Energy Storage & Electrification Study for County Facilities

Presented by

Jeremiah LeRoy

Office of Sustainability

Purpose

- ✓ Understand possible next steps as net metered PV options become more limited
- ✓ Examine both the energy and economic impact of energy storage systems (ESS) and building electrification
- ✓ Utilize this analysis to develop a pipeline of new projects; develop and/or enhance policies to influence future growth and development

Energy Storage Systems (ESS)
What and Why?

Really Big Batteries

Benefits

- Demand Charge Savings
- Peak Reduction/Shifting
- Energy Arbitrage
- Solar Export Reduction

Building Electrification

AKA:

Beneficial Electrification
Building Decarbonization

What is it?

The shift to using electricity, rather than burning fossil fuel sources like oil, gas, coal, etc. in order to meet a facility's energy needs

Methodology

Evaluations consisted of:

- Site visits to confirm
  - current equipment
  - Equipment sizing
  - Layout, potential space limitations, etc.
- Utility consumption analysis (gas & electric)
  - Determine increased load requirements for fuel switching
  - ESS system right sizing and energy impacts
- Identify fuel switching and ESS opportunities; energy and financial implications for all recommendations
  - New equipment and cost estimates
  - Scenarios for ESS and/or ESS + MEP (mechanical, electrical, plumbing)
  - Rate of Return/NPV and simple payback (with/without potential incentives)

High Level Takeaways

In several facilities ESS presents an excellent opportunity

- Existing PV sites
- Moderate to high intensity
- Time of Use rate structure

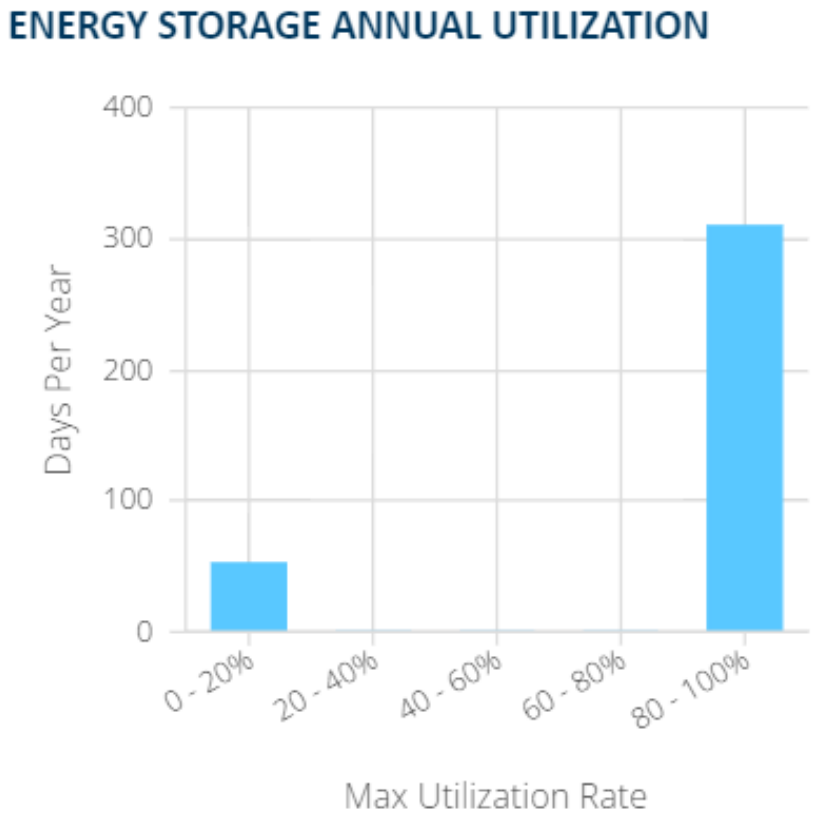
Electrification

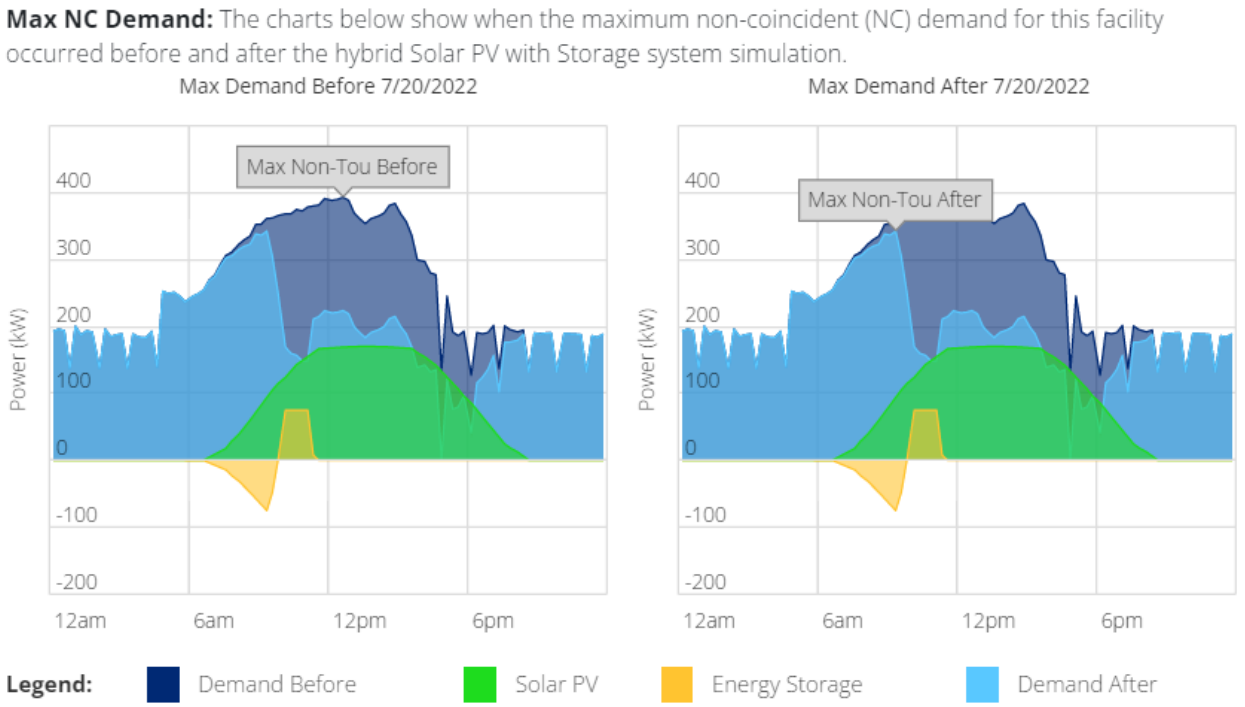
- The time is coming - but it’s likely not today
- New or enhanced policies can help drive the County in the right direction

ESS Example

Example: HHS and Parking Deck

Proposed ESS: 100kWh(dc)
Cost Estimate: $75,000
First Year Savings: $28,443
Payback: 2.7 years





Top 5 Combined ESS Projects

- HHS Building
- Transfer Station
- Animal Shelter
- Public Safety Training Center
- PSTC Apparatus Bldg

- Combined Cost:
  - $345,000
- Year One Savings
  - $87,029
- Average Payback
  - 3.9 years

Electrification Results

Why not now?

State of the grid

- Only ~8% of Duke's generation is from renewables

Cost Prohibitive

- Most facilities were not designed for electric only; would require major infrastructure investments as well as equipment upgrades
- Adding MEP pushed most into a negative net present value and often added a decade or more to the projects payback

Opportunities

New or Enhanced Policies

Current Building Policy – LEED Gold over 10K Sqft

Potential Recommendations:

- No new gas?
- Equipment electrification upon end of useful life?
- Require lifecycle cost analysis?
- Other thoughts?

Questions/Discussion