Cayman Islands microgrid digital twin

Microgrids, as a flexible architecture capable of integrating local distributed energy resources (DERs), can satisfy wide-ranging demands via their variable solutions, from off-grid to on-grid applications.

A digital twin can show you how your renewable energy resources will interact with each other in both a steady state and should you need to island from the grid during an outage. It can also instantly validate the microgrid controller"s logic, eliminating the need for someone to manually update and validate any changes that might need to be ...

This chapter aims to provide a thorough analysis of the concept by offering a detailed framework for digital twin microgrids (DTMGs) and examining the potential benefits that arise from the implementation of software-based management systems in MGs.

A microgrid digital twin (MGDT) refers to the digital representation of a microgrid (MG), which mirrors the behavior of its physical counterpart by using high-fidelity models and simulation platforms as well as real-time bi-directional data exchange with the real twin.

Through real-time data, mathematical models, and analysis and response of the physical systems, digital twin technology in microgrids can be implemented to optimize energy, generation, storage, distribution, and control. In a DER microgrid digital twin model, key components form the structure of a functional digital twin for power optimization.

These digital twins will enable corporations engaging in decarbonisation programmes to optimise total cost of ownership ("TCO") and capture and synthesize near real-time analytics and carbon abatement data.

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Microgrids can satisfy wide-ranging demands via their variable solutions, from off-grid to on-grid applications. The digital twin (DT) concept opens a new dimension in the energy system to break down data silos and carry out seamless functional processes in data analysis, modeling, simulation, and artificial intelligence (AI)-driven decision ...

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