Title of Proposed Initiative: Statewide energy database to improve energy management in California

Investment Areas
☒Market Facilitation

Electricity System Value Chain
☒Demand-side management

Issues and Barriers:

Access to energy use data for designing and evaluating energy policies is limited in California and presents a key challenge to conducting rigorous analysis of the state's energy patterns, maximizing energy efficiency investments, improving distributed generation planning and increasing resilience to climate change. Energy institutions and policies created and implemented in the past produce path dependencies that will interact with new strategies in unpredictable ways. To achieve the state's energy use goals and maximize ratepayer return on investment, new knowledge must be created that analyzes and assesses the dramatic changes that have occurred in policy, technology and environmental awareness over the last few decades.

In order to fill these knowledge gaps, we propose the creation of a database that links high-resolution energy use data to information on land use, building stock, weather, and socio-demographic characteristics on an ongoing basis over several years. This will enable greatly improved targeting of investments to reduce ratepayer expenditures and greenhouse gas emissions, improve climate change adaptation planning, and increase grid reliability.

The underlying challenges to such knowledge creation are data availability, preservation, and access. At present, the IOUs are the sole stewards of most customer consumption data, with limited exception as directed by the California Public Utilities Commission. Yet IOUs do not always preserve billing data over several years, nor do they link these data to the range of explanatory datasets needed to understand energy consumption patterns with precision. Without a systematic approach to long-term stewardship, linkage, and analysis of customer-level energy use data, California's leadership role in energy management is under threat.

Initiative Description and Purpose:

To address this gap, we propose the California Energy Commission fund an initiative to systematize the collection, linkage, preservation, and analysis of the following data on an ongoing basis for the full service territory of California's electric IOUs for at least ten years:

- Permanent site ID of residence or commercial establishment
- Customer account ID
- Meter-level monthly electricity consumption and billing data
- Customer classification (including NAICS and BEA codes), census block group, and assessor's parcel number identifiers

- Address-level program participation, including program type and intervention date
- Parcel-level County Assessor's building stock characteristics
- Census block group-level socio-demographic characteristics from the U.S. Census
- Weather characteristics

While these data may already exist, pulling them together into one dynamic, multidimensional database that is maintained and updated over time will enable the creation of new knowledge needed to understand key drivers of energy consumption, and in turn to promote better energy management. This will generate significant benefits for California electric IOU ratepayers through energy expenditures, reduced climate change adaptation costs, and increased grid reliability. We recommend a funding level between $4,000,000 and 6,500,000.

Stakeholders:

This initiative is supported by the California Public Utilities Commission, the Governor's Office of Planning and Research, the Southern California Regional Energy Network, and the Los Angeles Regional Collaborative for Climate Action and Sustainability.

Background and the State-of-the-Art:

A pilot-scale project to demonstrate the value of collection, linkage, and analysis of the data specified above is currently underway in Los Angeles County, funded by the CEC's Public Interest Energy Research program. This project has collected a multi-year census of customer-level monthly electricity consumption data to create high-resolution baselines of energy use across the County.[1] Initial spatial analysis completed to date includes mapping electricity use in the City of Los Angeles for fiscal year 2011-2012. This work is currently being replicated for the remainder of the County and for several previous years. Results have demonstrated that aggregated data masks important spatial trends in consumption and can lead to poorly designed policy.

This project has also uncovered significant gaps in attention to the storage, preservation, and analysis of consumption and program participation data. Data are stored in idiosyncratic formats within and across utilities, with no one department responsible for maintaining master databases combining these data. There is little review, quality control, or analysis of stored data. As such, California's IOUs appear to be foregoing a significant opportunity to improve the State's ability to make cost-effective and equitable energy policy and to rigorously evaluate the ratepayer benefits that have resulted from programs they have implemented. Given these realities, significant cost savings could be realized from a systematic statewide mechanism for data collection, curation, preservation, and analysis.

Justification:

This strategy has application to all stationary consumption of electricity in California, spanning residential and non-residential sectors. The creation of the proposed database would streamline the

[1] Pincetl et al. (2012) "Methodologies to establish regional energy baselines." Interim project report, California Energy Commission Public Interest Energy Research.

design, implementation, and evaluation of state energy policies and would enable the creation of updated baselines of energy use on an ongoing basis, important for assessing the impact of California's aggressive energy policies. We estimate the proposed initiative would create 15 full-time equivalent positions to develop and implement systematic protocols and to manage, update, and analyze the specified data and provide funding for the education and training of several students. This proposal has the potential to generate significant ratepayer benefits, and is thus appropriate for public funding.

Ratepayer Benefits:

☒Promote greater reliability

☒Potential energy and cost savings

☒Societal benefits

☒Environmental benefits (specify)

☒GHG emissions mitigation/adaptation in the electricity sector at the lowest possible cost

☒Economic development

This proposal will directly improve the development and implementation of ratepayer-sponsored programs to reduce energy consumption and expenditures, promote grid reliability, and reduce future expenditures on climate change adaptation. The linkage of customer-level electricity use data will enable new knowledge to help guide future investments that minimize unintended consequences, regressive equity impacts, and costs to ratepayers while supporting achievement of California's aggressive energy and environmental policy objectives.

Public Utilities Code Sections 740.1 and 8360:

This initiative supports the principles articulated in California Public Utilities Code sections 740.1 and 8360 by providing significant likelihood of ratepayer benefits, improving and extending knowledge of the key drivers of energy consumption, maximizing cost-effectiveness, supporting increased use of cost-effective digital information to improve efficiency of deployment of demand response, demand-side management, and energy efficiency resources, generating environmental benefits, promoting conservation by efficient resource use, and promoting the welfare of California's residents and businesses.