Energy Storage in Federal Buildings:
Advice Letter to GSA

GSA Green Building Advisory Committee
Building Energy Storage Task Group
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GBAC Building Energy Storage Task Group

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Batteries: Cost Curve
GSA GBAC BES: Task Group Mission

• Study the use of energy storage at federal facilities
• Determine if energy storage should be considered for use at federal facilities
  • Look at building storage systems (behind-the-meter) rather than grid storage
  • Determine the types of storage to be considered.
• Study potential benefits of building energy storage
• Determine procurement/financing options
• Study barriers to deployment
• Develop recommendations
Why Energy Storage?

• Grid carbon content varies throughout the day.
• Need to match:
  • renewable energy generation and
  • grid energy use
• Grid carbon content varies by region.
Key Technologies:

1. Chilled water storage

• Make and store chilled water (or ice) in tanks when energy has low carbon content.

• Use stored chilled water to cool the building when energy has high carbon content.

• Pros and cons:
  • Low cost but takes lots of space
  • Does not inconvenience users
  • Established technology
Key Technologies:

2. Hot water storage

- Make *hotter* water or *more* water when energy has low carbon content.
- Use stored hot water to when energy has high carbon content.
- Pros and cons:
  - New technology
  - BTO partnering with Advanced Water Heaters Initiative
  - Does not store large amounts of energy
Key Technologies:

3. Lithium ion batteries

- By far the fastest growing and most versatile type of building energy storage
- Ability to scale from single family residence to utility size

Source: Navigant Research
3. Lithium ion batteries

- Electric: Can allow an all electric building to run if the grid goes down.

- Coupled with photovoltaic systems can provide microgrids with capabilities for longer duration operation.

- Can reduce the need for standby generators.
3. Lithium ion batteries
• Some applications include:
  • Avoiding infrastructure upgrades
  • Standby power/bill reduction/resilience
  • Community disaster recover center
  • Utility company maintenance center – 7 days no power, water, gas, or sewer
Key technologies:

3. Lithium ion batteries concerns:
   • Fire safety
     • new codes addressing battery storage
     • Main concern Li batteries “thermal runaway” fires
   • Raw material sourcing
     • from environmentally sensitive areas
   • Nascent recycling industry
Energy Storage Benefits:

• Reduced electricity bills
• Provides grid support
• Potential to reduce carbon emissions
• Resilience
• Leadership

Energy Storage Challenges:

• Can cause delays in the planning process
• Policies/incentives are inconsistent nationally
• Cybersecurity
Procurement:

• Utility Energy Service Contract (UESC)
• Energy Savings Performance Contract (ESPC)
• Energy Sales Agreements (ESAs)
• Utility Service Contract (USC)
• Power purchase agreements (PPAs)
• Enhanced use lease (EUL)
• Utility privatization (UP)

• Department of Defense has special authority for public-public partnerships
Recommendations:

• Consider the use of energy storage on all projects going forward
• Develop a “roadmap” to assist GSA staff to make decisions on deploying energy storage in buildings
• Conduct further research non-financial benefits to stakeholders
• Develop case studies of successful projects
• Support the nascent lithium ion battery recycling industry
• Continue to track battery technology evolution
Case Studies:

• Department of Defense: US Army Base, Fort Carson, Colorado Springs, CO – completed 2019

• GSA and FDA: White Oak campus, Silver Spring, MD - completed 2013

• U.S. Marine Corps facility, Miramar, San Diego, CA – completed 2019

• Schwartz Federal Building and Courthouse, San Diego, CA – completed 2018
Questions

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