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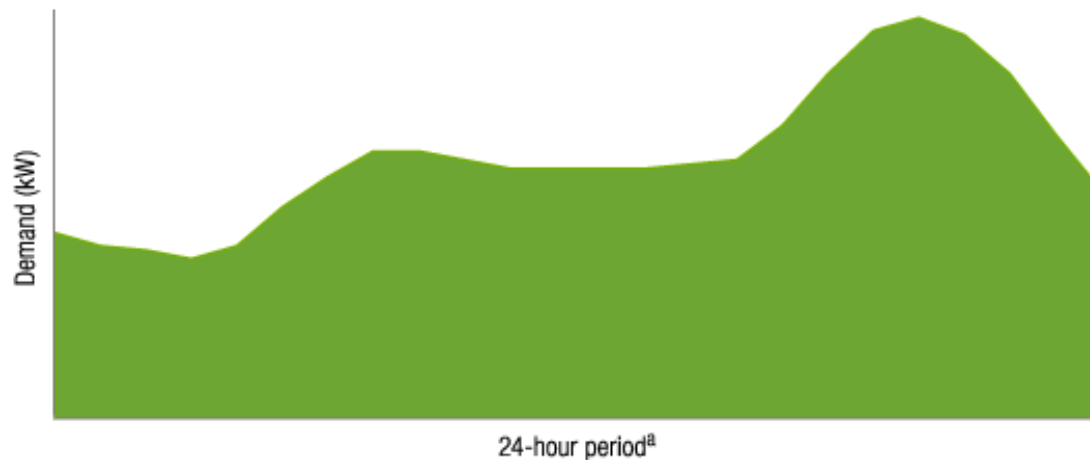
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Research: Load Side Thermal Energy Storage for Utility Peak Shaving



Background

- Cooling loads in commercial and residential buildings are among the highest in utility energy consumption
- Utilities must invest in infrastructure based on meeting the peak load, the flexible supply usually being provided by natural gas plants



Notes: kW = kilowatt.

a. 24-hour period = midnight to midnight.

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Motivation

- Significant grid penetration of solar energy technologies is inhibited by timing inconsistency between supply and peak load
- Renewables cannot effectively displace cost and resources invested into peaking plants, thus the benefits of installed renewable systems are not fully realized
- Thermal energy storage on a scale of several hours has the potential to alleviate this problem

Research Sequence

- Collect empirical data and model an existing phase change thermal energy storage system
- Utilize currently available and cost effective materials to model an ideal system built today
- Investigate the potential advantage of significant penetration of thermal energy storage on a utility's investment in infrastructure