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# APU Energy Storage System Plan Update

Public Utilities Board

July 22, 2020

ANAHEIM PUBLIC UTILITIES

## Energy Storage (ES) Systems



- Various technologies are able to store energy for later use on the grid
- Battery-based systems are being deployed by utilities and have become economically viable
- Approximately 534 MW are currently operating in California

## Power Supply Portfolio Future Needs

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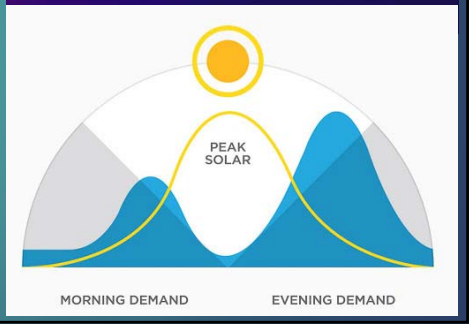
- Energy storage needed to balance oversupply of intermittent renewables required by state mandates
- More dispatchable resources needed to supplement existing generation fleet during outages to maintain grid reliability
- Battery-based ES systems are available utility-scale products to address peak periods (evening ramp) and negative pricing (oversupply)




## ES Configurations

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- Capacity and Duration
  - Up to 50 Megawatts (10% of system peak)
  - Short duration (2 hour discharge) provides best value
  - Scalable ES to meet future needs
- 2 potential ES configurations
  - Stand-alone ES
  - Solar + ES
- Direct install or power purchase agreement

# ES Cost Analysis

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- Reviewed ES costs against potential wholesale market opportunities
- Engaged consultant to validate analysis and provide additional ES performance metrics
- Direct installation offers approximately 21% - 37% greater returns compared to PPA
- Costs expected to drop by time of RFP

| Forecast of Installed Cost and Payback | | |
|---|---|---|
| **Battery Duration** | **Direct Installation Cost ($M)** | **Payback (years)** |
| **1 hr** | $34 | 3 |
| **2 hr** | $43 | 4 |
| **4 hr** | $73 | 5 |

# Own or Lease Energy Storage?

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| Ownership Structure | Pros | Cons |
|---|---|---|
| Direct Install (Design-Build) | • Greater net return over project life<br>• Utility staff gains direct experience for future deployments<br>• Access to low interest financing | • Potential issues with siting, design, construction, coordination, and maintenance<br>• Decommissioning responsibilities |
| Power Purchase Agreement (Lease) | • Simpler project management<br>• Third-party responsible for ES performance (battery degradation) and decommissioning | Less financial benefit over project duration |

- RFP will be issued for both products to compare battery technology options, market rates, risk terms, pairing with solar, and vendor experience

# Assembly Bill 2514

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- Enacted in 2010 – Requires all electric utilities to evaluate and develop procurement target for ES systems if viable
  - Subsequent evaluations required every 3-years
- 2014 Evaluation – Concluded ES systems not viable due to high costs and concerns about system efficacy
- 2017 Evaluation – Set 1 MW pilot project by 2021, and up to 10 MW in 2026
- 2020 Evaluation – Eliminates 1MW pilot due to economies of scale and sets new target of up to 50 MW by 2026

# Historical Trends in ES Pricing

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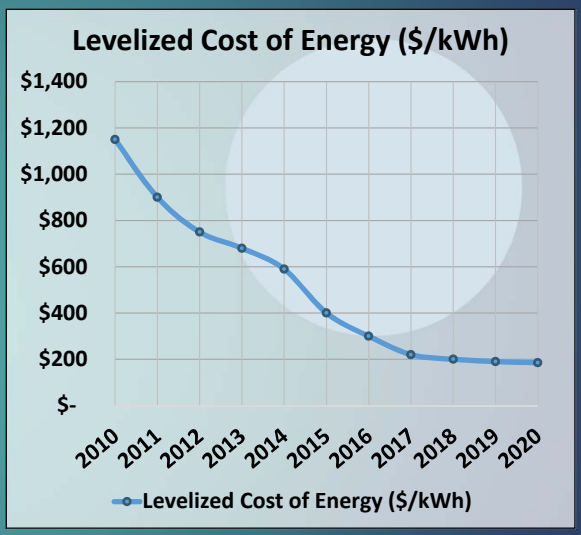
- Cost of ES battery packs has fallen nearly 85% over the past decade
- Revenue opportunities are also projected to drop in the future
- These trends have influenced APU's strategy for the timing and sizing of potential ES projects




Source: Bloomberg NEF

# AB 2514 Recommendations

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- 0 MW by December 31, 2021
  - ES technologies continue to mature while prices decline
  - Wholesale energy prices are becoming increasingly volatile
  - Proof-of-concept pilot project no longer required due to economies of scale and better established market
- Up to 50 MW by December 31, 2026
  - Total capacity range for one or more projects
  - APU is still evaluating the optimal procurement method (own vs lease) to meet this new recommended target
  - Potential sites for utility-owned: Canyon Power Plant or next to existing substation


## Questions?

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