Utilidata

Karman

enables breakthrough in real-time DER management at the grid edge

Utilidata's distributed AI platform, Karman, helps utilities transform distributed energy resources (DERs) from passive assets into intelligent, responsive participants by enabling advanced computation and secure communication at the grid edge. To maximize DER value for both utilities and end-customers, Karman delivers autonomous DER management that responds to real-time system needs rather than pre-scheduled events.

How it works

Karman leverages AI and local data from the meter to calculate optimal dispatch responses in real time, while incorporating end-customer preferences. For this demonstration, operational commands were sent locally over WiFi to DERs without transmitting sensitive data to the cloud. This edge-based architecture allows for fast, secure, and efficient DER management, directly from the meter. At scale, utilities will utilize the Karman platform in coordination with centralized DERMS platform.

Karman is powered by Utilidata's custom NVIDIA module, purpose-built for grid devices like smart meters.

About Utilidata

Utilidata is an AI-powered technology company providing utilities with real-time, actionable insights to operate a dynamic and flexible grid.

Results

In a demonstration project with Electric Power Research Institute (EPRI) sponsored by Southern California Edison (SCE), Karman delivered:

12.8%
reduction in electricity costs for end customer

27%
decrease in peak demand for end customer

EPRI

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Key benefits

Increased value from DERs:
Local data processing and communications enabled greater bill savings and peak reduction.

Enhance reliability:
Karman supports real-time grid balancing by dynamically adjusting DER behavior based on local grid conditions—reducing outages and reliability-related costs.

Homeowner bill reduction:
Aligns DER operation with time-of-use pricing to lower customer energy bills

Deferred grid upgrades:
By better managing DERs and peak demand in real-time, utilities can defer or avoid upgrades to transformers and other expensive equipment.

Reduce reactive maintenance:
Local processing and wireless communications reduce data transmission costs.

A paradigm shift from traditional DERMS and VPPs

While most DERMS and VPPs rely on static schedules and limited grid visibility, Karman creates a responsive, intelligent layer of local management at the grid edge.

AI-driven forecasting:
Accurate, real-time load and solar generation forecasts based on analysis of real-time local conditions.

Autonomous dispatch:
Instantaneous command signals to DERs—curtailing solar and charging or discharging batteries—without relying on the cloud.

Utility override capability:
Utilities can send over-the-air commands to adjust or override Karman's local dispatch when needed.

These findings are the result of an EPRI lab demonstration project sponsored by SCE to showcase the Karman platform's ability to forecast load, forecast and disaggregate solar, and issue DER calculations and commands for local DER optimization. The study was performed using EPRI's Simulation Platform for Integration of DER (SPIDER) software which generated realistic net load data.

> "SCE identified several essential elements for DER management at the grid edge, which highlighted the capabilities and potential of the Karman platform. Karman provides DER communication, load disaggregation, and forecasting—key components for enabling seamless integration between customer and utility DER management systems."
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> – SCE Customer Grid Edge Team