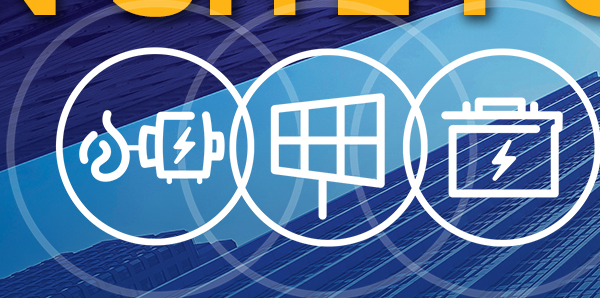




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ON-SITE POWER EXPO



Featuring Combined Heat and Power (CHP), Solar PV, and Energy Storage

On-Site Power Expo Partners



Batteries/Fuel Cells:

New York Battery and Energy Storage Technology Consortium - NY-BEST

Solar PV:

New York Solar Energy Industries Association - NYSEIA

Solar Energy Industries Association - SEIA

Combined Heat and Power (CHP):

Northeast Clean Heat and Power Initiative - NECHPI

CHP Association

World Alliance for Decentralized Energy - WADE

International District Energy Association - IDEA



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On-Site Power Expo Partners



Government:

U.S. Department of Energy
U.S. Environmental Protection Agency
NYS Department of Public Service
NYC Department of Buildings
NYC Retrofit Accelerator

Utilities:

Con Edison
National Grid
New York Power Authority
Long Island Power Authority / PSEG-Long Island

Finance:

NY Green Bank
NYC Energy Efficiency Corporation - NYCEEC

Clean Energy Implementation Support:

Sustainable CUNY
Pace Energy and Climate Center



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On-Site Power Systems can positively impact your triple-bottom-line

- **Financial** - Energy cost savings
- **Sustainability** - Reduced carbon footprint
- **Reliability** - Some configurations can provide power during a utility grid outage

When considering an On-Site Power System, it is good to also consider Energy Efficiency

- Energy Efficiency is the first, best investment (upgrade to better lighting, better motors, better insulation, better appliances, etc.)
- Fulfilling your needs by using energy more efficiently will minimize the size and installation cost of an On-Site Power System



NYSERDA Advice



An Individual Technology can deliver a successful On-Site Power solution

- *Solar PV* - Photovoltaics
- *Energy Storage* - Batteries
- *Combined Heat and Power (CHP)* - Also known as Cogeneration

A Hybrid (integrated, multi-technology) On-Site Power System can offer extra value in some cases, such as

- Solar + Storage provides firm production despite periodic cloudiness
- CHP + Solar + Storage provides robust resiliency and economically vibrant flexibility

Choose from an ample cadre of competent solution providers



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Energy Storage Overview



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Analytical support in partnership with GridMarket.

GRIDMARKET

Benefits of Using Energy Storage



What Energy Storage does for you

- ❖ Reduces Demand Charges on your electricity bill
- ❖ Allows you to participate in demand reduction programs
- ❖ Provides emergency power for lights, elevators and other critical items.

Benefits of Using Energy Storage

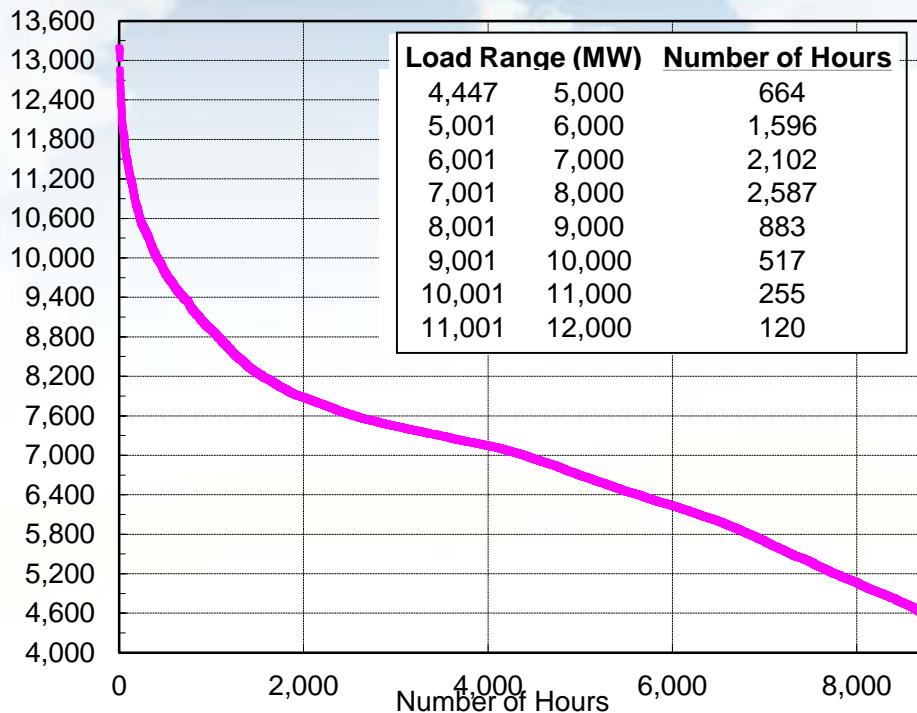


What Energy Storage does for the Grid

- ❖ Improving the efficiency and capacity factor (utilization) of the electric grid
- ❖ Integrating an increasing amount of renewable energy
- ❖ Enhancing the reliability and resilience of the electric grid

Peak Power is expensive

CECONY Service Area Load Duration Curve

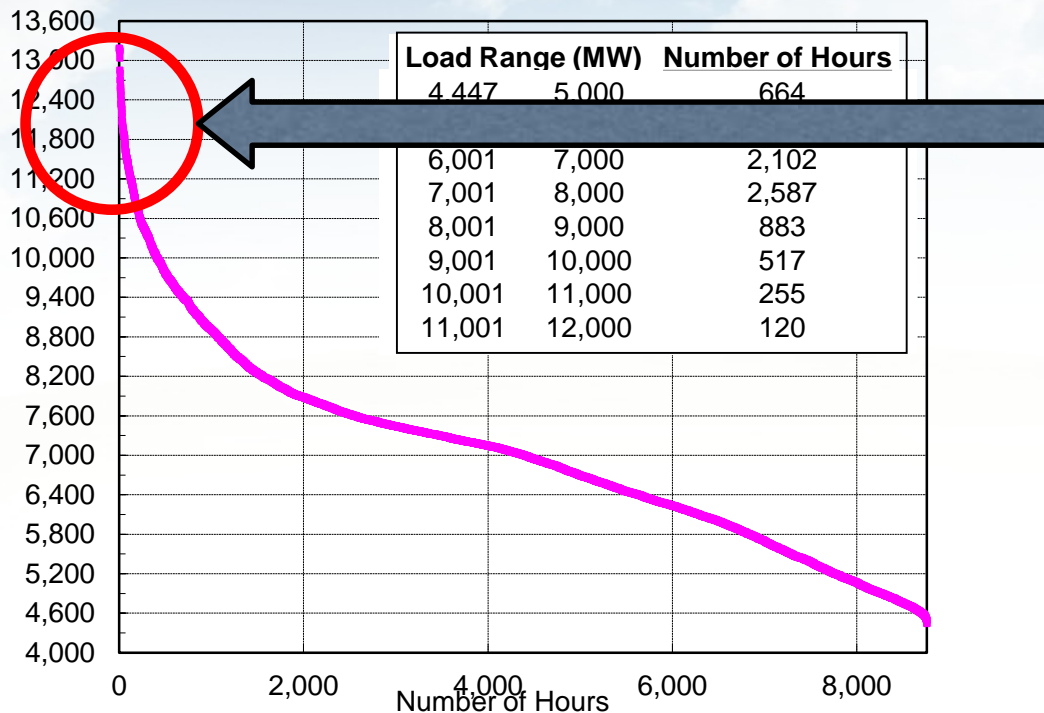


Generation and
Transmission built to
serve peak demand

Source: Consolidated Edison

Peak Power is expensive

CECONY Service Area Load Duration Curve

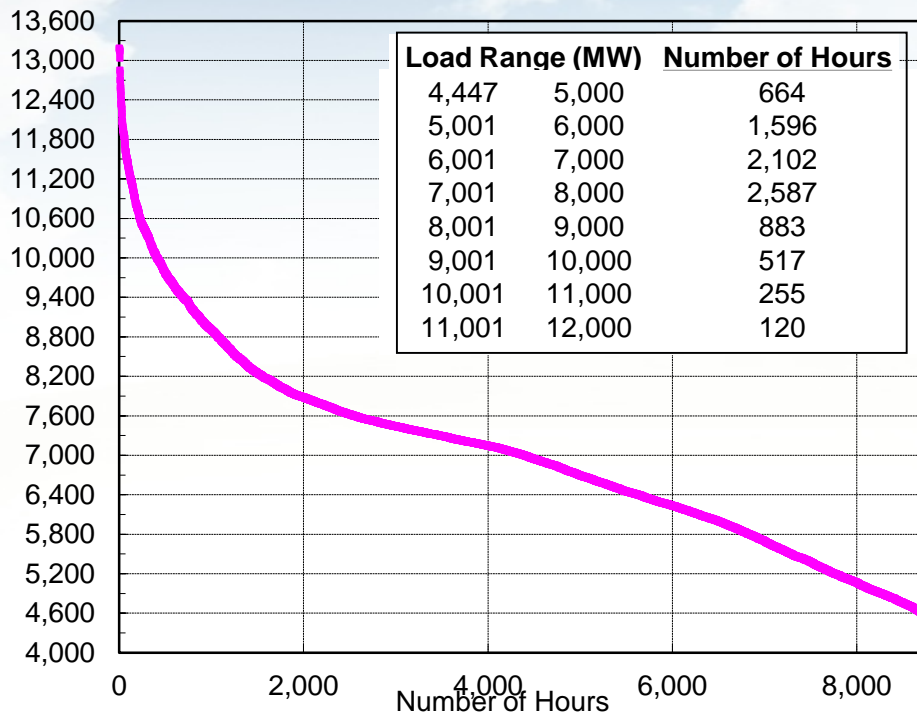


A Gigawatt of capacity is used less than 24 hours a year

Source: Consolidated Edison

Peak Power is expensive

CECONY Service Area Load Duration Curve



Source: Consolidated Edison

The Public Service
Commission
Estimates that the top
100 hours cost New
Yorker \$1.2 to \$1.7
billion per year

How reducing peak demand saves you money



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Demand Charges

- ❖ Depending on your tariff, you may be paying demand charges tied to peak electricity consumption
- ❖ If your peak usage is high at particular times of the day, an energy storage system can reduce your peaks (and demand charge)

How reducing peak demand saves you money



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Demand Response (DR)

- ❖ You can be paid to reduce your load at critical times. With an energy storage system, you can participate in demand response programs without adversely affecting your operations.
- ❖ DR programs are offered by both your utility to deal with local needs and the NYISO to deal with State-wide peaks.

How reducing peak demand saves you money



Reducing local grid costs

- ❖ Utilities offer location specific programs to reduce the cost of grid upgrades.
- ❖ Projects in identified areas can receive payments that offset the customers cost.

And you get resiliency



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Many customers opt to connect energy storage in a way that also gives them backup power for critical infrastructure

- ❖ Elevators
- ❖ Emergency Lighting
- ❖ Phone Charging
- ❖ Furnace (heat)

How to learn more

Talk to vendors and State resources

- ❖ NYSERDA (add websites)
- ❖ New York Battery and Energy Storage Consortium (NY-BEST)
- ❖ CUNY
- ❖ Grid Market

400kW/1600kWh Battery & 40kW PV Proforma



PROJECT PROFORMA

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
CASH										
System Cost	-\$1,920,000						-\$400,000			
NYSERDA MW Block	\$28,000									
ConEd DMP 2 Investment	\$320,000									
Income										
Battery Demand Response Revenue	\$117,400	\$117,400	\$120,922	\$124,550	\$128,286	\$132,135	\$136,099	\$140,182	\$144,387	\$148,719
Battery Supply Cost Savings ICAP		\$87,800	\$90,434	\$93,147	\$95,942	\$98,820	\$101,785	\$104,838	\$107,983	\$111,223
Battery Delivery Bill Savings	\$117,741	\$121,274	\$124,912	\$128,659	\$132,519	\$136,495	\$140,589	\$144,807	\$149,151	\$153,626
Solar Supply Cost Savings	\$4,102	\$4,225	\$4,351	\$4,482	\$4,616	\$4,755	\$4,898	\$5,044	\$5,196	\$5,352
Total Savings/Revenue	\$239,243	\$330,699	\$340,620	\$350,838	\$361,363	\$372,204	\$383,370	\$394,872	\$406,718	\$418,919
Expense										
Operations & Maintenance / Service Warranty		\$0	\$0	\$0	\$0	-\$26,800	-\$27,604	-\$28,432	-\$29,285	-\$30,164
Insurance	-\$1,920	-\$1,978	-\$2,037	-\$2,098	-\$2,161	-\$2,226	-\$2,293	-\$2,361	-\$2,432	-\$2,505
Total Expenses	-\$1,920	-\$1,978	-\$2,037	-\$2,098	-\$2,161	-\$29,026	-\$29,897	-\$30,793	-\$31,717	-\$32,669
Total Net Revenue:	\$348,000	\$237,323	\$328,721	\$338,583	\$348,740	\$359,202	\$343,178	\$353,474	\$364,078	\$375,000
TAX BENEFITS										
Federal ITC:	\$48,000									
NYC Property Tax Abatement	\$6,600	\$6,600	\$6,600	\$6,600						
Depreciation (MACRS 5-year):	\$326,400	\$522,240	\$313,344	\$187,680	\$187,680	\$94,656		\$68,000	\$108,800	\$65,280
Total Tax Benefit:	\$91,211	\$86,136	-\$3,773	-\$59,596	-\$70,496	-\$102,143	-\$145,278	-\$121,688	-\$109,408	-\$131,919
Net Project Cash Flow:	-\$1,572,000	\$328,534	\$414,857	\$334,810	\$289,144	\$288,707	\$241,036	\$208,196	\$242,390	\$254,332
Total Cumulative Net Project Benefits	-\$1,572,000	-\$1,243,466	-\$828,609	-\$493,799	-\$204,655	\$84,052	\$325,087	\$533,284	\$775,673	\$1,295,597

Non-Discounted Payback (yrs)

4.71

Net Present Value (NPV, 0.06)

\$1,605,152

20-year IRR

18.55%

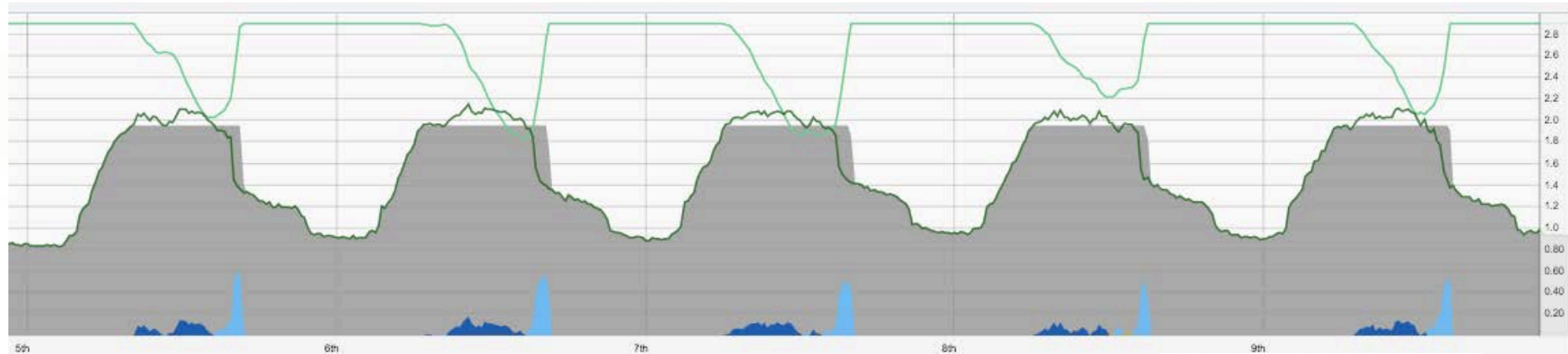
Analysis by GRIDMARKET

400kW/1600kWh Battery & 40kW PV Demand Charge Management



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- Building Loads
- Grid: Importing
- Grid: Exporting
- Battery Charging
- Battery Discharging
- Charge State (%)
- Renewables



Analysis by GRIDMARKET

Battery Storage: Business Case Benchmarks



- ❖ Simple Payback: 3-7 years
- ❖ IRR: 10-15%
- ❖ Savings to Investment Ratio: 1.5-3.0
- ❖ Positive Net Present Value

Battery Storage: Typical System Configuration & Footprints



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About NY-BEST



The New York Battery and Energy Storage Technology Consortium

MISSION: To catalyze and grow the energy storage industry and establish New York State as a global leader.

NY-BEST will do this by:

1. *Communicating information and facilitating connections*
2. *Accelerating Commercialization*
3. *Educating policymakers and stakeholders*
4. *Promoting New York's capabilities and markets*

If you're interested in further information, visit www.ny-best.org

Thank you



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