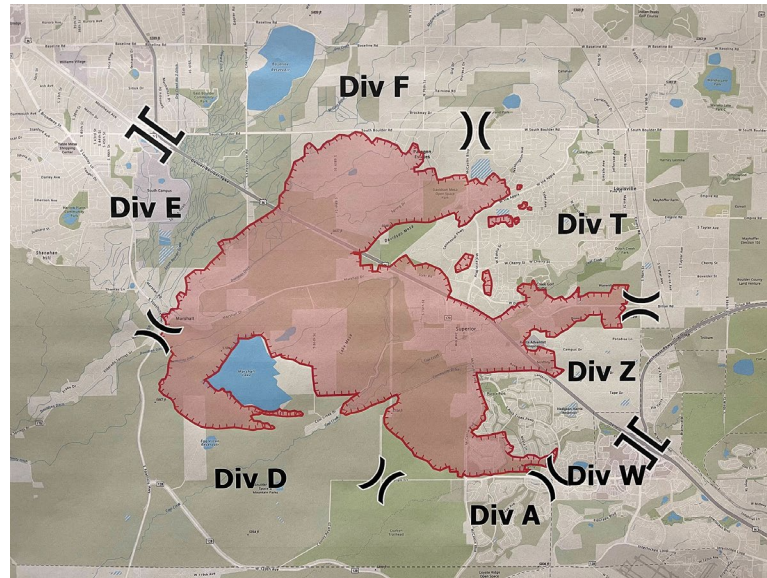


# Marshall Fire Rebuilding

(Adapted from the Calwood Rebuilding presentation)

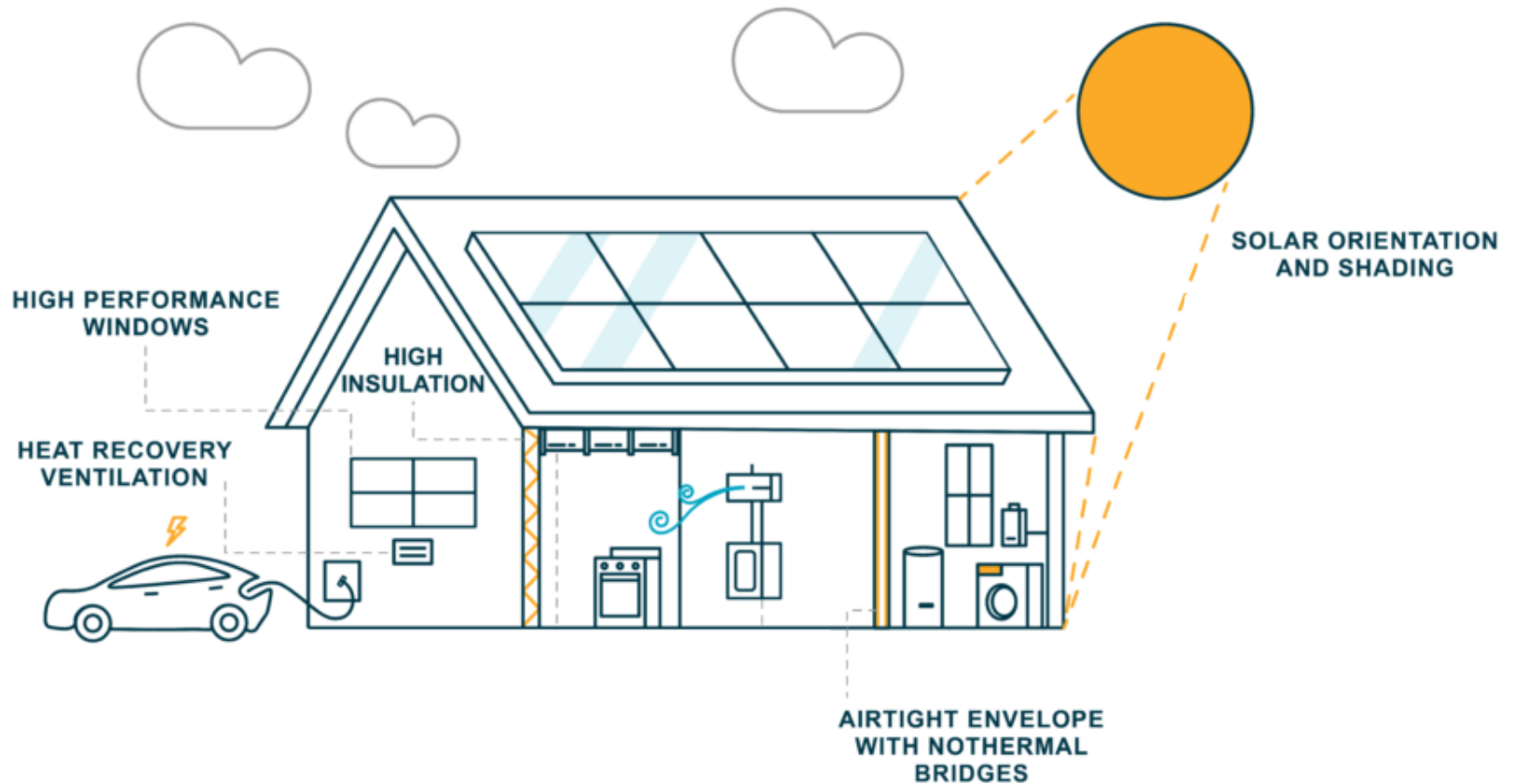
**An overview of Boulder County BuildSmart regulations and  
home construction in unincorporated Boulder County**

**April 11, 2022**

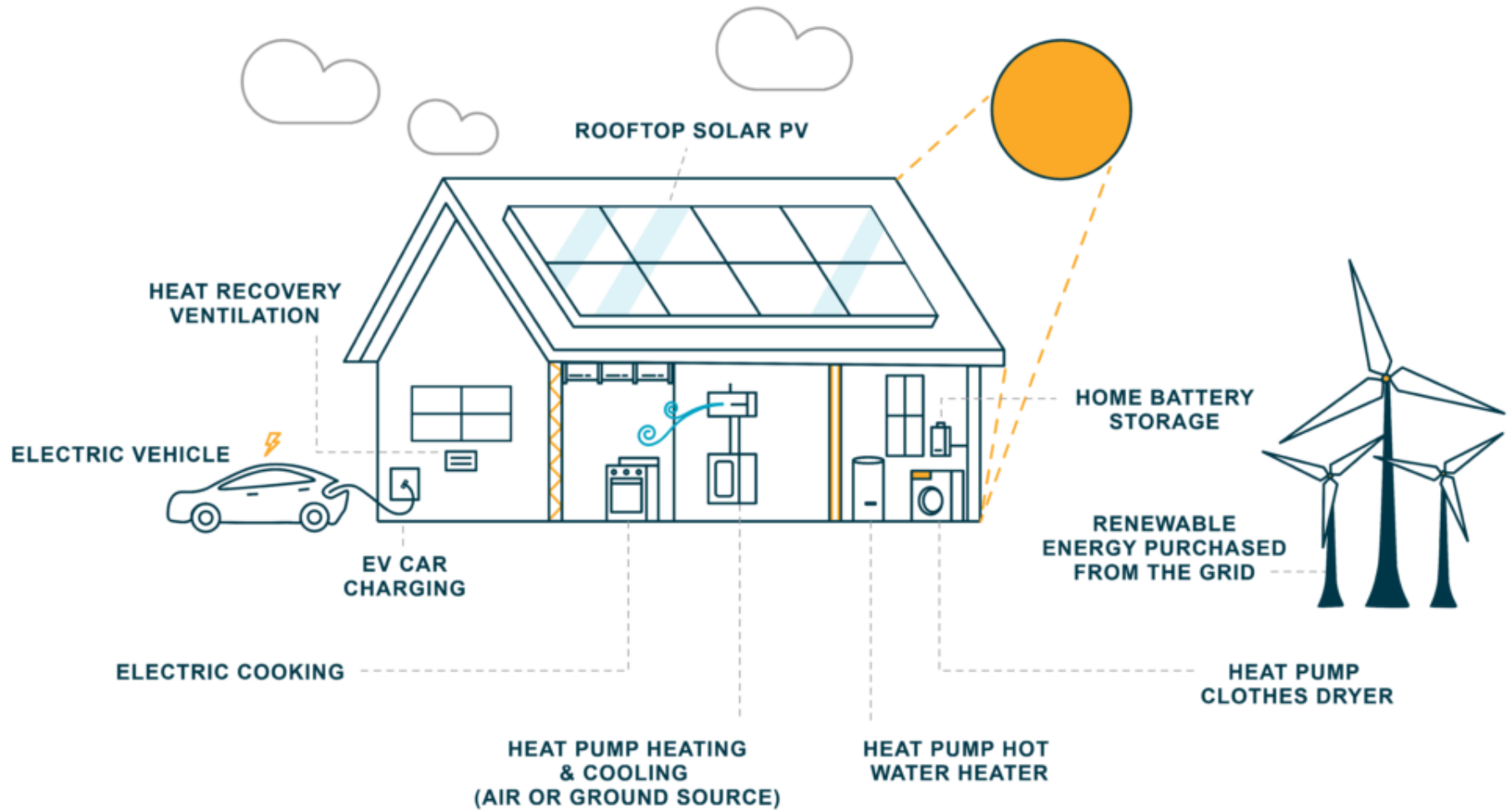


**What home elements are  
addressed in energy codes?**

# What Makes up a High-Performance Home?



# What Makes up an Electrified Home?



# Benefits of an Electrified, High-Performance Home

1. Healthier indoor air quality
  - Sealed against air infiltration
  - Filtered fresh air
  - No natural gas combustion by-products to breathe
2. A more comfortable and quieter home
3. Increased resistance to future wildfires and smoke damage
4. Increased resiliency during disasters
5. Energy costs reduced by 10% or more
6. Reduced contribution to the climate crisis

# What are the BuildSmart Requirements?



## Current Version based on the 2015 IECC

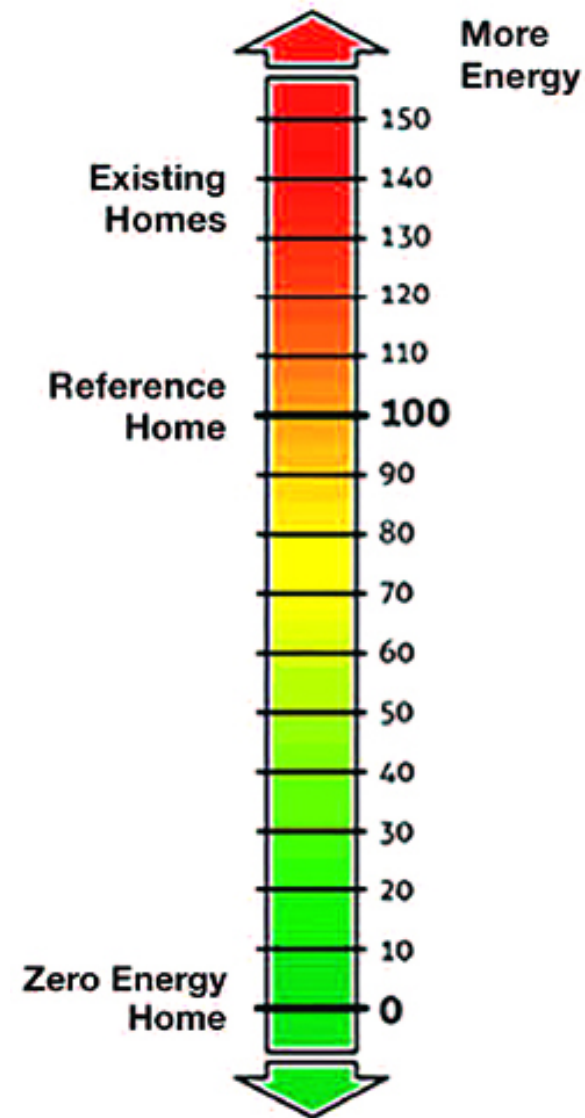


## Home Energy Rating System (HERS) 0-100

- Baseline is IECC 2006 - ASHRAE 90.1 2004

- 100 = meets 2006 IECC
- 0 = Net-Zero energy use

“Green” refers to a broader definition of environmental sustainability that also includes resource conservation, life-cycle impacts, ecological toxicity and occupant & builder health





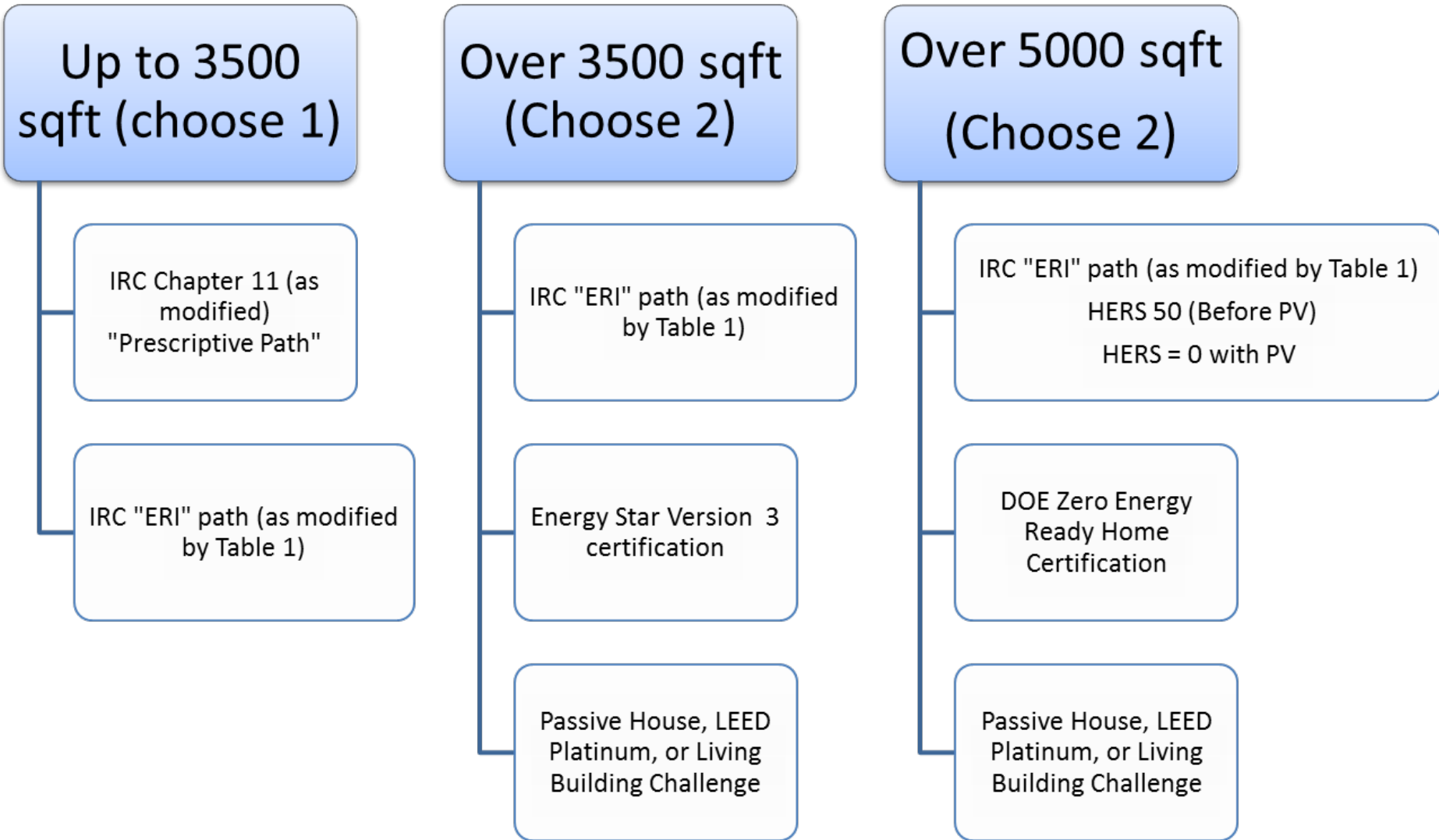
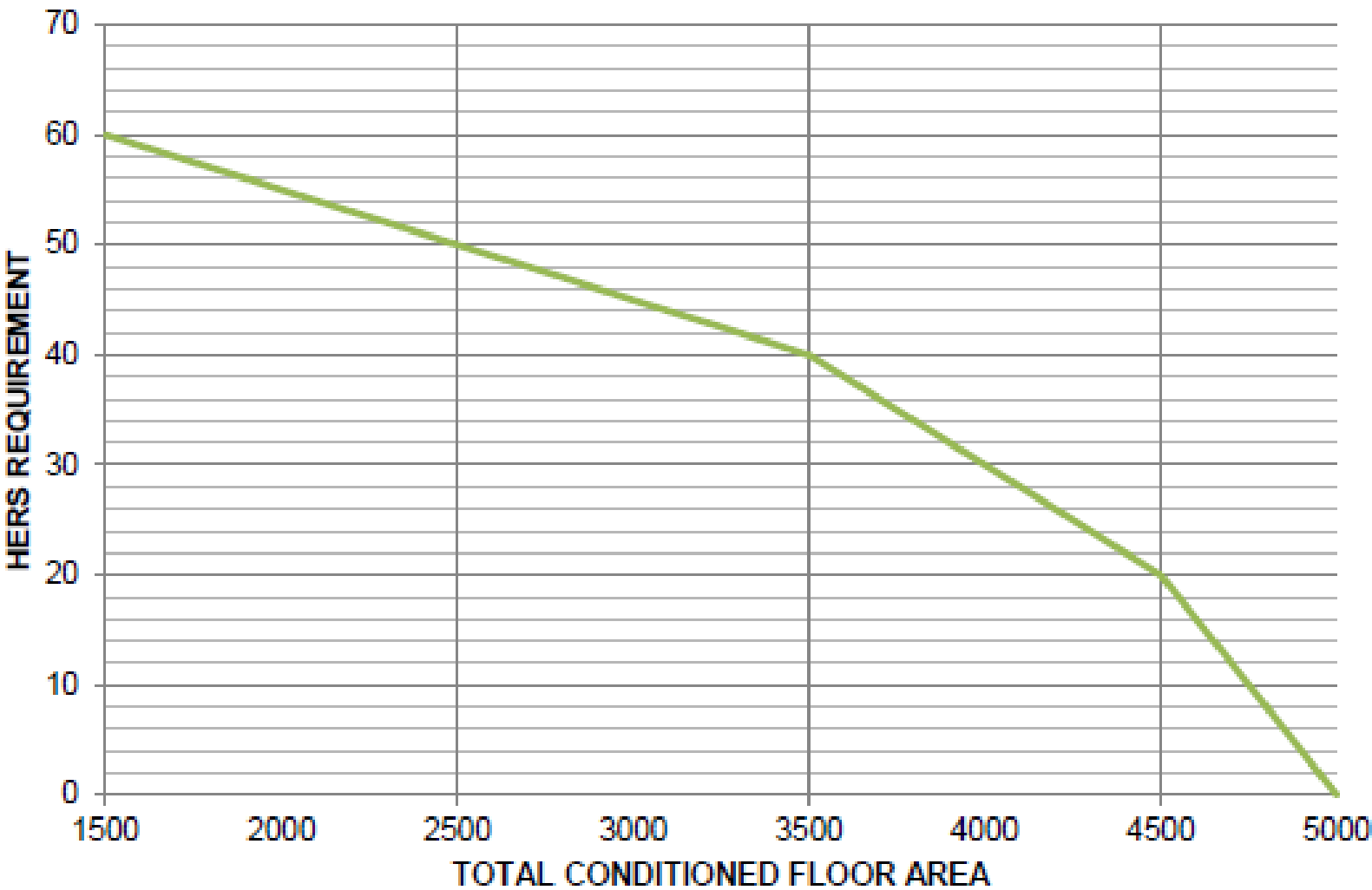


FIGURE N1106.4 MAXIMUM ENERGY RATING INDEX (HERS INDEX),  
GRAPHICAL



Note: Exterior fossil fuel consuming devices must have energy offsets (except cooking devices).

- Glazing to floor area ratios that exceed 18% may not use prescriptive path (passive solar designs in which more than 50% of the total glazing faces South excepted).
- All exterior fossil fuel consuming devices must have energy offsets (except cooking devices).
- One, Level 2 electric vehicle charging receptacle, is required in all new garages or car ports that have electricity.

**TABLE N1102.1.2**  
**INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>a, l, m</sup>**

CLIMATE ZONE	FENESTRATION U-FACTOR <sup>b</sup>	SKYLIGHT <sup>b</sup> U-FACTOR	GLAZED FENESTRATION SHGC <sup>b, c</sup>	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE <sup>e, j</sup>	FLOOR R-VALUE	BASEMENT <sup>o</sup> WALL R-VALUE	SLAB <sup>d</sup> R-VALUE & DEPTH	CRAWL SPACE <sup>o</sup> WALL R-VALUE
Boulder County (modified 5 & Marine 4)	0.30	0.43	NR	54	19 + 5 <sup>h, k</sup>	18/24	42 <sup>g</sup>	15/20	15, 3 ft	15/20

For SI: 1 foot = 304.8 mm.

a. *R*-values are minimums. *U*-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall not be less than the *R*-value specified in the table.

**Exception:** An *R*-19 batt installed in a 2 X 6 stud cavity shall be deemed to meet the requirements of this code.

b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

**Exception:** Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.

c. "15/20" means *R*-15 continuous insulation on the interior or exterior of the home or *R*-20 cavity insulation at the interior of the basement wall. "15/20" shall be permitted to be met with *R*-13 cavity insulation on the interior of the basement wall plus *R*-5 continuous insulation on the interior or exterior of the home.

d. *R*-10 shall be added to the required slab edge *R*-values for heated slabs.

e. Not Used.

f. Not Used.

g. Floors over conditioned space are exempt from this requirement.

h. The first value is cavity insulation, the second value is continuous insulation, so "19+5" means *R*-19 cavity insulation plus *R*-5 continuous insulation.

i. The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

j. For strawbale construction, see Section AS108.

k. To reduce the potential for condensation within the wall assembly, it is recommended that exterior continuous insulation be a minimum of *R*-7.5. See also Table R702.7.1.

l. Overhead doors for garages and shops that contain conditioned floor area must have fully weather stripped overhead doors with a minimum *R*-value of 13. Such doors must be weather stripped at the top, sides and bottom and between the panels.

m. Buildings with glazing to floor area ratios that exceed 18% may not use the prescriptive path.

**Exception:** Passive solar designs in which 50% or more of the total glazing faces south.

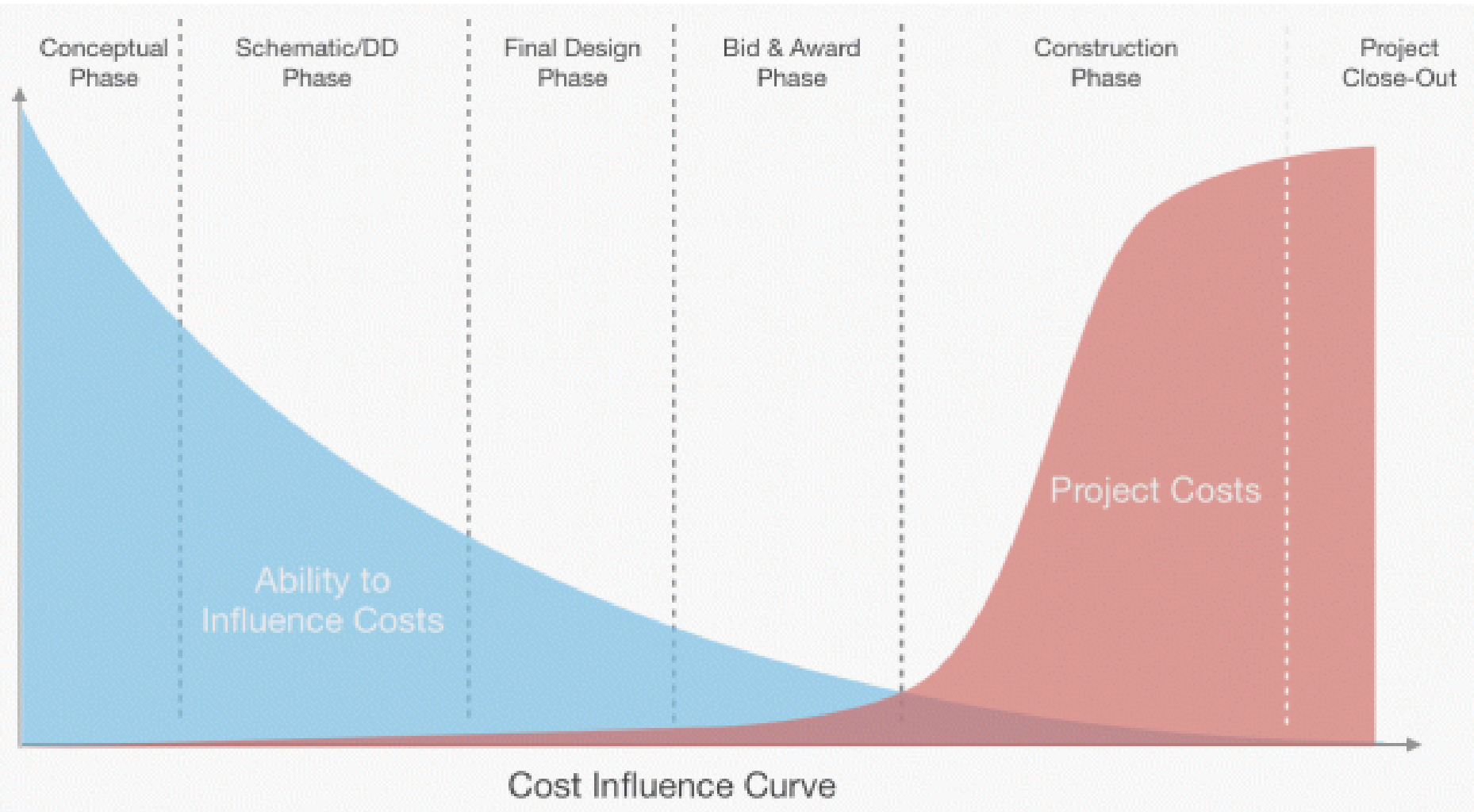
**How can you save money and improve your home?**

# How can you save money and improve your home?

1. Align your team
2. Consider home performance early
3. Simple shape “more corners = more money”
4. Multifunctional spaces
5. Xcel Energy’s incentives



# Planning, Design, and the MacLeamy Curve



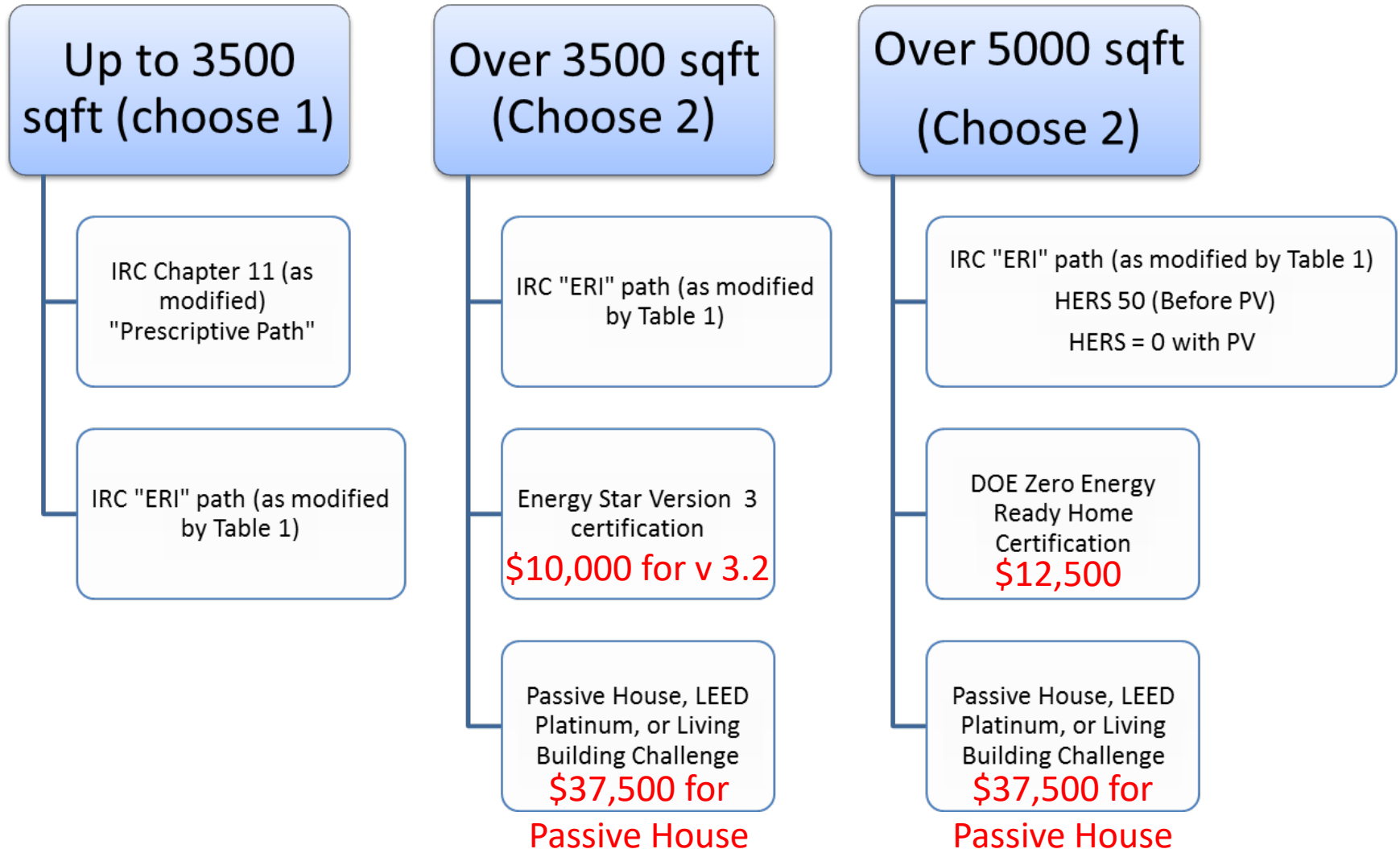
# Xcel Energy's Incentives

Choose from one of four categories:

CATEGORY	INCENTIVE AMOUNT*
ENERGY STAR® Home v3.2	\$10,000
Department of Energy "Zero Energy Ready" Home v2	\$12,500
ENERGY STAR® New Certification Program	\$17,500
Passive House	\$37,500

- \*These incentives apply to new homes built to replace properties destroyed in the Marshall fire by the homeowners at the time of the fire
- The further down the list, the more high-performance the home

# Comparison of Xcel's Incentives and BuildSmart



# Prescriptive Comparison of 2021 IECC and BuildSmart

## 2021 International Energy Conservation Code

**TABLE R402.1.3**  
**INSULATION MINIMUM *R*-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>a</sup>**

CLIMATE ZONE	FENESTRATION <i>U</i> -FACTOR <sup>b, i</sup>	SKYLIGHT <sup>b</sup> <i>U</i> -FACTOR	GLAZED FENESTRATION SHGC <sup>b, e</sup>	CEILING <i>R</i> -VALUE	WOOD FRAME WALL <i>R</i> -VALUE <sup>g</sup>	MASS WALL <i>R</i> -VALUE <sup>h</sup>	FLOOR <i>R</i> -VALUE	BASEMENT <sup>c, g</sup> WALL <i>R</i> -VALUE	SLAB <sup>d</sup> <i>R</i> -VALUE & DEPTH	CRAWL SPACE <sup>c, g</sup> WALL <i>R</i> -VALUE
5 and Marine 4	0.30 <sup>i</sup>	0.55	0.40	60	20 + 5 or 13 + 10ci or 0 + 15	13/17	30	15ci or 19 or 13 + 5ci	10ci, 4 ft	15ci or 19 or 13 + 5ci

## BuildSmart

**TABLE N1102.1.2**  
**INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>a, l, m</sup>**

CLIMATE ZONE	FENESTRATION <i>U</i> -FACTOR <sup>b</sup>	SKYLIGHT <sup>b</sup> <i>U</i> -FACTOR	GLAZED FENESTRATION SHGC <sup>b, e</sup>	CEILING <i>R</i> -VALUE	WOOD FRAME WALL <i>R</i> -VALUE	MASS WALL <i>R</i> -VALUE <sup>i, j</sup>	FLOOR <i>R</i> -VALUE	BASEMENT <sup>c</sup> WALL <i>R</i> -VALUE	SLAB <sup>d</sup> <i>R</i> -VALUE & DEPTH	CRAWL SPACE <sup>c</sup> WALL <i>R</i> -VALUE
Boulder County (modified 5 & Marine 4)	0.30	0.43	NR	54	19 + 5 <sup>h, k</sup>	18/24	42 <sup>g</sup>	15/20	15, 3 ft	15/20

# Additional details about the standards







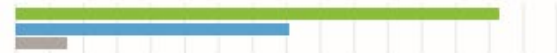
## Lives better.

### HEALTHFUL ENVIRONMENT



Every DOE Zero Energy Ready Home has a comprehensive package of measures to minimize dangerous pollutants, provide continuous fresh air, and effectively filter the air you breathe.

### COMFORT PLUS



Superior insulation, windows, air sealing and space conditioning systems included in every DOE Zero Energy Ready Home surround you with even temperatures, low-humidity, and quiet in every room on every floor.

**KEY**

- DOE Zero Energy Ready Home
- ENERGY STAR Certified Home
- Existing Home



## Works better.

### ADVANCED TECHNOLOGY



Every DOE Zero Energy Ready Home begins with solid building science specified by ENERGY STAR for Homes, and then adds advanced technologies and practices from DOE's world-class research program, Building America.

### ULTRA EFFICIENT

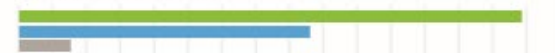


Compared to a typical home, an ultra efficient Zero Energy Ready Home is inexpensive to own. In fact, every DOE Zero Energy Ready Home is so energy efficient, a small solar electric system can easily offset most, or all, of your annual energy consumption. We call this Zero Net-Energy Ready.



## Lasts better.

### QUALITY BUILT



Advanced construction practices and technologies are specified for every DOE Zero Energy Ready Home. Then they are enforced by independent verifiers with detailed checklists and prescribed diagnostics.

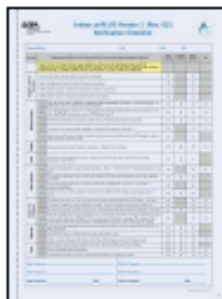
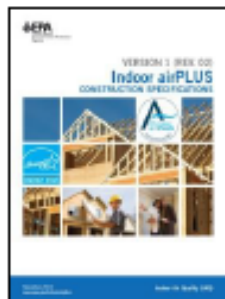
### DURABILITY



The advanced levels of energy savings, comfort, health, durability, quality and future performance in every DOE Zero Energy Ready Home provide value that will stand the test of time, and will meet and exceed forthcoming code requirements.

**LEARN MORE AT:** [buildings.energy.gov/zero](http://buildings.energy.gov/zero)

# Indoor airPLUS



Moisture Control

Materials

Combustion Safety

Pest Barriers

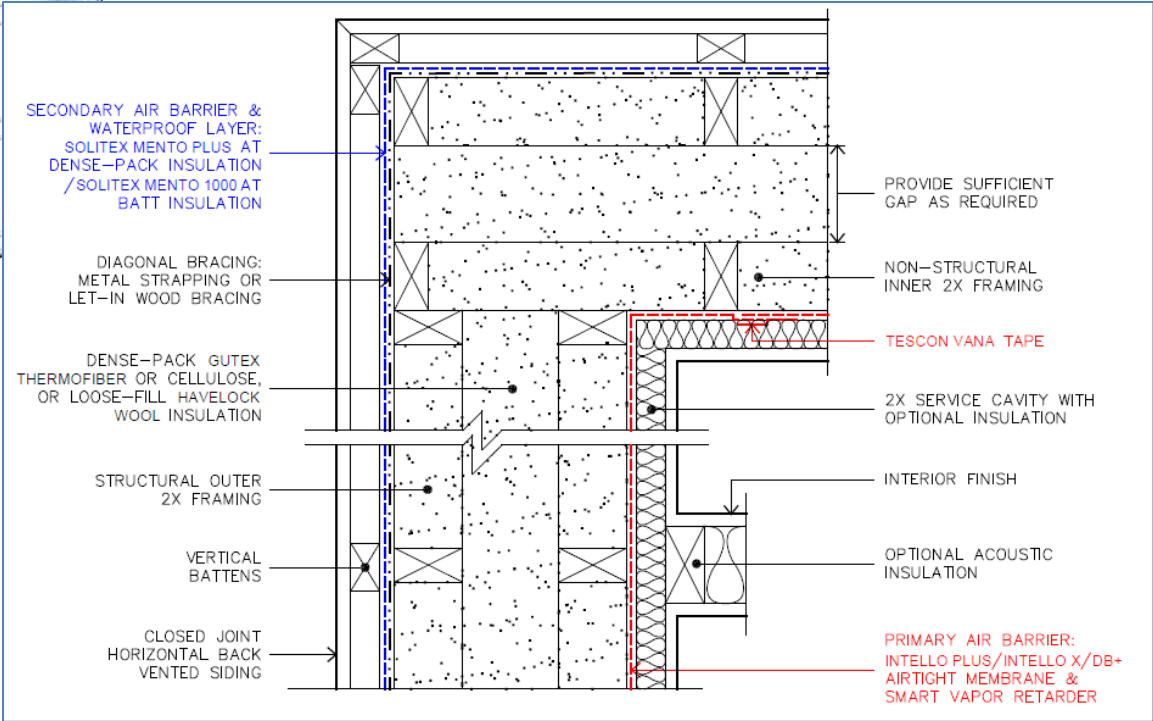
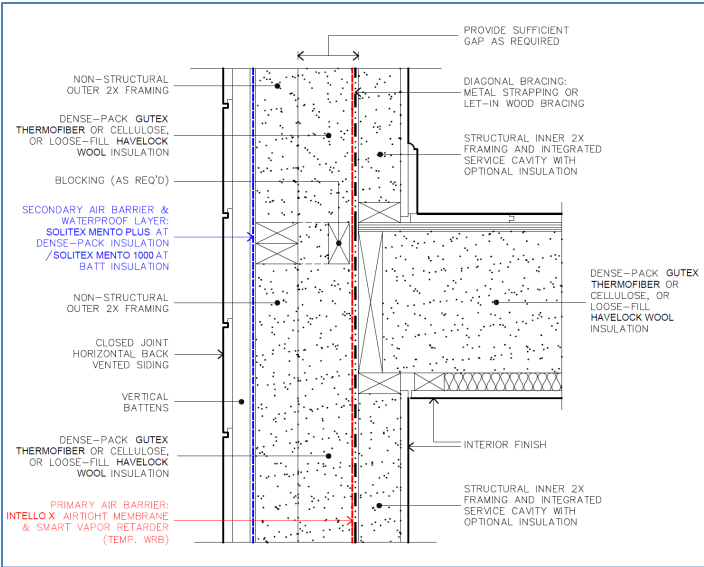
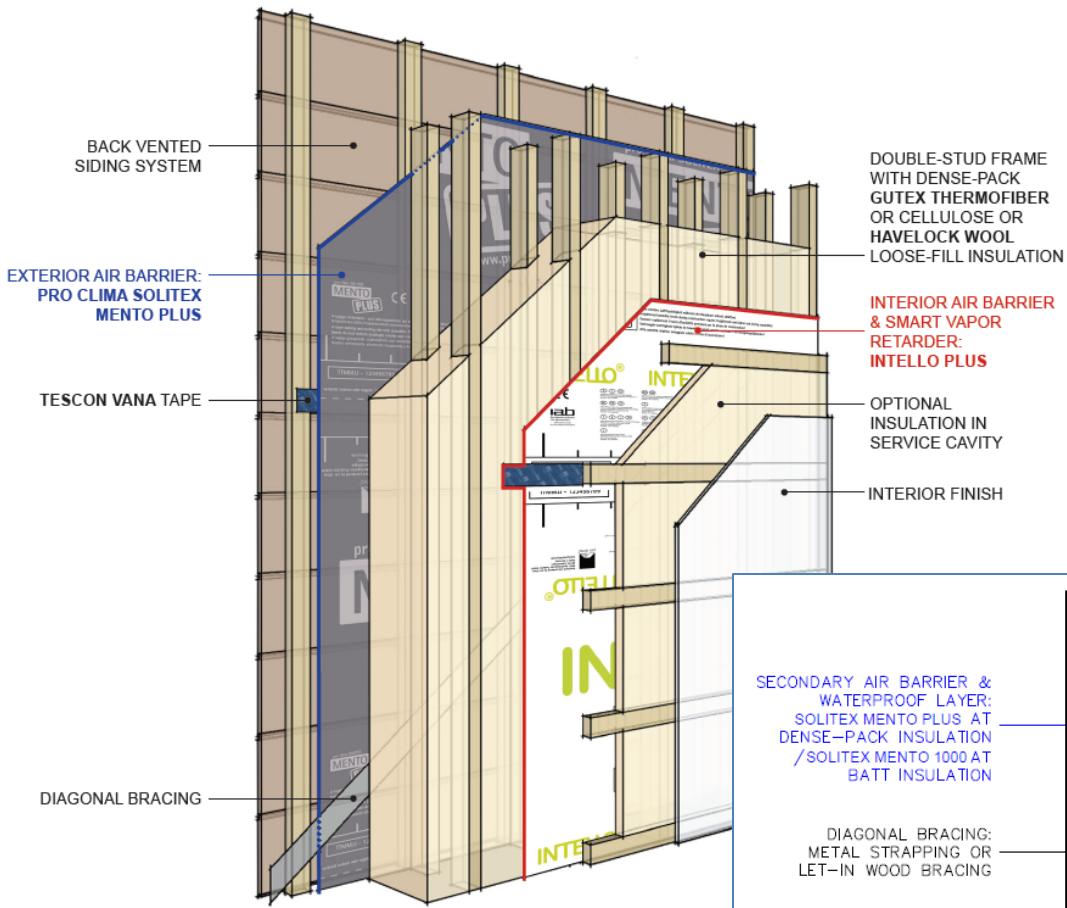
Radon Control

Ventilation  
& Filtration



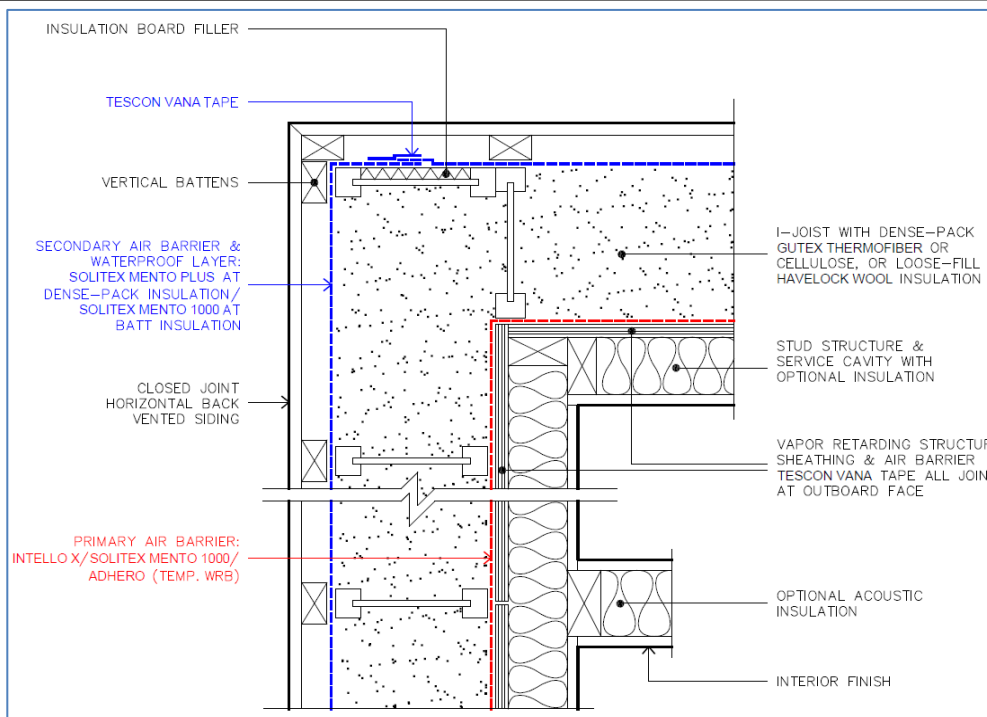
Indoor Air Quality (IAQ)

# Passive House

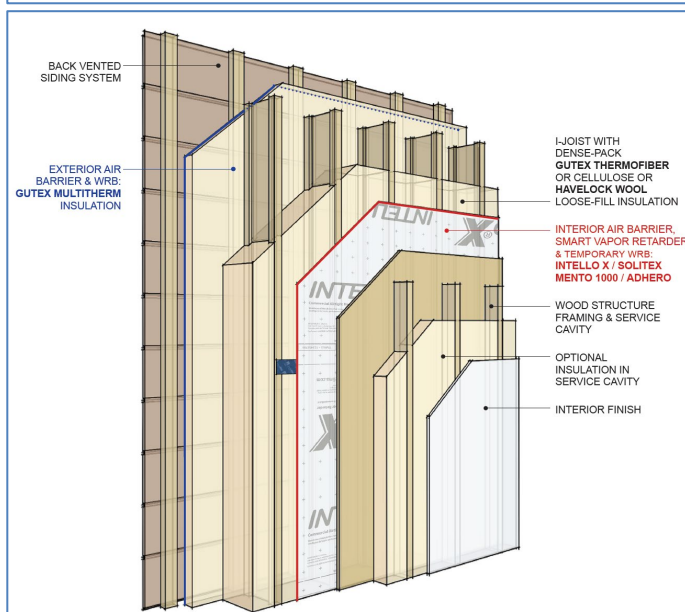


Images courtesy of:

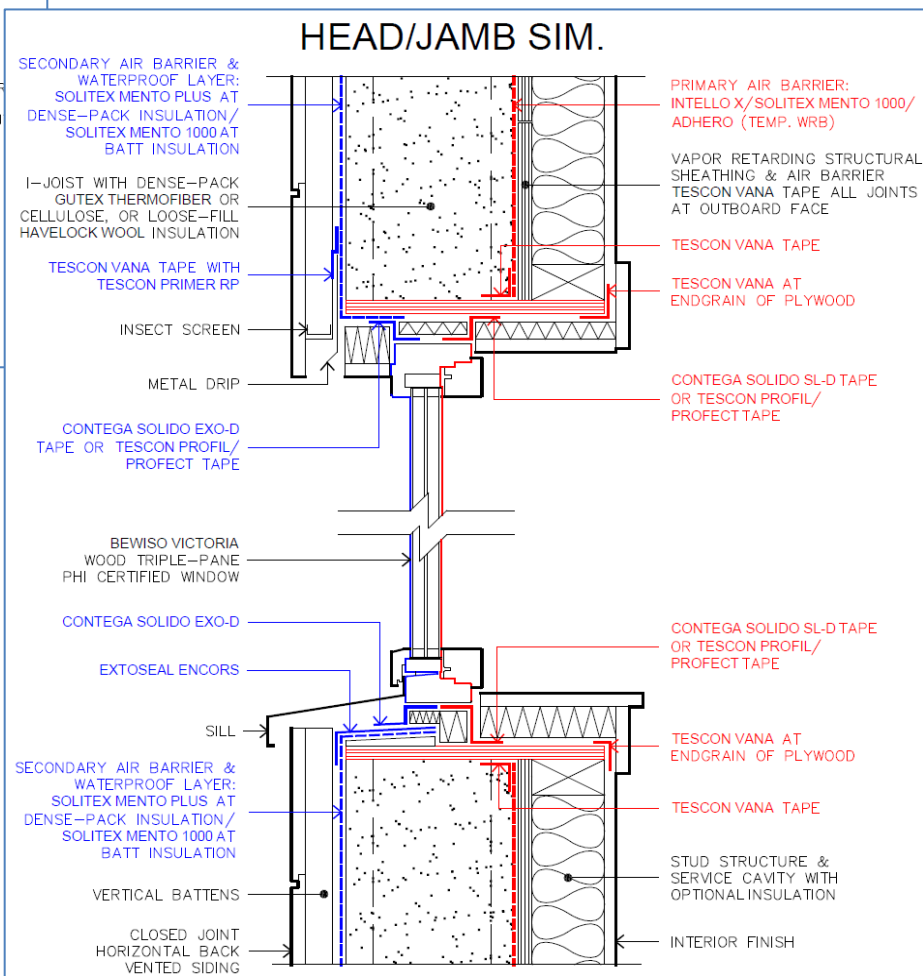
# Passive House



- Space heat demand 4.75 kBtu/ft<sup>2</sup>/year
- 0.6 ACH @ 50 Pa
- Total Primary Energy Demand max. 38 kBtu/ft<sup>2</sup> per year.



Images courtesy of:



# Additional resources

- ✓ Purpose built for the Marshall fire
- ✓ Resources for homeowners and builders
- ✓ Information and education
- ✓ Incentives, discounts, and financing
- ✓ Live support available from EnergySmart's staff by phone or email

Launches this week!



## Organized by Chapters:

1. Building a Healthy and Comfortable Home
2. Building a Resilient Home
3. Rebates, Discounts, and Financing
4. Finding Your Team
5. Materials and Equipment
6. Landscaping and Outdoor

# Upcoming Events

- Xcel Energy is hosting two information sessions on Xcel rebates specifically for builders and raters:
  - **EPA ENERGY STAR v3.2 and NextGen Information Session**  
Wednesday, April 27 9:00-10:30 AM
  - **DOE Zero Energy Ready v2 Information Session**  
Thursday, April 28 9:00-10:30 AM
- **Why Passive House?**

You've heard the buzz around Passive House, but you're not sure why all the fuss? Is it really that different?

Passive House Network Executive Director Ken Levenson unpacks the logic, the principles, the history and the new frontiers. Find out how Passive House can change the way you think and work with buildings - how you can make radical decarbonization and affordable high-performance a given. Get the low-down, ask questions, and discuss possible next steps.

  - May 13<sup>th</sup> 12:00 PM <https://naphnetwork.org/calendar/>

## Further Information

Link to Building Code, references, useful information, policies, and procedures:

<https://www.bouldercounty.org/property-and-land/land-use/building/building-code-amendments/>

Code and Permit Application Questions : [building@bouldercounty.org](mailto:building@bouldercounty.org)  
303-441-3926

Subscribe to text or email updates from Boulder County: <https://boco.org/e-news>

ICC Public Access (free online codes): <https://codes.iccsafe.org/public/collections/I-Codes>

Ron Flax  
Deputy Director / Chief Building Official  
Boulder County Community Planning & Permitting  
2045 13th Street  
Boulder, CO 80306  
720-564-2643  
[rflax@bouldercounty.org](mailto:rflax@bouldercounty.org)

### Marshall Fire Recovery:

Contact the rebuilding team:

[MarshallRebuilding@bouldercounty.org](mailto:MarshallRebuilding@bouldercounty.org)  
303-441-3930

Visit the [Marshall Fire Recovery](#) page:

<https://www.bouldercounty.org/disasters/wildfires/marshall/>

**www.RebuildingBetter.org**

Launches soon

**Questions about high-performance homes:**

[info@EnergySmartYes.com](mailto:info@EnergySmartYes.com)

303-544-1000

**Xcel Energy questions:**

<https://co.my.xcelenergy.com/s/outage-safety/marshall-fire-recovery>

866-672-3834

Zac Swank

Built Environment Coordinator

Boulder County

Office of Sustainability, Climate Action, and  
Resilience

303-441-1143

[zswank@bouldercounty.org](mailto:zswank@bouldercounty.org)

### Marshall Fire Recovery:

**Contact the rebuilding team:**

[MarshallRebuilding@bouldercounty.org](mailto:MarshallRebuilding@bouldercounty.org)

303-441-3930

**Visit the [Marshall Fire Recovery page](#):**

[https://www.bouldercounty.org/disasters/  
wildfires/marshall/](https://www.bouldercounty.org/disasters/wildfires/marshall/)