

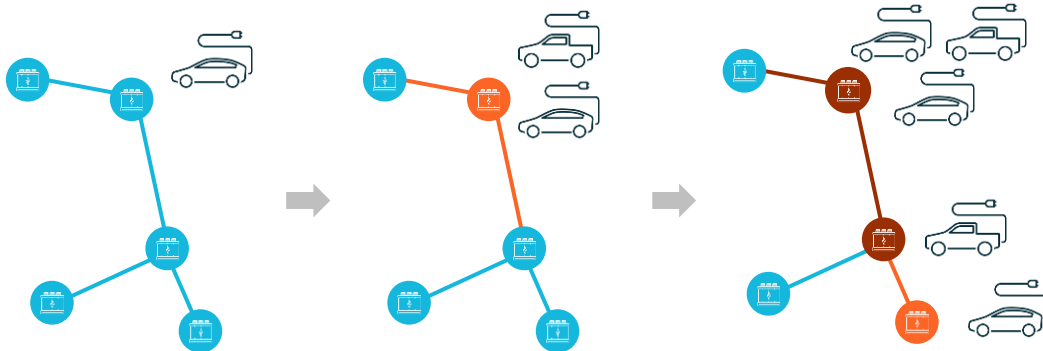
Distribution Integrated Smart Charging Orchestration

ESIG Technical Workshop
March 2024

Kyle Garton

The grid was not designed with EVs in mind

OVERLOADING FROM EVs LEADS TO DISTRIBUTION ASSET AGING AND FAILURE



Complex challenges for utilities at the grid edge.



80% of charging happens at home w/ limited visibility



Level 2 charger = can double a home's demand



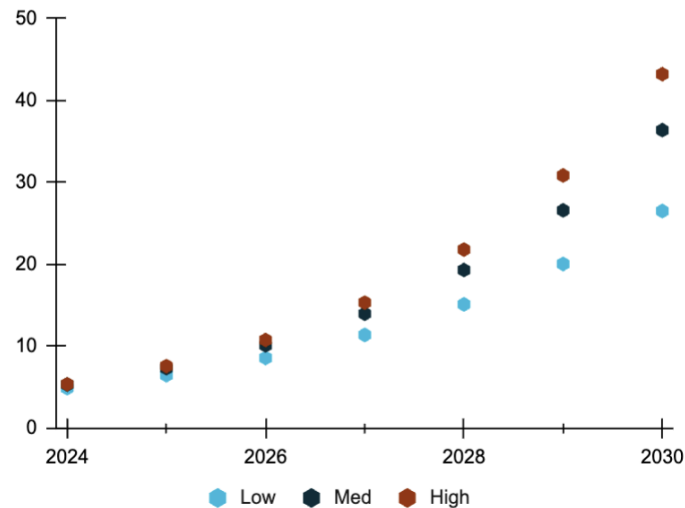
EV adoption is very clustered in low growth neighborhoods



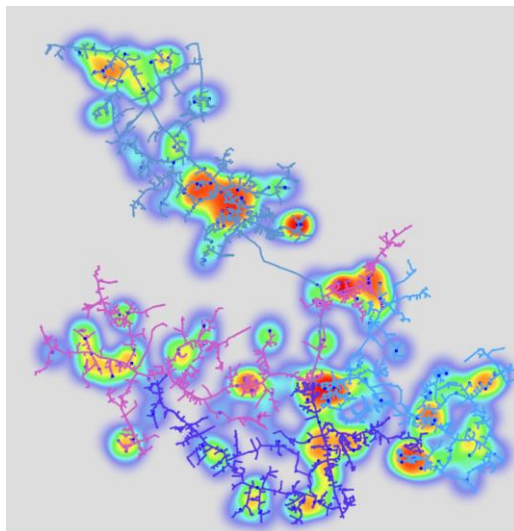
Local transformer supports 4-10 homes

The EV transition may be costly

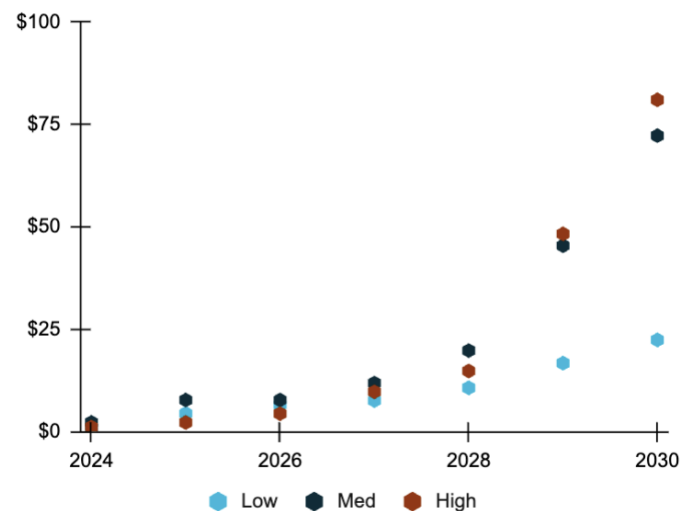
National EV Growth Projections (millions)



Distribution Loading Impact

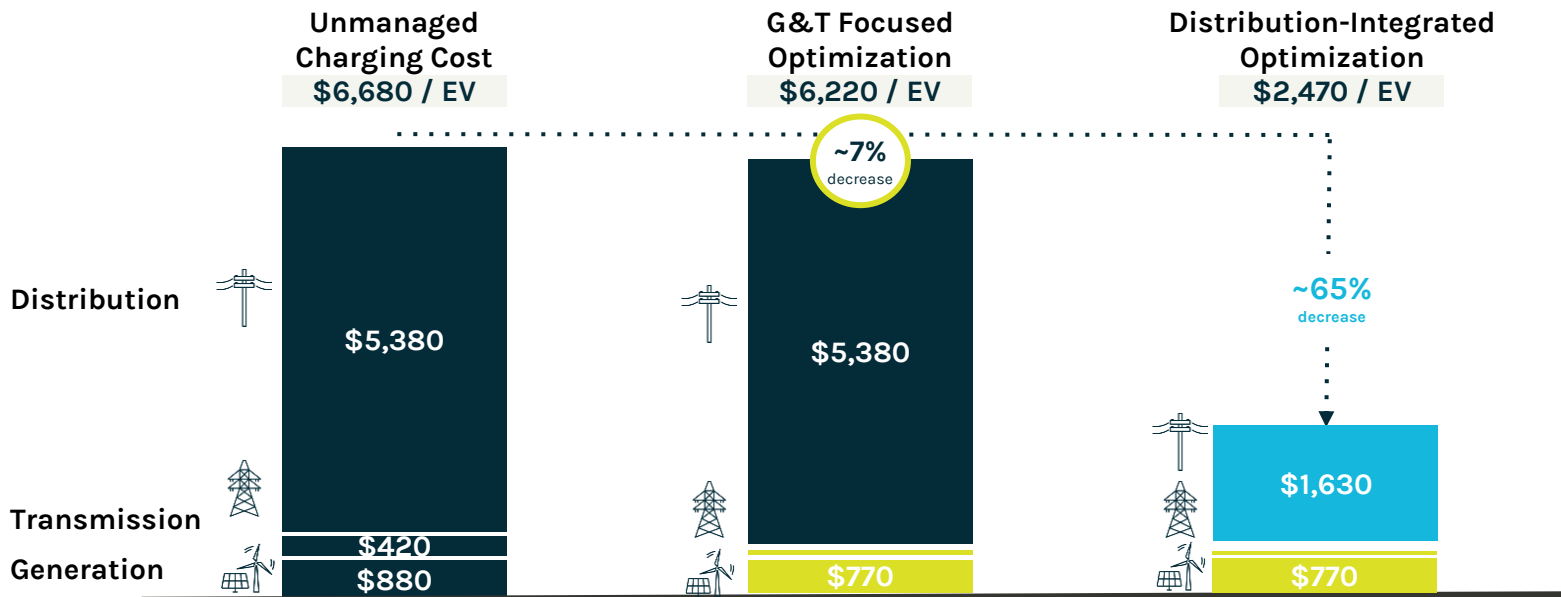


Service Transformer Upgrade Costs (\$M cumulative)



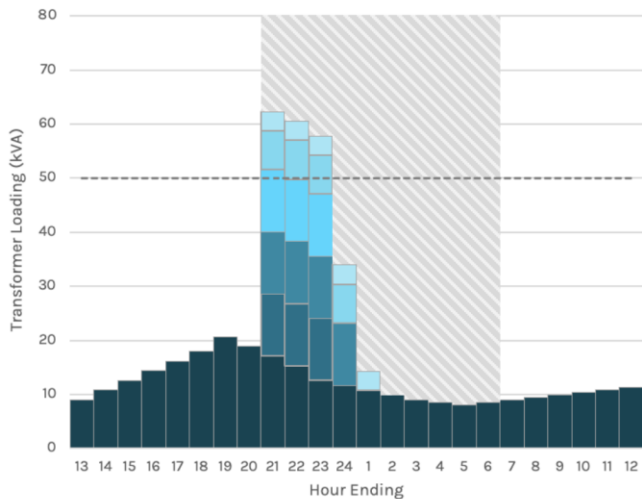
Preparing the grid for EVs will require distribution-focused optimization

Cost or Investment per EV through 2030 (\$)

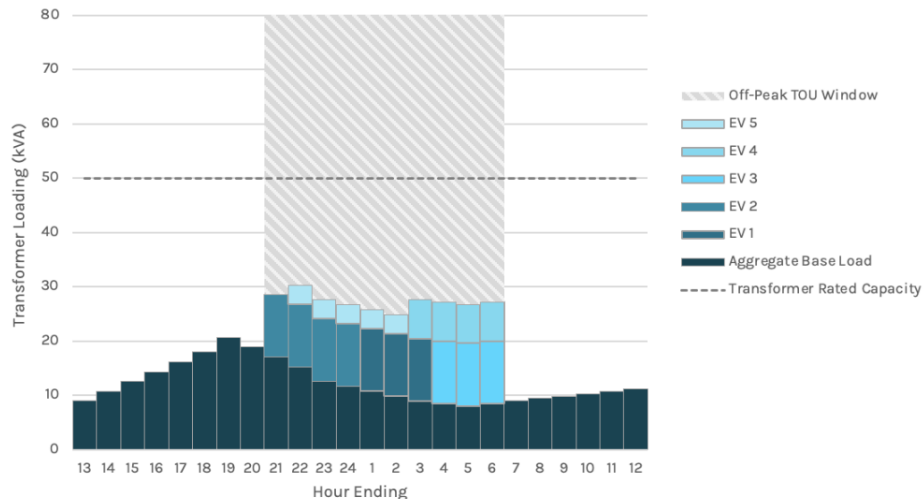


Digital Infrastructure Optimizes Traditional Infrastructure

TOU SCHEDULED CHARGING



DISCO-OPTIMIZED CHARGING



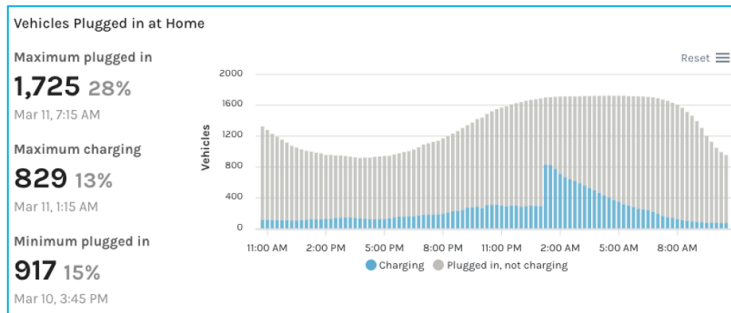
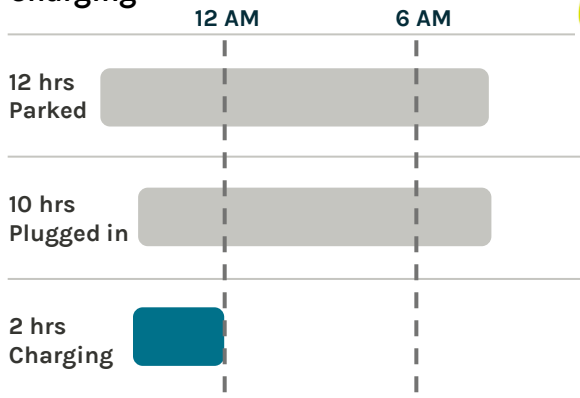
Simulated example

There is no right time for **everyone** to charge.

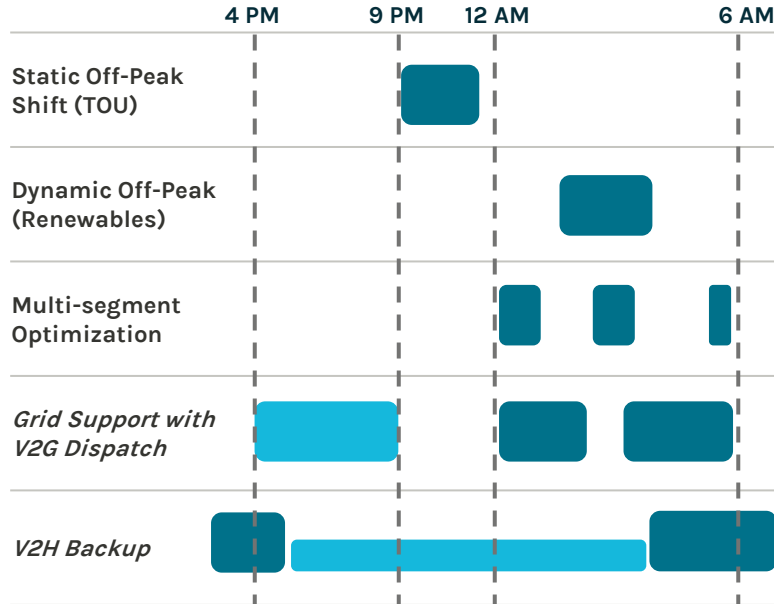
There is a best time, speed, duration, and location for **each** charge.

EV flexibility enables optimal response to grid conditions

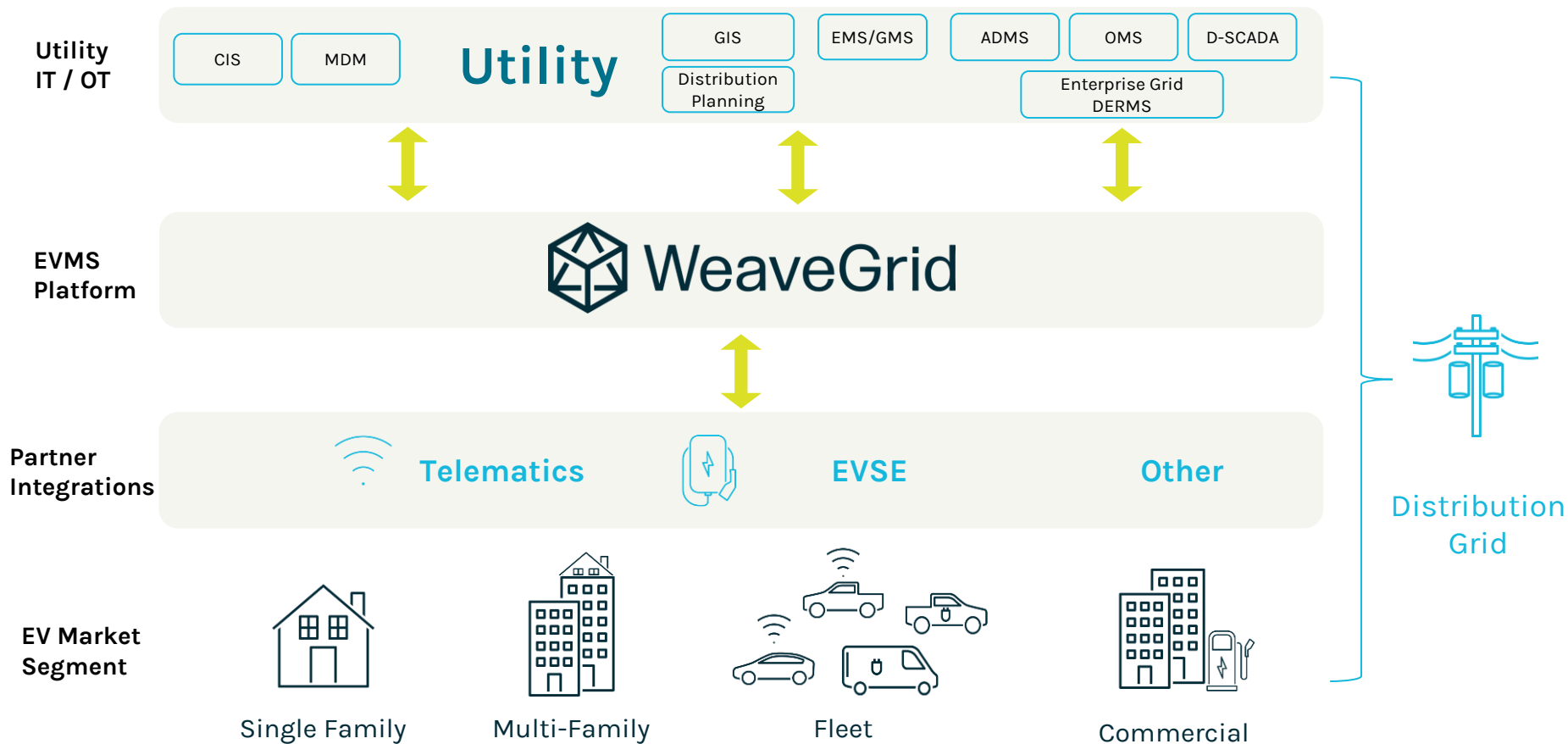
Unmanaged Charging



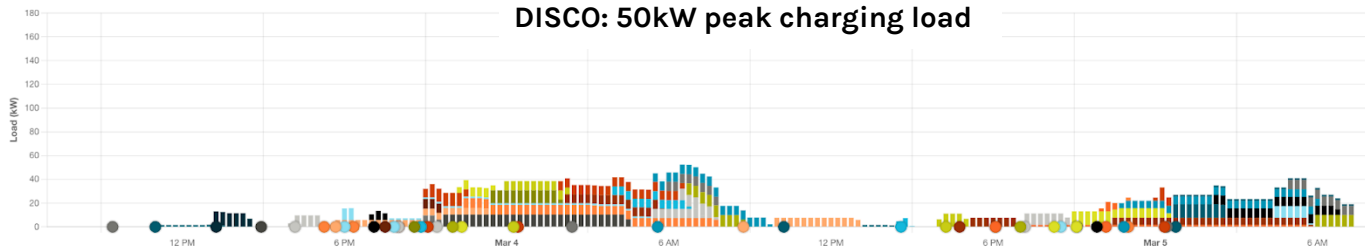
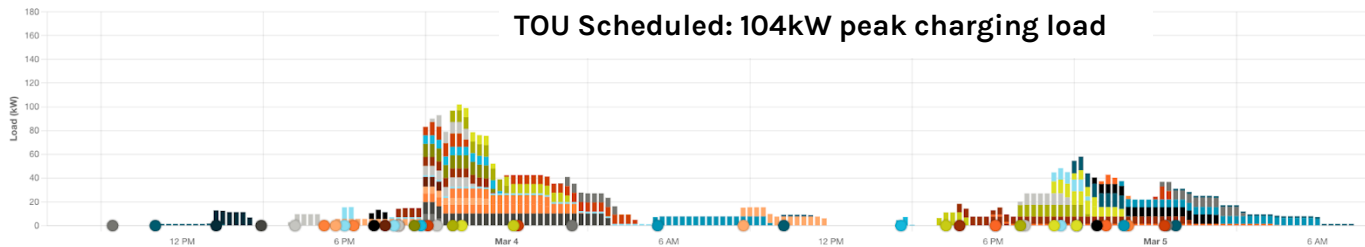
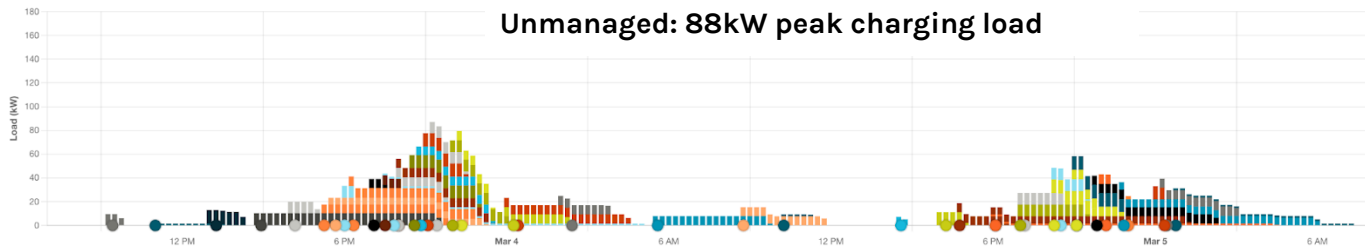
Charging with WeaveGrid Optimization



EVs are special, but can be integrated with utility operations



Significant results with minimal data



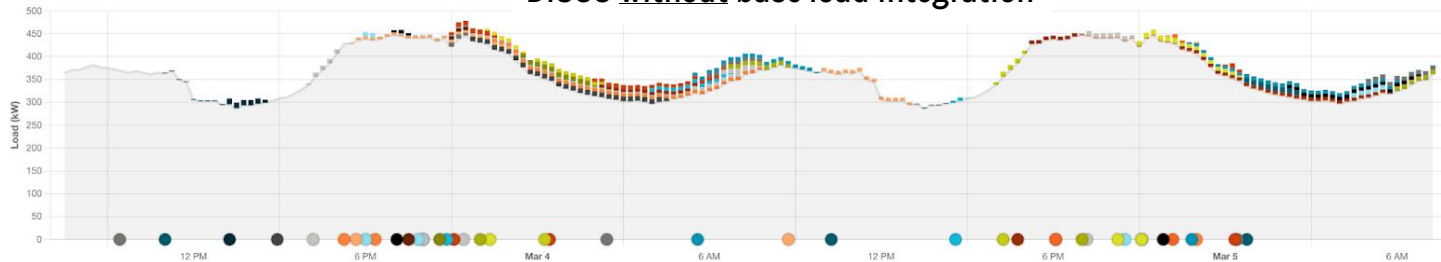
Scenario:

- 48 hour period (Fri-Sat)
- Segment of a high EV penetration feeder
- 53 total EVs
- 32 active EVs in period
- 44 charging sessions

~50% peak charging load reduction via automated optimization

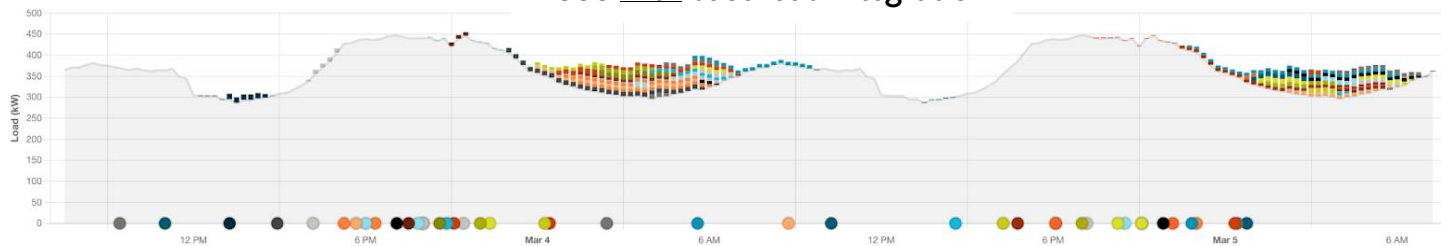
More data enables more optimization

DISCO without base load integration



EVs may still contribute to local peaks if other load is not considered

DISCO with base load integration



~95% reduction in net peak contribution via automated optimization

Thank You!

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