

## ZNE for Multifamily Residences

Track: Advancing Residential & Multifamily ZNE Markets

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Q:

ZNE buildings will greatly  
increase if ... ?

HOLD THAT  
THOUGHT!

## Residential Zero

Sounds Absolute, But it's Absolutely Relative



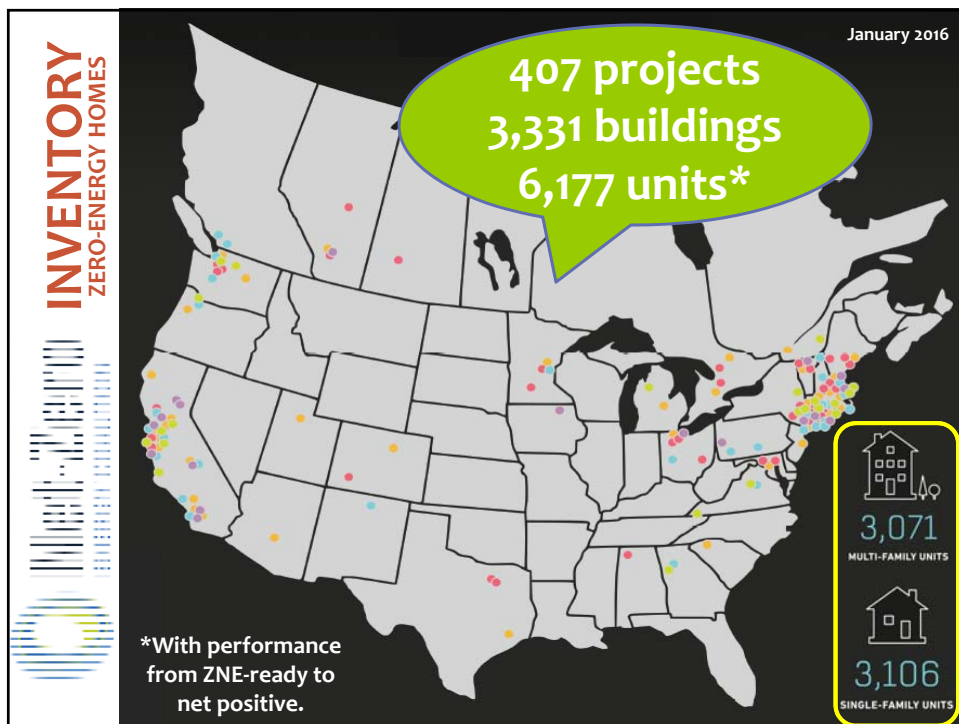
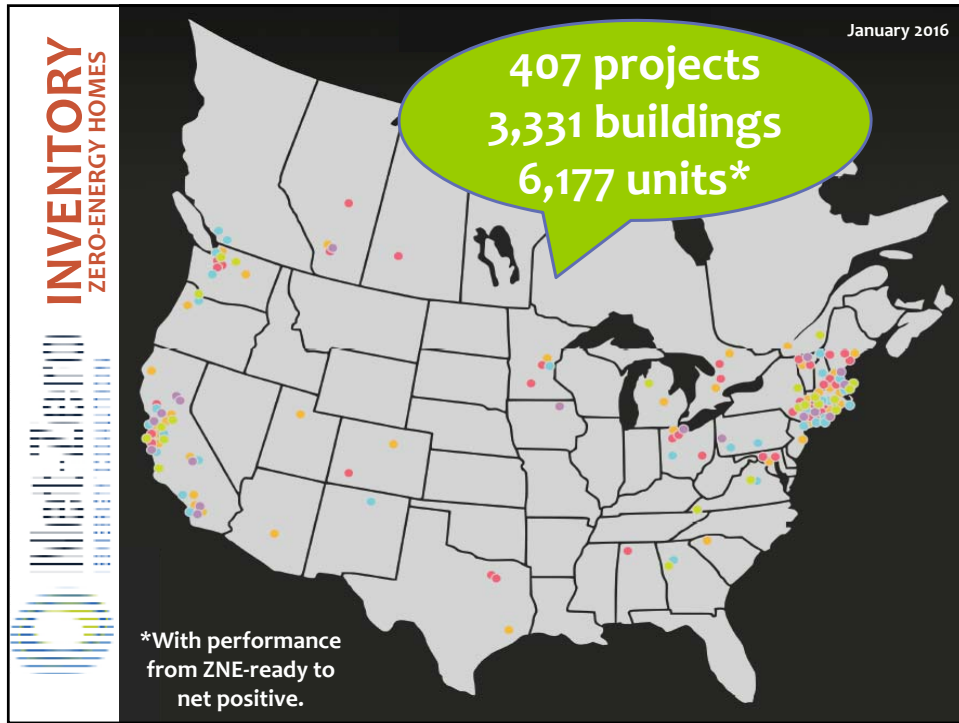
A rose is a rose is  
a rose ...  
more or less

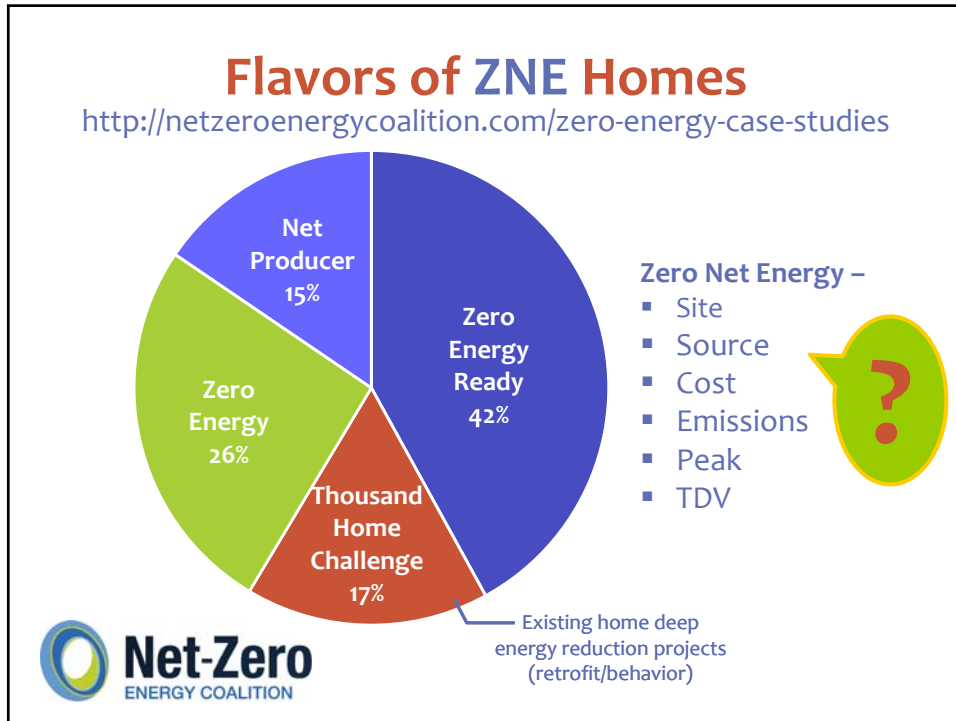


### Part 1. Residential ZNE in North America

### Part 2. Programs & Policies Behind ZNE

### Part 3. ZNE Distinctions & Implications









## ZNE is happening at community scale (and it's global!)

Fujisawa Sustainable Smart Town, Japan



FortZED, Ft. Collins, CO

Pecan Street, Austin, TX

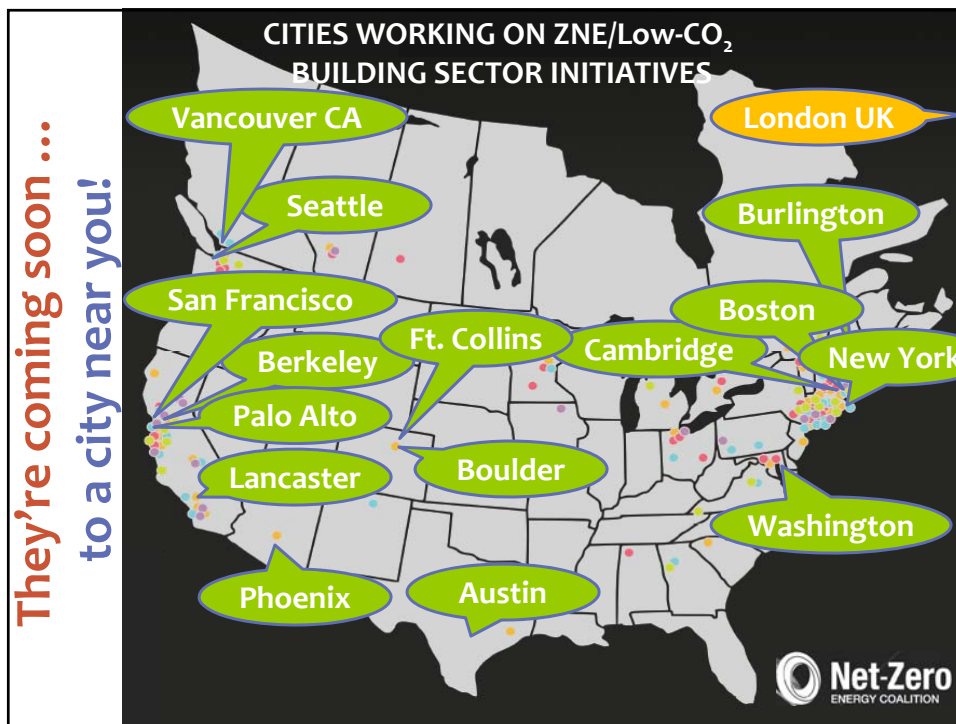
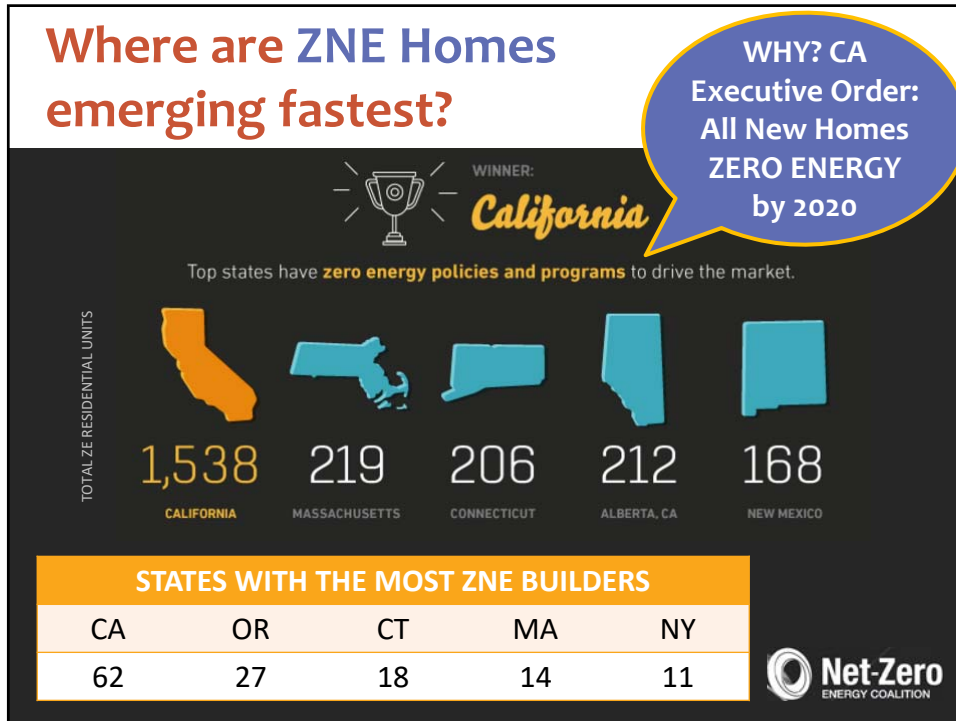


Lancaster, CA

### Part 1. Residential ZNE in North America

### Part 2. Programs & Policies Behind ZNE

### Part 3. ZNE Distinctions & Implications





**Part 1.**  
Residential ZNE in North America

**Part 2.**  
Programs & Policies Behind ZNE

**Part 3.**  
ZNE Distinctions & Implications




## ZNE Program Distinctions

- DOE ZERH Program
- International Living Future Institute
- Earth Advantage Institute
- Thousand Home Challenge
- Passive House Institute US
- Passive House International
- Build It Green
- Net Zero Energy Coalition
- Architecture 2030
- National Renewable Energy Lab
- Northeast Sustainable Energy Association
- New Buildings Institute
- North American Passive House Network
- Passive House California
- Energy & Environmental Building Alliance
- Structural Insulated Panel Association

**3 major program distinctions:**

- Modeled vs. measured energy
- Onsite vs. offsite
- Flavor of ZNE



+  
site or  
source

## ZNE Program Distinctions

Organization	Modeled vs. Measured	Allowable Renewable Energy Sources	Site vs. Source
DOE	modeled	Onsite, community, or offsite	source
International Living Future Institute	measured	Onsite, or offsite only per “scale jumping” criteria – generally nearby; no RECs	site
Earth Advantage	modeled	Onsite; neighborhood/ community under consideration	site (90%)
Passive House International	modeled	Onsite or offsite	source
Passive House Institute US	modeled	Onsite or neighborhood/ community	source
Thousand Home Challenge	measured	Onsite, or offsite only if the owner/ occupant owns a share of the renewable system and has actual production from the facility	site
Build It Green	modeled	Onsite, only after code has been met	source

## ZNE Program Distinctions

Implications: modeled vs. measured energy

<p><b>MEASURED</b> energy:</p> <ul style="list-style-type: none"> <li>■ Is the only way to know if ZNE <i>really</i> achieved</li> <li>■ Necessary for proof of concept</li> <li>■ Most practical for existing homes</li> </ul>	<p><b>MODELED</b> energy:</p> <ul style="list-style-type: none"> <li>■ Is the only way to objectively evaluate the <i>home</i> rather than the occupants</li> <li>■ Pragmatic need for market transformation programs</li> </ul>
<p><b>IMPLICATIONS:</b></p> <ul style="list-style-type: none"> <li>■ <b>Measured</b> energy likeliest basis for programs &amp; policies targeting existing homes</li> <li>■ <b>Modeled</b> energy likeliest basis for new homes</li> </ul>	

## ZNE Program Distinctions

Implications: onsite vs. offsite renewables

<p><b>ONSITE</b> renewable energy:</p> <ul style="list-style-type: none"> <li>■ Is the easiest way to <i>verify</i> ZNE performance (of whatever flavor)</li> </ul>	<p><b>OFFSITE</b> renewable energy:</p> <ul style="list-style-type: none"> <li>■ Is needed for community-scale ZNE</li> <li>■ Is more economical and equitable</li> </ul>
<p><b>IMPLICATIONS:</b></p> <ul style="list-style-type: none"> <li>■ <b>Onsite</b> RE likeliest basis for programs &amp; policies that focus on individual buildings</li> <li>■ <b>Offsite</b> RE likeliest basis for community-scale initiatives</li> <li>■ Credible accounting mechanism needed for <b>offsite</b></li> </ul>	

## ZNE Program Distinctions

Implications: site vs. source energy definition

<p><b>SITE ZNE:</b></p> <ul style="list-style-type: none"> <li>■ Is the easiest definition for verifying ZNE performance</li> <li>■ Is hardest to understand</li> </ul>	<p><b>SOURCE ZNE:</b></p> <ul style="list-style-type: none"> <li>■ Is more intuitively in line with carbon goals</li> </ul>
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**IMPLICATIONS:**

- **Site** results in the largest renewable energy requirement
- **Site** is a driver towards 100% electric building energy
- **Source** is more compatible with mixed-fuel projects due to utility economics

## ZNE Program Distinctions

Conclusions

**IMPLICATIONS:**

- Valid program distinctions should and will remain
- Consensus on other points of divergence would be beneficial to market transformation; in particular:
  - Site vs. source vs. other ZNE definitions
  - Contribution of offsite renewable energy
  - Mechanism to account for offsite renewable energy

