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Integrated Water Energy Carbon Development Platform

Additional submitted attachment is included below.

CALIFORNIA ENERGY COMMISSION

CALIFORNIA NATURAL RESOURCES AGENCY

Electric Program Investment Charge 2026–2030 (EPIC 5) Research Concept Proposal Form

The California Energy Commission (CEC) is currently soliciting research concept ideas and other input for the Electric Program Investment Charge 2026–2030 (EPIC 5) Investment Plan. For those who would like to submit an idea for consideration, please complete this form and submit it to the CEC by **August 8, 2025**. More information about EPIC 5 is available below.

To submit the form, please visit the e-commenting link: https://efiling.energy.ca.gov/EComment/ECommentSelectProceeding.aspx and select the Docket **25-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 in advance 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:

   Floyd Keneipp, floyd.keneipp@tierrarc.com, (925) 305-8915

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

   Tierra Resource Consultants

3. Please provide a brief description of the proposed concept that you would like the CEC to consider as part of the EPIC 5 Investment Plan. What is the purpose of the concept, and what would it seek to do? Why are EPIC funds needed to support the concept?

   Our concept is called the Integrated Water Energy Carbon Development Platform (Platform). The Platform will 1) demonstrate the co-benefits of a new crop growth system and 2) implement a cross-agency development process to scale deployment across California agricultural market.

At the core of the proposal is a new crop growth system currently being tested on 40,000 acres in California's Central Valley. Based on initial field tests, we expect to achieve a broad spectrum of benefits:

- ✓ 20% water savings. Preliminary estimates are 1 acre ft of water saved per 2 acres treated. At scale we anticipate potential savings of 250,000 acre-ft of water saved annually on 500,000 acres deployed by 2030, and 500,000 acre-ft saved annually on 1.000,000 acres deployed.
- ✓ Direct energy savings based on reduced pumping across the full range of irrigation system operating pressure from 6 to 50 PSI.
- ✓ The system will work with most crops and soil types across California with an average 10% to 20% yield increase depending on the crop.
- ✓ Doubles Soil Organic Matter (SOM), which is 58% carbon, thereby positioning agriculture as a significant carbon sink and contributor to carbon reduction. Initial yields indicate over 10 $MtCO_2e$ Stored per Acre (24t CO2e / hectare).
- ✓ Simultaneously solving over two dozen grower challenges, from soil health to pest pressure to yield increases
- ✓ Potential to produce high-integrity credits. Deep-soil carbon (30+tCO_2e/acre, below 12 cm (6 inches), permanent) is verified with MRV partners (UCANR, CSU Water, UC System). Credits available to corporate net-zero buyers starting 2026+.

The benefits of this platform are of great importance to growers at a time when they are facing rapidly increasing energy costs, volatile commodity prices, and water uncertainty. In addition, the crop growth system currently being tested is in 100% organic compliance and reduces pesticide use and other environmental and health burdens.

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 technology or innovation? 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, provide more information on what data and information gaps the proposed concept would help fill, and which specific parties or end users would benefit from the results, and for what purpose(s)?

   Our funding request will develop 2 critical market components.

1. The first component is a working group that engages across various California agencies to collectively asses the results for field testing and, if positive, define how new crop growth systems will align with, and benefit, various policy initiatives. Our initial assessment indicates alignment and benefits for multiple agencies, including:

   - ✓ **CPUC**: including energy efficiency and resiliency resulting from a 20% reduction in irrigation water use and related pumping energy, water conservation mandates and incentive programs, including drought response benefits related to reduce ag pumping
   - ✓ **CEC**: Carbon Removal Innovation Support Program (CRISP) or any Carbon Management Hub related initiatives, strengthening IEPRs strategic objective to use natural and working lands as carbon sinks and support GHG reduction through improved soil and water management.
   - ✓ **DOA:** including support for State Water Efficiency and Enhancement Program (SWEEP), Renewable Energy for Agriculture Program (REAP), Climate-Smart Agriculture Initiatives and Water-Energy Nexus Policy Integration.
   - ✓ **CARB:** Sustainable Agricultural Lands Conservation Program (SALCP), Healthy Soils initiative and scoping efforts related to AB 32 and AB 1279)
   - ✓ **DWR**: Water Resilience Portfolio initiatives and mandates related to SB 606, AB 1668, Sustainable Groundwater Management Act (SGMA) implementation

   Work on this market component will provide agency specific benefits in terms that each agency uses to assess performance to goals and how ongoing agency participation will achieve verified scale. This component will also define and verify the co-benefits that may be shared and claimed by each agency.

2. Upon verifying the efficacy of the RA solution and the individual and collective agency benefits, the second market components to be funded will develop and implement 4 frameworks needed to achieve scale, including:

   1. A funding and financing framework, this is implementation plan and operating platform that leverage all available sources of funds to scale regenerative agriculture across California.
   2. A policy and planning framework, this is an operations platform by which participating agencies and key industry stakeholders define how existing policies can be leveraged to effectively scale RA, and where policy gaps exist and how they might be addressed

3. A technology deployment framework, a technical advisory service and consortium of trades representatives to develop and implement the most efficient path to implement new group growth technologies and how results are to be verified, valued and reported, including methods related to carbon credits.
4. A market development framework that defines the cooperative operating structure by all vertical elements in the market, from policymakers to water district to producers will collaborate integrate polices, funding, and technologies to achieved new growth system that achieve energy, water, and GHG savings scale while providing growers with significant economic benefits.

Work on this market component will begin after the first market component (i.e., the cross agency working group) matures and will proceed until the end of the EPIC funding cycle. Developing these market components will lead to new and accelerated technological advancements in California's agriculture market and provide an integrated solution to help overcome barriers that prevent the achievement of the state's statutory energy, water, and carbon goals.

The end results being sought by our funding request is a business model that is economically self-sustaining based on energy savings, water savings, improve agricultural yields and value received for verified carbon savings.

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 or ratepayer costs and/or increase performance to improve the overall value proposition of the technology? What is the potential of the innovation at scale? How will the innovation lead to ratepayer benefits in alignment with EPIC's guiding principles to improve safety, reliability, affordability, environmental sustainability, and equity?

The Integrated Water Energy Carbon Development Platform project will define, test and forecast, at minimum, the following metrics:

- ✓ At scale, water savings is significant. During peak growing season, between 8.5 and 9.6 million acres of land in California is irrigated annually California involving 25M to 30M acre feet of water. 20% water savings.
- ✓ Water pumping constitutes by far the largest component of a growers energy bill and reduced pumping correlates directly with reduced energy costs. This is increasingly important as electricity rate increases outpace other production costs

- ✓ A 10% to 20% yield increase in crop yield correlates closely with a 10% to 20 increase in pre-tax producers income.
- ✓ 10 $MtCO_2e$ Stored per Acre (24t CO2e / hectare) is a scalable metrics for most row crops. Approximately 2 and 2.5 million acres of row crops are in production annually in California

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

   Our project will focus on quantitative metrics including:

   - ✓ Changes in acre-ft used
   - ✓ kWh reduction as related to reduced water pumping
   - ✓ Time of use metrics related to any time shift in pumping activity
   - ✓ $MtCO_2e$ Stored per Acre including verification process details
   - ✓ Changes in crop yields, including changes by crop type accounting for weather other exogenous factor
   - ✓ Changes in farm income based on recorded costs and price adjusted value of sales

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

   The following links provide an overview of the growing system being tested:

   - ✓ Crop growth system provider: Urth Agriculture
   - ✓ Overview of system: UA PRO GROW SYSTEM — Urth Agriculture
   - ✓ Soil fundamental: https://www.urthagriculture.com/soil-testing-1
   - ✓ Example of soil sample report: Sample-Soil-20201216_Redacted.pdf
   - ✓ Carbon cycle overview: https://www.urthagriculture.com/carbon-2

8. The EPIC 5 Investment Plan must support at least one of five Strategic Goals:

   Our proposed project will have direct and measurable impact on the following strategic goas:

   a. Distributed Energy Resource Integration
   b. Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas
   c. Climate Adaptation