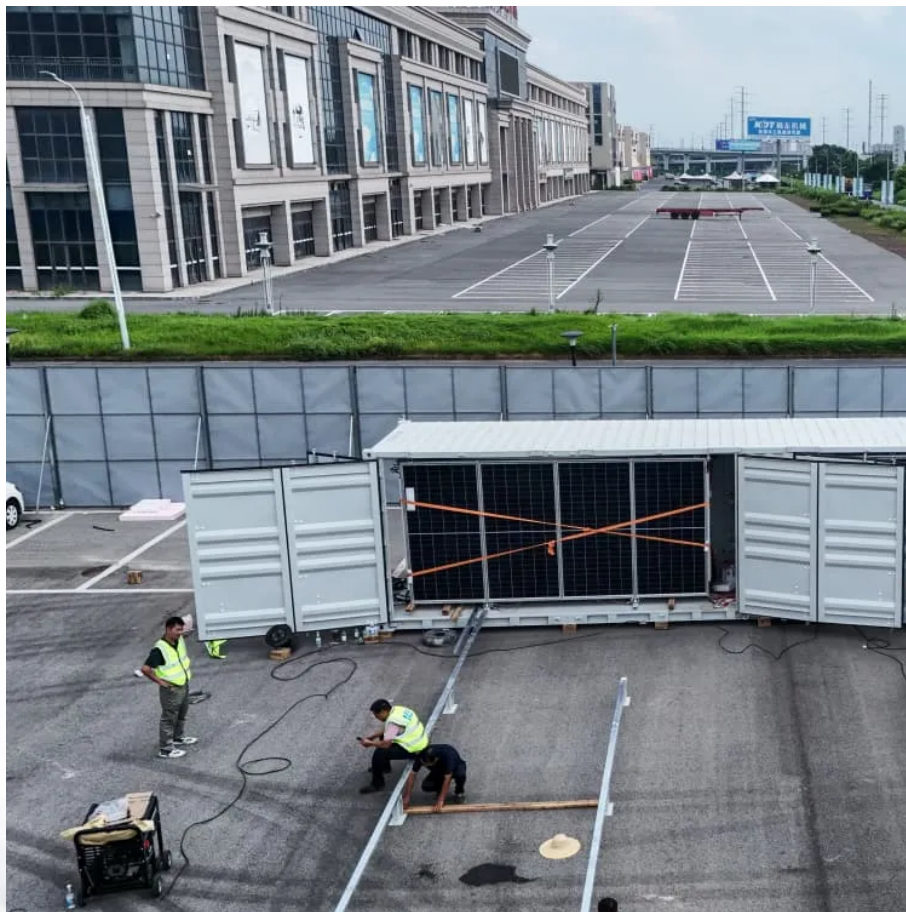


Riyadh Smart Photovoltaic Energy Storage Container Hybrid





Overview

What is the capacity factor of solar storage in Riyadh?

The size of the storage is 18 h capacity. After multiple iterations to maximize the capacity factor of the plant by increasing the solar multiple, the plant capacity factor is 79% with a solar multiple of 6 (LCOE 0.177 \$/kWh). Fig. 9. Case 1: Riyadh baseline hourly generation CSP-PT SM = 6.

What is the capacity of solar storage in Riyadh vs Tabuk?

The size of the storage is 18 h capacity. After multiple iterations to achieve the same capacity factor of the Riyadh plant which is 79% the solar multiple is 3.5 with an LCOE of 0.137 \$/kWh. This is a rather strong contrast to the Riyadh case which required a solar multiple of 6 and is attributed to the high DNI in Tabuk versus Riyadh.

How many solar multiples are there in Riyadh?

In Riyadh, the solar multiple ranged from 2.9 to 3 with the PV portion of the plant having a nameplate capacity equal to that of the CSP portion and 1.95 for a case with the PV nameplate capacity 60% greater than the CSP portion. For these same cases in Tabuk, the solar multiples were 1.78–1.85 and 1.6 simultaneously.

How to simulate a PTC-PV hybrid system in Riyadh?

Case 1: Riyadh baseline hourly generation CSP-PT SM = 6. PTC-PV hybrid system (Case 2) is simulated by adding a PV plant with 45 MWe AC output based on 63 MWe DC with ratio of 1:4. The solar multiple of the PTC was then reduced to match the 79% capacity factor of the baseline case, with the resulting solar multiple of 3.



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