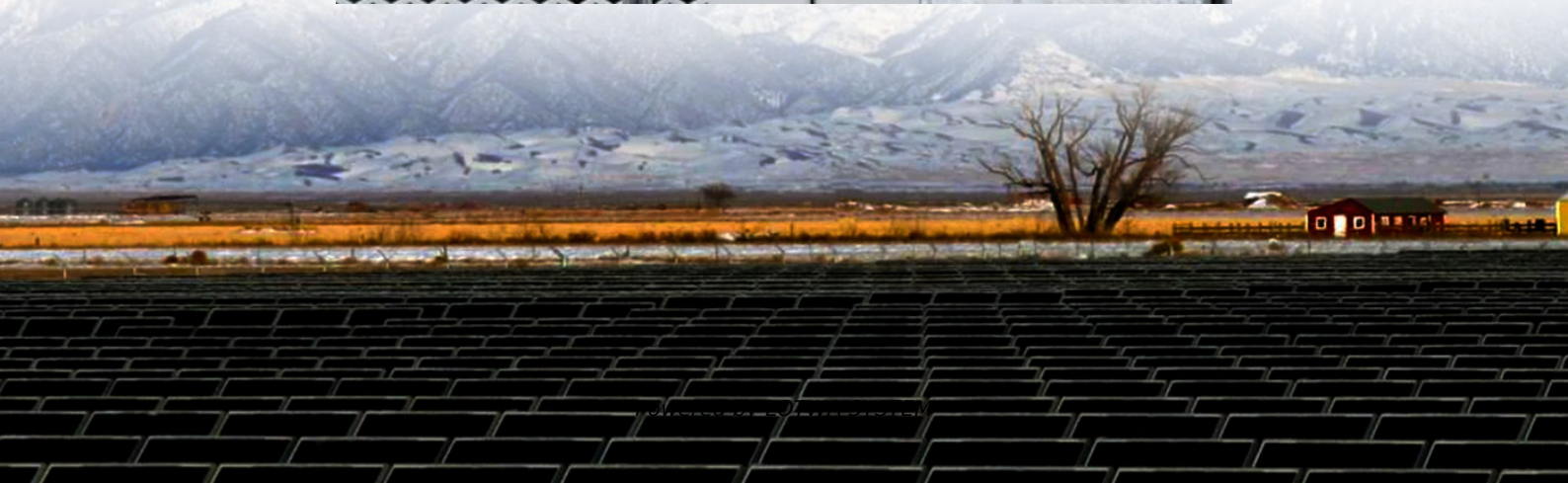


Off-grid solar containerized fixed-type highway applications price reduction





Overview

What is a highway photovoltaic system?

Schematic diagram of the highway photovoltaics (PV) system. Roofing highways with solar panels generates green electricity that is delivered to the grid to replace the electricity from fossil fuels, thereby contributing to CO₂ e emission reductions.

How does a highway PV solution align with the SDGs?

The highway PV solution can align with SDGs 1 (no poverty), 3 (well-being), 7 (clean energy), 8 (economic growth), and 13 (climate action) by supplying solar electricity, decreasing CO₂ e emissions, and reducing traffic losses (Table S9 in Supporting Information S1).

Is Highway PV economically feasible?

We analyze the economic feasibility of developing highway PV worldwide based on LCOE and discover conspicuous spatial variability (Figure 2c). The global LCOE values range from US\$44 to US\$380 MWh⁻¹, with the majority (56%) in the range of US\$60–120 MWh⁻¹ (Figure 2d).

Can roofing solar panels increase electricity generation over secondary roads?

Additionally, we investigate the possible increase in electricity generation by roofing solar panels over secondary roads with broader geographical coverage and higher density (Figure S1b in Supporting Information S1). The annual electricity generation of the secondary-road PV is 13,570 TWh, corresponding to an installed capacity of 10,191 GW.



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