



OVERVIEW

Knowing which customer is served from each transformer is essential for utilities to forecast load growth, EV penetration, associated system reinforcement investment requirements, and manage communications for power shutoffs, to name a few. But most utilities have many incorrect assignments between customer meters and distribution transformers.

UMS Group was engaged to develop a series of methodologies to find instances of customer/transformer misassignment. We analyzed data from GIS-distribution assets, customer records, reliability events, and AMI data files to develop a range of algorithms to identify instances where the assignment of each customer meter to distribution transformer was suspect.



METHODOLOGY

UMS Group utilized four methodologies to identify customers that were incorrectly assigned to their currently associated transformer in the system (i.e. their “transformer of record”). All four methodologies were run independently and the results were then aggregated for comparison, determining the likelihood of misassignment, and, where possible, identifying the most probable accurate assignment to a different transformer.

- Method 1 – Distance: At a high level, this is an analysis of the distance from the customer to its assigned transformer, utilizing lat/long coordinates of each. If the distance exceeded a designated threshold, it was flagged.
- Method 2a – Smart Meter Clusters: The assumption is that if a transformer experiences an outage, all smart meters (99% of the system) fed from that transformer should have outage event timestamps within a few minutes of each other. For a particular transformer outage event, if a meter outage timestamp falls outside the norm for the majority of the cluster, it would be considered misassigned.
- Method 2b – Transformer vs. Smart Meter Outages: At a high level, this is a check of the transformer outage records vs. the smart meter outage records per customer - i.e. a meter outage record does not match a corresponding transformer outage record, or vice versa.
- Method 3 – Transformer Loading: The transformer was considered overloaded (and therefore potentially misassigned) if the peak load kVA was greater than a threshold (e.g. 200% of the transformer name plate rating).

Case Study: Misassigned Customers Identification



DATA UTILIZED

Transformer/customer records, smart meter outage records, transformer loading information.



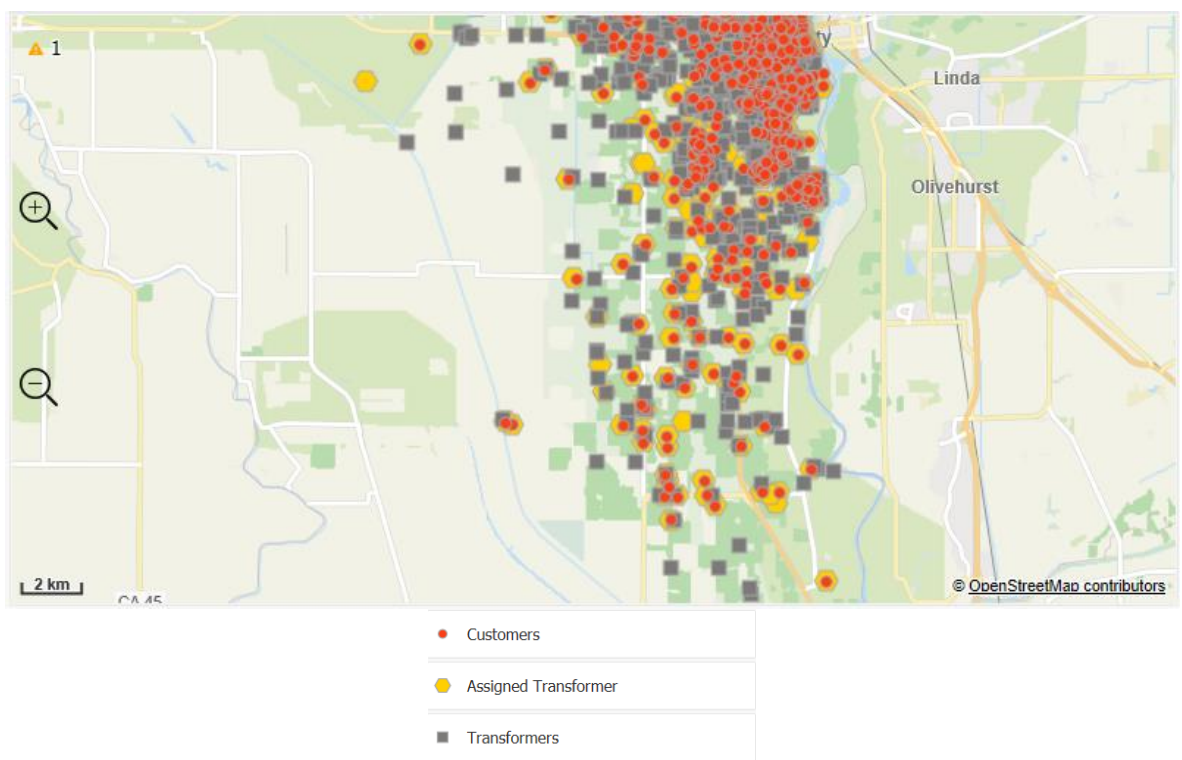
CHALLENGES

General data quality issues.



SUCCESS

~80% successful at flagging misassigned customers using the distance methodology
~80-90% positively identified misassigned customers using the cluster approach



Map of the customers and transformers from the misassigned customers project, as seen in the UMS Group analysis platform.