bidgely **hydro one**

CASE STORY

Gearing Up for the EV Revolution

Electric vehicle adoption in Canada currently remains relatively low. However, that number is forecast to scale exponentially because the Canadian government has established a mandatory target that all new light-duty cars and passenger trucks sales must be zero-emission by 2035.

Hydro One is preparing to stay ahead of the curve and in the driver seat, by investing in comprehensive EV management tools that will help them optimize EV driver engagement and charging load management.

Enter EV Intelligence

Data sits at the heart of any successful, scalable EV engagement and load management program. To successfully manage EVs on their grid, utilities must have insight into who has EVs, when and how they are charging, where they are charging on the distribution network, and what charging load will look like in the future.

In order to answer these questions, Hydro One utilized Bidgely's UtilityAI™ platform tool: Analytics Workbench. **With Analytics Workbench, Hydro One has been able to harness deep and actionable insights from its AMI meter investments.**

UtilityAI™ isolates (disaggregates) EV charging sessions from the "noise" of household consumption, enabling utilities to detect EVs at the premise level with greater than 90 percent accuracy.

Disaggregation allows utilities to detect all EVs in their territory in an all-inclusive and non-discriminatory manner. This approach can provide remarkable outcomes in delivering the "full picture" when it comes to EVs on the grid with no customer action required.

Phoebe Chang, Network Management Engineer at Hydro One, shared an example of this order of magnitude:

> When we relied upon annual customer surveys, fewer than 1,000 of our customers self-reported that they owned an EV. By contrast, when we turned to our AMI data analytics, **we were able to identify 20,000 EV owners charging on our grid**," Chang said. "By identifying that far larger population, through Bidgely's tool, we're empowered to both deliver more meaningful value to our customers in optimizing their EV ownership experience, while also improving our ability to effectively plan for the future."

Relying on the survey for EV reporting had created a vast data shortfall. With Analytics Workbench, Hydro One has on-demand insights into which customers own EVs and when and how they're charging their vehicles. With a comprehensive, accurate, and near real-time picture of EV adoption and behavior, Hydro One has gained valuable information to conduct bottom-up feeder and transformer load analysis.

Using Bidgely's true disaggregation, the utility was able to identify not only a total residential charging load for 2022, but even the day and hour of its peak EV charging demand: December 21, 2022 at 9 p.m.

8760 Demand Curve (Total Demand)
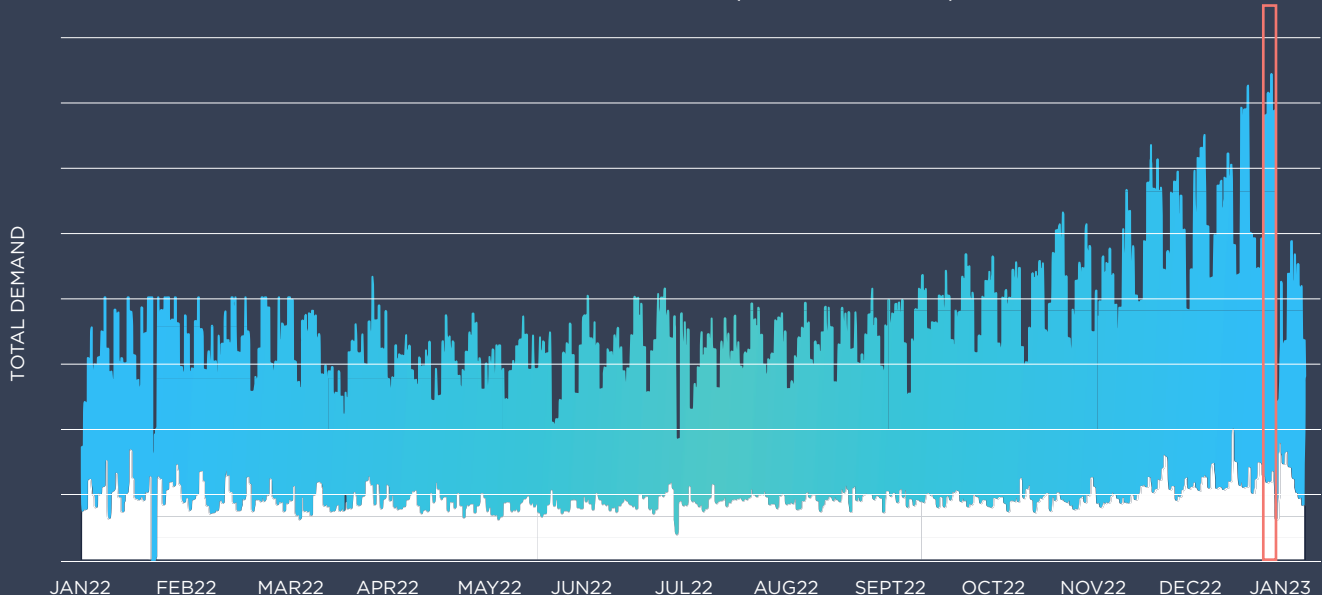
Prior to this, in order to compute the EV charging load on our system, we would assume that each customer was going to charge 2500 kilowatt hours per year, and then multiply that by the number of customers we estimated to have an EV to arrive at a total charging load figure, Chang explained. **"But now we can disaggregate it straight from our smart meter data and determine the amount of residential Level 2 charging that we're seeing on our system today."**

Similarly, the utility was able to determine the total MW and kW/EV that residential EV charging load contributed during its 2022 system peak on July 19, 2022.

kW per EV on 2022 System Peak Day

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

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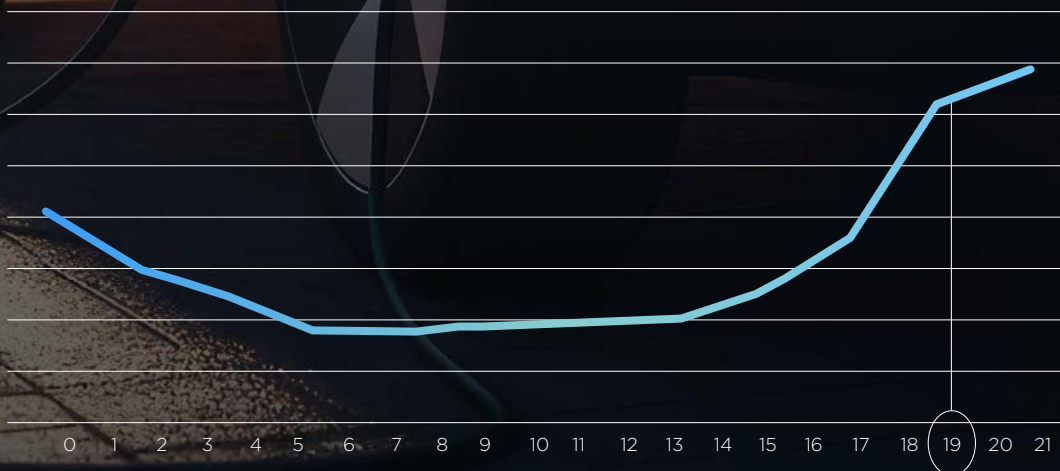
And we were also able to compare the load contribution per EV customer at different asset levels," Chang described. "We observed that at the system-wide level, the EV load contribution for end customers is not as high, likely due to the diversity of charging. On the other hand, when you look at a lower level station, which has fewer end customers, the kilowatt-per-customer is greater due to the loss of charging diversity."

The utility also learned that during peak charging periods, the EV contribution to load at the distribution and transmission level is higher than its contribution at the system level.

Hydro One is also able to visualize its residential EV load shape for the first time, which is instructive when it comes to determining the load shift impact of rate plans.

In Ontario, all utilities offer three rate plans: TOU, ultra-low overnight (ULO) and tiered.
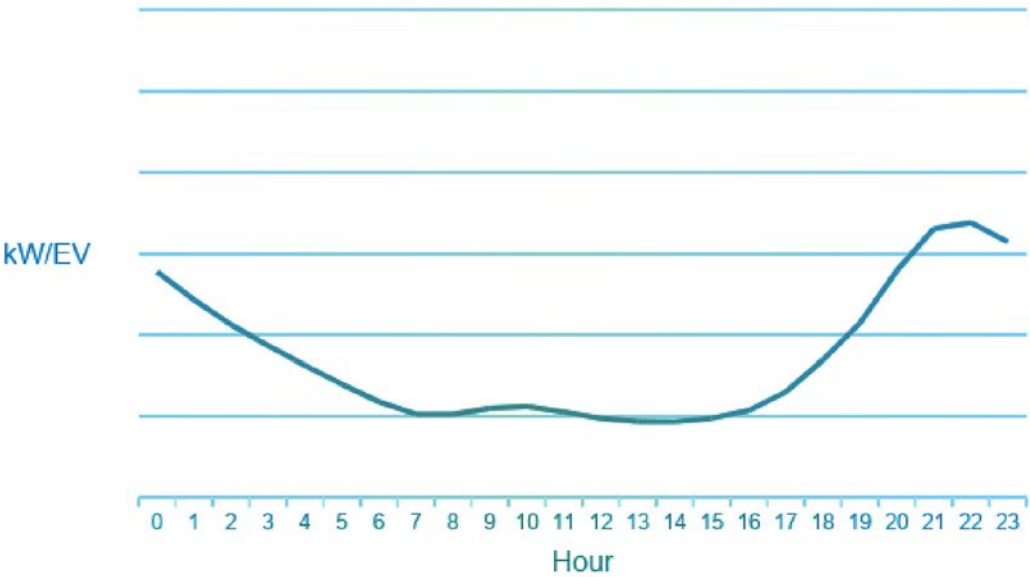
> At Hydro One, customer experience is very important to us. Understanding whether customers charge every day, or charge periodically is important. So is knowing the time of use," Chang said. **"Having a better, more granular view of EV charging behaviors helps us better serve our customers and manage the grid accordingly."**

Additional Opportunities to Leverage Bidgely Data

(1) **Continue to monitor** the proliferation of EVs within its service territory

(2) **Identify** charging behavior by different geographic areas and different rate classes

(3) **Determine** load impact of EVs at different asset levels

Gaining a deeper understanding of customer charging behavior will play a pivotal role in achieving all three goals.

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Learn More:

Get Shift Done with Bidgely's Complete EV Management Solution
https://www.bidgely.com/solutions/ev/

DER Grid Planning with Bottom-Up Behind-the-Meter Visibility
https://www.bidgely.com/solutions/der-grid-planning/