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Poster Title: Driving Down the Peak - Using Load Shape Data to Develop Demand Reduction Programs

Abstract: Objective: The objective of this poster is to demonstrate how the overall system peak for a Northeast utility is not set by an accumulation of absolute customer peaks, but rather is the aggregation of "shoulder" peaks. It was the Company's assumption that certain conditions, namely a combination of heat and humidity, cause each individual customer's load to spike which in aggregate then creates a system peak. Through this analysis it was possible to see that the system peak was not the result of every customer peaking at the same time and in fact was not the result of many customer's top load hours at all.

Results/Achievements/Concepts: Peak load is a driver for capacity requirements, capacity cost allocation, transmission and distribution infrastructure, and high energy prices. For this reason, reducing system peak demand is a key objective for many utilities and public utility commissions. The analysis presented in the poster is an effort by the utility to disaggregate system peak demand in New England. The utility examined the issue following a top down approach. ISO level – the Company carefully examined when the ISO peak was occurring, noting that the peak has progressively moved further back in the day, likely due to the penetration of solar. Distribution level – the Company reviewed load shapes by rate class and how coincident those load shapes were with the overall system peak. Customer level – Lastly, the Company took a random sample of 300 C&I customers and reviewed how coincident each individual customer's load shape was with the overall ISO system peak.

The poster will present customer and rate class load shapes and a comparison of those load shapes to the overall system load shape. This will show that the overall system load shape does not exactly resemble the load shape of any individual rate class or customer. We then delve further into the system and show that many customers do not peak at the same time as the system peak. Rather the system peak seems to be an aggregation of customer "shoulder" peaks. However, the analysis did show that certain industry verticals tended to be more coincident than others. Data will be presented on individual customer's load shapes and to what extent their top 40 or 100 load hours are coincident with the overall system peak.

The ultimate goal of this analysis is to help utilities understand which customers to pursue for peak load reductions. Understanding when the peak is occurring, and how coincident an individual type of customer is with that peak, helps show which types of customers to pursue and which solutions might be best for them.

Worthiness: This analysis will help other program administrators (PA) as they develop demand focused programs to help reliability and ensure positive grid impacts from energy efficiency and demand response programs. By understanding what and who is driving system peaks, PAs can develop a portfolio of solutions that can effectively address demand at each level of the system and for each customer type.