EBOOK

uplight

Maximizing DER Value With An Integrated DERMS

Leveraging DERs as Strategic Assets

In 2025, load growth is the dominant trend impacting the electricity sector. While data centers receive significant attention for their grid impact, the implications of EV adoption, heating electrification, battery storage, and other DERs are equally significant for utilities. Distributed energy resources (DERs) installations continue to accelerate, with a projected growth of 217 GW of DER capacity being added to the grid by 2028, and their scale now roughly on par with new utility-scale generation. Residential DERs alone saw a substantial 63% increase from 2022 to 2023, bringing both opportunity and responsibility to proactively manage and monetize these resources for increasing grid demands.

If uncoordinated, DERs represent liabilities, not resources. Reliability can suffer as unmanaged DERs exacerbate peak load, cause voltage issues, and overload infrastructure; affordability is threatened by increased distribution infrastructure investments or poorly structured tariffs; and most critically, ineffective DER integration can slow the energy transition by limiting customer choice and forcing greater reliance on fossil generation when cleaner, distributed options are already available.

Effective DER management—specifically the ability to identify, forecast, monitor, and orchestrate these assets—can improve reliability, resilience, customer satisfaction, and emissions reduction through programs that optimize the use of DER for the benefit of the grid and customers.

Fortunately, DERMS solutions have matured, and are now more sophisticated and capable than ever with tools that can integrate and orchestrate a wide array of DERs across use cases. The challenge, however, is that the term "DERMS" (Distributed Energy Resource Management System) has become a catch-all, encompassing a wide range of technologies and deployment models that each have different strengths and weaknesses.

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Navigating the DERMS Landscape

At a high level, today the DERMS market is bifurcated into two overarching categories: Edge DERMS, which largely evolved out of traditional Demand Response systems and cater primarily to behind-the-meter (BTM), customer-owned assets, and Grid DERMS, which evolved out of upstream utility operational technologies like Advanced Distribution System Management software and cater to front-of-the-meter DER and aggregations of BTM assets. As highlighted in a recent SEPA report, each DERMS category has relative strengths and limitations.

Most utilities have already begun their journey toward DER management, either through an Edge DERMS (most often in service of one or more customer DER programs) or a Grid DERMS (most often as an extension of an existing ADMS). But fully realizing all the value streams that DER are capable of delivering requires leveraging the best of both worlds: an Integrated DERMS solution.

Combining the customer experience and granular asset integration capabilities of Edge DERMS with the network-aware modeling and forecasting capabilities of Grid DERMS unlocks new ways of utilizing DER that enable utilities to recognize novel value streams, from avoided transmission and distribution costs, to ancillary services, to facilitating renewable generation interconnections.

At Uplight, we have several years of experience scoping and delivering utility solutions to connect our Flex Edge DERMS with leading Grid DERMS vendors in support of advanced DER use cases. Navigating this new and rapidly-evolving landscape requires a clear understanding of what Integrated DERMS can offer and how to align them with utility-specific objectives. In this eBook, we'll discuss what an Integrated DERMS is, the different use cases it enables, and how it can help utilities harness the true power of DERs.

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What is an Integrated DERMS?

As the name implies, an Integrated DERMS solution is a structured, coordinated framework to combine Grid DERMS and Edge DERMS in support of advanced DER use cases, particularly distribution network grid services. Today technical integrations are implemented via API and/or open protocols (such as IEEE20230.5) to facilitate automated data sharing and communication between Grid DERMS and Edge DERMS.

Understanding how an Integrated DERMS can unlock the full value of DERs requires examining the complementary capabilities of its constituent components.

Edge DERMS

Edge DERMS generally evolved from demand response platforms (which often focused on a specific DER technology) to coordinate a wide range of behind-the-meter assets including through the complete DER program lifecycle—from customer enrollment to forecasting, dispatch, and reporting. Edge DERMS have the defining characteristic of providing direct technical integrations to mass-market consumer DER manufacturers (e.g. smart thermostats, electric vehicles and chargers, battery storage systems, etc.), allowing for highly granular DER visibility and control. Because of their historical focus on delivering peak reduction through DER programs, Edge DERMS typically operate independently of core grid operations and planning systems (most often, they rely only on utility meter data and/or customer data).

Grid DERMS

Grid DERMS, primarily developed as extensions of ADMS (Advanced Distribution Management System) platforms, focus on managing larger DERs (e.g. front-of-the-meter resources) or aggregated "blocks" of smaller DERs, with emphasis on distribution network topology and physical conditions. These systems are tightly coupled with the core operational technology systems used for grid operations and planning, and accordingly can both model and monitor how DERs affect voltage and power flow to optimize interconnection, resolve congestion issues, and enhance system reliability.

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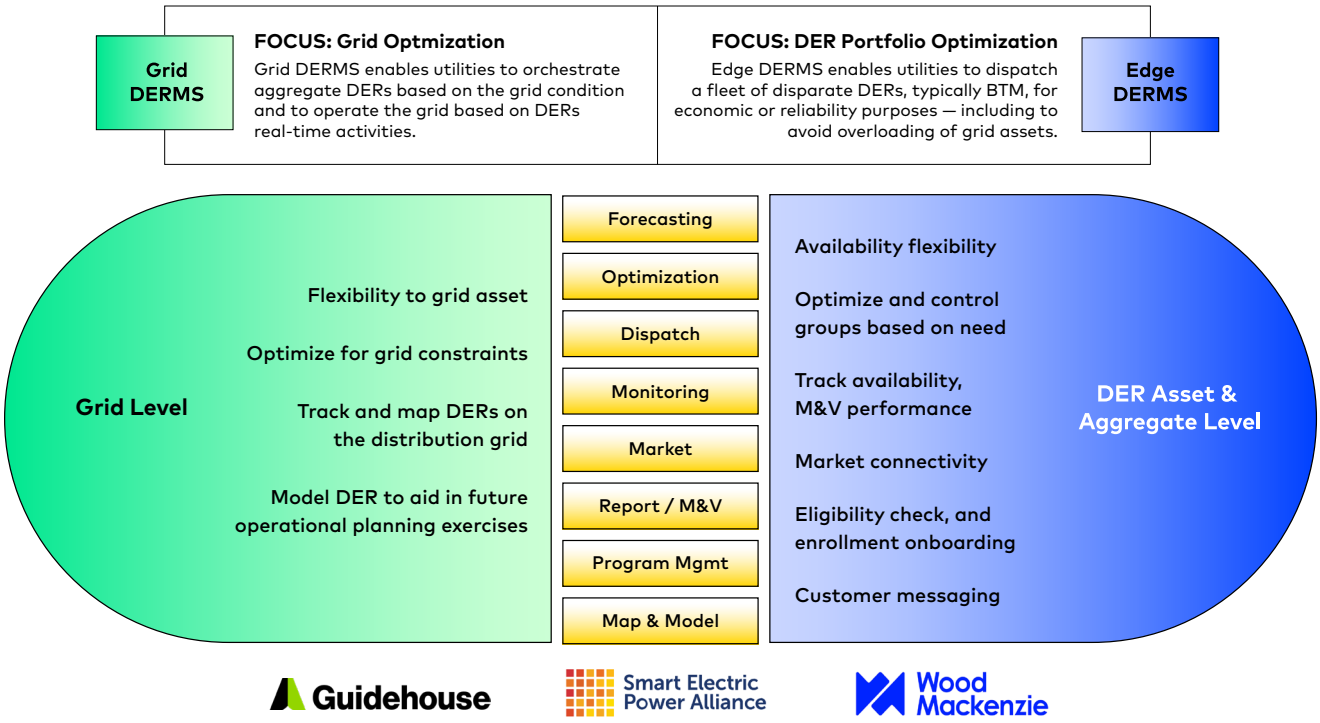
While both systems integrate with DERs and support grid services, they have distinct focuses: Edge DERMS prioritizes DER portfolio optimization for customer-facing assets and program delivery, while Grid DERMS specializes in grid optimization and distribution system operations. Together, these components form an Integrated DERMS that provides comprehensive solutions across the full spectrum of DER management challenges, as illustrated in the diagram below.

Combined Edge and Grid DERMS



When combined, Grid DERMS and Edge DERMS form a powerful system that can both have visibility into current grid conditions and local constraints, while simultaneously signaling dispatch of certain BTM DER assets to solve those grid congestion issues. This integrated system gives grid operators visibility and ability to call upon which BTM DERs are closest, how many megawatts per device will be shifted, and dispatchability—allowing them to easily resolve overloading or congestion with DERS.

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Integrated DERMS systems combine the key use cases of both a Grid DERMS and an Edge DERMS to create a comprehensive solution designed to meet grid challenges more effectively than either solution alone. Together, they unify all of a utility's demand-side and distributed resources into a single system, unlocking new capabilities that enhance DER and demand side management value while improving coordination among key internal stakeholders, including DSM program teams, grid operations, and planning departments.

This integration has several distinct benefits including solving local constraints on the grid. Because of the ability of the Grid DERMS to "understand" where there are transmission bottlenecks, and then "communicate" where those areas are on the grid to the Edge DERMS, the Edge DERMS system can dispatch localized DERs to resolve congestion. This capability substantially increases DSM program value by transforming DERs into responsive grid assets that can address localized issues without requiring manual intervention from operations teams.

While most DSM programs are only designed to manage peak demand reduction, leveraging an Integrated DERMS enables DERS to be utilized in much more sophisticated ways. Including localized network services in dispatch strategies can improve the program cost-effectiveness. Importantly, with new regulations around wholesale markets and FERC 2222 compliances, an Integrated DERMS can facilitate utilization of DER for wholesale services in a way that ensures safe operating limits within the distribution network.

Beyond congestion management, Integrated DERMS addresses critical visibility challenges. Utilities often struggle to monitor and control newly connected DERs, making it difficult to assess reliability impacts and leading to cautious interconnection policies. An Integrated DERMS resolves this issue by providing visibility into behind-the-meter DER and DSM program data, surfacing an accurate, real-time view of capacity and potential congestion—ultimately enabling utilities to make more accurate interconnection decisions. It also automates DER dispatch using APIs and event-based triggers, moving beyond manual, day-ahead planning to more responsive grid operations.

Organizationally, Integrated DERMS eliminates operational silos by providing a unified interface for monitoring and managing both utility and customer assets—replacing the fragmented tools that currently limit cross-team collaboration and establishing a single source of truth that enhances coordination, planning, and utilization of aggregated DER capacity across the organization.

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The Power of an Integrated DERMS

Uplight's experience demonstrates that combining Edge DERMS functionality (used for managing demand-side management programs) with Grid DERMS capabilities (from upstream grid planning and operations) unlocks more advanced use cases. Most importantly Integrated DERMS helps bridge the gap between potential and realized value of DER control, helping address the missing value of DERs only accessible through sophisticated dispatch strategies provided by an Integrated DERMS. Below are a few of the use cases where we highlight this type of sophisticated dispatch:

Topology Mapping

Topology Mapping—one form of sophisticated dispatch enabled by an Integrated DERMS solution—is all about helping utilities group DERs based on where they are located on the grid. This mapping is as specific as single feeders or substations allowing for precise dispatch strategies. Instead of managing devices one by one, utilities can automatically organize them based on a real-world grid layout (static or dynamic) and update those assignments as grid conditions change in real time. This makes it easier to dispatch resources in specific areas where there's a voltage issue or local constraint. This use case is made possible through Grid DERMS pulling in a service data point from an Edge DERMs like Uplight Flex—tying it to the right grid location, and then keeping that info updated, so utilities can act fast and at scale.

Situational Awareness

Another use case, situational awareness, means giving utilities a real-time and forecasted view of the DERs on their system. This covers which assets are online, how much flexibility is available (from each asset individually, as well as groups of assets), and where (i.e. a geospatial model of available capacity). This works when a Grid DERMS pulls in data from an Edge DERMS on all the programs, devices, and groups, then maps out how much flexible load is available by location or device type. With this context, operators can make better decisions, like which DERs to call on during a grid event based on what's happening now or what's expected to happen later.

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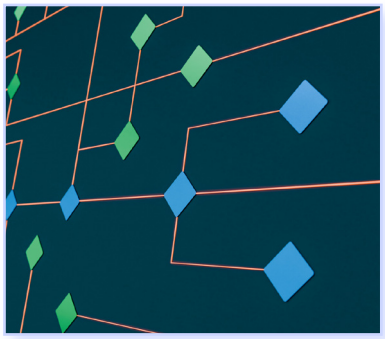
Site-level Telemetry & Forecasting

Site-level telemetry and forecasting function of an Integrated DERMS helps utilities plan around what's happening behind the meter, especially at C&I sites. A Grid DERMS can ingest real-time data and forecasts for devices like batteries, EVs, and solar PV, as well as broader site load and solar generation forecasts. This lets utilities better predict how much flexibility they'll get from each site and adjust their plans to account for things like time-of-use rates or demand charges. This capability gives utilities a more accurate and detailed picture of what each site can deliver, and aids in planning.



Automated Dispatch

Automated dispatch makes it easier and faster for utilities to act on their load shift plans. A Grid DERMS can send signals to an Edge DERMS to trigger DERs across an entire program or within specific groups. This helps streamline operations and reduces the need for manual coordination. Whether it's a heatwave, a market opportunity, or a localized constraint, automated dispatch lets utilities quickly activate the right resources at the right time.

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Getting Started with an Integrated DERMS

Implementing an Integrated DERMS begins with organizational alignment and an honest assessment of your utility's DER program maturity. As with any new initiative or program, it's usually best to start small, prove value, and scale from there. The most important first step is getting clear on the why. What challenges are you hoping DERMS will help solve? Is it grid congestion? Delays in approving interconnections? A need for more dynamic load flexibility?

After aligning stakeholders across grid operations, planning, DSM, and IT around common goals, conduct a comprehensive evaluation of your existing DER landscape. What types of programs are already in place? Are you running DR programs for residential or C&I customers? What tools are you using to manage those assets?

If you've got a demand response or VPP program with high enrollment and a great customer experience up and running, that can be a solid foundation to build off. From this baseline, consider implementing either a Grid DERMS or Edge DERMS initially to address specific operational challenges before pursuing comprehensive integration.

Building up to an Integrated DERMS solution takes time, and doesn't need to happen immediately. Once a Grid DERMS and Edge DERMS is in place, start with a focused use case, like automating DR dispatch based on grid signals or improving DER interconnection planning with up to date DER capacity data. Pilot programs offer valuable opportunities to validate system performance, test forecasting accuracy, and measure operational improvements.

Success then depends on thoughtful scaling with compatible technology partners, ensuring seamless communication between existing utility systems, and continually strengthening the business case through demonstrated outcomes.

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Integrated DERMS Improves Program Operations

A leading utility partnered with Uplight to implement the first of its kind Integrated DERMS solution. Initially launched as a traditional demand response program, the utility expanded its efforts to bring together residential and commercial demand response, smart thermostats, and behind-the-meter batteries and other DERs—under a single DERMS platform. This integration allowed the utility to improve visibility and control across its growing DER portfolio, enabling more precise dispatch and coordination in response to grid conditions.

With enhanced forecasting tools and real-time optimization, the Integrated DERMS helped the utility reduce load forecast errors, lower program costs, and streamline decision-making across planning, operations, and customer programs. Two demonstration projects in 2024 showcased the Integrated DERMS solutions'ability to manage both simulated and real DER assets, demonstrating end-to-end grid flexibility and setting the stage for full-scale rollout. By breaking down internal silos and aligning system operations with customer-side assets, an Integrated DERMS is helping this utility transition from siloed DER management to a smarter, system-level approach that supports both reliability and decarbonization goals.

Utilities need a tool that can intelligently manage DER assets both in front of and behind the meter to unlock the full value of their demand flexibility resources. An Integrated DERMS solution that combines Grid DERMS and Edge DERMS capabilities creates a comprehensive system that enhances visibility, automates dispatch, resolves local constraints, and breaks down organizational silos. By starting with clear goals, building on existing programs, and scaling thoughtfully with the right technology partners, utilities can transform their DER management approach to improve reliability, maximize asset value, and advance their decarbonization objectives.

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Get an Edge in Driving a Cleaner Energy Future

Uplight creates and manages capacity for the grid through networks of connected devices that generate, shift, or save energy. We combine best-in-class customer experiences with an open flexible capacity management platform that improves grid resilience, reduces costs, and accelerates decarbonization.

Let's Connect

Curious to learn more? Request more information or schedule a demonstration with an Uplight Integrated DERMS expert.

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