

0 Energy Expo Seminar

March 15, 2018 • Cottonwood, AZ

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



Why Zero Now?

SAM RASHKIN

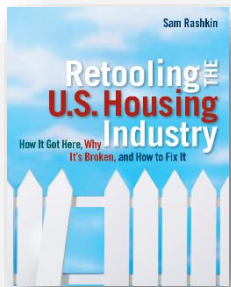
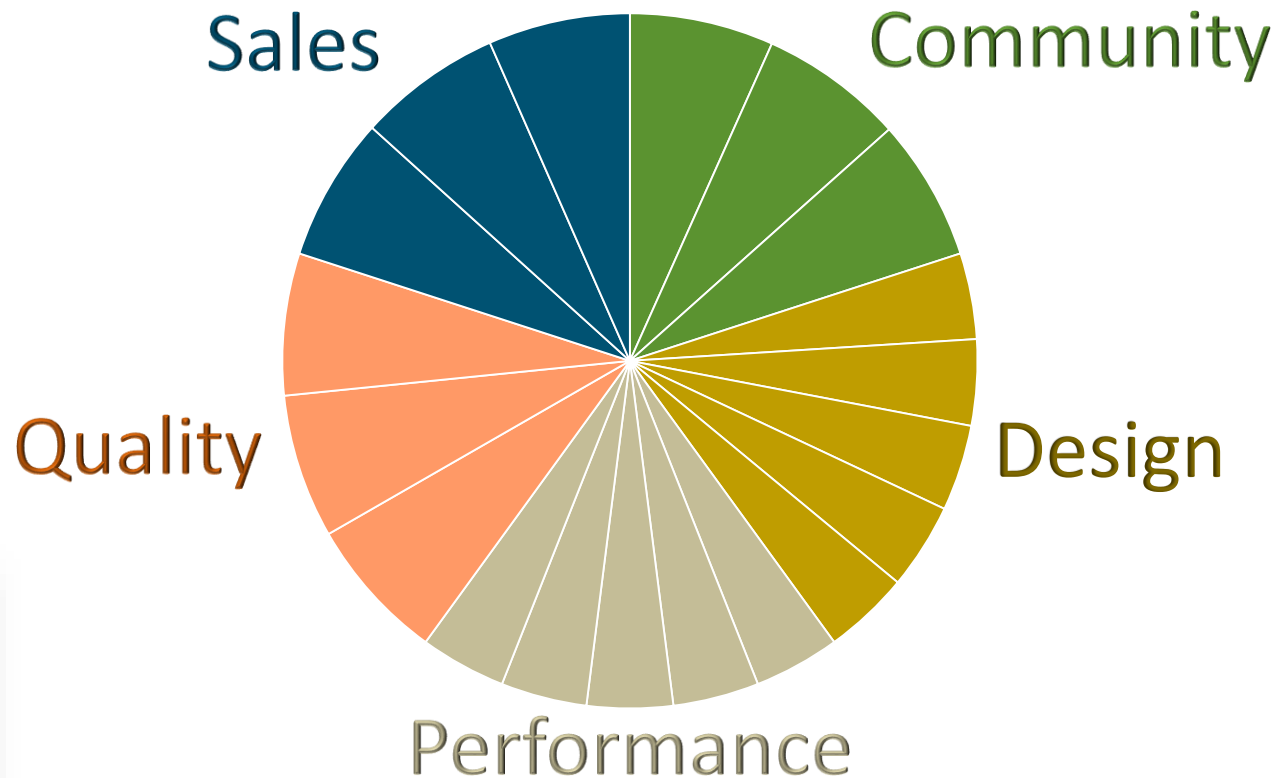
Chief Architect

Building Technologies Office



Prologue: You Are Here

Five Key Consumer Experiences





What is Zero?

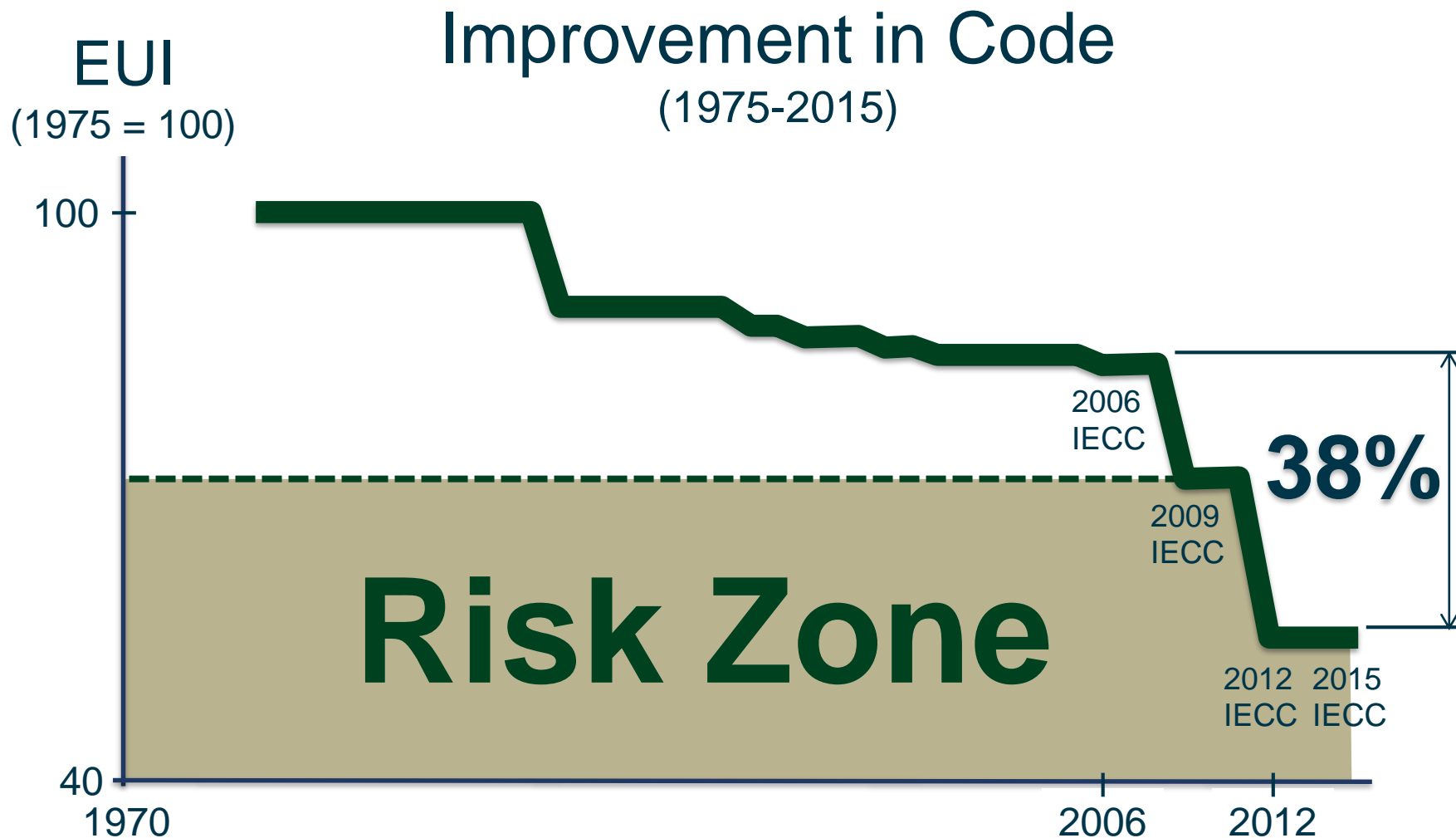
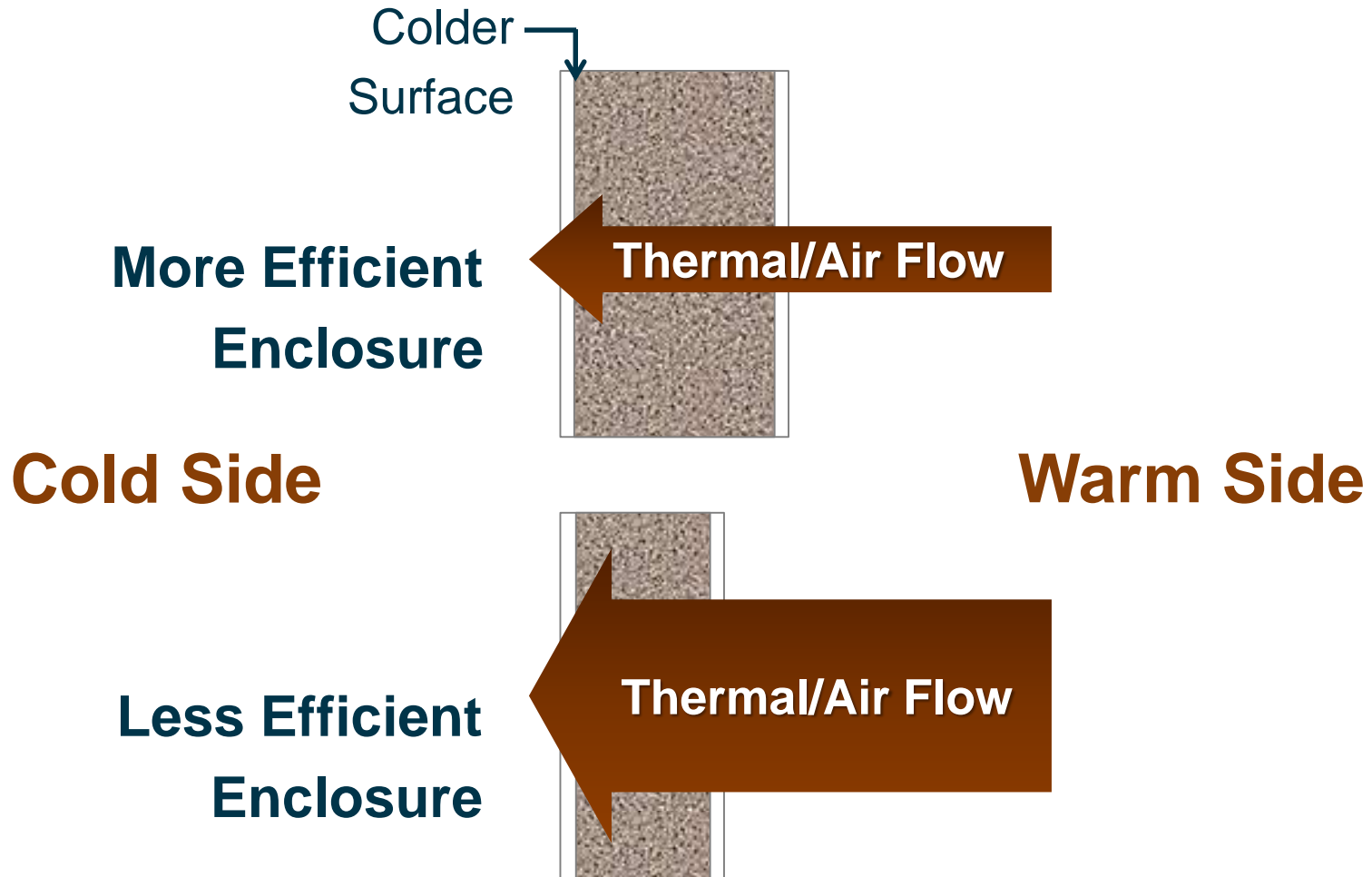
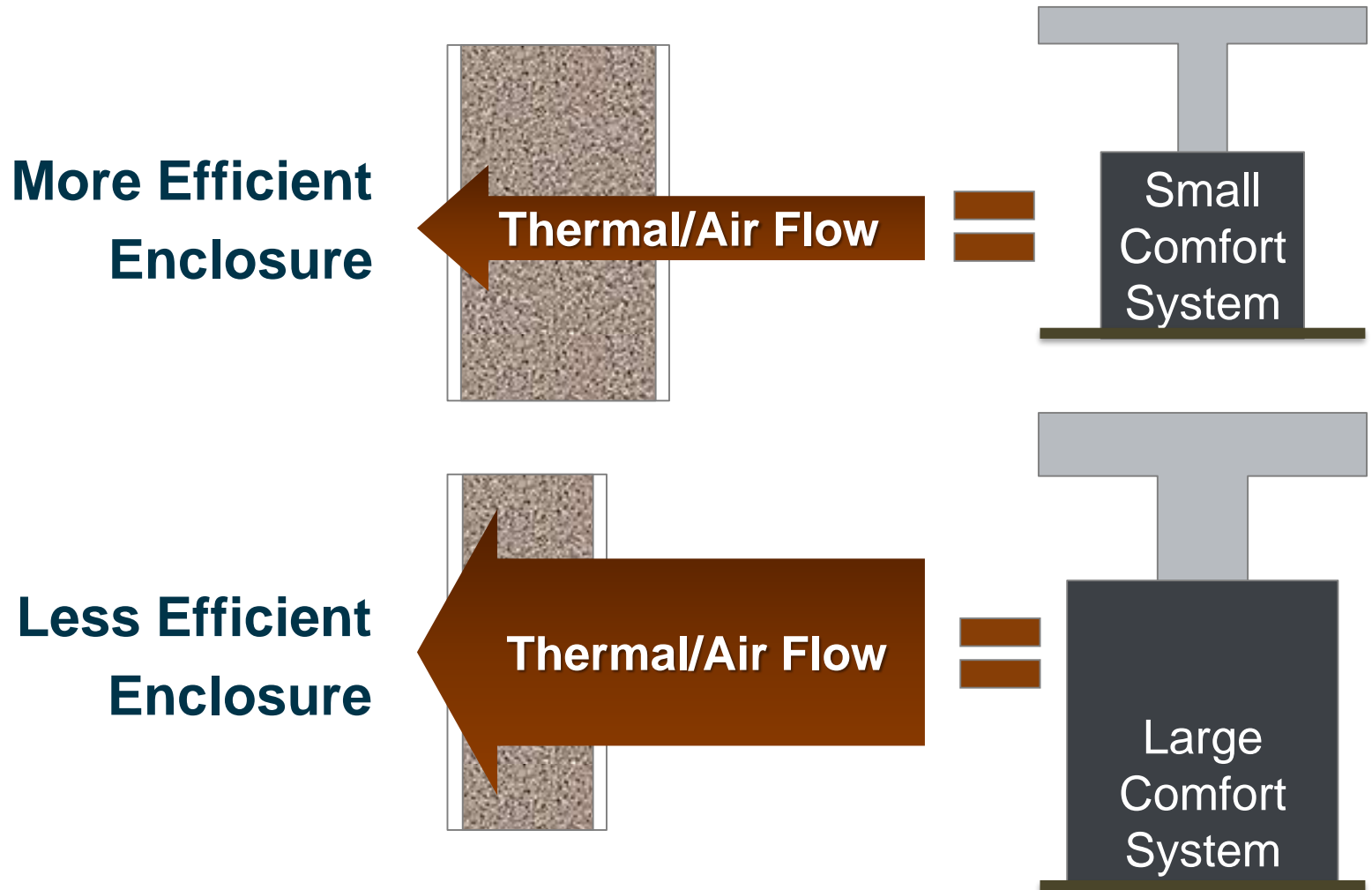


Image Basis: Building Energy Codes Program: National Benefits Assessment, 1992-2040,
https://www.energycodes.gov/sites/default/files/documents/BenefitsReport_Final_March20142.pdf

Risk 1: More Wetting Potential

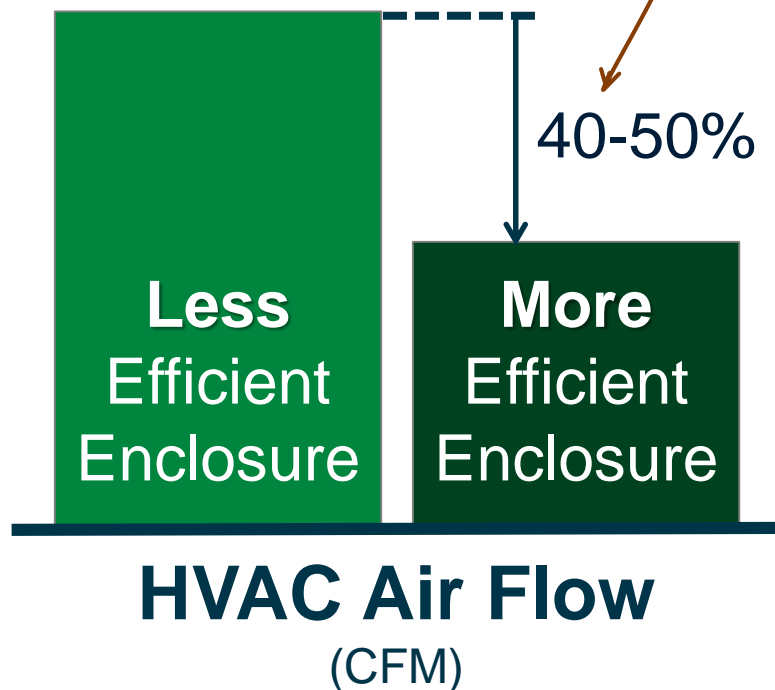


Risk 2: More Comfort Challenges



Challenge:

Ensure Mixing with
Less Air Flow

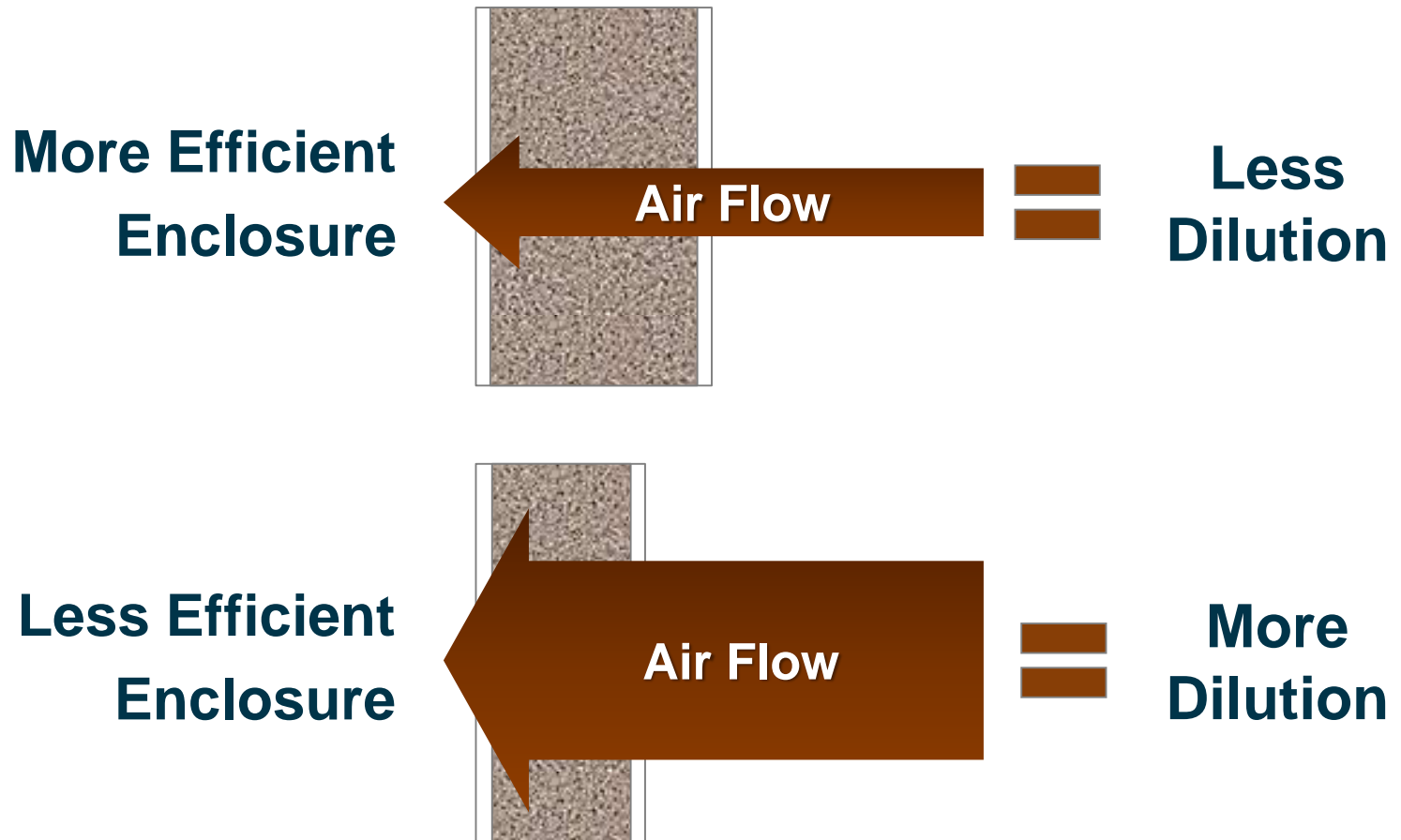


Challenge:

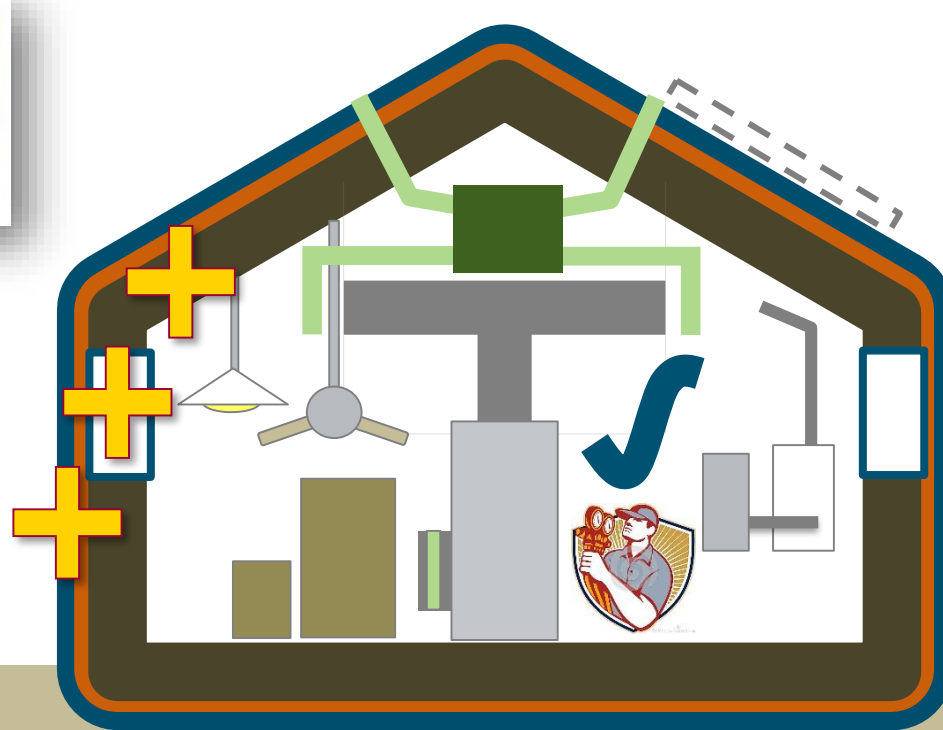
Ensure Humidity Control
when No Sensible Load



Risk 3: More Indoor Contaminants

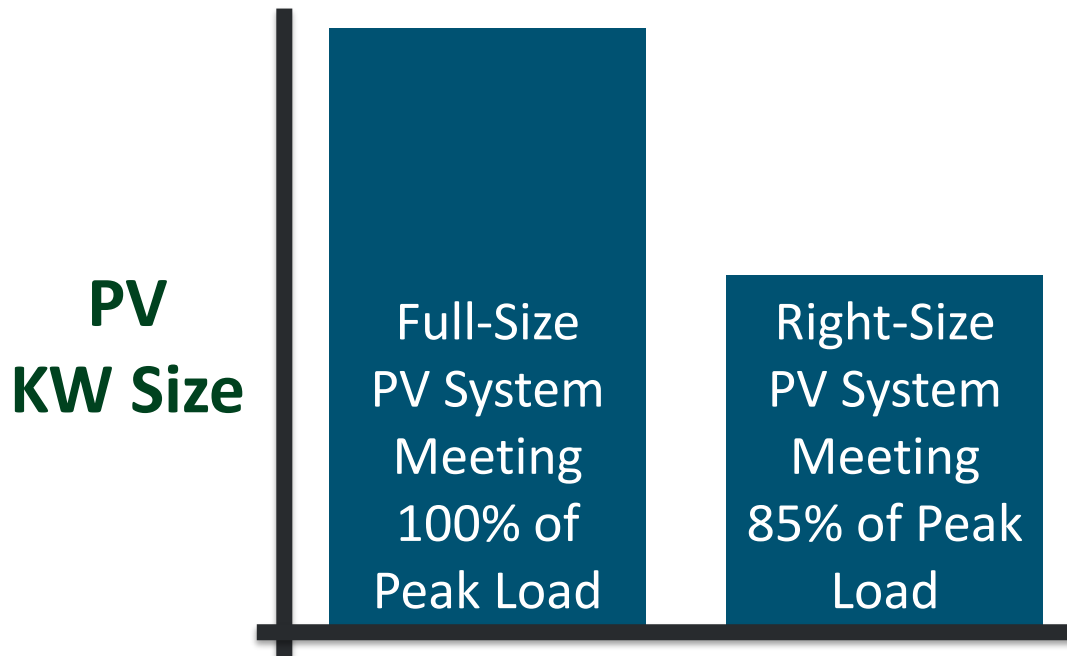


Zero = Risk Management

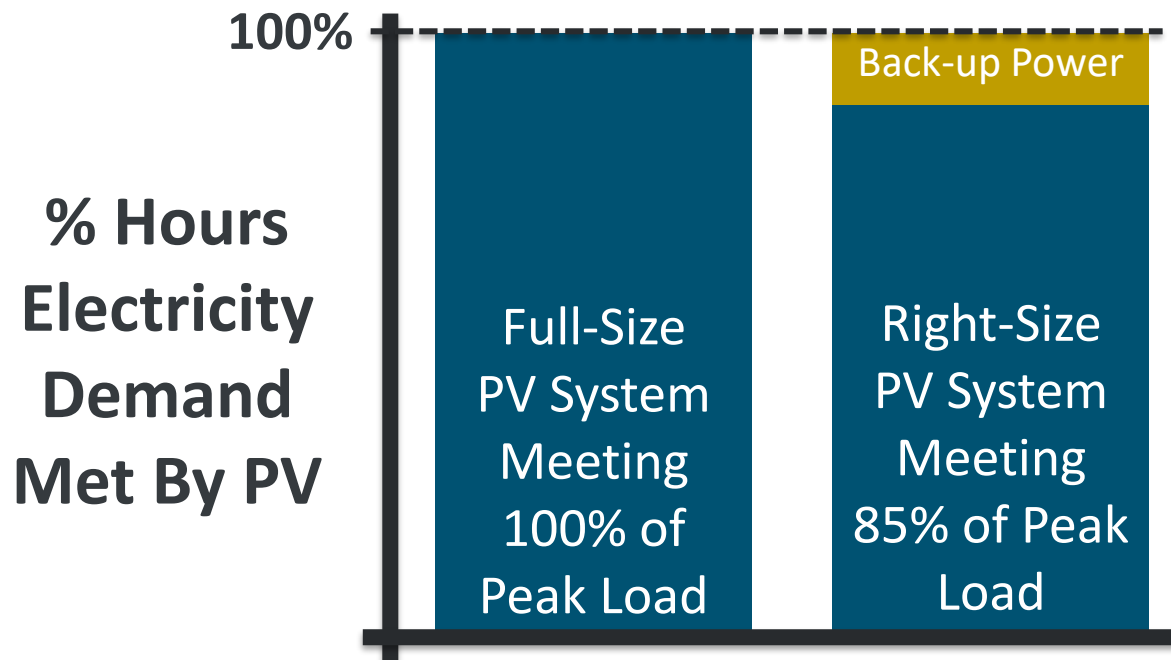


Optimized Enclosure	Efficient Components	Water Protection	Ensured Comfort	Indoor Air Quality	Solar Ready
Energy Efficiency		Performance			0 Ready

Zero Future: Off-Grid Homes



Zero Future: Off-Grid Homes





REUTERS

World

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Markets

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TV

Q Search...

Myanmar

CERAWeek

Brexit

North Korea

Earnings

Future of Money

Breakingviews

ENVIRONMENT

OCTOBER 12, 2017 / 3:09 PM / 5 MONTHS AGO

Mandalay to build 3,000 Arizona homes with solar and Sonnen batteries

Nichola Groom

3 MIN READ



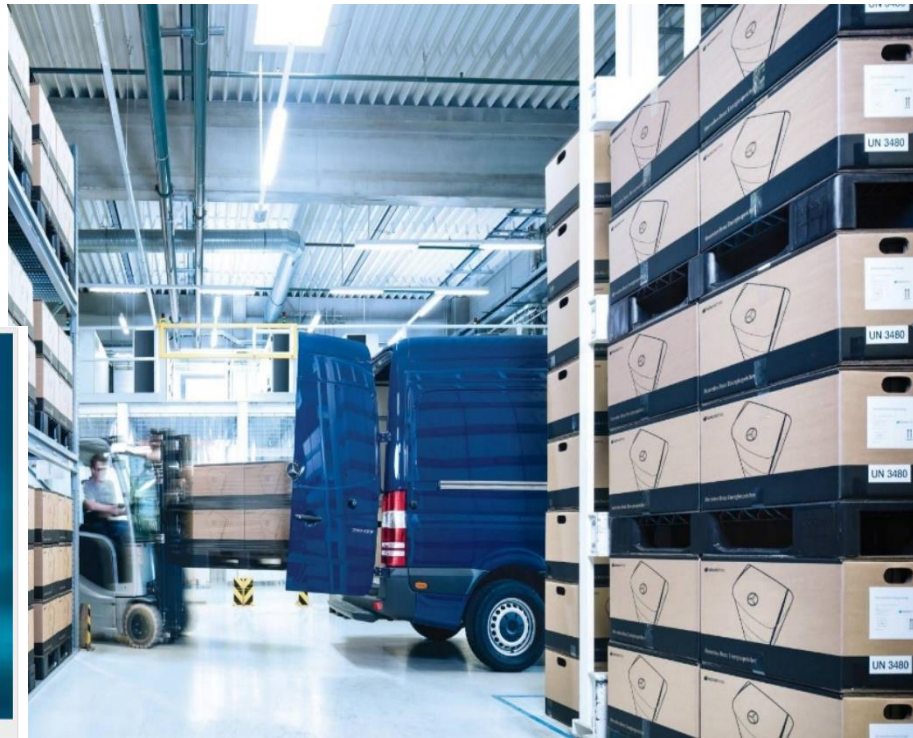
(Reuters) - German battery maker Sonnen GmbH on Thursday said it would partner with home builder Mandalay Homes to outfit 3,000 new Arizona homes with batteries to store the excess energy generated by their rooftop solar installations.

Mercedes-Benz Starts Delivery Home Energy Storage To Private Individuals

Tesla Motors isn't the only game in town when it comes to re-branding automotive fame into the energy storage business.

Daimler has also announced the start of deliveries for its home energy storage systems produced under the Mercedes-Benz brand by subsidiary Deutsche ACCUMOTIVE.

Initially, Daimler entered into the ESS for business and utility companies; today, private homes is the next logical step in leveraging its advantage from developing battery packs for cars.



Multi-Function Fuel-Fired Heat Pump:

- 50% More Efficient
- Natural Gas Cooling
- Waste Engine Heat Provides:
 - Water Heating and
 - Boosts Space Heating Eff.
- Off-Grid Operation
- 1.5 Kw Emergency Power



Zero Future: Off-Grid Homes



Source: Tesla Corporation

Zero Future: Off-Grid Homes

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Energy Efficiency &
Renewable Energy



Source: Tesla Corporation

Present: Wired Communities

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Future: Communities w/o Wires

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Puerto Rico Satellite After Hurricane Maria - 2017



Future: Resilient Communities

Moore, OK Tornado Paths: 1999, 2003, 2013



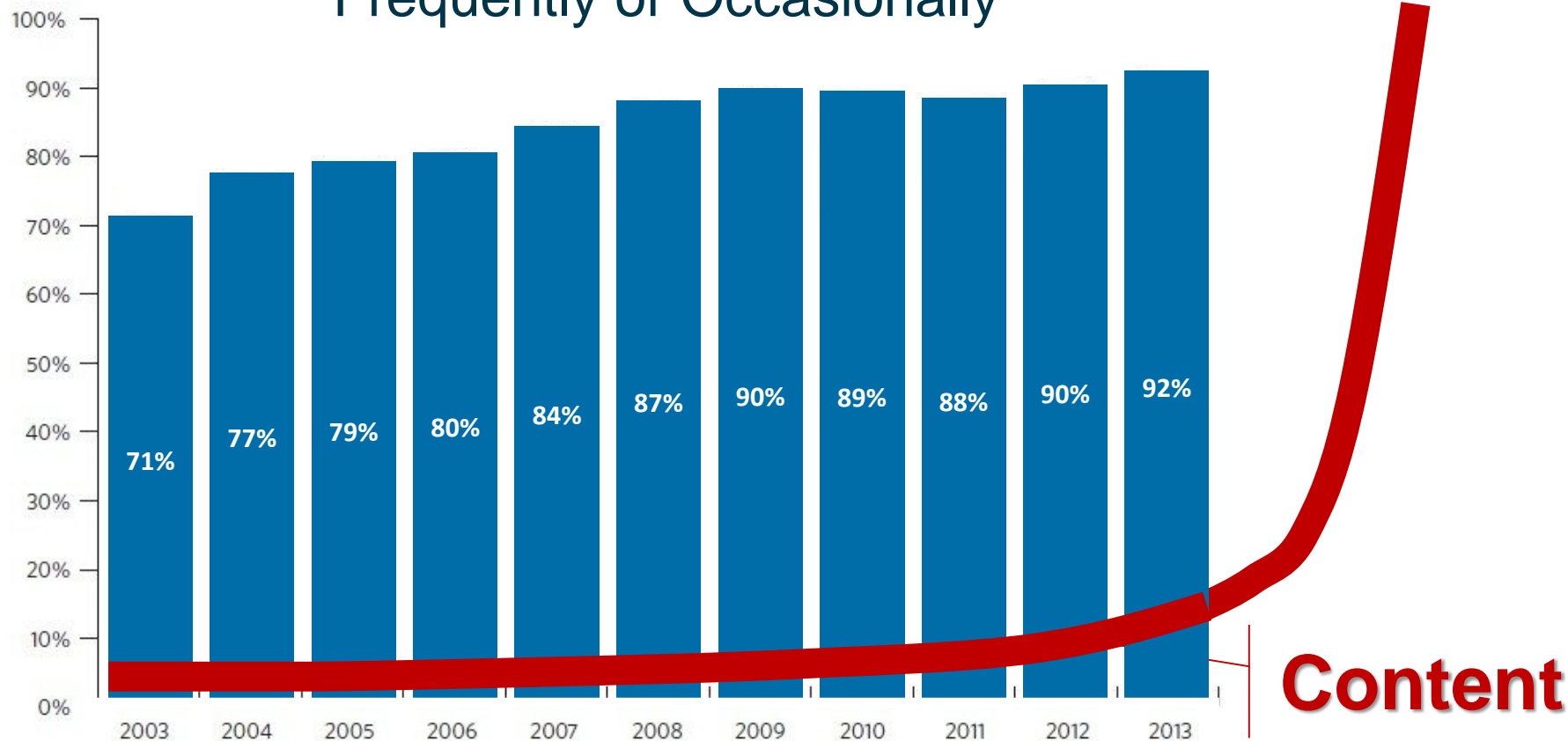
Colorado Flooding 2013





Why Zero Now?

Frequently or Occasionally



Source: National Association of Realtors®



BBC Sign in News Sport Weather Shop Earth Travel More Search

future

What is BBC Future?

Latest

Future Now

Video

OUR PICKS

Best of Future

SPECIAL SERIES

Grand Challenges

Tomorrow's Skies

PRESENTED BY:

Plymouth University psychologists 2014 study showed that householders who received thermal images of their homes were

4.9 times more likely

to install draught proofing than those just presented with an energy audit

Sustainability | Electricity | Britain

The man who makes you see the invisible

britain

special series

One solution for reducing carbon footprints – and household bills – is increased energy efficiency. With infrared imaging, inventor Brian Harper is helping people to see exactly how.

By Nic Fleming

14 June 2017

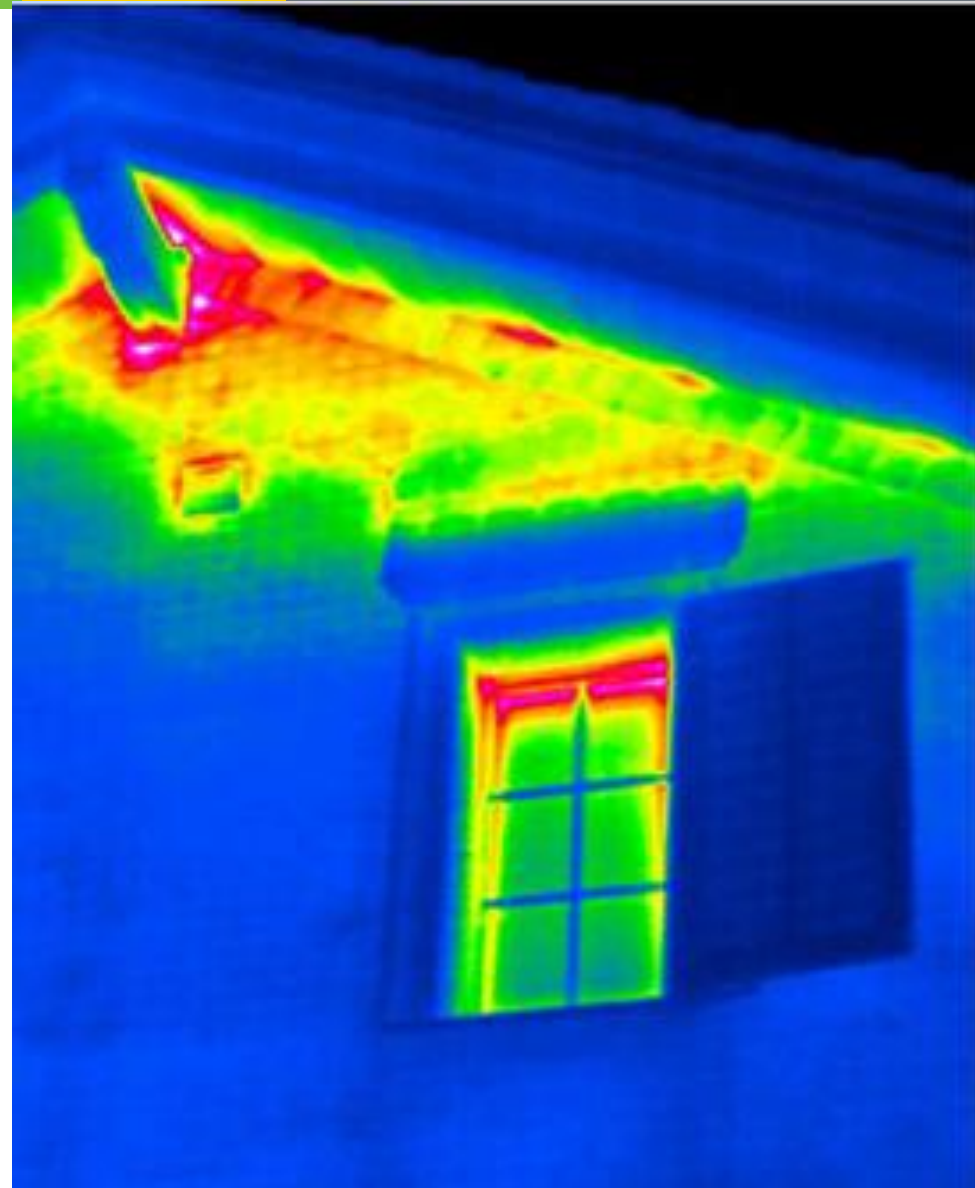
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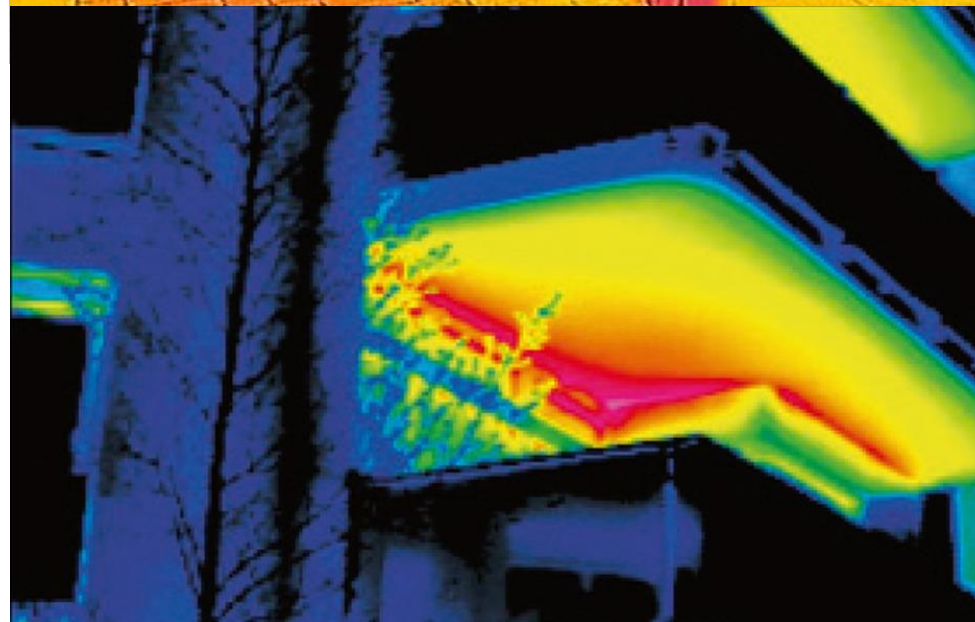
...will know a lot more about

Insulation Defects



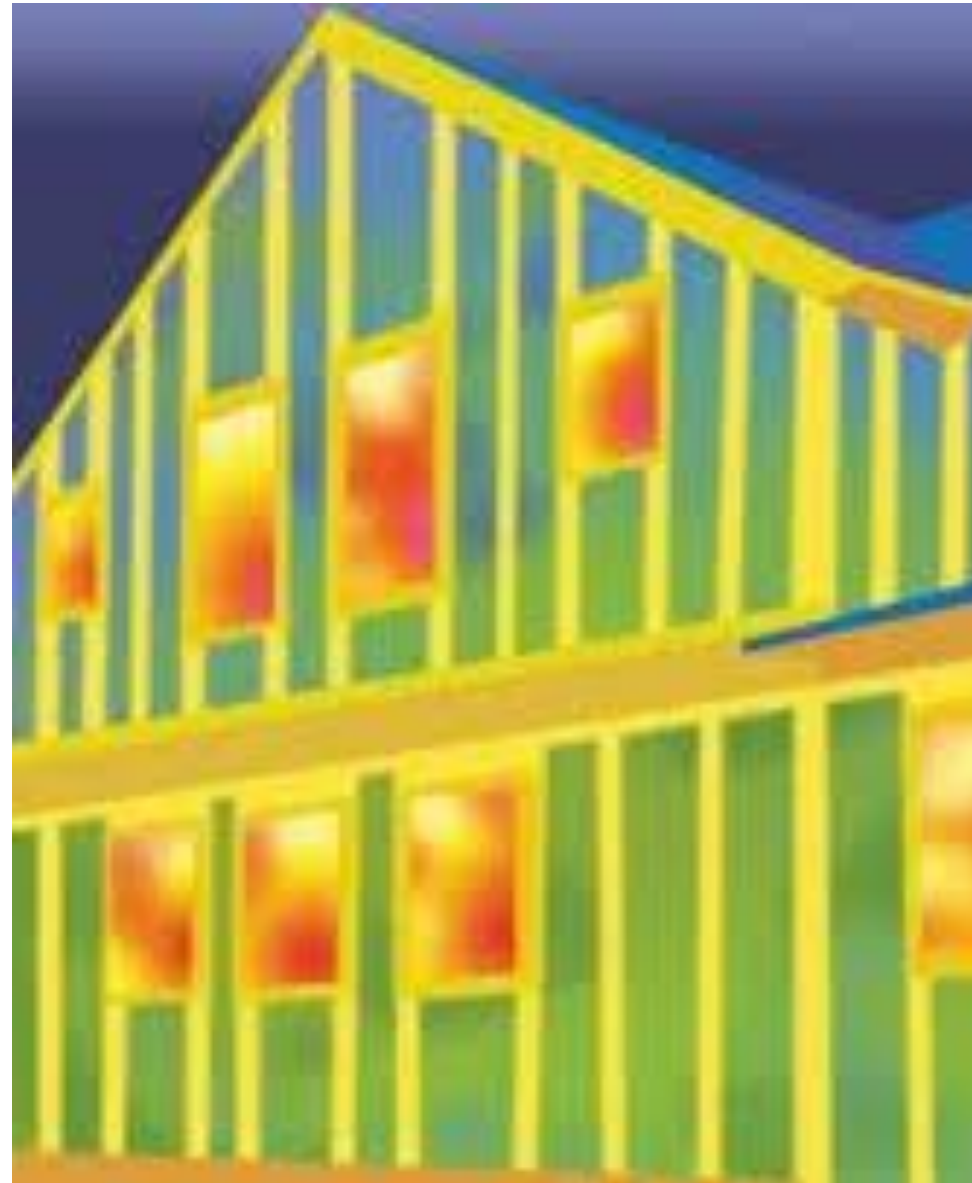
...will know a lot more about

Cold Floors



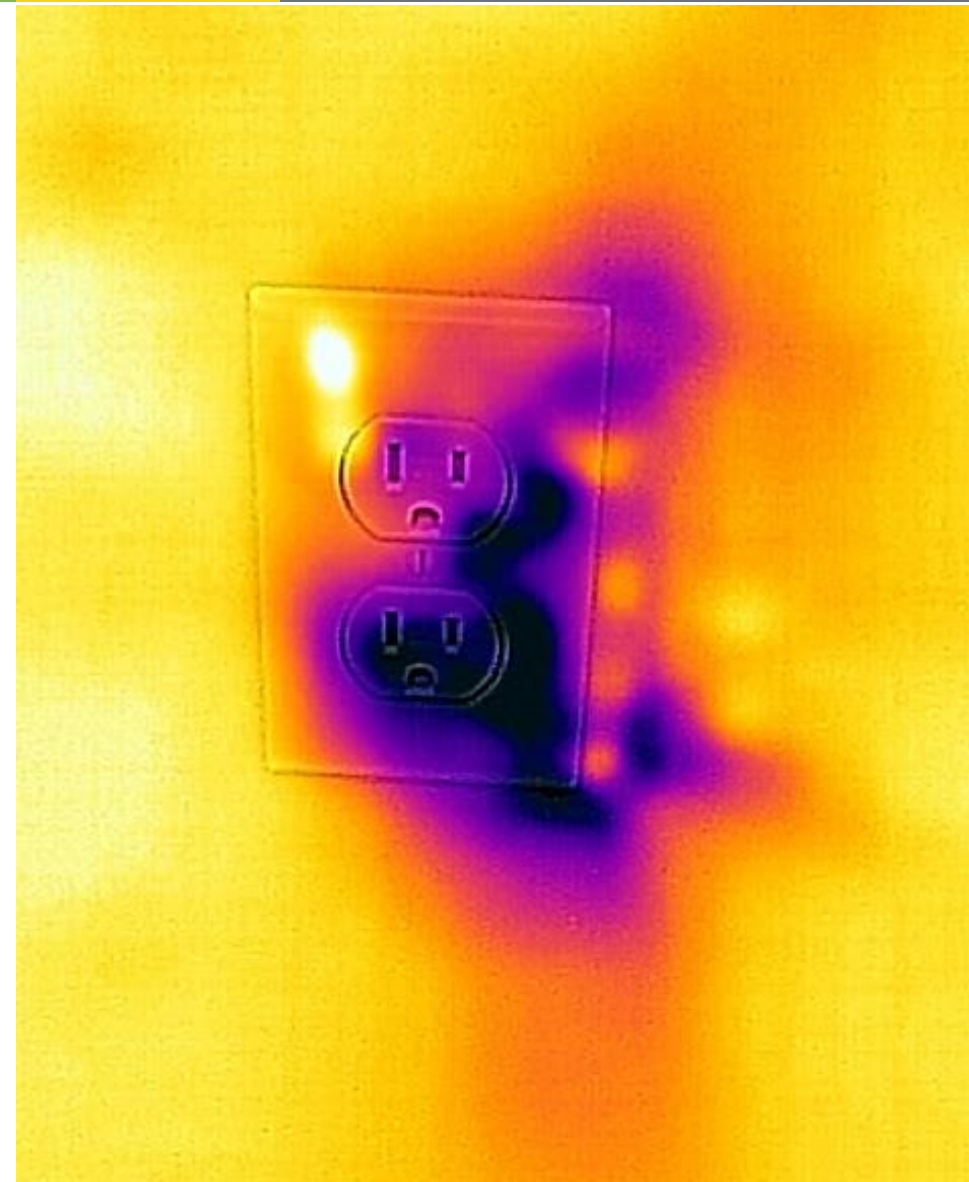
...will know a lot more about

Thermal Bridging



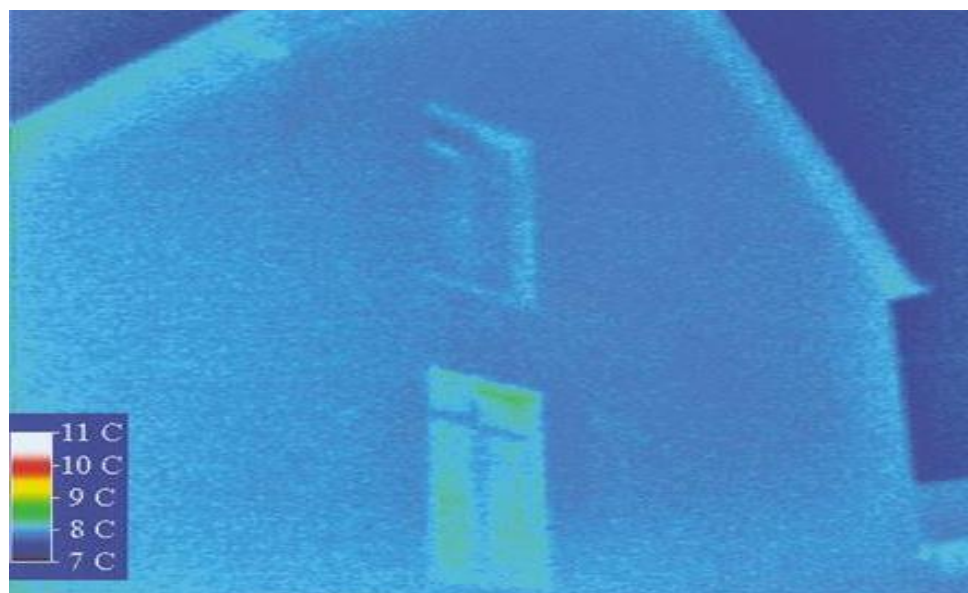
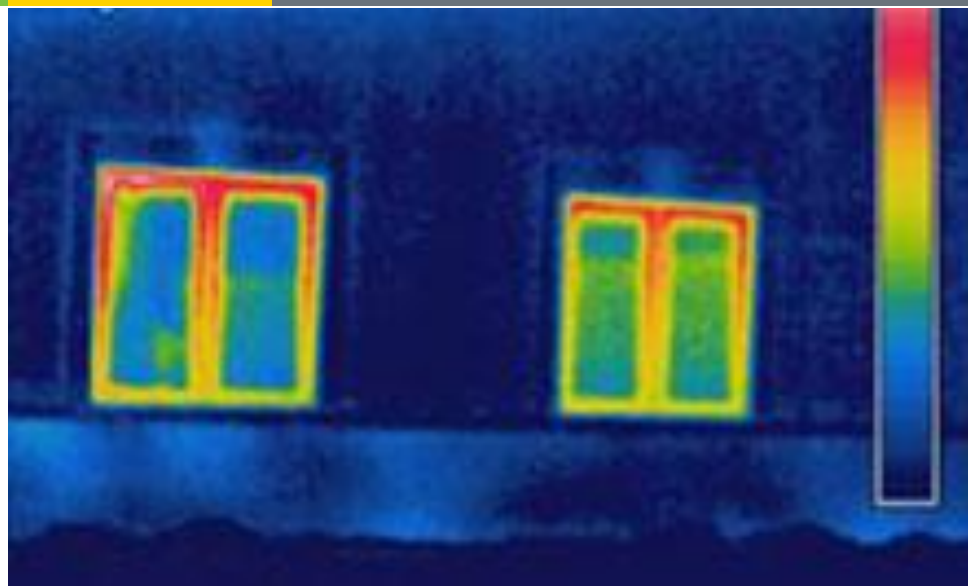
...will know a lot more about

Drafty Rooms



...will know a lot more about

Quality Windows



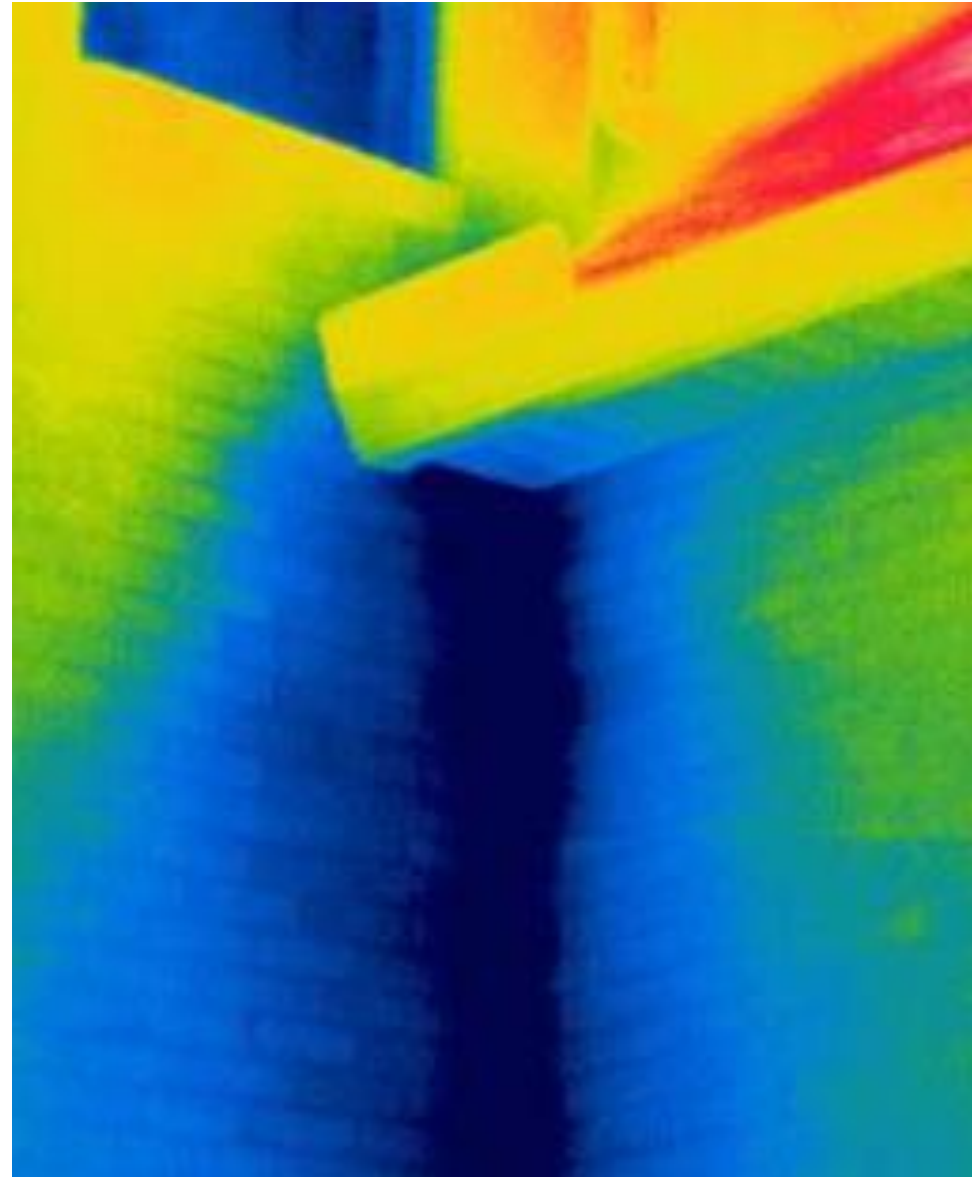
...will know a lot more about

Moisture Risks



...will know a lot more about

Moisture Risks

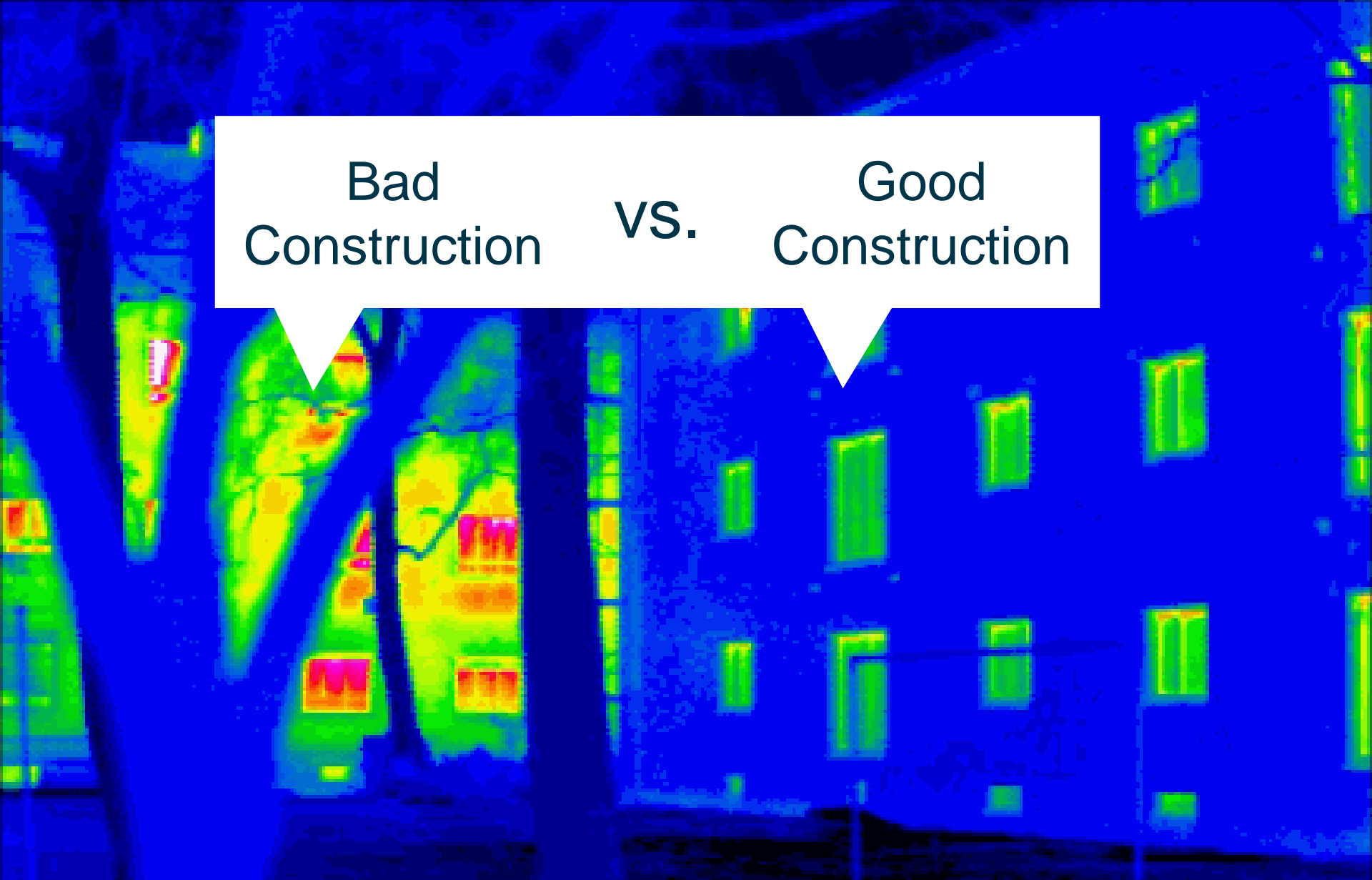


Informed Buyers will Know...

Bad
Construction

VS.

Good
Construction



...will know a lot more about

True Comfort



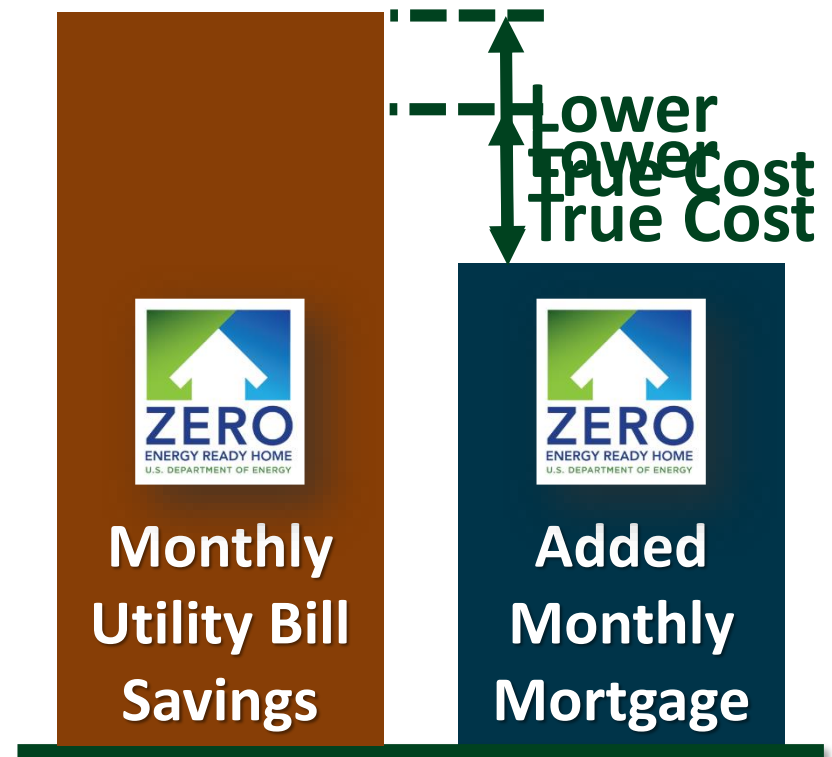
...will know a lot more about

Health Risks



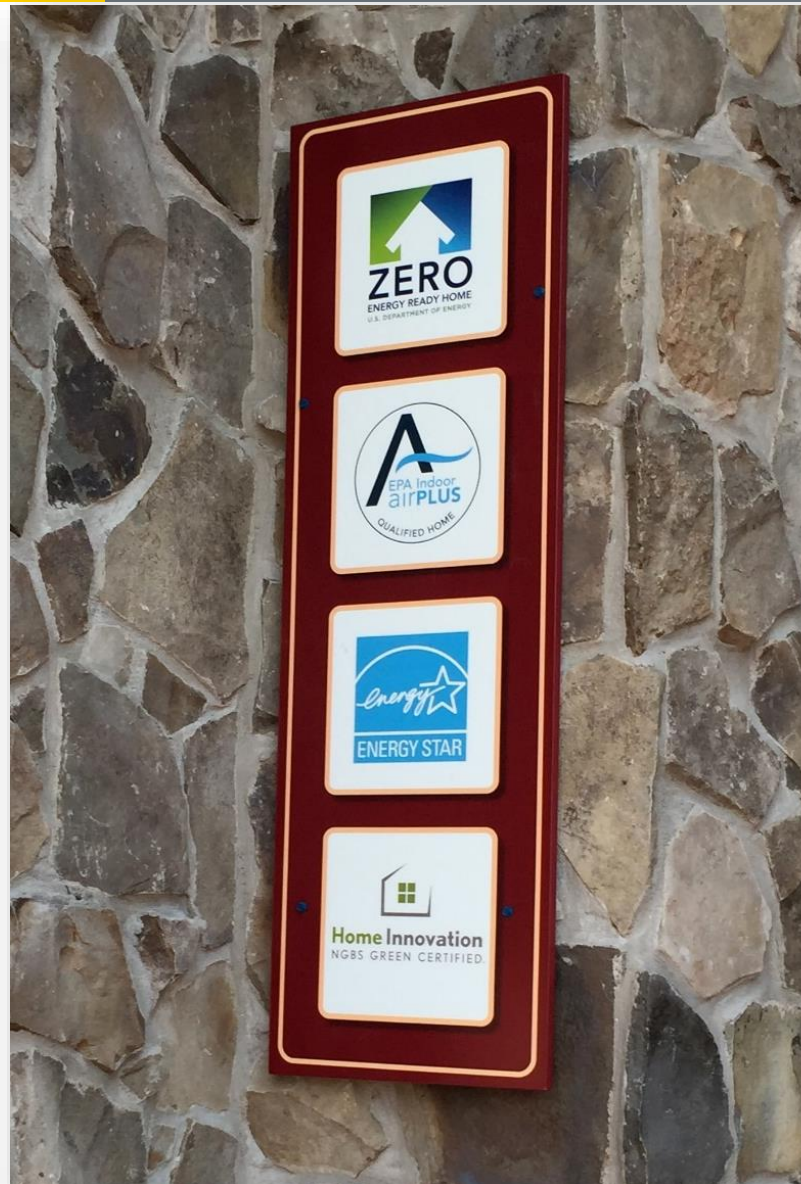
...will know a lot more about

True Cost



...will know a lot more about

Trusted Performance



...will know more about a
**Better
Home
Experience**

The screenshot shows a list of home builders on the Houzz website. The list includes:

- Net Zero Homes LLC**: Orange County's Leading Insulated Concrete Forms Installer. With over 18 years of construction experience, quality construction at an affordable price is our priority. If... See my projects > (352) 571-1720
- Legacy Custom Built Homes**: We are passionate builders, of relationships, dreams and dream homes. Founded in 2006, Legacy Construction's... Read More > (407) 949-4995 Winter park, FL, 32789
- Forever Homes**: Volusia County's Premier Custom Home Builder. To insure that our clients are getting their "Forever" home, we work closely with them from the design stage all... See my projects > (386) 563-3457 Orlando area
- Christopher Burton Homes, Inc.**: Brevard County Homebuilder - 4X Best of Houzz Award Winner! Our motto, "Building homes for life & relationships for a lifetime," is more than a slogan to us. We work with... See my projects > (321) 369-9374 9 projects in the Orlando area
- Mark Gamble Homes & Renovations**: 30 years of new home construction and renovations Read More > (407) 949-4995 Winter park, FL, 32789

A red circle highlights the review section for the builder "Forever Homes", showing a rating of 2 reviews.

...will increasingly know the

**Zero is the
Experience
They Have
to Have**



...for Transformational Experiences:

Personal Transportation



<1X

Informed Buyers Willing to Pay...

...for Transformational Experiences:

Personal
Transportation

Daily
Break



<1X

2-3X

Informed Buyers Willing to Pay...

...for Transformational Experiences:

Personal
Transportation



Daily
Break



Healthy
Food



<1X

2-3X

2-3X

Informed Buyers Willing to Pay...

...for Transformational Experiences:

Personal
Transportation

Daily
Break

Healthy
Food

Tech +
Design



<1X

2-3X

2-3X

10X

Informed Buyers Willing to Pay...

...for Transformational Experiences:

Personal
Transportation



Daily
Break



Healthy
Food



Tech +
Design



Healthy
Water



<1X

2-3X

2-3X

10X

∞X



How Communicate Zero?

Too Confusing for Consumers!





**A superior
home
experience**
is as easy as
looking for a certified
**Zero Energy
Ready Home.**



**\$10,000's
of savings**
on utility bills over
a 30-year mortgage.



Full Thermal Protection

from the hottest and
coldest weather.



Total Comfort

at a whole new level
with advanced
heating and cooling.



Healthy Living

with contaminants
kept out the air you
breathe every day.



Peace-of-Mind

from moisture problems
with comprehensive
water protection.



Certified Performance

with a home
independently tested
and inspected to the
most rigorous
federal guidelines.



Enhanced Future Value

with construction that
meets and exceeds
forthcoming codes.

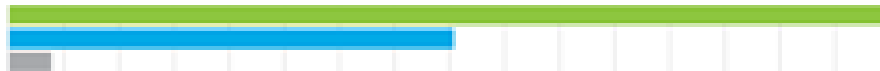


<https://energy.gov/eere/buildings/zero-energy-ready-home-homebuyers>

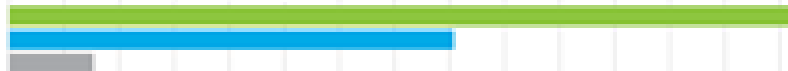
Visit the Zero Energy Ready Home website for more information how you can get a **Better Home Experience.**

Making Zero Simple...

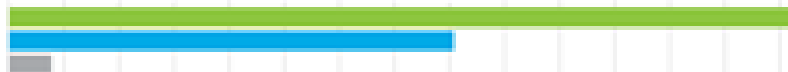
HEALTHFUL ENVIRONMENT



COMFORT PLUS



ADVANCED TECHNOLOGY



ULTRA EFFICIENT






QUALITY BUILT



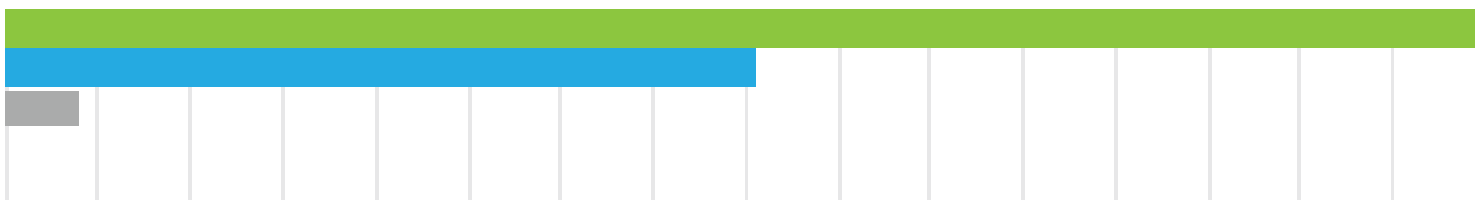
DURABILITY



Key:

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

HEALTHFUL ENVIRONMENT



- KEY**
- DOE Zero Energy Ready Home
 - ENERGY STAR Home
 - Existing Home

This label indicates relative performance of this DOE Zero Energy Ready Home to existing homes (built between 1990 and 2010) and ENERGY STAR qualified homes. Actual performance may vary.



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ENERGY



**My power bill is \$5.
What's yours?**

- Heather Robbins, Garbett Homeowner

garbettHOMES.com
Now you're living.



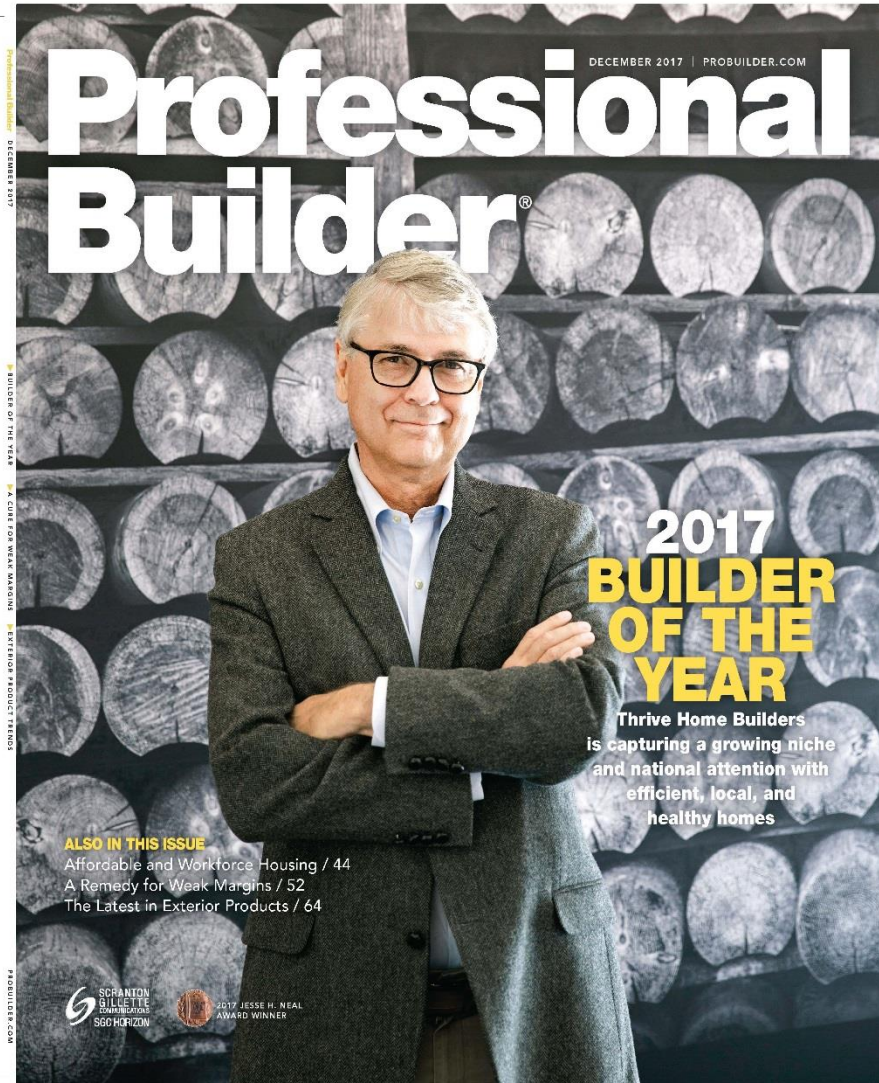
“Our daughter couldn’t breathe without discomfort for years. Within two months of moving into our new Cobblestone home

we threw away

the inhaler.
That was
priceless!”

Charly and Mary Jones,
Cobblestone Homeowner





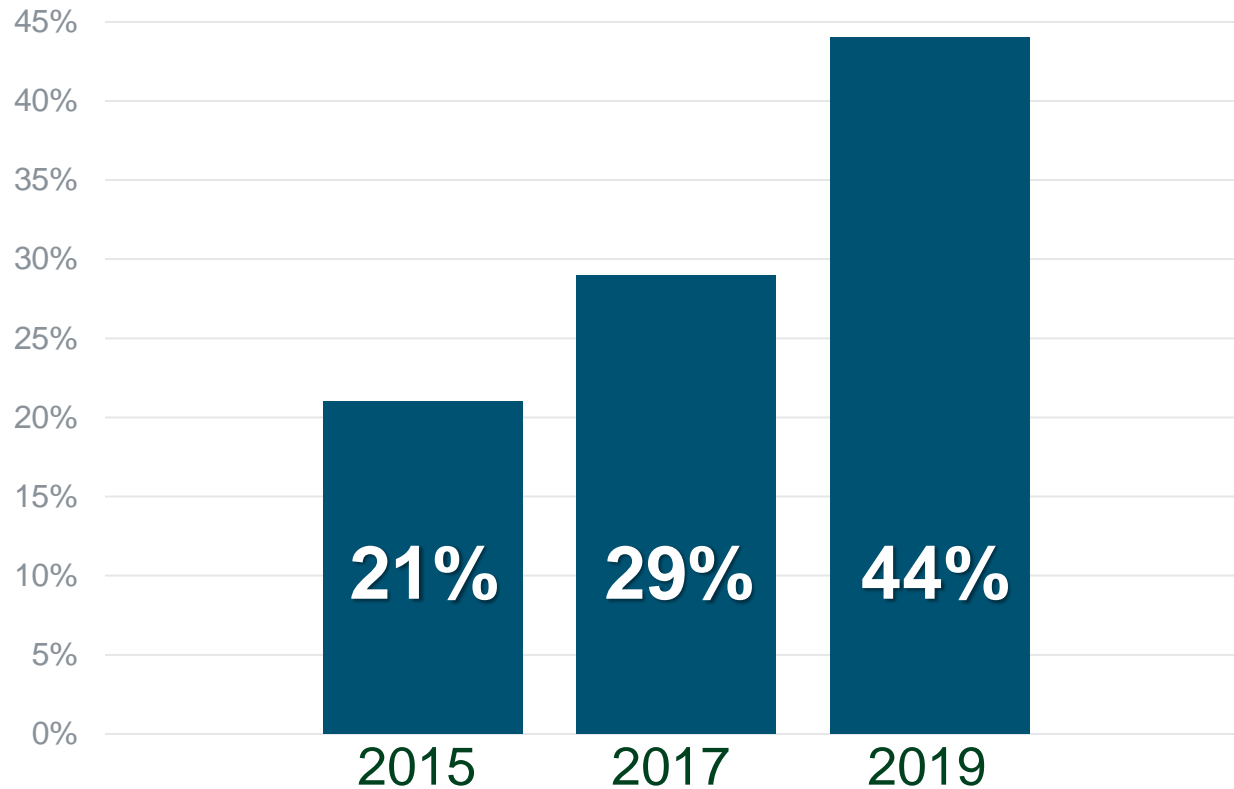


Join the Zero Movement

Zero Residential Units



Source: "To Zero and Beyond, Zero Energy Residential Buildings Study, 2016 Inventory of residential projects on the path to zero in the U.S. and Canada, Net Zero Energy Coalition, June 2017, call with Shipa Sankaran, February 16, 2018



Built or Plan to Build a Net Zero,
Near Net Zero, or Net Zero Ready Home

Source: Dodge Data & Analytics, October 2017

- **Visit ZERH Website:**
 - National Program Requirements
 - Take Tour of Zero
 - View Resources
 - View Webinars
- **Sign up as a ZERH Partner**
 - Builder
 - Verifier
 - Innovation Partner

Final Word



“Who we are is what we leave behind.”

Subaru ‘Stop Waste’ Campaign



Thank You



For More Information:

www.buildings.energy.gov/zero/

Email Contact:

zero@newportpartnersllc.com