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**SMUD Comments Re Lead Commissioner Workshop on SB423 21 - ESR-01**

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*Additional submitted attachment is included below.*

**STATE OF CALIFORNIA  
BEFORE THE CALIFORNIA ENERGY COMMISSION**

<b>In the matter of:</b>	)	Docket No. 21-ESR-01
	)	
<b><i>Energy System Reliability</i></b>	)	SMUD Comments Re: Lead
	)	Commissioner Workshop on Senate
	)	Bill 423 Emerging Renewable and
	)	Firm Zero Carbon Resources
	)	
	)	December 4, 2023

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**Comments of SACRAMENTO MUNICIPAL UTILITY DISTRICT on Lead  
Commissioner Workshop on Senate Bill 423 Emerging Renewable and Firm  
Zero Carbon Resources**

The Sacramento Municipal Utility District (SMUD) respectfully submits these comments on the California Energy Commission’s (CEC) November 17, 2023 *Lead Commissioner Workshop on Senate Bill (SB) 423 Emerging Renewable and Firm Zero Carbon Resources* (Workshop).<sup>1</sup> SMUD appreciates staff’s presentation and continued efforts to develop the SB 423 Report (Report).

SMUD offers the following feedback regarding the Workshop:

- The CEC correctly recognizes carbon capture, long-duration energy storage (LDES), and green hydrogen technologies as firm zero-carbon (FZC) resources.
- The CEC’s working definition of FZC resources should clarify the meaning of “extended periods” and ensure Renewable Portfolio Standard (RPS) eligible resources meet the same performance requirements to be considered “firm” resources.
- Geothermal and hydropower resources are clean, non-combustion technologies and should be treated as zero-emissions consistent with state policy.
- The CEC should recognize that carbon capture resources may provide both system and local reliability benefits.
- The CEC should clarify assumptions, conclusions, and limits regarding reliability modeling.

SMUD’s comments are further detailed below.

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<sup>1</sup> See “Presentation of Lead Commissioner Workshop on Senate Bill 423 Emerging Renewable and Firm Zero Carbon Resources 11-17-2023”, TN 253179 (November 17, 2023), 21-ESR-01, *available at* <https://efiling.energy.ca.gov/GetDocument.aspx?tn=253179&DocumentContentId=88384>.

**The CEC Correctly Recognizes Carbon Capture, LDES and Green Hydrogen Technologies as FZC Resources.**

As SB 423 recognized, meeting the state’s clean energy goals in an efficient and cost-effective manner requires a diverse set of clean energy resources. SMUD’s Zero Carbon Plan aims to eliminate carbon emissions from its electricity production by 2030, while also maintaining reliable and affordable service. A large part of this plan involves expanding the use of currently available carbon-free technologies, like solar, wind, and battery storage, along with leveraging load flexibility through new and existing programs and pilots. However, SMUD also anticipates a need for new and emerging FZC technologies to enable the removal of the last carbon emissions from electricity production.

With this in mind, SMUD commends the CEC for its recognition of carbon capture, long-duration energy storage (LDES), and green hydrogen as technologies that contribute to reliability and reduce emissions.<sup>2</sup> SMUD is partnering with Calpine Corporation (Calpine) to retrofit the Sutter Energy Center, an existing gas power plant in Sutter County, with carbon capture and sequestration (CCS) technology. The project is expected to be operational in 2027; as an offtaker, SMUD anticipates realizing substantial reliability and emission reduction benefits. SMUD is also partnering with ESS Inc. to demonstrate iron flow batteries on SMUD’s system and is a member of California’s Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) initiative.

SMUD appreciates the inclusion and continued analysis of these emerging FZC resources within the scope of the SB 423 Report. SMUD also recommends the Report clarify that “carbon capture” includes both CCS and carbon capture, utilization, and storage (CCUS), the latter of which is specific to projects with a carbon utilization component (e.g., production of materials like plastic or concrete). SMUD additionally believes that the proposed partial counting for CCS resources with less than a 100% capture rate is reasonable given the evolving technology.

**The CEC’s Working Definition of FZC Resources Should Clarify the Meaning of “Extended Periods” and Ensure RPS-Eligible Resources Meet the Same Performance Requirements to be Considered “Firm” Resources.**

The Workshop provided the following working definition of FZC resources:

Firm Zero-carbon Resources are resources or combination of resources that reliably produce zero-carbon electricity on demand, ensuring a consistent and stable power supply for extended periods and/or are eligible for the Renewable Portfolio Standard (RPS).<sup>3</sup>

This working definition should include two clarifications. First, “extended periods” should be further specified. The performance duration of limited availability renewable resources directly affects the ability to serve as a “firm” resource. SB 423’s definition of

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<sup>2</sup> Id. at Slide 14.

<sup>3</sup> Id. at Slide 12.

FZC resources provides that there is a need to deliver zero-carbon power “with *high availability* for the expected duration” of multiday and atypical weather events, including periods of “low renewable energy generation”.<sup>4</sup> During the Workshop, the CEC observed that multiday reliability events range from 2-7 days, with an average duration of 3 days. In such circumstances, it is unclear and may be unlikely that some currently available technologies, like solar and wind resources paired with existing battery storage technology, would be able to maintain high availability. For example, during early January 2023, SMUD’s local solar generation was substantially reduced to an average of approximately 9% over a three-week period due to abnormal winter storms. The working definition could include or exclude certain technologies, depending on what is meant by “extended period” and additional clarity on this phrase would help to discern which technologies should be further considered for purposes of the SB 423 Report.

Second, the CEC should clarify that RPS-eligible resources must meet the same performance requirements to be considered “firm”. The working definition defines FZC resources as those that reliably and stably produce zero carbon energy for extended periods “and/or” are RPS-eligible. This definition implies that RPS-eligible resources may not need to meet the same reliability and duration requirements of other non-RPS resources. Instead, the CEC should ensure that both RPS-eligible and non-RPS eligible resources show similar performance capabilities to be considered firm resources.

**Geothermal and Hydropower Resources are Clean, Non-Combustion Technologies and Should be Treated as Zero-Emissions Consistent with State Policy.**

At the Workshop, geothermal and hydropower resources were characterized as “low emission” resources rather than zero emission resources. SMUD recommends the CEC reconsider these characterizations. Hydropower has long been recognized as a GHG-free resource in the California Air Resources Board’s (CARB) Mandatory Reporting Regulation (MRR)<sup>5</sup>; this recognition is also reflected in the 2021 SB 100 Report.<sup>6</sup> Geothermal resources similarly do not incur emissions-related compliance obligations under CARB’s Cap-and-Trade regulation.<sup>7</sup> Further, SB 423’s legislative text and analysis<sup>8</sup> recognize geothermal as an FZC resource and the 2021 SB 100 Report<sup>9</sup> recognizes both hydropower and geothermal as FZC resources. The CEC should classify both resources as zero emissions, consistent with these authorities.

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<sup>4</sup> See SB 423, Section 2 (d)(2).

<sup>5</sup> See Mandatory Reporting Regulation at section 95105 (f), excluding hydropower.

<sup>6</sup> See 2021 SB 100 Report, at 39, fn.51 (listing large and small hydropower as “carbon free” resources) and B-9 (identifying a large hydro facility as a zero-carbon resource).

<sup>7</sup> See Cap and Trade Regulation at section 95852.2 (b).

<sup>8</sup> See SB 423, Section 1 (a)(3) & (4) (suggesting geothermal is a firm zero-carbon resource),

<sup>9</sup> See 2021 SB 100 Report, at 39, fn.51 and B-9 (listing large and small hydropower as a “carbon free” resources); at 63, fn. 93 (stating “Firm Resources’ are generating resources that can generate electricity at any given time. Examples of zero-carbon firm resources include geothermal, biomass, hydroelectric, and nuclear power.”)

**The CEC Should Recognize That Carbon Capture Resources May Provide Both System and Local Reliability Benefits.**

CEC staff provided preliminary resource characterizations regarding system and local reliability and resiliency for identified FZC resources. Notably, carbon capture resources were listed as providing system reliability benefits, but not local reliability benefits. As discussed above, SMUD is currently working with Calpine to retrofit the Sutter Energy Center with CCS technology. The Sutter Energy Center is located within the Balancing Authority of Northern California's (BANC) footprint and is proximate to SMUD's service area. SMUD anticipates that the Sutter Energy Center will provide significant local reliability benefits because of its location, deliverability, and capacity relative to SMUD's load. SMUD encourages the CEC to recognize CCS's potential for contributing to local reliability in certain circumstances and avoid linking the definition of local reliability to areas exclusively within the California Independent System Operator (CAISO).

**The CEC Should Clarify Assumptions, Conclusions, and Limits Regarding Reliability Modeling.**

During the Workshop, CEC staff presented on preliminary reliability modeling analyses. SB 423 requires the evaluation of a reasonable range of cost and performance assumptions that reflect emerging technology trends to help resource integration on a daily, multiday, and seasonal basis.<sup>10</sup> Modeling Objective #1 evaluated how incorporating more firm resources into the portfolio affects the requirement for other resources. The modeling concluded that reliability could be met with both firm and non-firm resources, but noted that other factors such as cost, feasibility, and renewable energy production should be considered separately.<sup>11</sup>

The CEC should consider whether two portfolios with the same loss of load expectation (LOLE) figure are truly providing the same level of reliability. As described in comments on the 2025 SB 100 Report,<sup>12</sup> reliability modeling may require a broader analysis, including factors such as cost, portfolio attributes, available transmission, and deliverability. Only looking at different resource stacks, for example without considering deliverability or transmission needs associated with each portfolio, may not provide accurate conclusions. In addition, it is unclear to what extent the analysis for Modeling Objective #1 incorporates extended periods of extreme weather (such as a three-week storm system) or system failure events, which have significant reliability impacts. The January 2023 storm system occurred outside the CEC's modeling window, and the analysis for Modeling Objective #2 (which evaluates what reliability concerns can occur during multi-day weather events in the near and mid term) focused on three-day events. SMUD encourages the CEC to clarify assumptions and limitations before concluding

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<sup>10</sup> SB 423 at Section 2.

<sup>11</sup> *Presentation* at Slide 30.

<sup>12</sup> See "POU BAA and CMUA Comments on SB 100 Analytical Framework Workshop", TN253173 (November 16, 2023) *available at* <https://efiling.energy.ca.gov/GetDocument.aspx?tn=253173&DocumentContentId=88378>.

that reliability can be reasonably met with either firm or non-firm resources and ensure extended multi-day events are considered within the analysis.

Furthermore, the CEC should more specifically consider cost and feasibility in determining firm and non-firm portfolios. This would be consistent with the direction in SB 423 and may provide a more accurate picture of which resources cost-effectively and efficiently meet the State's clean energy goals.

### **Conclusion**

SMUD thanks the CEC for consideration of the above comments and looks forward to working collaboratively on the development of the SB 423 Report.

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