Scalable, Replicable and Possible?!
Retrofitting a school to ZNE with the Prop. 39 ZNE Pilot Program

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Proposition 39 Program Overview

Goals

- Leverage Prop 39 funds
- Retrofit 'existing' buildings in public schools & community colleges
- Establish "proof of concept" of feasibility across California
- Document findings & best practices
- Future program development

Values

- Socialize awareness to stakeholders
- Design Assistance
- Training & Education
- Promotion of on-going maintenance

What do they gain?

- Design Consultation
- Construction Inspection and Commissioning Support
- Incremental Cost Buy Down
- Monitoring, Diagnosis, Correction and Validation
- Coordination with Prop 39

The report card

Five school district projects were evaluated under the following criteria:

ZNE viability

- Potential for EUI of 16-22 kBtu/sqft/year + renewable energy on-site generation

Cost effectiveness

- Project currently has Prop. 39 funding or other Non-Prop 39 funds
- Savings-to-investment ratio

Meet schedule

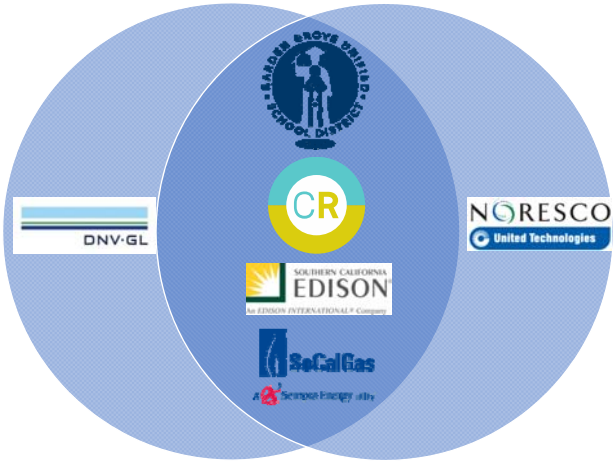
- Must meet pilot's schedule and participate in Pre/Post evaluation, measurement & verification

Project impact and project diversity were also considered in the evaluation

Garden Grove Unified School District

Project team

Santiago High
Science Building



Ralston Intermediate
MPR & Kitchen

The ideal candidate: round peg, round hole

Culture of frugality	Leveraging Prop. 39 funds	Installing HVAC
No/low-cost solutions Modernization plan 2010-20122	+ Modernization Bond funds and CREBs for PV Solar Generate positive savings-to-investment ratios	Only 15% of campuses had HVAC Need solutions to reduce district's anticipated energy costs

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- Retrofit of an 8,096 square feet, science classroom
- Install low cost, replicable and scalable systems & measures for the school district

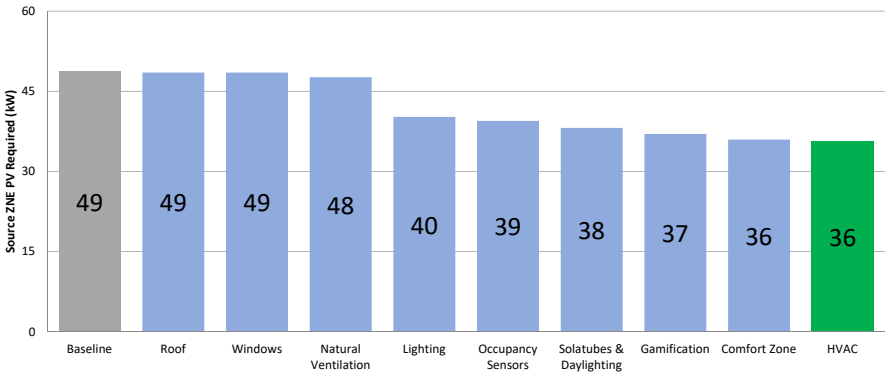
Reducing the existing energy footprint

	EUI ($kBtu/ft^2/yr$)
Roof Insulation	34
High Performance Windows	33
LED Lighting	30
Occupancy Sensors	28
Solatubes & Daylighting	27
Gamification	26
Setback Temperature Optimization	25

Offsetting with solar

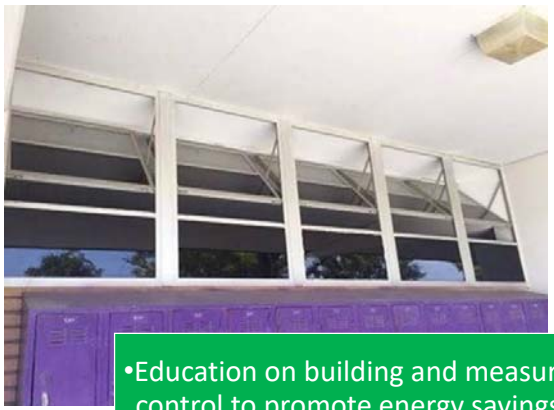
ZNE Source instead of ZNE TDV definition:

'A building that produces as much energy as it consumes over the course of a year, when accounted for at the energy generation source'



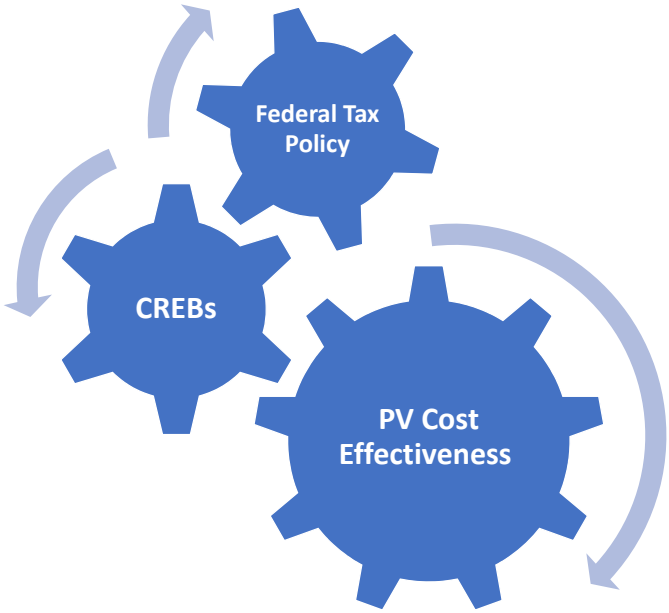
Occupant engagement

•Students becoming the ZNE champions in classrooms



•Education on building and measure control to promote energy savings

Challenges so far



Closing thoughts

Case studies provide invaluable examples of real time challenges for ZNE projects.

There is not *a one program fits all* approach for ZNE

For public buildings that leverage diverse funding sources that are limited, the cost of ZNE is a barrier

Focus on project wins and achievements beyond standard

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"small wins"