California Community Power Long Duration Energy Storage

Notice to Proceed with LS Power Tumbleweed
October 8, 2021 CC Power Special Board Meeting

Objective

Provide background on RFO, evaluation, shortlisting and negotiation process to support approval of

Notice of Intent to execute an Energy Storage Service Agreement, and ancillary agreements with,

LS Power for Tumbleweed Long Duration Energy Storage

RFO Background & Timeline

June '20	Interest & Information Gathering (RFI)
Oct '20	CCAs Issue a Joint-Request for Offers (RFO) for up to 500 MW of LDS
Feb '21	California Community Power (CC Power) Formed/Long Duration Storage Project Oversight Committee formalized
Jun '21	LDS Projects Shortlisted, ESSA Negotiations start, and begin to development of CC Power/CCA Agreements
Jun '21	CPUC Issues Mid-term Reliability Procurement Order – LDS POC Develop Pathways to Achieve Compliance
Oct '21	CC Power and individual CCA Approval Process for LDS Project #1 – LS Power's Tumbleweed

RFO Timeline

Activity	Original Date
Issuance of RFO	October 15, 2020
Offerors Webinar	October 28, 2020
Offer Submission Deadline	December 1, 2020
Project Shortlisting	Mid-May 2021
Developer/Buyer Negotiations	June – October 2021
CC Power 60-day Notice for Contract Approval	October 2021
CC Power Final Contract Approval (Tentative)	December 2021
Individual CCA Board Approval	December 2021 – February 2022

RFO Objectives & Requirements

Objectives

- Procure cost-effective LDS to integrate renewables & support grid reliability
- Joint-procurement to share resources and project risk
- Meet future potential IRP procurement mandates
- Technology and location agnostic with desire to evaluate emerging technologies
- Full tolls – for capacity and energy value

Requirements

- CAISO resource or Import with dynamic transfer rights
- Must be able to qualify for Resource Adequacy
- Grid-charged with minimum 8-hour discharge duration
- COD no later than June 1, 2026
- Minimum delivery term 10 years
- 50 MW minimum
- Complete bid submission

Offers

- Projects on-line as early as 2023
- 51 Entities submitted offers (over 9,000 MW)
- Total of 221 unique pricing offers
  - 160 Full Toll Offers
  - 57 RA Only Offers
- 8 Technology types
  - 18 distinct technologies
- 8,10,12-hour, and multi-day discharge durations

Technology
Battery aqueous-air flow lithium-ion zinc
Chemical Flow iron redox flow vanadium flow
Compressed Air
Fuel Cell – Hydrogen
Hybrid hydrogen, combined-cycle gas gen li-ion, combined-cycle gas gen
Mechanical – Gravity
Pumped Hydro
Thermal ice (HVAC) liquid air molten Salt molten Salt & Gas gen volcanic stone water heat exchange

Primary Offers

- Identified 98 primary offers out of the initial list of 221
- Primary offers were chosen based on the following principles:
    - Conforming offers only
    - Lowest price
    - Shortest delivery term (10-15 years)

Evaluation Process

Conforming Y/N and shorten list to 98 offers

Review each offer and determine if it meets minimum criteria

Round 1

Evaluate and Score Projects based on 100-point scoring rubric

Quantitative and Qualitative Assessment of individual projects based on NPV, Risk, Developer experience, Technology, Environmental Impact, and Delivery Term

Round 2

Rank Projects and Identify Top Candidates for Further Analysis

Top Projects per Technology and Max of 10 -17 will undergo further Quantitative and Qualitative Assessment

Shortlist

Project Oversight Committee Recommendation

Two levels of Projects recommended for Shortlisting & Negotiations to CC Power

Two-Round Evaluation Process

98 Primary offers were chosen based on the following principles:

- Conforming offers only
- Lowest price
- Shortest delivery term (10-15 years)

Round One

All Primary Offers were scored and ranked. Top 17 moved to Round 2

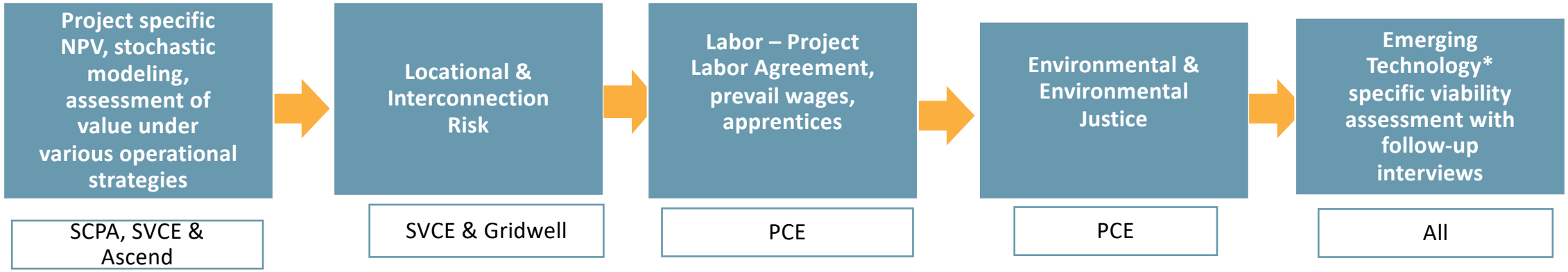
Lithium-Ion vs. Emerging Technologies

- The top 10 projects were the highest scores (all li-ion).
- The remaining 7 spots were allocated to the highest scoring non li-ion projects.
  - The decision to include non li-ion and classify as “emerging technologies” was to introduce technology diversity to the potential shortlist.
  - 56 out of the 98 primary offers represented li-ion

Round 2 – Evaluation Process

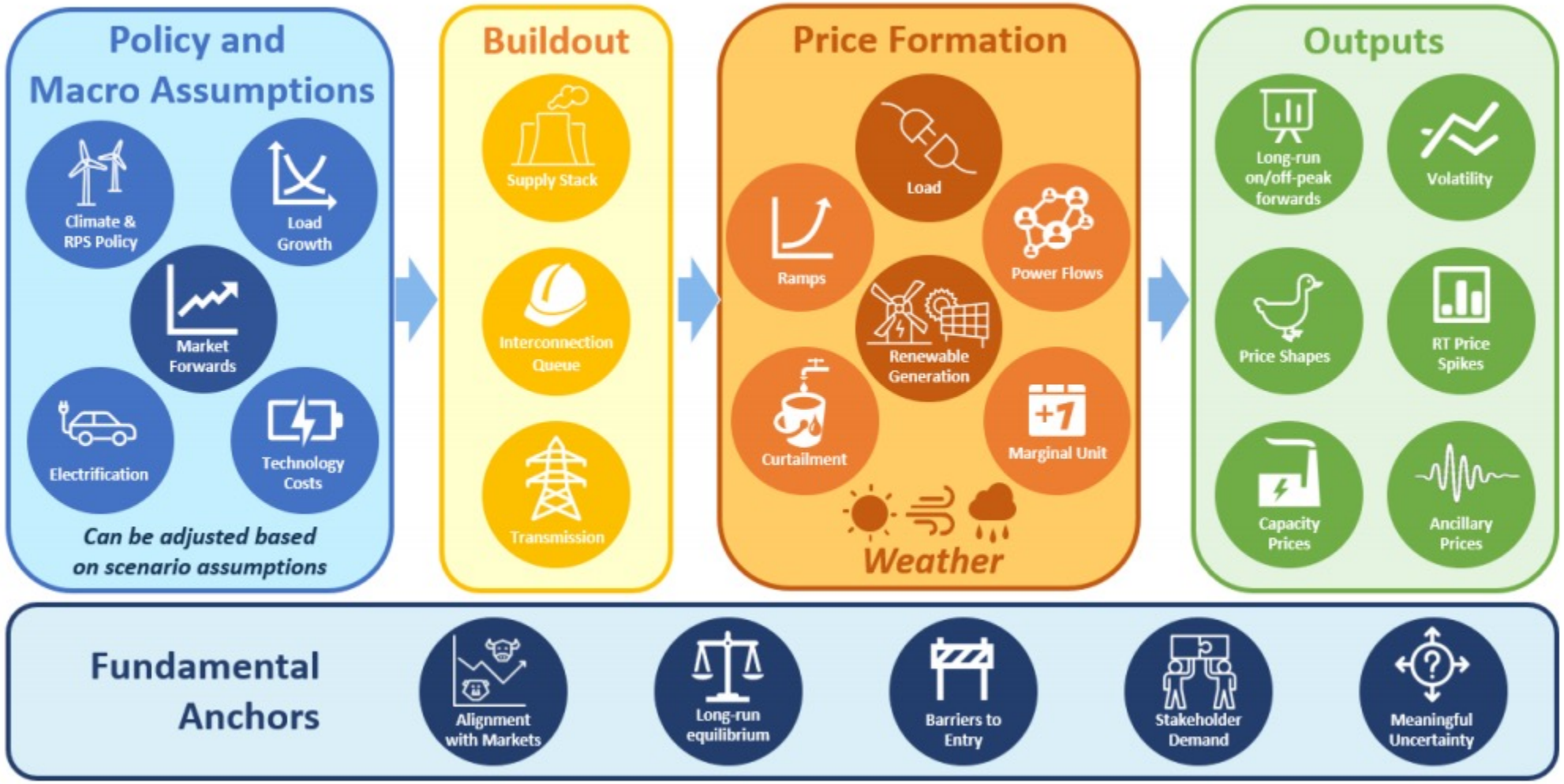
Deep dive on 17 primary offers

Round Two



*Emerging technologies defined as non-Li-Ion including 2nd life EV, Gravity, Hydrogen, Liquid Air, Compressed Air, Iron Redox Flow, and Pumped Storage Hydro

Round 2 Evaluation: NPV Modeling



Project Value

1. Cost were assumed fixed, with the exception of projects with a variable operating component
2. Expected value ranged from negative to marginally positive
3. Value highly variable and uncertain over time
    1. Location matters
    2. dependent on and how the storage is operated (day ahead vs. real time)
    3. A/S value expected to decrease over time
4. Resource Adequacy value (avoided cost) is dependent on regulatory structure

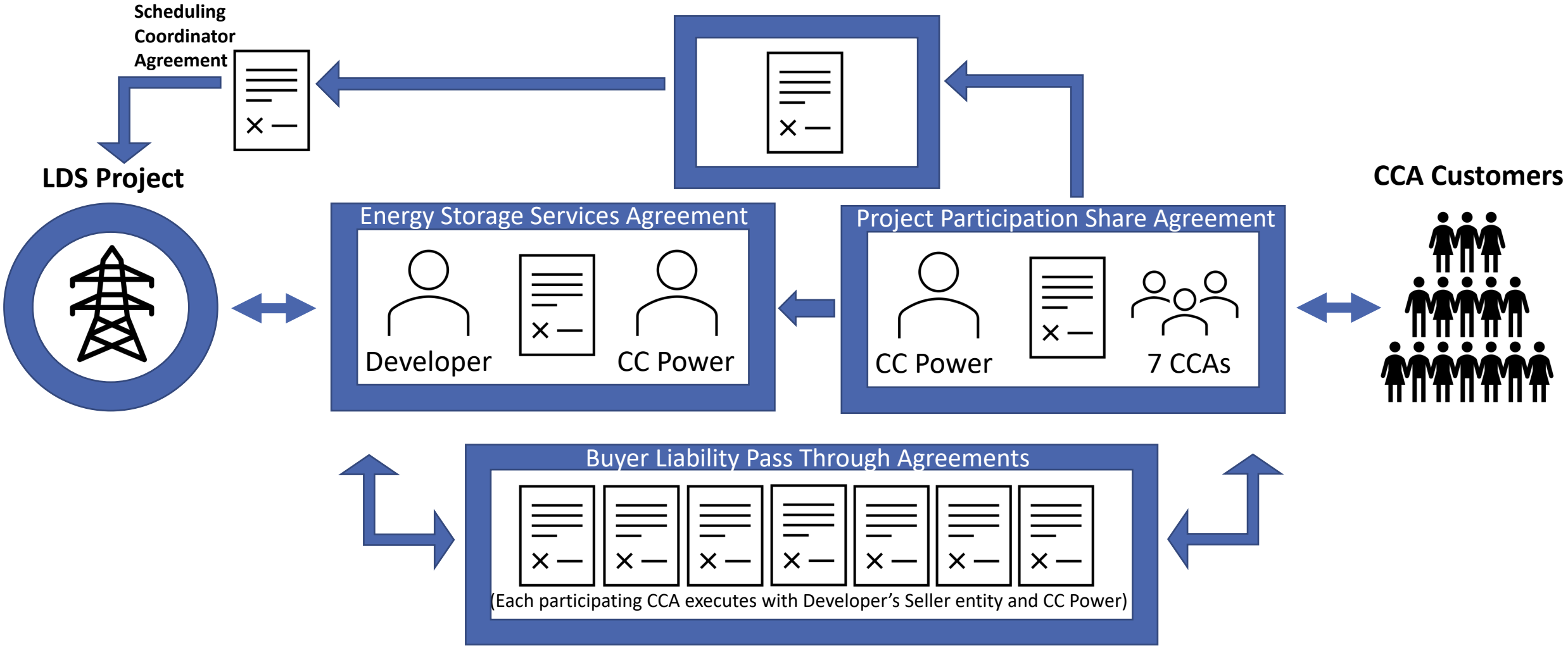
Shortlisting

- Based on updates during round 2, the POC agreed upon a two-tier shortlist.
  - Tier 1 – Offers that scored the highest and received the most confidence in delivering a long duration storage product.
  - Tier 2 – Offers that require more information for CC Power negotiating team to commit to executing a contract.
- The two-tiered approach also provides additional capacity to deal with projects dropping
- Focus of negotiations on Tier 1 Projects
- CC Power General Manager finalized Shortlist

Negotiation Team & Agreements

- Confirmation and refinement of Term Sheet Offer
  - Led to dropping a couple of projects
- Exclusivity Agreements between CC Power & Seller/Developer
- Energy Storage Service Agreement Proforma development
- Credit/Collateral Requirements
- Project Participation Share Agreement
- Operating Agreement
- Pathways – Need based on CPUC requirements, project size and CCA member interest in moving forward and specific projects

Contract Structure



Participating CCAs in LDS Procurement

7 CCAs agreed to move forward with joint LDS procurement

SILICON VALLEY CLEAN ENERGY

SAN JOSE CLEAN ENERGY

REDWOOD COAST EnergyAuthority

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

CleanPowerSF
Same Service • Cleaner Energy

PENINSULA CLEAN ENERGY

Sonoma Clean Power

VALLEY CLEAN ENERGY

Mid-Term Reliability Decision (2023-2026)

D.21-06-035 adopted by CPUC on June 24, 2021 to address mid-term reliability needs

- LSEs required to collectively procure 11,500 MW NQC of new resources
- Follow-on to November 7, 2019 CPUC decision mandating 3,300 MW NQC procurement for 2021-2023 to maintain reliability
- Contract of at least 10 years
- Allocated to LSEs by load share
- Resources must be zero-emission or RPS eligible (no fossil resources)
- 4,500 MW of obligation subject to specific category requirements (next slide)

Procurement Timing

Timing of overall procurement requirement and specific categories is assigned in tranches between 2023 and 2026

Procurement Obligation in NQC[1] MW for All LSEs by Category and Year

Procurement Category	2023	2024	2025	2026	Total
Zero-emissions generation, generation paired with storage, or demand response resources[2]	-	-	2,500	-	2,500
Firm zero-emitting resources[3]	-	-	-	1,000	1,000
Long-duration storage resources[3]	-	-	-	1,000	1,000
Remaining New Capacity Required			-	-	7,000
Total Annual Capacity Requirements	***2,000***	***6,000***	***1,500***	***2,000***	***11,500***

1. *Obligation is in NQC MW (not nameplate) and subject to ELCC factor (next slide)*
2. *Zero-emissions resources required to replace Diablo Canyon must be procured by 2025, but may occur in any of the years 2023-2025; therefore, the columns do not add to the total.*
3. *LSEs may request an extension by February 1, 2023 up to 2028 for the LLT resources. Minimum 8-hour discharge*

Effective Load Carrying Capacity Factors

CPUC released an ELCC study in September 2021 to convert facility nameplate to Net Qualifying Capacity ("NQC)

- 2025 and 2026 figures are indicative and will be finalized by end of 2022

Incremental ELCCs for Storage Resources

Procurement Category	2023	2024	2025 *Indicative*	2026 *Indicative*
4-Hour Battery	96.3%	90.7%	74.2%	69.0%
6-Hour Battery	98.0%	93.4%	79.6%	75.1%
8-Hour Battery	98.2%	**94.3%**	82.2%	**78.2%**
8-Hour Pumped Storage Hydro				76.8%
12-Hour Pumped Storage Hydro				80.8%

LDS Obligation for Participating CCAs

Long Duration Storage requirement in NQC MW and converted to nameplate using the available 2024 and 2026 ELCCs

CCA	NQC MW	Nameplate MW (2024 ELCC)	Nameplate MW (2026 ELCC)
CleanPowerSF	15.5	16.4	19.8
Peninsula Clean Energy	19.0	20.1	24.3
Redwood Coast Energy	3.5	3.7	4.5
San Jose Clean Energy	21.5	22.8	27.5
Silicon Valley Clean Energy	20.5	21.7	26.2
Sonoma Clean Power	12.5	13.3	16.0
Valley Clean Energy	4.0	4.2	5.1
Total	**96.5**	**102.3**	**123.4**

Obligation is
less than sought through RFO

LDS Project #1

- **Project – LS Power's Tumbleweed**
- **Product** – 69 MW/552 MWh – Tolling Agreement
- **Location** – Rosamond, Kern County
- **Technology** –Li-ion
- **Interconnection Status** – PCDS
- **COD** – 7/1/24
- **Discharge Duration** – 8 hours
- **Price** – fixed $/kw-mo
- **Term** – 15 years

Tumbleweed Shares per CCA

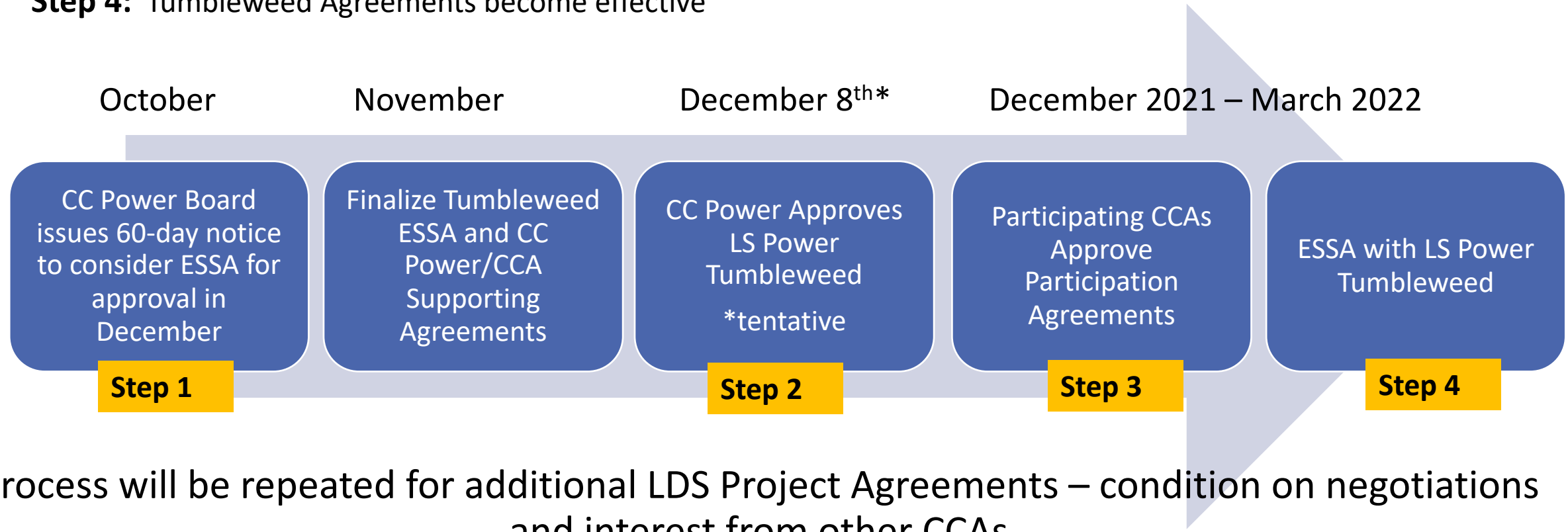
- Expected capacity share per CCA is based on a pro rata share of CPUC's Mid-term Reliability Procurement Order

Participating CCA	MTR Procurement Capacity Order LDS MW	% of MTR Requirement	Tumbleweed Allocation MW
CPSF	15.5	16%	11.1
PCE	19	20%	13.6
RCEA	3.5	4%	2.5
SJCE	21.5	22%	15.4
SVCE	20.5	21%	14.7
SCPA	12.5	13%	8.9
VCE	4	4%	2.9
Total	**96.5**		**69.0**

- Participating CCAs will seek authority to take a maximum capacity to cover:
  - Increased capacity should a CCA not obtain approval to move forward
  - Step-up capacity of up to 25% of contracted capacity

Tumbleweed Approval Process

Step 1: CC Power Board issues 60-day notice to consider ESSA for approval in December - Today
Step 2: CC Power Board approves ESSA, PPSA, BLPTA & Operating Agreement condition on individual CCA Approval
Step 3: CCAs seek respective Board Approvals of PPSA, BLPTA and Operating Agreement
Step 4: Tumbleweed Agreements become effective



Process will be repeated for additional LDS Project Agreements – condition on negotiations and interest from other CCAs

Summary

1. Tumbleweed NPV to participating CCAs is highly uncertain
2. Procurement of Long Duration Storage (8-hours or more) is mandated through MTR order
3. LS Power's Tumbleweed project will meet 56 to 68 percent of participating members MTR obligation
4. Tumbleweed COD is 2024, which may provide for a greater ELCC (94.3%) than 2026 COD (78.2%). Seeking CPUC clarification
5. Seeking provisions for prevailing wages, a PLA and prohibition of forced labor.

CC Power Board Request

Approve Resolution No. 21-10-02 to provide 60-Day Notice of Intent to Execute Energy Storage Agreement with LS Power Tumbleweed for Long Duration Energy Storage.

Credits

Project Oversight Committee

CCA	POC Member	Other Staff
CleanPowerSF	Michael Hyams	Erin Mulberg
Peninsula Clean Energy	Siobhan Doherty	
Redwood Coast Energy	Richard Engel	Jocelyn Gwynn
San Jose Clean Energy	Jeanne Sole	Phil Cornish
Silicon Valley Clean Energy	Monica Padilla	Karthik Rajan
Sonoma Clean Power	Deb Emerson	Ryan Tracey and Hannah Rennie
Valley Clean Energy	Gordon Samuel	

Gridwell Consulting – Carrie Bentley

Keyes & Fox – Kevin Fox

Ascend Analytics – David Millar, Brent Nelson and Valerie Katz

BBSW – Tony Braun, Justin Wynne, Brittany Iles, Kris Kirkegaard

Timothy Haines