

8th Annual Public Sector Climate Leadership Symposium

Designing for Future Climates

Mobilizing Building Adaptation and Resilience

Goals, Gaps, Challenges, and Partnerships in Moving Forward

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Wilma Leung, BC Housing

Senior Manager, Technical Research & Education

Lead, MBAR Project



**MOBILIZING
BUILDING ADAPTATION
AND RESILIENCE**

Changing Climate



- Storms, flooding events
- Threats to safety, power supply, property and wellbeing



- Urban interface fires
- Air quality advisories
- Threats to health safety & property



- Warmer, drier summers
- Heat waves and threats of overheating
- Threats to occupant health and comfort

... and Seismic Resilience

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... and Seismic Resilience

Also, Social Resilience is key to Adaptative Response on the ground

MBAR - What Do Municipalities & Industry Want?



Mobilizing

To capture opportunities and see results



Building

To impact design and retrofits of buildings, and benefit neighbourhoods



Adaptation

To apply climate knowledge to reduce emissions, and protect people and properties



Resilience

To define resilience, and the capacity to respond



Build capacity by **piloting** integrated adaptive and resilient design solutions



Create tools & training curriculum informed by **real-life application** experience through pilot projects.

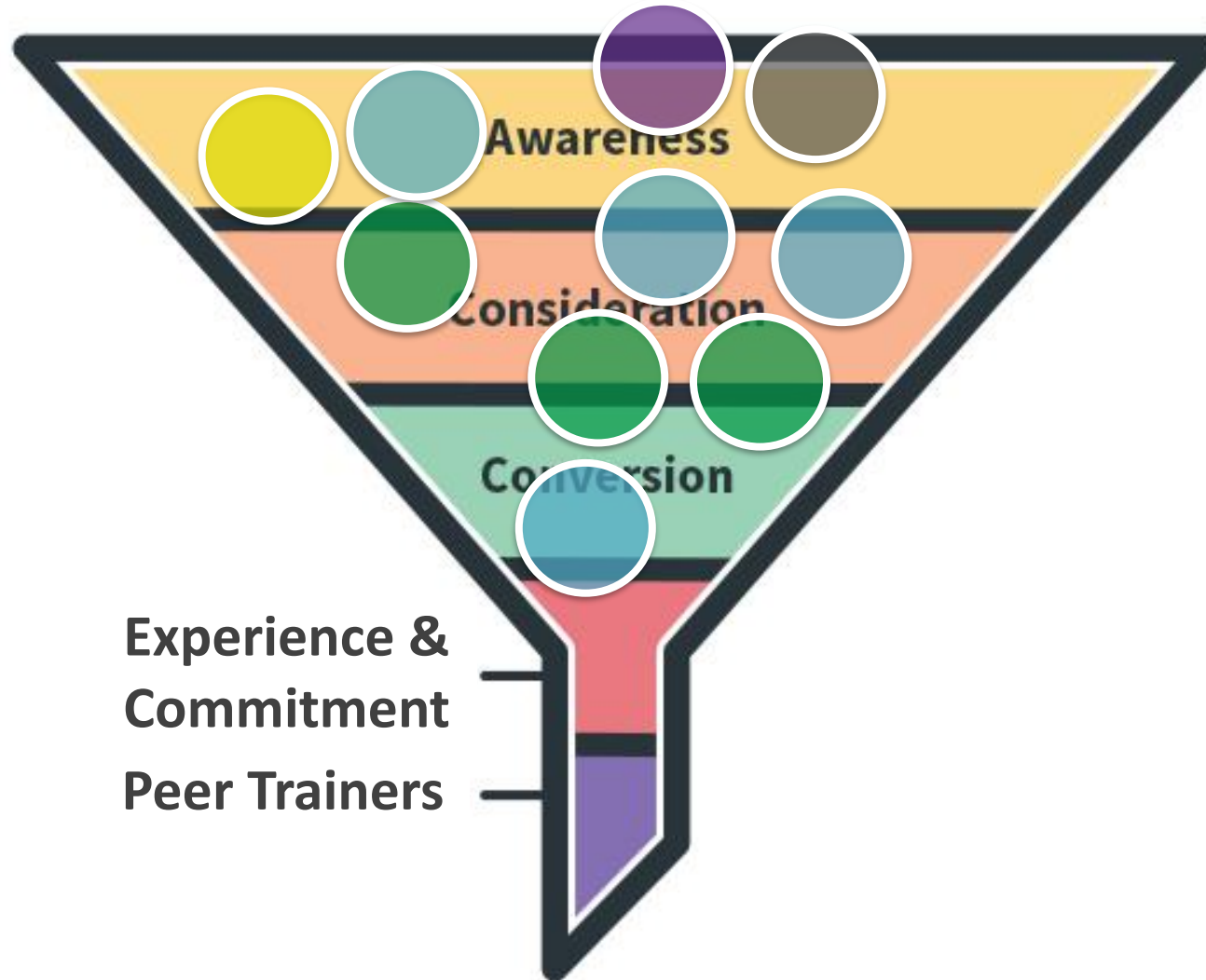


Increase the number of **practitioners** who are aware, informed, educated and experienced.



Experienced practitioners to become **peer trainers**.

Facilitating & Documenting Pilot Project Decision Making Process



Location of Current Pilot Projects

Vancouver



North Shore



Victoria



Nelson



Burnaby



Resilient Buildings

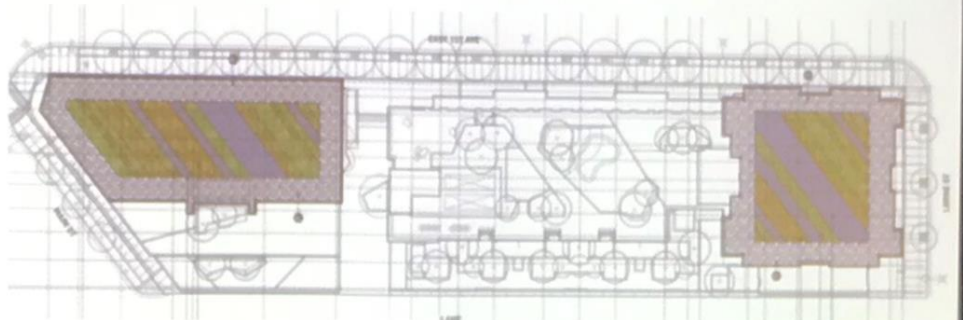


- Maintain critical operations and functions in the face of extreme climate events and ease the return to normal operations
- Improve the overall health and well-being of its occupants
- Assess potential risks and opportunities for resilient design solutions

Air Quality

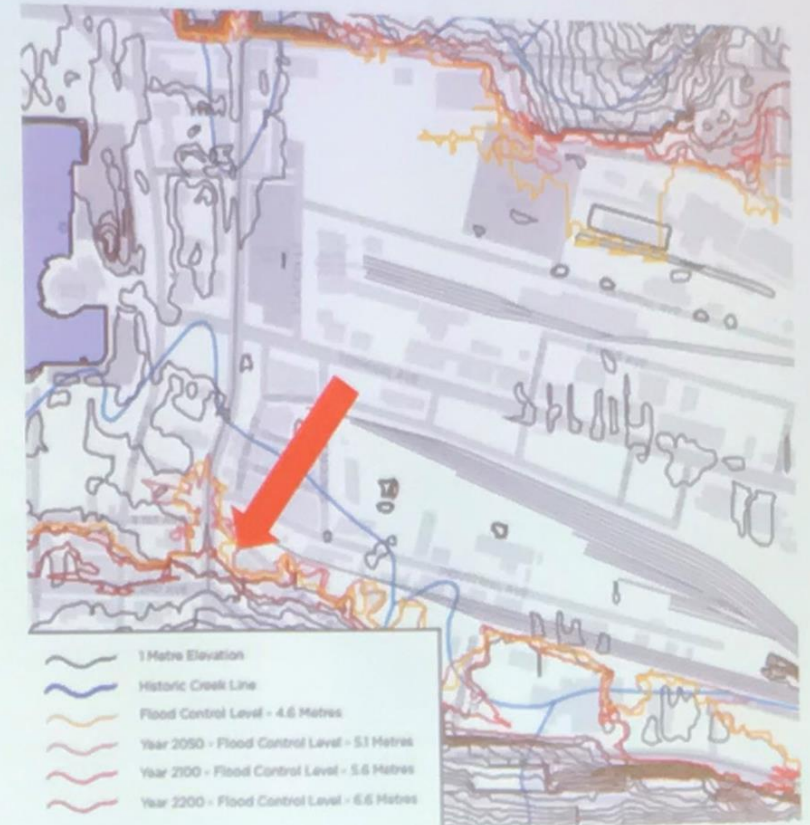
- Air-conditioning in residential suites
- Extensive green roofs and outdoor amenity

Outdoor air to the offices and residential spaces will be provided via localized heat recovery ventilators (HRVs)



Storms and Flood Risk

- Parkade entrance above FCL 4.6m
- Parkade designed to protect service rooms during flood events
- Incoming services design to prevent water back up in case of flood
- Green roof system designed to store water during heavy rainfall events



Emergency Power

- Base case VBBL requires 2-hr for life-safety - lighting, elevators, water supply
 - Emergency generator with additional capacity to operate for up to 8 hours

Design amenity to function as emergency gathering space with back-up power and separate mechanical (i.e. air-conditioning and filtration)



Seismic Events

- Constructed to VBBL, which considers life-safety for seismic events but does not intend for buildings to be operational post-earthquake
- Install meters to measure movement to inform post earthquake condition assessment



Lessons Learned

- Resiliency strategy needs to be considered early in design
- Process led by Owner
- Codes and regulation can support the process
- Knowledge needs to be shared

In the Long Run



Better **protect** everyone's **investments** and society's resources

Compass North



No one is stressed beyond their **ability to cope** in the face of climate change

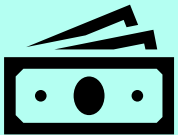


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No one is stressed beyond their **ability to cope** in the face of climate change

More Immediate



Net present value of resiliency measures is always positive



Create **conditions** for zero cost premium to mitigate, adapt and build resilience

In the Long Run



Better **protect** everyone's **investments** and Earth's resources

Compass North



No one is stressed beyond their **ability to cope** in the face of climate change

More Immediate



Net present value of resiliency measures is always positive – often met



Create **conditions** for **zero cost premium** to mitigate, adapt and build resilience

– needs plenty of collective efforts over time



Positive net present value is easy to achieve
but **zero cost premium** is not



Positive net present value is easy to achieve
but zero cost premium is not **yet**

- Any finance directors in the room?



Positive net present value is easy to achieve
but zero cost premium is not **yet**

- Capital costs vs. Operating costs vs. Aftermarket vs. Renewal



Positive net present value is easy to achieve
but zero cost premium is not **yet**

- Capital costs vs. Operating costs vs.
- Any planners in the room?



Positive net present value is easy to achieve
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- Capital costs vs. Operating costs
- Bylaws view cones. . . . and



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Importantly:

- Capital costs vs. Operating costs
- Bylaws view cones. . . . and

Also need:

- Industry tools and capacity – **support MBAR**



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Creating economic conditions:

- Transitioning #1
- Transitioning #2



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- Transitioning #1: Retraining. Repurposing. . . . At an orgn level?
- Transitioning #2:



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Creating economic conditions:

- Transitioning #1: Retraining. Repurposing. . . . At an orgn level?
- Transitioning #2: Carbon use that moves us away from rather than entrenches our dependencies on Carbon?

Examples of Guidelines & Tools – Existing & In Development

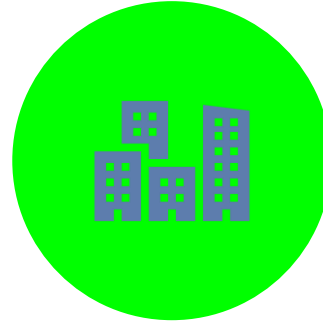
- **Design Discussion Primers.**
Heat waves, warmer summers, wildfires & air quality, severe storms, floods, power outages, earthquake
- **New energy modelling template.**
New considerations for cooling and ventilation, integrating mitigation and adaptation needs
- **Cost-benefit study and financial template for seismic upgrades.**
- **Overheating Design Guide.**
(An extension of our research & education work on Energy Step Code).
- **Leveling the Playing Field for Resilience in Design/Construction Procurement.**



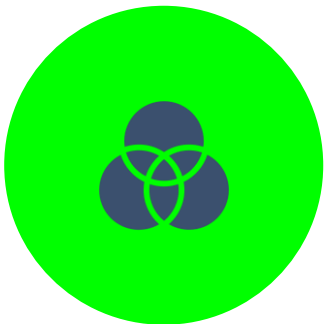
MBAR - Examples of Research Collaboration



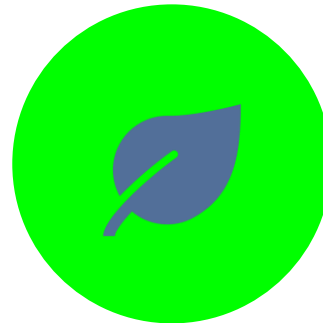
Disaster resilience and climate adaptation for **low-rise residential houses**, through builders peer-to-peer learning. **Institute for Catastrophic Loss Reduction (ICLR)**. Piloting first with **Ontario** builders, and then with **BC** builders.



Design Strategies for Climate Resilience MURBS “2050 ready” to maintain thermal comfort in existing and new multifamily buildings. **UBC & PCIC**. Results applicable to other municipalities in **southern coastal BC**.



Adaptive Mitigation: A framework for assessing synergies, conflicts, opportunities and trade-offs between climate mitigation and adaptation in urban neighbourhoods. **PICS & UBC**. Six buildings from **across BC** are being evaluated.



Low Carbon Power Back-up Options. UBC & BC Hydro.

Questions?

Wilma Leung

wileung@bchousing.org

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