Center for Resource Efficient Communities

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California Energy Commission
Electric Program Investment Charge
1516 Ninth Street
Sacramento, CA 95814

To the California Energy Commission and EPIC Program Implementation Staff:

Thank you for the opportunity to submit feedback on the implementation of the Electric Program Implementation Charge (EPIC) program. We would like to respond particularly to one of the specific questions upon which you solicited input:

- Is there a need to invest EPIC funds in research centers or consortiums that implement multi-year programs? If so, describe why research centers or consortiums are needed and identify which topic areas they are needed in.

In response to the first portion, research centers provide important capabilities and benefits that are not available when research funds are distributed solely on a project-by-project basis, and therefore should be an essential ingredient of EPIC program implementation. Stable funding from EPIC to research centers would bring all of the following benefits to the EPIC program:

- **A long attention span on important topics** – Many critical research needs that the EPIC program faces will require sustained attention from dedicated groups of expert researchers. Research centers can tackle big-picture, long-term research questions that might not be answerable in two or three years (i.e. the lifespan of a typical research contract), but require a continuing effort over several years or even decades. While many individual researchers seek to focus their work in this way, it is certainly more difficult to do so while having to meet the requirements of numerous funding agencies and programs. Research centers also have the ability to generate and curate long-term datasets from which many different research questions can be answered, multiplying the benefits to the state and the ratepayers.

- **Possibilities for leveraging EPIC investments** – Research centers are better positioned to leverage EPIC research dollars with funding from other sources. For example, stable operating budgets provided by EPIC would enable research centers to provide matching funds in other funding competitions (often important in competing for federal funds, especially), cultivate enduring industry partnerships, and develop a national and international reputation as a "go-to" on a specific topic that may attract unanticipated new funding opportunities.

- **Developing human capital** – As in any other important field of inquiry, energy researchers accumulate expertise as they work and the rate of accumulation on any specific topic is diminished if the researchers must divide their attention among disparate projects in order to fund their time. Simply put, stable funding for a center enables a core set of carefully selected researchers to get off the proposal treadmill and instead focus their time and energies exclusively on a key topic of importance to the state and the EPIC program. Moreover, research centers can much more easily employ and retain highly skilled staff researchers who do not have the job security of academic faculty but who are often essential to the successful execution of research.

- **Timely expertise for policymaking** – Finally, stable research centers can be called upon to respond to legislative and policy priorities and questions in a timely manner as they emerge. It is much harder to assemble such expertise in an ad hoc manner when a need is urgent. Availability to fill this role could be made an explicit requirement of EPIC funding for research centers.

With respect to topic areas, we feel strongly that land use decisions are central to the EPIC Program's objectives of enhancing electricity ratepayer benefits in accordance with the Energy Commission's and the CPUC's broader policy goals, as well as the state's objective of dramatically reducing greenhouse gas emissions. Electricity consumption depends upon land use decisions in important ways, and this is only becoming more true as the state seeks to broaden the use of electricity as a fuel for space heating and vehicle propulsion.

Four connections between land use and electricity ratepayer benefits are particularly important areas of needed research, and could be packaged together as the research portfolio for a center focused on the linkage between urban land use and electricity consumption:

- **Zero-net-energy buildings**. To reach the ambitious net-zero building standards that the CEC and CPUC have set, it will be necessary to analyze what land use patterns and zoning standards are consistent with creating large numbers of net-zero buildings. To reach net-zero, buildings have to generate a significant amount of electricity on-site, or else directly displace electricity use through passive daylighting and other means. To do either of these, buildings must have the correct orientation and solar access, as well as having the correct architectural features. Building orientation and solar access, however, are controlled much more by planners than by architects, because in urbanized areas buildings generally orient to the street layout and their clustering is largely determined by zoning standards. Studying the street layouts, zoning standards, and solar access standards necessary to achieve widespread net-zero construction is therefore key to achieving this policy goal. The CEC's SEAT tool allows planners to answer some of these questions for new subdivisions, but there is as yet little analysis for existing urbanized areas, where the state is attempting to incentivize new growth through SB 375 and other policy means.

- **Land use – residential electricity links**. Previous research has documented that more compact communities generally stimulate less residential energy consumption, including electricity consumption, than sprawling land use patterns. Screening tools have been built that will allow municipalities to evaluate the residential electricity consumption consequences of alternative land use scenarios, but there is much additional research to be done in this area, especially if better electricity end-use data could be made available by the CPUC or the utilities for research

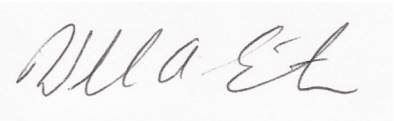
purposes. In addition, as vehicle propulsion is gradually electrified in line with state policy initiatives, the huge transportation demand created by sprawling residential land use patterns will increasingly become an issue for electricity grid management.

- **"Cool communities" planning standards**. The largest peak loads on the electricity grids are for air conditioning on hot summer days. These loads are directly related to the outdoor air temperatures in the city, which are influenced by a host of urban design and land use factors, especially the amount of trees and vegetated open space, the materials used in paving and roofing, and the amount of open water. While EPIC is already sponsoring research on cool roof and paving materials, the land use planning techniques needed to advance the other dimensions of cool communities are largely unexplored. The biggest needs are to establish "cool communities" planning, zoning and building standards, and to develop financing mechanisms to generate the investments needed from the private sector (i.e. cool pavement and roofing materials on private property).

- **Distributed renewables**. To meet long-range state energy and climate change goals related to electricity, it will likely be necessary to site a substantial amount of renewable electricity generating capacity within urban areas. Siting these more distributed renewable systems in large numbers in existing urban areas requires extensive land use planning analysis that includes factors like proximity to existing transmission lines, grid capacities, modification of local building codes, and visual impacts (which are often controversial). These new planning standards must then be integrated into general plans and zoning documents with appropriate public participation. This research need may be partially encompassed within the upcoming solicitation to "Establish Strategies for Enhanced Local Regulatory Assistance and Permit Streamlining that will Accelerate Deployment of Clean Energy," but it should be noted that the need is not merely one of regulatory streamlining but also assessment of the urban landscape to systematically identify opportunity sites and understand better the potential overall contribution of urban areas to the state's electricity generation portfolio.

We applaud the efforts that the CPUC and CEC have put forth to bring the EPIC program to this point, and greatly appreciate the opportunity to share our opinions. Please do not hesitate to contact us if we may be of further assistance.

Sincerely,



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