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Additional submitted attachment is included below.

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

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:

The California Energy Efficiency Strategic Plan (CPUC 2011) has the following goals for existing homes: "Energy consumption in existing homes will be reduced by 20% by 2015 and 40% by 2020 through universal demand for highly efficient homes and products". Going beyond this goal, if brought up to current Title 24 standards, California homes have the potential to cut their energy use in half, and this can be done using only technologies currently available off-the-shelf, and with current construction practices (Less et al. 2012). Through rapid deployment of Very Efficient Home Retroits (VERs) California ratepayers can save 60% or more on their individual energy bills and about one-third of household energy use statewide. Similarly, there will be an almost one-third savings in peak electric demand resulting in lower peak electricity prices and a more stable and reliable electricity supply.

What is needed in order to realize these goals is a comprehensive plan, funding, and demonstrated benefits for large scale retrofitting of existing homes with energy efficient products. One integral step in this plan is the identification of residential retrofit packages that are cost-effective for each of the most common California housing types whose energy efficiency falls significantly below that required by current standards. The next is demonstration of these retrofit packages in California homes. Finally, education of both contractors and homeowners on the results of the analyses and demonstrations and methods for implementation will allow for rapid deployment of Very Efficient Home Retrofits (VERs).

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?

The barriers to widespread adoption of very efficient retrofits are a combination of the cost to perform the work, the lack of knowledge in the industry on how to carry out the very efficient retrofits and the fact that both homeowners and contractors are risk-averse and uncomfortable making unproven out-of-the-ordinary changes to homes. External funding is needed to overcome these barriers because the current market is highly fragmented into small companies and lacks the financial resources to perform a similar study of its own. Also, in order to mitigate risk, customers need information from trusted third-party sources and EPIC projects are just such a source.

The cost barrier to VERs can be addressed by developing packages of retrofits for common house types that remove some of the up-front design costs. The packages would seek the lowest-cost approaches to achieving the goals of retrofitting existing homes to perform better than Title 24 2008 and realizing significant energy savings.

The uncertainty barrier can be addressed demonstrating these packages and proving that these approaches will deliver the promised savings without compromising health, safety, comfort, durability, or building integrity.

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?

A combination of demonstrations, packages, tools for contractors and outreach activities can be used to overcome the market barriers discussed above and help the state meet its energy saving and GHG emission goals, while expanding the building performance contracting business, and generating more employment through this critical upgrade for California's infrastructure. Beneficiaries and users include homeowners who will benefit from lower utility bills, utilities who will benefit from reduced peak demand and associated cost to produce electricity, contractors who will benefit from an uptick in specialized work which can't be outsourced, and society as a whole which will benefit from lower GHG emissions and associated effects.

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

Monitoring of building energy use and indoor environmental quality should be conducted throughout any project funded under this initiative. At the conclusion of the project, the data should be used to determine annual energy use, peak loads, pre-post savings and CO2e. A parallel analysis of the California housing stock should be done to quantify the number of homes in each geographic area or climate zone that are reasonably represented by the study homes and that could be retrofitted with packages similar to those demonstrated in the project. Five years from the completion of the demonstrations, a randomized survey of California homeowners should be conducted to assess participation.

From this, aggregate energy use, peak load, pre-post savings and CO2e benefits of implementation of retrofit packages across suitable homes across the state can be used as the primary indicators 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.

CEC. 2011. California's Major Sources of Energy. http://energyalmanac.ca.gov/overview/energy_sources.html. Sacramento, California: California Energy Commission.

Fisher, Jeremy. Deep Energy Retrofits - Ten California Case Studies. 2011. http://thousandhomechallenge.com/sites/thousandhomechallenge.com/files/userfiles/Fisher_THESIS_FINAL_DRAFT.pdf. Berkeley, California: UC Berkeley.

Keesee, Mike. (2012). Deep Energy Retrofits: Six Real World Examples and Lessons Learned. Paper presented at the ACEEE Summer Study on Energy Efficiency in Buildings-Fueling Our Future With Efficieincy, Pacific Grove, CA. pp. 1-141- 1-152. [http://www.aceee.org/files/proceedings/2012/data/papers/0193-000006.pdf]

Less, Brennan. (2014). Deep Energy Retrofits - Eleven California Case Studies . Lawrence Berkeley National Laboratory: Lawrence Berkeley National Laboratory. LBNL Paper LBNL-6166E

Less, Brennan. (2014). A Meta-Analysis of Single-Family Deep Energy Retrofit Performance in the U.S. . Lawrence Berkeley National Laboratory: Lawrence Berkeley National Laboratory. LBNL Paper LBNL-6581E.

PNNL: Building America Residential Deep Energy Retrofit Research Project. 2011. http://deepenergyretrofits.pnnl.gov/. Richland, Washington: Pacific Northwest National Laboratory

Primen/The Response Center. 2001. 2001 CA Residential Remodeling/Renovation Market Study

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?

N/A

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