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Government Action



Realizing Resilient Buildings (R2B)

Barriers and Enablers for Climate Adaptation and Resilience in the Building Sector

CleanBC CLIMATE LEADERSHIP SYMPOSIUM
Public Sector and Local Government Action
October 18-19, 2023

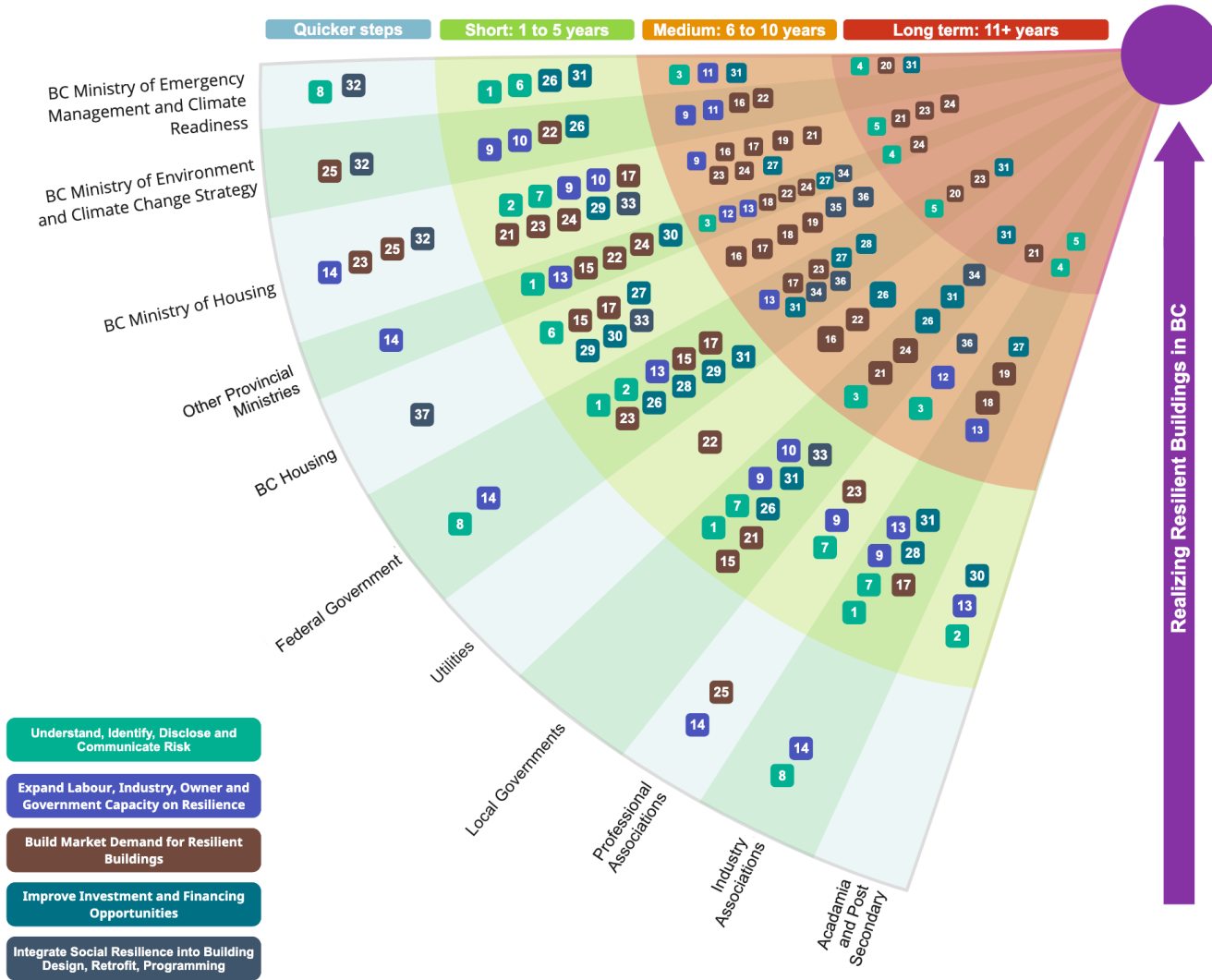
Wilma Leung
Senior Manager, Technical Research & Education
BC Housing Research Centre

“Breakout Session”

Location: Grand Hall



Removing barriers and adding enablers will involve many actors



- the importance of collaboration and of each actor playing their role
- commitment (or at least thoughts) about what each organization can / will contribute to advance the issue
- examples to support overcoming barriers
 - ✓ through leadership in public sector procurement e.g. at BC Housing
 - ✓ use of contracting that supports integrated design and delivery
 - ✓ supporting / undertaking research on retrofit programs
 - ✓ assessing innovative materials and technologies

Overview: Primary Barriers

Technical training and capacity

Limited innovation in design

Little data/ understanding of site hazard exposures

Insufficient training on appropriate resilience measures

Little data on effectiveness of resilience measures

Product availability

Electrical grid capacity constraints

Labour supply limitations

Productivity Limitations

Political and Regulatory

Barriers to retrofits and those imposed by leases and stratas

Complex systems, processes cross jurisdictions

Building Code slow to change

Resilience insufficiently integrated into development regulations

Resilient design conflicts with local policies

Lack of strategic, policy or legislative direction

Training and capacity for local government

Economic and Financial

Few incentives to incorporate resilience approaches

Low consumer demand

Increased burden on operations

Insurance sector grappling with increased costs and incentivizing resilience

Banks and investors lack tools to evaluate climate-related risks

Post-event financial assistance

Funding resilience measures through development may impact affordability

Social and Informational






Range of reporting frameworks on the resilience of buildings

Lack of understanding building system operation and maintenance

Poor awareness of and preparation for local hazards

Social connectivity ignored in building design and operation, may conflict with security

Primary Enablers

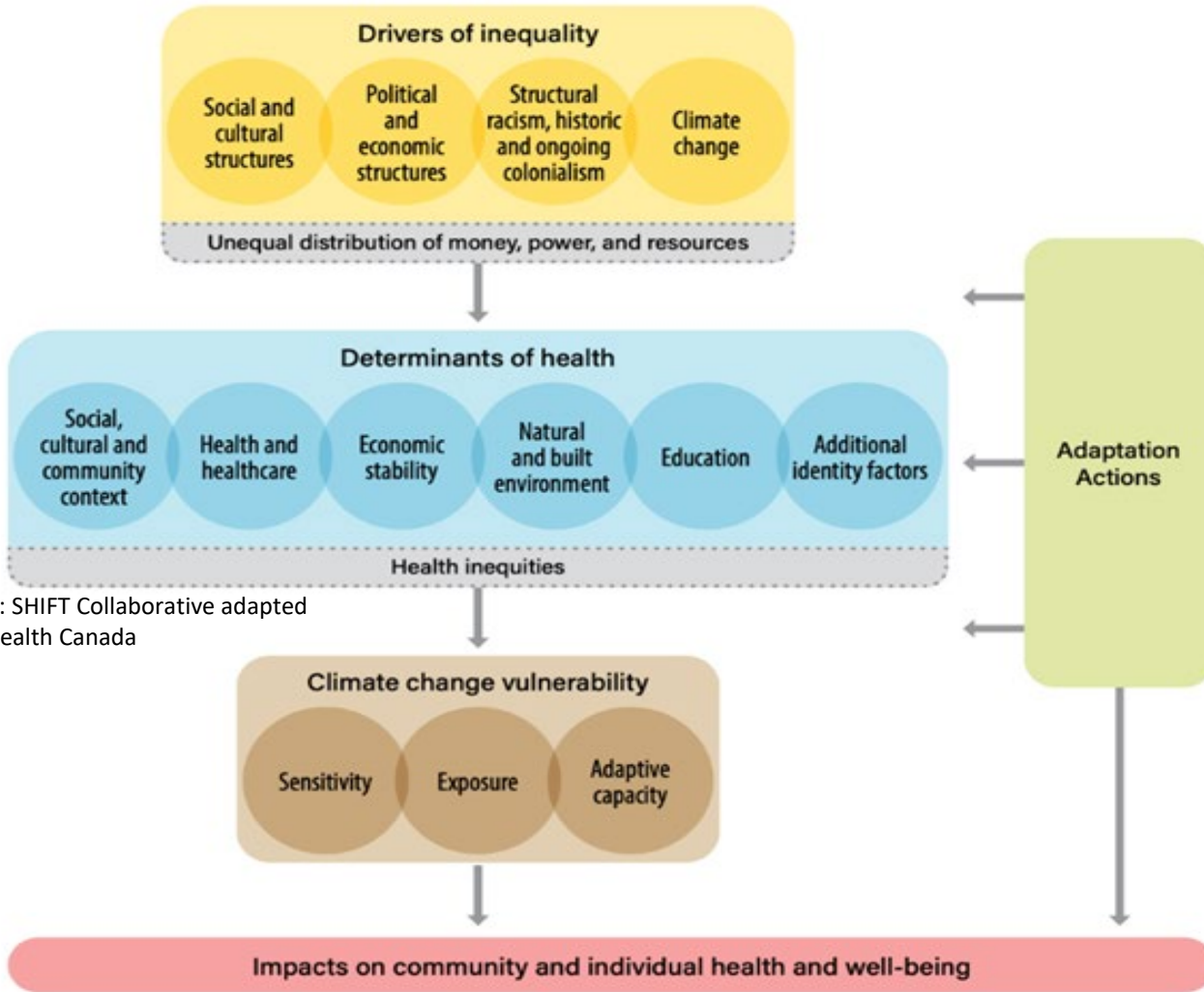
-  **Data and information:** Understand, identify, disclose, communicate
-  **Awareness and capacity:** Expand labour, industry, owner and government capacity on resilience
-  **Policy development:** Build market demand for resilient buildings
-  **Financial mechanisms:** Improve investment and financing opportunities
-  **Social capacity:** Integrate social resilience into building design, retrofits, programming

Alignment With Zero-emission Buildings

Zero-emission building features	Resilient zero-emission building features	Equitable considerations
Energy efficient building envelopes and mechanical systems	<ul style="list-style-type: none"> → Improve airtightness, and include good ventilation and air filtration effective for wildfire smoke 	<ul style="list-style-type: none"> → Prioritize older buildings with more vulnerable occupants
High-efficiency electric heating	<ul style="list-style-type: none"> → Include high-efficiency cooling systems → Add backup power 	<ul style="list-style-type: none"> → Prioritize cooling in units or in rooms on site for populations more vulnerable to heat in units (e.g., reduced mobility, elderly, certain medical conditions)
On-site renewable energy	<ul style="list-style-type: none"> → Add energy storage or backup power suitable for use during future hazard events 	<ul style="list-style-type: none"> → Consider diverse needs for backup power (e.g., refrigeration of medications, technology that supports those with disabilities)
Passive heating and cooling designs	<ul style="list-style-type: none"> → Include options for active heating and cooling in preparation for more extreme conditions → Add space for larger mechanical systems 	<ul style="list-style-type: none"> → Consider and prioritize cooling needs for populations more vulnerable to heat
Low-carbon building materials	<ul style="list-style-type: none"> → Materials are resistant to all hazards identified by local risk assessment (fire, flood, wind, snow, earthquakes, etc.) 	
	<ul style="list-style-type: none"> → Plan for backup sources for power outages or periods of 	<ul style="list-style-type: none"> → Make all information and awareness

Equity

- “As we build systems and solutions that are more climate resilient, we have the opportunity to address systemic inequities that make people vulnerable.”
(Government of Canada. 2022. Draft National Adaptation Strategy.)



Source: SHIFT Collaborative adapted from Health Canada

Five essential resilience attributes

1. Diversity
2. Redundancy
3. Connectivity
4. Inclusivity and equity
5. Adaptive learning

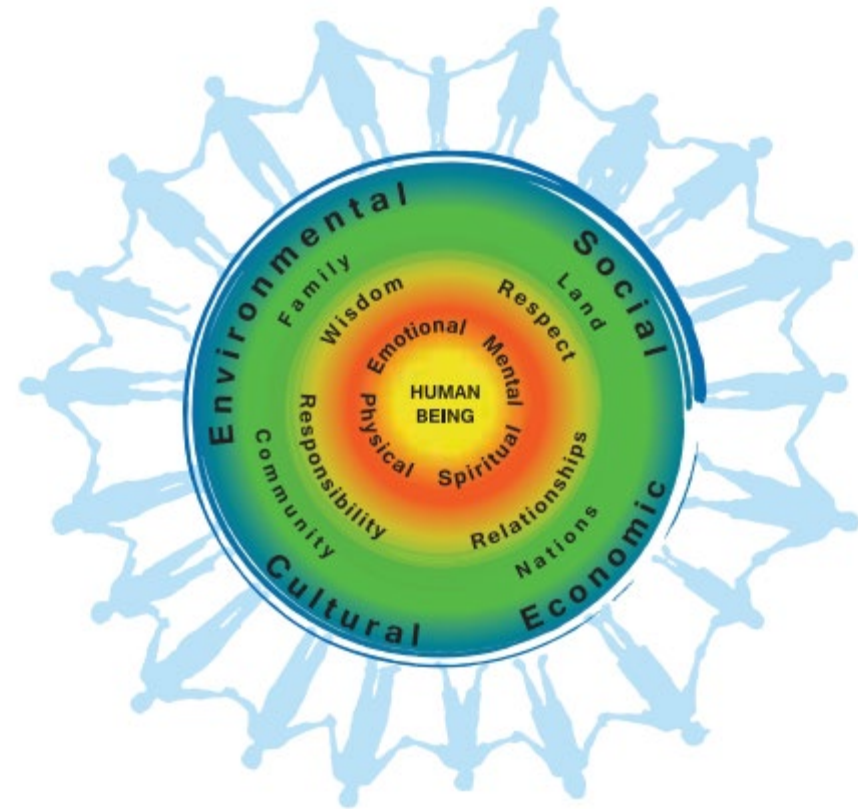
Source: Global Resilience Partnership

Indigenous Perspectives



Figure 2.0: First Nations Climate Lens excerpted from the [AFN National Climate Gathering Report: Gathering Change, Leading Solutions \(2020\)](#)

Source: BC First Nations Climate Strategy and Action Plan



Source: FNHA &PHO

About the Realizing Resilient Building (R2B) Toolkit

- **Audience:** BC regional and municipal governments
- **Purpose:** Build capacity of staff and elected officials on climate resilience in the building sector
- **Focus:** Preparedness and risk mitigation at building & site scale
- **Out of scope:** Community-wide resilience strategies and response and recovery resources

What is the hazard threat and how is it changing?

Design features that improve resilience

Local gov't strategies and tools for implementation

Equity Considerations

Extreme Heat

This diagram shows some examples of building-scale strategies that are important to increase resilience to extreme heat.

Building orientation to increase solar gain in winter and reduce solar gain in summer

Operable windows with cross-ventilation

Shading with trees

Use methods of **natural ventilation**

Exterior window shades

Lower wall to window ratios

Provide a **cool room** in a common area

Design sufficient **mechanical cooling** for heat waves, considering closed windows if high pollution coincides

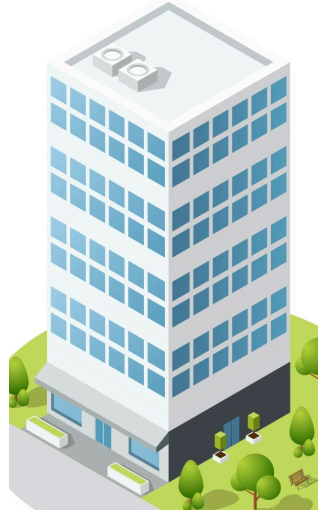
Heat pumps for energy efficient cooling



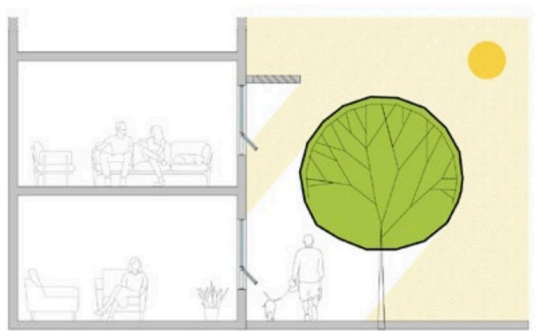
Key Design Enablers for Local Governments



Site Coverage, Setbacks, Balconies, Noise



Building Height and Roofs

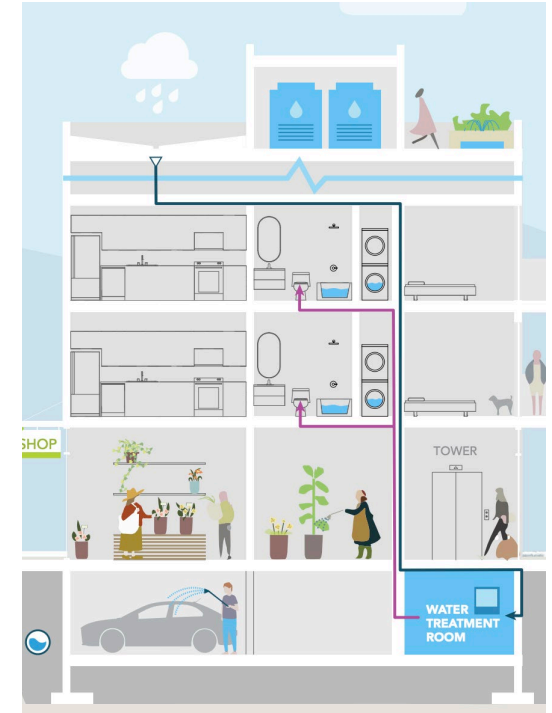


Landscaping Trees and Water

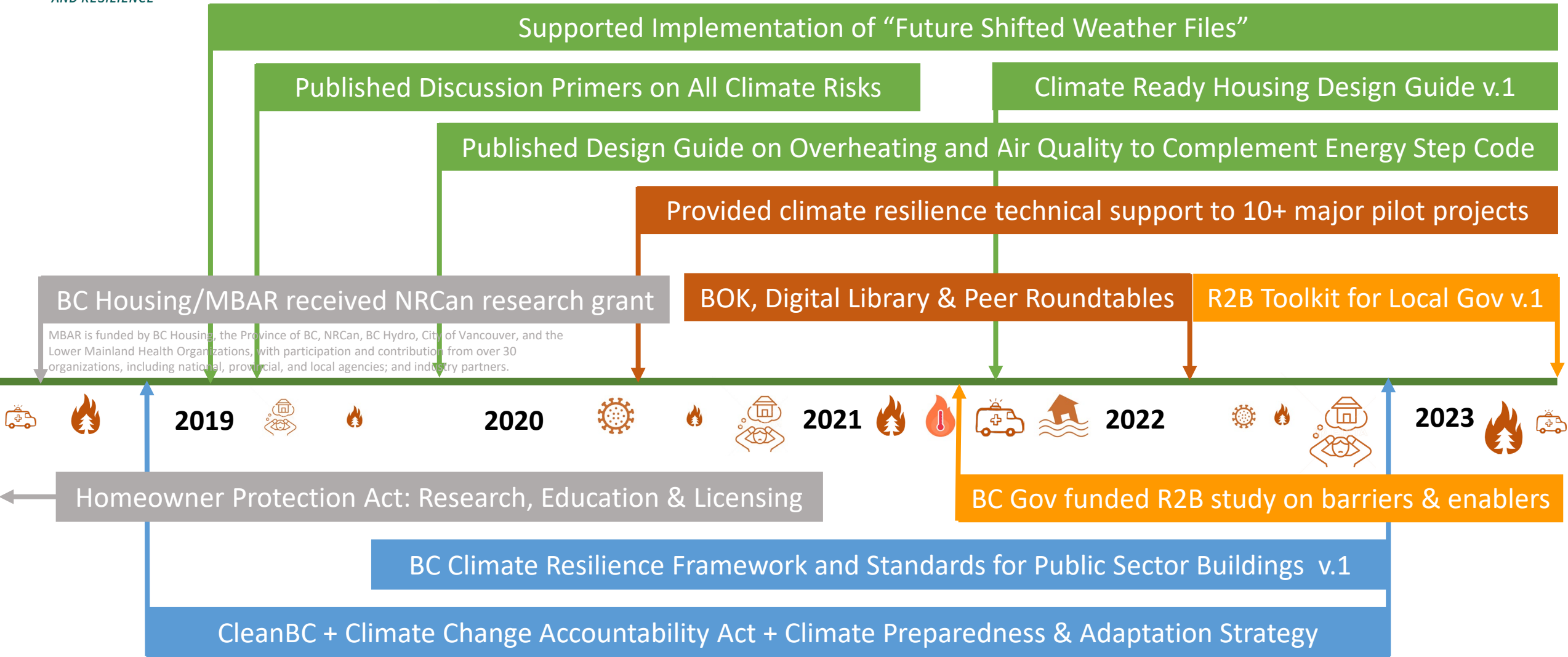


Form and Character Guidelines

Gross Floor Area



More Resilient Buildings & Homes Quicker





Thank You!

“Save the Dates”

Mon Oct 23, 9:15-10:45 PT, **Input on R2B Recommendations Report**

Mon Oct 23, 14:00-15:30 PT, **Input on R2B Toolkit**

Tue Nov 14, 10:30-12:00 PT, **Info Session on MBAR Pilots**

Wed Dec 6, 10:45-12:00 PT, **MBAR Roundtable on Fire Resilient Buildings & Communities**

Email: **MBAR@bchousing.org**

to express your interest.



BC HOUSING
RESEARCH CENTRE



**MOBILIZING
BUILDING ADAPTATION
AND RESILIENCE**