Presenters: Mark Okland - Product Development Manager, IKO
Vince Carrier - Special Projects Manager, IKO
Effects - Extreme weather events

- 2009 Windstorm: $350 M
- 2009 Hailstorm: $30 M
- 2004 Hailstorm: $166 M
- 2006 Storm: $133 M
- 2011 Windstorm: $200 M
- 2010 Hailstorm: $500 M
- 2010 Thunderstorm: $120 M
- 2013 Storm: $850 M
- 2010 Winter Storm: $51 M

(adapted from Warren & Lemmen, 2014)
Effects - Extreme weather events

- Storm (including snow)
- Wildfire
- Tornado
- Hurricane
- Flooding

2011 Wildfire $700M

2003 Wildfire $200M

(adapted from Warren & Lemmen, 2014)
Effects - Extreme weather events

(adapted from Warren & Lemmen, 2014)
Effects - Extreme weather events

- Storm (including snow)
- Wildfire
- Tornado
- Hurricane
- Flooding

2011 Hurricane $130M
2010 Hurricane $70M
2003 Hurricane $132M

(adapted from Warren & Lemmen, 2014)
Effects - Extreme weather events

- Storm (including snow)
- Wildfire
- Tornado
- Hurricane
- Flooding

2005 Flooding $60M

2013 Flooding $1700M

2005 Flooding $300M

(adapted from Warren & Lemmen, 2014)
Effects - Extreme weather events

- Storm (including snow)
- Wildfire
- Tornado
- Hurricane
- Flooding

These types of losses are expected to become more frequent with increasing climate change.

(adapted from Warren & Lemmen, 2014)
Industry paid out $5B for summer storm damage in Alberta from 2010 to 2017, AMA boss notes

Alberta's volatile summer weather causes more damage here than all other provinces combined — and it has the Alberta Motor Association (AMA) raising the alarm.

According to AMA's vice president of claims, Ted Koleff, said the province's severe weather has been more destructive and happening more often in the last decade.

"Storms, really since 2010, have become more frequent, more severe and more costly," he said.

$5B in insured damage since 2010

Koleff said wind, hail and rain-related flooding have caused more than $5 billion worth of insured damage in this province over the last eight years.

"Sixty one per cent of all of Canada's insured damage has been in Alberta since 2010," he said.

On average, Koleff said approximately 44 tornados touch down in the Prairies each summer.

"That's almost one a day through July and August. So, the frequency and the severity from an insured damage perspective is going up," he said.

And, the things getting damaged are costing more.

"Roofs are more expensive and siding that gets damaged is more expensive then it was 10 to 15 years ago, so those are the trends," he said.
All Confirmed and Probable Tornadoes
By Fujita Scale (1980-2009)
Tornades confirmées et probables par l'échelle de Fujita

- **F5** (1)
- **F4** (5)
- **F3** (24)
- **F2** (119)
- **F1** (478)
- **F0** (1217)

<table>
<thead>
<tr>
<th>Class</th>
<th>Wind speeds (km/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$F_0$</td>
<td>65 - 117</td>
</tr>
<tr>
<td>$F_1$</td>
<td>117 - 180</td>
</tr>
<tr>
<td>$F_2$</td>
<td>182 - 252</td>
</tr>
<tr>
<td>$F_3$</td>
<td>253 - 333</td>
</tr>
<tr>
<td>$F_4$</td>
<td>334 - 419</td>
</tr>
<tr>
<td>$F_5$</td>
<td>420 - 511</td>
</tr>
<tr>
<td>$F_6$</td>
<td>Above 511</td>
</tr>
</tbody>
</table>
What is the IBHS?

- The Institute for Business & Home Safety is a nonprofit organization funded by the property insurance and re-insurance industry.

- [www.disastersafety.org](http://www.disastersafety.org)

- Headquartered in Tampa with a research facility in South Carolina.

- IBHS conduct research directed towards identifying how to mitigate property loss by examining how materials perform in extreme weather events.

- Their test capabilities include high winds, heavy precipitation, hail and wildfire.
Wind Testing

IBHS Research Center Fans

Hail Demo Building Test Chamber
Wildfire and Rain Testing

Research Center Demo-Ember Wildfire Testing

Water Intrusion Testing

FORTIFIED Asphalt Shingle Roofs
How and Why They are Different

AIA CES Registered Program
Hail and Natural Weathering

Hail Testing Lab-Cannon Design

Aging Farm, Aging Snow

FORTIFIED Asphalt Shingle Roofs
How and Why They are Different

AIA CES Registered Program
Why FORTIFIED?

- Recognition of two primary factors for building performance:
  - Materials.
  - Application.

- Ongoing materials research, dialogue with manufacturers, participation in industry organizations and forums.

- FORTIFIED requirements address the application aspect of materials in hurricane-and-hail-prone areas.

- FORTIFIED requires documentation and inspection.

- Homeowners insurance discounts may be mandated/available in certain jurisdictions for FORTIFIED-certified projects.
FORTIFIED Home™ Designation Basics

- Trained and certified third-party evaluators.
- Third-party inspection and verification.
- Detailed data and documentation/photos submitted to IBHS.
- FORTIFIED Home™ designations last for 5 years.
Improved roof sheathing attachment, sealed roof deck, wind-rated roof cover, water-resistant attic vents (ridge and off-ridge), structural sheathing on gable ends.

Impact-rated protection of windows and doors, pressure-rated garage doors, reinforced gable end walls, metal connectors to secure attached structures.

Well-engineered continuous load path, reinforced/anchored wood frame chimneys.
- Confirm structural sheathing at gable end wall.
- Attach roof deck.
- Seal roof deck.
- Seal perimeter.
- Apply wind-rated shingles.
- Install water-resistant attic vents.
- Reinforce overhangs, if necessary.
## Wind Zones for Roof

<table>
<thead>
<tr>
<th>Wind Zone</th>
<th>Pressure Relative to Zone 1</th>
<th>Location</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>=</td>
<td>Roof Interior</td>
<td>Yellow</td>
</tr>
<tr>
<td>2</td>
<td>+ + + Higher than highest on walls</td>
<td>Roof Edge</td>
<td>Orange</td>
</tr>
<tr>
<td>3</td>
<td>+++ + Highest house</td>
<td>Roof Corner</td>
<td>Red</td>
</tr>
</tbody>
</table>
Gable Reinforcement

Field Research - Hurricane Charley

FORTIFIED Asphalt Shingle Roofs
How and Why They are Different

AIA CES Registered Program
Gable End Vents Allow Wind-Driven Water Entry

- Water deposited on gable ends is easily driven by strong winds through both gable end vents and gable rake venting.

- Cover or remove gable vents.

- Block gable rake venting.

- Use TAS 100(A)-rated ridge or off-ridge vents.
Roof Deck Minimum Requirements

- Roof deck sheathing must be minimum of 7/16 inches.
- Can be OSB/plywood or dimensional lumber.
- Must be documented.
Fastening
Roof Sheathing
New & Existing

- Ring shank nail requirements:
  - Full head (not clipped or D).
  - Minimum 0.113-inch diameter.
  - Minimum 2 3/8 inches long.
  - Power-driven fasteners, OK.
  - Offset head for collating, OK.
  - Spaced 6 inches o.c.
    (unless Code or Engineering requires closer).
## Fastening Pattern for Roof Zones Greater than 120 MPH

<table>
<thead>
<tr>
<th>Zone</th>
<th>Fastener Spacing</th>
<th>Location</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Field</td>
<td>6 inches O.C.</td>
<td>Roof Interior</td>
<td>Yellow</td>
</tr>
<tr>
<td>2-Perimeter</td>
<td>4 inches O.C.</td>
<td>Roof Edge within 4 feet of gable ends</td>
<td>Orange</td>
</tr>
<tr>
<td>3-Corner</td>
<td>4 inches O.C.</td>
<td>Roof Corner within 4 feet of hip corners</td>
<td>Red</td>
</tr>
</tbody>
</table>
Sealed Roof Deck

- Sealing the roof deck is a code-plus requirement of the FORTIFIED Home™ program.

- Most existing homes WILL NOT have a qualified sealed roof deck.

- NOTE: Florida’s OIR 1802 form accepts two of IBHS’ sealed roof deck systems (originally called: Secondary Water Resistance on the OIR 1802).
Sealed Roof Deck: 4 Qualified Systems

- Four-inch wide ASTM D-1970 modified bitumen tape or AAMA 711-13 Level 3 high heat-resistant tape applied to all seams. Install an ASTM D226 Type II, ASTM D 4869 Type IV or a qualified synthetic underlayment over the entire roof deck, thus covering the self-adhering tape.

- Fully adhered membrane (peel & stick).
Sealed Roof Deck: 4 Qualified Systems

- Double layer of #30 felt installed in accordance with the Technical Bulletin/low-slope guidance:
  - 19 inches overlap.
  - Button cap nails at 6 inches o.c. along laps and one row 12 inches o.c in the field.

- For each method, a clean, fully exposed roof deck is required, regardless if job is new construction or re-roofing.
Taped Seams Option

- Option 1:
  - Apply an ASTM 1970 compliant self-adhering polymer-modified bitumen flashing tape at least 4 inches wide, directly to the roof deck to seal the horizontal and vertical joints in the roof deck.

- Option 2:
  - Apply an AAMA 711-13, level 3 (for exposure up to 80°C/176°F) compliant self-adhering flexible flashing tape, at least 3 3/4 inches wide, directly to the roof deck to seal the horizontal and vertical joints in the roof deck.
Step 1: Four-Inch Wide Modified Bitumen Tape Applied Over All Deck Seams

Roof Deck/Tape Seams

Roof Deck/Tape Seams Covering Measurements
Step 2: Install #30 Felt Over Tape on Entire Roof Deck

Roof Deck/Tape Seams Covering

Roof Deck/Tape Seams Felt Covering
Full Membrane (Peel & Stick) Option

- Must meet ASTM D1970 and be installed in accordance with manufacturer’s installation requirements.
Two Layers of #30 Felt Option

Compliance Verification Requirements
This method of sealing the roof deck is to be documented and verified by a certified FORTIFIED evaluator. Acceptable documentation includes, but is not limited to: pictures of laps and fasteners at four different locations of the roof; a completed Roof Compliance Form (RCF-1); certification by the installer; as well as bills of lading, invoices and product packaging.

FORTIFIED Asphalt Shingle Roofs
How and Why They are Different

AIA CES Registered Program
Example of Sealed Roof Deck Photo Documentation

Photo Supplied as documentation for a FORTIFIED Home designation
Provide metal drip edge at eaves and gables per FORTIFIED standards:

- There must be a minimum of 3 inches overlap.
- Drip edge must extend 1/2 inch below sheathing and 2 inches back on roof deck.
- Attach to roof deck with fasteners at 4 inches on center.
- Drip edge must be installed OVER the underlayment at eaves and OVER the underlayment at rake edges EXCEPT where prohibited by local codes.
Some Unacceptable Eave and Rake Installs

Roof Deck Rake Bad Example

Roof Deck Eave Bad Example
Adhesion at Perimeter Area is Key

- Shingles must have a connection at the eave and rake.

- Use:
  - 8 inches of roof cement.
  - Peel & stick starter or nail-on starter embedded in roof cement.
Example of Drip Edge Installation

Drip Edge Install

Starter Strip Install over Drip Edge
Fully Adhering a Starter Shingle

Fully Adhered Starter Strip Install

Insurance Institute for Business and Home Safety
Asphalt Roof Shingles

- Use shingles classified as Class F (ASTM D 3161) and/or Class H (ASTM D 7158).
FORTIFIED Ridge & Off-Ridge Vents

Must be TAS 100(A) compliant

IKO 203 FORTIFIED Asphalt Shingle Roofs How and Why They are Different

AIA CES Registered Program
Critical for Success

- Documentation.
- Photos.
- Product information:
  - Labels, data sheets, testing reports.
- Compliance forms.
TB2016-05

IBHS requires evaluations for roofs installed after Dec. 5, 2016, to include the following documentation:

- New Roof Compliance Form completed.
- Photo of installation of tape or self-adhered membrane.
- Photo of the underlayment fastening pattern.
- Photo of drip edge metal fastening.
- Photo of the application of flashing cement along roof edges or photo of self-adhered shingle starter strip installed at edges.
PERFORMANCE
You Can Trust

IKO Performance Products provide 
UNPARALLELED PROTECTION from the elements.
Storm Activity Appears to be on the Rise.

- A number of studies, such as the Stanford University 2013 climate analysis, forecasts global warming to drive an increase in severe thunderstorm risk in the U.S.

- According to the 2018 3M Economic Forecast for US Asphalt Roofing Study, the 18-year average for high-winded storm events is 24,751.
Storm Activity Appears to be on the Rise.

- The National Geographic website cites an increase in all global weather events since 1980.
- The bottom line is, there is more severe weather in more places than ever before.

[link to National Geographic website](www.nationalgeographic.com/environment/climate-change/)
Not All Roofs Perform the Same.
IKO Performance Products Stand up to Adverse Conditions.

Durable to the core thanks to IKO’s proprietary fiberglass mat.

Incredibly strong and fast bonding thanks to IKO’s Fastlock™ sealant.

Long-lasting durability because of IKO’s heavyweight asphalt coating and proprietary granules.

Superior nail holding strength, in the ArmourZone®, reinforced nailing zone.

Incredible wind resistance, warranted up to 130 mph (210 km/h).
What Defines Shingle Performance.

- Core Integrity
- The Amount and Type of Asphalt
- Granule Coverage and Adhesion
- Blue-Green Algae Resistance
- Nail-Holding Power
- Effective Sealing
• IKO manufactures its own glass fibers as well as its own fiberglass mat.
• Moisture and rot-resistant.
• Provides structural integrity.
Asphalt Can be Formulated for Various Applications

- Asphalt can be modified by various additives to produce unique qualities.

- Rubberized polymers can make asphalt more pliable and elastic.

- If the asphalt is too pliable, it can easily scuff.

- As with almost all building materials, the more material, the better. IKO shingles are among the heaviest in the industry.
- IKO quarries and crushes its granules to its unique specifications.

- Granule coverage and adhesion are critical to the long life of the shingle.

- Granules protect the asphalt from the harmful effects of the sun and inhibit the weathering process.
IKO Copper-Coated Granules Prevent Unsightly Black Streaks

- IKO mines its own granules and applies a copper coating that inhibits blue-green algae growth.

- Blue-green algae can cause unsightly black streaks on a roof and is a commonplace issue on older roofs.
Awesome Nail-Holding Power

- ArmourZone's dual nailing lines, top and bottom, 1-1/4" apart, guide installers to the wider nailing surface of IKO's Performance shingles, for correct nail placement.

- The extraordinary holding power of the tear-resistant high performance band on these shingles helps prevent nail blow-through during installation and helps ensure nails won't pull through these shingles in high-winded storms.
Fastlock® Sticks and Stays Stuck

- Fastlock sealant has one of the fastest initial tack times in cold weather.
- It also has one of the fastest full adhesion times in cold weather.
- It is among the best with regard to tab uplift resistance in cold or hot weather.

Source: IKO R&D Lab Tests
Two Shingles, One result: Awesome.

The IKO Performance category features 2 products:

- **Dynasty®**
  - Wind-resistant, high-definition colors, standard asphalt coating.

- **Nordic™**
  - Wind- and hail-resistant, high-definition colors, modified asphalt coating.
<table>
<thead>
<tr>
<th>IKO SHINGLE FEATURES</th>
<th>DYNASTY</th>
<th>NORDIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>ArmourZone 1-1/4” Reinforced Nailing Zone</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>130 mph / 210 km/h Limited Wind Warranty</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>5 7/8” Exposure</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Fiberglass Core</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Fastlock Sealant</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Heavy-Weight Asphalt Coating / Granule Application</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Algae-Resistant Granules</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Iron Clad Warranty Protection 15 years</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>High-Definition Colors</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Polymer-Modified Asphalt</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Class 4 Impact-Resistance Rating*</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

*This rating is not to be construed as any type of express or implied warranty or guarantee of the impact performance of this shingle by the manufacturer, supplier or installer.
The Awesome Power of ArmourZone

130 mph (210 km/h) Limited Wind Warranty

15 High-Definition Colors
Nordic™
Features a Class 4 Impact Resistance Rating – the Highest Available

- Nordic features IKO’s exclusive polymer-modified asphalt.


- This rating is not an express or implied warranty, or guarantee of performance. It may qualify homeowners for a discount on their homeowners insurance.
# Roof Shingle Hail Impact Ratings

<table>
<thead>
<tr>
<th>Manufacturer/Brand</th>
<th>Overall Rating</th>
<th>Dents/Ridges</th>
<th>Tears</th>
<th>Granule Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlas StormMaster® Shake</td>
<td>Excellent</td>
<td>Good</td>
<td>Marginal</td>
<td>Poor</td>
</tr>
<tr>
<td>GAF TruDefinition® Duration FLEX™</td>
<td>Excellent</td>
<td>Good</td>
<td>Marginal</td>
<td>Poor</td>
</tr>
<tr>
<td>CertainTeed Roofing NorthGate®</td>
<td>Excellent</td>
<td>Good</td>
<td>Marginal</td>
<td>Poor</td>
</tr>
<tr>
<td>Malarkey Roofing Legacy®</td>
<td>Excellent</td>
<td>Good</td>
<td>Marginal</td>
<td>Poor</td>
</tr>
<tr>
<td>Malarkey Roofing Vista®</td>
<td>Excellent</td>
<td>Good</td>
<td>Marginal</td>
<td>Poor</td>
</tr>
<tr>
<td>IKO Nordic™</td>
<td>Excellent</td>
<td>Good</td>
<td>Marginal</td>
<td>Poor</td>
</tr>
<tr>
<td>IKO Timberline® Armorshield™ II</td>
<td>Excellent</td>
<td>Good</td>
<td>Marginal</td>
<td>Poor</td>
</tr>
<tr>
<td>TAMKO Building Products Heritage® IR</td>
<td>Excellent</td>
<td>Good</td>
<td>Marginal</td>
<td>Poor</td>
</tr>
<tr>
<td>CertainTeed Roofing TruDefinition® WeatherGuard® HP</td>
<td>Excellent</td>
<td>Good</td>
<td>Marginal</td>
<td>Poor</td>
</tr>
<tr>
<td>CertainTeed Roofing Landmark® IR</td>
<td>Excellent</td>
<td>Good</td>
<td>Marginal</td>
<td>Poor</td>
</tr>
</tbody>
</table>

**Key**  
- Excellent  
- Good  
- Marginal  
- Poor

*Insurance Institute for Business & Home Safety*

*Updated: June 25, 2020*
When Extreme Weather and a Global Pandemic Collide: The Case for Building Stronger

https://medium.com/@roy_wright/when-extreme-weather-and-a-global-pandemic-collide-the-case-for-building-stronger-b66e60b2d08a

WRITTEN BY

Roy Wright
President & Chief Executive Officer at The Insurance Institute for Business & Home Safety (IBHS) https://ibhs.org/

Good Neighbors Elevated – a homeowner experienced roof damage and leaks after a storm. He and his son noticed that a neighbor’s new Nordic roof, however, was unharmed by the storm. They reached out to the IKO contractor who did the neighbors roof and, today, have Nordic on the house. https://youtu.be/H_KBjzDvt0s (this is a follow up to Protection Elevated which can be found below).
Average Age of Roofing Replaced


3M Economic Forecast for the Asphalt Shingle Industry 2017
Roof covering and re-roofing requirements (effective 1/12/19):
Residential roof covering installations must comply with 2018 IRC Chapter 9.
Commercial and multi-family roof covering installations must comply with 2018 IBC Chapter 15.

New construction:
1. **NEW:** Asphalt shingles are required to be Class 4 impact resistant that meet UL 2218 test.
2. The fire resistant classification of a roof covering on any new structure regulated by this code shall be Class A or noncombustible.
3. Roof coverings must be installed for a “high wind area” per manufacturer specs.
4. Any fire resistant Class B or Class C roof covering may be used on the construction of an addition to an existing single-family house/duplex/townhouse, provided the roof extremities of such existing building and newly constructed addition are located a minimum distance of 5 feet to the nearest adjacent property line and are a minimum distance of ten feet to another building.
Re-roof requirements:
1. A permit is required for roof repair or replacement exceeding one square of covering (100 sq.ft.).
2. NEW: Asphalt shingles are required to be Class 4 impact resistant that meet UL 2218 test.
3. NEW: In order to receive a required letter of completion, a disposal receipt and final waste management plan must be submitted at the end of the project including amount of waste discarded and location/landfill where waste was discarded.
4. No portion of an existing non-fire resistant rated roof covering may be permanently replaced or covered with more than one square of non-fire-rated roof covering.
5. A change of roof material will require a Class A fire resistant rated roof covering be installed. A roof covering system may be replaced with the same fire classification in accordance with the manufacturer’s installation instructions when the same materials are used (i.e. asphalt shingle to asphalt shingle), provided the replacement roof covering has a minimum Class C fire rating.
6. Existing solid sheathed deck shall be without water damage or physical damage. Gaps between sheathing exceeding 1/8” will require solid sheathing (overlay of min. 1/4” plywood or new solid sheathing).
7. Roofs with 2 or more layers of existing roof covering must have all layers removed down to deck for new roof covering. No more than two total layers of roof covering are allowed at completion.
8. Ice barrier shall be installed at all roof eaves starting at the low eave edge and extending upslope to a point at least 24 inches beyond the interior edge of the exterior wall. For roofs with slopes 8:12 or steeper the ice barrier shall also extend at least 36 inches upslope from the eave edge.
9. A final inspection and a letter of completion are required for all roofing permits.
Homeowner Insurance Discounts

Roofing Materials - Discounts

Homeowners may be able to obtain a discount in their home insurance premiums based on roofing materials.

Roofing: Premium Credits Product Listing
Roofing Products Eligible for Discount in the Following States

Asphalt Composition

IKO Industries Ltd.

UL 2218 / FM 4473 Classification:
Class 4
FORTIFIED
US States Supporting Resilience

Alabama

A 2009 Alabama law requires insurers to provide homeowners with discounts for coastal houses that are built, rebuilt, or retrofitted according to FORTIFIED standards. They now earn a **discount of about 35 percent** on the wind portion of their insurance premium.

A state program, [Strengthen Alabama Homes](#), provides grants for retrofitting homes to FORTIFIED standards. The “coastal code supplement” building code overlay adopted by many municipalities is also based on the FORTIFIED standard.

FORTIFIED standards provide “greater assurance for homeowners that, if an extreme event occurs, they won’t have to move out for six months while they rebuild.”—Alabama Center for Insurance Information and Research (ACIIR) director Lars Powell.

North Carolina

In North Carolina, a FORTIFIED Home Roof designation may qualify you for annual **wind mitigation credit** that could **lower your insurance premium**. Check with your insurance agent for specific policy requirements and potential wind mitigation credits in your area.

Connecticut

Recent amendments to the 2015 International Residential Code (IRC) require that tape be applied over all horizontal and vertical joints before underlayment is applied to roof decking. This step is one of the most cost-effective and easy-to-install elements of the IBHS FORTIFIED Roof program.
FORTIFIED
Increasing Home Resale Value

A recent study concludes: “switching from a conventional construction standard to a FORTIFIED designation increases the value of a home by nearly 7 percent, holding all other variables constant.”

The findings “suggest that building FORTIFIED houses or retrofitting houses to meet FORTIFIED standards is an economically sound investment,” the report says.

Bottom line...“The additional cost of building or retrofitting is frequently less than 7 percent of home value; therefore, the benefit of FORTIFIED designation is very likely to outweigh the cost.”

“Estimating the Effect of FORTIFIED Home™ Construction on Home Resale Value,” investigated the sales of 321 homes from 2004 to 2015, 22 percent of which were built or retrofitted according to FORTIFIED standards.
Additional Programs Supporting Resilience

**HERO Program**
A Property Assessed Clean Energy Program provided by the Federal Government to provide financing for energy-efficient, water efficient, and renewable energy products to home and businesses in approved communities.

**PACE**
Property Assessed Clean Energy (PACE) is an innovative financing tool which building owners and developers can use to upgrade their building's energy performance, install renewable energy systems and reduce resource consumption with no money down and with the financing repaid through their property’s tax bill.

- In the US, PACE programs are typically enabled through state legislation, and authorized at the local government level. Municipalities may directly administer residential PACE programs, or through public-private partnerships with one or more PACE providers.

- In Canada, PACE is a private non-profit education and advocacy organization. We are dedicated to dramatically reducing Canada’s GHG footprint through the establishment of a dynamic and thriving PACE ecosystem in Canada.
THANK YOU!