WEBINAR | THURSDAY, JUNE 20, 2019

Adaptation towards low carbon resiliency in existing buildings

Prism
ENGINEERING

Welcome

Sarah Smith, Principal

Sarah leads Prism's Sustainability Team and has been working with clients since 2010 to design and deliver sustainability staff engagement programs. With a background in behaviour and organizational change theory, volunteer management, social science research and program development, Sarah works with organizations to design and implement solutions that will enhance creativity, capacity and stewardship.

Introductions

Prism ENGINEERING

saving you energy

Prism Engineering provides consulting services to address technical, behavioural and organizational aspects of Energy Management

We design and implement cost effective approaches to address comfort, efficiency and reliability.

Our Work By the Numbers

We've had the privilege of serving our clients since 1990:

- **1,100** energy audits
- **2,500** buildings modernized
- **100 million sq ft** assessed
- **15,000** energy accounts analyzed
- **8,000** workshop attendees
- **$30 million** in annual savings identified

Introduction to your Prism Facilitator

Ainaz Bozorgzadeh, P.Eng, has a decade of experience working with organizations to better understand and effect change toward reducing their environmental impact, identifying low carbon resilient retrofits, and planning appropriate actions to meet their targets.

She currently leads climate change adaptation and greenhouse gas emission planning services at Prism.

Agenda

- Why is Adaptation Important?
- Defining Low Carbon Resiliency
- Where to Start
- Finding a Framework that suits you
- Case studies of past projects
- How we can help + wrap up
- Q&A

Desired Webinar Outcomes

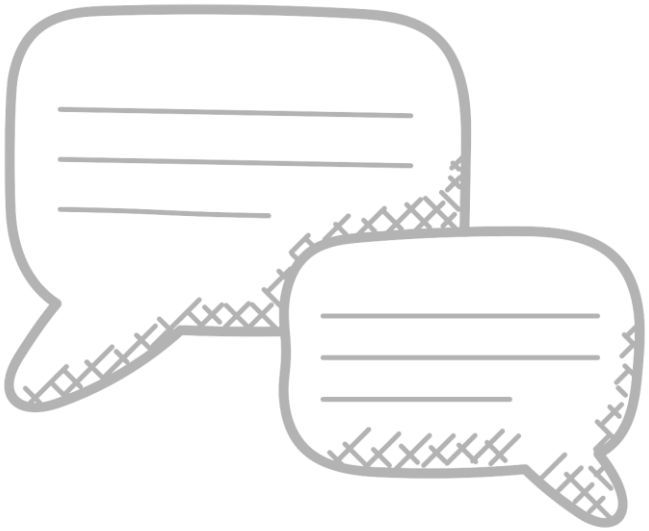
- Increase understanding of the impacts of climate change on existing buildings
- Increase appreciation for importance of integrating climate adaptation work as part of energy management planning
- Motivate you to take action towards adapting your facilities to be resilient in our changing climate

Webinar Logistics

- We need your focus and attention throughout
- We will engage participants directly in the webinar
- Please ensure your phone is *muted* from background noise
- We will have a **Q&A** sessions at the end

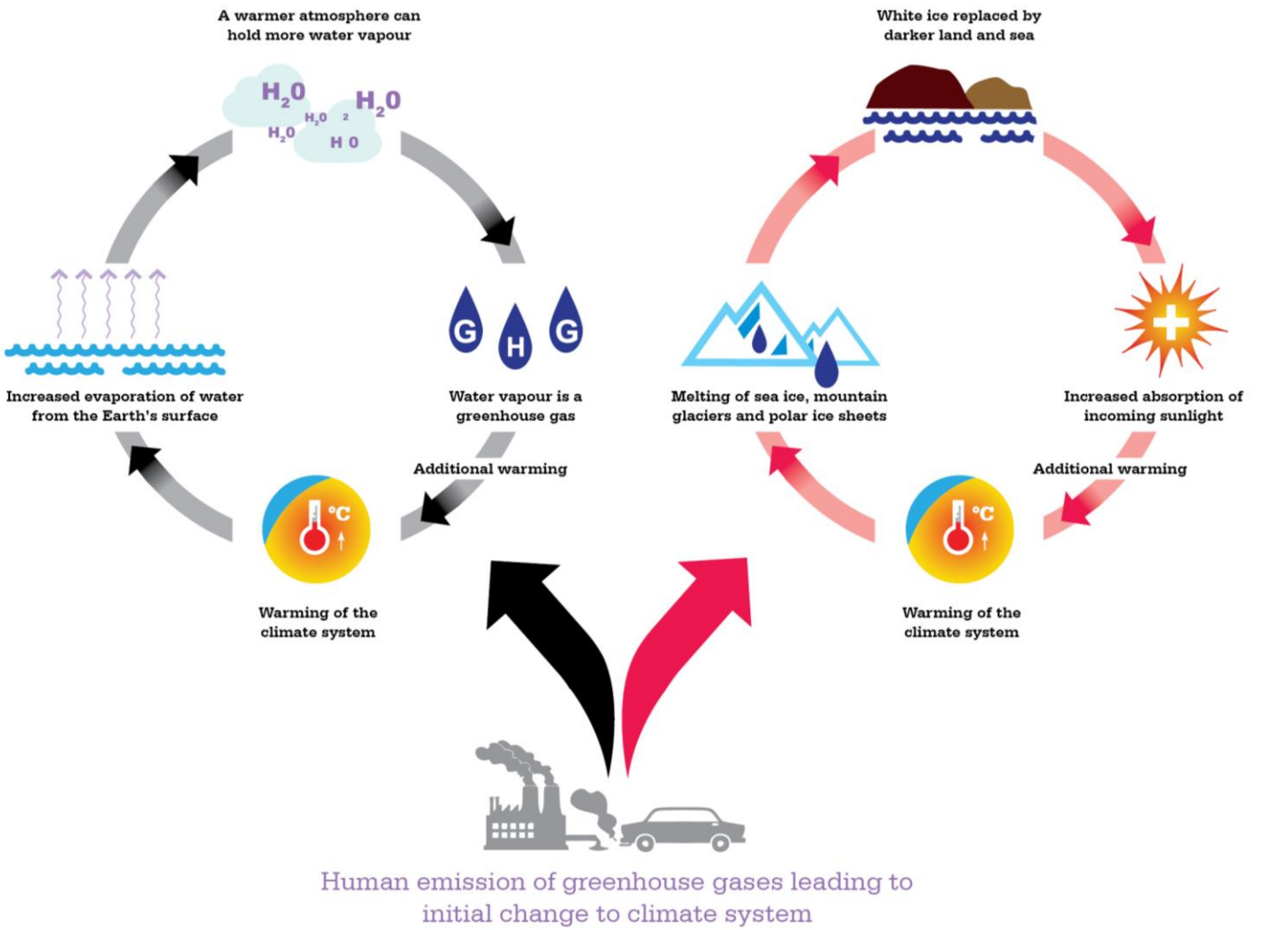
Chat box

- Please enter your questions and comments throughout as they come up



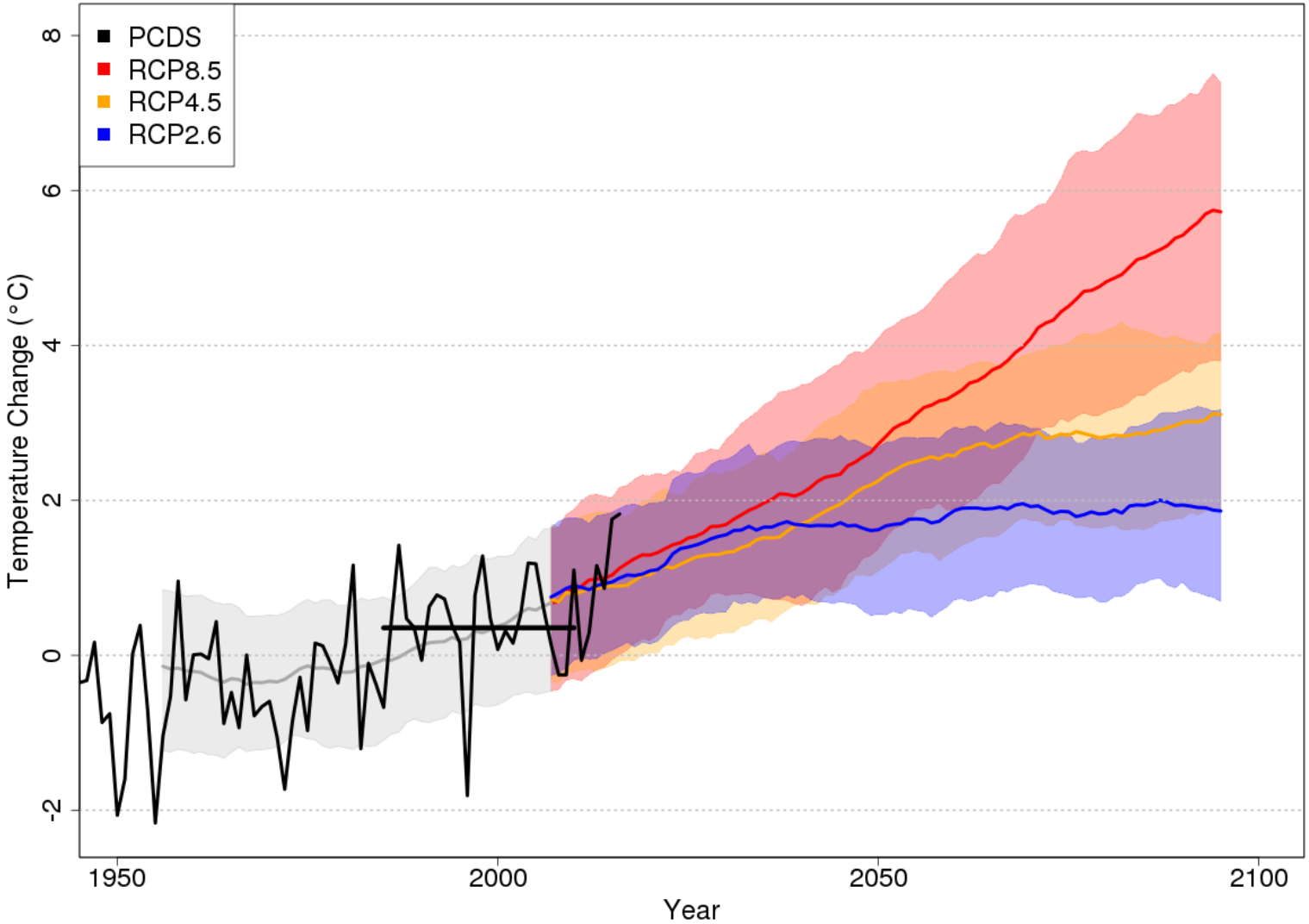
WHY IS ADAPTATION IMPORTANT

Why this topic matters



www.climatecommission.gov.au

Climate Scenarios in BC



Weather vs. Climate

WEATHER

what you get

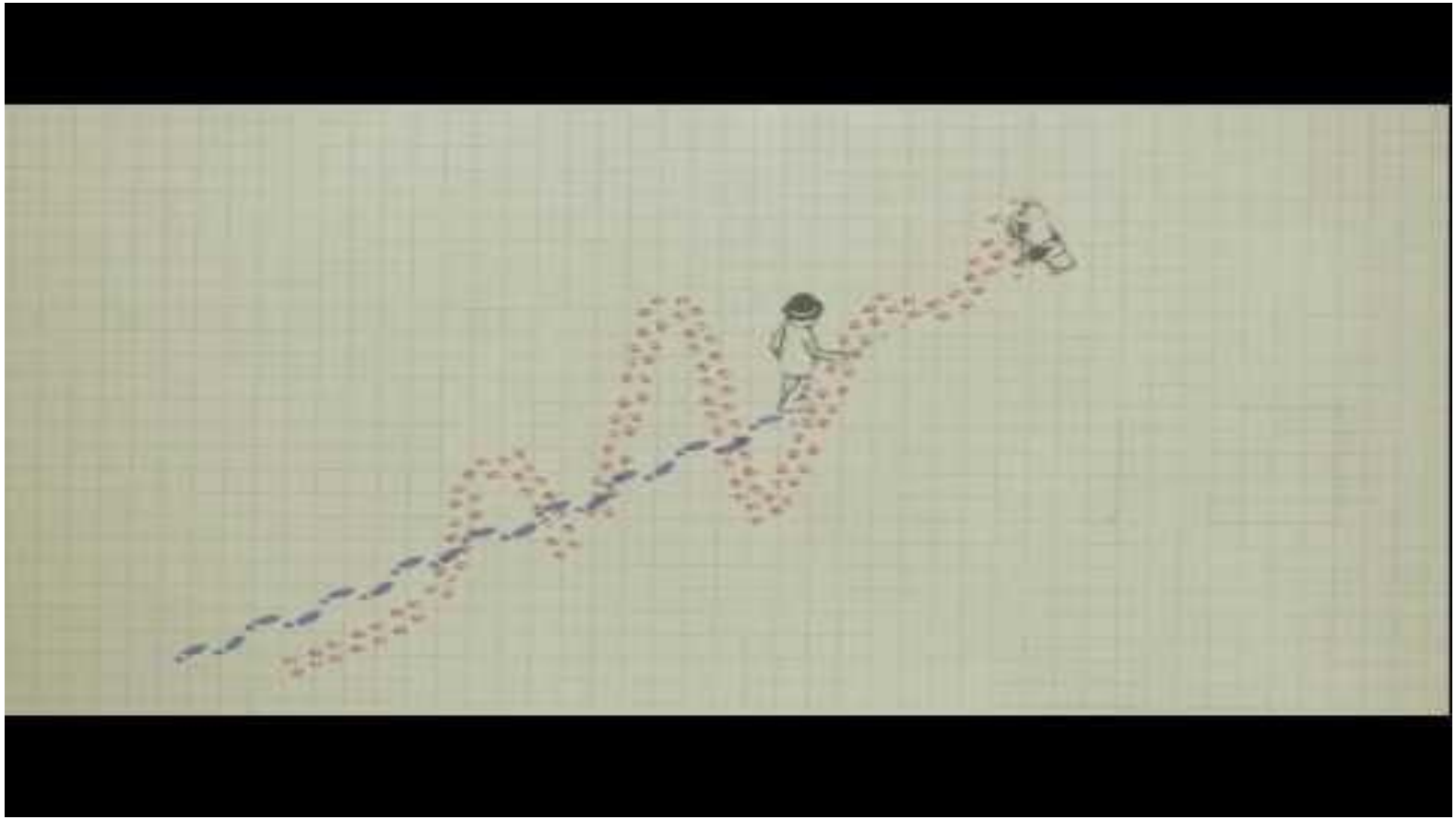
- Conditions that occur over the short-term and often vary

CLIMATE

what you expect

- Long-term weather trends for a specific region (~30 years time spans)

Trend vs. Variation



https://youtu.be/e0vj-0imOLw

The impact on buildings: services

- Severe climate events, impose risks on the **infrastructure services**

Risks may not be directly on the facility, but may still impact the facility services:

energy supply | road access | clean water supply

The impact on buildings: comfort and safety

- Occupants comfort and safety (staff, students, tenants, …)

The impact on buildings: business continuity

- Service provider accountability and revenue
  - private sector office landlord
  - insurance costs
  - etc.

Consider

How long is your most important building self-sufficient in an event of a climate emergency?

MITIGATION + ADAPTATION

= LOW CARBON RESILIENCY

Mitigation

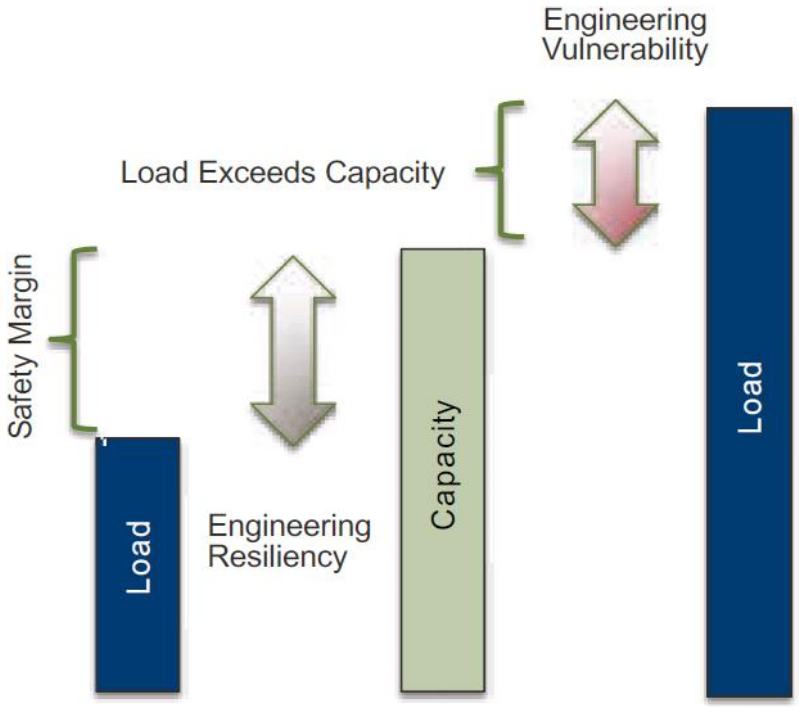
In context of buildings:

> Mitigation involves modification of building systems to **reduce the building's environmental impact** by lowering energy and water use

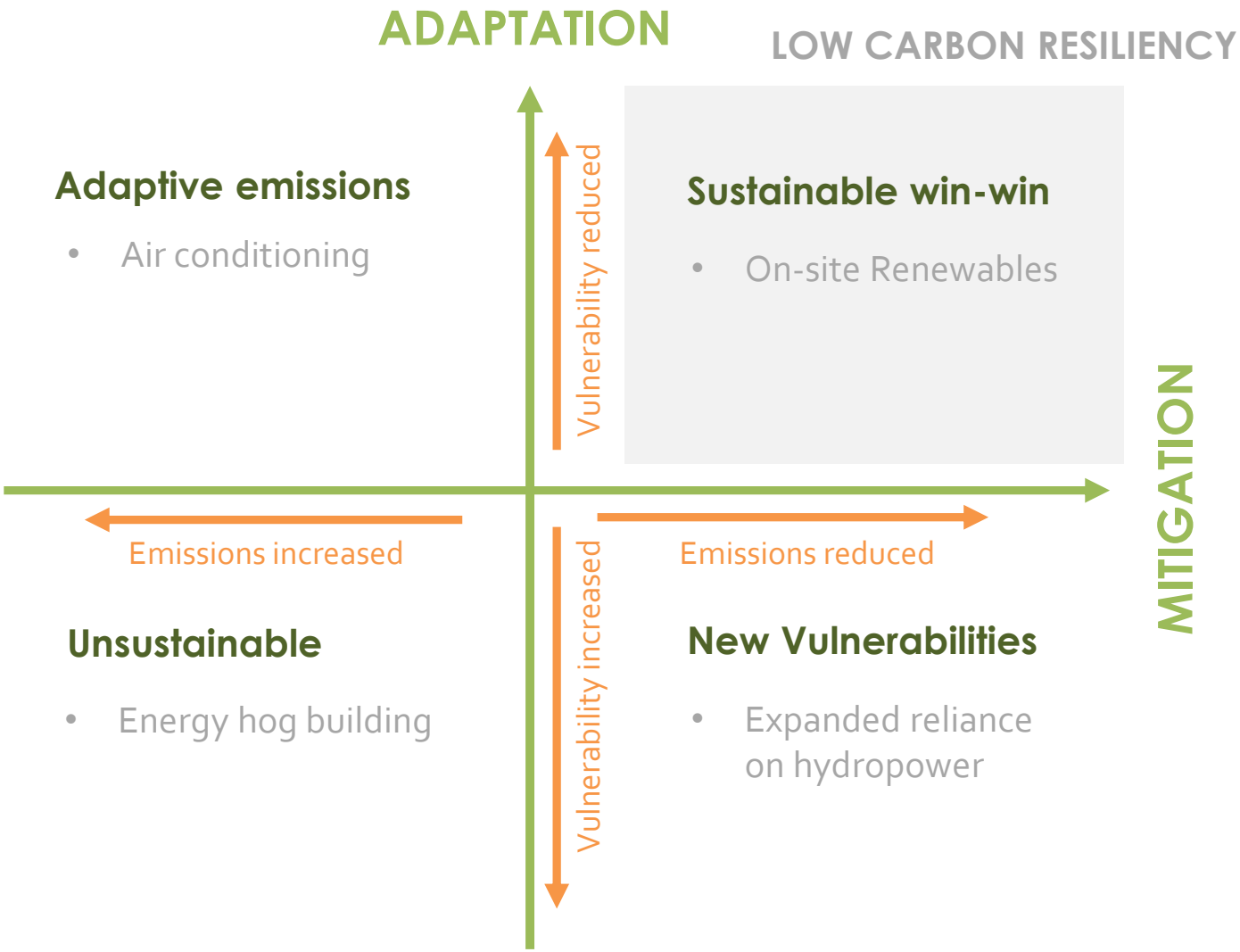
Adaptation

In context of buildings:

> Adaptation involves modification of building systems to **address vulnerability to climate change** by improving infrastructure resilience



Mitigation & Adaptation Interrelation



Adapted from Cohen and Waddell, 2009

Low Carbon Resiliency

- Reduced energy demand
- Controls

- Heat recovery
- Fuel source diversity

- Passive options
- Renewable options
- Etc.

Poll Question

On scale of 1-10, how advanced is your organization in its planning efforts around adaptation?

1 = just starting

5 = advanced (have a plan, have been conducting risk assessment on our facilities, etc)

WHERE TO START

Starting the conversation in your organization

- Open with why this is important
- Emphasize what you've already achieved

Where to get started
Lay of the land

- **Identify your critical buildings**
  - any that are used in emergency services?
- **Identify key stakeholders within your organization**
  - asset planning
  - risk management
  - operations
- **Start with a training if needed**
  - shared language

Where to get started
Identify candidate buildings

- **Survey staff/occupants to learn where there are existing issues**
  - Over heating
  - Flooding
  - Other?
- **Pick the buildings which are already due** for upgrades and conduct a risk assessment (PIEVC or similar)

Where to get started
Narrow it down

- **Pick one area in your facility to be resilient**
  - community hall as cooling relief centre
  - community centre as fire smoke refuge

A Collaborative Approach

- Multidisciplinary Team
  - Project Managers
  - Engineers
  - Climate Scientists
  - Operations Staff
  - Subject Matter Experts

Consider

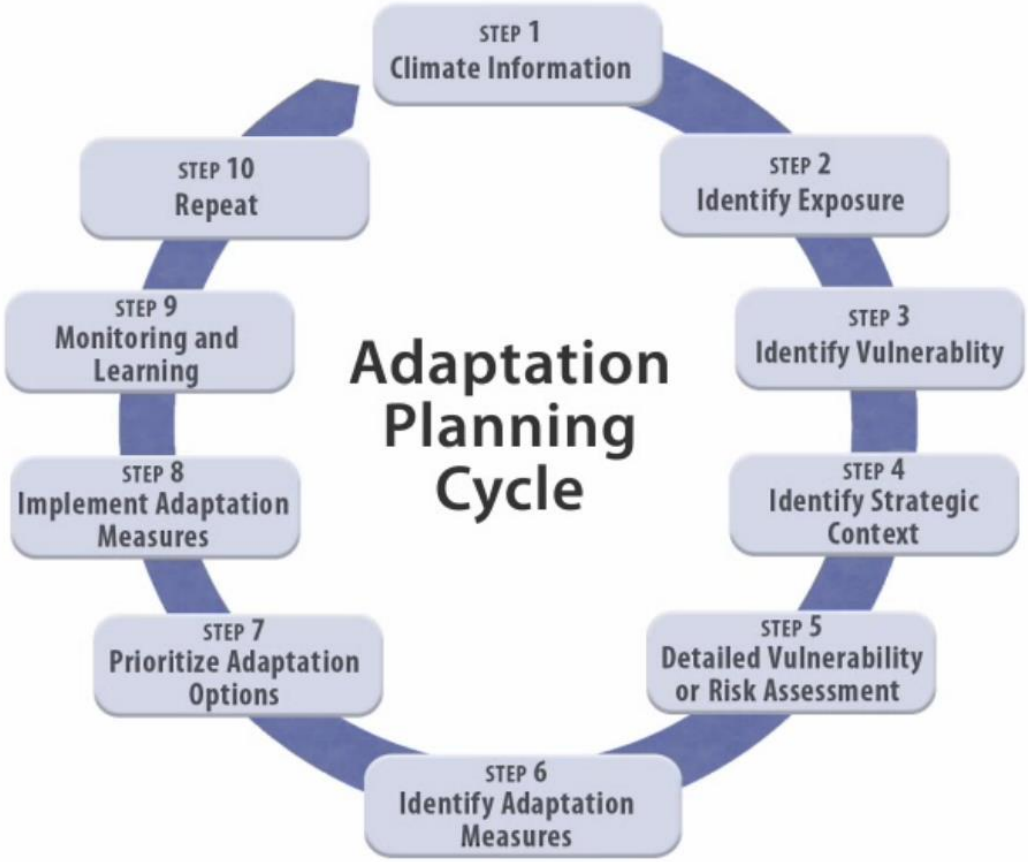
What are the barriers in your organization for progressing your adaptation/resiliency of buildings?

FINDING A FRAMEWORK THAT SUITS YOU

Types of Frameworks

- Building Level
- Organizational Level
- Both Organizational and Building Level

Adaptation Planning Cycle



Pacific Institute For Climate Solutions
Knowledge. Insight. Action

Federation of Canadian Municipalities (FCM)

Climate Adaptation Maturity Scale

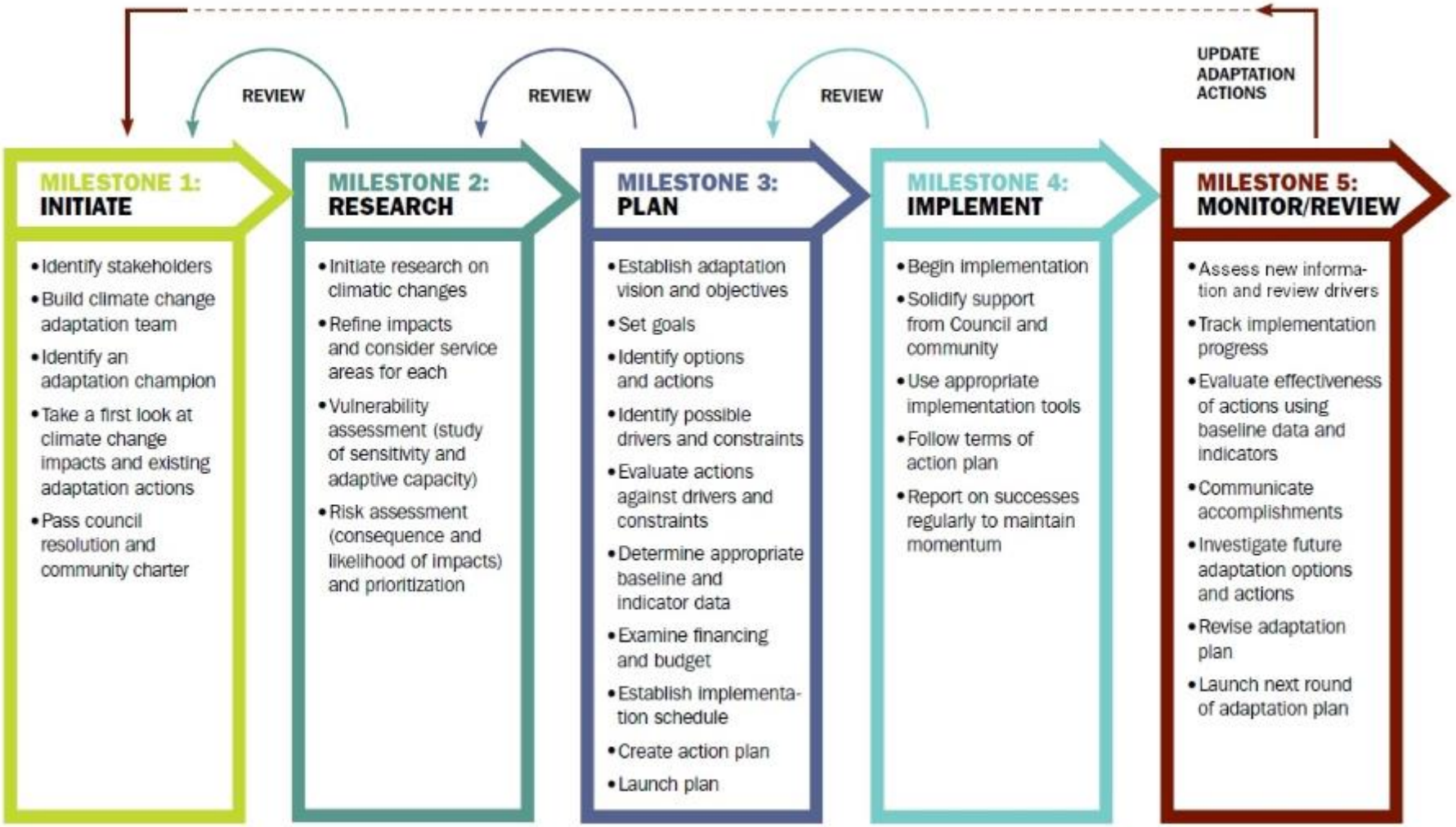
	1		2		3		4		5	
	Concept Level		**Preliminary Level**		**Implementation Level**		**Operational Level**		**Continuous Improvement Level**	
	Working on Level 1 ☐	Completed on Level 1 ☐	Working on Level 2 ☐	Completed on Level 2 ☐	Working on Level 3 ☐	Completed on Level 3 ☐	Working on Level 4 ☐	Completed on Level 4 ☐	Working on Level 5 ☐	Completed on Level 5 ☐
Maturity level →	We have set expectations for our work on climate adaptation. We have the support we need to begin preparing a policy.		We have drafted a climate adaptation policy and have prepared strategic guidelines that will inform the development of an adaptation plan and other adaptation initiatives.		We have adopted our climate adaptation policy and are using it to guide our actions, and have drafted an adaptation plan. We have established performance measures to monitor progress.		We have a climate adaptation plan in place and are managing climate risks. We are using performance measures to track the progress and outcomes of our climate adaptation initiatives.		We are continually improving our understanding of climate risks and our approach to managing these risks.	

FCM FEDERATION OF CANADIAN MUNICIPALITIES FÉDÉRATION CANADIENNE DES MUNICIPALITÉS

https://fcm.ca/en/resources/mcip/tool-climate-adaptation-maturity-scale

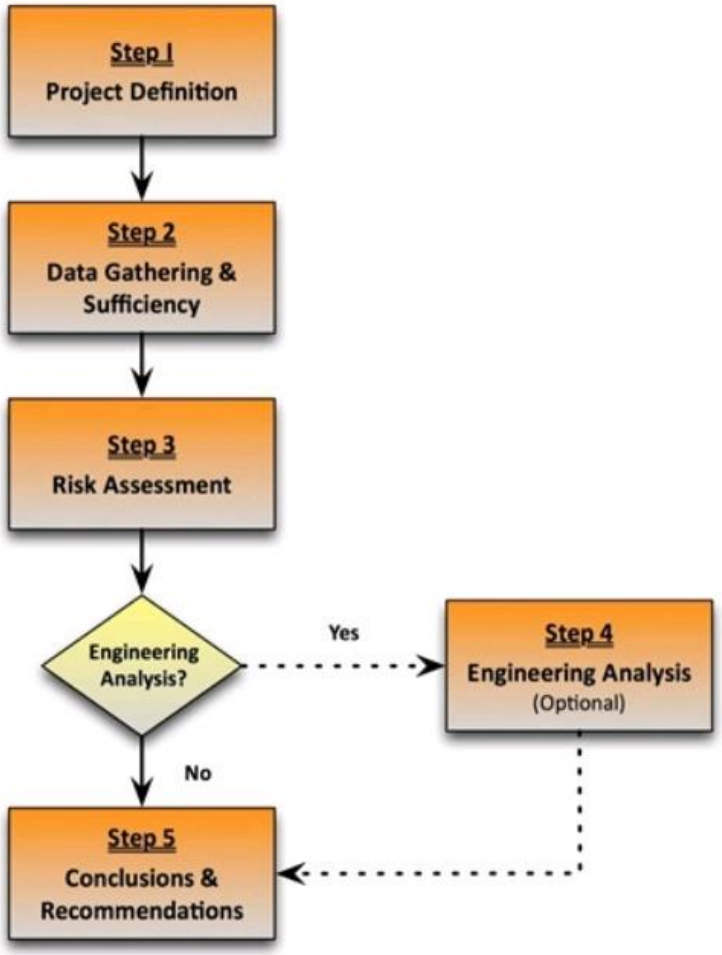
Building Adaptive & Resilient Communities (BARC) Program

ICLEI Local Governments for Sustainability CANADA



http://www.icleicanada.org/programs/adaptation/barc

Public Infrastructure Engineering Vulnerability Committee (PIEVC)



engineerscanada
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BOMA Canada
Climate Change Risk Assessment Tool

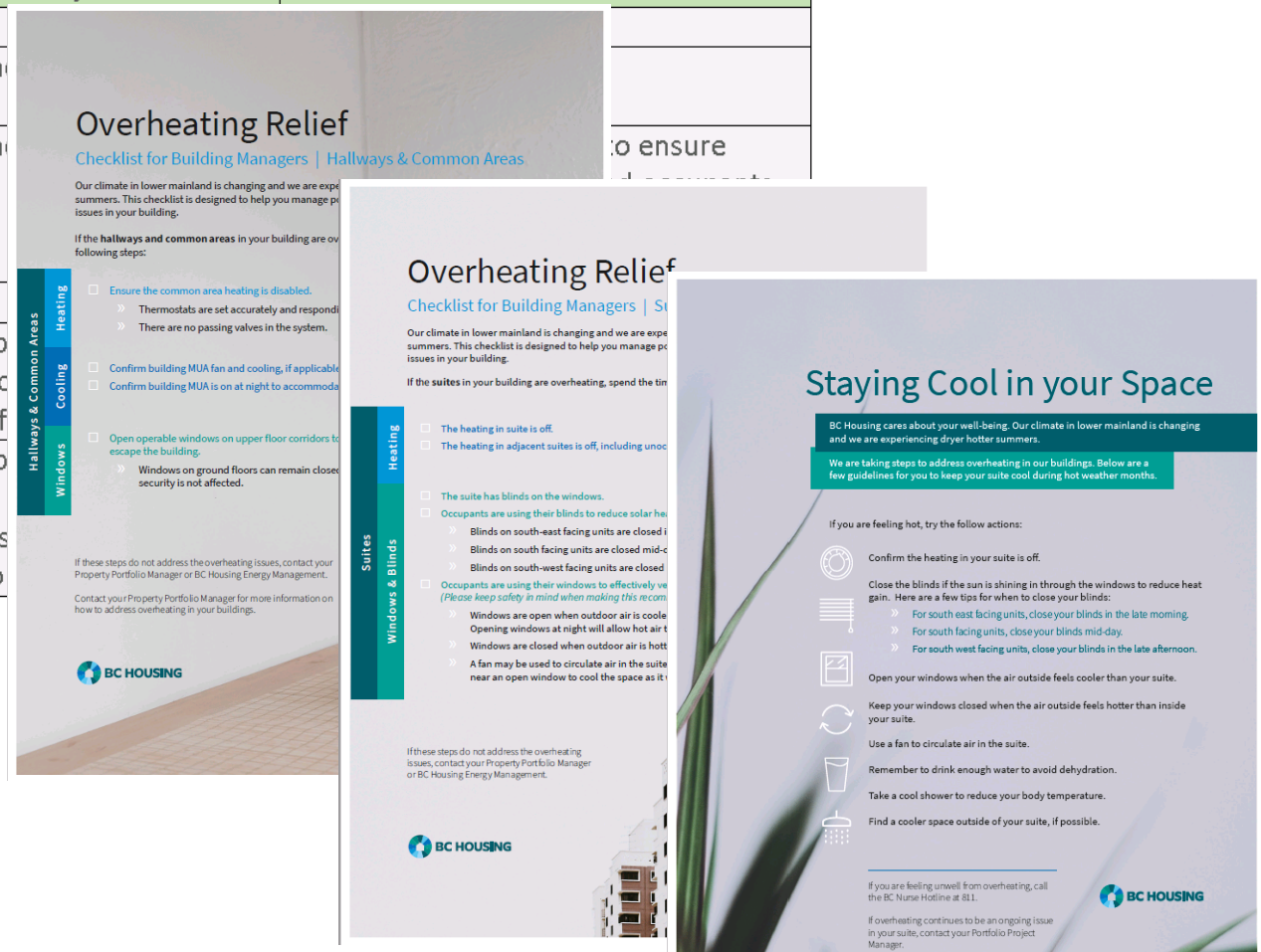
- **Spreadsheet tool for self assessment**
  - HVAC
  - Electrical
  - Communications
  - Backup Power
  - Elevators
  - Building Envelope
  - Documentation
  - Hazardous Material
  - Flood Risk/Protection
  - Snow & Ice
  - Demand Response
  - Travel and Shelter
  - Risk Assessment
  - Emergency Planning

http://bomacanada.ca/resources/resilience-brief/

CASE STUDIES OF PAST PROJECTS

High level assessment
All facilities

Cooling Option	Applicability	Notes
Passive Cooling		
Window Film	Applicable to all win building archetypes	
Window Blinds	Applicable to all win building archetypes	to ensure
Mechanical Cooling		
Window Fan-Wall	Most easily applicab windows, although c way of cut-out into f	
Variable Refrigerant Flow(VRF)	Most easily applicab mid-rise buildings Difficulty for high-ris piping refrigerant to	



Overheating Relief

Checklist for Building Managers | Hallways & Common Areas

Our climate in lower mainland is changing and we are expe summers. This checklist is designed to help you manage p issues in your building.

If the **hallways and common areas** in your building are ov following steps:

Hallways & Common Areas

Heating

- Ensure the common area heating is disabled.
  - Thermostats are set accurately and respondi
  - There are no passing valves in the system.

Cooling

- Confirm building MUA fan and cooling, if applicable
- Confirm building MUA is on at night to accommoda

Windows

- Open operable windows on upper floor corridors to escape the building.
  - Windows on ground floors can remain close security is not affected.

If these steps do not address the overheating issues, contact your Property Portfolio Manager or BC Housing Energy Management.

Contact your Property Portfolio Manager for more information on how to address overheating in your buildings.

BC HOUSING

Overheating Relief

Checklist for Building Managers | Su

Our climate in lower mainland is changing and we are expe summers. This checklist is designed to help you manage p issues in your building.

If the **suites** in your building are overheating, spend the tim

Suites

Heating

- The heating in suite is off.
- The heating in adjacent suites is off, including unoc

Windows & Blinds

- The suite has blinds on the windows.
- Occupants are using their blinds to reduce solar he
  - Blinds on south-east facing units are closed i
  - Blinds on south facing units are closed mid-c
  - Blinds on south-west facing units are closed
- Occupants are using their windows to effectively ve *(Please keep safety in mind when making this recom*
  - Windows are open when outdoor air is coole Opening windows at night will allow hot air t
  - Windows are closed when outdoor air is hott
  - A fan may be used to circulate air in the suite near an open window to cool the space as it

If these steps do not address the overheating issues, contact your Property Portfolio Manager or BC Housing Energy Management.

BC HOUSING

Staying Cool in your Space

BC Housing cares about your well-being. Our climate in lower mainland is changing and we are experiencing dryer hotter summers.

We are taking steps to address overheating in our buildings. Below are a few guidelines for you to keep your suite cool during hot weather months.

If you are feeling hot, try the follow actions:

Confirm the heating in your suite is off.

Close the blinds if the sun is shining in through the windows to reduce heat gain. Here are a few tips for when to close your blinds:

- For south east facing units, close your blinds in the late morning.
- For south facing units, close your blinds mid-day.
- For south west facing units, close your blinds in the late afternoon.

Open your windows when the air outside feels cooler than your suite.

Keep your windows closed when the air outside feels hotter than inside your suite.

Use a fan to circulate air in the suite.

Remember to drink enough water to avoid dehydration.

Take a cool shower to reduce your body temperature.

Find a cooler space outside of your suite, if possible.

If you are feeling unwell from overheating, call the BC Nurse Hotline at 811.

If overheating continues to be an ongoing issue in your suite, contact your Portfolio Project Manager.

BC HOUSING

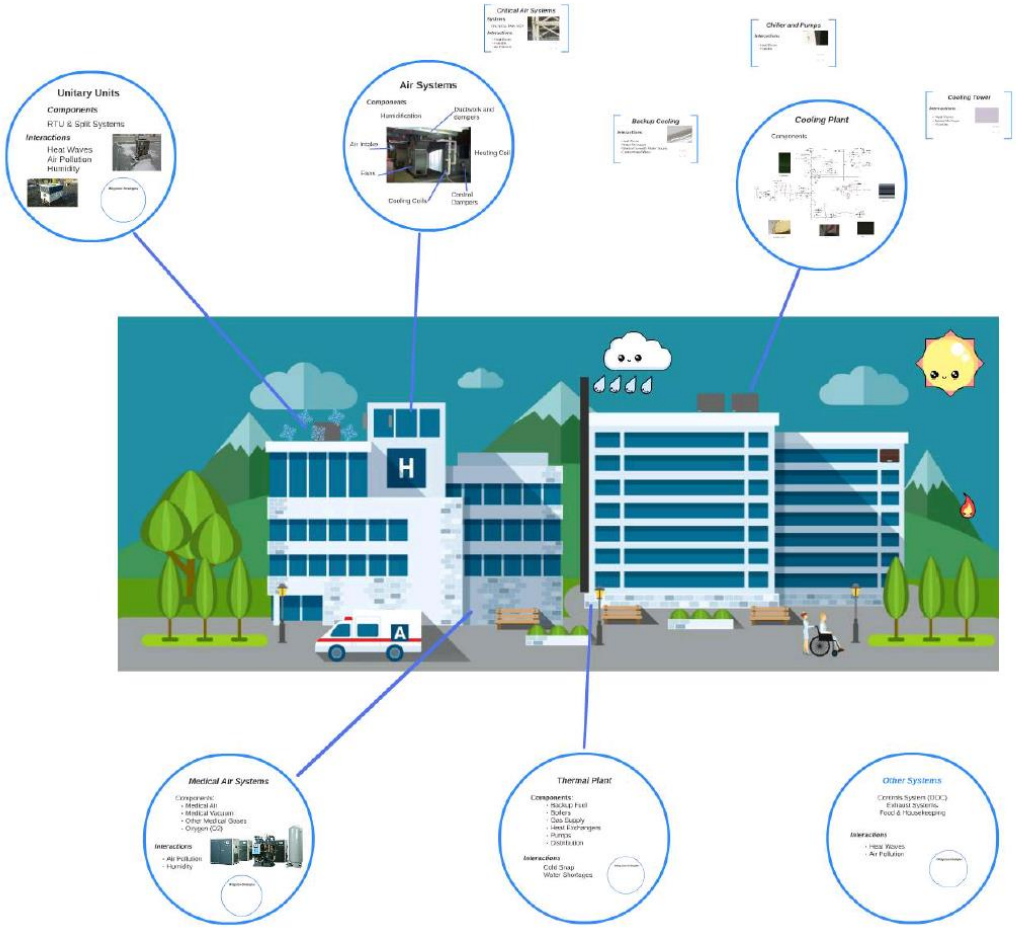
Detailed assessment

One location

island health

Detailed assessment

One location



Adaptation retrofit examples

- **Install sensor to bring elevator above flood level**

- **Indoor and outdoor air quality monitoring**
  - Forest fires
  - Extreme heat

Adaptation retrofit examples

- **Incorporate passive cooling**
  - window film
  - shading
- **Incorporate self sufficiency**
  - on-site energy generation/storage
  - heat recovery
  - water filtration

Adaptation retrofit examples

- **Move critical equipment and documentation above flood level** (e.g. mechanical room location)
- **Back up documentation off-site**

HOW WE CAN HELP

Adaptation: Prism Services

- Identify critical facilities and systems
- Conduct vulnerability risk assessment
- Implement capital upgrades
- Stakeholder engagement and facilitation
- Policies and plans
- Education and training

WRAP UP

Recap

- Mitigation is about reducing environmental impact and adaptation is about building infrastructure resilience
- Why adapt? Impact on buildings' surrounding infrastructure services, comfort and safety, business continuity

  Find the right terminology for your audience to communicate why adaptation is important

- How to get started? Figure out the of the land then narrow it down
- Leverage frameworks and support: Draw on existing tools and examples from case studies

Resources:

- Canada Climate Atlas
  https://climateatlas.ca/
- BC Climate Projections
  https://pacificclimate.org/data
- For Municipalities
  https://fcm.ca/home/issues/climate-change-and-resiliency/climate-change-adaptation.htm
  http://www.icleicanada.org/programs/adaptation/barc-network
- For all Buildings
  https://www.fraserbasin.bc.ca/ccaq_bcrac.html
  https://www2.gov.bc.ca/gov/content/environment/climate-change/adaptation
- Other Resources
  http://ecocity2019.com/
  https://www.fraserbasin.bc.ca/AdaptationCanada2020.html

Q & A

Thank you.

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Prism ENGINEERING

saving you energy™