Real Time Energy Management (RTEM)

RTEM describes a family of hardware, software, and services used to gain visibility into the live operation of energy-consuming and energy-producing building equipment. Hardware, software, and services communicate through cloud connectivity.

Grid-responsive Energy Management (GEM)

Grid-responsive energy management builds on NYSERDA's RTEM program to allow buildings to act as virtual batteries, using advanced controls and intelligent automation to quickly shed or shift load ("demand flexibility services")

RTEM monitors and connects energy and non-energy data points and controls into a comprehensive, cloud- based building operating system.

RTEM Program Details

30% cost share	project cost share for commercial (includes SMB, retail, universities, hospitals), multifamily and industrial buildings.
40	qualified vendors with active projects in NYS.
$70 million	in program incentives and other support.

Energy benefits from RTEM:

- Help customers save up to 10% to 20% on energy costs
- Avoid on-peak consumption and demand charges
- Provide ongoing fault detection and diagnostics, predictive analytics, and performance optimization

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RTEM in High Performance NYC Portfolios

- NYSERDA is working with dozens of the world's leading real estate portfolio owners and operators on RTEM.
- These companies represent more than 25% of NYC's Class A Office owners and they are responsible 67.8% of NYC's 245M+ sq. ft. of Class A Office space.[1]
- These companies spend between $687M and $830M in energy and maintenance-related expenses.[2]

[1] CoStar 2019
[2] BOMA International 2018 Office Experience Exchange Report

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Context for NYS Electricity

- NYS is targeting 70% renewables by 2030; a carbon neutral grid by 2040; and a carbon neutral economy by 2050.

- Difficult to permit large batteries in NYC, but NYC needs a lot of storage to support clean energy targets and accommodate closing of aging, fossil-fired Peaker plants, as well as Indian Point.

- Electrification of heating systems and vehicles are keys to achieving carbon neutral economy but will have significant impact on electric grid.

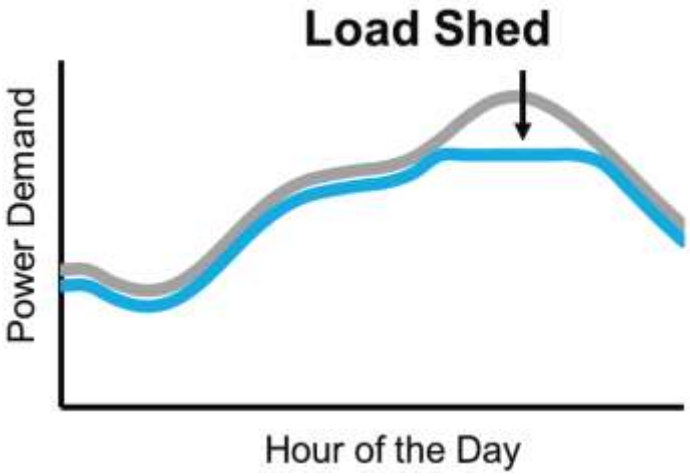
Context for Large Buildings in NYC

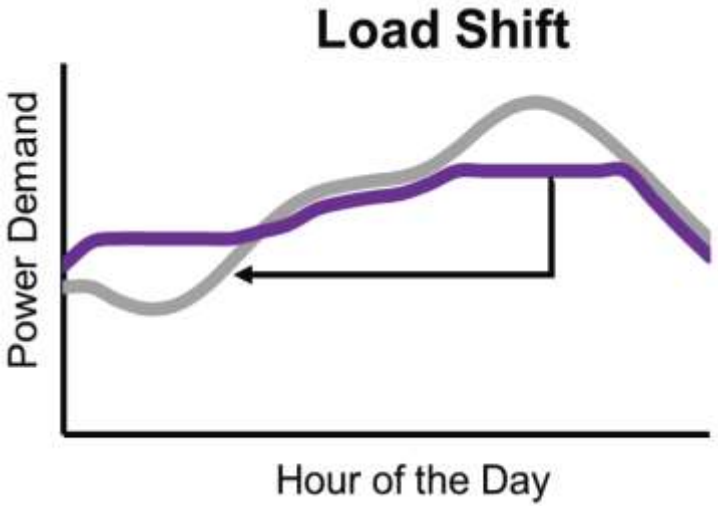
- Real Estate Owners are investing in the capabilities to manage their buildings' energy systems in real-time (a.k.a. "RTEM" or "Smart Buildings").

- Electrification of heating systems and vehicles will create new controllable loads to be dynamically managed in buildings so as not to overstress a highly renewable grid.

- "Virtual battery services" provided by buildings are beneficial to utilities and grid-users in terms of system cost and reliability.

Grid Responsive Energy Management (GEM) describes a market in which buildings can flexibly shed and shift load based on grid needs (likely rate based)





GEM: Anticipated Energy Benefits

Energy benefits from RTEM:

- Help customers save up to 10% to 20% on energy costs
- Avoid on-peak consumption and demand charges
- Provide ongoing fault detection and diagnostics, predictive analytics, and performance optimization

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Grid services which make renewable energy cheaper and more efficient to deliver through geographically-targeted demand reductions, load building, and system balancing. For example, GEM can help alleviate constraints associated with;

- Contingency reserves
- Non-wires solutions
- Generation capacity

GEM: Next Steps

Working with high performance CRE owners in the RTEM program to study their buildings and provide information on Load Shifting and Load Shedding use cases

Exploring opportunities to run demonstration projects with utility and NYISO partners

Continuing to support technical modeling and analysis to quantify the value proposition for GEM investment in NYS

And most importantly… continuing to invest in RTEM and energy efficiency