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Suggestion for Alternatives to Deep Energy Retrofits Grant Funding Opportunity as part of EPIC Program

Suggestion for Alternatives to Deep Energy Retrofits Grant Funding Opportunity as part of the EPIC 2018 â€“ 2020 Triennial Investment Plan.

Additional submitted attachment is included below.

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The Energy Commission is currently soliciting ideas and stakeholder input for the 2018 – 2020 EPIC Triennial Investment Plan. For those that would like to submit an idea for consideration in the 2018-2020 EPIC Triennial Plan, we ask that you complete the form below. Submittals are due by **5:00 p.m. on February 10, 2017.**

Part 1. Initiative Description and Purpose:

1. Please provide a brief description of the proposed initiative:

One of CEC's Strategic Frameworks is to "advance technologies for deep energy savings in buildings and facilities." Many assume that achieving deep energy savings in existing buildings require deep energy retrofits. A deep energy retrofit refers to stripping a building down to the studs and rebuilding it (based on building science techniques). The goal is to reduce energy consumption and improve home comfort.

While deep energy retrofits can be beneficial, they can also have drawbacks. First, they might be economically and environmentally wasteful (perfectly useful materials are discarded along with the embedded carbon required to manufacture them). Second, they are invasive because they require occupants to vacate the building for an extended time period.

The assumption that deep energy savings in existing buildings require deep energy retrofits is not necessarily correct. This is particularly true within California's relatively moderate climate. The need for a deep retrofit depends on how uniformly losses are distributed throughout the building. A simple example will suffice. Suppose that a home is generally well-insulated. Most of the walls have foam insulation and the attic is well-insulated so that both have an R-value of 20. In addition, suppose that a few locations (representing 5 percent of the total surface area) are uninsulated and have an R-value of 1. This could occur if portions of seemingly interior walls actually have exterior exposure. The overall thermal performance would have an average R-value of 10. This value is so low even though 95 percent of the building has an R-value of 20!

2. What technical and/or market barriers would the proposed initiative help overcome? For scientific analysis and tools, what knowledge gaps would the proposed initiative help fill?

CEC should promote alternative approaches to deep energy retrofits in addressing thermal problems within existing buildings. In particular, CEC should promote low-cost methods to identify and repair building shell problems with existing buildings. Projects should address several questions: What is the overall thermal performance of the building and is there a low-cost way to perform this analysis using smart meter data? How uniform are the losses throughout the structure? How can specific losses be identified using low-cost techniques? Can the issues be addressed with minimal inconvenience to occupants?

CPR has demonstrated that it is feasible to achieve a "deep energy retrofit level" of energy savings without performing a deep energy retrofit. Results have been documented based on two-and-a-half years worth of results for a test home (See Part 7, 8, and 9 of the 11-part Solar+ Home blog series available at https://www.cleanpower.com/2016/solar-homes-7-staying-warm-winter/). CPR monitored the test home with a high-quality monitoring system. Measured results demonstrate that heating fuel consumption has reduced from over 350 therms (which has a site energy equivalence of 10,000 kWh) to less than 1,500 kWh. This was achieved by performing a virtual energy audit and then applying a combination of targeted insulation, building sealing, window treatments, and the switch to a heat pump space heater.

Part 2. Benefits and Impacts

3. If this initiative is successful, either fully or partially, what would be the expected impact? Who are the primary users and/or beneficiaries?

This initiative will benefit residential customers, the California electric grid, and the overall state of California. Residential consumers will save money. The California electric grid will have increased reliability by reducing the need for electric space heating (if heat pumps are implemented) and cooling. The state of California will experience a reduction in emissions.

4. Describe what quantitative or qualitative metrics or indicators would be used to evaluate the impacts of the proposed initiative:

5. Please provide a list of peer-reviewed references that support the responses for questions 3 and 4. Proposed initiatives that include peer-reviewed references will be given stronger consideration.

6. (For technologies only) What competitive advantages does the proposed technology solution have over current benchmark technologies? If the technology is beyond the prototype stage, what strategies do you suggest to bring to scale?

Part 3. Connection to Energy Commission's EPIC Framework
Energy Commission staff have developed a draft strategic framework to guide the CEC's planning and implementation of EPIC across triennial investment cycles. One of the objectives of the draft strategic framework is to communicate a consistent set of priorities for organizing current and future EPIC investments.

7. Please indicate which of the following strategic framework themes you feel the proposed initiative best fits within:
    - Advance Technology Solutions for Deep Energy Savings in Building and Facilities
    - Accelerate Widespread Customer Adoption of Distributed Energy Resources
    - Increase System Flexibility from Low-Carbon Resources
    - Increase the Cost-Competiveness of Renewable Generation
    - Create a Statewide Ecosystem for Incubating New Energy Innovations
    - Maximize Synergies in the Water-Energy-Food Nexus
    - Develop Tools and Analysis to Inform Energy Policy and Planning Decisions
    - Catalyze Clean Energy Investments in California's Underrepresented and Disadvantaged Communities

If Other, Please Specify