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*Comment Received From: University of California Davis, EEI and WCEC*
*Submitted On: 7/2/2021*
*Docket Number: 20-EPIC-01*

## Battery Energy Storage Valuation

*Additional submitted attachment is included below.*

CALIFORNIA ENERGY COMMISSION

**ELECTRIC PROGRAM INVESTMENT CHARGE 2021-2025 (EPIC 4)**
**RESEARCH CONCEPT PROPOSAL FORM**

The CEC is currently soliciting research concept ideas and other stakeholder input for the EPIC 4 Investment Plan. For those who would like to submit an idea for consideration, we ask that you complete this form and submit it to the CEC by 5:00 p.m. on **July 2, 2021**.

To submit the form, please visit the e-commenting link, https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=20-EPIC-01, enter your contact information, and then use the "choose file" button at the bottom of the page to upload and submit the completed form. Thank you for your input.

1. Please provide the name, email, and phone number of the best person to contact should the CEC have additional questions regarding the research concept:

   David Vernon, dvernon@ucdavis.edu, 505-670-5138

2. Please provide the name of the contact person's organization or affiliation:

   University of California Davis, Western Cooling Efficiency Center

3. Please provide a brief description of the proposed concept you would like the CEC to consider as part of the EPIC 4 Investment Plan. What is the purpose of the concept, and what would it seek to do?

   Tool to evaluate the value of battery energy storage optimizing charge and discharge timing for TDV, greenhouse gas intensity, and utility tariff rate schedules.

4. In accordance with Senate Bill 96, please describe how the proposed concept will **"lead to technological advancement and breakthroughs to overcome barriers that prevent the achievement of the state's statutory energy goals."** For example, what technical and/or market barriers or customer pain points would the proposed concept address that would lead to increased adoption of clean energy technologies? Where possible, please provide specific cost and performance targets that need to be met for increased industry and consumer acceptance. For scientific analysis and tools, what data and information gaps would the proposed concept help fill, what specific stakeholders will use the results, and for what purpose(s)?

Currently stakeholders considering investment in batterye energy storage systems and stakeholders developing utility tariffs and battery energy export rules do not have effective ways to evaluate the value of battery systems. This lack of information slows down the adoption of battery energy storage systems and slows down the benefits of battery systems exporting power during times of grid stress or high greenhouse gas intensity.

5. Please describe the anticipated outcomes if this research concept is successful, either fully or partially. For example, to what extent would the research reduce technology costs and/or increase performance to improve the overall value proposition of the technology? What is the potential of the technology at scale?

   A tool enabling evaluate the value of battery energy storage optimizing charge and discharge timing for TDV, greenhouse gas intensity, and utility tariff rate schedules will provide the input that utility tariff designers, CPUC rule makers, and CEC and Utility incentive planners need to consider tradeoffs and encourage the best outcomes for society. By understanding the incentive imposed by these different goals policies, regulations, and incentives can be aligned to motivate faster adoption of battery energy storage systems for scoietal benefit at lower cost than many other efficiency investments. This tool would also enable customers considering the purchase of battery systems to better understand how to most effectively control them and could significantly increase battery system adoption.

6. Describe what quantitative or qualitative metrics or indicators would be used to evaluate the impacts of the proposed research concept.

   Compare typical battery charge and discharge controls to optimized controls and evaluate the benefits to the battery owner, operator, utility, and societal benefits. Benefits include: utility bill costs, greenhouse gas emissions reduction, enhanced site resiliency, and potential for enhanced grid resiliency.

7. Please provide references to any information provided in the form that support the research concept's merits. This can include references to cost targets, technical potential, market barriers, etc.

   This tool would expand the capabilities of current tools to address the needs and perspective of the end users, the utilities, and the regulatory agencies by simultaneously assessing the value of battery energy storage optimizing charge and discharge timing for TDV, greenhouse gas intensity, and utility tariff rate schedules. By understanding the incentive imposed by these different goals policies, regulations, and incentives can be aligned to motivate faster adoption of battery energy storage systems for scoietal benefit at lower cost than many

other efficiency investments. For example Quest is a tool developed by Sandia National Laboratories is state of the art but does not cover greenhouse gas emissions reductions, resiliency considerations for the site. https://www.sandia.gov/ess-ssl/tools/quest/?utm_source=newsrelease