



How Iberdrola Uses DERMS to Assess Flexibility on a Renewables-Heavy Grid

“AspenTech OSI Distributed Energy Resource Management System is crucial to the success of this innovative Flexener project and as a tool that helps in the 100% renewable electricity system target.”

—Carlos Pascual, Head of Energy Management Solutions, Iberdrola Group

CHALLENGE

- Evaluate how Distributed Energy Resources (DERs) can enhance consumers flexibility and reliability
- Accelerate Spain’s transition to clean energy to achieve 100% renewable electric system by 2050

SOLUTION

The AspenTech OSI Distributed Energy Resource Management System (DERMS) enables seamless integration of Iberdrola’s SCADA controlled devices as well as consumer and commercial distributed energy resources such as electric vehicles, BESS, solar and building control systems into a single global system for enterprise-wide optimization of generation, load demand and economics.

VALUE CREATED

- Seamlessly integrates various renewables and DERs into a single system for flexible operations
- Provides visibility and control to orchestrate energy resource utilization across different locations
- Optimizes energy supply for economics, market participation and network objectives
- Dynamically balances demand to grid needs



Overview

The Iberdrola Group is driving Spain toward a future powered by 100% renewables. In 2007, Iberdrola made clean energy adoption the central pillar in its corporate strategy. Starting with large investments in wind energy, the company has since evolved to develop and deploy utility-scale solar, energy storage, smart grids and digital technologies.

More recently, Iberdrola has emphasized helping customers invest in solar panels, EV chargers, energy storage and other Distributed Energy Resources (DERs). Iberdrola's focus on DERs is set to deliver financial savings to customers while also supporting a dramatic increase in carbon-free electricity generation.

How AspenTech OSI DERMS Delivers Flexibility

With robust demand for clean energy, Iberdrola has deployed approximately 20 gigawatts of renewables in Spain. To rapidly scale up renewables and DERs, it will require a fundamental change in how the grid operates and, more importantly, how customers participate in complex electricity markets. Testing technologies that engage and incentivize customers to participate in Spain's transition to 100% renewables is the primary objective of the Iberdrola-led Flexener consortium.

Spain's grid needs demand side flexibility to add a lot more renewables and DERs. In the past, the grid was reliable and stable because a small number of large fossil fuel power plants delivered a consistent supply of electricity to homes and businesses. By contrast, renewables deliver intermittent power; solar panels work when the sun shines and wind turbines spin when it's windy.

As larger amounts of renewable generation are added to the grid, reliability depends on technologies that incentivize and intelligently manage DERs to operate flexibly. For example, charging EVs in the middle of the day when solar energy is abundant can relieve demand on the grid later in the day, when customers get home from work and turn on their air conditioning and other appliances. DERMS gives grid operators a tool to optimize supply and demand to respond to the intermittent nature of wind and solar, allowing more renewables to be added to the grid.



AspenTech OSI DERMS Provides Vital DER Visibility, Control and Orchestration

DERMS is software that provides real-time integration, visibility, control and optimization of DERs. DERMS enables utilities to operate DERs to maximize their potential operational and financial benefits. For example, a customer who owns rooftop solar and energy storage could reduce their energy bill by utilizing the electricity stored in their battery at times when electricity prices are high. But this requires knowledge about how electricity rates work and advanced planning and effort to ensure the battery dispatch takes place at the right time. Not only is this entirely up to the customer, but grid operators also have no way to know whether DERs will be used in ways that support grid reliability. By

contrast, AspenTech OSI DERMS provides Iberdrola the visibility needed to monitor and control many DERs in ways that benefit customers and support the grid.

As part of the Flexener consortium, for example, Iberdrola tested how well DERMS could manage the operation of DERs to deliver financial and decarbonization benefits to customers while also supporting the grid. This is possible because AspenTech OSI DERMS can optimize DERs across several goals all while operating autonomously. Iberdrola and its partners sought real-world experience of deploying DERMS to manage a relatively small number of DERs and controllable customer loads to see if it could deliver the intelligent control, visibility and optimization needed to incorporate more renewable energy while benefitting customers.

“With the control provided by AspenTech OSI DERMS, Iberdrola can manage when an EV charges to make sure it takes place when the utility rate is lowest or when renewable generation is plentiful.”

—Carlos Pascual, Head of Smart Energy Solutions, Iberdrola Group

Iberdrola’s Future Vision for DERMS

AspenTech OSI DERMS has been able to successfully control and manage the DERs and customer loads that are part of the project. This has involved optimizing when EV chargers are used (whether for charging EVs or supplying power back to the grid from the EV) and batteries are dispatched, as well as integrating with building management systems to control HVAC loads. Iberdrola has also used DERMS to provide forecasts of load and renewable generation based on changing weather conditions and control the maximum power that customers can consume from the grid.

Validating the technical proficiency of DERMS was an important lesson, but Iberdrola also learned how important it is to communicate to customers the benefits that can be delivered by handing over DER and load control to a central, grid-level DERMS. Customers need to know that it is financially worthwhile to let Iberdrola manage the assets they own.

Iberdrola also learned how critical it is to be able to seamlessly communicate directly with DERs, building management systems and DER aggregators. While the foundation of smooth communication is connectivity (DERs and customer loads must be smart assets), efficient



communication also demands interoperability. It's often more difficult to manage DERs smoothly when multiple communication protocols with varying levels of granularity must be juggled. When SCADA allows for near real-time operation, but a proprietary API allows operations to occur every 15 minutes, it can be challenging to utilize assets quickly to respond and work together. Because AspenTech OSI DERMS was designed with such interoperability in mind, Iberdrola was able to combine the different resources with different communication methods and response capabilities into a single resource.

Iberdrola's pilot deployment of DERMS also provided the company clarity about the features a DERMS needs to flexibly support a rapid uptake of renewables. For example, AspenTech OSI DERMS uses sophisticated load and generation models to provide the data needed to balance supply and demand on the grid. This provides grid operators the transparency and information they need to make decisions that improve reliability.

The DERMS solution also provides Iberdrola the potential to aggregate a collection of individual DERs into a single Virtual Power Plant (VPP) that can participate in TSO and DSO markets in the same way a large fossil fuel power plant does—another tool enabling the integration of more renewables.

Lessons learned by Iberdrola from the Flexener consortium project are guiding the company's future direction. It recently launched the Advanced Smart Assistant program, a service for residential DER owners to optimize the potential behind-the-meter value customers receive. Experience from the Flexener consortium is also driving Iberdrola's development of DER programs for commercial and industrial (C&I) customers.

While Spain has significant work to do in order to reach the 2050 net-zero target, the country is on its way thanks to the Iberdrola Group, a global energy leader that is taking bold action to achieve a 100% renewable electricity system.





About Aspen Technology

Aspen Technology, Inc. (NASDAQ: AZPN) is a global software leader helping industries at the forefront of the world's dual challenge meet the increasing demand for resources from a rapidly growing population in a profitable and sustainable manner. AspenTech solutions address complex environments where it is critical to optimize the asset design, operation and maintenance life-cycle. Through our unique combination of deep domain expertise and innovation, customers in asset-intensive industries can run their assets safer, greener, longer and faster to improve their operational excellence.

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