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Our Path To ZNE



Who & Where?

Why?

What?

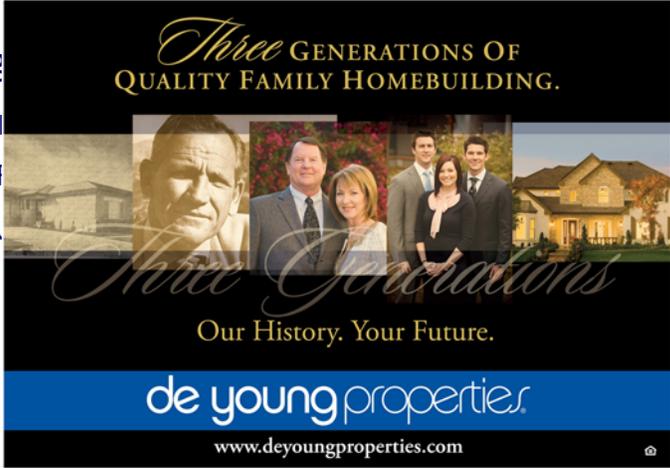
How?

Remaining Challenges

Who & Where?



- 3-g
- Cen
- R
- Rou



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Why?



Pull: Culture of Innovation, Differentiation, & The Right Thing To Do

Push: California 2019/2020 Title 24 Energy Code

Sometimes it feels like this

What?



- All homes third-party certified, GreenPoint Rated since 2009
- Exceeded CA Title 24 by 15% in 2009, then by 30% since 2010
- We continue to significantly exceed Title 24, even as it grows more stringent (2013, 2016, and soon 2019)

- In 2013, we partnered with PG&E to design and build the first and only known **Zero Net Energy (ZNE) Home** in San Joaquin Valley of California as proof of concept and for experience
 - It is currently a model home in Clovis, CA and is still open to public for tours
 - Its performance is still monitored monthly
 - We have verified after a year's operation that it has met our ZNE criteria

What? (cont.)



- With the lessons learned we've updated designs and broken ground on our **second ZNE Home**
 - It will be sold and lived in by someone from the public
 - Soon thereafter, we plan to begin **offering ZNE at least as an option**

- And now, we're in the middle of R&D for **full-scale ZNE communities** with industry leading partners, such as PG&E, CEC, BIRAenergy, EPRI, SolarCity, Tesla, and many more

How?



Initial Thoughts

- We have designated a position within company to champion the pursuit of ZNE (me). If smaller builder, I recommend using Purchasing Dept. head.
- Utilized third-party consultants and green and energy programs to provide predefined pathways and spec options
- Partnered with the most prominent industry experts we could find to refine our designs
- Started to attend as many government and utility-sponsored workshops and meetings as possible
- Lastly, we have really utilized rebates, grant funding, and special utility/CEC programs as much as possible to assist our R&D process

How? (cont.)



Overview Of Our Process

1. Determine what code minimum spec's are
2. Note the energy and green spec's of our homes as they already are to use as starting point
3. Decide on energy and green goals as a company
4. Work with industry partners to define all feasible options at our disposal to achieve our goals
5. Vetting
 - a. Run energy modeling to see potential impact of each option
 - b. Price out each option
 - c. Review constructability and product availability
 - d. Review any warranty concerns

How? (cont.)



Overview Of Our Process (cont.)

5. Combine options into packages then compare pros/cons of each to settle on most effective solution
6. Determine starting point of new specifications and ensure all departments are prepared
 - Specific point in time?
 - New community?

Remaining Challenges



- **Cost**
 - Even if the long-term value proposition is feasible that doesn't mean buyers will be able to afford the upfront cost!
- **Enough roof space for PV to achieve ZNE?**
- **100% electric?**
 - For the record, I feel this should be the end-game (no fossil fuels)
 - Is our market ready for all electric cooktop, space heating, water heating, no gas connection for outdoor BBQ, no sealed gas fireplace units, no gas clothes dryer, etc.?
 - If you still have gas, what are the economics of overproduced kWh (not net metered; VERY low compensation rate)? What's the value to the buyer?
- **Labeling**
 - Zero Net Energy? Net Zero Energy? Zero Energy? Zero Energy Ready? Solar Home?
 - California definition misnomer