

**DOCKETED**

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## **Farm Decarbonization Research Hub**

*Additional submitted attachment is included below.*



## **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), <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 Meyers  
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2. Please provide the name of the contact person’s organization or affiliation:

Polaris Energy Services

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?

Farm Decarbonization Research Hub. Several technologies that address the decarbonization of California’s agriculture sector have been developed and tested with EPIC funding and others funded by other agencies with similar or overlapping goals, such as water efficiency and carbon capture. Following completion of these projects, few of the technologies—which often achieved success in the context of their pilots—have reached widescale commercial adoption. This means that statutory goals are not being met and ratepayer money is not earning a return. The purpose of the research hub is to identify barriers to adoption and to develop solutions that combine multiple technologies and value streams that together can overcome the economic and policy hurdles that have hindered adoption. The concept is similar to the Demand Flexibility Research Hub for buildings but, because of the diversity of farm ‘configurations’, the hub

will be virtual, encompassing deployments on a number of farms that agree to participate as test beds for an integrated approach.

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)?

The concept will contribute to decarbonization through energy efficiency and load shift as well as water savings by stacking benefits from complementary technologies. As an example, there are irrigation pumping loads that cannot be shifted because crop water requirements do not allow for full avoidance of peak hours. If previous EPIC technologies were combined:

1. With Transactive Energy (RATES/Polaris), partial shift could be achieved because there would not be an 'all or nothing' structure imposed by demand charges.
2. With deficit irrigation (IFF), the total water requirement could be reduced, creating windows for additional shift and reducing overall pumping energy requirement.
3. With energy efficiency (Wexus and AgMonitor), more water could be delivered in less time, creating windows for additional shift and reducing overall pumping energy requirement.

Technologies that have not been part of EPIC projects would also be included. For example, composting application to fields reduces evaporation, which reduces water requirements. Currently, this technology is funded and evaluated in isolation. In combination, the reduced irrigation requirements could not only lower total energy demand but free up capacity to shift remaining on-peak irrigation to off-peak hours with commensurate decarbonization and reliability benefits.

The results will be used by policy makers to structure programs and markets and by technology vendors and project developers to develop solutions with stacked benefits that will meet customers' investment hurdles.

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?

If the concept is successful, it will be possible to develop a decarbonization plan for every California farm that amplifies the benefits of previously disjointed projects and technology deployments. At scale, irrigation can be fully decarbonized and total water and energy savings achieved that are greater than the sum of the component parts.

6. Describe what quantitative or qualitative metrics or indicators would be used to evaluate the impacts of the proposed research concept.
  1. For research hub test sites, the individual decarbonization benefit of each technology as a standalone deployment compared with the stacked benefits.
  2. Quantification of customer benefits and qualitative surveys to determine adoption rates that can be expected outside of the research hub.
  
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.

These EPIC projects provide data on results of several individual technologies and the cost to implement at scale. This is a partial list:

1. Polaris (EPC-16-045)
2. Wexus (EPC-14-070)
3. IFF (EPC-16-027)
4. PowWow (EPC-14-081)
5. RATES (EPC-15-054)