

Thrive Home Builders

Row Homes at RidgeGate
Denver, CO



BUILDER PROFILE

Thrive Home Builders, Denver, CO
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FEATURED HOME/DEVELOPMENT:

Project Data:

- Name: Row Homes at RidgeGate
- Location: Denver, CO
- Layout: 2 bdrm, 2 bath, 3 fl, 1,815 ft²
- Climate Zone: IECC 5B, cold
- Completion: June 2016
- Category: multifamily

Modeled Performance Data:

- HERS Index: without PV 50, with PV 30
- Projected Annual Energy Costs: without PV \$1,033, with PV \$552
- Projected Annual Energy Cost Savings: (vs home built to 2009 IECC) without PV \$720, with PV \$1,202
- Projected Annual Energy Savings: without PV 2,669 kWh, 413 therms, with PV 6,690 kWh, 413 therms
- Added Construction Cost: without PV \$10,900, with PV \$16,204

Thrive Home Builders may be the first builder in Colorado to offer net zero energy construction in a townhome community. “Denver’s suburbs have never seen anything like this before,” said Bill Rectanus, Vice President of Operations for Thrive Home Builders referring to the high-performance townhomes at RidgeGate, a 3.45-acre site that will include 57 townhomes when completed at the RidgeGate master planned community in the Lone Tree suburb south-east of Denver. Every townhome will be certified to the U.S. Department of Energy’s Zero Energy Ready Home program and all of the homes will be equipped with 2.6 kW of solar photovoltaic panels on the roof.

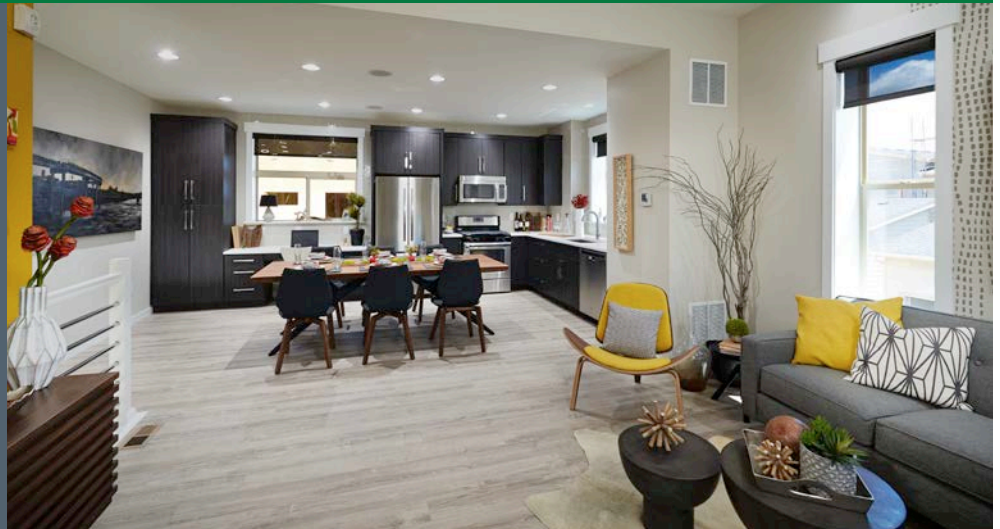
These two- and three-story, 1,226- to 1,878-ft² townhomes are so efficient that, even without PV, they achieve Home Energy Rating System (HERS) scores of 50, while typical new homes built to code would score about 80 to 100. With the addition of the 2.6 kW of solar panels, the homes drop to an impressive HERS 30, which should give home owners energy bills of about \$46 per month. These homes were designed with space on the roof to add even more PV panels, enough to bring the homes down to a HERS score of 0, which equates to \$0 energy bills for lucky home owners.

“Designing a multifamily product with sufficient roof space for a meaningful [PV] system can be more than challenging,” admits Rectanus. The RidgeGate townhomes were designed with large monolithic roof planes that allowed Thrive to maximize the space for PV panels on each residence. Thrive employed an innovative design feature. Regardless of whether the unit faces south or north, the roof truss design can be “flipped” so that the shed roof is optimally oriented toward the sun, without affecting the home’s floor plan.



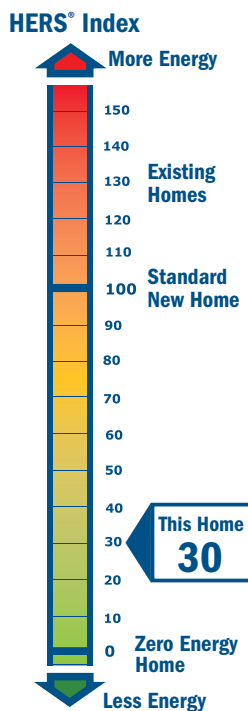
The U.S. Department of Energy invites home builders across the country to meet the extraordinary levels of excellence and quality specified in DOE’s Zero Energy Ready Home program (formerly known as Challenge Home). Every DOE Zero Energy Ready Home starts with ENERGY STAR Certified Homes Version 3.0 for an energy-efficient home built on a solid foundation of building science research. Advanced technologies are designed in to give you superior construction, durability, and comfort; healthy indoor air; high-performance HVAC, lighting, and appliances; and solar-ready components for low or no utility bills in a quality home that will last for generations to come.

Thrive Home Builders constructed this multifamily building in Denver, Colorado, to the performance criteria of the U.S. Department of Energy Zero Energy Ready Home (ZERH) program. For additional energy savings, ENERGY STAR-rated appliances are installed in each unit. A tankless gas water heater, EPA WaterSense-qualifying fixtures, and drip irrigation help save water.



What makes a home a DOE ZERO ENERGY READY HOME?

- 1 **BASELINE**
ENERGY STAR Certified Homes Version 3.0
- 2 **ENVELOPE**
meets or exceeds 2012 IECC levels
- 3 **DUCT SYSTEM**
located within the home's thermal boundary
- 4 **WATER EFFICIENCY**
meets or exceeds the EPA WaterSense Section 3.3 specs
- 5 **LIGHTING AND APPLIANCES**
ENERGY STAR qualified
- 6 **INDOOR AIR QUALITY**
meets or exceeds the EPA Indoor airPLUS Verification Checklist
- 7 **RENEWABLE READY**
meets EPA Renewable Energy-Ready Home.



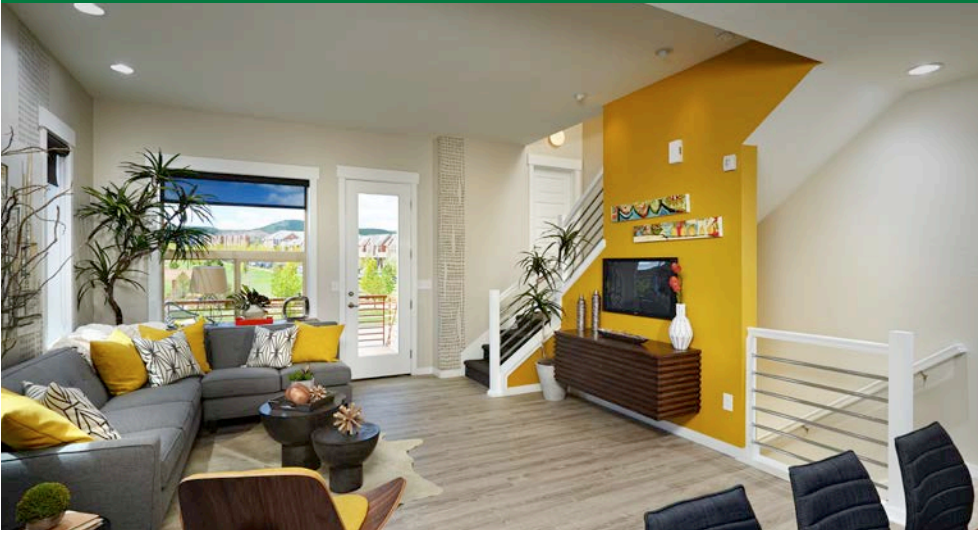
Thrive planned the site so that the 57 homes are situated for maximum solar exposure with every home also facing a park or courtyard and all within a quarter-mile walk from shops, restaurants, a performing arts center, and library. Rectanus credits the strength of this plan for Thrive's selection as the builder for RidgeGate from a field of much bigger competitors. And, Rectanus credits Thrive's success at RidgeGate (they sold 45 of the 57 units before the model was completed) with gaining them the opportunity to acquire an additional 33 units on a parcel across the street.

Rectanus also credits the DOE Zero Energy Ready Home program affiliation for helping to position Thrive as a forward-thinking, conscientious "builder of choice" for land owners and municipalities. "RidgeGate is a highly desirable location in Douglas County that commands a premium price," said Rectanus. "We know for certain that Thrive's reputation as an energy-efficient builder, with the credibility of the DOE ZERH program to bolster our message, was a key component that helped us secure such an attractive land position."

Thrive is no stranger to energy-efficient construction. According to Rectanus, they've been designing, building and selling high-performance homes for 24 years. Thrive has partnered with the DOE Zero Energy Ready Home program since 2013 and has certified over 120 homes (with 200 more in the works). Their efforts have earned them high honors in the DOE Housing Innovation Awards. They were named the grand winner in the multifamily category in 2015 and the grand winner in the production home category in both 2013 and 2014.

Their efforts have also been rewarded financially. Rectanus pointed to a recent market study that showed, in the first quarter of 2016 Thrive commanded the third highest sales price per square foot in the greater Denver area (after a luxury home builder and a retiree-focused home builder). "The DOE and ENERGY STAR labels go a long way in helping to validate the story and put us at the head of the line for many A+ project opportunities," said Rectanus.

The DOE Zero Energy Ready Home program requires every certified home to meet all of the requirements of ENERGY STAR Certified Homes Version 3.0 and the U.S. Environmental Protection Agency's Indoor airPLUS, as well as the hot water distribution requirements of the EPA's WaterSense program and the insulation requirements of the 2012 International Energy Conservation Code. In addition, homes are required to have solar electric panels installed or have the conduit and electrical panel space in place for it.



Strategically placed windows let daylight in, reducing the need for overhead lighting. The high-performing windows with vinyl frames are double pane and argon gas filled to ensure cool air stays out in the winter months and in during the summer. For healthy indoor air quality, the home features no- or low-VOC finishes including structural wood products, primer, paint, cabinets, and flooring to meet the EPA Indoor airPLUS requirements and ensure healthy air inside the home.

RidgeGate is Thrive's first townhome development to use double-wall construction. The double walls consist of two 2x4 walls set 2.5 inches apart to create a 9.5-inch wall cavity that is filled with blown fiberglass insulation. The studs are set at 24 inches on center and staggered so the inner wall studs and outer wall studs don't align. Advanced framing details were used including open two-stud corners, right-sized headers over windows and doors on non-load-bearing walls, and open-framed interior-exterior wall intersections. All of these steps reduced the amount of lumber used while maximizing the space for insulation, resulting in a total R value for the exterior walls of R-34.2. Thrive used framing wood that was locally harvested and locally milled from standing dead trees that had been killed by a beetle infestation in the mountains of Colorado. Thrive's crews carefully applied closed-cell foam sealant around electrical boxes, wall penetrations, and at the joint between the bottom wall plates and the floor. They also used a sprayer-applied sealant to form a gasket along all top plates before installing the drywall, which served as the wall's air barrier. The half-inch OSB exterior sheathing was covered with house wrap, which provided a weather-resistant barrier and drainage plane under the fiber cement and synthetic stone siding.

The roofs at RidgeGate are protected with a self-adhering ice-and-water shield extending from the roof edge up at least 24 inches past the wall line and at all valleys. All roof edges are protected with a metal drip edge. The deck is covered with a waterproof underlayment and 30-year asphalt shingles. RidgeGate's vented attics are insulated with R-50 blown fiberglass insulation. Truss heel heights are raised to 14 inches to maximize the insulation depths to the outside edge of the top plate. Crews used sprayer-applied sealant to air seal all top plate-attic ceiling junctions to reduce air infiltration at one of the homes' most leak-prone areas. Thrive installed airtight can lights and sealed them to the drywall with caulk.

The party walls in townhomes can be challenging to air seal. However, the RidgeGate townhomes were tested for whole-house airtightness and easily met the code-required air-leakage limit of < 7 air changes per hour at 50 Pascals (ACH 50). The award-winning townhome tested at 4.35 ACH 50.

The foundations are slab-on-grade with sub-slab and perimeter insulation wrapping the slab with R-10 of rigid foam to protect the townhomes from heat loss to the ground. Under the insulation, the home is separated from the soil by 4 inches of clean gravel and a vapor barrier which helps to keep radon gas from entering the homes. The soils on the site presented a high risk of expansion after

HOME CERTIFICATIONS

DOE Zero Energy Ready Home Program, 100% commitment

ENERGY STAR Certified Homes Version 3.1

EPA Indoor airPLUS



Every DOE Zero Energy Ready Home combines a building science baseline specified by ENERGY STAR Certified Homes with advanced technologies and practices from DOE's Building America research program.



Double-wall construction provides a 9.5-inch wall cavity to fill with an ultra-thick layer of blown fiberglass insulation.

metal ducts and returns are located within the home's conditioned space and are sealed with mastic. The homes use ENERGY STAR-rated exhaust fans set for continuous ventilation. The fans are individually tested to ensure compliance with the ASHRAE 62.2 residential ventilation standard.

The 2.6-kW solar photovoltaic system included on each rowhome provides a lasting source of renewable energy and financial savings for each resident. Each resident is provided with their own internet-based live monitoring system to track their solar system's production and their home's overall electric consumption. This information can help home owners better understand how behavioral changes can improve their home's efficiency and cut costs.

Helping people understand the value of their Zero Energy Ready Homes is a major focus for Thrive. From the "Building Science Center" with its hands-on energy-efficiency displays to the in-house sales trainings to the DOE Zero Energy Ready Home grand awards proudly displayed in every Thrive Sales Center, you could say it's "show and tell" every day at Thrive.

Sales staff receive extensive training in energy efficiency and junior sales staff apprentice to senior staff while they learn about things such as how Thrive's low HERS scores are an important tool for comparing Thrive with other builders. Thrive presents new home buyers with a framed HERS certificate, along with a comprehensive owners' manual, and invites new home owners to get informal social and educational get togethers. Thrive's construction staff participate in monthly meetings, annual trainings with the Denver Home Builders Association, frequent vendor training sessions, and instructional walk-throughs with Thrive's energy rater during inspections. Visitors to Thrive's Building Science Centers can see first-hand how what's in the walls and on the roof can benefit their bottom line. Big wall displays invite prospective home owners to think of what they'll do with all the money they save. Rectanus calls the Centers an "extraordinary sales tool that goes far beyond a deconstructed home and is our most popular and effective sales tool." He adds, "we have received feedback from both buyers and realtors about how this demonstration was the deciding factor in the buying decision."

Photos courtesy of Thrive Home Builders

construction. To mitigate that risk, the site was over-excavated by as much as 30 feet. The excavated material was replaced with soil at optimal moisture and compaction that reduced the risk of soil expansion at a lower cost than a friction pier foundation.

The homes were heated with gas furnaces with a 92.1 AFUE (annual fuel utilization efficiency) and cooled with air conditioners having a cooling efficiency of 13 SEER (seasonal energy efficiency ratio). The HVAC systems and

KEY FEATURES

- **DOE Zero Energy Ready Home Path:** Performance.
- **Walls:** Double walls, 2x4 24" o.c. staggered with space for 9.5" R-40 blown fiberglass; sprayer-applied sealant, 1/2" OSB sheathing, house wrap, fiber cement and synthetic stone siding.
- **Roof:** Ice-and-water shield at roof edge, waterproof underlayment, drip edge, asphalt shingles.
- **Attic:** Vented attic, R-50 blown fiberglass, 14" raised heel trusses, sprayer-applied sealant at all top plates.
- **Foundation:** Slab-on-grade, R-10 rigid foam under slab and at slab edge.
- **Windows:** ENERGY STAR double-pane, argon-filled, vinyl-framed windows, U=0.30, SHGC=0.30.
- **Air Sealing:** 4.35 ACH 50.
- **Ventilation:** Continuous exhaust fans.
- **HVAC:** 92.1 AFUE gas furnace, 13 SEER air conditioner, ducts in conditioned space.
- **Hot Water:** 0.95 EF tankless gas water heater.
- **Lighting:** 100% CFL.
- **Appliances:** ENERGY STAR appliances.
- **Solar:** 2.6-kW solar PV.
- **Water Conservation:** WaterSense fixtures, drought-tolerant plants, drip irrigation.
- **Energy Management System:** Internet monitoring.
- **Other:** Low-VOC paints, low-formaldehyde wood products, fresh air intake, passive radon mitigation.

"Introducing home owners to the benefits of energy-efficient homes has been incredibly rewarding. Everyone wins because net zero homes are good for the environment and offer home owners significant savings on energy costs."

—Gene Myers
CEO of Thrive Home Builders