



DRIVING ZNE TO SCALE IN CALIFORNIA STATE BUILDINGS

Ellen Steiner, Ph.D., Paul Wasmund, Rick Winch, Opinion Dynamics
Robert Hansen, CPUC

2017 IEPEC Conference —
Baltimore, Maryland



Agenda/Review of Presentation

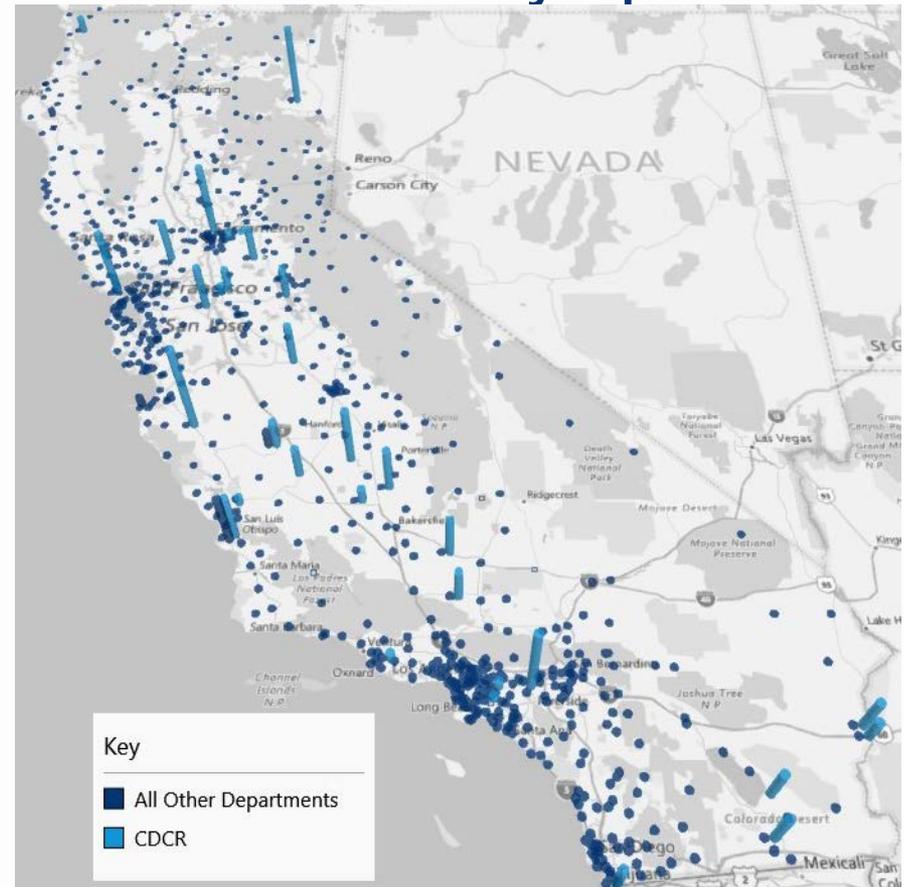
- Impetus of Study
- California State Buildings & ZNE
- Research Approach
- Typical Pathway to ZNE
- 4 Systemic Barriers
- Moving Forward

California State Buildings

California is a large real estate holder and a major consumer of energy. State owned buildings accounts for:

- 35 state departments occupy 1,490 properties, which represent 8,612 buildings
- 112 million square feet
- 9.9 Billion kBtu of Grid Purchases
- 78.41 million kBtu of on-site renewable production

State-owned Building Concentration by Zip Code



CA State Agency ZNE Definition

ZNE Source – Produces as much energy as it consumes over the course of a year, when accounted for at the energy generation source. Source energy traces the heat and electricity requirements of a building back to the primary energy (raw fuel) input. Source Energy incorporates all generation, transmission, and delivery losses -- allowing for an equitable assessment of building-level energy, expressed in kBtus.



State Building ZNE Goals

- 50% of all new state buildings beginning design after 2020 be ZNE;
- 100% of all new state buildings and major renovations beginning design after 2025 be ZNE; and,
- By 2025, state departments should take measures toward achieving ZNE for 50% of all existing state-owned building square footage.

Research Approach

Objective: Characterize state department pathways on their “road to ZNE” through the identification of barriers they face when contemplating ZNE.

1

Literature Review & Secondary Data Analysis
n=100+ docs
Goal: Develop context for interviews and data analysis

2

Interviews: Existing ZNE Building Staff
n=10 people
Goal: Characterize paths to ZNE (Experiences, Barriers, Solutions, Lessons Learned)

3

Interviews: ZNE Experts, Utilities, & Regulatory
n= 16 people
Goal: Understand policy drivers, Utility roles, Context for barriers, Solutions

4

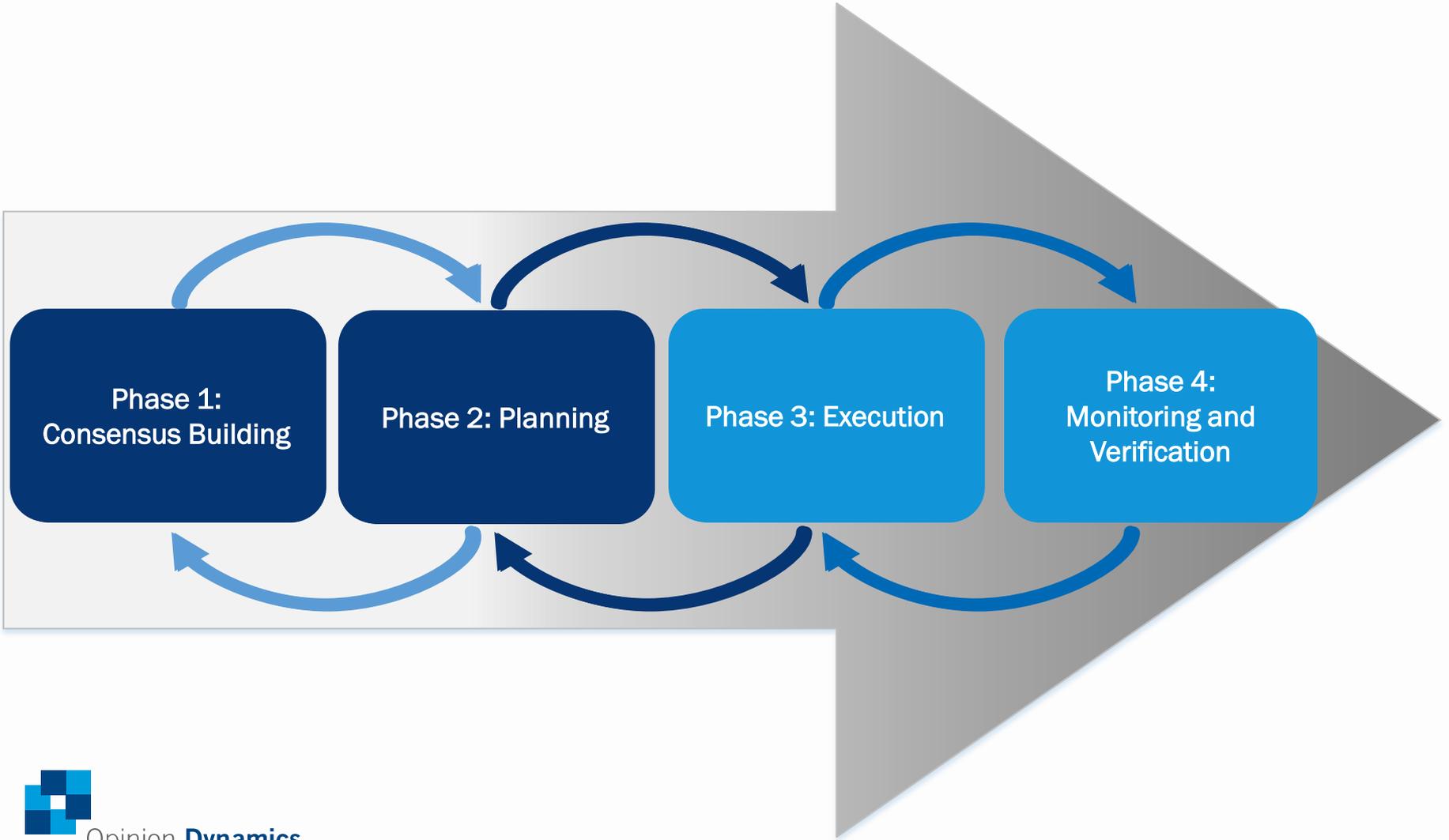
Interviews: State Agency Decision Makers
n=60 people
Goal: Understand progress towards ZNE, Barriers, Solutions

5

ESPM Data Analysis
n=1,540 Facilities
Goal: Characterize state buildings & related energy use variables



Typical Pathway to ZNE

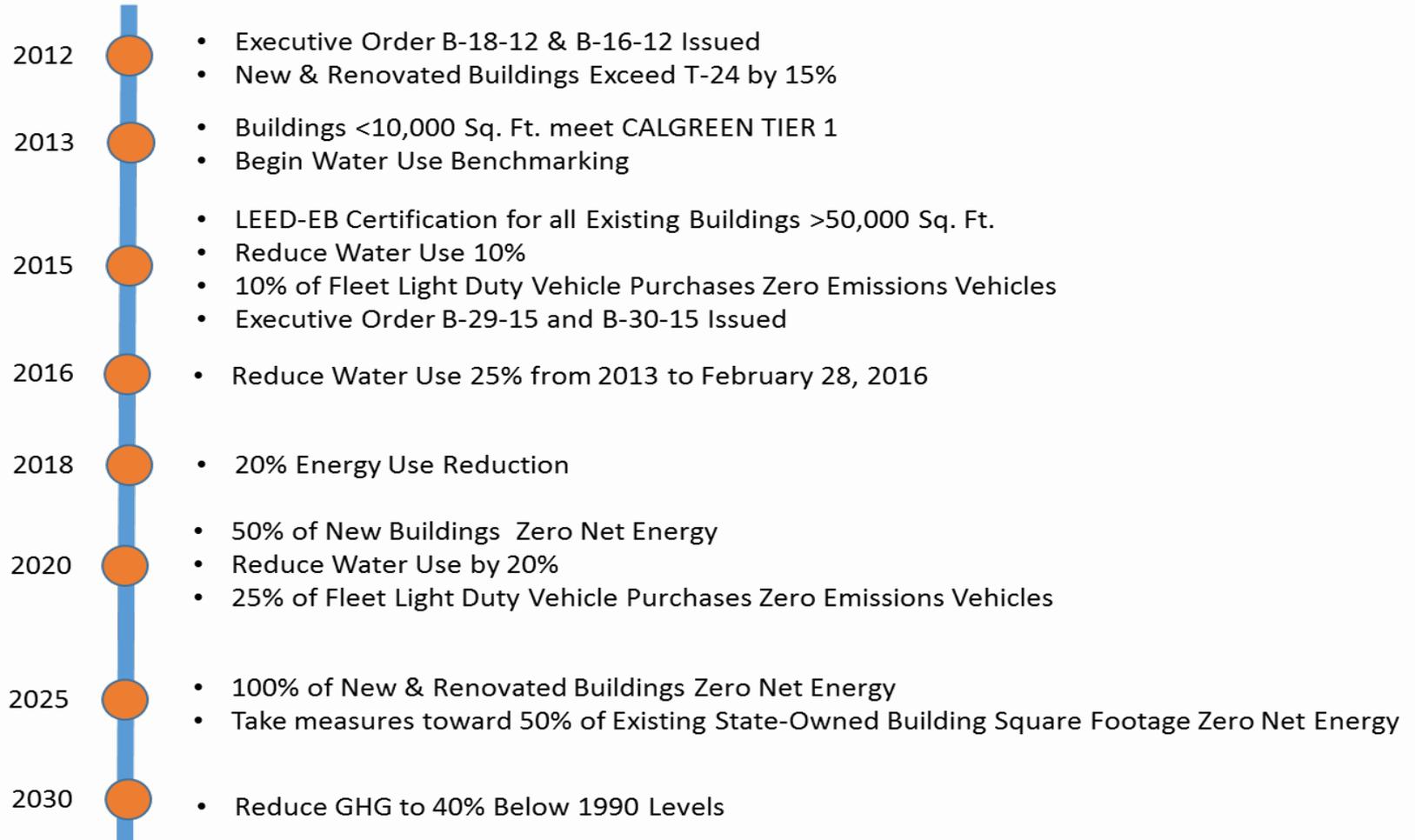


4 Key Barriers



Barrier: Managing Competing Priorities

Green Executive Order Milestones and Timeline



Barrier: Beginning the ZNE Journey

“I know we have those [ZNE] goals, and it's completely unclear to me how we ought to be moving towards trying to achieve them...I think one of the things that would be helpful for me, anyway, is if somebody said, "Here, start with this. Start working through this checklist." I've got a project checklist. I see all the ones for core and shell, I see the ones for mechanical. But is there some more systematic way to be approaching this?”

-State Agency Interviewee



Barrier: Securing Funding

“I mean it’s kind of the challenge with a number of the executive orders that we face, you know, like in a general sense there’s a huge number of requirements that have been laid out, but no additional budget to pursue those things and, a lot of them are very expensive undertakings. So given that we have an aging portfolio of buildings, pretty significant deferred maintenance needs, you know, that is where the priority is, in keeping things running and then a lot of the green initiatives are nice to have things frankly, so it’s just competing budget needs I guess would be the short answer [to the biggest barrier to ZNE].”

-State Agency Interviewee



Barrier: Planning and Installing Renewables

Our buildings are the easiest type, I think. Our district offices, typically a single story, 10,000 to 15,000 square feet. Typically about 20% of that is warehouse, unconditioned. So almost just by that formula, we're almost always going to have enough canvas on the roof to handle our [PV] array. Certainly other folks, multi-story, urban setting, it's certainly a whole different challenge than we've had.

-State Agency Interviewee



Moving Forward on ZNE

- Focus ZNE on departments that represent the most significant portion of state-owned building square footage.
- Select buildings on a case-by-case basis
- Develop a ZNE Manual for departmental use
- Continue to seek alternative funding sources

Thank you

Ellen Steiner, Ph.D.

esteiner@opiniondynamics.com

720-262-5857



Opinion **Dynamics**