Mutual Support of Building Energy Modeling and CalNEXT Projects

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CalNEXT
ENERGIZING CALIFORNIA'S FUTURE

Motivation & Goal

Motivation

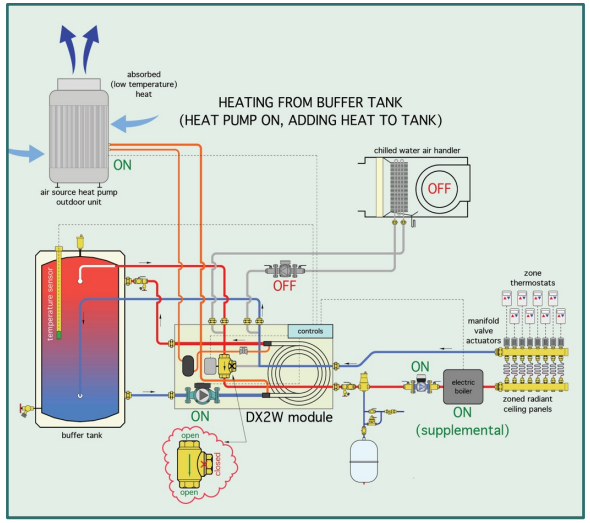
- Significant amount of research is done on *Emerging Technologies* in CalNEXT that will be added to the CA energy efficiency portfolio.
- Some research ideation through CalNEXT helps enhancement and improvement of building energy modeling tools and software.

Goal

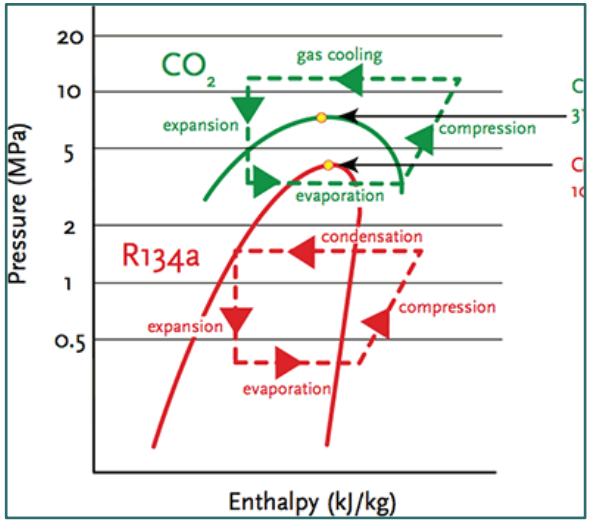
- Describe some active CalNEXT projects that are good candidate for cross-cutting collaboration between CalNEXT and building energy modeling experts.

Technologies, Measures, or Research Topics

Commercial building duct sealing energy savings and cost analysis



NR HRC and AWHP measure package development

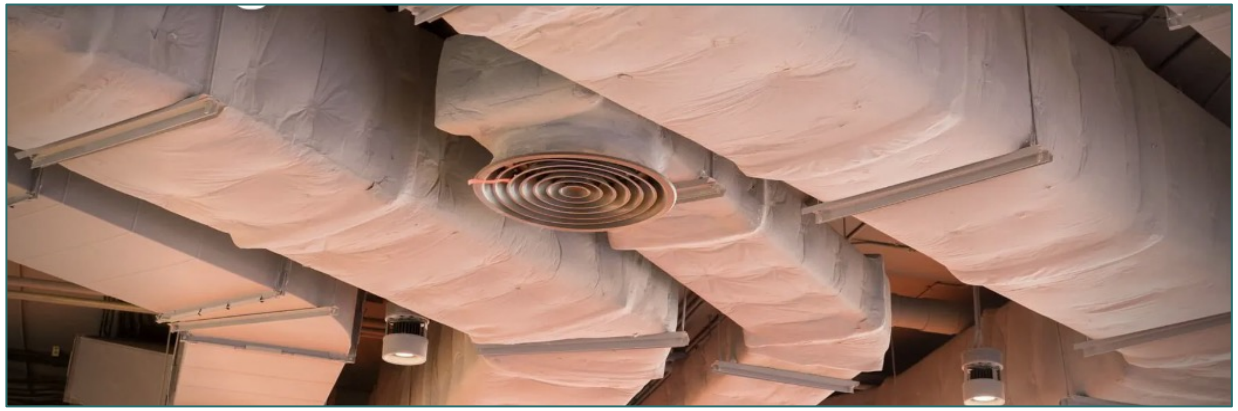


Modeling CO2 refrigeration system

Mobile and manufactured housing market characterization

Commercial Building Duct Sealing Energy Savings & Cost Analysis

- Air leakage from duct systems is a known problem in commercial buildings with forced-air heating and cooling systems. Previous field studies showed that duct sealing can save 12-34% of fan energy use.
- This CalNEXT project focuses on evaluating duct sealing technologies for commercial buildings to gather and provide data for the development of a measure package.



BEM ⇄ **Duct sealing project**

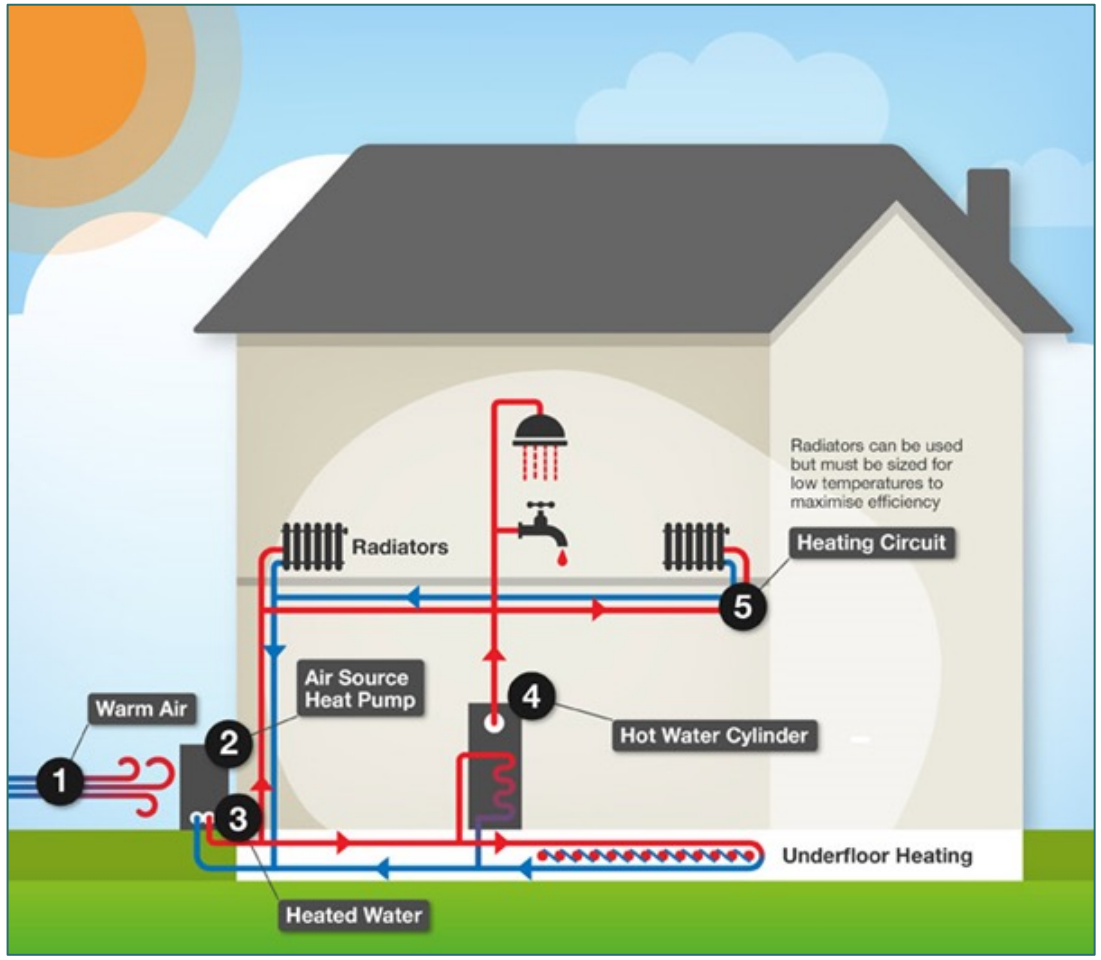
- Building energy simulation is needed to evaluate the impacts of duct sealing on HVAC performance and energy consumption.
- EnergyPlus has limitations in simulating duct leakage. Secondary data sources gathered in this project can be used to resolve the EnergyPlus limitations.

Nonresidential HRC & AWHP Measure Package Development

This CalNEXT research project has two goals:

1. Examine whether HRC and AWHP can be combined into one measure package for California eTRM.
2. Identify use cases in which these technologies were not applied appropriately.

- Building energy modeling can promote simulation and application of this measure package.
- CBECC has limitations in modeling HRCs. This project can help enhance CBECC and enable it to model HRCs.



Modeling CO2 Refrigeration Systems

Technology Background

- Transcritical carbon dioxide (TC CO2) is emerging as the preferred low GWP option for commercial refrigeration systems in supermarkets and grocery stores.
- These systems are different from traditional HCF systems and currently energy modeling tools cannot model these systems.

How CalNEXT Can Support BEM

- Through this CalNEXT project, energy modeling software tools based on EnergyPlus and OpenStudio will be developed to simulate these refrigeration systems.
- Collecting data from two supermarkets with TC CO2 refrigeration systems to predict the correlation between store condition and refrigeration load in order to improve modeling.

Mobile and Manufactured Housing Market Characterization Study

The project goal is:

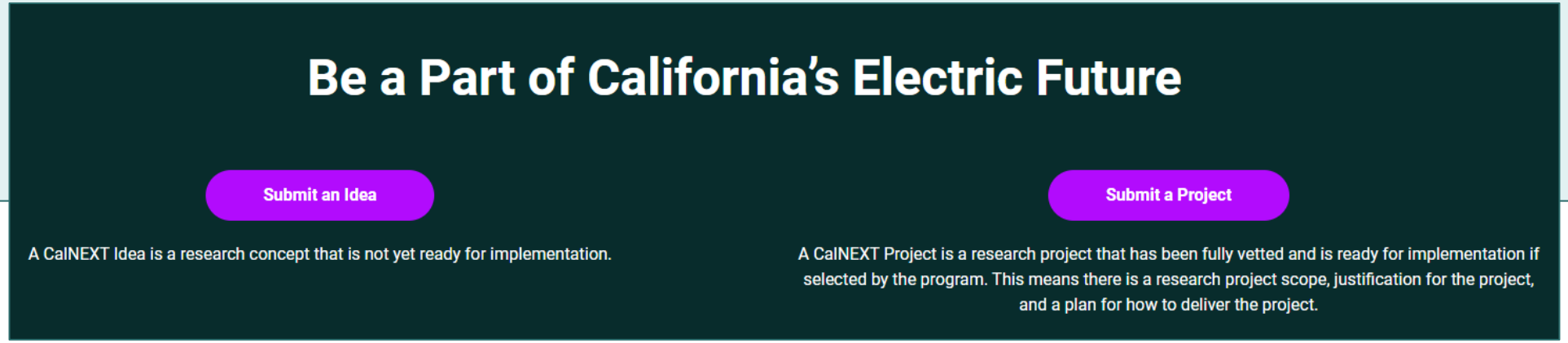
Compiling and analyzing data on mobile and manufactured housing (MMH) to understand technical and market barriers for electrification.

BEM ⇄ **MMH Market Characterization**

- Building energy modeling tools and capabilities will be used to create energy models that characterize typical California MMH.
- The MMH building energy models will help other projects like creating prototypes for CA building stock.

Conclusion

- The results of research on emerging technologies and measures in CalNEXT offer variety of opportunities (e.g., building characteristics data, equipment data) to enhance building energy modeling tools and software.
- Building energy modeling supports research and implementation of several CalNEXT projects.
- **Call for action: submit an idea**
  - https://calnext.com/
  - https://calnext.com/how-to-participate/



Thank you

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