

Charging and Energy Management for Avoided Utility Service Upgrades

The Mobility House, June 2020

TMH ChargePilot Solution

The Mobility House's (TMH) proprietary software, ChargePilot, is a Charging and Energy Management (CEM) system which enables reliable and cost-efficient charging of electric fleets, while keeping customers below utility interconnection limits. The CEM system processes different real-time parameters to optimize when and how much to charge each vehicle. In order to ensure the highest level of reliability, the system architecture of TMH's LEM solution, ChargePilot, applies both local and cloud intelligence. ChargePilot has been successfully deployed in both of the main load management configurations offered by TMH

1. Simple Charging and Energy Management, which optimizes fleet charging load.
2. Dynamic Load Management, which also optimizes fleet charging load but also considers the available power for charging based on existing building/site load.

ChargePilot deployments for avoided upgrades

TMH has deployed Charging and Energy Management software to avoid utility interconnection limitations in various Light Duty and Medium-Heavy duty electric fleet applications throughout Europe. Some of these installations include.

[ASB – Light Duty fleet with avoided interconnection upgrade](#)

Arbieter-Samartier-Bund (ASB), a Munich nursing home, has electrified their fleet for meal delivery and avoided utility service upgrades with use of TMH's ChargePilot software. ASB installed 9 AC 22kW wallbox chargers in an underground parking garage for their 8 vehicle light duty fleet as well as employee vehicle charging. Without CEM, the grid connection at this location would have been overloaded; with software, ASB was able to keep the load well below the ~75kW limit and save the equivalent of >\$38,000 USD for upgrades. In addition, CEM saves this customer up to \$14,000 USD in demand charging costs annually.

[Netherlands – Heavy Duty fleet kept below interconnection limit](#)

TMH's Charging and Energy Management software, ChargePilot, has also helped one of the largest electric fleets in Europe keep below 20% of their current utility connection limit. This fleet, consisting of 100 heavy duty vehicles, uses 7 DC 450kW pantograph chargers for opportunity charging. CEM allows the site to stay at a limit of 1MW throughout the >150 charging sessions per day, 1/5th the total 5MW power available at the site; and saves the fleet operators several hundred thousand dollars annually.

[Porto Santo – Avoided grid expansion to remote island](#)

A small island in the Atlantic Ocean, Portugal's Porto Santo has utilized Charging and Energy Management software to avoid a costly grid expansion and become an entirely CO₂-free island. Working with the local energy provider, TMH integrated 22 electric vehicles along with 40 smart charging stations, 2 of which are bi-directional, with solar, wind, and second-life battery stationary storage on the island to reduce the need for grid expansions to the island or diesel generators.

Other information – Hamburg Distribution Grid Benefits with Charge Management

With the most charging points of anywhere in Germany, Stromnetz Hamburg the local distribution operator in Hamburg has analyzed the impact of charging peaks on the local grid infrastructure. In 2018, Stromnetz Hamburg ran a load development analysis to identify critical situations for uncontrolled charging of EVs at 11kW and 22kW. They found that a 3% share of EVs in their territory (20,000 EVs in private infrastructure) would cause 200 bottlenecks with issues in the low-voltage grid; and a 9% share (60,000 EVs in private infrastructure) would lead to bottlenecks in 15% (800) of the feeders in the city's distribution network. To avoid this, Stromnetz Hamburg found that in this 9% scenario they would need to reinforce ~10,000 km of 0.4kV cable lines, costing an investment of >20M EURO, not including the additional significant cost to replace the overloaded transformers. As a more cost-effective solution, Stromnetz Hamburg partnered with Siemens to install units for smart charging control and monitoring at 30 charge points. This solution will decrease the number of EVs charging simultaneously on the same local grid and reduce charging load peaks, for example the 11kW chargers can be reduced from 16A to 8A. The estimated cost of this solution is only 10% the cost of reinforcing cables, around 2M EURO.

[\[see IRENA_Innovation_Outlook_EV_smart_charging_2019.pdf\]](#)