The Value and Promise of Meter Voltage Analytics

Like all utilities, the electric grid infrastructure is at risk of fraud when customers divert power from the line side of the revenue meter. Until smart meters were installed, this fraud went undetected during billing reads and even by meter readers who would visit properties each month to read the meter and visually inspect the utility's equipment located on the customer's property. Diverted loads are often hidden behind customers' walls or buried below ground and, when undetected, continue unabated. Costs are passed on to rate payers who, on average, pay an additional $120 per year to make up for the cost of theft in the typical 100,000-meter example.

SMART grid meter voltage analytics provides the opportunity to stop this fraud by exposing various types of anomalies that are strongly associated with diverted loads. This approach simultaneously delivers other capabilities including:

- ***Optimizing transformer operational integrity-efficiency:*** Voltage analytics enables utilities to verify that transformers aren't exceeding their KVA limit, and allows them to evaluate transformer duty cycles and correct mis-mapping of meters to transformers.

- ***Increasing safety:*** Diverted wires with no secondary voltage protection are very hazardous, and any type of short on the utility side of the meter has the potential to act as an arc welder and continue to burn, as there are no breakers for auto shut-off. Voltage analytics can identify opportunities to prevent fire or electrocution at the meter, while also protecting utility employees who must investigate overheated transformers.

- ***Improving service:*** in addition to cutting theft-related costs, utilities can use voltage analytics to prevent damage to rate payers' connected electrical equipment and associated liability due to large diverted loads and faulty secondary connections, and to improve service quality by preempting transformer overuse, overheating and unplanned outages.

- ***Aligning with sustainability initiatives:*** The headlines are full of stories about state/local initiatives to offset high energy usage by marijuana cultivators and other residences above 600% of baseline. Marijuana growers, in particular, may not be willing or able to invest in carbon offsets and transformer upgrades these initiatives require, increasing the likelihood of diversion.

Adding voltage analytics to a SMART Grid technology toolkit delivers a variety of benefits that are paid for through the technique's high rate of success in identifying diversions so that utilities can recover revenues.