mPrest

The challenge and the opportunity: Optimizing the distributed network

In recent years there has been a proliferation of distributed energy resources (DERs) throughout the global market. Consumers' growing demand for greater energy autonomy and clean energy sources is rapidly transforming the production and distribution of energy. The increasing number of solar panels, electric cars and home energy storage systems, coupled with legacy demand response platforms, presented new complexities for Vector. These included a rapid evolution from a unidirectional system to a multidirectional electrical grid, through which decentralized solar arrays, batteries and other distributed energy resources can transfer the energy they generate back to the distribution grid.

This transformation created new challenges for Vector. The utility found that although centralized electricity demand is declining, its network saw localized spikes and drops in energy production and consumption, which caused stress on its distribution assets.

Rather than invest capital in upgrading/replacing existing assets or in new assets such as transformers and cables to manage these new challenges, which could become stranded in the future, Vector saw an opportunity: If it could optimize management of DERs against the existing loads and better channel energy to areas of high demand and away from areas of high supply, it could alleviate stress on the network, reduce capital investments and operational costs, improve reliability, and lower the costs of delivering energy for all of its customers. Vector recognized that in the long-term, advanced grid management would result in improved asset utilization and sophisticated response to fluctuations in energy prices. Such DERMS capabilities would enable Vector to protect its current key assets from overloading and would support the network during outages to ensure only minimal customer impact. Furthermore, DERMS would support Vector in streamlining further penetration of renewable energy sources and in implementing innovations such as utilizing stored solar and charged energy from batteries and electric vehicles as well as peer-to-peer trading.

The mDERMS application allows Vector to not only improve operational efficiencies, but also offer new services to its customers

"Simply put, the mPrest software is revolutionary. It is the most comprehensive monitoring, analytics and control system available anywhere in the world. It greatly enhances the resilience, security, and efficiency of customer solutions and our network."

- Simon Mackenzie,
  Vector Chief Executive Officer

Finding the right fit for the Internet of Energy

In mid-2016, Vector searched for a system that would focus on DER integration and would offer situational awareness and platform integration capabilities for Vector's existing systems. Due to the anticipated changes in customer behavior and the resultant impact on the network, Vector needed an application that could help it adapt to rapid changes to infrastructure and operation, now and in the future. This system should also easily integrate new systems and sensors with the ability to aggregate and correlate their data in a 'system of systems' approach. Furthermore, Vector searched for an application that enables the utility to create, implement and adapt business and operational rules in response to changes in customer needs, as well as market and regulatory demands. It also had to be capable of managing huge volumes of data and performing optimization algorithms that provide meaningful insights to grid business users.

Vector considered multiple applications in their search. Some were lacking in their ability to support the critical use cases Vector identified for its network. These limitations were either in the ability to fulfill the scope of the use cases or in their limited integration capabilities. Vector recognized that many of the applications available in the market were limited to control room scenarios, with little to no support of DERMS applications outside the control room.

Finally, Vector found that mPrest – a world leader in smart monitoring, control and big data analytics applications – met the utility's complex needs immediately. In December 2016, one month after contract execution, mPrest supplied an integrated proof of concept version of the Distributed Energy Management System (mDERMS) application. Since mDERMS is vendor-agnostic and supports a 'best of breed' strategy, mPrest was able to integrate Vector's internal operations platforms in a short time. After four weeks of data collection, interface definition and integration efforts, the PoC application was connected to operational systems. mDERMS seamlessly united customer-facing DER functions, such as electric vehicle charging, energy storage and demand response, with internal operations such as distribution automation, into a single command and control system. The integration included nine different Operational Technology (OT) systems including GIS, SCADA, BI tools and asset management tools, onto a single integrated system for monitoring, analytics and control, for use both in and out of the control room.

mPrest's Intelligent Grid Management "system of systems" approach presented unique value - not only could mDERMS display all the above platforms on a single screen, but it also executed end-to-end processes, allowing inputs from one system to effect changes in other systems. Such an ability enabled Vector to automate processes that in the past required manual work and coordination between systems and teams.

For Vector, mDERMS is transforming DERs into powerful tools which enhance system efficiency and resiliency, maximizing the value of customer-owned and Vector-owned DERs and delivering improved network reliability. mDERMS will not only allow Vector to improve operational efficiencies, but also enable it to offer new services to its customers – including the choice of clean energy sources, as well as supporting peer-to-peer energy trading.

A revolution for system performance management

After a successful proof of concept, Vector decided to implement mDERMS network-wide. As both DERs and DERMS will evolve, a key deciding factor to use mDERMS is that this technology is flexible and future-proof, capable of incorporating the expected changes that Vector will require in order to maintain an effective grid. Based on the speed and quality of delivery and effectiveness of the working system, Vector made a strategic decision to strengthen its long-term relationship with mPrest by becoming an investor and reselling partner of the company.