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Item 4: Information Item on the Request for Information on Investments in Clean Energy Resources for Statewide Reliability

November 16, 2022 Business Meeting

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Benefits to Californians

- Advance clean energy goals
- Increase grid reliability

Overview of Requirements to Evaluate Clean Energy Resources

SB 846	• Clean Energy Reliability Investment Plan (Mar 2023) • Comparison to Diablo Canyon Extension (Sep 2023) • Load Shift Goal (Jul 2023)
AB 205	• Reliability Report (Jan 2023)
SB 423	• Clean Firm Resource Report (Dec 2023)
SB 100	• Next Report (Jan 2025)

Preliminary Supply Resource List

Renewables	Geothermal
	Hydro (Small)
	Solar (Utility-Scale, >5 MW)
	Solar (1-5 MW Scale)
	Wind (Onshore)
	Wind (Offshore)
Storage	Pumped Hydro
	Energy Storage (Short-Duration; less than 8 hour)
	Energy Storage (Long-Duration; 8 hours or more)
Gas-Fired Generation	Reciprocating Engines (fossil or renewable gas)
	Reciprocating Engines (hydrogen gas)
	Air Cooled Gas Turbines (fossil or renewable gas)
	Air Cooled Gas Turbines (hydrogen gas)
Approach	Procure Electricity from Outside California

Preliminary Demand Resource List

End-Use & Enabling Technology Combinations for Demand Reduction or Demand Flexibility	Electric Vehicle Managed Charging (V1G)
	Electric Vehicle to Building (V2B)
	HVAC Control (Smart Thermostats/EMS)
	Appliance Load Control
	Water Heating Control
	Lighting Control
	Commercial Refrigeration Control
	Industrial Process Load Control
	Water/Wastewater Treatment & Pumping Control
	Agricultural Pumping Control
Permanent Load Shift	Thermal Energy Storage
Energy Efficiency	Energy Efficiency Measures
Approach*	Existing DR Programs
	New DR/DF Programs
	Time-Varying Rates, Transactive Energy

*Approach refers here to programs or rates that can realize DR/DF potential from end-use and enabling technology combinations, and therefore the two categories overlap

Preliminary Supply/Demand Resource List

Distributed Technologies	Solar (Distributed, less than 1 MW) Energy Storage (short duration, 8 hour or less) Fuel Cells (fossil or renewable gas) Fuel Cells (hydrogen this is directly supplied) Electric Vehicle to Grid (V2G) Microgrids (controls and switching)

Preliminary Qualitative Attributes

Preliminary Qualitative Attributes
Readiness
Permitting
Interconnection
Supply Chain
Customer Acceptance
Cleanliness
Dispatchability
Policy Alignment
Equity

- The first five factors inform Achievability
- Attributes not necessarily equally weighted

Preliminary Attributes Described (1 of 3)

Attribute	Definition
Readiness	Technological readiness and maturity
Permitting	Ease of permitting processes (e.g., local, CEQA) required to implement the resource
Interconnection	Ease of interconnection and availability of infrastructure (e.g., transmission line access) for successful implementation of the resource
Supply Chain	Efficiency and effectiveness of manufacturing and supply chains to support implementation of the resource
Customer Acceptance	Operator and end-user acceptance of the technical aspects and value proposition of the resource

Preliminary Attributes Described (2 of 3)

Attribute	Definition
Cleanliness	Low GHG emissions and low criteria pollutant emissions
Dispatchability	Certainty and firmness of a resource, including number of events, frequency of events, and event duration
Policy Alignment	Availability of supportive policies and incentives, current and expected
Equity	Considerations of benefits/impacts for equity communities

Preliminary Attributes Described (3 of 3)

Solar (1-5 MW Scale)

Achievability		Notes
2023	✓	Continued growth
2024	✓	
2025	✓	
2026-2030	✓	Replacements and limited growth
2031-2035	✓	

Attribute		Notes
Readiness	●	Mature
Cleanliness	●	No direct emissions
Dispatchability	○	Low by its… …rage and enabling h…
Capacity Fact…		…or is higher during early part of daily …mmer peaks than during the winter
…	◑	Time consuming but well established
…rconnection	◑	Time consuming but well established; transmission access varies by project
Supply Chain	◑	Some solar supply chain challenges in short and medium term
Customer Acceptance	◑	Economics can be more challenging than larger projects
Policy Alignment	●	Largely supportive

Illustrative Example

Preliminary Quantitative Information

- Developing quantitative estimates for each resource 2023-2035
  - Potential Deployment Estimates
    - Capacity (MW)
    - Energy (MWh)
  - Levelized Cost Estimates
    - $/MW
    - $/MWh-yr
- Estimates will include ranges (Low, Expected, High)

Request for Information

- Clean Energy Resources for Reliability
  - Released Nov 4, 2022
  - Responses due Nov 30, 2022
  - Docket: 21-ESR-01

Next Steps

- Evaluate public input
- Conduct preliminary analysis
- Present preliminary results in a December public workshop