

DTE – Loop Scheme Performance, Energy Storage Sizing, and Asset Health Monitoring with Seeq

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Relevant Work Experience9 Years utility industry6 Years work in SCADA Design

Current Projects CVR/VVO Large Scale Utility BESS implementation EV Fast charging/Fleet Charging Solutions/Bidirectional Inverters DER Gateways



DTE Overview



 DTE is a Detroit-based diversified energy company involved in the development and management of energy-related businesses and services nationwide. Its operating units include an electric utility serving 2.2 million customers in Southeastern Michigan and a natural gas utility serving 1.3 million customers in Michigan. The DTE portfolio includes energy businesses focused on power and industrial projects, renewable natural gas, and energy marketing and trading.



Recloser Loop Scheme Performance



- Measuring performance of combination of distribution switching devices and impact on number of customers and customer outage duration.
- Regulatory reporting requirement.



SOLUTION

 Using Seeq workbooks and element relative relationships to discover time periods where device operations occurred, and which customers were most likely benefited as a result of the switching.



RESULTS

- Significant reduction of time to discover events
- Utilized capsules to verify that devices were functioning properly during the event.
- Compute number of customers affected duration & customer minutes affected for regulatory reporting.



Detection of Long Duration Load Transfers



Quickly discover multiple events over the course of the year

Establish which Devices operated and their duration



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Energy Storage Sizing



• Rural Substation feeding ~2k customers across 70 miles currently operating at 124% firm rating.



• Install 500kW of Solar Generation and 4 MWh Battery.



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RESULTS

SOLUTION

• Solar to reduce duration of the over firm events and peak MVA. Battery can be used for peak shaving to cut all but two events over the last three years.



Substation is over firm rating less than 1% of the year



3 x •	Firm Rating	4.5 MVA		
		1/1/2019 - 1/1/2020	1/1/2020 - 1/1/2021	1/1/2021 - 1/1/2022
3 x . •	Peak	5.5766 MVA	5.3475 MVA	5.4452 MVA
3 x . •	Max MVA Over Firm	1.0766 MVA	0.8475 MVA	0.9452 MVA
3 × • •	Max MVAh Over Firm	8.04 MVA·h	3.1366 MVA h	6.741 MVA·h
3 × • •	Duration Over Firm	27.937 h	59.362 h	35.688 h
3 × • •	Instances Over Firm	3	10	7



500kW of solar generation reduces the duration of the over firm events and peak MVA over firm.





Based on load with 500kW solar generation, a 1MWx4MWh batt has enough capacity to prevent all except two over firm events





Battery discharges during over firm events up to a max of 1MW for a total of 2.4 MWh of energy, then changes once load drops below firm





Asset Health Monitoring - Future Use Cases



- Determine precursors for equipment failure events
- Identify opportunities for predictive maintenance



• Discovering outliers and patterns.





• Preemptively address and replace equipment before it has the chance to fail.



 One example is the predictive analytics on capacitors & regulators – Momentary analysis on Reclosers – Classifying reliability for our customers.





For more information and event updates, please visit seeq.com