

# Zero Net Energy Buildings & PG&E

**BayREN Forum: Zero Energy Buildings for Local Government**

**Peter Turnbull, Principal**

**November 16, 2016**



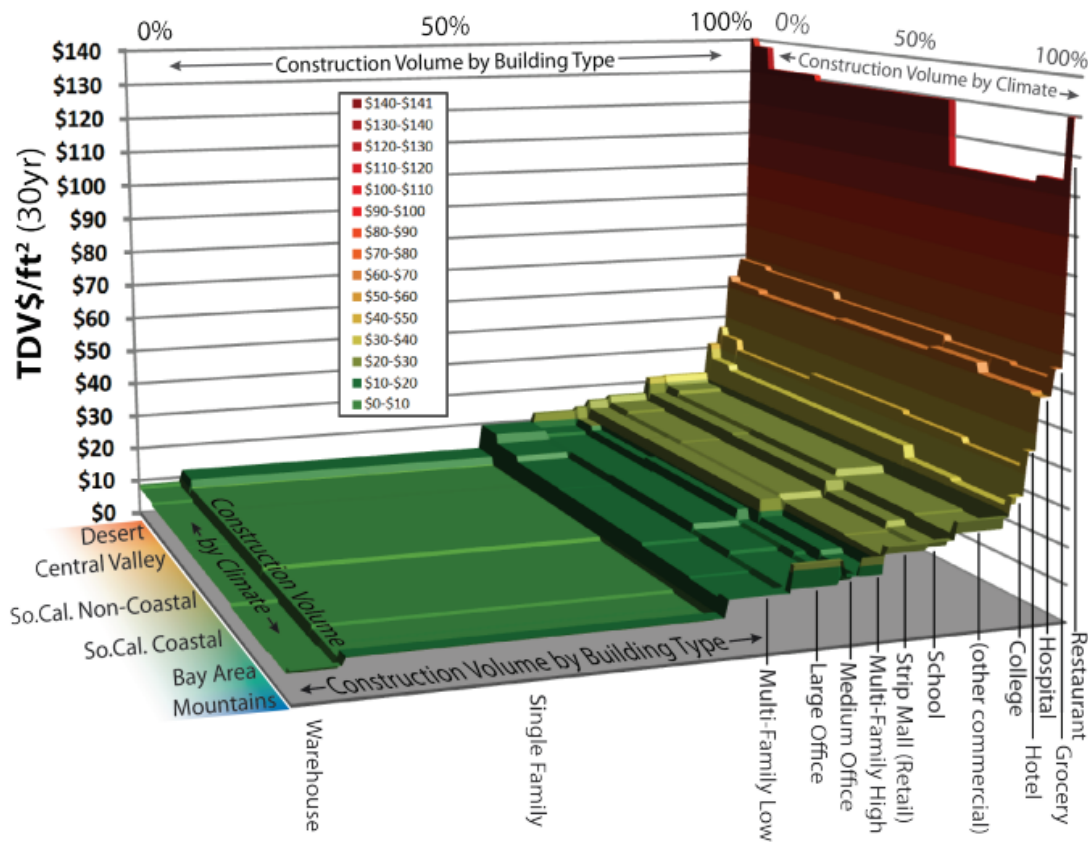
Together, Building  
a Better California



# Technical Feasibility of ZNE in CA

## without Solar

Figure 10 – Statewide Technically Feasible EUIs without Solar (TDV\$) distributed by Projected 2020 Construction Volume



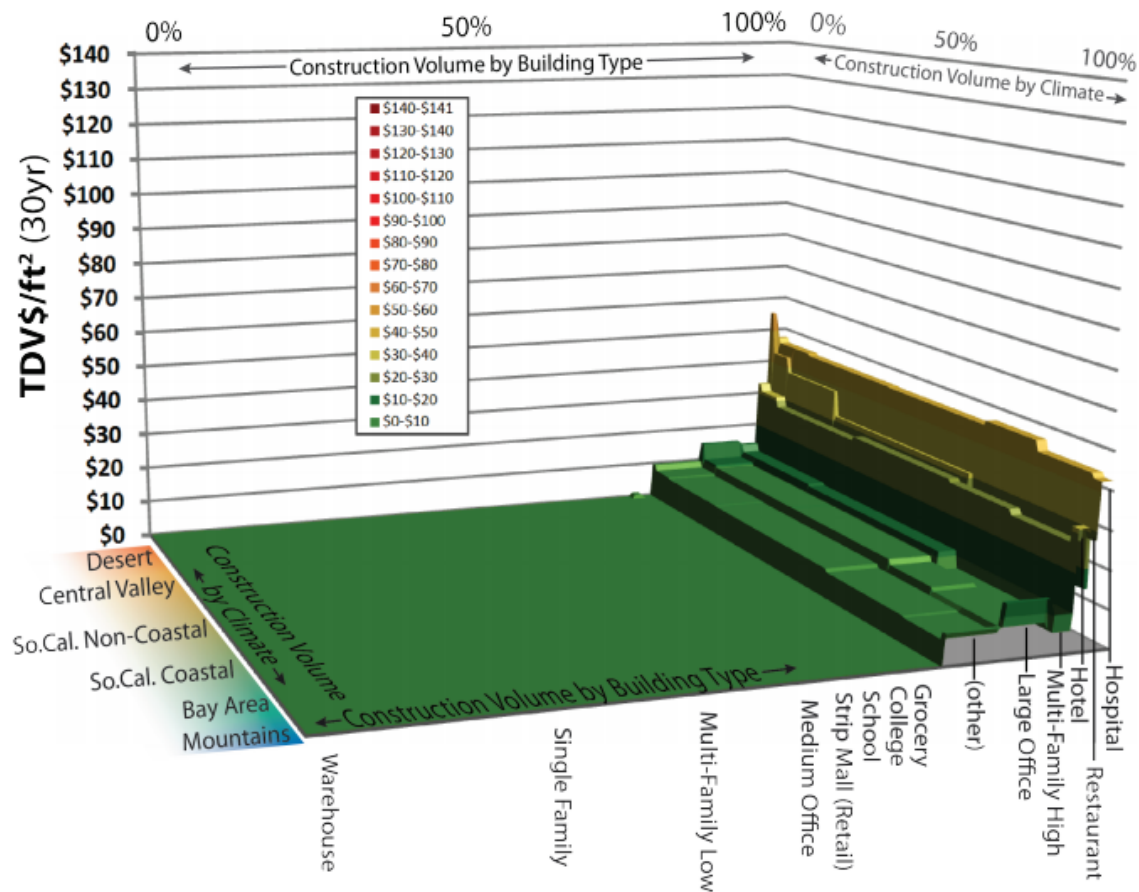
From "The Technical Feasibility of Zero Net Energy Buildings in California" by ARUP  
[http://www.energydataweb.com/cpucfiles/pddocs/904/california\\_zne\\_technical\\_feasibility\\_report\\_final.pdf](http://www.energydataweb.com/cpucfiles/pddocs/904/california_zne_technical_feasibility_report_final.pdf)



# Technical Feasibility of ZNE in CA

## with Solar

Figure 11 – Statewide Technically Feasible Net-EUIs with Solar (TDV\$) by Projected 2020 Construction Volume



From "The Technical Feasibility of Zero Net Energy Buildings in California" by ARUP  
[http://www.energydataweb.com/cpucfiles/pdoadocs/904/california\\_zne\\_technical\\_feasibility\\_report\\_final.pdf](http://www.energydataweb.com/cpucfiles/pdoadocs/904/california_zne_technical_feasibility_report_final.pdf)



# PG&E Activities

## Production Builder Demonstration

### Partnership with 7 Production Builders

- Covers 25% of California builder market
- Different climate zones & customer profiles
- Occupancy starting March 2016
- Free design assistance for energy performance goals



### Pulte Home Corporation

- #3 Builder in the Nation
- 2,344 sf (~215 m<sup>2</sup>)
- 4 Bedrooms

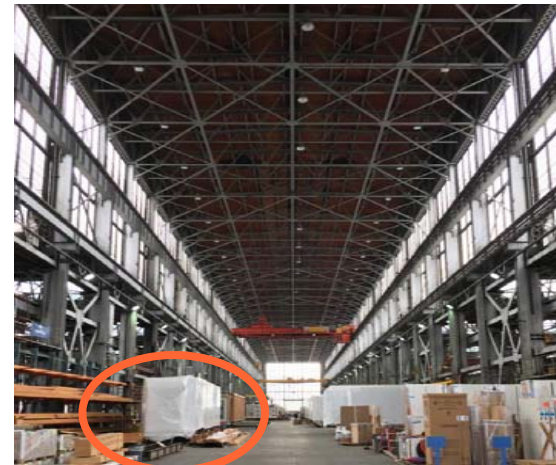


# PG&E Activities

## Production Builder Demonstration

### Partnership with 7 Production Builders

- Incremental cost buy-down of EEMs
- Determine how to influence future offerings
- How to reduce market barriers
- Collect and evaluate monitoring data



### Blu Homes

- 1,869 sf (~175 m<sup>2</sup>)
- 3 Bedrooms



# PG&E Activities

## ZNE Schools Retrofit Pilot

### Support Retrofit of 7 Schools by leveraging Prop 39 Funding

- Feasible “Proof of Concept” projects
- Different climate zones & customer profiles
- Free design assistance for energy performance goals
- Incremental cost buy-down of EEMs
- Determine how to influence future offerings
- How to reduce market barriers for retrofits
- Collect and evaluate monitoring data





# Support State Government

## State is PG&E's largest client

### Supporting Local Governments

- Sponsored in-depth studies on courthouses with Judicial Branch
- Helped DGS on the ZNE definitions on existing facilities
- Continue to work with government in project support that can be duplicated.





# PG&E Activities

## Architecture at Zero Competition

### A competition for Zero Net Energy

- [www.architectureatzero.com](http://www.architectureatzero.com)
- Annual international design competition for professionals and students
- Emeryville, UC Merced, Tenderloin, Jack London Gateway, UCSF Mission Bay, SFSU
- Creative and feasible approaches to ZNE building
- Technical prowess in addition to design possibilities
- 2016: 543 Registrations from 61 Countries



2015 Honor Awards: Weber Thompson (top) & Mithun (Bottom)



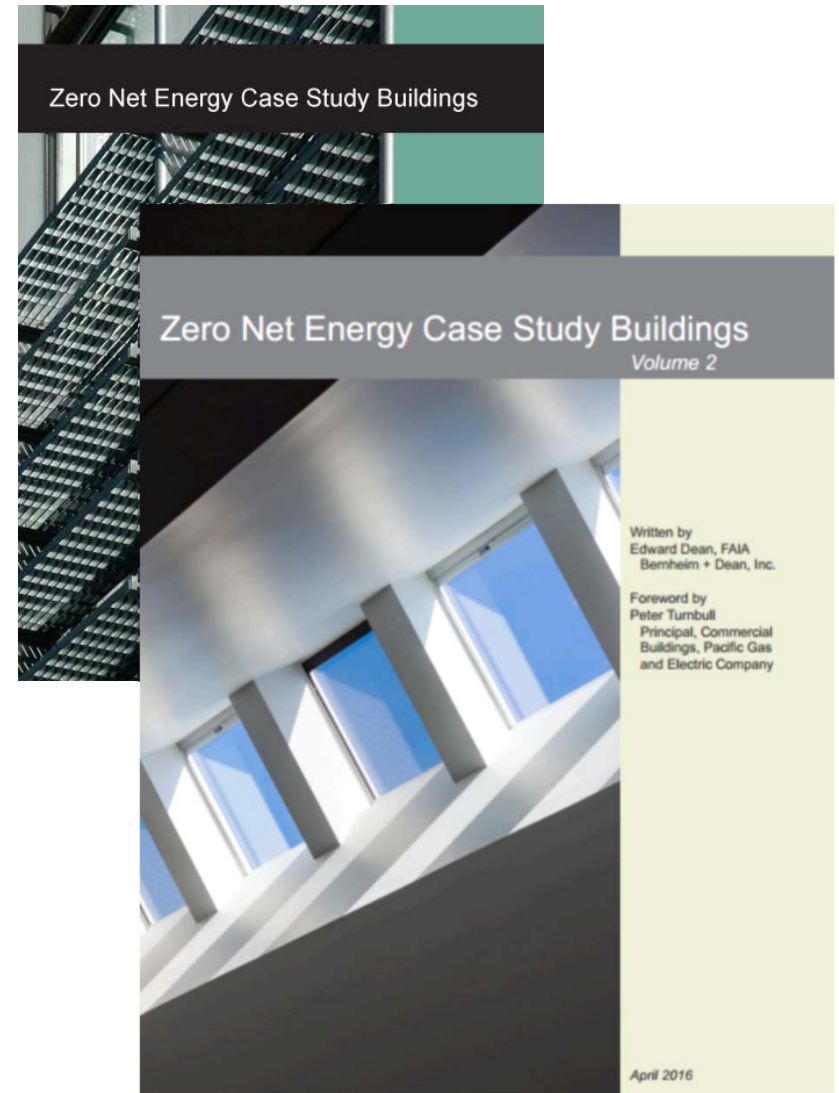


# PG&E Activities

## Case Study Books

Insider stories about designing, modelling and post-occupancy of Non-Res Buildings

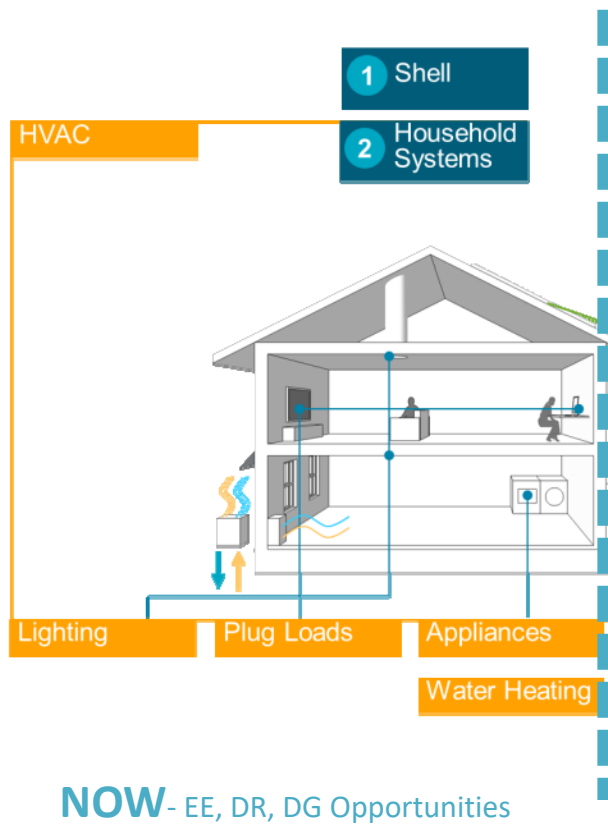
- Authored by Edward Dean, FAIA
- Volume 1 - (6 facilities)
- Volume 2 – (5 facilities)
- Available at Amazon.com  
(Sold at cost)
- FREE to Download
  - Vol1:<http://bit.ly/2a6J6v4>
  - Vol2:<http://bit.ly/29VOVwx>





# Future Opportunities

## Community Scale – Grid Impact



# Thank you

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