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Project Title:	Energy System Reliability
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Document Title:	Request for Information Clean Energy Resources for Reliability
Description:	The California Energy Commission (CEC) is seeking to identify clean energy resources and characterize their ability to support grid reliability. The CEC is required to conduct an assessment and comparison of clean energy alternatives to support grid reliability and make recommendations to expand their deployment. This Request for Information (RFI) on Clean Energy Resources for Reliability seeks to collect information on the potential resources and attributes for consideration in these analyses.
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Request for Information
Clean Energy Resources for Reliability
November 3, 2022
Docket # 21-ESR-01
Due Date: November 30, 2022

Purpose of Request

The California Energy Commission (CEC) is seeking to identify clean energy resources and characterize their ability to support grid reliability. The CEC is required to conduct an assessment and comparison of clean energy alternatives to support grid reliability and make recommendations to expand their deployment. This Request for Information (RFI) on Clean Energy Resources for Reliability seeks to collect information on the potential resources and attributes for consideration in these analyses.

Background

Senate Bill 846 (Stats. 2022, ch. 239) requires the CEC to develop a Clean Energy Reliability Investment Plan (CERIP), conduct a cost comparison of extending operations at the Diablo Canyon Nuclear Power Plant with portfolios of other feasible resources consistent with the state's 2030 greenhouse gas emissions reduction goals, and to develop a goal for load shifting. Additionally, Assembly Bill 205 (Stats. 2022, ch. 61) established the Distributed Electricity Backup Assets (DEBA) Program as part of the Strategic Reliability Reserve. The DEBA Program is intended to incentivize the installation of cleaner and more efficient distributed energy assets that would serve as on-call emergency supply or load reduction for the state's electrical grid during extreme events. Each of these efforts requires knowledge of the full suite of clean energy resources that could be deployed and an understanding of their performance and cost characteristics between now and 2035. Several legislative reports will also require the CEC to compare different resources to make recommendations on the state's clean energy investments.

Request for Information

The CEC is accepting public comments under this RFI to inform staff on the resources and attributes that should be considered in the analysis required by the multiple legislative requirements of SB 846 and AB 205. The CEC is also soliciting information and public comments specific to the potential design of the DEBA program to help expedite the phased development and launch of the program.

CEC is creating a list of resources that should be considered in the analyses. CEC anticipates creating subsets of resources from the full list, depending on the requirements of each analysis.

For example, the CERIP is intended to be limited to clean energy resources, so it would not consider any fossil gas solutions. However, for the comparison of portfolios as alternates to extending Diablo Canyon, the CEC anticipates considering a wider variety of resources in the analysis. DEBA is focused on providing incentives for clean energy resources that can provide emergency grid support and will therefore focus on resources that can be relied on in an emergency, particularly during the most challenging hours of 4 pm to 9 pm. The following tables present the CEC's initial effort at identifying resources differentiated by those that are supply (Table 1), those that are demand reduction (Table 2), and resources that can be either supply or demand depending on the application (Table 3). Supply resources are generally considered those that can generate electricity directly to the grid. Demand resources are those that modify customer demand but do not supply electricity to the grid. The category of supply/demand are those resources that could either export to the grid or provide demand modification depending on the application or customer preference. The lists contain both technologies and approaches, where approaches can be market-based mechanisms to achieve either greater supply or modify demand.

Table 1: Supply Resources

Categories	Resource Types
Renewables	Geothermal
	Hydro (small, less than 30 MW)
	Solar (utility-scale, greater than 5MW)
	Solar (1 – 5 MW)
	Wind (onshore)
	Wind (offshore)
Storage	Pumped Hydro (30 MW or greater
	Energy Storage (short duration, less than 8 hour)
	Energy Storage (long duration, 8 hour or greater)
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)
Imports	Procure Electricity from Outside California

Table 2: Demand Resources

Categories	Resource Types
End-Use & Enabling Technology Combinations for Demand Response (DR) or Demand Flexibility (DF)	Electric Vehicle Managed Charging (V1G)
	Electric Vehicle to Building (V2B)
	HVAC Controls (Smart Thermostats/EMS)
	Appliance Load Controls
	Water Heating Controls
	Lighting Controls
	Commercial Refrigeration Controls
	Industrial Process Load Controls
	Water/Wastewater Treatment & Pumping Controls
	Agricultural Pumping Controls
Permanent Load Shift (PLS)	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 of "end-use and enabling technology combinations" and "approaches" overlap.

** PLS could be achieved by battery energy storage too, which is included under the third category in Table 3.

Table 3: Supply/Demand Resources

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

Qualitative Assessment

In evaluating these resources, CEC will need to consider the attributes of each resource for its ability to support the objectives of the analysis, such as providing reliability, supporting the state's greenhouse gas reduction goals, readiness of deployment, and ability to support equity communities. CEC will need to consider barriers that hinder deployment, such as interconnection challenges, supply chain limitations, and permitting challenges. These barriers should be identified

and evaluated because they can delay the ability of the technology or approach to be deployed at the scale and speed necessary for meeting the state's reliability and clean energy objectives. Additionally, CEC seeks to identify market adoption barriers and recommend solutions to overcome the barriers to the legislature. Lastly, CEC must evaluate these resources and their potential for deployment between now and 2035, so will need to evaluate these attributes and how they may change over time. CEC intends to use a qualitative assessment of the attributes in the evaluation, such as with the use of Harvey Balls (e.g., ●◕◐◔○). CEC has not determined a weighting for the attributes but seeks input on whether weighting is possible and how to weight the attributes. The description of each attribute being proposed by CEC is in Table 4. In addition to the qualitative assessment, CEC will undertake quantitative assessment of these resources to provide estimates on potential availability of these resources on an annual basis over the analysis timeframe, along with levelized costs for these resources to be available

Table 4: Qualitative Attributes to Assess Resources

Preliminary Qualitative Attributes

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
Cleanliness	Low GHG emissions and low criteria pollutant emissions
Dispatchability	Certainty and firmness of a resource, including ability to respond to different event frequencies, durations, and notification periods
Policy Alignment	Ability to support policies and availability incentives, current and expected
Equity	Equity considerations such as impacts on low income and disadvantaged communities, and tribes

Questions for the Public

List of Resource types and Evaluation Attributes

The RFI seeks feedback on the following questions regarding the list of preliminary resources and qualitative and quantitative attributes by which they will be evaluated:

1) Are the categories (indicated in Tables 1, 2 and 3) appropriately representing how the CEC should be evaluating resources?
2) Are there resources that should be added to or removed from the preliminary list under each of the categories (shown in Tables 1, 2, and 3)?
3) Are there other attributes that should be considered, in addition to the ones listed in Table 4? If so, should those be considered for the qualitative and/or quantitative evaluation?
4) How should the attributes be weighted relative to each other? Should some attributes be weighted more than others?
5) What data/information sources can help inform characterization and evaluation (both qualitative and quantitative) of the different resources?

Resource Characterization

The RFI seeks feedback on the following questions for each potential resource.

1) Please provide a general overview of the resource, including the following:
    a. Resource category (e.g., supply, demand) and type (e.g., solar) and scale (e.g., utility, distributed)?
2) How does the resource compare to conventional generation in terms of greenhouse gas and priority pollutant emissions?
3) How does the resource support reliability (e.g., supply, permanent load reduction, net peak reduction, or emergency asset?) (List all that apply.)
    a. How can the resource be used as an incremental on-call resource during emergencies?
4) How many new MWs and MWhs can the resource provide per year, taking into account resource characteristics and known barriers between now and 2035?
    a. How is that different if used incrementally as an emergency asset during an extreme heat event?
5) What is the levelized cost for the resource in $/MW-yr. and $/MWh-yr. from 2023 to 2035?
6) What is the average length of time from ordering or purchasing the resource to operation? How long does that typically take in today's market? What conditions must be met to deploy the technology rapidly? (e.g., transmission interconnection, building electrification or upgrades, etc.)
7) For an emerging technology, when will it be ready for deployment, and at what scale?
8) Is the target customer primarily residential, commercial, agricultural or industrial?

9) What are the key non-financial barriers to the development and implementation of this resource (including, but not limited to, permitting, interconnection, supply chain, customer acceptance, and alignment with policy goals)?

10) What are the key financial barriers to the development and implementation of this resource?

11) What types of benefits or impacts is the resource anticipated to have on low income and disadvantaged communities, and tribes, if any in terms of development and deployment?

Input on Distributed Electricity Backup Assets Program Design

The Distributed Electricity Backup Assets program can provide incentives for two main categories of projects:

- Efficiency upgrades, maintenance, and capacity additions to existing power generators.
- Deployment of new zero- or low-emission technologies, including, but not limited to, fuel cells or energy storage, at existing or new facilities.

The statute also requires that all funding recipients participate as on-call emergency resources for the state during extreme events.

The RFI seeks feedback on the following questions, in addition to the information requested in the questions above, to help inform the design of the Distributed Electricity Backup Assets program and its phased development and launch:

1) What size of resource and what types of customers should the program target?

2) What types of incentive structures and amounts are needed to accelerate the development and deployment of this resource?

3) What types of conditionalities and measurement and verification requirements should the program include to ensure funded resources participate and deliver during emergency events?

4) In general, please provide any specific proposal or recommendation on the design and implementation of the DEBA program.

How to Provide Information

Respondents to this RFI should not include any proprietary or confidential information. Comments may be submitted through 5:00 p.m. on November 30, 2022 using the e-commenting feature at this docket 21-ESR-01 at https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=21-ESR-01.
A full name, email address, comment title, and either a comment or an attached document (.doc, .docx, or .pdf format) is mandatory. After a challenge-response test is used by the system to ensure that responses are generated by a human user and not a computer, click on the "Agree & Submit Your Comment" button to submit the information to the CEC's Docket Unit.

Written comments, attachments, and associated contact information included within the documents and attachments (that is, your address, phone number, and email address) become

part of the viewable public record. This information may become available via Google, Yahoo, and any other search engines.

Interested stakeholders are encouraged to use the electronic filing system described above to submit information. If you are unable to submit electronically, a paper copy of your information may be sent to:

California Energy Commission
Docket Unit, MS-4
Re: Docket No. 21-ESR-01
715 P Street
Sacramento, CA 95814-5512

Alternatively, you may email responses to: docket@energy.ca.gov with the "21-ESR-01: RFI Clean Energy Resources for Reliability" in the subject line.

For information, please contact David Erne at david.erne@energy.ca.gov or call (916) 776-0603.

The RFI is embedded in its entirety in this notice and available for free on the CEC website at the Docket No. 21-ESR-01, at https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-ESR-01.

Media inquiries can be directed to the Media and Public Communications Office at (916) 654-4989 or at mediaoffice@energy.ca.gov.