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# DERMS: The Mission Critical Tool for the Energy Transition Era





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It's no secret that the utility industry is undergoing massive change. Driven by decentralization of power generation, digitization and the changing role of the customer, today's utility landscape is transforming at a break-neck pace. After 100+ years of delivering reliable energy, savvy utility leaders are re-positioning their organizations to remain a foundational piece of the energy landscape for the next 100 years.

## THIS IS WHAT TRANSFORMATION LOOKS LIKE

Clearly, the way energy is generated (decentralized resources) and consumed (electric vehicles, LED lighting, moratoriums on new natural gas connections, etc.) is changing—and simultaneously creating new challenges. An example of this is the reliability challenge of seeing daytime electricity demand at an all-time low, while morning and evening peaks are growing rapidly. The magnitude of the demand ramp-up rate during these times of the day rate keeps getting steeper. Put another way, the neck of the notorious duck curve keeps getting steeper and

longer, and the costs to manage the largest peaks a year dwarf any baseload needs.

At the core of these changes is the explosion of distributed energy resources (DERs.) Researchers at Wood Mackenzie report that by 2025, DER capacity added since 2016 will be comparable to renewables on the bulk generation side (e.g., grid scale solar and wind). Figure 1, also from Wood Mackenzie, tells the story of how DERs are not only growing rapidly, but also how they are changing the resource mix at the wholesale level.

**FIGURE 1. GROWTH IN DERS WILL PROVIDE NEW CLASSES OF RESOURCES FOR THE WHOLESALE MARKET AND UTILITY GRID SERVICES**

# 2021

## Traditional demand response with behind-the-meter resources

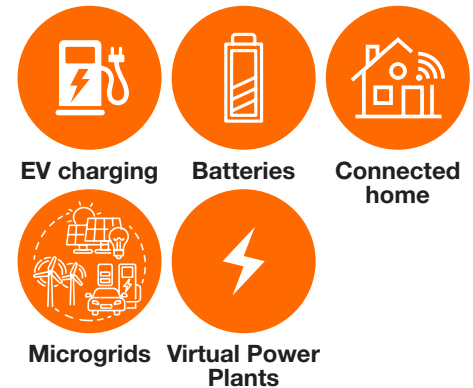
To date, DERs have been participating in wholesale markets and providing utility services via demand response program constructs. The total registered capacity to date stands at approximately 50 GW across the U.S. Note, around a quarter of the registered capacity comes from back-up fuel-based generation



# 2025

## New resources and aggregations forming new products

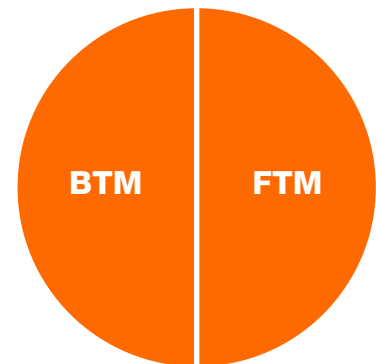
As energy consumption, production and management at consumer sites become more sophisticated, so will the pairings of resources that go to market. Aggregations will bring new classes of resources to market and unlock new value streams for customers. WoodMac forecasts the availability of 387 MW of DER capacity online behind the meter by 2025.



# 2030 AND BEYOND

## Load shaping resources to follow bulk power supply

As the bulk power grid reaches meaningful levels of renewable generation, customer sited DERs and orchestration software technologies deployed will contribute to shaping demand to follow supply. The scale of this opportunity depends on the intelligence behind aggregation and orchestration.



This transformation will be accelerated with the expected impacts from FERC Order 2222, which pushes markets to enable DER participation alongside traditional generation resources, opening U.S. wholesale markets to new sources of distributed energy and grid services from these DERs.

While this is an advance in sustainability that all can applaud, it does raise questions about managing the grid to ensure and maintain the levels of reliability upon which the developed world has built its economies as thousands (and eventually millions) of DERs go online.

Enter distributed energy resource management systems, or “DERMS.” An important part of a utility’s infrastructure in this new energy landscape, DERMS have caused a lot of confusion in the marketplace about what a DERMS is and what it does. The misconceptions range from lack of understanding about DERMS clouding how utilities ask for and write RFPs, to how solution providers are positioning and promoting their DERMS capabilities, to a lack of urgency around DERMS implementation despite exploding DER penetration.

## CLARITY OF VALUE

The reality is that a DERMS, properly implemented, is mission critical for utility leaders to unlock and embrace the value of DERs. Eric Young, VP of Industry Solutions at Generac Grid Services, notes the massive potential value of DERs:

“DERs primarily give utilities the capability to increase or decrease supply, all with greater flexibility and lower cost than the traditional operating paradigm. For example, if a utility can collect and manage the value of all the DERs on its system, this greatly reduces the need to manage a large contingency of costly, distant reserves. DERs can now be that reserve facility, with the added benefit of being able to flexibly source energy needs locally.”

One other consideration of this standard model is that there is usually a need for an integrator/professional services provider to assist with the initial implementation. However, the workflows associated with DERMS and VPP implementations are usually tailored to a utility’s existing processes, and the software solution vendor is typically involved in helping with the initial design and navigation of the workflows.

Young also noted higher costs and decreased reliability when attempting to apply traditional demand management models to a decentralized, DER-rich operating environment. Now with a DERMS managing this new environment, the flexibility to manage the requisite reserve margins (which are sometimes as high as 25% of load) will reduce the cost and energy losses associated with the historical approach while simultaneously improving reliability beyond what is currently achievable utilizing traditional models.

“This is made possible by substituting aggregations of existing customer assets, such as solar and storage systems or even smart thermostats, for dedicated central generation, which no longer needs to be built,” explains Ben Hertz-Shargel, Global Head of Grid Edge research at Wood Mackenzie.

**“In much of the U.S., combined cycle gas turbines (CCGTs) are assumed to be the default resource to be constructed if reserve margins fall below planning levels. The Energy Information Administration (EIA) estimates the capital cost of a modern CCGT to be \$958/kW of capacity delivered. A typical residential solar and storage system can easily deliver 2 kW of capacity, meaning a 10 MW plant costing \$9.5 million could be displaced by using a DERMS to aggregate the capacity of 5000 customers. Wood Mackenzie forecasts that distributed solar alone will reach 34 GWdc of capacity in the U.S. by 2025, showing how far one could scale this scenario.”**

The second major benefit that a DERMS brings to the table is that it helps manage local voltage on distribution feeders. On this, Young says, “Better DER management helps increase the amount of DERs you can put on a feeder, which can lead to even more granular voltage management, which is best when it is localized to where the power is being exchanged. Taking this one step farther is to compare the ‘traditional’ management and control scenario that goes down to the substation level vs. a DERMS providing visibility and management beyond the substation on the feeders. This is a new level of visibility, enabling utilities to manage the existing distribution infrastructure at a very high fidelity.”

## PUSHING THE STANDARDS ENVELOPE

And of course, as a regulated industry, utilities have questions around how regulatory standards will evolve as DERs become more and more pervasive across the grid.

“Historically, innovation drove the need for communication standards,” observes Young at Generac Grid Services. “But more recently, requirements for standards have begun to try to drive innovation, which becomes the limiting factor. The standards-driven approach often yields unintended consequences, adding complexity and cost to solving the initial problem. We need to focus on providing organization-wide value and employ the best method of communication to fulfill those requirements. OpenADR is a good example of this. Created as a standard for simplified grid signaling, for which it works fairly well once configured, the OpenADR standard is now being asked to address requests from the industry for near real-time applications like frequency regulation. This is a challenge it was never intended to meet.”

Clearly there needs to be a focus not only on solving the problem, but also on managing expectations and aligning the appropriate technologies while still avoiding vendor lock in.

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## MAKING IT WORK

To recap: DER-driven disruption is happening industry-wide, and the pace of disruption will continue to accelerate. So, how should utility leaders be preparing for this? The short answer is that an investment in an enterprise DERMS solution is a wise move. Put another way: “Yes, we need a DERMS now, and it needs to meet some key requirements.”

Young notes that a utility considering a DERMS solution should start with these three criteria:

- **Agnostic:** Utility leaders shouldn’t have to worry about the asset or device type; they just want it to be able to communicate, preferably bidirectionally. Being completely system agnostic is a key first step.
- **Scalable:** The DERMS needs to be able to scale to manage an enormous number of DERs – upwards of hundreds of thousands or even millions of DERs given today’s growth projections.
- **Simple:** Often lost in the DERMS discussion are simplicity and elegance. The selected

DERMS provider needs to be able to take all the complexity in a DER-rich environment and provide a simple, easy-to-understand solution that enables moving load, managing voltage and supporting system maintenance and/or outages. In short, end users should just see the system running smoothly, while a solution provider like Generac Grid Services manages complexity behind the scenes.

The DER era of utility operations is upon us. Savvy utility leaders need to partner with a DERMS solution provider not only to be prepared for the future, but also to start assisting in today’s operations.

**Interested in learning more or speaking with an adviser at Generac Grid Services? Visit <https://www.generac.com> or contact us today at 1 (866) 957-3672.**



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