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California Energy Commission

Title: Integrated Energy Policy Report Workshop - Building Decarbonization

Presenter: Yu Hou

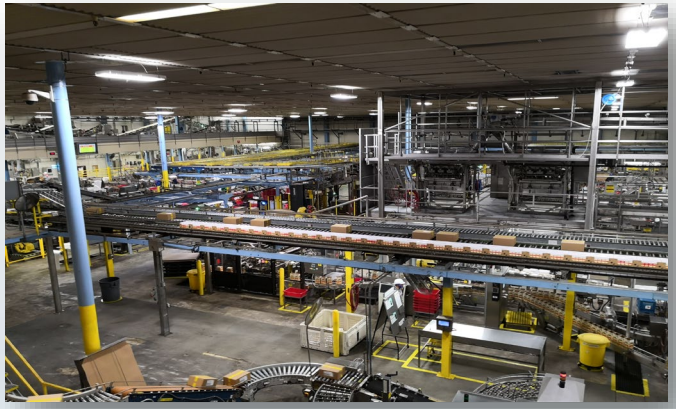
Date: June 22, 2021

California's Investment in Clean Energy Innovation

Entrepreneurial Ecosystem

Building Decarbonization

Grid & Natural Gas System Decarbonization



Industrial & Agriculture Innovation

Resiliency & Safety

Low Emission Transportation

Energy R&D funding programs

Core mission: strategically invest funds to catalyze change and accelerate achievement of policy goals

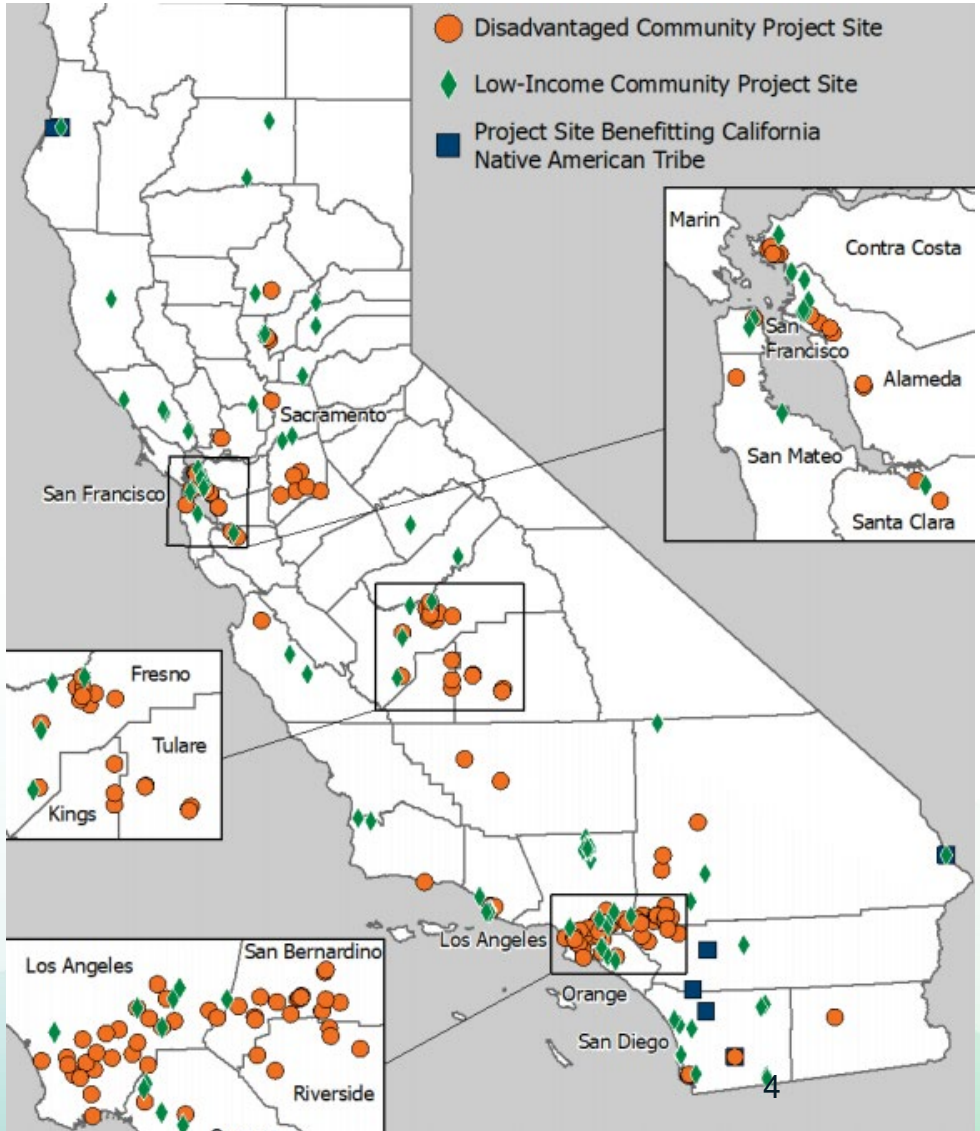
- Electric Program Investment Charge (EPIC),
  $133 million annually
- Natural Gas Research, Development and Demonstration Program,
  $24 million annually

https://www.energy.ca.gov/programs-and-topics/programs/electric-program-investment-charge-epic-program
https://www.energy.ca.gov/programs-and-topics/programs/natural-gas-program

EPIC Demonstration Projects in Under-resourced Communities

Affordability & Equity

- Lower energy burden
- Support vulnerable communities
- Address challenges
- Reduce costs
- Increase access to clean energy technologies
- 68% of tech demonstration investments in under-resourced communities



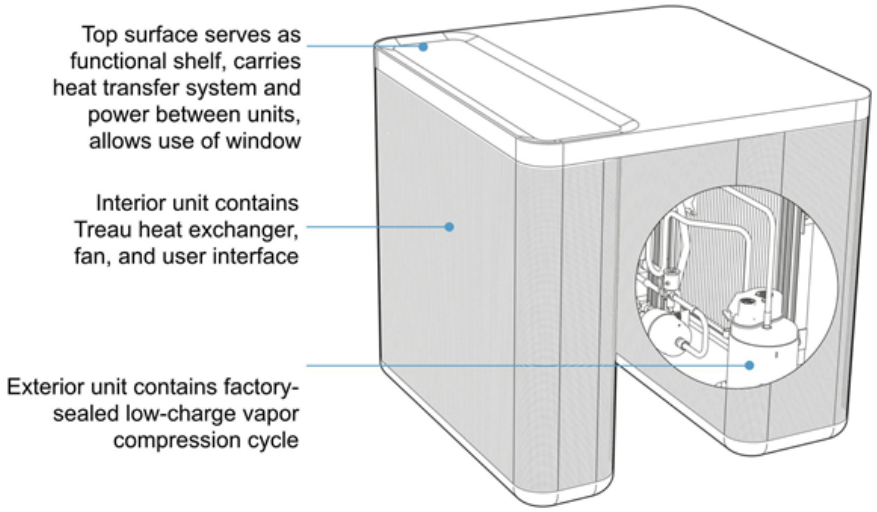
Residential HVAC Advancements

Advanced Heat Pumps
(EPRI)

- Reduce cooling energy by 22-32%
- Provide over 90% annual heating load

Mechanical Modules
(Rocky Mountain Institute)

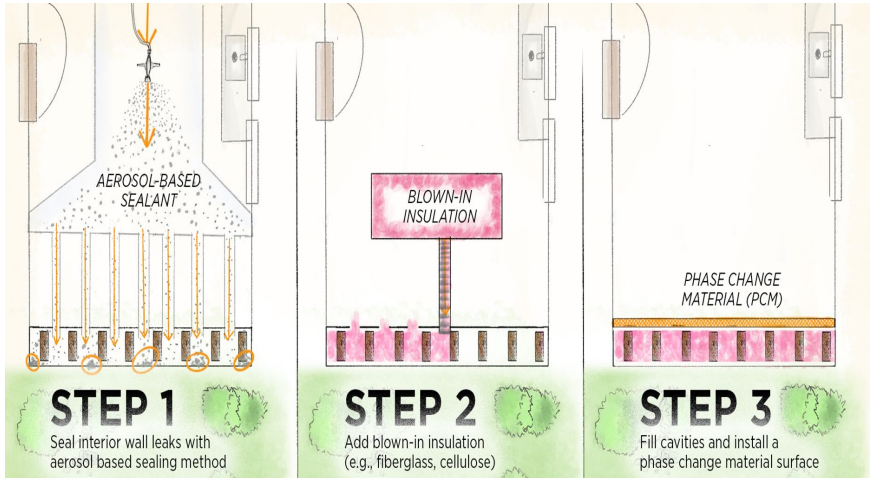
- Integrated HVAC and hot water heater, controls and real time energy monitoring
- Designed for mass production & installation



Low GWP Heat Pumps
(Treau)

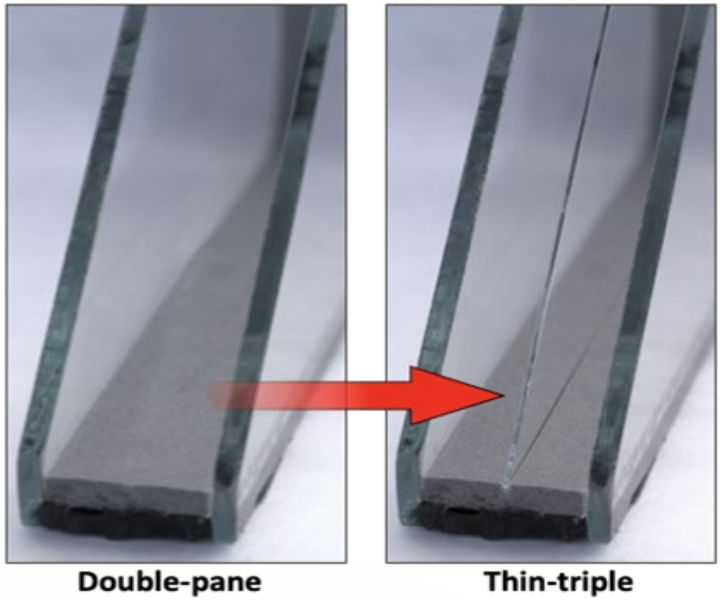
- Low cost polymer heat exchanger
- Easy to install
- 30% reduction in energy use
- Reduce greenhouse gas emissions by 50%

Envelope Improvements



Phase Change Material-Enhanced Insulation (UC Davis)

- Retrofit insulation solution combines sealing, blown-in insulation and PCMs.
- Tests the process for aerosol sealing wall cavities in retrofit applications
- Identify most cost-effective applications of PCMs retrofit wall in a range of California climate zones.



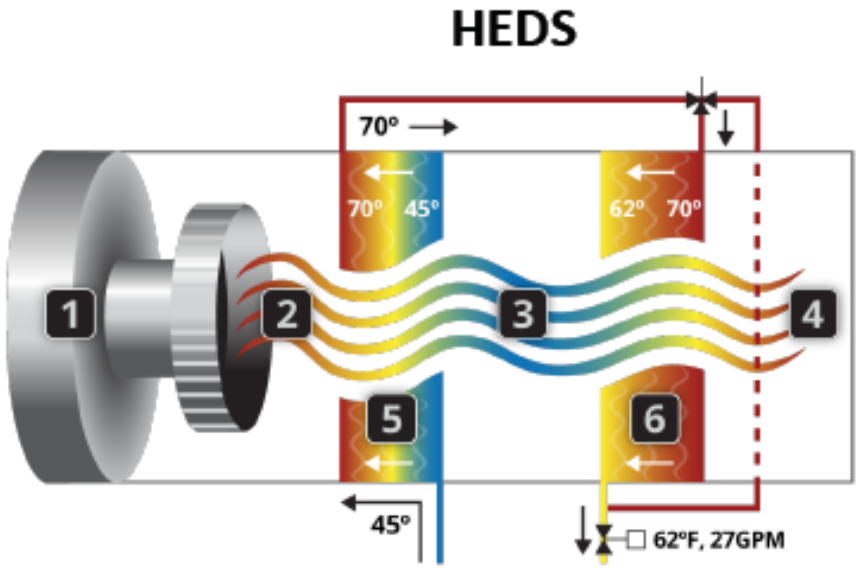
Thin Triple Pane Windows (LBNL)

- Same size and weight as double pane windows
- Same thermal performance as traditional triple pane windows
- $450-$650/ window installed

PV Embedded in Windows (Ubiquitous Energy)

- PV absorbs UV and IR radiation to generate energy
- Visible light to pass
- Reduce solar heat gain

Commercial Buildings



Decarbonizing Healthcare (EPRI)

- Demonstrate a cost-effective novel dehumidification process,
- **Reduce or eliminate the need for reheat**
- Goal of 30% reduction on natural gas use and 20%reduction on cooling load

Decarbonizing Healthcare Guidebook (Mazzetti)

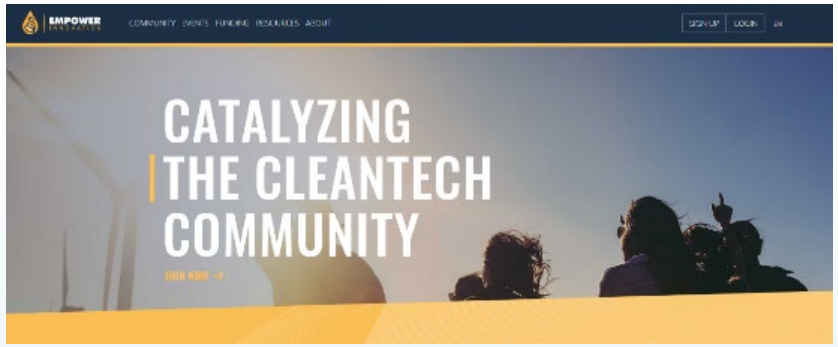
- Identifies emerging energy efficiency equipment, systems, and improvements
- Provides a clear path to decarbonizing the healthcare industry
- **Interactive online platform website:** https://decarbhealthcare.com/

Investing Across California, for All Californians

Building a Diverse Base of Innovators

Empower Innovation Tool

- Web platform to connect underserved communities, researchers, technology developers, and investors
- Browse resource libraries, funding sources, tools, and databases



Visit: https://www.empowerinnovation.net/

Over 30% of prime or subcontractor recipients are women, minority, disabled veteran, or LGBT owned

Ideas for Building Decarbonization Research?

- Electric Program Investment Charge program
  - Developing 4-year investment plan
  - Upcoming workshops planned for June and July to obtain stakeholder input on potential technology gaps that could be addressed with research. Potential topics:
    - Hydrogen roadmap
    - Load flexibility and distributed energy resources
    - Building and industrial decarbonization
    - Offshore Wind
    - Energy Storage
    - Entrepreneurial Ecosystem
  - Sign up for notifications at: Electric Program Investment Charge Program - EPIC | California Energy Commission

Thank You!