

## DOCKETED

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<b>Project Title:</b>	Development of the California Energy Commission Electric Program Investment Charge 2018-2020 Triennial Investment Plan
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<b>Document Title:</b>	Incorporating Community Focused Equity in Research Funding
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# CALIFORNIA ENERGY COMMISSION

## RESEARCH & DEVELOPMENT DIVISION



## Incorporating Community Focused Equity in Research Funding

Staff Workshop | Los Angeles | March 27, 2017



# Housekeeping

- Facilities
- Public comment protocol
- Today's presentation will be posted at:

<http://www.energy.ca.gov/research/epic/17-EPIC-01/documents/>



# Opening Remarks

**Kevin Barker**

Senior Advisor to Chair Robert Weisenmiller  
California Energy Commission

**Rhetta deMesa**

Senior Advisor to Commissioner Janea Scott  
California Energy Commission



## Workshop Agenda

<b>10:15am</b>	<b>Introduction</b>
10:20am	Case Study: Methods for Engaged Community Driven Research & Technology
10:45am	Panel Discussion: Challenges & Solutions for Overcoming Issues with Split Incentives and Retrofitting Multi-Family Housing
11:40am	Big Picture – Various State Initiatives to Support Equity
12:15pm	Introduction to Collaboration Questionnaire*
12:20pm	LUNCH BREAK
1:20pm	Electricity Research and Equity: What is EPIC Funding and How Does it Relate to Community Focused Equity?
1:45pm	Panel Discussion: Equity and Community Driven Energy Research
2:45pm	EPIC Research Investments: Overview of upcoming research opportunities
3:15pm	Closing Remarks



## Purpose of Workshop

- Familiarize attendees with the:
  - California Energy Commission
  - EPIC Program
  - 2018 – 2020 EPIC Triennial Investment Plan
- Seek input on how to:
  - Remove some of the barriers to community adoption
  - Build future funding opportunities that prioritize community engagement in project design and implementation

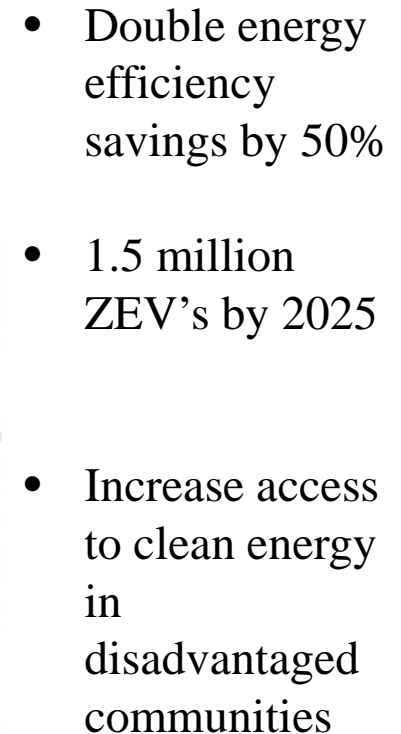


## Overview of EPIC Program

- The Electric Program Investment Charge (EPIC) program is California's R&D investment in the 21<sup>st</sup> century electric power system.
- All EPIC research initiatives must:
  - Address the state's pioneering energy priorities.
  - Accelerate technology innovations and tools.
  - Provide benefits to California ratepayers.
- Transforming our state's electric power system is a significant undertaking that requires multi-dimensional solutions.



- Increase RPS to 50% by 2030
- Reduce GHG to 80% below 1990 by 2050
- 1.3 GW of storage by 2020







## **Panel Discussion: Challenges and Solutions for Overcoming Issues with Split Incentives and Retrofitting Multi-family Housing**

Moderator:

Maria Stamas, Natural Resources Defense Council

Panelists:

- Blanca de la Cruz, California Housing Partnership Corporation
- Walker Wells, Global Green
- John Perfitt, Los Angeles Better Buildings Challenge



## Big Picture: Multiple State Initiatives to Support Communities

### Presentations:

- SB 350 Barriers Report and Recommendations: Michael Sokol, Energy Commission
- Transformative Climate Communities: Daniela Simunovitch, Strategic Growth Council
- Urban Greening: Julie Alvis, California Natural Resources Agency
- CSD Programs: Glen Baird, Community Services and Development



## EPIC Innovation: Providing Solutions

Addressing  
California's  
Susceptibility  
to Drought



Innovative  
Solutions  
to Address  
Tree  
Mortality



Adapting to  
Climate  
Risks to  
the Electricity  
System





## EPIC Innovation: Engaging Customers

Increasing Energy Savings for Multi-Family Dwellings



Creating Zero or Near Zero Net Energy Buildings



Building the Advanced Energy Community of the Future





## Competitive Solicitation Process - Proposal Evaluation:

- Detailed technical review determines:
  - Merit and Need (advancements, uniqueness and relevance)
  - Technical Approach
  - Impacts and Benefits to California
  - Team qualifications
  - Budget Reasonableness
  - Amount of EPIC funds spent in California.
- Those meeting the minimum could get additional points for providing match funding and for projects in and benefiting DACs



# **Examples of Building Energy Efficiency Research Projects Aimed at Benefiting Low Income or Disadvantaged Communities**

Energy Research and Development Division  
California Energy Commission  
March 27, 2017





# Research Project Benefiting Low Income/DACs

- Beechwood Multifamily Complex, Lancaster, CA
- Developed cost-effective packages of cutting edge energy efficiency measures
  - Demonstrate technical and financial value to property owners and occupants
- Retrofitted 30 apartments



## Project participants:

- Electric Power Research Institute
- Southern California Edison
- Southern California Gas
- LINC Housing
- Bira Energy
- Additional funding from HUD (renewables) and the Federal Home Loan Bank (internet)



# Project Approach

## Baseline Analysis

- Physical audits and modeling
- Utility bill data

## Develop Technology Packages

- Develop whole building EE packages using models
- Technical analysis for energy and cost to select measures

## Contract and construct

- Develop scopes of work, identify construction manager and bid construction contracts
- Install energy measures and extensive data acquisition systems to monitor post installation performance

## Impact analysis and financial Models

- Evaluate energy impact installed technologies/measures
- Develop scaling scenarios with utility On Bill Financing, low interest loans and tax credits





## Baseline Data: Visit, Inspect, Document





## Emerging Technologies – Analyzed and Evaluated

### Common Area

- 99% Gas Condensing Tankless for laundry
- High Efficiency roof top unit with fault detection and diagnostics (FDD)
- Economizer Retrofit
- **Foam roof insulation, cool roof and insulated ducts**
- **Aerosol envelope sealing**
- Ozone retrofit kits
- Moisture sensing retrofit for dryers
- **LED lighting indoor**
- **LED outdoor lighting**
- HVAC FDD
- **Smart Thermostats**

### Tenant Units (30)

- **Solar thermal water heating**
- T-stats with energy efficiency and demand response capability
- **Boxing and ducts in semi-insulated spaces**
- **Air sealing**
- Home Energy Management Systems
- **Insulated underground piping**
- Messaging for behavioral change
- Post-installation surveys
- Non-intrusive load monitoring systems
- **Weather stripping**
- **Refrigerator replacements**
- **Outdoor LED lighting**
- **Indoor LED lighting**





# Construction Photos

Stripped roof for foaming



New duct joints



Old and new ductwork



Old  
crumpled  
ducts

Duct boots sealed





# Construction Photos



New Outdoor Lighting



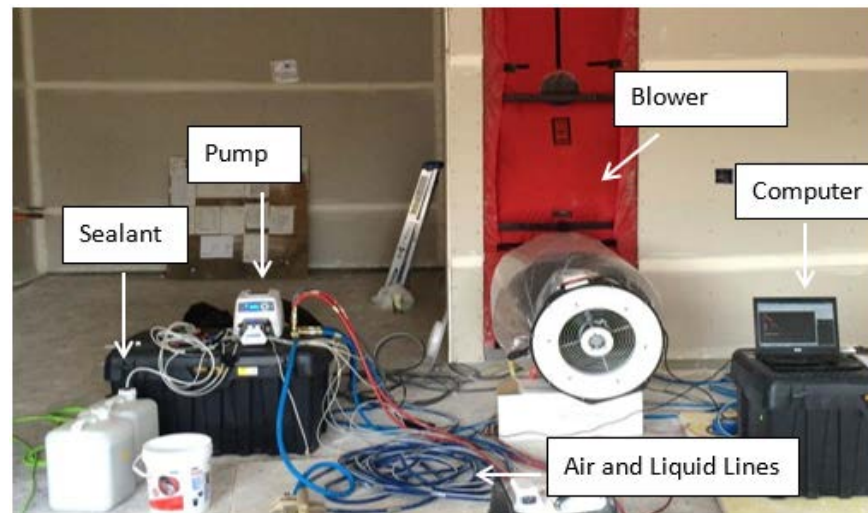
HVAC Data Monitoring  
Wireless enabled



Solar Thermal on Roof



Solar Thermal Heat  
Exchanger Piping



Aerosol Envelope Sealing in Common Areas





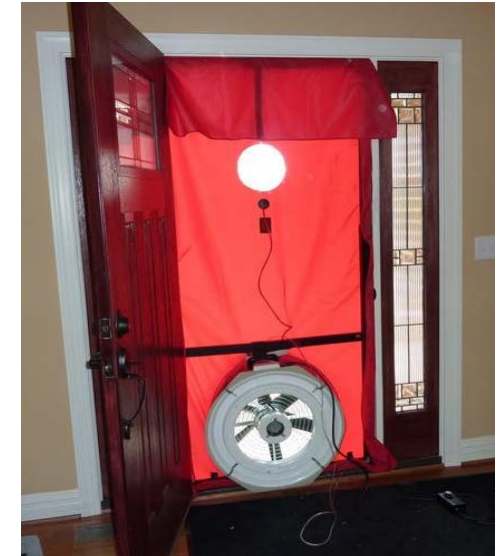
# Commissioning and Performance Tests



Test Smart Thermostat



Measure HVAC Air Leakage,  
Air Flow



Measure Envelope Leakage



Test District Heating



Test Solar Thermal System



Test Foam Insulation<sup>8</sup>



## Preliminary Project Results

Measure	Unit	Average Measured Savings
Envelope Improvement Package – duct replacements, insulation and conditioned attic, air sealing (electric)	kWh	22% (based on RTU operation)
Envelope Improvement Package – duct replacements, insulation and conditioned attic, air sealing (gas)	Therms	34% (based on RTU usage)
Smart Thermostats – average (electric)	kWh	14% (estimated)
Smart Thermostats – average (gas)	Therms	14% (estimated)
WH Improvements – Solar Thermal	Therms	70% savings (100 Therms/unit)
WH improvements – distribution improvement	Therms	
LED lighting	kWh	Under calculation
Spray Foam Roof Insulation	kWh	17%

\*Project team estimates the retrofit packages will reduce annual electricity use by about 22% and natural gas use by 50% (results and final report still being finalized - expected by March 2017)



## Outreach

- LINC led resident outreach through the retrofit so that residents can learn to live comfortably while reducing energy
- Distributed energy use surveys to help identify most effective measures and lifestyles of the residents
- Educated residents on energy efficiency- explaining the purpose of the retrofits and the process and answering questions.
- Launched LINC Healthy Homes Challenge at the same time to encourage reduction in energy and water consumption
  - Gift cards for meeting individualized or property-wide energy reduction targets
  - Create specific trainings, such as programmable thermostats





## Lessons Learned

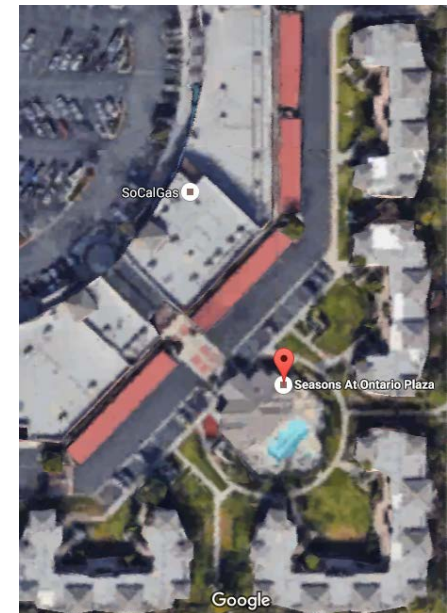
- Many barriers continue to exist to achieve widespread adoption of large scale retrofits in low income properties, including costs, cost/benefit, and split incentives
- Incorporate building vintage as a consideration since it could lead to unexpected costs (e.g., asbestos abatement)
- Incorporate customer acceptance as a consideration (customers more involved in selection of technologies)
- Hassle factor with energy efficiency measures and customer inconvenience leads to solar as an easier retrofit option (less coordination helps reduce costs)





## Next Steps

- Information learned from this project will be considered in the development of a new EPIC-funded project that focuses on “customer centric” approaches
- 2 multifamily properties located in disadvantaged communities: Fresno and Ontario
  - Master-metered for both electric and natural gas-owner pays the utility bills
  - Evaluate opportunities for electric vehicle infrastructure, distributed energy resource integration
  - Evaluate Indoor Air Quality





## Other Example Projects

- Renovation of mixed use low income property in San Francisco consisting of single occupant residences and businesses.
  - Project involves installing advanced energy efficiency measures to keep housing affordable by lowering operating costs.
- Demonstrate automatically controlled, learning ceiling fans with SMART thermostats in several multifamily buildings in DACs in Madera, Fresno, El Monte and San Diego
  - Goal: provide energy efficiency, improved comfort and lower energy bills (common areas/dwelling units).





## Panel Discussion: Equity and Community Driven Energy Research

Moderator:

Sonya Ziaja, Energy Commission

Panelists:

- Raquel Mason, Physicians for Social Responsibility
- Darryl Molina Sarmiento, Communities for a Better Environment
- Ben Russak, Liberty Hill Foundation



## Tentative Schedule for Developing 2018-2020 EPIC Investment Plan

Activity	Time Frame
Energy Commission Post Draft Funding Initiatives	March 10, 2017
Energy Commission Hosted Workshop on Draft Funding Initiatives; Sacramento, CA	March 14, 2017
<b>Comments due</b> <a href="https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=17-EPIC-01">https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=17-EPIC-01</a>	<b>March 29, 2017</b>
Energy Commission Post Final Investment Plan	April 14, 2017
Energy Commission Business Meeting to Approve Investment Plan	April 27, 2017
Submit to CPUC	May 1, 2017



# 2018 – 2020 EPIC Investment Plan Draft Funding Initiatives



## **Theme 1: Advance Technology Solutions for Deep Energy Savings in Buildings and Facilities**

- S1.1 Accelerate Product Development and Market Acceptance of Solid-state Lighting Technologies and Designs
- S1.2 Develop Advanced Building Envelope Materials and Designs for Healthy, Comfortable and Highly-Efficient Buildings
- S1.3 Drive Technical- and Cost-Performance Improvements in High-Efficiency Heating, Ventilation and Air Conditioning Systems
- S1.4 Enable Integration of Building and Equipment Controls and Automation
- S1.5 Increase the Energy Efficiency of Plug Loads and Consumer Electronics Devices
- S1.6 Accelerate the Transition to Direct Current Powered Buildings and Facilities
- S1.7 Develop Technologies that can Assist in Decarbonizing Key California Industries



## Theme 2: Accelerate Widespread Customer Adoption of Distributed Energy Resources

- S2.1 Increase the Cost-effectiveness of Zero Net Energy Buildings and Communities
- S2.2 Push Low-Carbon Microgrids Closer to Commercial Viability
- S2.3 Improve the Business Proposition of Integrated Distributed Storage
- S2.4 Incentivize DER Adoption through Innovative Strategies at the Local Level





## Theme 3: Increase System Flexibility from Low-Carbon Resources

- S3.1 Accelerate Broad Adoption of Automated Demand Response Capabilities that Provide the Grid Flexible Response Services
- S3.2 Enable Electric Vehicle-Based Grid Services
- S3.3 Increase the Value of Distributed Energy Resources and Renewables to the Transmission and Distribution System
- S3.4 Define and Demonstrate the Locational Benefits and Optimal Configurations of Grid-level Storage as the California Grid Transitions to More Distributed Energy Resources





## Theme 4: Increase the Cost-Competiveness of Renewable Generation

- S4.1 Advance Emerging Thin-Film PV Technologies for High Value Applications
- S4.2 Develop Technologies that Enable Increased Wind Capacity in California
- S4.3 Increase the Strategic Value of Flexible CSP and Geothermal to the Electricity System
- S4.4 Improve the Value Proposition of Bioenergy



## Theme 5: Create a Statewide Ecosystem for Incubating New Energy Innovations

- S5.1 Shorten the Timeframe of New Energy Technologies from Idea to Investment
- S5.2 Accelerate the Most Promising Energy Technologies from Prototype to Market Entry



## Theme 6: Maximize Synergies in the Water-Energy-Food Nexus

- S6.1 Reduce the Energy Intensity Required to Supply and Treat Water
- S6.2 Increase the Energy and Water Efficiency of California's Food and Agricultural Sector
- S6.3 Optimize Management Practices Associated with the Water-Energy Nexus



## Theme 7: Develop Tools and Analysis to Inform Energy Policy and Planning Decisions

S7.1 Identify Pathways for Achieving California's Energy and Climate Goals

S7.2 Increase the Resiliency of the Electricity System to Climate Change and  
Extreme Weather Events

S7.3 Evaluate Strategies to Understand and Mitigate Impacts of the Electricity  
System on the Environment and Public Health and Safety



## Theme 8: Catalyze Clean Energy Investment in California's Disadvantaged Communities

- SB350 takes steps to ensure California's clean energy transformation benefits all Californian's, especially those in the most vulnerable communities
- The SB350 Barriers Study identifies several recommendations – including recommendations for RD&D – to ensure disadvantaged and underserved communities have access to clean and affordable energy services
- The initiatives described in this theme seek to increase investment, deployment, and adoption of clean energy innovations in low-income and disadvantaged communities by:
  - Reducing knowledge gaps among decision makers looking to advance technology deployment in these communities
  - Demonstrating energy innovations and technologies that lead to sustained investments for low-income and disadvantaged communities
  - Developing new financial and business models that can mobilize private-sector energy investments



## **Theme 8: Catalyze Clean Energy Investment in California's Disadvantaged Communities**

- S8.1 Inform Policy Efforts to Bring Low-Carbon Energy Solutions and Their Benefits to Low-Income Customers and Disadvantaged Communities
- S8.2 Demonstrate Emerging Clean Energy Technology Solutions in Disadvantaged Communities
- S8.3 Develop Innovative Strategies to Increase Clean Energy Investment in Disadvantaged Communities



## **S8.1 Inform Policy Efforts to Bring Low-Carbon Energy Solutions and Their Benefits to Low-Income Customers and Disadvantaged Communities**

### **S8.1.1 Advancing the Information Infrastructure for California's Low-income and Disadvantaged Communities**

- There is a lack of information on energy-usage in low-income and disadvantaged communities
- This lack of information limits decision makers' understanding of how to advance technology development in these communities
- This initiative will support continued public data and information collection as well as increase the state's analytical capacity to determine the most pressing market gaps for clean energy in low-income and disadvantaged communities



## S8.2 Demonstrate Emerging Clean Energy Technology Solutions in Disadvantaged Communities

### S8.2.1 Scaling ZNE and Building California's Resilient Neighborhoods in Low-income and Disadvantaged Communities

- One of the largest hurdles for expanding clean energy in low-income and disadvantaged communities is the lack of examples of successful clean energy demonstrations to serve as models for would-be adopters
- Insufficient means to design, finance, and implement clean energy technologies, especially for retrofitting projects or community-scale projects, further impedes wide-spread customer adoption in these communities
- This initiative will demonstrate flexible and adaptive ZNE, or near ZNE, design packages in low-income and disadvantaged communities that include energy efficiency, renewable energy, demand response, and energy storage applications





## S8.3 Develop Innovative Strategies to Increase Clean Energy Investment in Disadvantaged Communities

### S8.3.1 The Inclusive Development through Equitable Adoption (IDEA) Challenge

- Driving California's clean energy economy will require innovative solutions to the financial barriers burdening low-income and disadvantaged communities
- The immature clean energy markets for low-income and disadvantaged communities raise a host of financing concerns that must be de-risked in order to bring in capital
- This initiative will launch a new Prize-based Competition that will challenge project teams to design innovative and inclusive financial models providing for more flexible, sustainable flows of capital to help overcome barriers to clean energy adoption and deployment in low-income and disadvantaged communities



## Questions and Comments

- 1. What clean energy technologies do you feel would bring the most benefits to your community?**
- 2. For demonstration projects where a system will be installed and tested, how would community members like to participate in the project (design to implementation)?**
- 3. What are the best ways to get information to your community about upcoming projects and opportunities?**



## Submitting Written Comments

Submit written comments via the e-Comment system for Docket 17-EPIC-01:  
<https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=17-EPIC-01>

Draft Funding Initiatives and Today's Presentation can be found here:  
<http://www.energy.ca.gov/research/epic/17-EPIC-01/documents/>

**Submit Comments by 5:00pm on March 29, 2017.**

**For more information, e-mail Anthony Ng at: [anthony.ng@energy.ca.gov](mailto:anthony.ng@energy.ca.gov)**