ZNE Approaches in Other States

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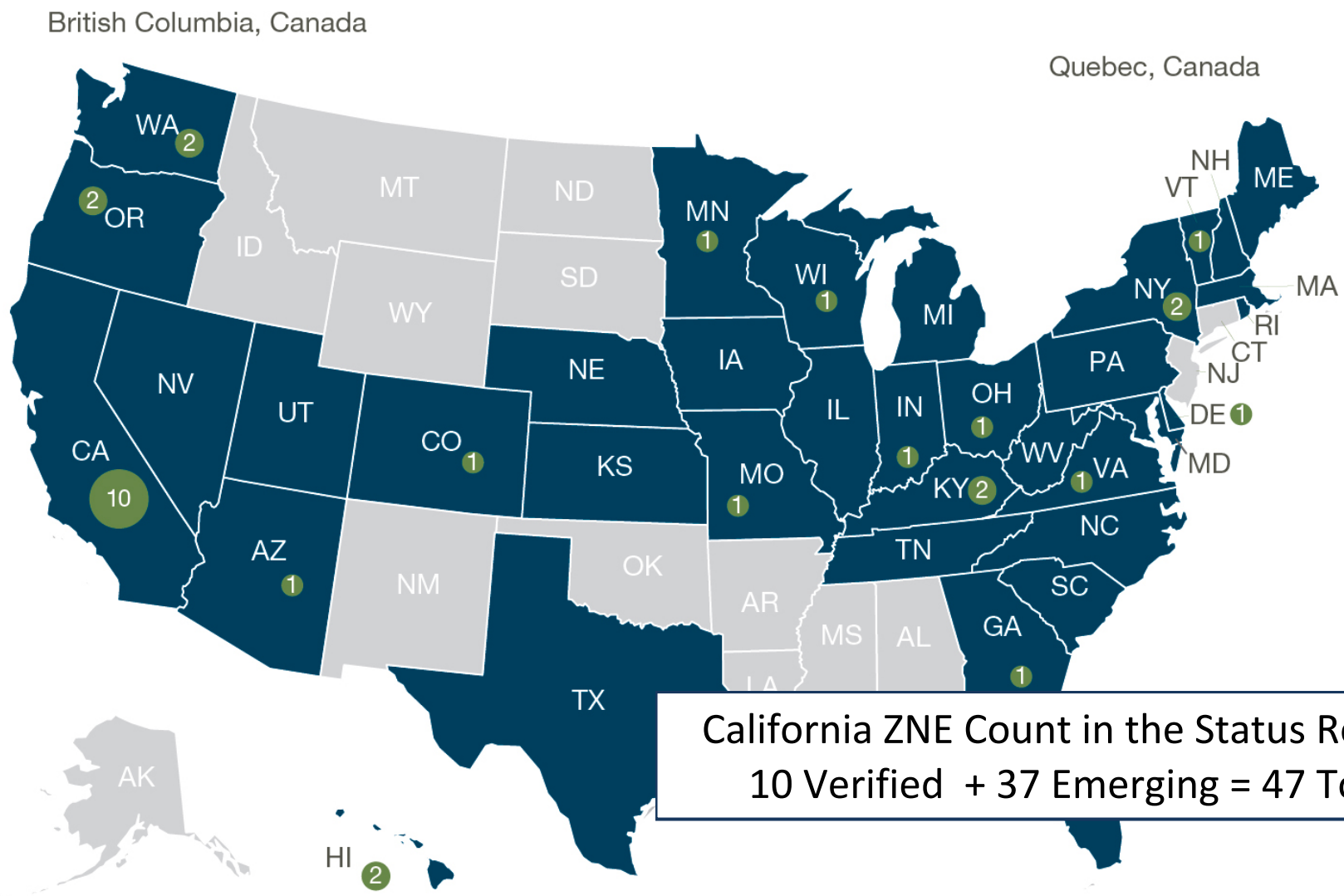
Zero Net Energy Definitions

- **U.S. DOE is about to finalize a definition of a Zero Energy Building (ZEB) as:**
  - "An energy-efficient **building** where the **actual annual source energy** consumption is balanced by **on-site renewable energy**."
  - This definition can be broadened to include campuses, communities or portfolios rather than "buildings", and the word "net" is dropped
- In California, the cost–effectiveness of codes has typically been reviewed by Time Dependent Valuation, and it is likely that this distinction will continue for ZEBs.

General ZNE Background

- Huge interest, but very early market stage
- Reframes energy efficiency with an aspirational goal
- California is the leader among states in ZNE activity
  - One-third of ZNE commercial buildings
- ZNE has moved from “is it possible?” to “a quite probable future” in just a few years
- ZNE being redefined to include off-site renewables, e.g. community scale solar



California ZNE Count in the Status Report:
10 Verified + 37 Emerging = 47 Total

Early Example - Small, simple building, PV on roof
IDeAs Z2 Retrofit , San Jose, CA

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Moving to Scale - Size, complexity, PV at community level
West Village, UC Davis

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Connecticut Zero Energy Challenge

- Operated by EverSource – former CT Light and Power
- Operates on top of residential new construction EE program that rewards deeper savings with tiered incentives
  - Separately funded/administered renewables (PV) incentives available
- Challenge stages annual competition and provides cash awards and publicity in five categories
  - Best single family and best multi-family overall
  - Most affordable, most efficient w/o renewables, most efficient w/ renewables
  - Total of $35,000 annually
  - Website, case studies, feature stories
- Attracts about 10 entries annually; entering fourth year

Efficiency Vermont

- Comprehensive Energy Plan calls for 30% of new construction ZNE by 2020, 100% ZNE by 2030
- Just beginning a 20 building ZNE commercial pilot; fully subscribed
- Detailed and ongoing monitoring of 9 residential projects featuring varying construction techniques, e.g. Passive House
  - Appears to be the most comprehensive monitoring program for homes
- Developed a high performance manufactured home
- Operate an annual conference/awards: “Better Buildings by Design”
- ZNE Communities pilot project in Montpelier

Massachusetts

- Started with Governor's ZNE Task Force in 2008-2009
  - Includes stretch codes, benchmarking, ZNE demonstrations
- IOUs provide incentives for efficiency in new construction
  - MA state has a solar incentive program
- Pathway to Zero; state funded demonstration grants of $3.5 million over multiple years
  - Funded 26 projects out of 42 applicants to date
  - Includes government buildings (only) on the non-residential side
  - Single family and multi-family

And, three state snippets

- Energy Trust of Oregon: Pilot for commercial/multifamily in 2010 targeted ten projects
  - Currently planning pilot of up to 30 projects
  - Oregon state law requires ZNE codes by 2030

- Kentucky: Concerted, multiyear effort has led to ZNE schools at the typical cost of construction, $200/Sq. Ft including solar PV

- New York: NYSERDA moving to primarily operating Market Transformation Programs. ZNE planned as a major element.

Insights/Lessons Learned

- CT ZNE Challenge competition yielding inexpensive earned media, market interest and innovation. Easily replicable in California
- VEIC (non-IOU administrator) performing well (best?) on monitoring, crucial for future learnings about best approaches and achieving cost reductions
- Enrollment targets (# of ZNE buildings or projects /funding cycle) is a typical and successful approach to create measurable goal
- Few programs offers bundled EE/PV incentives in a single program. Typically different programs with different guidance creating another challenge.