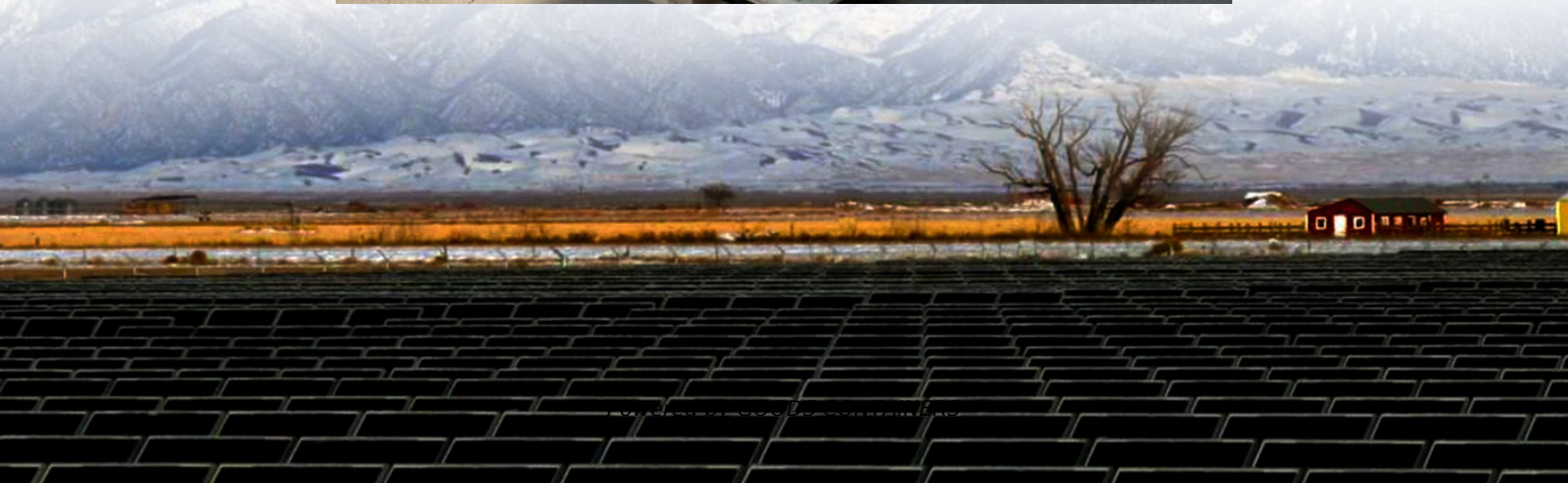


Bidirectional charging of energy storage containers at port terminals





Overview

Why is energy storage a critical port function?

Ensuring availability of these electrical resources to meet loads which are intermittent and uncertain is becoming a critical port function. It requires investment in multi-vector energy supply chains, energy storage in ports and their associated energy management systems.

How are environmental regulations affecting port operations?

Stricter environmental regulations are adopted by authorities to limit pollutants and GHG emissions arising from energy consumption. Increasingly, port operational strategies and energy usage patterns are under scrutiny.

What technologies are used in ports?

Technologies such as electrification of equipment, cold-ironing, energy storage systems, smart grid, microgrid are reviewed. Renewable energy and clean fuel use in ports are presented. Methods regarding energy consumption and emission measuring/assessment are detailed for ports.

How will the next generation ports use smart energy management systems?

The next generation ports will use automation, electrification and smart energy management systems. In this sense, roles of autonomous and/or electrified vehicles in smart grid should be further discussed for port operations. An intelligent energy planning system can be established by considering stochastic energy demand and supply. 5.4.



Bidirectional charging of energy storage containers at port terminals



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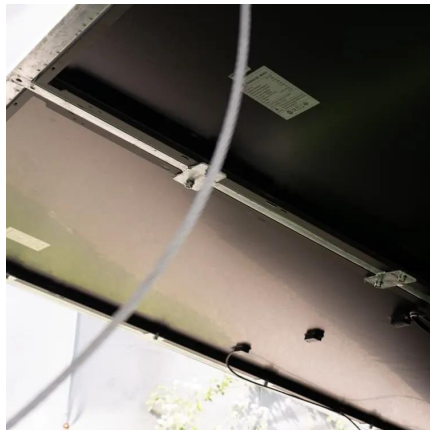
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