
U.S. DEPARTMENT OF
ENERGY
Office of
ENERGY EFFICIENCY &
RENEWABLE ENERGY
WELCOME
2023 NATIONAL ENERGY CODES CONFERENCE

# 2023 National Energy Codes Conference

CHICAGO | MAY 2-4

U.S. DEPARTMENT OF ENERGY | Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

BUILDING TECHNOLOGIES OFFICE

# WELCOME

## Welcome Remarks

*J.B. Pritzker, Governor of Illinois*

## BTO's Zero Energy Vision

Ram Narayanamurthy, DOE, BTO Deputy Director

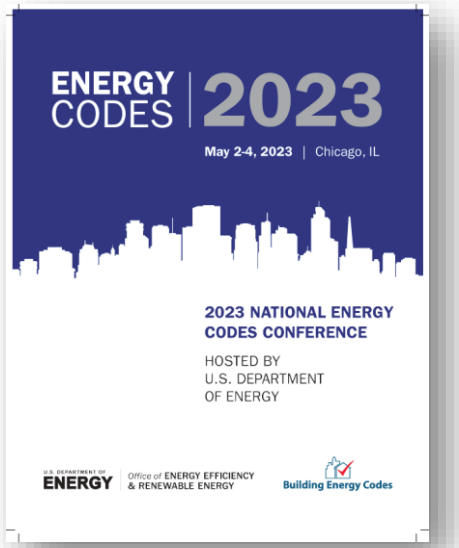
## EERE Key Priorities

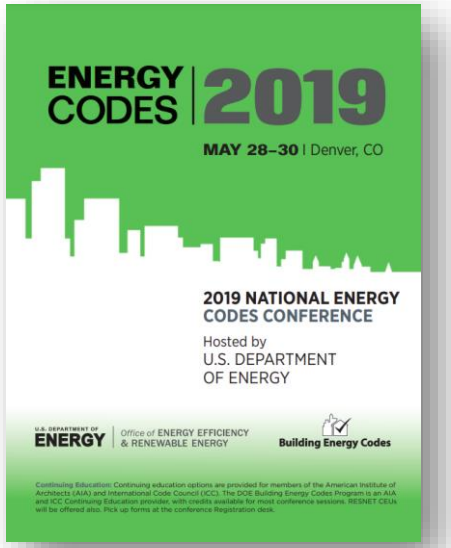
Jeff Marootian, DOE, Sr. Advisor EERE

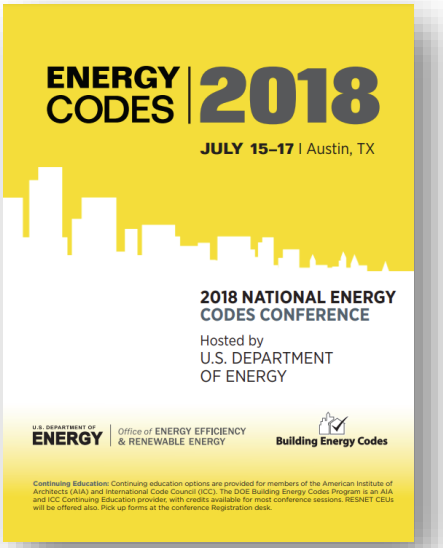
## How BECP Can Help You

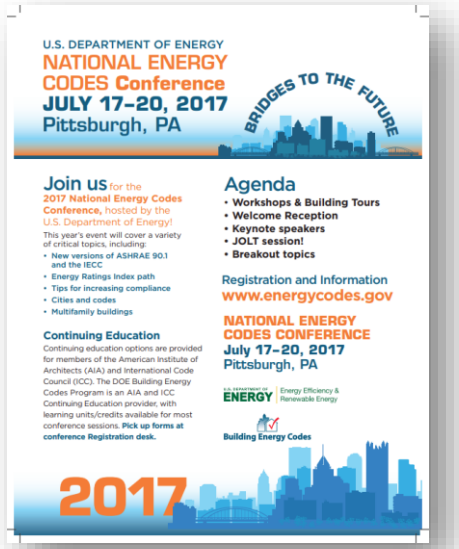
Ian Blanding, DOE, Building Energy Codes Program

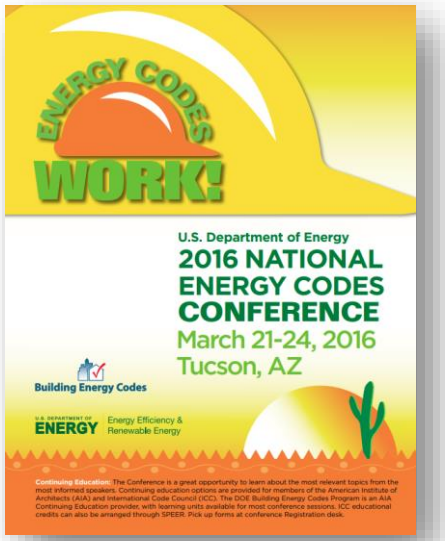
# Welcome back to an in-person National Energy Codes Conference!

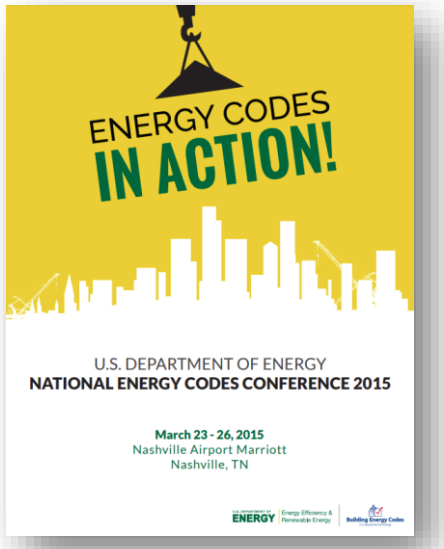


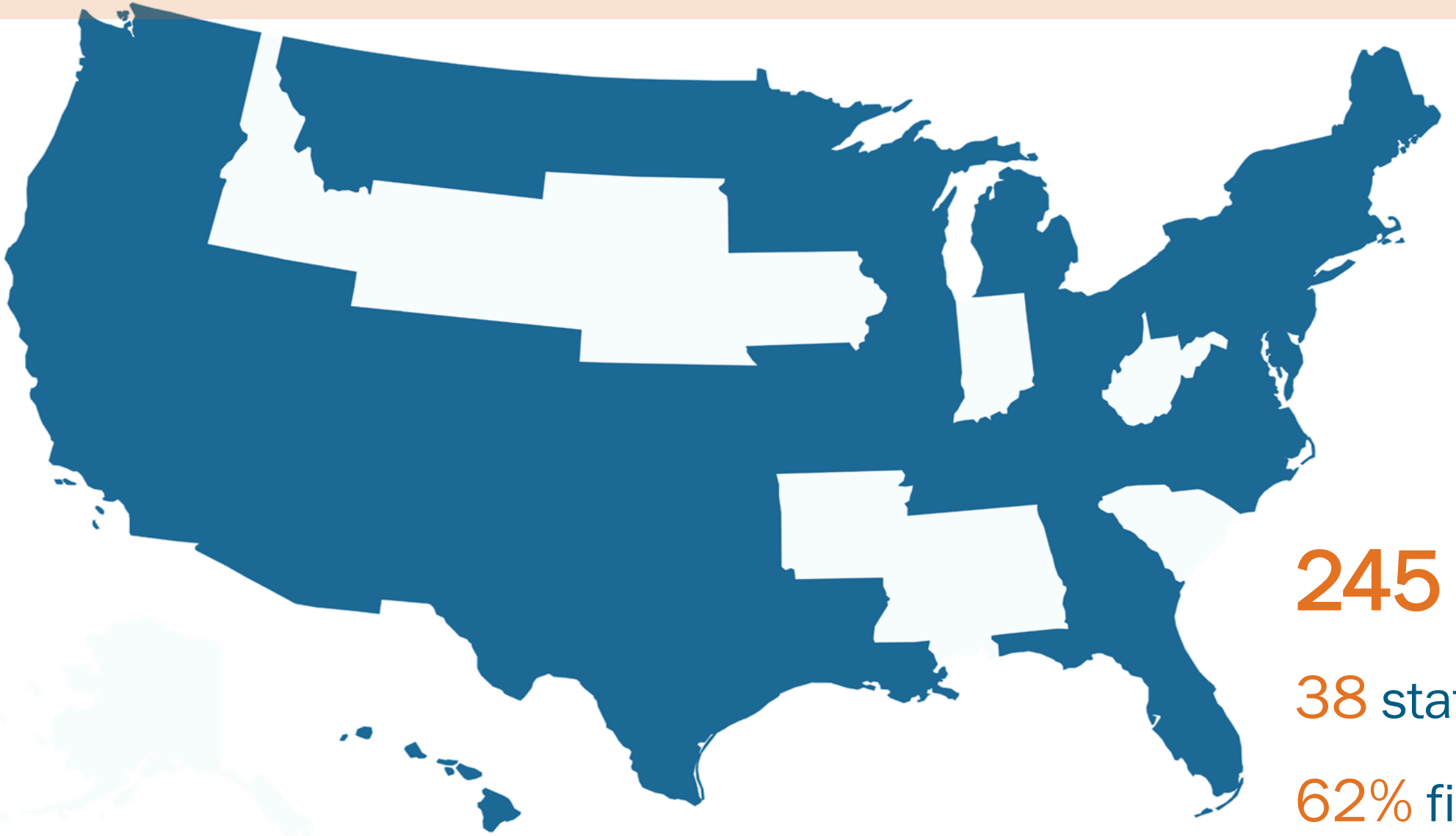



# A look back at some past NECCs

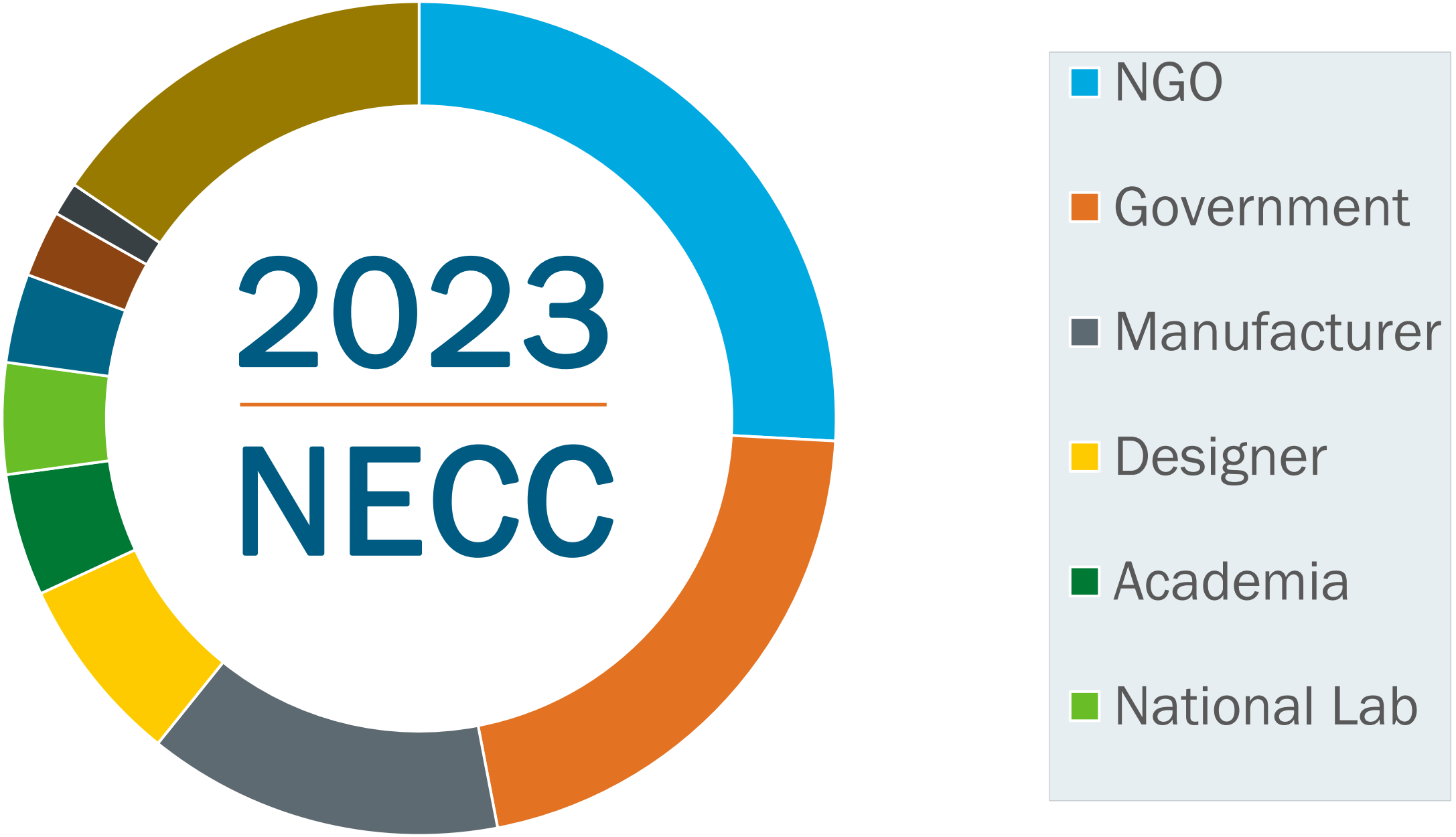

# Who's at the NECC in '23?



**245** attendees

**38** states

**62%** first-time


2023
NECC
NGO
Government
Manufacturer
Designer
Academia
National Lab


THANK YOU!
Session Leads
Speakers
DOE Support

# YESTERDAY | Pre-Conference Training Workshops + Tour

## Tuesday, May 2

| TIME | TOPIC |
|---|---|
| 1:00–5:00 pm | **Energy Codes 101 \| REScheck Basics \| COMcheck Basics**<br>Crystal (3rd Floor) |
| 1:00–4:00 pm | **Kinexx Tour**<br>Clark 5 (7th Floor) |
| 5:30–6:30 pm | **Welcome Reception**<br>Mezzanine |

> Thanks to all who joined us—we hope you enjoyed the pre-conference events!

# REMINDERS

- Digital program: www.energycodes.gov/2023-national-energy-codes-conference
  - Agenda also available at Registration
- Wi-fi is available in the lobby and in meeting rooms
- See the conference registration table for:
  - *Lightning Round* session signups
  - Informal discussion sessions (5-6pm)
  - Professional development credits
- Today's networking lunch includes two award presentations: Jeffrey A. Johnson and ICC's National Leadership in Sustainability and Energy Efficiency award
- Presentations will be made available at www.energycodes.gov

# Navigating the Agenda

ENERGY CODES 2023

2023 NATIONAL ENERGY CODES CONFERENCE
HOSTED BY THE U.S. DEPARTMENT OF ENERGY
May 2-4, 2023 | Chicago, IL

**ENERGY CODES BOOTCAMP & TOUR** Tuesday, May 2

| | |
|---|---|
| 1:00 – 4:00p | Tour – Kinexx Modular Construction Manufacturing Plant *(must sign up in advance) – Clark 5 (for presentation before tour)* |
| 1:00 – 5:00p | Crystal<br>Energy Codes 101<br>REScheck Basics<br>COMcheck Basics |
| 5:30 – 6:30p | Welcome Reception - Mezzanine |

**Day 01** Wednesday, May 3

| | | | |
|---|---|---|---|
| 8:00 – 9:00a | Registration (Outside Empire) & Breakfast (Mezzanine) | | |
| 9:00 – 9:30a | Welcome & Opening Remarks - Empire | | |
| 9:30 – 10:00a | Keynotes: Governor JB Pritzker, Illinois (*recorded remarks*), Jeff Marootian, Senior Advisor, Office of the Secretary (*recorded remarks*) and Ram Narayanamurthy, Deputy Director, Building Technologies Office, U.S. DOE - Empire | | |
| 10:00-10:30a | Break | | |
| 10:30 – 11:3 | New Federal Funding and Assistance Opportunities for Building Energy Codes - Empire | | |
| 11:30 – 1:00 | | | |
| 1:00 – 2:30p | Honore<br>Decarbonizing Energy Codes: Weighing Effectiveness, Adoptability, and Enforceability | Wabash<br>Navigating DOE Energy Code Funding: Past, Present, and Future Opportunities | Crystal<br>(Discussion) BPS and Codes: Making Sure the Left Hand Knows What the Right Hand is Doing |
| 2:30 – 3:00p | Break | | |
| 3:00 – 3:30p | Lightning Round – Where Are Energy Codes Going by 2035? - Empire | | |
| 3:30 – 5:00p | Honore<br>What's the Latest in the IECC and 90.1 Model Code Development Cycles? | Wabash<br>What States and Cities Ought to Know About Macro Trends Impacting Multifamily Properties | Crystal<br>(Discussion) Building Up the Workforce: Strategies to Reach Students and Working Professionals |

ENERGY CODES 2023

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**Day 02** Thursday, May 4

| | | | |
|---|---|---|---|
| 7:30 – 8:30a | Registration (Outside Empire) & Breakfast (Mezzanine) | | |
| 8:30 – 9:30a | The Next Decade: The Role of Energy Codes in Supporting State and Local Goals - Empire | | |
| 9:30 – 10:00a | Break | | |
| 10:00 – 11:30 | Honore<br>Building Performance Standards: Adoption, Implementation, and Lessons Learned | Wabash<br>Lessons Learned with Electrification Stretch Codes | Crystal<br>(Discussion) The Suite Life: Benefits and Challenges of Adopting all Codes |
| 11:30 – 12:30p | Networking Lunch - Mezzanine | | |
| 12:30 – 2:00p | Honore<br>How Valuing Resilience Demonstrates Energy Codes Benefits for Grid Stability and Life Safety | Wabash<br>Saving Water and Saving Energy in Growing Communities | Crystal<br>(Discussion) Leveraging Relationships to Encourage Program Buy-in and Improve Code Compliance |
| 2:00 – 2:30p | Break | | |
| 2:30 – 4:00p | Honore<br>Embodied Carbon: Taking a Lifecycle Approach to Codes | Wabash<br>Performance Based Compliance: From Modeling to Quality Assurance | |

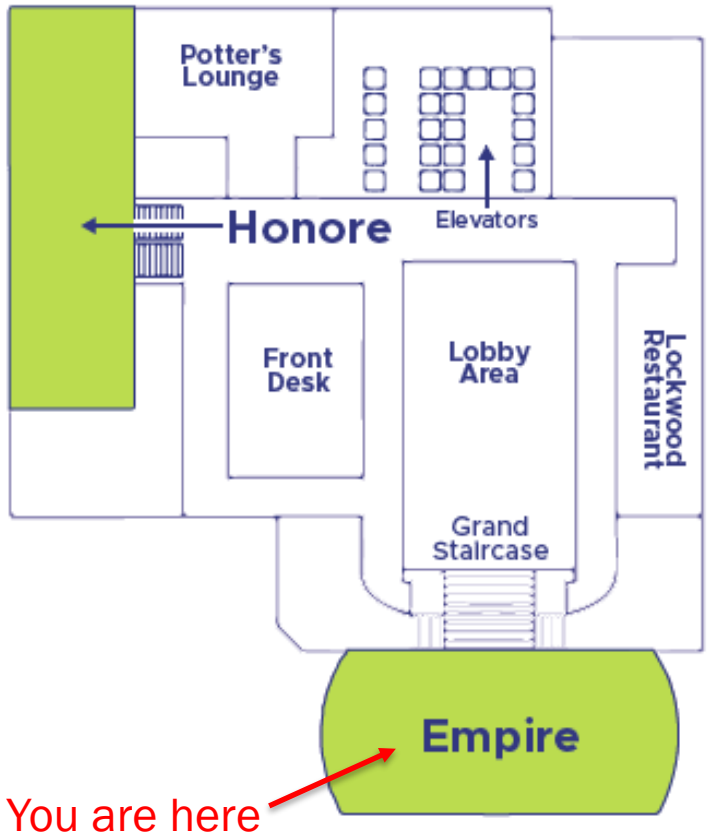
Plenary session

Traditional presentation sessions

Discussion sessions

# Palmer House | Chicago

## Lobby




## Third Floor

# CONTINUING EDUCATION

Thanks to the following continuing education providers…

AIA

ICC INTERNATIONAL CODE COUNCIL®

RESNET® RESIDENTIAL ENERGY SERVICES NETWORK

We hope you enjoy this year’s event!


# WELCOME REMARKS

## 2023 NATIONAL ENERGY CODES CONFERENCE

# WELCOME REMARKS

## Governor JB Pritzker

*43rd Governor of Illinois*

Building Energy Codes
U.S. DEPARTMENT OF ENERGY


U.S. DEPARTMENT OF
ENERGY
Office of
ENERGY EFFICIENCY &
RENEWABLE ENERGY
KEYNOTES
2023 NATIONAL ENERGY CODES CONFERENCE

# How Will We Achieve Net Zero Energy in Buildings?


## Ram Narayanamurthy

*Deputy Director, Building Technologies Office*
U.S. Department of Energy


Building Energy Codes
U.S. DEPARTMENT OF ENERGY

# Achieving Net Zero by 2050

## BUILDING TECHNOLOGIES OFFICE

MAY 2023

U.S. DEPARTMENT OF ENERGY | Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

BUILDING TECHNOLOGIES OFFICE

# The U.S. is pursuing ambitious climate mitigation goals

**Greenhouse gas emissions reductions**

50-52% reduction by 2030 vs. 2005 levels

Buildings largest sources of emissions between all sectors

**Power system decarbonization**

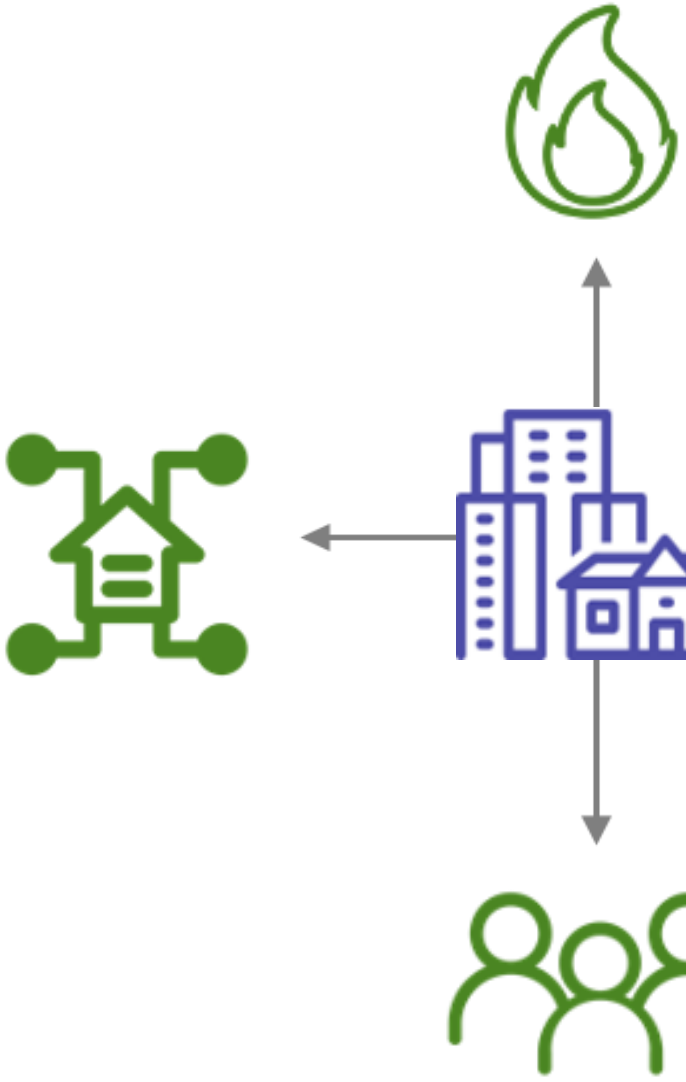
100% carbon pollution-free electricity by 2035

**Energy justice**

40% of benefits from federal climate and clean energy investments flow to disadvantaged communities

Source: National Climate Task Force

# Buildings are central to multiple decarbonization pillars



**Reduce fossil-fired demand** through electrification of heating, water heating, and cooking

**Connect EVs, distributed generation and storage** to the distribution grid

**Limit scale of required electricity infrastructure** needed under deep grid decarbonization

**Improve people-centric outcomes** such as energy justice, community resilience, air quality and public health, and energy security

# A vision for a net-zero U.S. building sector by 2050

## Support rapid decarbonization of the U.S. building stock in line with economy-wide net-zero emissions by 2050 while centering equity and benefits to communities

### Increase building energy efficiency

Reduce onsite energy use intensity in buildings 30% by 2035 and 45% by 2050, compared to 2005

### Accelerate building electrification

Reduce onsite fossil-based $CO_2$ emissions in buildings 25% by 2035 and 75% by 2050, compared to 2005

### Transform the grid edge at buildings

Increase building demand flexibility potential 3X by 2050, compared to 2020, to enable a net-zero grid, reduce grid edge infrastructure costs, and improve resilience.

### Prioritize equity, affordability, and resilience

Ensure that 40% of the benefits of federal building decarbonization investments flow to disadvantaged communities

Reduce the cost of decarbonizing key building segments 50% by 2035 while also reducing consumer energy burdens

Increase the ability of communities to withstand stress from climate change, extreme weather, and grid disruptions

# Recognize buildings have a purpose while decarbonizing them

## People-centered

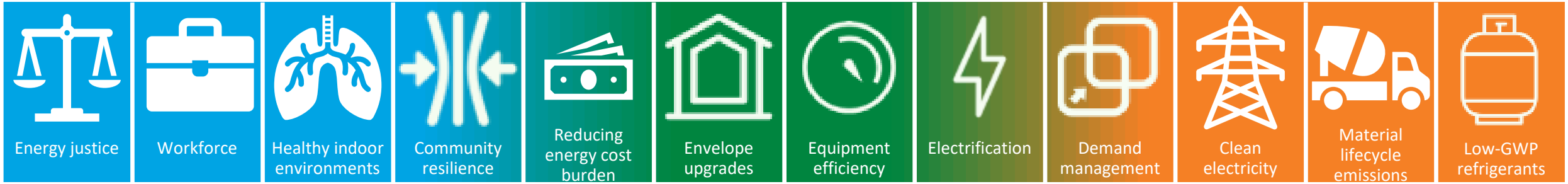
*Healthy, comfortable, and resilient buildings for living and working are foundational to communities that underpin the human experience*

## Efficient

*Efficiency helps us reduce waste and save money in healthy buildings*

## Clean

*Decarbonization makes healthy, efficient buildings better for the environment and enhances societal good*



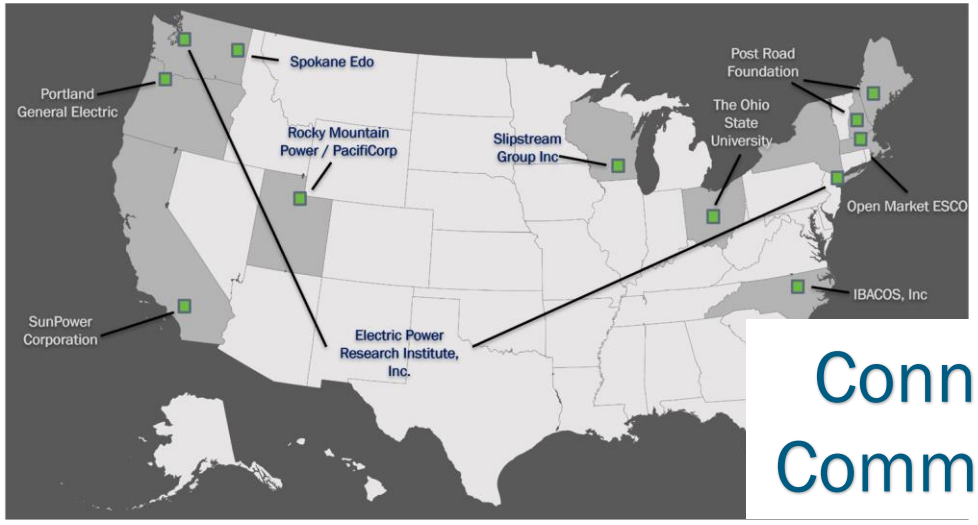

**Buildings serve a function first. Focus on performing this function efficiently, and then aim for societal benefits such as decarbonization and grid enablement.**

# BTO Significant Initiatives

## Advanced Building Construction

E3 and Cold Climate Heat Pumps

Better Buildings/ Better Climate




Connected Communities

# Building Technologies Office

*BTO works to reduce the energy intensity and related carbon emissions resulting from homes and commercial buildings through the development and application of cost-effective technologies and practices.*

## Emerging Technologies

- Building technology developments in energy-efficiency, demand-flexibility, low-carbon, and cost reductions to help support building sector decarbonization.

## Commercial Buildings Integration

- Identify and develop strategies and technologies to dramatically reduce commercial building decarbonization and energy consumption.

## Residential Buildings Integration

- Residential solutions to deliver energy, cost, carbon, and other benefits at scale.

## Appliance and Equipment Standards

- Set policy regulations for more than 60 products to save energy and water for residential, commercial, and industrial consumers, as directed by statute.

## Building Codes

- Provides technical assistance to support building energy efficiency, decarbonization, and resilience, and comfort through the advancements and implementation of building codes.

## BUDGET

$307.5M FY22

$392M FY23 (REQUEST)

## STAFF

55 Feds

24 Contractors

9 Fellows

# Building Energy Codes Program

## Mission

To support building energy code development, adoption, implementation and enforcement processes to achieve the maximum practicable, cost-effective improvements in energy efficiency and decarbonization while providing safe, healthy buildings for occupants.

## Directive

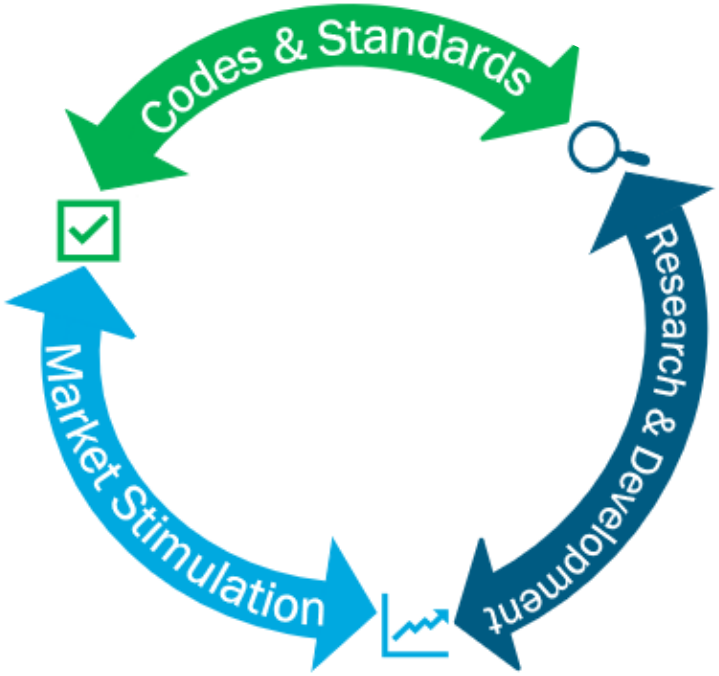
The Building Energy Codes Program is directed to:

- Participate in industry processes to develop model building energy codes
- Issue determinations as to whether updated codes result in energy savings
- Promulgate standards for federal buildings
- Provide technical assistance to states to implement their energy codes

# How does BECP support the mission of BTO and EERE?

**Increasing Energy Efficiency & Building Decarbonization**

Developing advanced code & standards built on cost-effective technologies




**Leading By Example**

Updating federal standards to ensure they're aligned with the latest design and construction practices

**Realizing the Benefits of Codes**

Supporting states and local governments to implement updated energy codes

**Ensuring Environmental Justice**

Exploring how building energy codes can enable more equitable outcomes

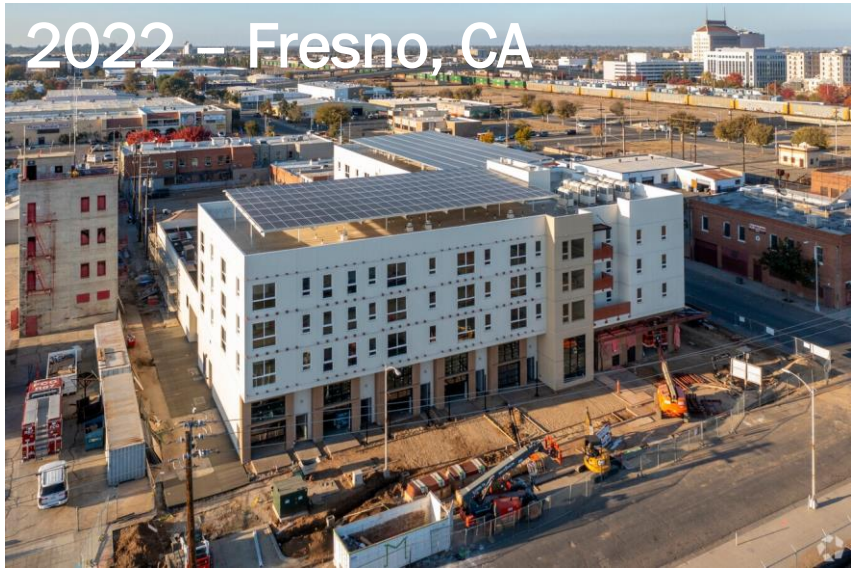
**Developing Workforce**

Helping the design and construction industry embrace the latest building codes & standards

# A personal vignette - The Net Zero Journey

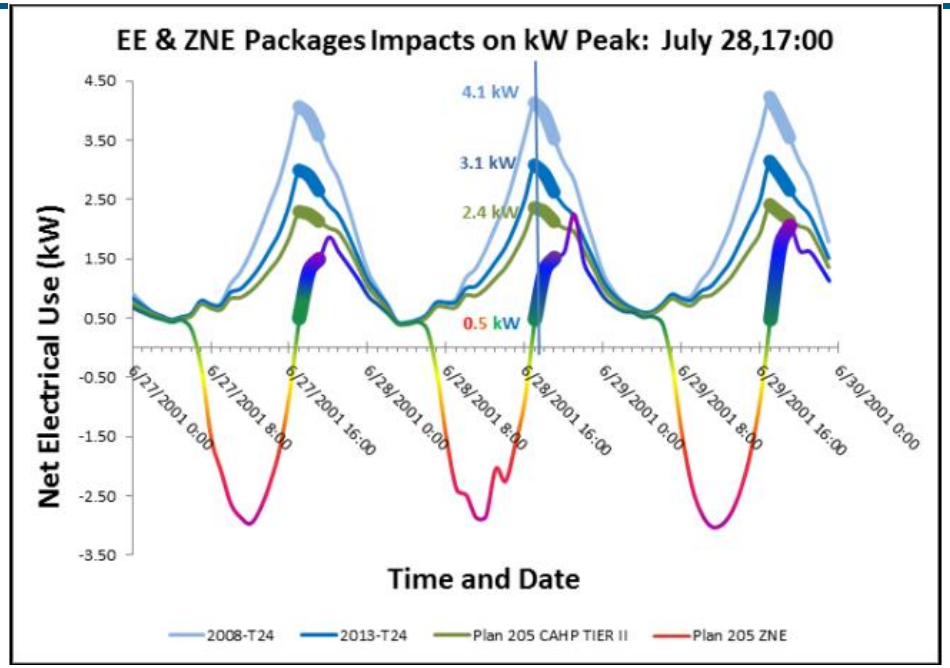


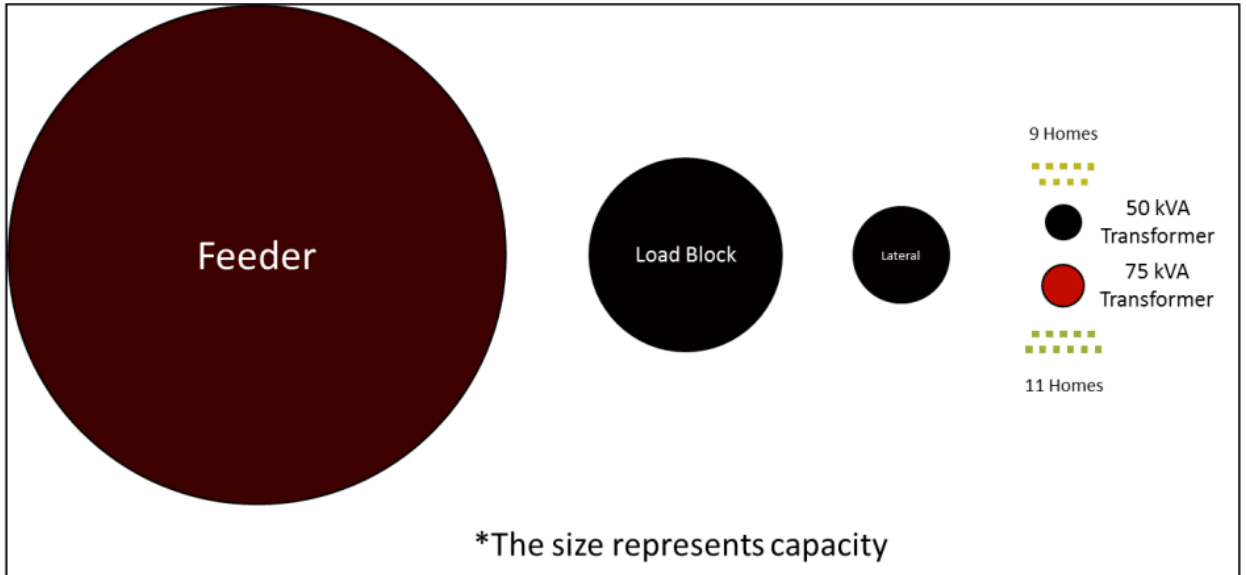




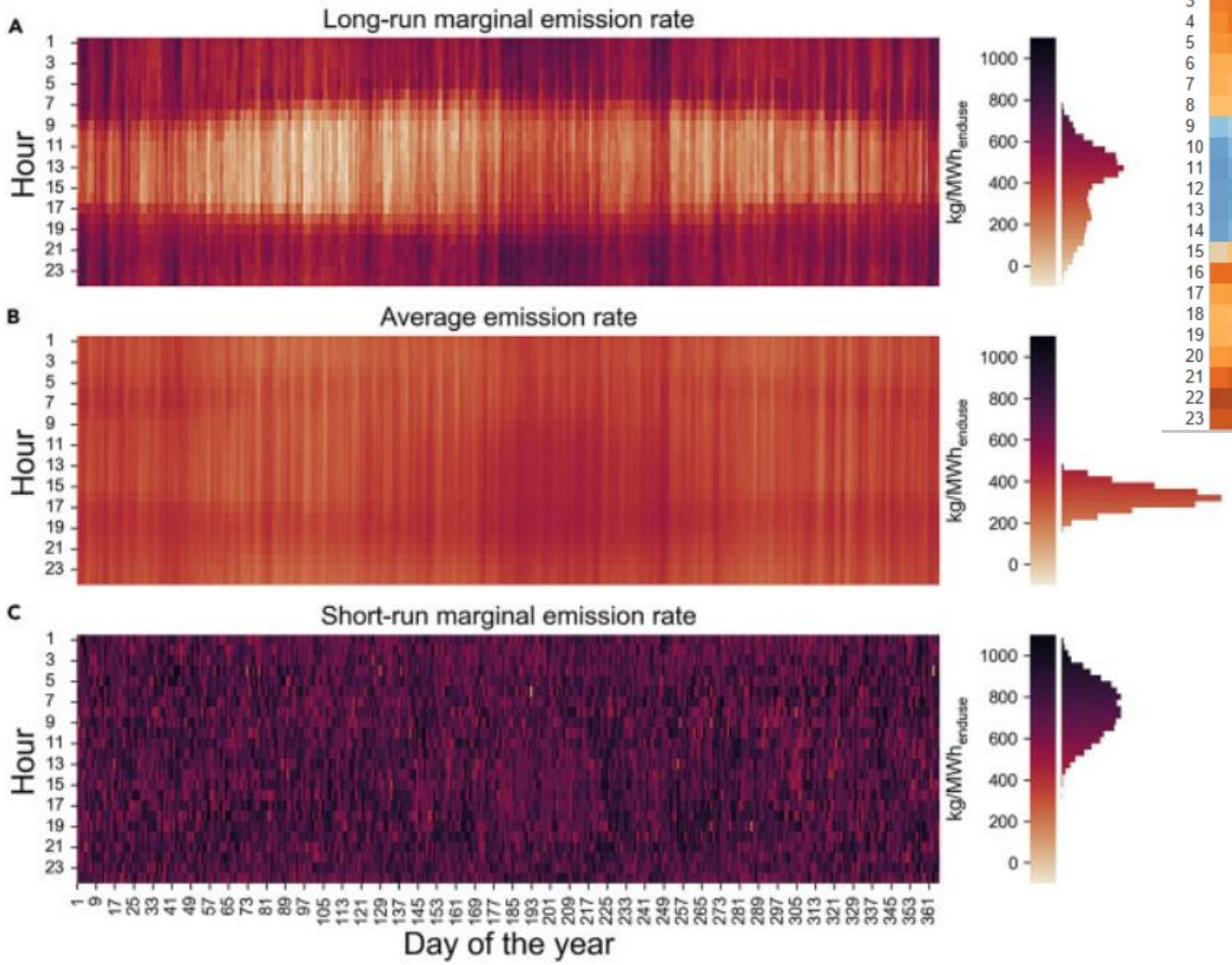
# The role of RD&D in getting to zero codes

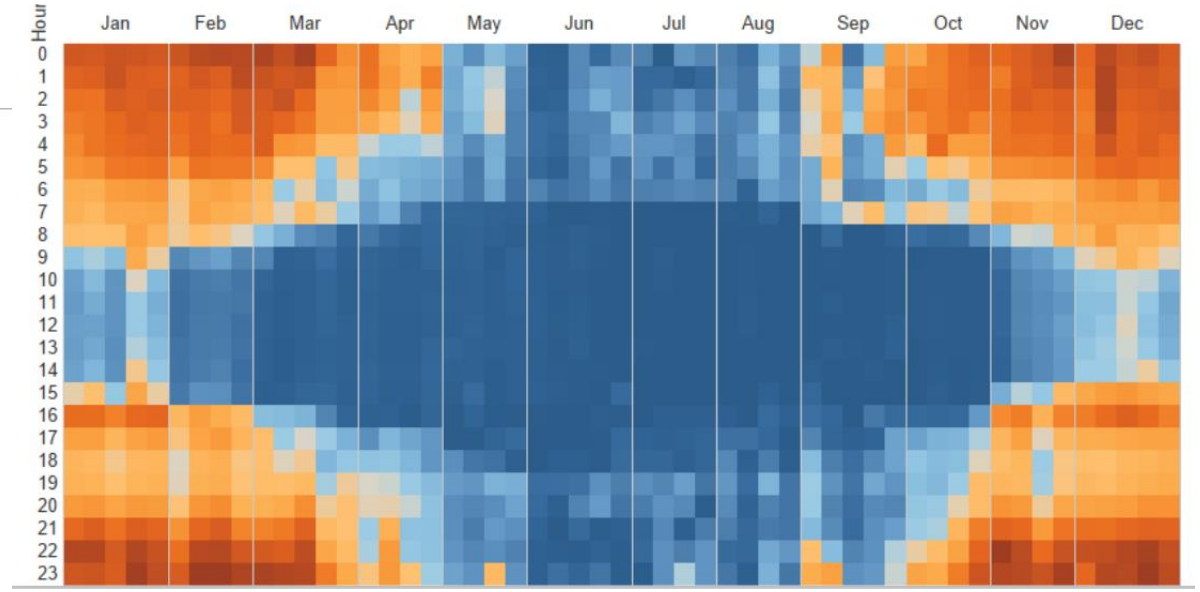
- Envelope efficiency was most effective measure for reducing grid impacts.
- Trading efficiency for solar to get to zero created a deeper trough and sharper ramp on the grid

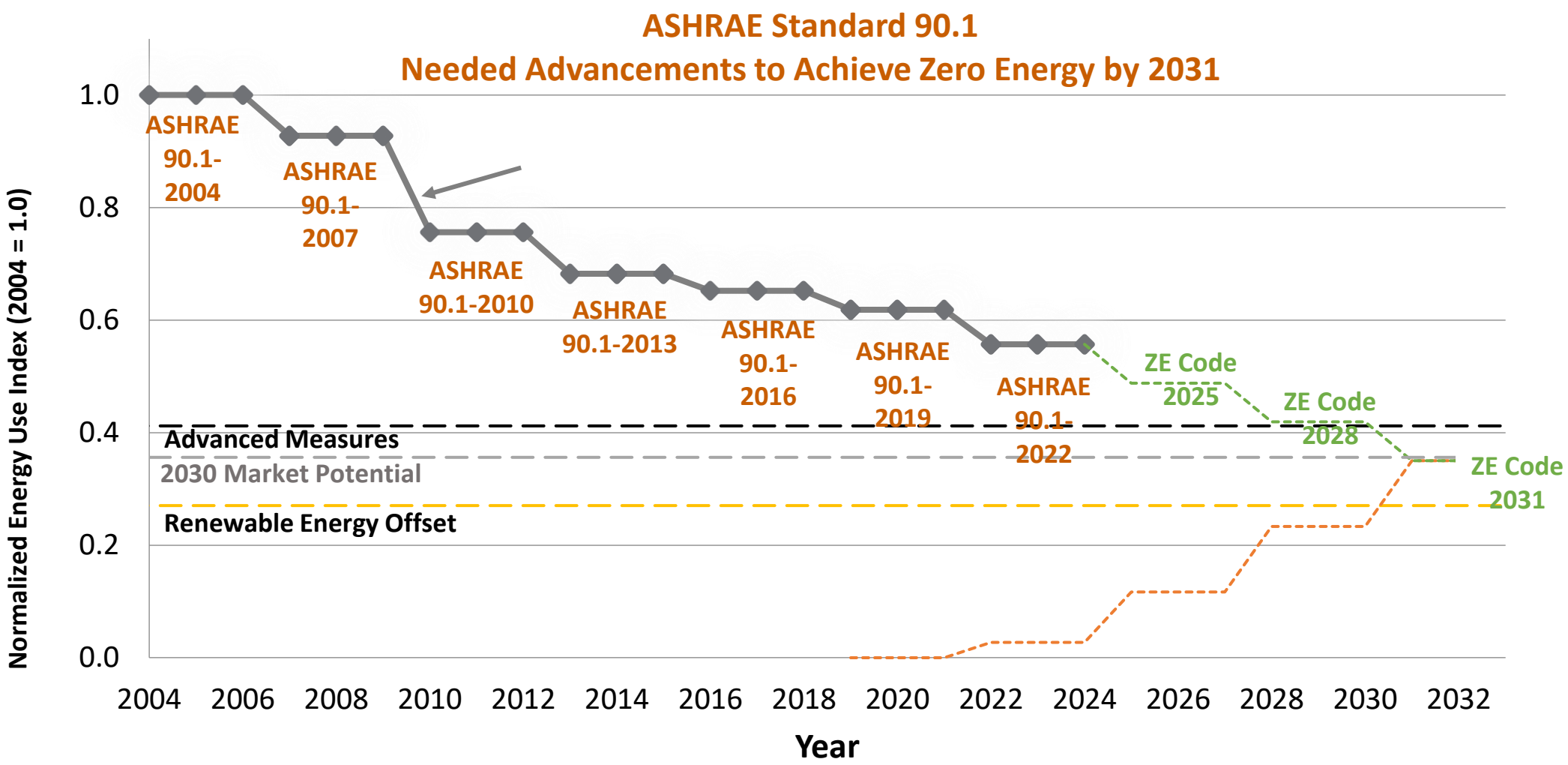
# As the grid decarbonizes....




As the grid gets cleaner with more carbon free power, what is the role of renewables in achieving zero?

# How can BECP help support efforts to achieve zero codes?




Both energy efficiency improvements and renewable energy will be needed to achieve zero energy codes

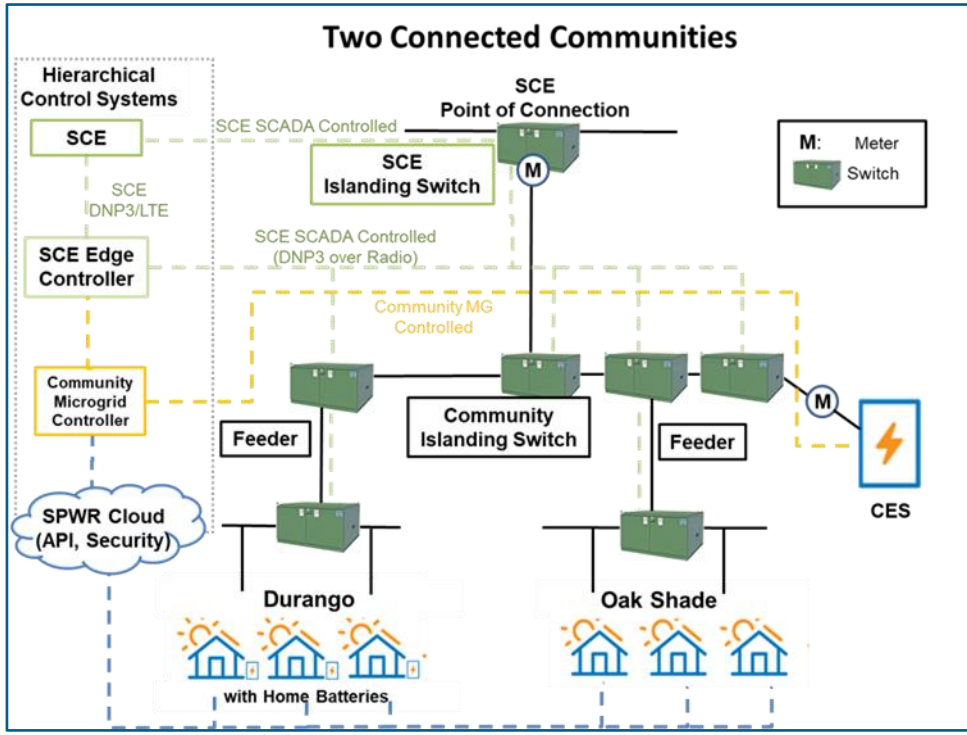
# Connected Communities –ZERH integration with grid and customer resilience; KB Homes, Sunpower, Kia, SCE

## Community Description

Two new home neighborhoods in California connected with microgrids equipped with distributed energy resources, load flexibility, energy efficiency, and reliability and resiliency measures. Homes will be all-electric, meet DOE zero energy ready homes criteria with PV and home energy management systems. Both neighborhoods (200+ homes) will have in home-batteries and be connected by a community battery which will power a microgrid in the event of a grid outage. The connected communities will be able to share resources as needed and provide grid services to the local utility.

**KEY INNOVATION:**

- ✓ Integration of existing commercial technology including nested microgrids.
- ✓ Evaluate value of community battery, residential batteries, and home energy management systems.
- ✓ Shifting natural gas fuel end-uses to high efficiency all-electric technology and utilizing controllable HVAC, water heaters and ENERGY STAR labeled appliances.
- ✓ Utility distribution SCADA and automation system edge controller w/close coupled community nested microgrid



# WELCOME ADDRESS

## Jeff Marootian

*Senior Advisor for Energy Efficiency and Renewable Energy, Office of the Secretary*
U.S. Department of Energy

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