

# NET ZERO = BIG SAVINGS

GRAND WINNERS OF THIS YEAR'S  
DOE HOUSING INNOVATION COMPETITION  
ARE MARKET READY AND  
SHOW THAT THE FUTURE IS HERE



**Sam Rashkin, Chief Architect**  
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**Office of Energy Efficiency and Renewable Energy**

**D**epartment of Energy analysis shows that commercial acceptance of zero energy-ready homes could save homeowners approximately \$350 billion in utility bills, add about 120,000 persistent new jobs that can't be outsourced, and reduce carbon emissions by around 3 million metric tons. Leading builders are willing to take the leap on these high-performance homes and are providing a whole new buyer experience. The homes are future ready, comfort ready, tech ready, health ready, solar ready, and moisture resistant. For these leaders—and their buyers—this is the future of housing, and it's here *today*.

With these homes, the builders are seeing decreased time on the market, improved customer satisfaction, reduced call-backs, and compelling market differentiation. As proof that the future of housing is here today, take a look at the Grand winners that follow. To read more, visit our Tour of Zero: <http://energy.gov/eere/buildings/doe-tour-zero>.

## GRAND WINNER FOR INNOVATION IN PRODUCTION HOMES

### MANDALAY HOMES, PHOENIX

Through advanced framing techniques and value engineering, Mandalay Homes worked vigilantly with architects and engineers to reduce the amount of lumber needed in its homes. The builder ensures that its trade partners understand priorities and helps them find ways to reduce waste and reuse bits that would otherwise go to the local dump. "A marked reduction in the amount of material delivered to our sites is a great indicator of our efforts," says Geoff Ferrell, Mandalay Homes' CTO.

### PROJECT INFO

- The Dells at Cathedral Point, Prescott, Ariz.
- Layout: 3 bedrooms, 3 baths, 1 floor, 2,207 square feet
- Climate Zone: IECC 4B, mixed-dry
- Completion: March 2016
- Category: Production

### MODELED PERFORMANCE DATA

- HERS Index, without solar: 47; with solar: -2
- Projected annual energy costs, without solar: \$1,473; with solar: -\$234
- Projected annual energy cost savings (vs. home built to 2012 IECC), without solar: \$897; with solar: \$2,334
- Projected annual energy cost savings, without solar: 4,206 kWh, 392 therms; with solar: 16,081 kWh, 404 therms
- Added construction cost, without solar: \$2 to \$3 per square foot; with solar: \$6 to \$9 per square foot

### KEY FEATURES

- DOE Zero Energy Ready Home Path: Performance
- Walls: 2x6 24-inch o.c. studs, advanced framing, R-17 spray foam in cavities, R-4 continuous rigid foam exterior, coated 7/16-inch OSB taped at seams for moisture barrier, stucco siding
- Roof: 1/2-inch coated OSB decking taped at seams, felt, battens, tile roofing
- Attic: Unvented attic, raised-heel trusses, R-25 open-cell foam on underside of roof deck
- Foundation: 2-inch R-10 foam at slab edge to 24 inches deep, on interior of stem wall on conventional slab
- Windows: Vinyl-framed, dual-pane, argon-filled, low-E, U=0.29, SHGC=0.23
- Air sealing: 0.83 ACH 50
- Ventilation: ERV
- HVAC: Two-stage 95 percent AFUE gas furnace, 18 SEER AC in conditioned attic
- Hot water: 95 percent efficient, natural gas tankless water heater
- Lighting: 90 percent LED, 10 percent CFL, motion sensors, Energy Star ceiling fans
- Appliances: All Energy Star
- Solar: Wired for solar
- Water conservation: All WaterSense fixtures, smart-timed drip irrigation
- Energy management system: Automatic controls of HVAC and lighting
- Other: EPA indoor airPLUS certified, no-/low-VOC paints, stains, adhesives, and flooring

PHOTO: COURTESY MANDALAY HOMES



### GRAND WINNER FOR INNOVATION IN CUSTOM HOMES (FOR BUYER)

IMERY GROUP, ROSWELL, GA.

Luis Imery, owner of Imery Group, and two-time winner of a U.S. Department of Energy's Zero Energy Ready Housing Innovation Award, can tell you that achieving a zero energy home doesn't just happen; it's the result of a lot of planning and collaboration.

#### PROJECT INFO

- High-Performance Bungalow, Roswell, Ga.
- Layout: 3 bedrooms, 2.5 baths, 1 floor, 2,194 square feet
- Climate Zone: IECC 3A, mixed-humid
- Completion: October 2015
- Category: Custom for buyer

#### MODELED PERFORMANCE DATA

- HERS Index, without solar: 41; with solar: 6
- Projected annual energy costs, without solar: \$650; with solar: \$202
- Projected annual energy cost savings (vs. home built to 2009 IECC), without solar: \$1,281; with solar: \$1,896
- Projected annual energy savings without solar: 21,353 kWh; with solar: 31,610 kWh
- Added construction cost, without solar: about 5 percent

#### KEY FEATURES

- DOE Zero Energy Ready Home Path: Performance
- Walls: 24 inches o.c. advanced framing, R-23 blown fiberglass, two layers R-5 foam sheathing, 1x furring behind cladding
- Roof: Coated sheathing, two layers rigid foam above deck, ice-and-water shield, furring strips, Energy Star cool metal roof
- Attic: Unvented attic, R-38 blown fiberglass netted to underside of roof deck, ice-and-water shield, furring strips, Energy Star cool metal roof
- Foundation: R-10 rigid foam under slab and at slab edge
- Windows: Wood-fiberglass-framed, double-pane, low-E, U=0.35, SHGC=0.25
- Air sealing: 0.51 ACH 50
- Ventilation: Spot exhaust ventilation plus balanced ventilation with powered fresh-air intake
- HVAC: Ducted mini-split heat pumps, 16 SEER, 9.2 HSPF, in conditioned attic
- Hot water: 50-gallon heat pump water heater, 2.4 EF
- Lighting: 50 percent CFL
- Appliances: Energy Star refrigerator, dishwasher, clothes washer
- Solar: 6.3 kW PV
- Water conservation: WaterSense fixtures
- Energy management system: Internet monitoring
- Other: EPA Indoor airPLUS

PHOTO: COURTESY IMERY GROUP

### GRAND WINNER FOR INNOVATION IN CUSTOM HOMES (SPEC)

DWELL DEVELOPMENT, SEATTLE

This home spent zero days on the market and sold at a neighborhood record price. Dwell Development's mission is to have every one of its homes be Net Zero energy-ready, an approach that's sustainable for many reasons. "It's good for the community, good for the economy, good for the built environment, and good for knowing and showing to everyone that you can design and build a net zero home and be profitable," says Anthony Maschmedt, principal and founder at Dwell Development.

#### PROJECT INFO

- Emerald Star, Seattle
- Layout: 3 bedrooms, 3 baths, 3 floors, 2,117 square feet
- Climate Zone: IECC 4C, marine
- Completion: October 2015
- Category: Custom spec

#### MODELED PERFORMANCE DATA

- HERS Index, without solar: 45; with solar: 0
- Projected annual energy costs, without solar: \$472; with solar: \$51
- Projected annual energy cost savings (vs. home built to 2012 IECC), without solar: \$888; with solar: \$1,628
- Projected annual energy savings, without solar: 9,896 kWh; with solar: 18,090 kWh
- Added construction cost, without solar: 10 percent

#### KEY FEATURES

- DOE Zero Energy Ready Home Path: Performance
- Walls: Double 2x4 stud wall, 12-inch cavity dense-packed with R-46 cellulose, ½-inch OSB sheathing, fluid-applied weather-resistive barrier, reclaimed barn wood, and standing-seam metal siding
- Roof: R-84: Unvented 16-inch cathedral roof with R-64 blown fiberglass, ½-inch OSB sheathing, 3-inch R-20 polyiso, ¼-inch protection board, standing-seam metal roof
- Attic: No attic
- Foundation: Poured concrete foundation stem walls, slab-on-grade with 4-inch R-16 EPS under slab and full perimeter thermal break R-8 slab edge
- Windows: Triple-pane, low-E, argon-filled, wood-frame, U=0.09, SHGC=0.50
- Air sealing: 1.17 ACH 50
- Ventilation: HRV, MERV 7 filters
- HVAC: 83-gallon CO<sub>2</sub> heat pump water heater, 450 percent efficient, for radiant floor heat and hot water
- Hot Water: CO<sub>2</sub> heat pump water heater
- Lighting: 100 percent LED
- Appliances: Energy Star refrigerator, dishwasher, clothes washer, dryer, induction range
- Solar: 8.1 kW PV
- Water conservation: All WaterSense low-flow fixtures, 420-gallon rainwater cistern
- Energy management system: Adaptive use home management system
- Other: Electric-car charging station, no-/low-VOC finishes, 100 percent reclaimed siding, 90 percent FSC or reclaimed wood, recycled content tile and countertops **PB**

PHOTO: COURTESY DWELL DEVELOPMENT