



**SAFE HAVENS. Protecting our  
assets and our families.**





**Frank Lohmann**  
Senior  
Director,  
Building  
Science, CHBA



**Qudsia Ahmed**  
AVP,  
Underwriting,  
Co-operators



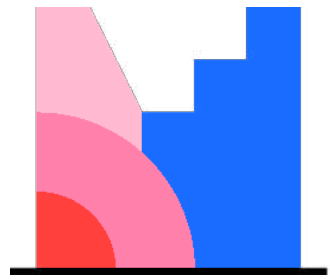
**Robert Lepage**  
Founding  
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Climes Group  
Engineering Inc.



**Dan Sandink**  
Director of  
Research,  
Institute for  
Catastrophic Loss  
Reduction



**Sonja Winkelmann**  
Senior Director,  
Net Zero Energy  
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# Mentimeter



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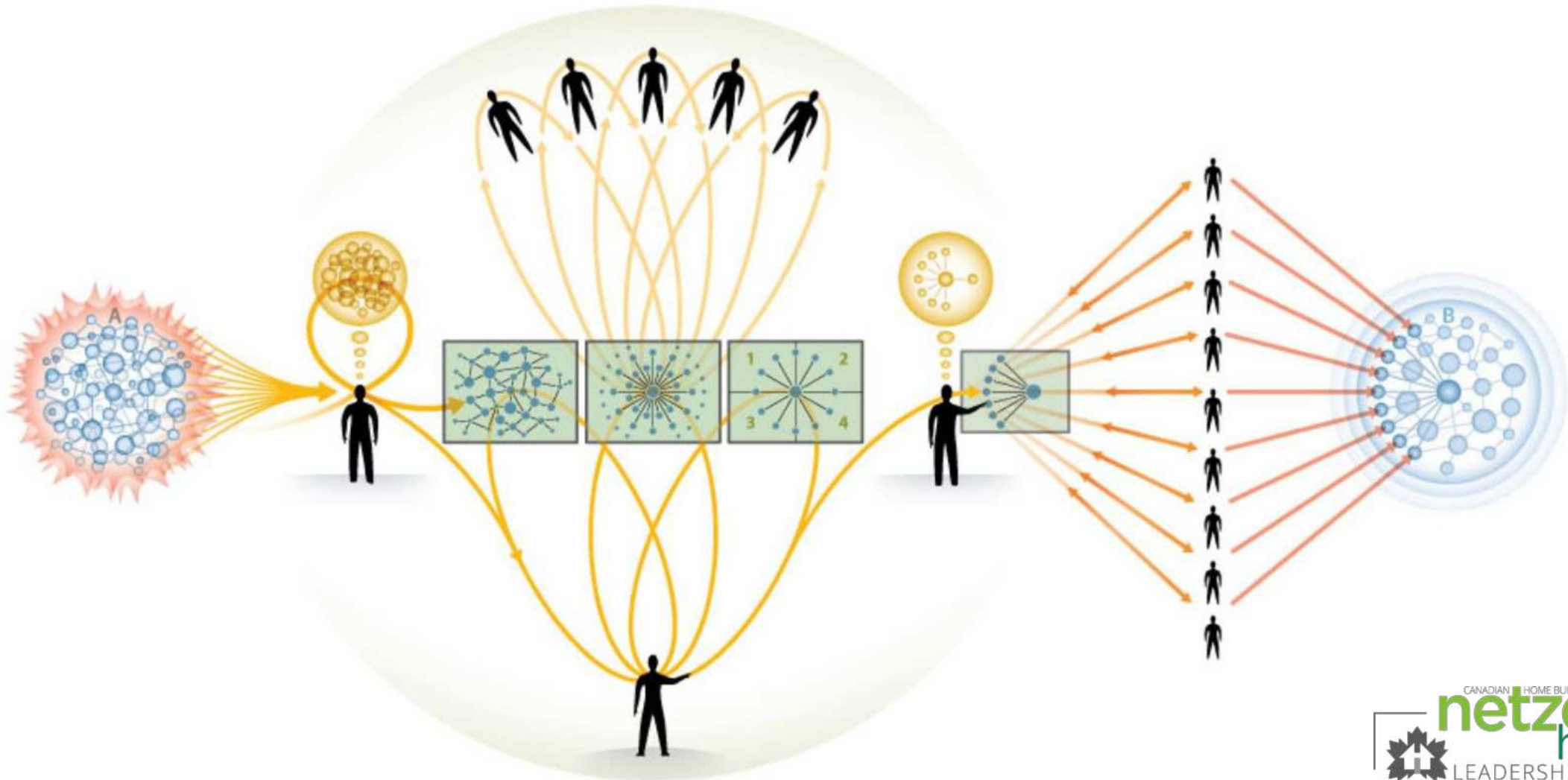
**Frank Lohmann,  
Senior Director, Building Science,  
CHBA**





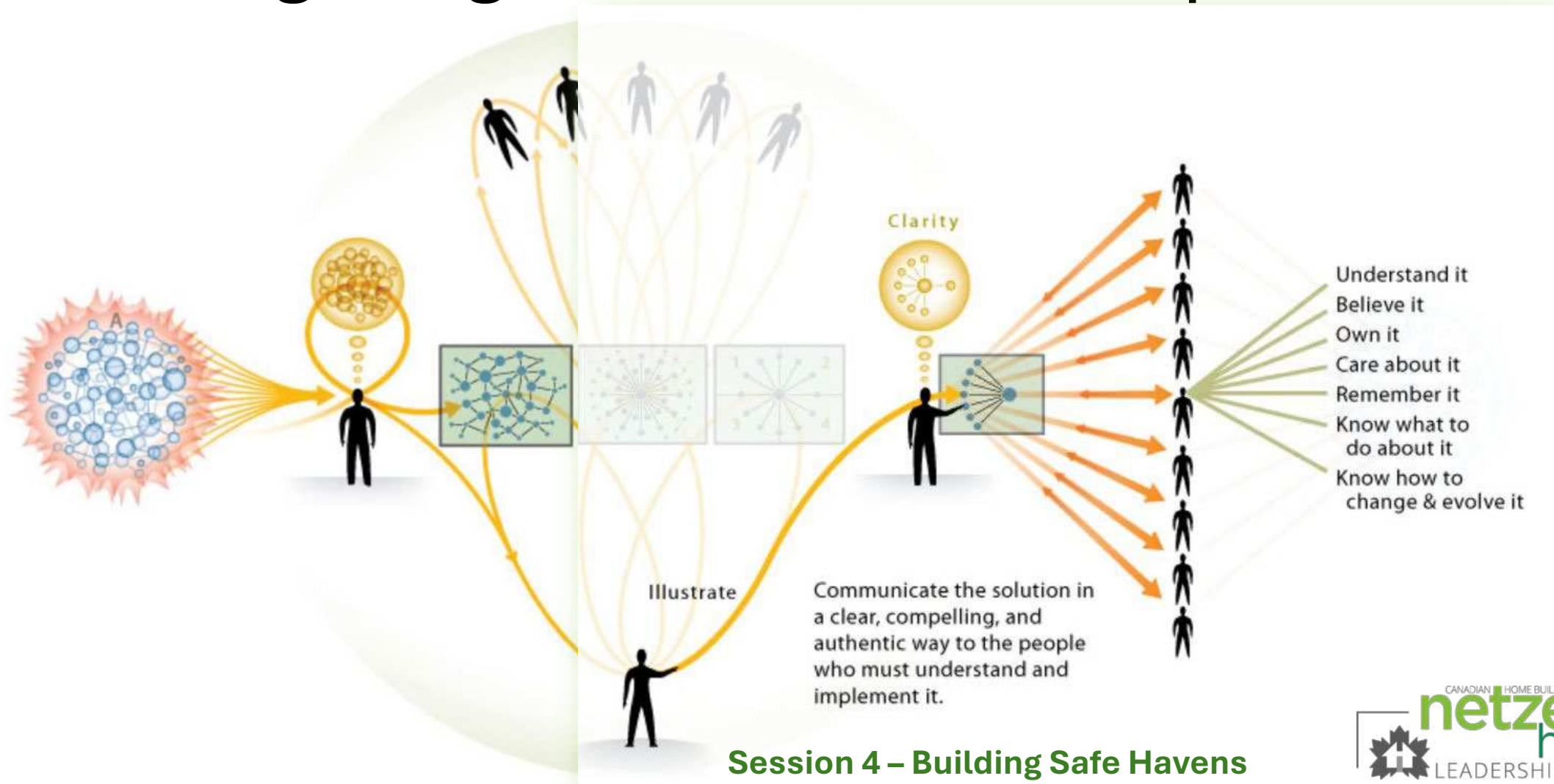
# Session 4

## Integrating Resilience and Adaptation



# Session 4

## Integrating Resilience and Adaptation



Session 4 – Building Safe Havens





**Qudsia Ahmed, AVP,  
Underwriting, The Cooperators**



# Reimagining Insurance

Integrating resiliency and sustainability principles to help insurance remain available and affordable.

Qudsia Ahmed, AVP Underwriting





# The World of Risk is Changing

Unsustainable Trends  
(Current State)

Increasing Risk Levels



Increasing Claims Costs



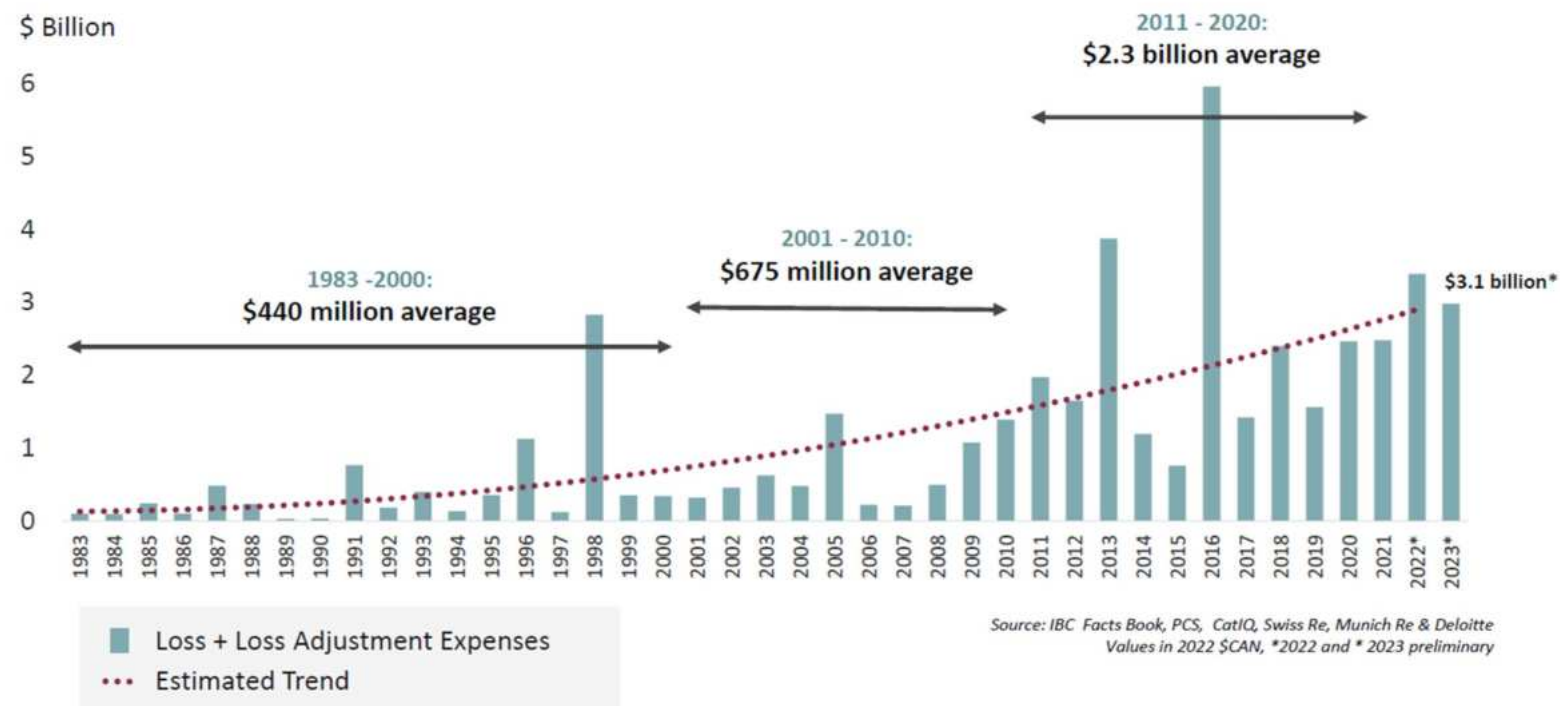
Rising Premiums



Coverage Availability Gaps

## Insured Catastrophic Losses in Canada

\*A catastrophic loss = A single event costing \$30 million or more in insured damage





# Adopting a Circular Operating Model

Insurance Industry  
(Current State)

## Linear Operating Model

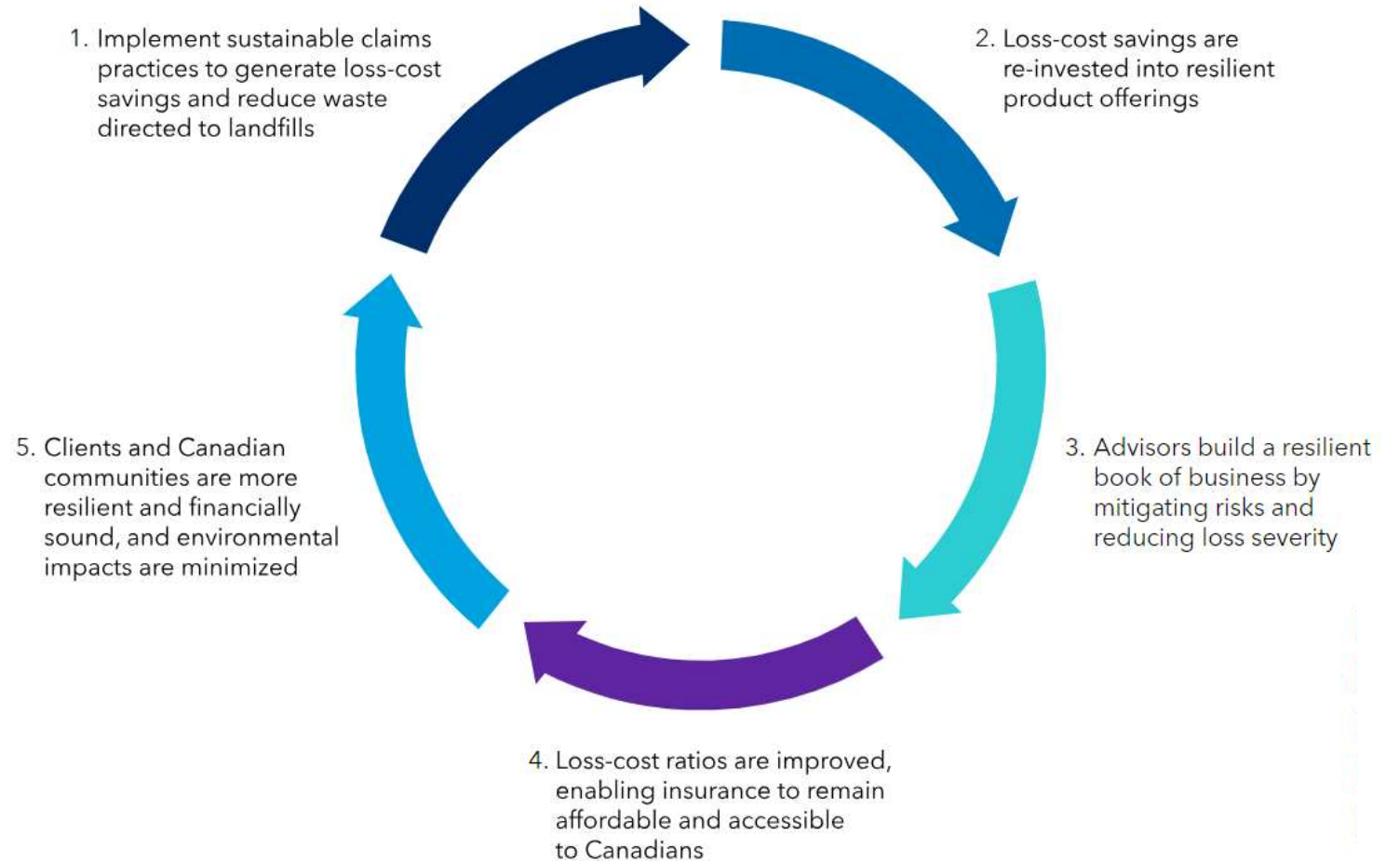
The insurance industry follows a Take, Make, Waste model.

## Claims Waste

In North America, 98% of insurance waste goes to landfills.

## Product Design

We rebuild with materials that are vulnerable to loss.





# CLAIM CHANGERS

PRESENTED BY  
CO-OPERATORS

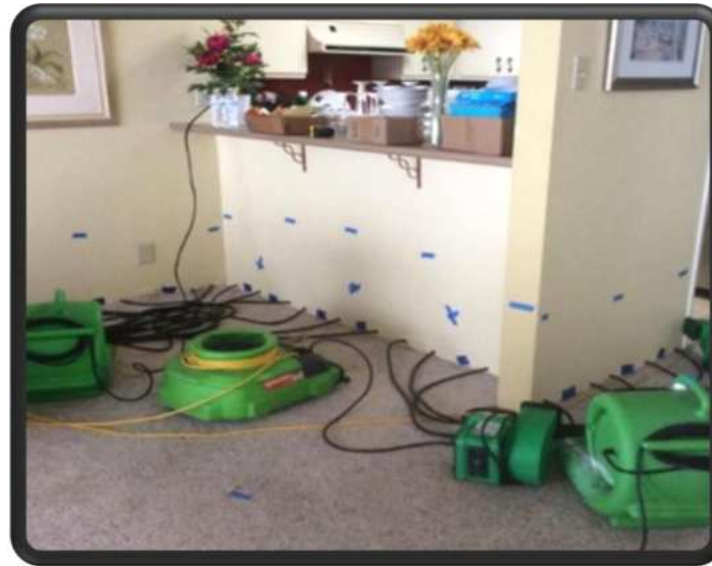
## Sustainable Claims Practices

We're changing the game on insurance waste with sustainable claims initiatives that help keep our clients' belongings out of landfills.

2023

Sustainable Claims  
GHG reduction:  
253 MTCO<sub>2</sub>e\*

Drying-in-Place



Soft-Contents Cleaning



\*Emissions from claims are currently outside of our operational greenhouse gas emissions scope. These reductions are estimations based on available data.



# Resiliency Focused Insurance Products

## Resilient Roofing

Better protection against hail and high winds.

## Hurricane Straps

Better protection against roof uplift during extreme wind events.

## Prevention

### Following a Loss

Rebuild with loss prevention measures that protect against wild fire and flood.

## TomorrowStrong™ Coverage

| Coverage Overview   | Driving Change  |
|---|---|
| <p><b>Resilient Roofing:</b><br/>Up to \$3,000 to rebuild with more resilient roofing.</p>  | <ul style="list-style-type: none"> <li>✓ The TomorrowStrong Endorsement is the first of its kind in Canada.</li> <li>✓ Provides additional funds to help clients build back better following a loss – at no additional premium.</li> <li>✓ Automatically embedded within all qualifying home policies*.</li> <li>✓ Provides stability by reducing our losses, especially in high-risk zones.</li> </ul> |
| <p><b>Hurricane Straps:</b><br/>Up to \$1,500 to rebuild with hurricane straps.</p>   |   |
| <p><b>Prevention Following a Loss:</b><br/>Up to \$1,000 to rebuild with a loss prevention measure focused on preventing that same loss from happening again.</p> |   |

TomorrowStrong™ is a trademark of The Co-operators Group Limited.



\*Habitational and Farm Dwelling Policies (homeowner, residential, seasonal risks – excludes trailers)



# Our future

## Build Resilient Communities

Resilient products ensure our clients & communities are more resilient to face our growing climate risk



## Product Development focused on Risk Mitigation

Design insurance products to reduce risk and prevent losses to ensure Co-operators can offer affordable and assessable insurance solutions



## Research & Design Sustainable Claims Practices

Partnering with international insurance providers, vendors, and the government to embed sustainability practices into our claims handling processes



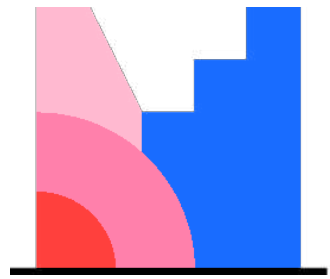




**Robert Lepage,  
Founding Principal,  
Climes Group Engineering Inc.**







# Mentimeter



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**Dan Sandink,  
Director of Research, Institute for  
Catastrophic Loss Reduction**





# Resilient Homes Task Force

## *Planned Activities and Outputs*



Dan Sandink, Director of Research – [dsandink@iclr.org](mailto:dsandink@iclr.org)  
CHBA Net Zero Leadership Summit – June 11, 2024 – Vancouver

## Understanding vulnerability, risk reduction options



Boundary Layer Wind Tunnel, Three Little Pigs, damage inspection – UWG; WindEEE Dome Dunrobin Model

ICLR/U of G Basement Flood Protection Lab: <https://basementfloodlab.com/>



WUI fire inspections

## Standards, guides, assessment methods



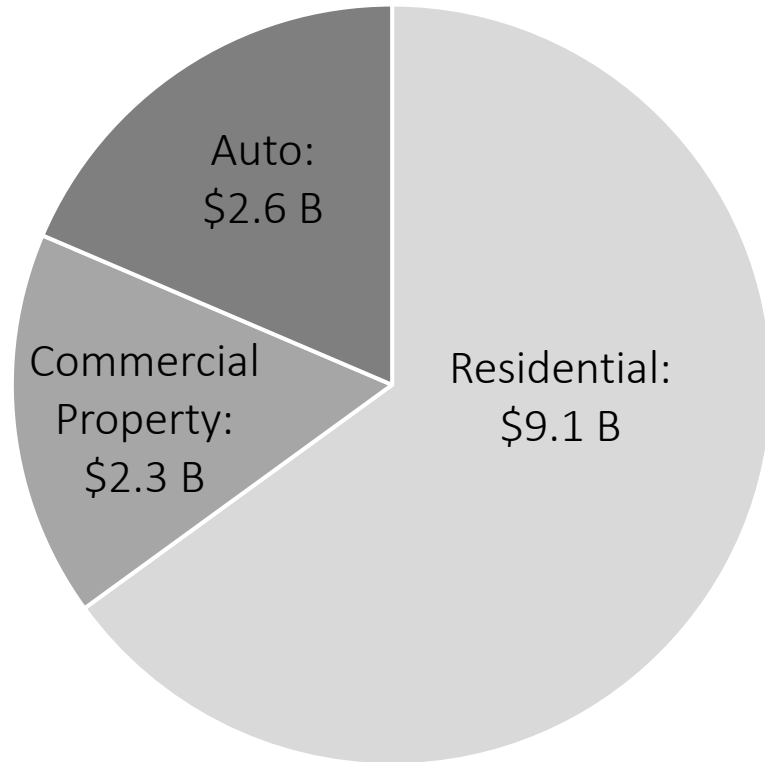
## Supporting implementation, pilots





# Catastrophe Loss in Canada

Cat losses, 2014 to 2023: ~\$14 B (CI, CC)



High wind, hail, urban/basement flood, wildfire are major drivers of climate-related catastrophe losses



# Resilient Homes Task Force

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## Home Building Industry (appointed by CHBA)

|                        |  |
|------------------------|--|
| Alex Miller (Co-Chair) | CEO, Big Block Construction                              |
| Rick Weste             | President & CEO, Triple M Housing                        |
| Cassidy deVeer         | President, 3 <sup>rd</sup> Generation Homes              |
| Carl Pawlowski         | Senior Manager, Sustainability, Minto Communities Canada |
| Bob Deeks              | President, RDC Fine Homes                                |
| Peter Darlington       | Solar Homes Inc.   |

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## Insurance Industry (appointed by ICLR)

|                            |   |
|----------------------------|---|
| Susan Penwarden (Co-Chair) | Managing Director, Personal Lines, Aviva Canada   |
| Lisa Guglietti             | Executive Vice President & Chief Operating Officer, P&C Insurance Solutions, Co-operators |
| Anna McCrindell            | SVP, Chief Operations Officer-East, Wawanesa  |
| Dipika Deol                | Senior Client Manager for Public Sector Solutions, Swiss Re                               |
| Craig Stewart              | Vice-President, Climate/Federal, IBC  |
| Peter Braid                | CEO, IBAC   |

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February 8, 2024 Task Force Meeting - Toronto



# Good, Better, Best

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We know what works for: Wind engineers, wildland fire specialists, drainage engineers, insurers – **we need to learn what works for builders.**

## Good



- Address *recurring* vulnerabilities
- Independent of municipal-side
- Low-risk to builders
- Applicable almost anywhere

## Better



- Builds on “good”
- Based on research, lab assessments
- Cost, practicality not fully assessed

## Best

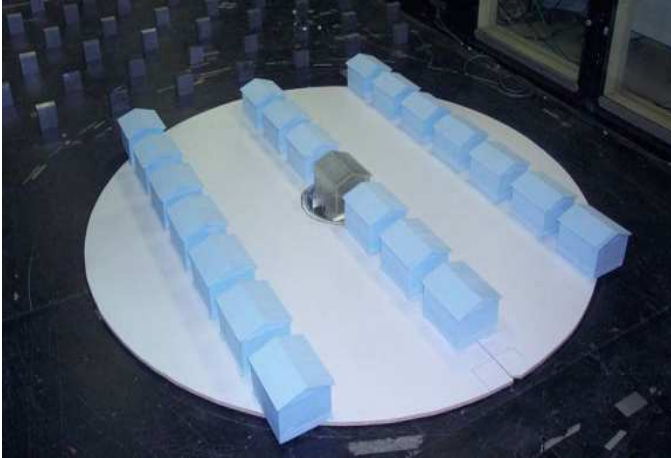


- Application of more “experimental” options
- Full application of guides, standards
- Emphasis on building performance

# Understanding Vulnerability

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Boundary Layer Wind Tunnel



Full scale testing

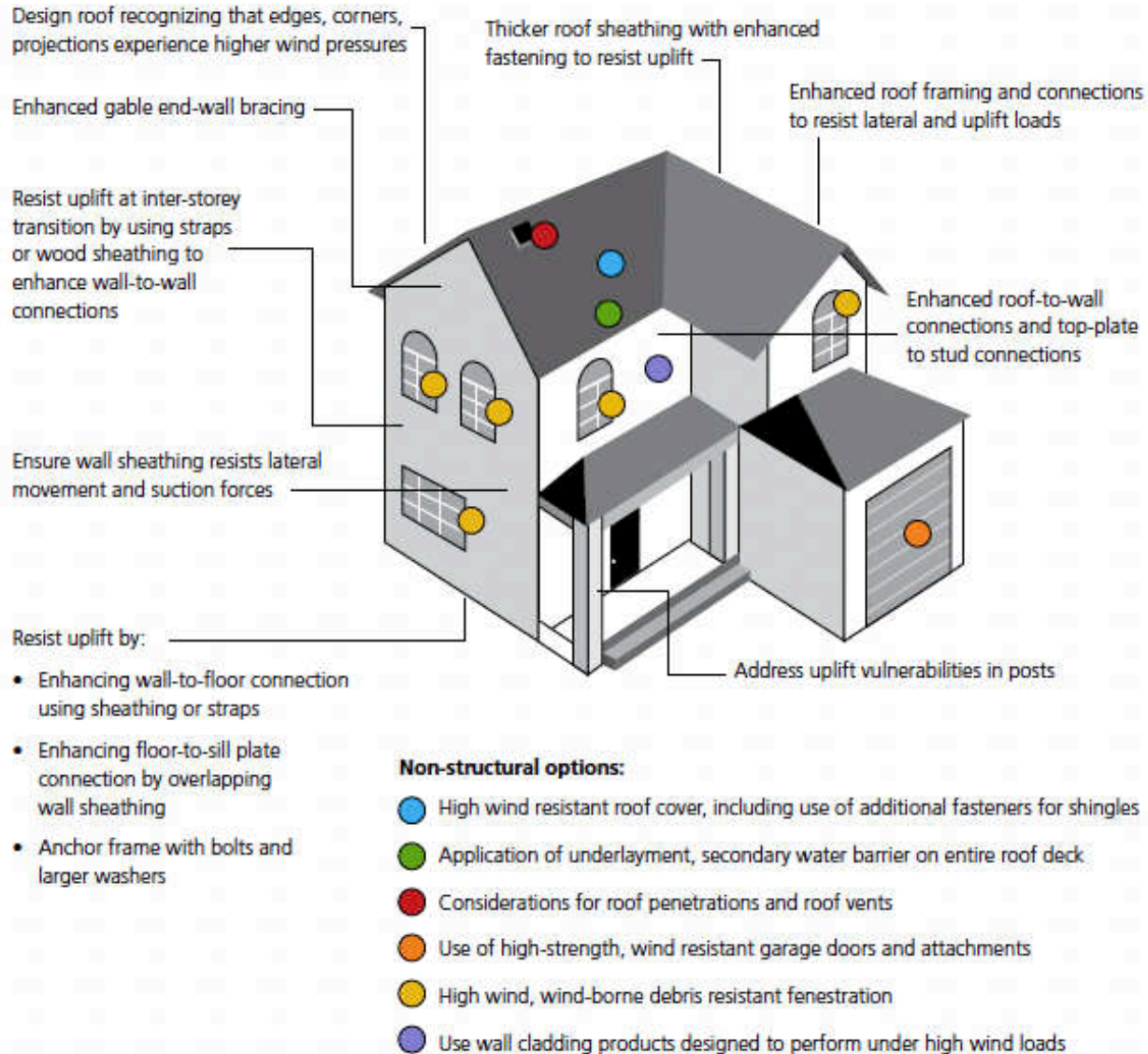



Field inspections





# High Wind Protection





CSA GROUP™

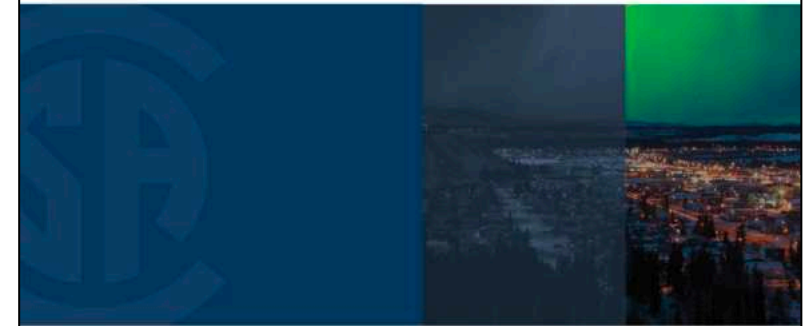
**CSA S520:22**  
National Standard of Canada



**Design and construction of low-rise residential and small buildings to resist high wind**



For CSA Committee Member Use Only. Distribution prohibited.  
Copie exclusive pour membre de comité seulement. Toute diffusion est interdite.



# High Wind Protection

## Good



- Roof cover (ASTM D7158 Class G), 6 fasteners
- Tape sheathing joints

## Better



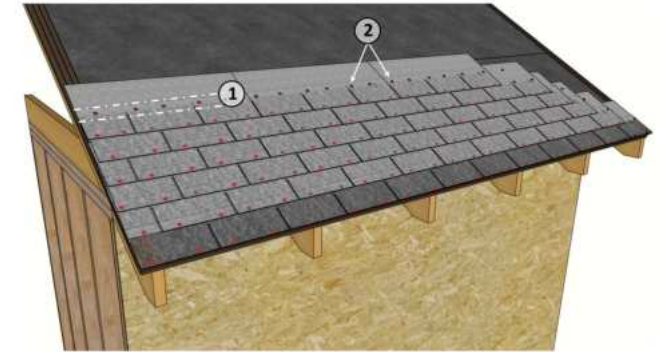
- Roof cover installation (ambient temperature)
- Improved underlayment (re. S520)
- Enhance vertical load path

## Best

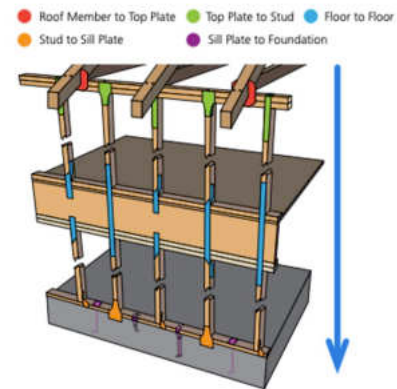
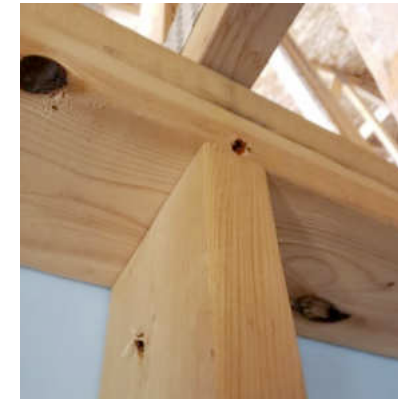


Full application of CSA S520, inc.:

- Thicker Roof Sheathing
- Gable end wall bracing
- Enhanced lateral load resistance
- Cladding, PV, garage doors, etc.



Housing & Urban Development, 2023

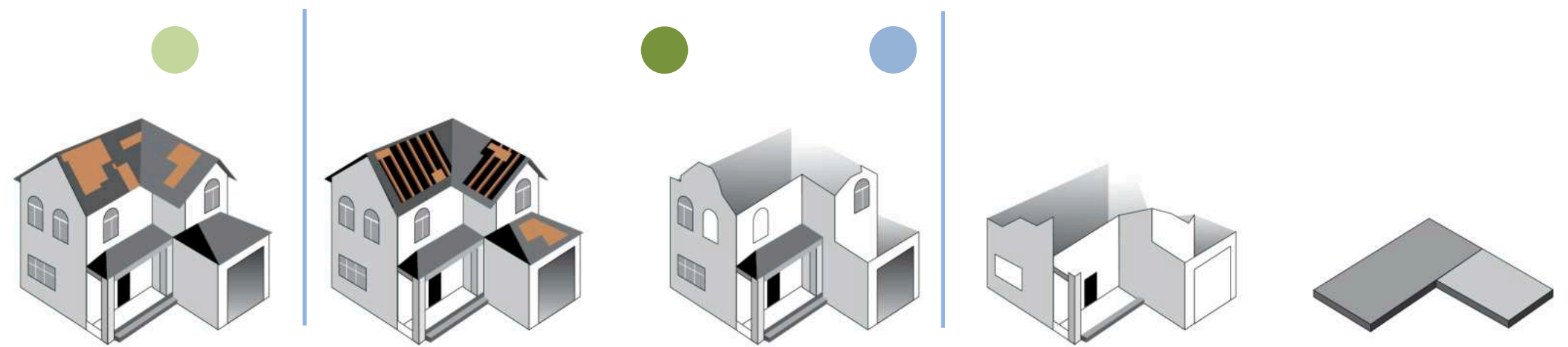




# High Wind Protection

99.6%

52%





Binbrook, 2012 (Luke Bell, Weather Network)



July 8, 2013 - GTA  
126 mm in 6 hrs

1 in 100 year: 91 mm/6 hrs



# Basement Flood Protection (*provisional*)

## Good ●

- Sewer backflow protection
- Backup power for sump pumps (where present)
- Lot grading & drainage
- Provision of maintenance information

## Better ●

- Enhance drainage (e.g., cap backfill)
- Enhance downspout and sump pump discharge
- Address gaps, openings in foundation
- Backwater valves graded 3-8%

## Best ●

Full application of CSA Z800, including:

- Enhanced protection of basement windows
- Utility penetrations above grade
- Enhanced foundation drainage practices, inc. maintenance access



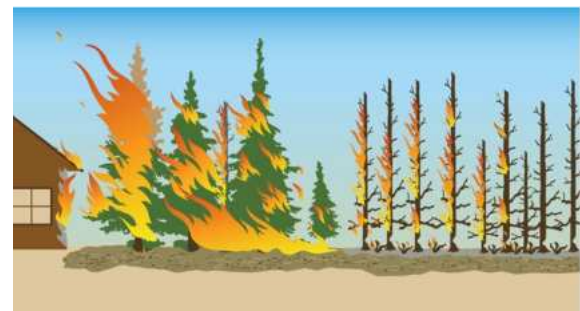
# Wildfire Protection



Convection/Transport of Embers



Radiant Heat



Conduction/Direct Flame Contact



Insurance Institute for Business and Home Safety (<https://ibhs.org/newsroom/>)



# Wildfire Protection (*provisional*)

## Good



- Address home ignition zones (inc., decks, no mulch around buildings)
- Class A roof cover
- Multi-pane windows

## Better



- Separate wood fence from building
- Cladding
- Non-combustible attachments
- Protect vents
- Enclose eaves

## Best



Apply NRC WUI Fire Guide, including:

- Gutters, selection of vegetation, addressing intermediate, extended zones



# Hail Protection

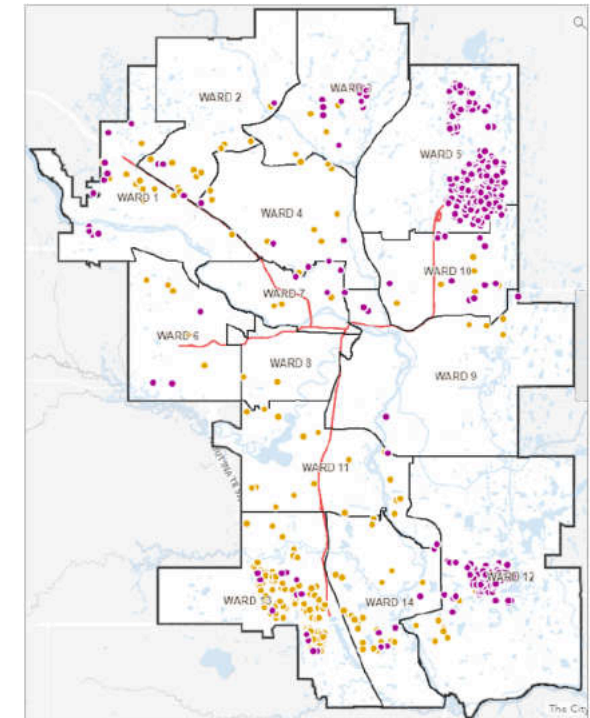
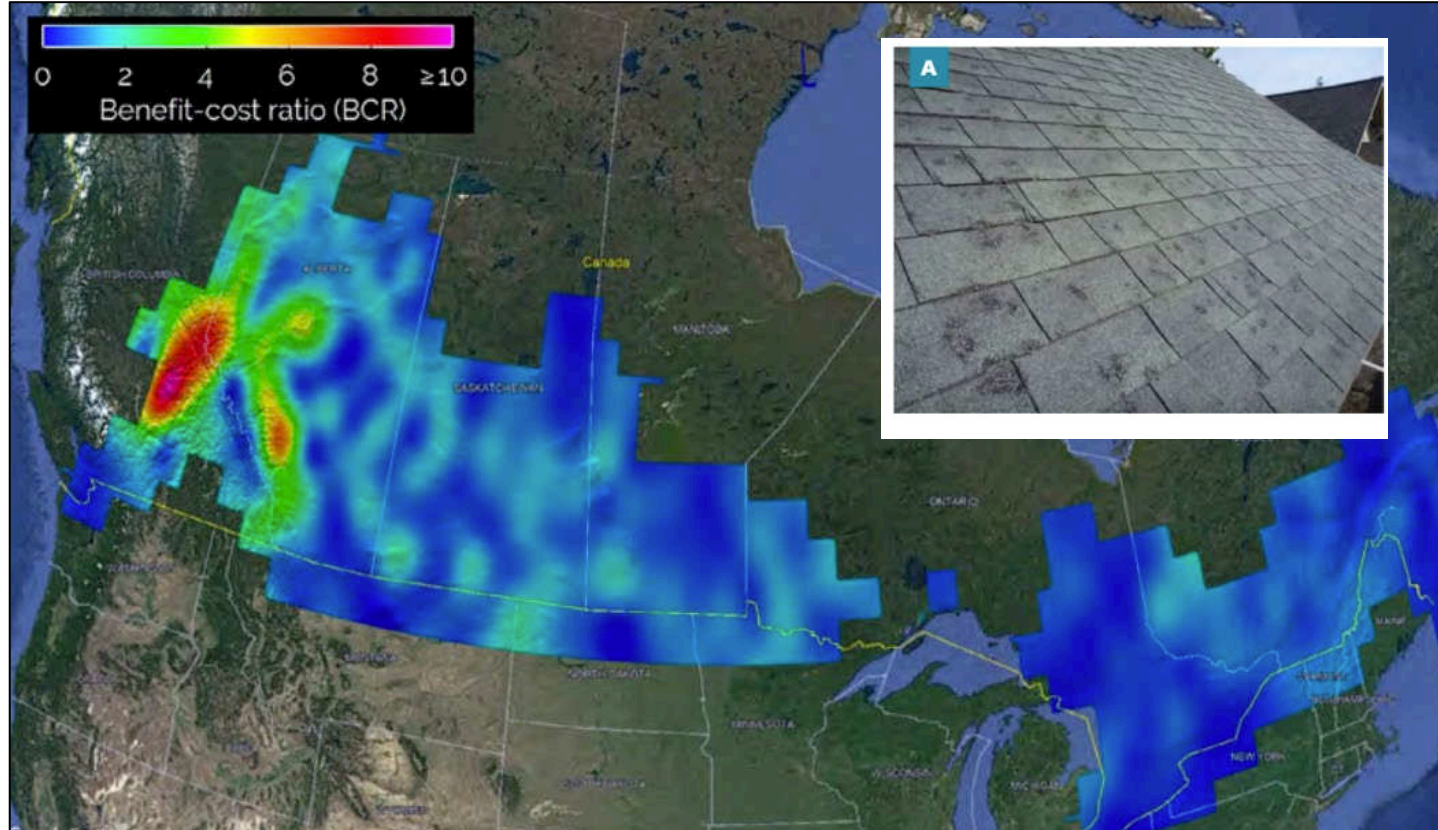
**Calgary**  **Hail in Calgary** 

June to September is hail season in Calgary. Hail is formed when drops of water freeze together in the upper regions of thunderstorm clouds. Hail can range in size from a small green pea to a tennis ball and can hit the ground at up to 100 km/hr. Severe storms can produce damaging hail, heavy rainfall and strong winds during these months. These storms can cause injury and damage to cars, homes, and businesses.

**Now is the time to prepare, follow these steps to get ready:**



  
Build Back Better



IR Roofing Rebate -  
Locations

Link: <https://www.iclr.org/wp-content/uploads/2022/04/Benefit-cost-analysis-of-impact-resistant-asphalt-shingle-roofing2.pdf>



# Hail Protection

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## Good

- UL 2218, FM 4473 IR Roof Cover

## Better

- Roof cover
- Secondary water barrier

## Best

- Roof cover
- Secondary water barrier
- Resilient siding



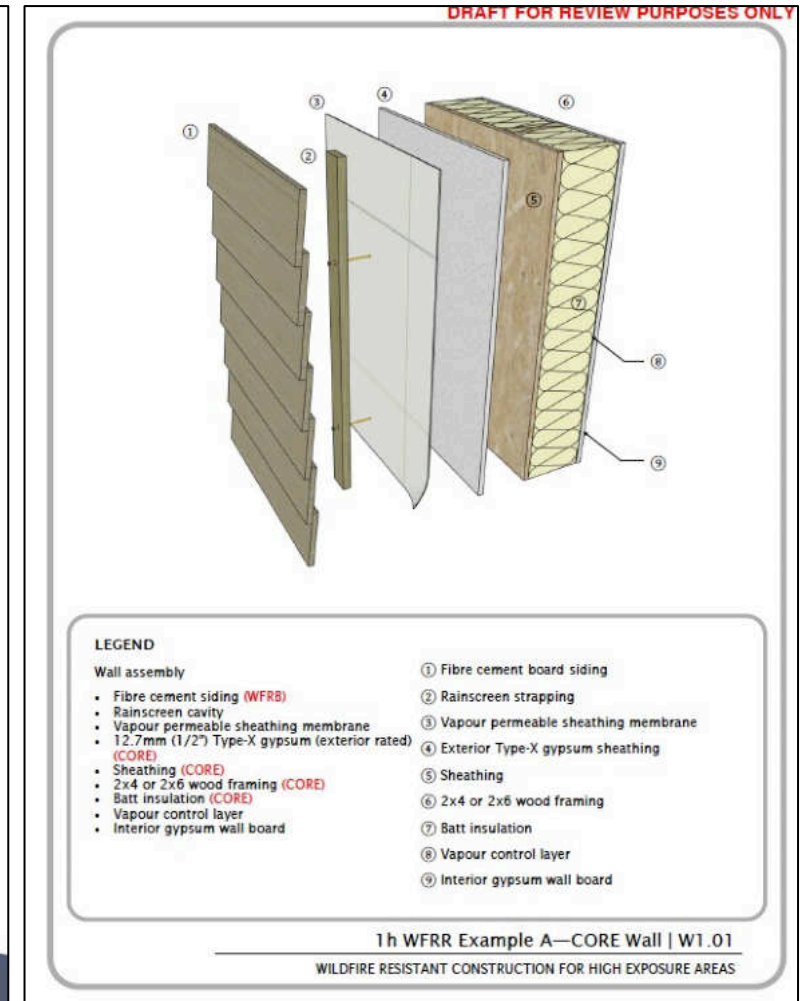
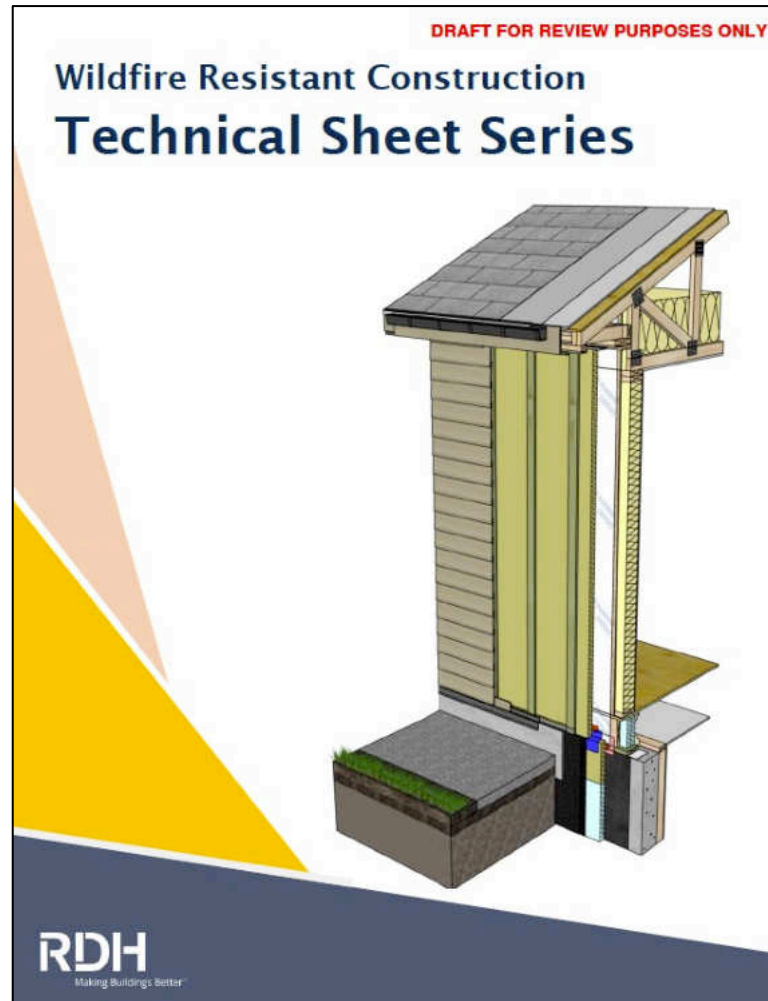
Class 4 IR Roof Cover – Calgary, 2022



After the June 2020 Calgary hail disaster – James Hardie

# What works for you?

## Technical drawings





# What works for you?

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## Checklists

### SOFFITS, FASCIA AND GUTTERS

- 15.  Eaves are closed. Roof systems that include a built-up roof above rafters do not include venting on the vertical face between rafters. Soffit venting can be used provided it follows item 11 above.
- 16.  Soffits and fascia are constructed of non-combustible materials and are tight fitting.
- 17.  Rain gutters and downspouts are of metal construction.
- 18.  Rain gutters are fitted with non-combustible gutter caps.

### EXTERIOR SIDING/CLADDING

- 19.  Exterior siding is non-combustible or ignition resistant.
- 20.  There is no vinyl siding and/or wood siding installed.
- 21.  Exterior siding terminates a minimum of 15 centimetres above grade. The exposed foundation wall between the siding termination and grade is non-combustible. This applies to all homes whether built with a foundation, frost wall, or slab-on-grade.

### WINDOWS, DOORS and SKYLIGHTS

- 22.  Windows are equipped with a tempered exterior pane.
- 23.  Exterior doors have a fire protection rating of at least 30 minutes.
- 24.  Door lites are glazed with tempered glass.
- 25.  Exterior screen doors are of non-combustible construction and have non-combustible screening.
- 26.  Skylights or daylighting tubes, including flashing, is of non-combustible construction and incorporate tempered glass and not acrylic glazing.

### EXTERIOR SEALING AND CAULKING

- 27.  Where gaps in the exterior siding are incorporated to allow drying of the wall assembly, (e.g. rain screen walls) any gap larger than three millimetres is fitted with three millimetre non-combustible metal screening to prevent ember penetration.

- 28.  Non-intentional gaps larger than three millimetres anywhere along the exterior of the structure are filled and sealed with a suitable fire-retardant caulking or sealing product.
- 29.  Only suitable fire-retardant caulking or sealing products is used to seal exterior penetrations, joints and gaps.

### FENCING

- 30.  Where the property includes combustible fencing, a 1.5 metre metal gate or full break exists between a wood fence and the exterior wall of a home.

### DECKS, BALCONIES, PATIOS AND PORCHES

- 31.  Decks, balconies, patios, porches, and similar building extensions attached to, or within 10 metres of a home have a continuous, ignition resistant or non-combustible top surface without slots, openings or spaces, which terminate low to the ground. Decks with gaps or cracks in the deck surface have deck joists capped with corrosion resistant, non-combustible material, or are constructed with non-combustible deck joists.
- 32.  Where deck, porch or balcony structures intersect with exterior walls, a non-combustible flashing is installed between the underside of the exterior siding and the top surface of the deck.
- 33.  Where a deck, porch or patio structure sits above a graded surface, this surface is devoid of vegetation and graded with non-combustible materials. Additionally, 12-millimetre sheathing or three-millimetre metal non-combustible screens can be installed to enclose the space under the deck.
- 34.  Where a deck, balcony, or porch requires a railing, the railing consists of non-combustible material.
- 35.  Decks that are on, or directly above slopes of 10 per cent or greater are enclosed with 12-millimetre non-combustible sheet or panel-type material to minimize the incursion of radiant and convective heat from below.

# What works for you?

## Accessible homeowner/buyer information

### Basement flood protection: New construction



Basement flooding can occur even where well-defined major drainage systems are present, due to excess water entering sanitary sewers. Regional basement flooding occurred during this storm in Binbrook, where ~250 mm of rain fell in 3 hrs. (Photo: Weather Network).

This document provides **basic, enhanced, and resilience** level measures appropriate for any Part 9 building in Ontario to reduce risk of basement flooding.

Extreme, short-duration rainfall events overwhelm stormwater system capacity, resulting in flooding of basements from a combination of stormwater/overland flow, sewer backup, and seepage. Every year, thousands of households in Canada are affected by basement flood events, resulting in \$100s of millions in damages, most of which are uninsured.

Unlike river flood events in Ontario, urban/basement flooding can affect almost any home when rainfall intensities exceed stormwater management system design standards.

**As this document is meant to support pilot implementation of flood resilience, it focuses on basic flood protection options.** Guidance concerning basic, enhanced, and resilience level measures are provided in the table below. Detailed guidance on basic measures are provided in the appendix to this document. Enhanced and Resilience level measures are outlined in CSA Z800:18 – *Basement flood protection and risk reduction*.

| Protection level  | Recommendations  |
|-------------------|--|
| <b>Basic</b>      | <ul style="list-style-type: none"><li>• Provide sanitary sewer backflow protection.</li><li>• Provide backup power system(s) for sump pumps (where pumps are present).</li><li>• Provide backwater valve and backup power maintenance guidance to the owner.</li><li>• Where provided, backwater valves and sump pumps systems should be accessible for ease of maintenance.</li><li>• Ensure lot grading and drainage directs water away from the building (applies only where local lot-grading and drainage bylaws are not present)</li></ul> <p><i>See appendix for additional detail on basic basement flood protection options.</i></p>  |
| <b>Enhanced</b>   | Basic measures plus: <ul style="list-style-type: none"><li>• Provide enhanced grade on mainline backwater valve (between 3% and 8%).</li><li>• Provide a well-graded, impermeable cap on backfill area, which extends beyond the line of excavation and backfill.</li><li>• Provide enhanced surface flood protection for exterior stairwells (where present).</li><li>• Eavestroughs downspout and sump pump discharge points should be located beyond the backfill area, directed to appropriate receiving drainage systems.</li><li>• Address foundation cracks and entry points for infiltration flooding.</li><li>• Identify and seal all potential surface flood entry points (e.g., penetrations through foundations).</li></ul>  |
| <b>Resilience</b> | Enhanced measures plus full application of remainder of CSA Z800:18, including: <ul style="list-style-type: none"><li>• Avoid installation of window wells. Where they are present, provide enhanced surface drainage protection.</li><li>• Foundation drainage systems drain by gravity to receiving systems and are protected against backwater. Where this is not possible, drain to the surface via sump pump (avoid 3<sup>rd</sup> pipe systems).</li><li>• Foundation drainage systems constructed in a manner that reduces risk of accumulation of debris over the life of the home. Access for foundation drain system maintenance is provided.</li><li>• Enhanced provisions are made for possible sump pit overflow/sump pump failure.</li><li>• Installation of sanitary sewer pipe complies with highest level of manufacturer guidance, with attention paid to grade, bedding, haunching, and backfill.</li></ul> |



# What works for you?

Explanatory web videos

Mobile apps



How to Operate your ERV or HRV | Net Zero Ready Building Science



Ventilation with ERV or HRV | Net Zero Ready Building Science

# Wildfire Resistant Construction Builder Field Trial Offer



12 projects will be selected to receive the following support:

- Co-operators and ICLR grant: \$5,000
- James Hardie material rebate: \$1,000 for standard siding package, \$1,500 if using trim on corners, windows and battens
- Rockwool material donation: Up to 3 pallets of Comfortboard 80 depending on volume and thickness purchased
- 7 interested candidates to date

\*Further details will be provided to interested candidates

Sponsors:



**PacifiCan Fire-Resilient Construction Checklist Version 1.2**

On June 30, 2021 a wildfire destroyed the village of Lytton and surrounding area. Homeowner Resilient Rebuild Program, PacifiCan is supporting eligible homeowner fire-resilient and Net Zero Homes.

The following checklist outlines the Lytton Homeowner Resilient Rebuild Program's resilient construction. The checklist was developed for the program in partnership Canada and expert consultants with RDH Building Sciences Inc. It was informed by wildfire resources and expertise, including the Canadian Wildland Urban Interface wildfire construction literature, and discussions with industry experts. Input from local were also considered to ensure that the program's fire-resilience requirements are current Lytton context, including building bylaws.

**Fire-Resilient Construction Checklist:**

Instructions: All items must be signed off by the builder before submission to PacifiCan program officials.

To complete the form, the builder must:

1. Initial in the right-hand column of each numbered item below to confirm construction is in conformance with the direction associated with that item.
2. Fill out the section at the end with a name, position, and associated company.
3. Sign and date the form.

| Assembly | Description   |  |
|----------|---|--|
| Roof     | 1) Roof coverings have a Class A classification when tested using CANULC-S107, "Fire Tests of Roof Coverings."  |  |
|          | 2) Valley and hip flashing, roof penetration flashing, sill plate flashing, and any other flashing that could be exposed to accumulated embers are non-combustible. |  |
|          | 3) Drip edges are:<br>a) Non-combustible; and<br>b) Extend at least 75 mm upslope from the edge of the roof.  |  |
|          | 4) Roof penetrations, such as pipes are non-combustible.  |  |

Version 1.2







**Our Upcoming workshop: EQ & ICLR Resiliency Workshop**

**When: 18 October 2024**

**Where: Western U**

# Resilient Homes Task Force

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We would like to hear from CHBA builders and renovators interested in conducting **field trials:**

**High wind, urban flood, wildfire, hail**

And we would like to  
**profile your resilience activities** to date

**CONTACTS:**

Frank Lohmann  
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Dan Sandink  
Director of Research  
ICLR

[dsandink@iclr.org](mailto:dsandink@iclr.org)



*Homeowners in Calgary and Edmonton discuss home resilience – ICLR, City of Calgary*





**Sonja Winkelmann, Senior  
Director, Net Zero Housing, CHBA**



# Barriers

## Marketing and Promotion

- Poor branding, understanding, awareness, and demand
- Difficult to articulate value proposition (sales & marketing)

## Competency & Capacity

- Limited education/accreditation and training/skills development

## Technical Standards, QA & Tools

- Lack of standards and support tools

## Cost Reduction

- High cost to build or retrofit (capital & labour)

## Financing & Real Estate

- Lack of appropriate financing mechanisms and/or incentives

## Policy

- Limited enabling policy (e.g. net metering, codes and regulations)



# What has been implemented for the NZHLP?

## Technical Standards, QA & Tools

- Definition
- Technical requirements (homes incl. ERS)
- Administrative requirements (participants)
- Legal language for sales/purchase agreements
- Annual NZHLP Summary Reports
- Technical Committee: change requests & ongoing updates

## Marketing and Promotion

- Brand/logos, consumer webpage with value proposition language and directory of builders/renovators
- Labels, plaques, brochures, shareable videos and blog posts, asset library with images, icons, and animated logos
- 4 social media accounts w. participant promo
- Awards and home opening/ribbon cutting promo package
- Project Profiles
- CHBA annual Home Buyer Preference Survey

## Competency & Capacity

- Building Science, Builder, and EA training
- Sales and Renovator training
- Building Official, Trades, and 9.36 training coming soon
- Webinars
- Net Zero Leadership Summit
- Government funded RD&D projects
- Networking at NZC meetings
- CHBA Builders' and Renovators' Manuals
- LEEP



# What has been implemented for the NZHLP?

## Cost Reduction

- **Still higher cost to build/retrofit** (capital & labour)
- **BUT** Net Zero has come down from ~\$160,000 to ~\$60,000 (some now at NZ TCO!)

## Financing & Real Estate

- **Still need appropriate and reliable financing mechanisms and incentives**
- **BUT** new ones are being developed ie RBC Green Home Mortgage

## Policy

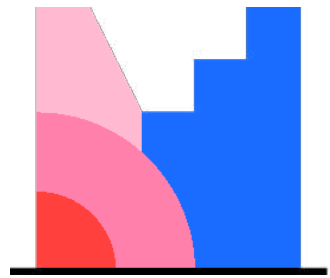
- **Still need reliable enabling policy** (incl. opGHGs & emGHGs + resilience)
- **BUT** codes and regulations are now driving the timelines (However, they're not allowing renewable energy generation to offset the GHGs – which would be helpful in provinces with high emission factor grids!)



# What do we need - to be able to implement RESILIENCE?

The Emissions and Resilience Working Group (ERWG) has been established to provide guidance to CHBA, to assess the feasibility and explore the potential integration of operational and embodied carbon emissions, and **adaptation and resilience aspects** due to extreme weather into the CHBA Net Zero Home Labelling Program (NZHLP).





# Mentimeter



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CANADIAN HOME BUILDERS ASSOCIATION  
**netzero** home  
LEADERSHIP SUMMIT

*Questions?*







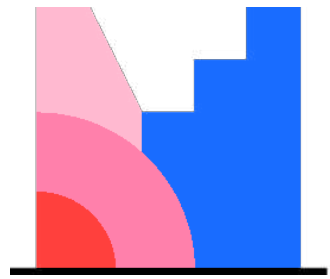
CANADIAN HOME BUILDERS ASSOCIATION  
**netzero** home  
LEADERSHIP SUMMIT

*Day*

*1*

**Closing  
Remarks**





# Mentimeter



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# What's on for tomorrow? Day 2 Agenda



- 7:30 AM Networking breakfast buffet and in the theatre
- 8:30 AM **LEADING THE WAY. Meet 5 Builder Teams achieving Net Zero/Ready in Multi-Family projects.**
- 10:15 AM Break and networking in the DEMO HUB
- 10:45 AM **HOW LOW CAN YOU GO. Electrification on 100 amps?**
- 12:00 PM Lunch buffet and networking in the DEMO HUB
- 1:15 PM **GOTTA KEEP 'EM SEPARATED. Compartmentalization for Multi-Family.**
- 2:30 PM Break and networking in the DEMO HUB
- 3:00 PM **ARE YOU READY FOR THIS? What's next for scaling a Net Zero future.**
- 4:15 PM Summit wrap-up
- THU** **Tours:** 7:30-8:00 AM breakfast to go, 8:00 buses depart, 1:00 PM buses return



# MEET OUR DAY 2 CO-HOSTS!



**Lynne Strickland,  
Director, Initiatives, Net  
Zero Energy Housing, CHBA**



**Andy Oding,  
Vice President, Director of  
Building Science, Building  
Knowledge Canada Inc.**



# Open Mic





# Auction







**# NZLeadershipSummit**  
**# NZLS2024**

*Tag us!* **@CHBANetZero**

