LONG DURATION STORAGE AND CALIFORNIA COMMUNITY POWER

May 13, 2021

SAN JOSE CLEAN ENERGY

A Program of the City of San José

CALIFORNIA COMMUNITY POWER: A CCA JOINT POWERS AUTHORITY

- CCAs formed a Joint Powers Authority (JPA) called California Community Power, or ‘CC Power’ to jointly contract for large projects.

- Forming CC Power addresses concerns that individual CCA’s are too small to contract for large infrastructure projects.

- Initial focus is on projects that ensure grid reliability.
  - long-duration storage (more than 8 hours)
  - could assist with RA requirements

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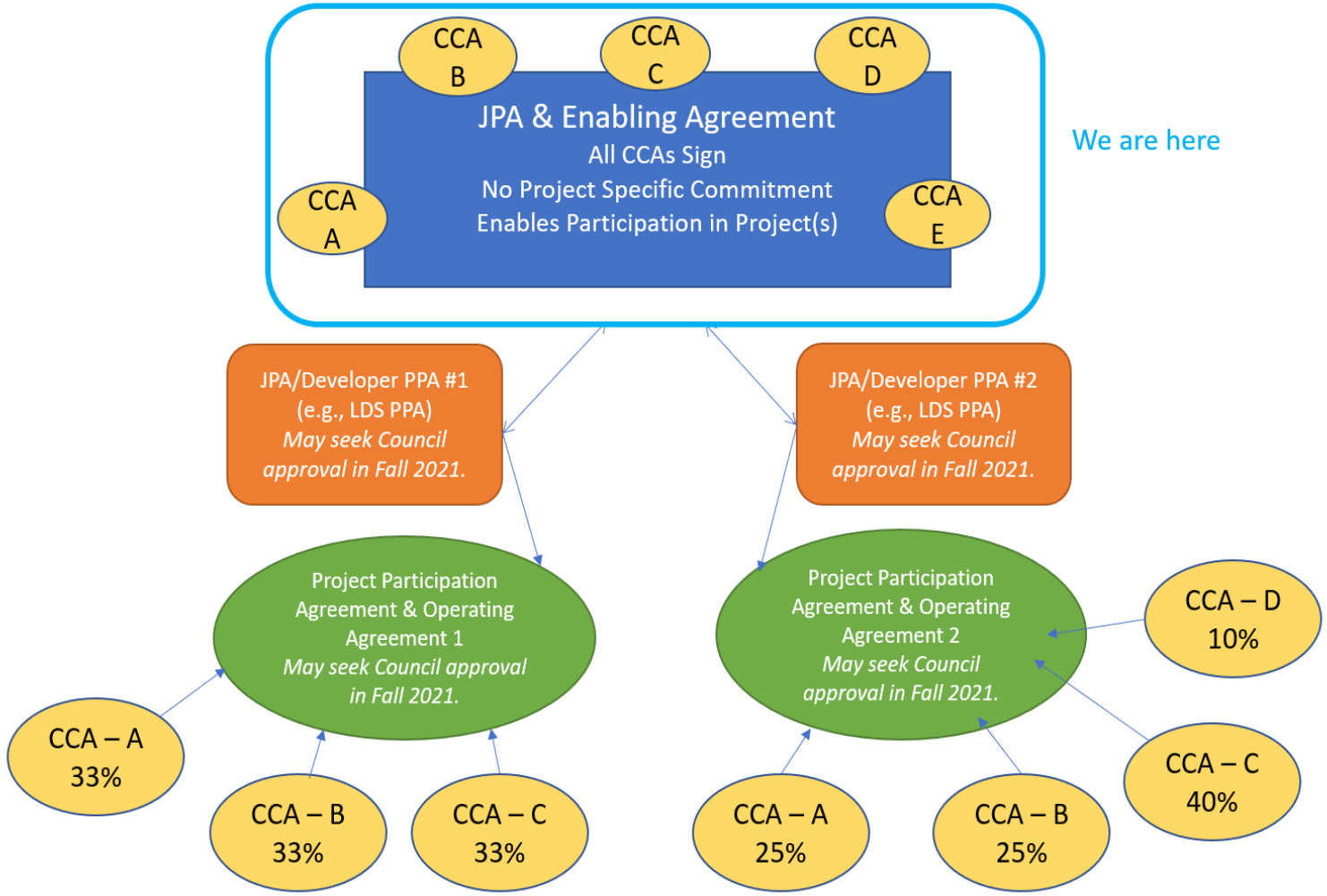
CC POWER CCAS

COMMITMENT ILLUSTRATION



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1ST PROJECT: LONG DURATION STORAGE (LDS)

- **Goal:** Target up to 500 MW of LDS that charges from the grid
  - Estimated value ~$2 Billion
- **Online date:** June 2026 or sooner
- Issued in mid-October 2020
- Bid evaluation still underway, shortlist announcement under consideration
- Only CCAs that join CC Power may contract for submitted bids
- Must be cost effective and have market and strategic value
- Issued prior to CC Power formation, but now slides under CC Power umbrella

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LDS RFO RESPONSE

gtm: Solar Grid Edge Storage Wind Trending Podcasts White Papers Webinars

ENERGY STORAGE

The First Major Long-Duration Storage Procurement Has Arrived

California's community-choice aggregators are moving ahead of the traditional utilities.

JULIAN SPECTOR | OCTOBER 16, 2020

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Grid Scale, Microgrids, News, Storage

California CCAs issue RFO for up to 500 MWs of long-duration storage

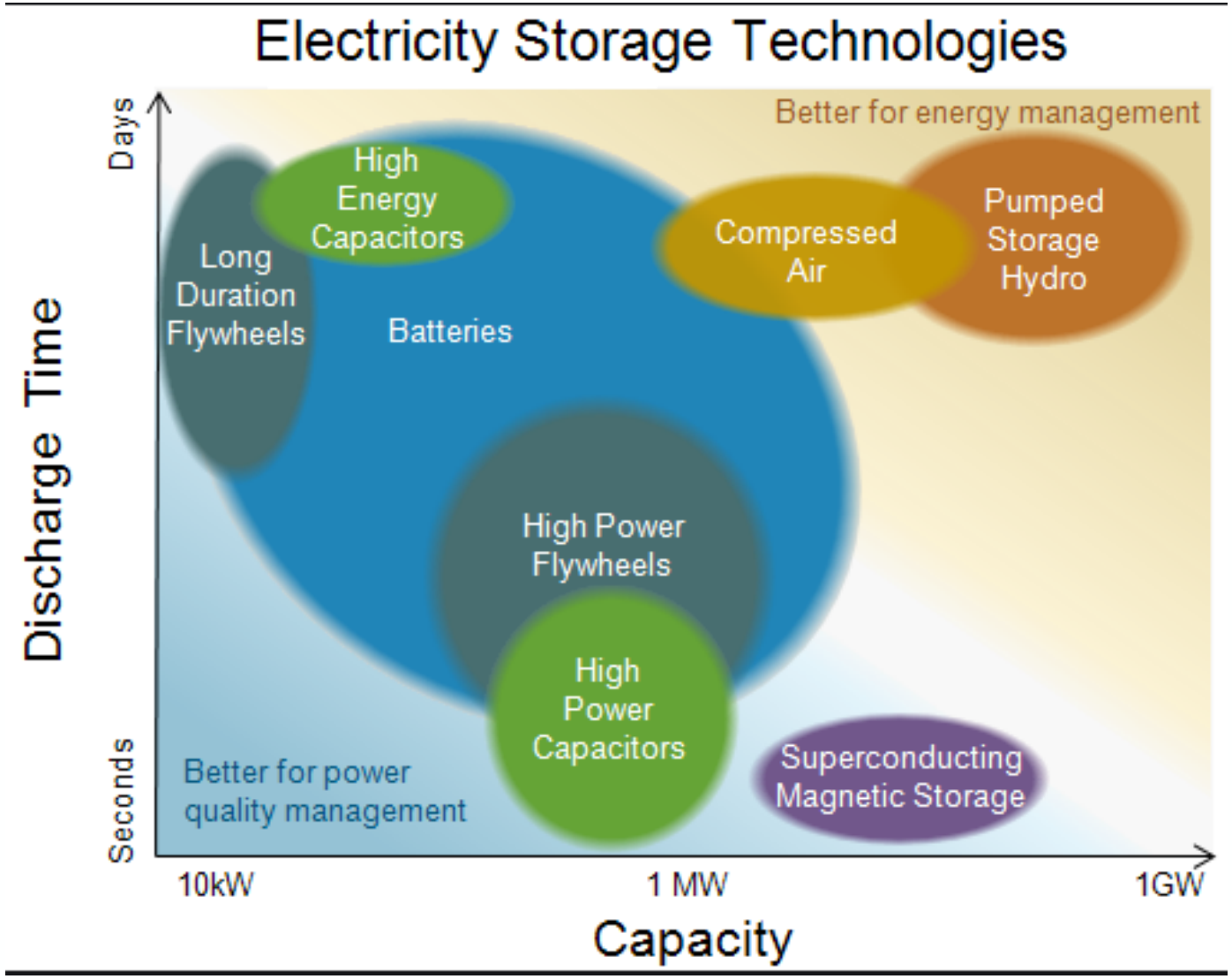
By Renewable Energy World Content Team | 10.16.20

REGULATORY & LEGISLATIVE CONSIDERATIONS

- CPUC
  - Mid-term reliability analysis for R.20-05-003 likely to require LDS specifically
  - LDS RFO and CC Power puts us out in front of this ruling
- Federal
  - ITC for standalone storage moving closer to reality, could reduce costs
  - ITC for storage paired with renewables likely to be extended (currently phasing out over next few years)

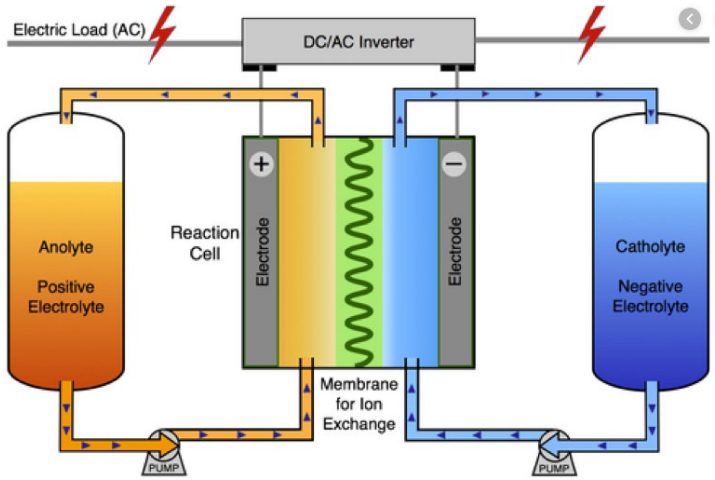
INTRO TO ENERGY STORAGE

- Many forms: chemical batteries, pumped hydro, kinetic, thermal, and more
- Different types better suited for different use cases



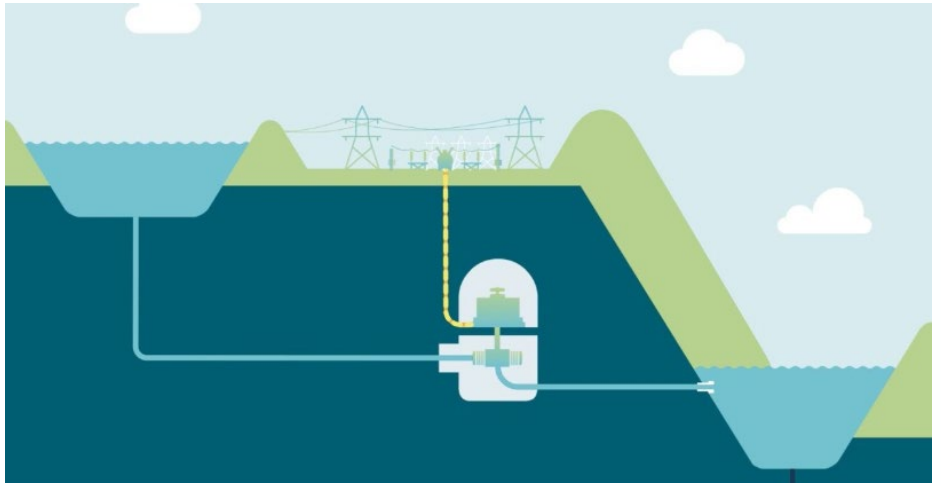
TECH OVERVIEW – CHEMICAL BATTERIES

- Lithium-ion
  - Most advanced from R&D related to EVs and electronics
  - New safety concerns due to thermal runaway in Arizona
  - Flooding the market
- Flow
  - Two chemical components dissolved in fluids that are separated by a membrane
  - Larger and heavier, which is no problem for utility scale energy storage
  - Longer duration, possibly less rare earth minerals, but not currently commercially available, but maybe close?



TECH OVERVIEW - GRAVITATIONAL

- Pumped Hydro
  - 22 GW of pumped hydro installed in the U.S. as of 2017
  - Great at long duration, 6-20 hours, but…
  - Expensive, so possibly needs a leg mandate
  - Few potential new sites on the horizon



- Energy Vault
  - stacking concrete blocks to form a tower, and lowering them to release the potential energy when needed
  - 30-40 year lifespan with 90% round-trip efficiency, but…
  - Gigantic! 30 stories tall, so siting will be challenging
  - Watch vid if time allows

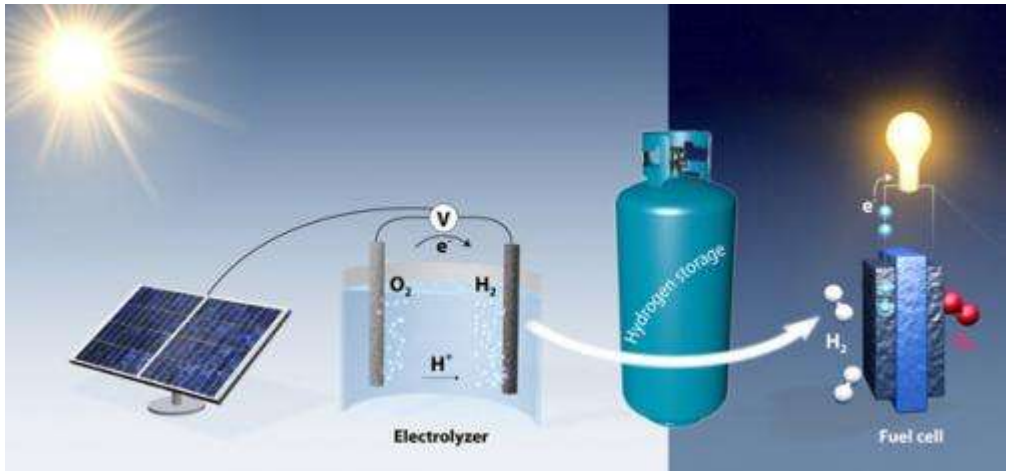
TECH OVERVIEW - THERMAL

- Molten salt
  - Has been paired with Concentrated Solar Power (CSP)
  - Salt can continue to generate electricity after sun goes down, improving the shape
  - Labor intensive, Nevada site is under contract dispute and some say this tech can't compete with current cheap traditional solar

- Cryogenic
  - Liquid air or nitrogen to store thermal energy
  - Low degradation, ~30 year asset life
  - Relatively simple to increase duration
  - ~60% round-trip efficiency
  - HighView Power is gaining attention from renewable developers and signing 50 MW contracts
  - HighView Power responded to our RFI; suggested it could offer an option to increase duration from 4 to 8 hours at a later date

TECH OVERVIEW – RENEWABLE GAS

- Renewable Gas
  - Many sources such as dairy farms, landfills
  - CA has major biomass feedstock which can be converted to gas
  - Not without carbon footprint, but has value
- Green hydrogen
  - Creation of storable hydrogen using renewable energy
  - E.g. excess solar during curtailment paired with electrolyzer to produce H., then paired with storage, pipeline, vehicles, fuel cell, or engine
  - Can help solve the duck curve



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CC POWER OVERVIEW

- Joining CC Power gives SJCE an opportunity to participate in large projects that may not otherwise be possible
- Costs: SJCE's share expected to be **$10,000-$30,000/year**
- **Joining CC Power does not commit an organization to participate in any specific projects or purchase any services**
  - Preserves the option to jointly procure if benefits outweigh risks
  - Majority of costs are related to participating in a project
- Joint Projects require additional agreements to address the sharing of costs, risks, and benefits
  - Requires future Council Approval (likely Fall 2021)

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