

Residential Zero

What We've Learned From the Market Leaders



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- 1 Residential ZE by the Numbers
- 2 ZE Builder Insights
- 3 ZE Designer Tips
- 4 ZE Builder Tips

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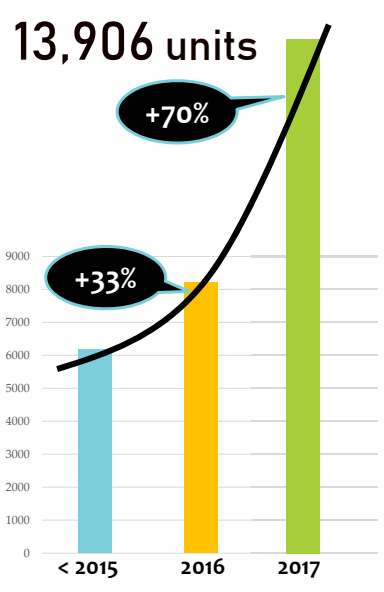
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1 Residential ZE by the Numbers

ZE Homes Are Going Exponential!



<http://netzeroenergycoalition.com/zero-energy-inventory/>



Plus: 33,324 units planned in 44 projects, including:

- 21,500 units in Santa Clarita, CA (Newhall Ranch, FivePoint)
- 5,000 units in Waterset, FL (EcoVillage Waterset, Planet Greenergy)
- 2,900 units in Prescott Valley, AZ (Jasper, Mandalay Homes)
- 1,900 units in London, ON (West 5 - Phase 2, Sifton Properties)

Multifamily & Multi-unit Single-family Projects Dominate

94% of the total

PROJECTS COMPRISING 2+ UNITS



4,730

SINGLE-FAMILY HOMES

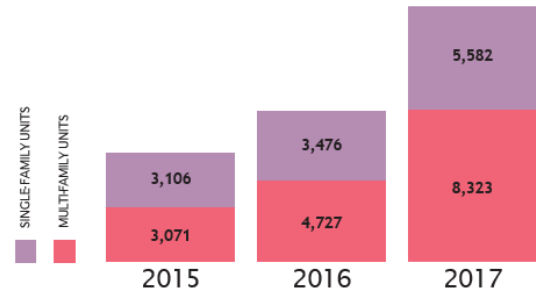


8,323

UNITS IN MULTI-FAMILY BUILDINGS

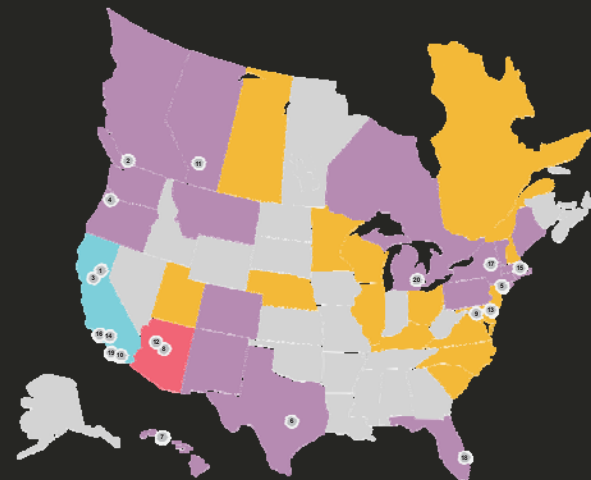
60%

SINGLE-FAMILY VS. MULTIFAMILY UNITS



ZNE development intensity is highest where there are advanced energy policies and market leaders.

PATH TO ZERO IN THE U.S. AND CANADA



- 5,000+ Units
- 1,000-4,999 Units
- 100-999 Units
- 10-99 Units
- 0-9 Units

1. Sacramento, CA	853
2. Vancouver, BC	723
3. Davis, CA	664
4. Portland, OR	365
5. New York, NY	361
6. Austin, TX	346
7. Honolulu, HI	338
8. Clarkdale, AZ	323
9. Washington DC	317
10. National City	268
11. Calgary, AB	210
12. Chino Valley, AZ	209
13. Townsend, MD	198
14. Carlsbad, CA	170
15. Boston, MA	165
16. San Ysidro, CA	160
17. Rotterdam, NY	160
18. Port St. Lucie, FL	154
19. Los Angeles, CA	153
20. Washtenaw, MI	150

	MULTI-FAMILY UNITS	SINGLE-FAMILY UNITS	TOTAL UNITS
Canada	1,089	327	1,416
USA	7,234	5,256	12,490
TOTAL	8,323	5,583	13,906

Big Projects Drive Top 10 ZE Cities

Rank	City	Biggest Project	Developer/Builder	Units	Type
1	Sacramento, CA	Northwest Land Park	Ranch Capital LLC	800	SF
2	Vancouver, BC	Alberni Towers	Recollective	358	MF
3	Davis, CA	West Village Student Housing	UC Davis	662	MF
4	Portland, OR	Ramona Apartments	Walsh Construction Co.	138	MF
5	New York, NY	The House at Cornell Tech	Handel Architects	290	MF
6	Austin, TX	Whisper Valley	Taurus of Texas	237	SF
7	Honolulu, HI	Kalaeloa NZE Community	Tesha Malama	338	MF
8	Clarkdale, AZ	Mountain Gate	Mandalay Homes Inc.	323	SF
9	Washington, DC	Langston Terrace Dwellings	DC Housing Authority	274	MF
10	National City, CA	Park Villas	San Diego Community Housing	268	MF

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ZE Builder Insights: **Understanding Buyers**

Gene Myers
Thrive Home Builders, CO



We have learned to adopt a less-is-more approach. The best example is how we sell health in the home — we show a girl in a high chair with her mom feeding her. The caption is, “The air she breathes is just as important as the food she eats.”

This resonates with buyers and their values.

ZE Builder Insights: **Features & Value**

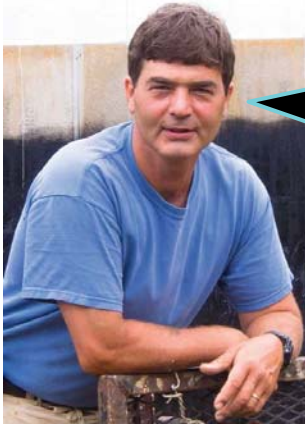
Josh Salinger
Birdsmouth Construction, OR



What separates us from other builders in our market is that we’re offering these features – comfort, performance, and quality – at close to cost parity with conventional homes.

ZE Builder Insights: **Simplicity & Savings**

Anthony Aebi
Greenhill Contracting, NY



Our homes are simpler. This keeps costs down. Our spectrum of buyers all realize that paying a bit more up front will save them in the long run.

ZE Builder Insights: **Building ZE to Save Money**

George Koertzen
Habitat for Humanity, CA



Some features, like added insulation, do cost more, others cost less. Because we add insulation and reduce air leakage, we can use a ¾-ton heat pump for a 1,200 sf home, instead of the typical 2.5- or 3-ton unit.

We're *saving* money by building this way.

ZE Builder Insights: All-electric ZE Homes

Brandon DeYoung
DeYoung Properties, CA



In our EnVision homes, the only gas will be for cooking; we have an induction option and some are upgrading to that. Some plans have a gas fireplace, but many buyers delete it. Gas is plumbed for the dryer, but most buyers choose electric.

It's just a matter of time and consumer education to get to all electric homes.

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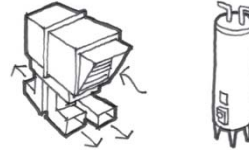
<https://energycodeace.adobeconnect.com/aia-zne-guide/>

Designer Tip #1: Focus on 3 Key Issues

A. Thermal Enclosure



B. Efficient Systems (HVAC & DHW)

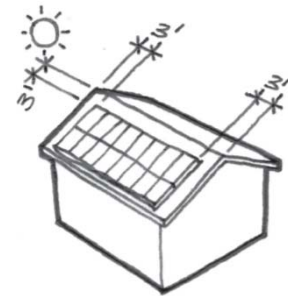


C. Solar Roof



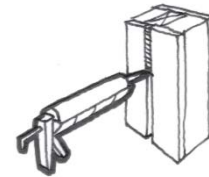
Designer Tip #2: Keep Track of Your Numbers

- Know how much space you will need for HVAC & other equipment (for a ZE home, this may be more than you are used to).
- Run an energy model **early** and **often**.
- Know how much **PV space** you will need, based on the model; compare with your roof design every time you change the design.



Designer Tip #3: Give Your Construction Docs Teeth

- Develop details for air sealing & exterior insulation
- Draw an air sealing cross section
- Provide specifications for air sealing, insulation installation, & other critical construction quality tasks



*Air sealing drawing by
Coldham & Hartman Architects*

<http://www.candharchitects.com/wp-content/uploads/2018/01/180103-AS-2-Wall-Section-Air-Sealing.pdf>

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<http://pge.com/zne>

Builder Tip #1: Weigh Your Trade-offs

- Super-efficient home, e.g.:
 - Advanced framing
 - Super-insulated walls & roofs
 - European windows
 - Compact HVAC & DHW distribution
 - Full commissioning➔

- less PV
 - more design flexibility

- Less efficient home, e.g.:
 - No advanced framing
 - Code-level insulation
 - Garden-variety windows
 - Garden-variety HVAC & DHW distribution
 - No commissioning➔

- more PV
 - less design flexibility

Builder Tip #2: Avoid Common Pitfalls

- Reluctance to update designs ➔

- All changes are **additive**
 - Additive changes add cost

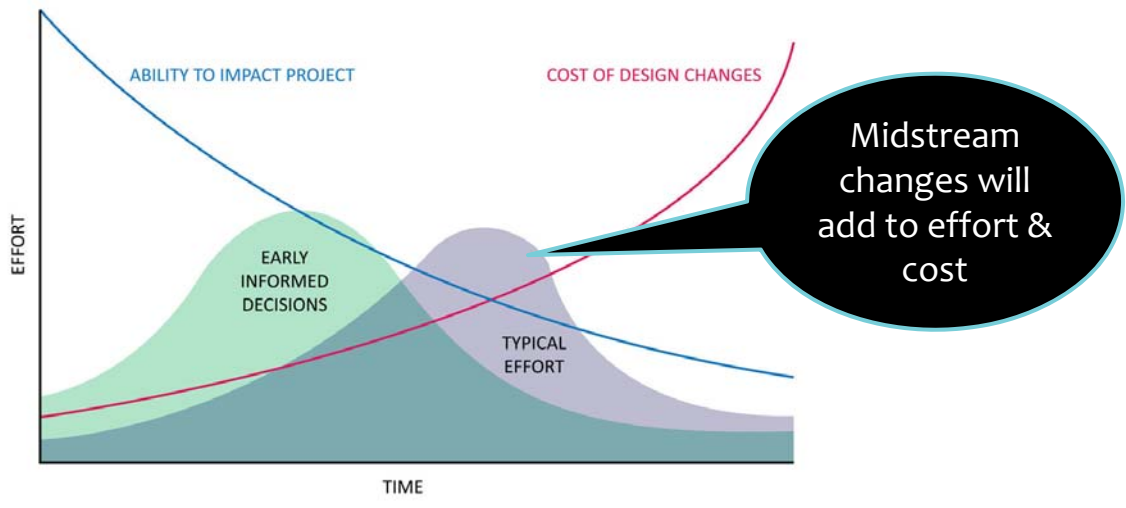
- Gaps in construction documents ➔

- Change orders add to cost
 - Enforcement is difficult

- Defaulting to standard practices ➔

- Performance suffers
 - Habit defeats specs

Builder Tip #3: Get Everyone on Board with ZE Early



AnnEdminster.com

Thank you!