



Environment and  
Climate Change Canada

Environnement et  
Changement climatique Canada

Canada

# Leveraging information from climate scenarios for robust infrastructure planning

Trevor Murdock  
Canadian Centre for Climate Services

19 July 2023

CANADIAN CENTRE FOR  
CLIMATE SERVICES

CENTRE CANADIEN DES  
SERVICES CLIMATIQUES

Interact during the webinar at:





# Leveraging information from climate scenarios for robust infrastructure planning

*Which scenario should I pick?*

Trevor Murdock  
Canadian Centre for Climate Services

19 July 2023

Interact during the webinar at:





## 1. Review

- Role of scenarios in risk assessment
- Understanding SSPs
- Uncertainty in Climate Projections

## 2. Which scenarios to pick?

## 3. What about GWLs?

## 4. Discussion

Interact during the webinar at:

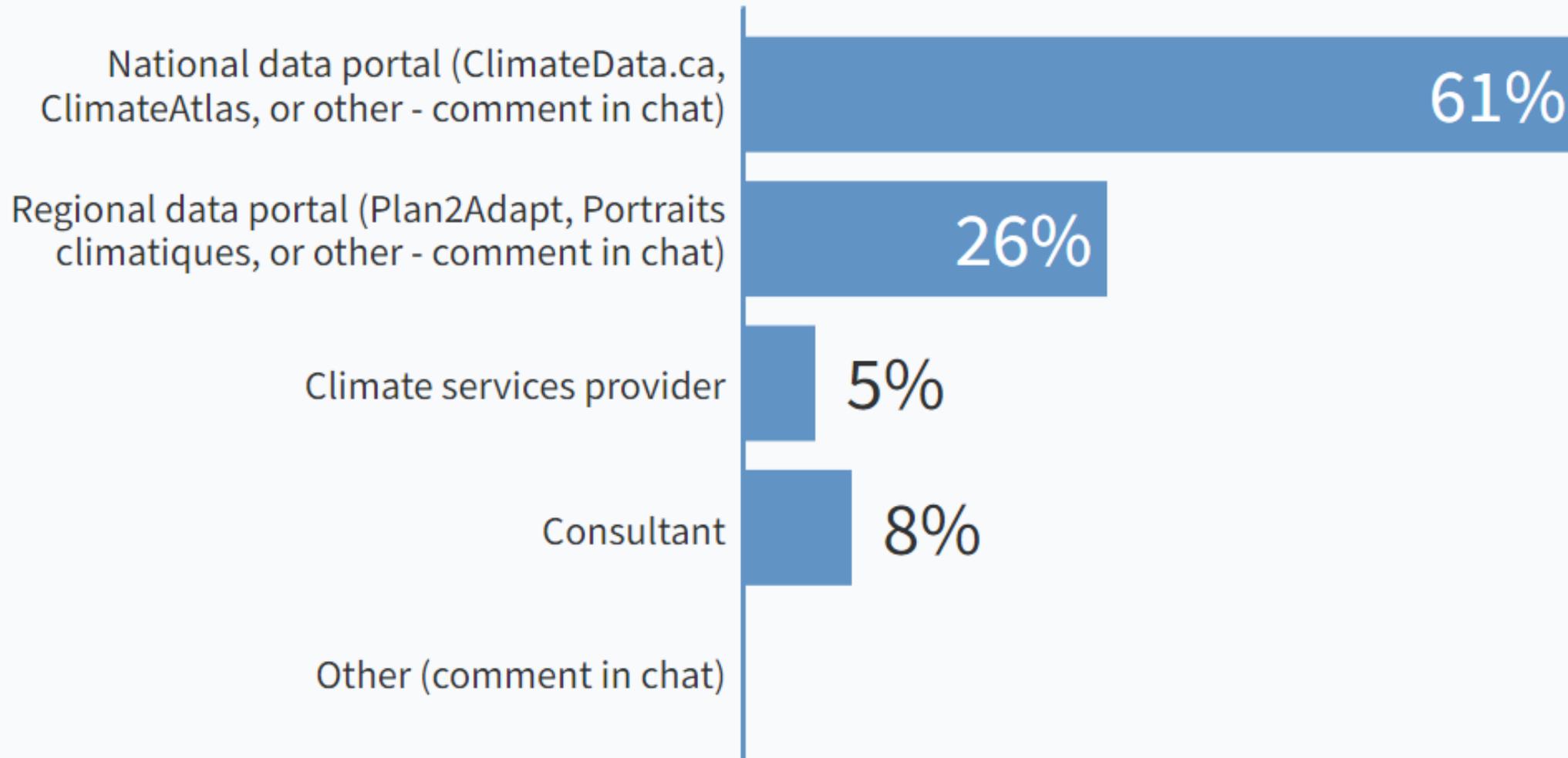


[Pollev.com/CCCS](https://pollev.com/CCCS)



New Message Cancel  
To: **37607**  
**CCCS**  
Send  
q w e r t y u i o p  
a s d f g h j k l  
z x c v b n m  
123 @ space return

# Where do you get climate data from for risk assessments?



# Risk = Likelihood x Consequence

**Risk Assessment Matrix**

<b>Consequence</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>14</b>	<b>21</b>	<b>28</b>	<b>35</b>	<b>42</b>	<b>49</b>
	<b>6</b>	<b>6</b>	<b>12</b>	<b>18</b>	<b>24</b>	<b>30</b>	<b>36</b>	<b>42</b>	<b>48</b>
	<b>5</b>	<b>5</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>35</b>	<b>40</b>
	<b>4</b>	<b>4</b>	<b>8</b>	<b>12</b>	<b>16</b>	<b>20</b>	<b>24</b>	<b>28</b>	<b>32</b>
	<b>3</b>	<b>3</b>	<b>6</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>18</b>	<b>21</b>	<b>24</b>
	<b>2</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>10</b>	<b>12</b>	<b>14</b>	<b>16</b>
	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	
		<b>Probability of Occurrence</b>							

Source: Public Infrastructure Engineering Vulnerability Committee

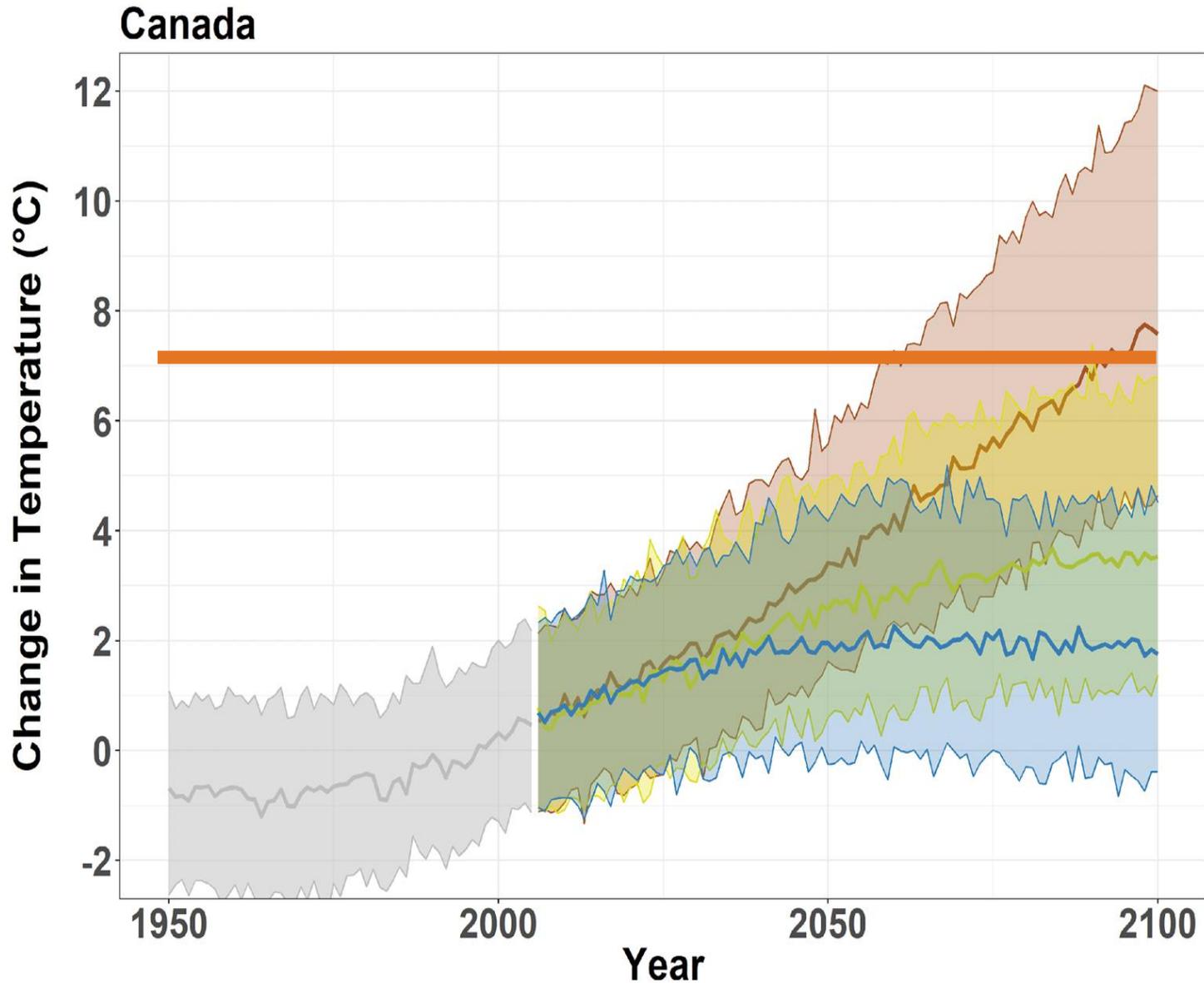
<http://www.pievvc.ca>



Learning Zone ▶ [Topic 3: Understanding Future Projections](#)

# Understanding Shared Socio- economic Pathways (SSPs)

Learn about the latest set of emissions scenarios, based on Shared Socio-economic Pathways (SSPs). Understand how SSPs differ from RCP scenarios and learn about key



# SSP5-8.5

Shared

Socioeconomic

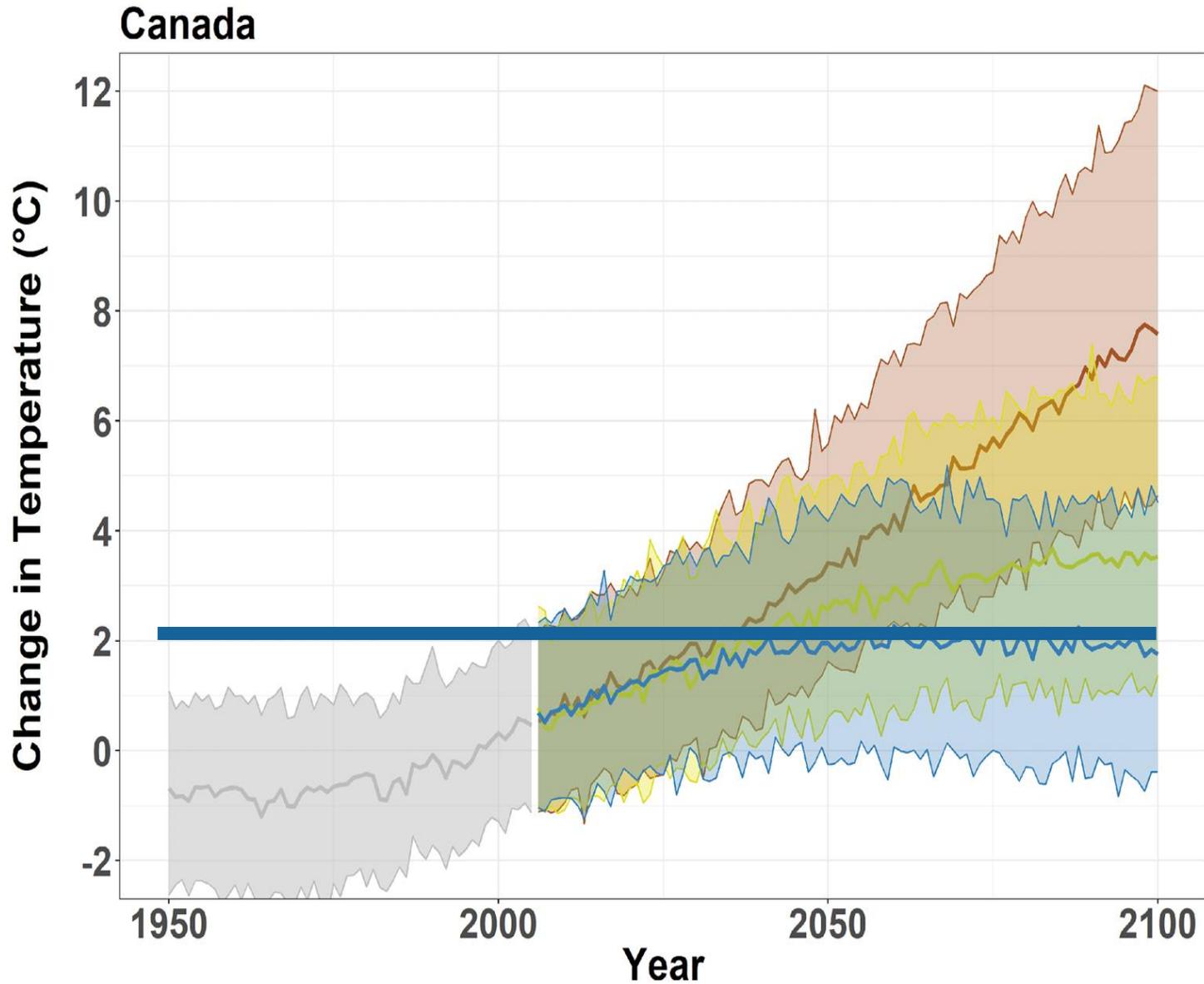
Pathway 5: "A high

fossil-fuel development

world throughout the

21st century."

UN IPCC AR6

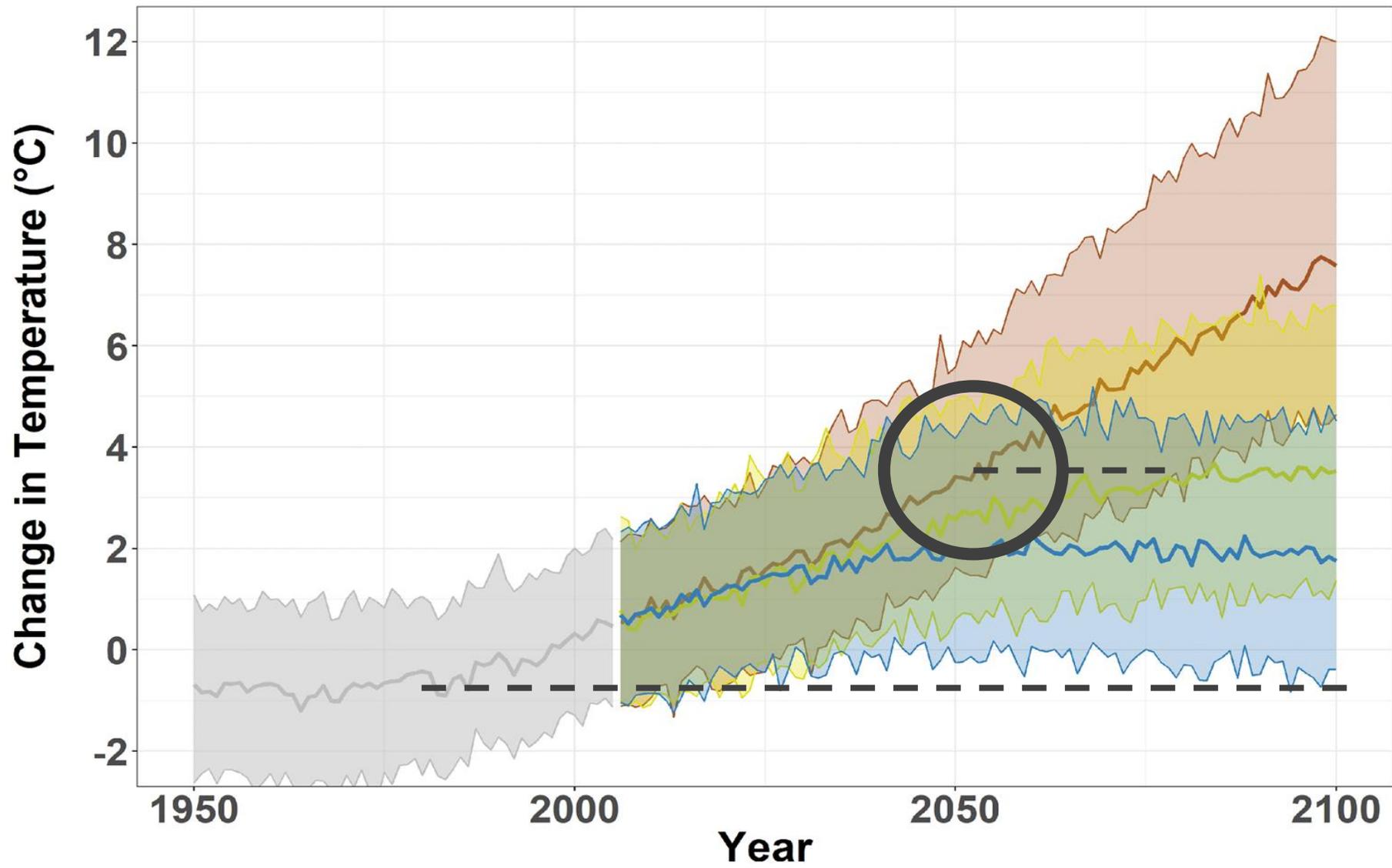


# SSP1-2.6

Shared  
Socioeconomic  
Pathway 1:  
“Consumption is oriented toward low material growth and lower resource and energy intensity.”

*UN IPCC AR6*

# Canada

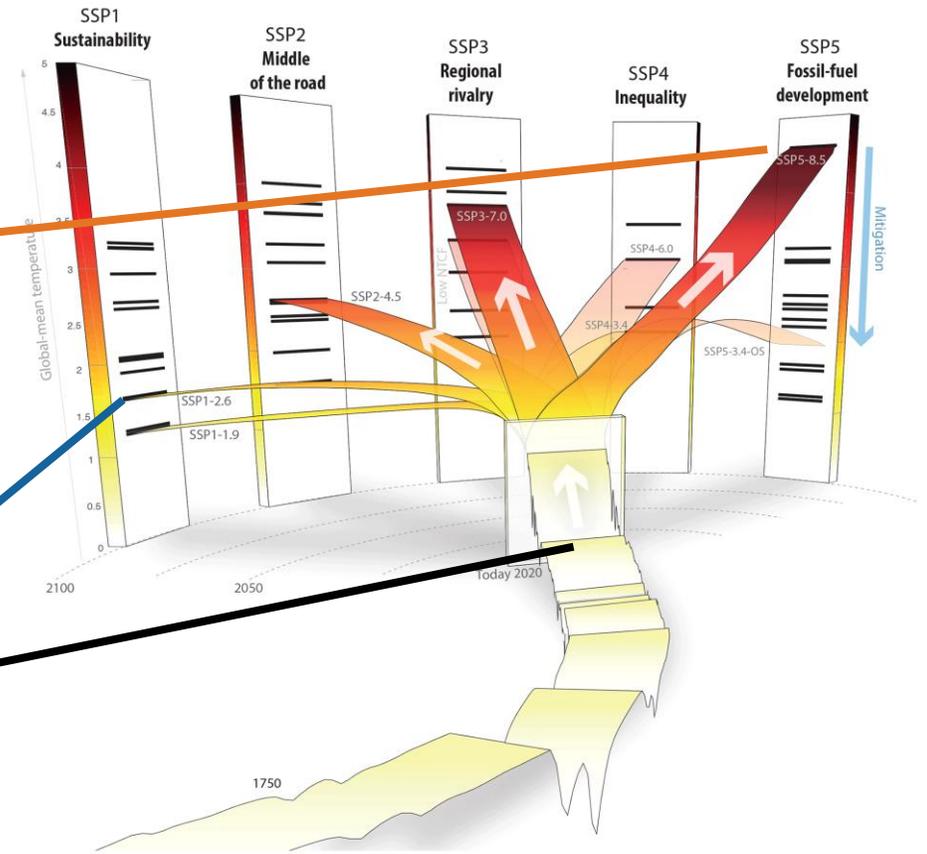
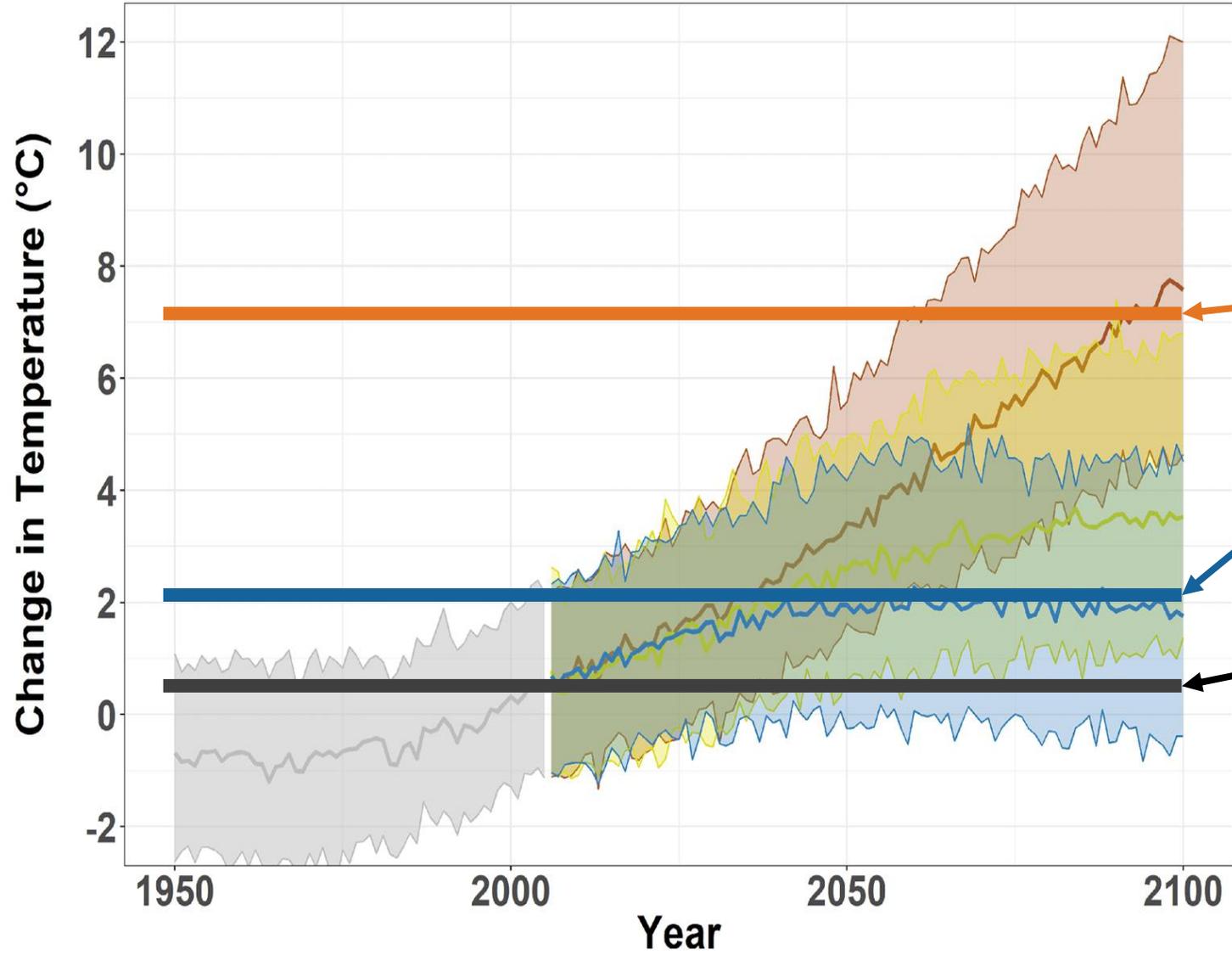


8.5 – major warming by end of century

4.5 – by 2070s reaches 2050s of 8.5

Historical data only no longer fit for purpose

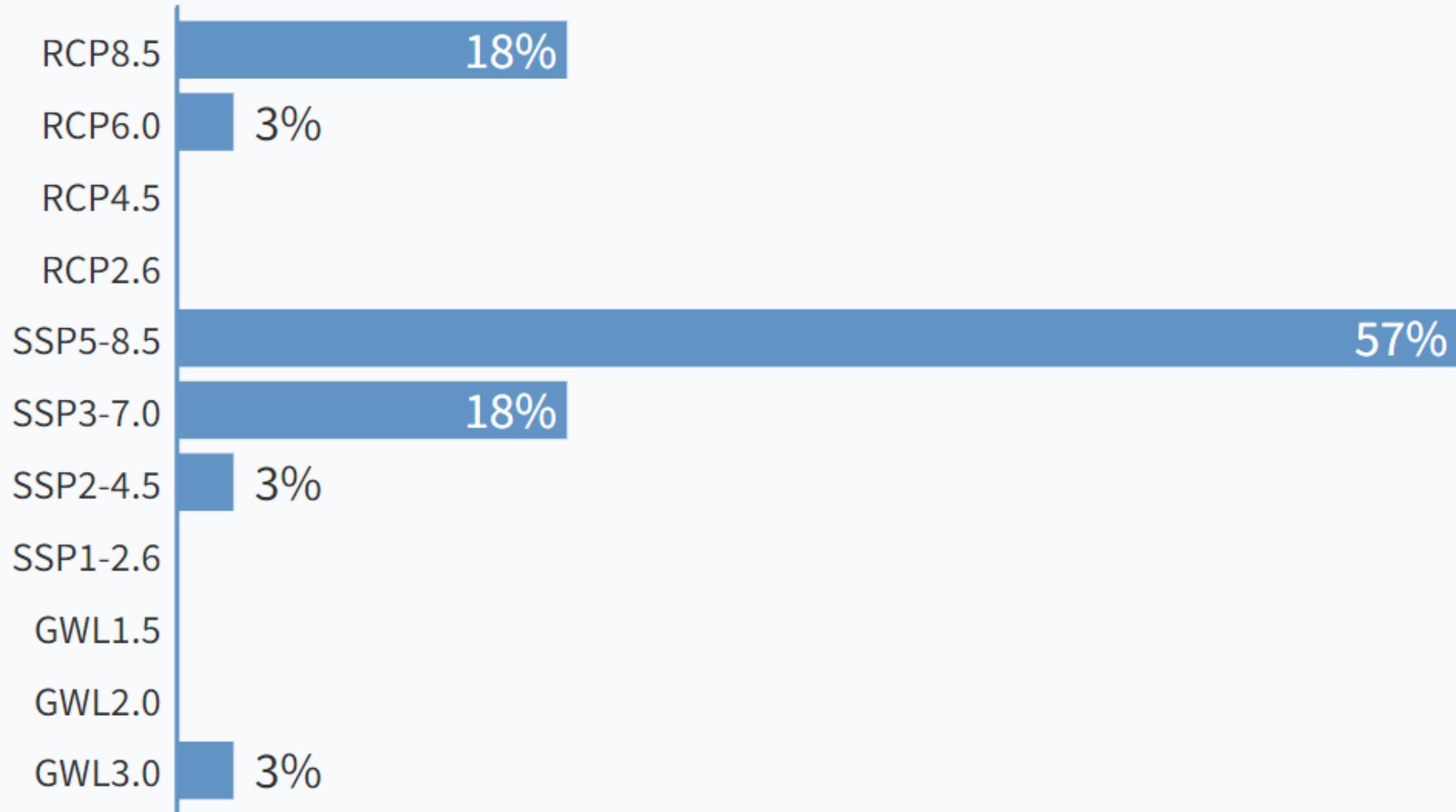
# Canada



# What to know about SSPs

1. Represent fundamentally different socio-economic assumptions
2. Map out range of plausible future conditions
3. Same radiative forcing levels as RCPs
  - Details are different (e.g., aerosols)
  - Some additional levels (forcing 1.9, 3.4, and 7.0 W/m<sup>2</sup>)
4. For new analysis use SSPs (CMIP6/IPCC AR6) but analysis with RCPs (CMIP5/IPCC AR5) remains valid

# Which scenario is best for risk assessment?





Location ▼

Variable ▼

Sector ▼

Analyze

Download

Learn

News

About Glossary

HAVE A QUESTION?

EN

FR

Learning Zone ▶ Topic 3: Understanding Future Projections

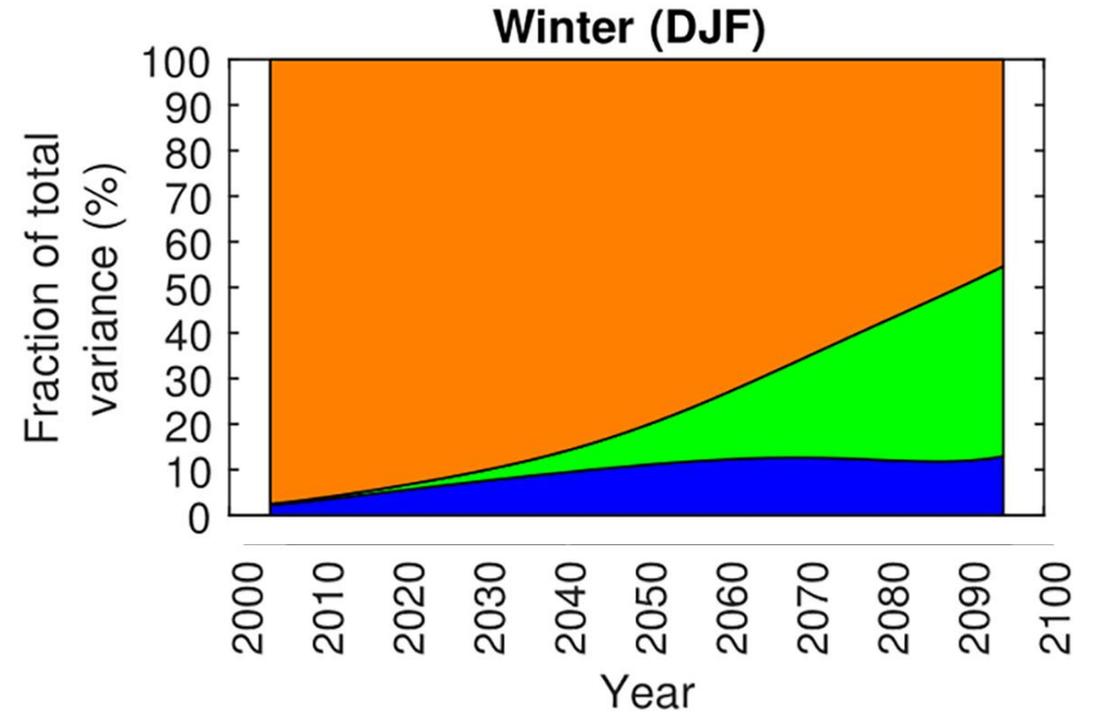
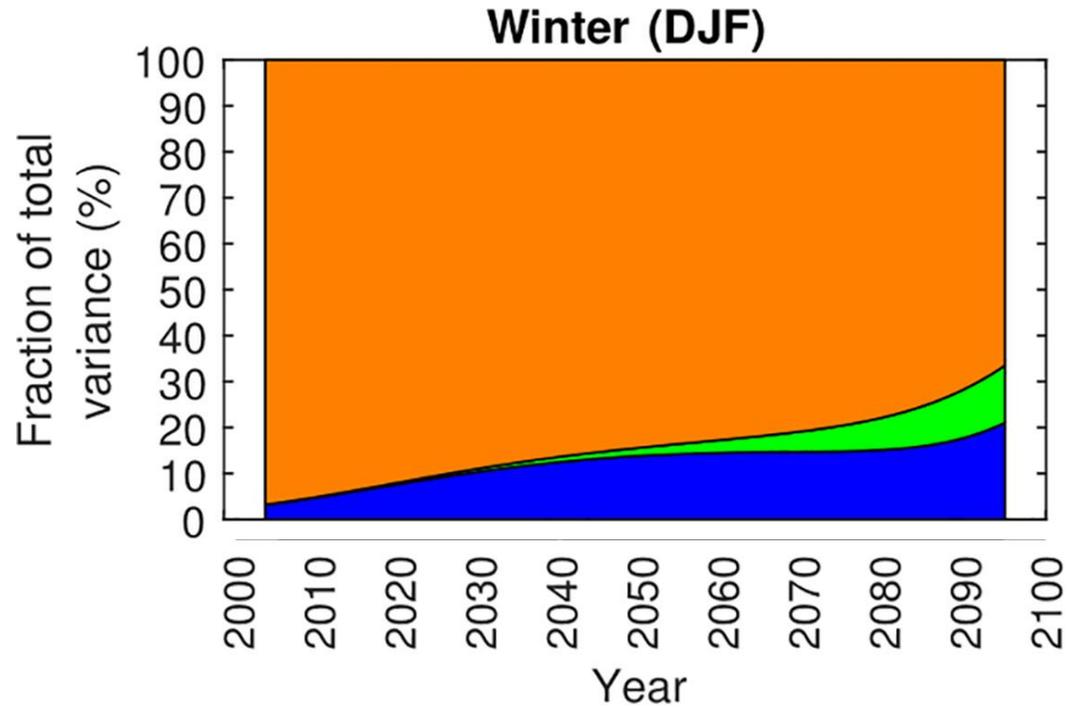
# Uncertainty in Climate Projections

Adapting to a changing climate requires confronting and dealing effectively with a wide range of uncertainties. Learn about the three main sources of uncertainty in climate projections.

TIME TO COMPLETION

3 min

# Scenario uncertainty relative to natural variability



Model uncertainty Scenario uncertainty Internal variability

# What to know about uncertainty

## 1. Natural variability

- is an irreducible component of the climate system that will always be present in future projections
- is a range that should be explicitly considered
- is present in historical observations even though not always explicit

## 2. Scenarios uncertainty

- depends on human behaviour, policies, and technologies
- hard to rule out the full range with confidence
- may not be particularly large in some cases

## 3. Model uncertainty

- limited by computing power, understanding; also downscaling method & historical observations if used (all generally improving but slowly)

# Risk = Likelihood x Consequence

**Risk Assessment Matrix**

<b>Consequence</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>14</b>	<b>21</b>	<b>28</b>	<b>35</b>	<b>42</b>	<b>49</b>
	<b>6</b>	<b>6</b>	<b>12</b>	<b>18</b>	<b>24</b>	<b>30</b>	<b>36</b>	<b>42</b>	<b>48</b>
	<b>5</b>	<b>5</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>35</b>	<b>40</b>
	<b>4</b>	<b>4</b>	<b>8</b>	<b>12</b>	<b>16</b>	<b>20</b>	<b>24</b>	<b>28</b>	<b>32</b>
	<b>3</b>	<b>3</b>	<b>6</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>18</b>	<b>21</b>	<b>24</b>
	<b>2</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>10</b>	<b>12</b>	<b>14</b>	<b>16</b>
	<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	
		<b>Probability of Occurrence</b>							

*Note: The matrix includes annotations: 'Flood' in starburst shapes at (7,3), (7,9), and (2,8); 'Climate Change' in a right-pointing arrow from (7,3) to (7,9); and 'Adapt' in a downward-pointing arrow from (7,9) to (5,9).*

Source: Public Infrastructure Engineering Vulnerability Committee

<http://www.pievvc.ca>

# Assigning likelihood scores for events/indices not all hazards' climate projections are equal

- Not available as PROBABILITY
  - e.g. heat waves, most derived indices/with thresholds
- Not DIRECTLY available
  - e.g. flooding, water shortages
- Not available at all
  - e.g. contaminated water, air pollution from wildfire

# Likelihood score “bins” are wide

LIKELIHOOD	RATING	CRITERIA FOR DISCRETE CLIMATE-RELATED RISK EVENTS
------------	--------	---

<b>Almost certain</b>	5	Event is expected to happen about once every two years or more frequently (i.e., annual chance $\geq 50\%$ ).
<b>Likely</b>	4	Event is expected to happen about once every 3 to 10 years (i.e., $10\% \leq$ annual chance $< 50\%$ ).
<b>Possible</b>	3	Event is expected to happen about once every 11 to 50 years (i.e., $2\% \leq$ annual chance $< 10\%$ ).
<b>Unlikely</b>	2	Event is expected to happen about once every 51 to 100 years (i.e., $1\% \leq$ annual chance $< 2\%$ ).

Probability	
Method A	Method B
Negligible	$< 0.1\%$
Not Applicable	$< 1$ in 1,000
Highly Unlikely	1 %
Improbable	1 in 100
Remotely Possible	5 %
	1 in 20
Possible	10 %
Occasional	1 in 10
Slightly Likely	20 %
Normal	1 in 5
Fairly Likely	40 %
Frequent	1 in 2.5
Probable	70 %
Often	1 in 1.4
Very Probable	$> 99\%$
High Certainty	$> 1$ in 1.01

Table 1: Data assigned to confidence tiers; tier 1 (green), tier 2 (orange), and tier 3 (red).

	Temperature	Precipitation	Ice and Snow	Wind
<b>Almost certain</b>	Max. mean daily air temperature	Annual total precipitation	Ice accretion thickness (1/20)	Hourly wind pressures (1/10)
<b>Likely</b>	Min. mean daily air temperature	Annual rain	Permafrost extent	Hourly wind pressures (1/25)
	Annual mean air temperature	15 min rain (1/10)	Rain load (1/50)	Hourly wind pressures (1/50)
<b>Possible</b>	Design temperatures January 1%	One day rain (1/50)	Snow load (1/50)	Hourly wind pressures (1/100)
	Design temperatures January 2.5%	Relative humidity		Driving rain wind pressure (1/5)
<b>Unlikely</b>	Design temperatures July 2.5% dry			
	Design temperatures July 2.5% wet			
<b>Very Unlikely</b>	Degree days below 18°C			

- Even qualitative findings can estimate *change* in likelihood
- Show your work: record the levels of confidence & other caveats
- Remember: purpose of a risk assessment is to surface risks and then have a conversation on risk tolerance for design

[Climate-Resilient Buildings and Core Public Infrastructure Initiative](#)

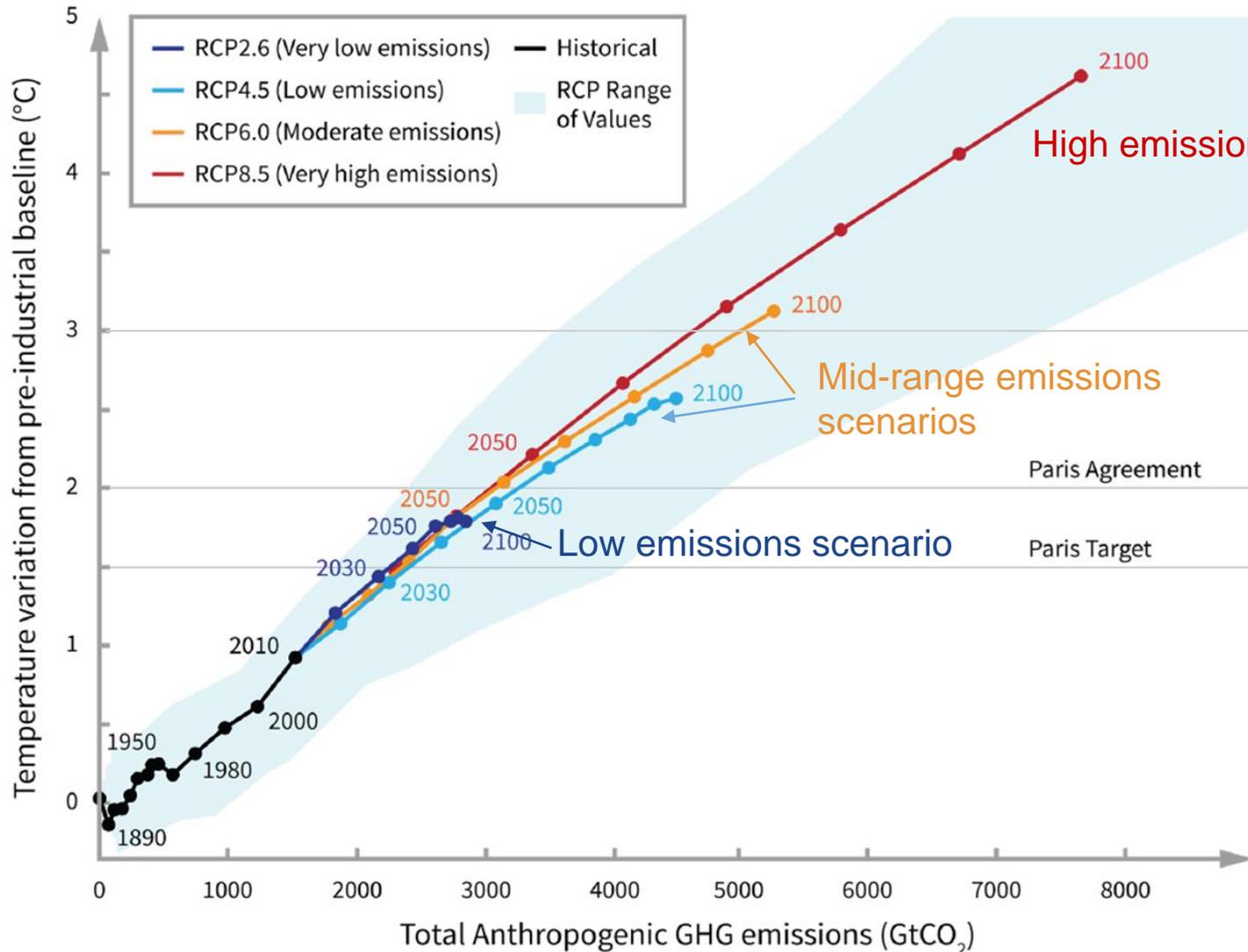
# Which tool is best for building a house?



# So which scenario? Use professional judgement

1. For risk assessment, currently 8.5 is most commonly used
  - Engineering conservative, allows for comparison to other work
  - Note that even more conservative options are possible and sometimes used (e.g., 90<sup>th</sup> percentile across ensemble of runs)
  - In some cases (subject to availability) 4.5, 6.0, 7.0 is used in addition or instead
2. For design *consider* multiple scenarios spanning wide range and use risk tolerance to make choices for design
3. Most importantly: state your assumptions & show your work
4. The climate system responds to total forcing so it is possible to re-examine an assessment or analysis done with a specific scenario in light of new information by adjusting how interpretation of risk tolerance and/or time

# Future Warming - Global Warming Levels



3°C

2°C

1.5°C

High emissions scenario

Mid-range emissions scenarios

Low emissions scenario

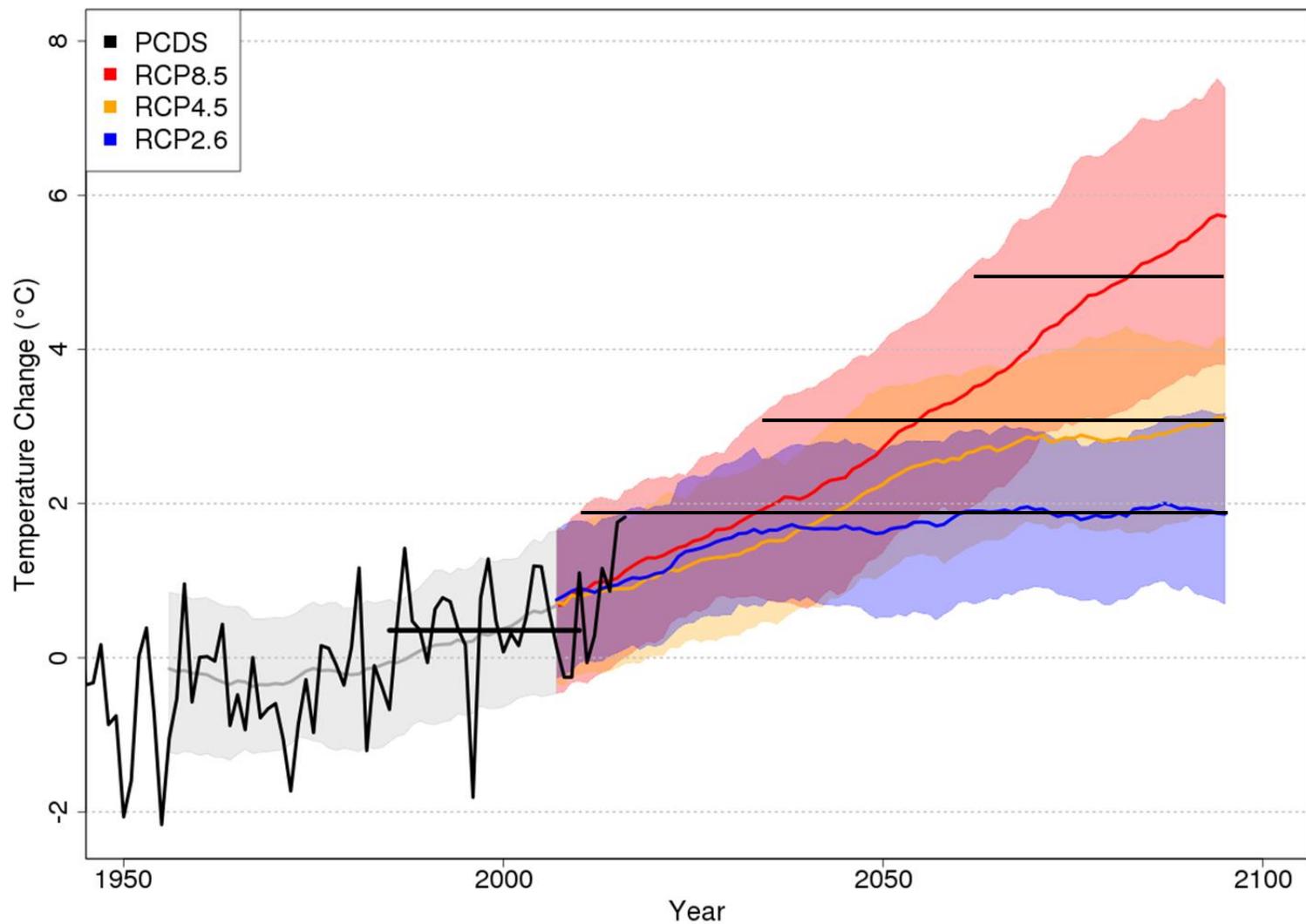
Paris Agreement

Paris Target

For a given GWL, it is more a question of *when* a scenario exceeds that warming, not if

**Important:** These are GWLs compared to a pre-industrial baseline (1850-1900)

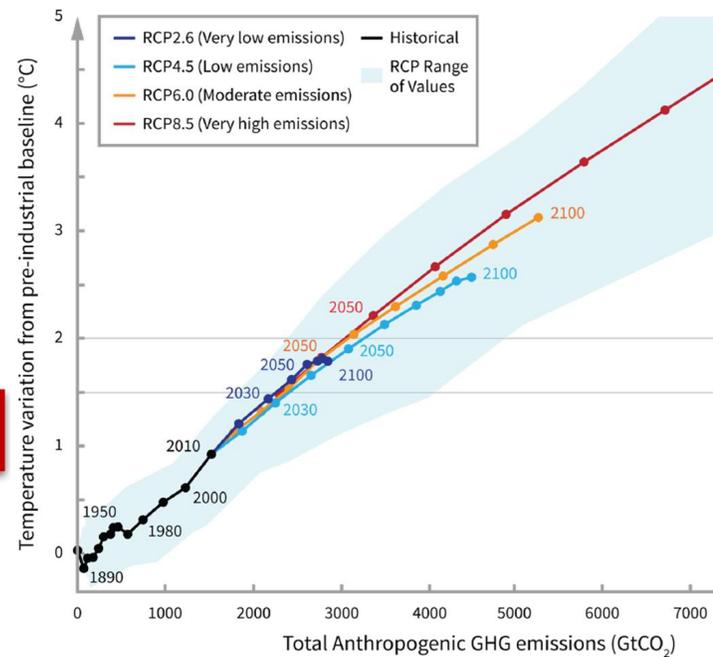
# Future Warming - Global Warming Levels



3.5°C

2°C

1.5°C



# What to know about levels of global warming

1. Complementary / convenient way to look at risk
  - allows assessment of risk / designing for fixed amount of warming
2. Not a silver bullet
  - need to choose risk tolerance remains but moves from “which scenario” → “when will this GWL occur”
  - need to choose multiple scenarios in design remains but moves from “multiple scenarios” → “multiple GWLs for a given time period”
  - uncertainty remains but moves from wide range of projected change → range of possible timing of occurrence
3. Can enable use of “Single Model Large Ensembles”
  - as in the use of CanRCM-LE for Appendix C-2 building code parameters

# Open discussion questions

1. Did you have any key insights?
2. Was anything surprising?
3. What is still confusing?

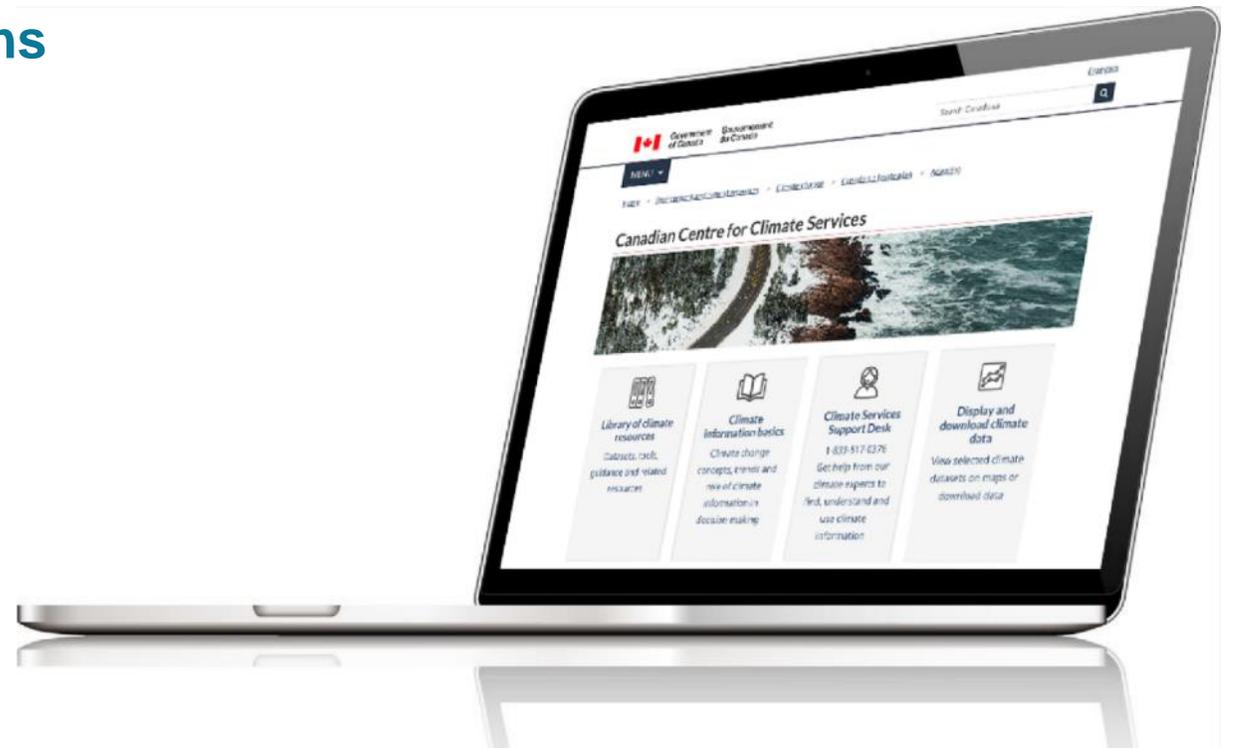
# Canadian Centre for Climate Services

Provides Canadians with information and support to consider climate change in their decisions

 1-833-517-0376

 [ccsc-cccs@ec.gc.ca](mailto:ccsc-cccs@ec.gc.ca)

 [Canada.ca/climate-services](https://Canada.ca/climate-services)





# Thank you

## Website

English:

[canada.ca/climate-services](https://canada.ca/climate-services)

Français:

[canada.ca/services-climatiques](https://canada.ca/services-climatiques)

## Climate Services Support Desk



1-833-517-0376



[ccsc-cccs@ec.gc.ca](mailto:ccsc-cccs@ec.gc.ca)

Acknowledgments – thanks to Laura VanVliet & Ken Chow for figures



Environment and  
Climate Change Canada

Environnement et  
Changement climatique Canada

Canada

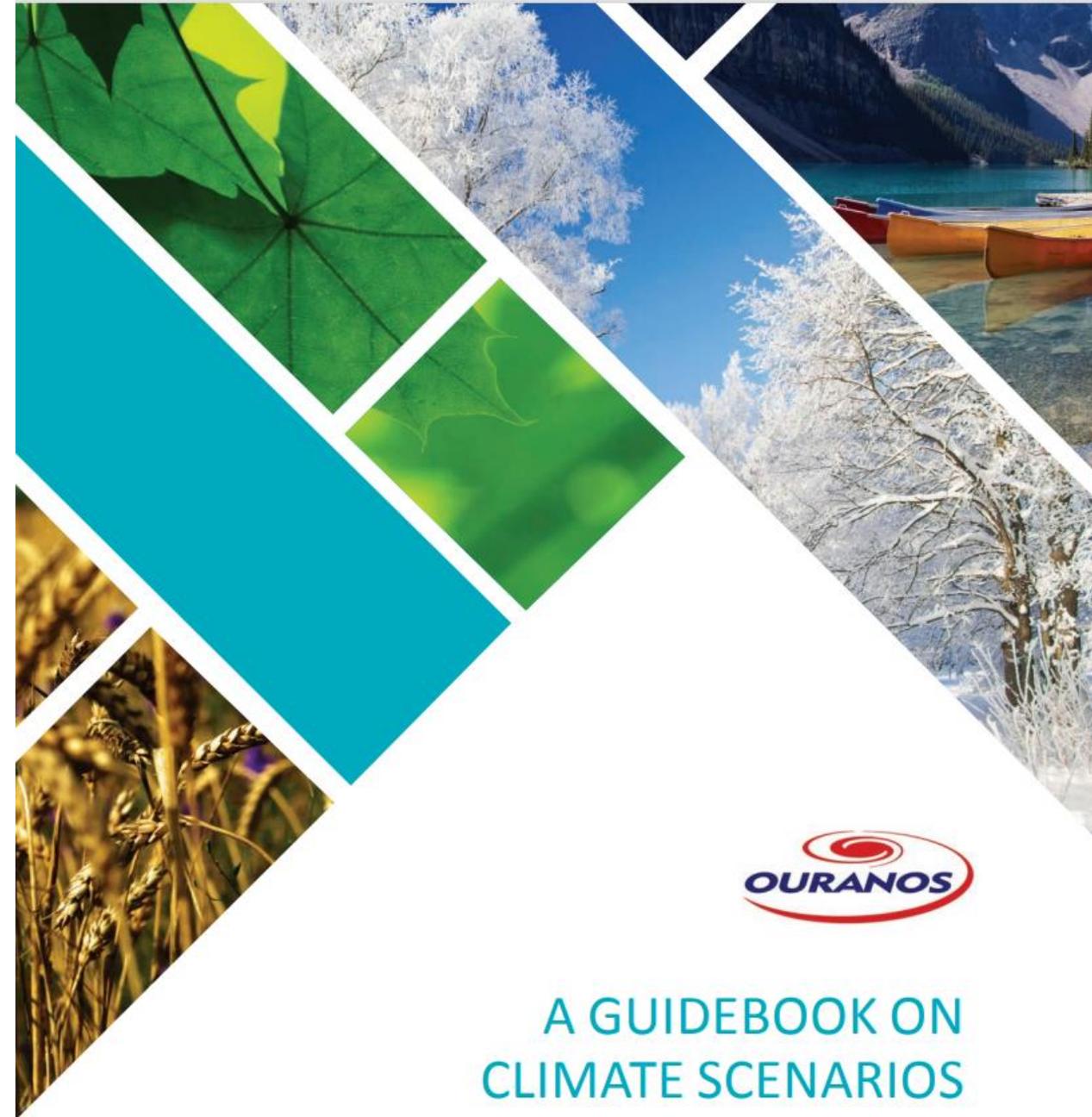
# Resources

CANADIAN CENTRE FOR  
CLIMATE SERVICES

CENTRE CANADIEN DES  
SERVICES CLIMATIQUES

# Guidebook on climate scenarios

- Current version is a 2016 update to previous guidance
- Newer recommendations in development



## A GUIDEBOOK ON CLIMATE SCENARIOS

USING CLIMATE INFORMATION TO GUIDE ADAPTATION RESEARCH AND DECISIONS

2016 EDITION

# CCCR2022

The latest science and information on climate change in Canada. Available at [ChangingClimate.ca](https://www.ChangingClimate.ca)

SSP – Shared Socio-economic Pathways

- SSP1-2.6 – emissions decline to net zero around or after 2050
- SSP5-8.5 – emissions roughly double from current levels by 2050

Guidance on the new scenarios and data available at [www.ClimateData.ca/Learn](https://www.ClimateData.ca/Learn) (~June 2022)



## Canada's Changing Climate Report

*in Light of the Latest Global  
Science Assessment*

# TAC-CCCS Training

- The CCCS, Transport Canada, and the Pacific Climate Impacts Consortium (PCIC) ran a three-part training series with the Transportation Association of Canada (TAC) on using climate information in the Transportation sector
  - Part 1: Introduction to climate information for decision making
    - Overview of key climate information concepts
    - Climate change impacts
    - Risk assessments
    - Historical datasets and future climate projections
  - Part 2: Finding and accessing climate data
    - Overview of key sources of climate information including ClimateData.ca, the Climate Atlas of Canada, and PCIC's Climate Explorer
  - Part 3: Assessing risk – A learning exercise
    - Learning exercise to understand key climate change impacts for infrastructure projects or asset management planning

# Video - more in depth on risk

- [Presentation](#) at University of Toronto Centre for Climate Science and Engineering
  - What is climate change risk
  - How to bring climate change risk into engineering work
  - Why do to so – including professional responsibility and duty of care



## CSA-CCCS webinar

- Why no longer appropriate to use IDF curves based on historical information alone?
- Best practices
- Details on a specific “scaling” approach used by Environment and Climate Change Canada and outlined in CSA PLUS 4013 to account for climate change, and coming to ClimateData.ca



FEBRUARY 16, 2022

# Intensity-Duration-Frequency (IDF) Curves and Climate Change

A joint webinar presented by CSA Group and the Canadian Centre for Climate Services

# Recorded CCCS presentations

[Français](#)



Government  
of Canada

Gouvernement  
du Canada



MENU ▾

[Canada.ca](#) > [Environment and natural resources](#) > [Climate change](#) > [Canada's climate plan](#) > [Adapting](#) > [Canadian Centre for Climate Services](#)

## Recorded presentations from the Canadian Centre for Climate Services



The list of presentations below is organized from most to least recent.

**CANADIAN CENTRE FOR  
CLIMATE SERVICES**

Please contact the [Climate Services Support Desk](#) if you have questions or wish to request a presentation for your organization.

# Engineers Canada

- Engineers cannot assume that the future will be similar to the past.
- Goal of report: that engineers consider the implications of climate change in their professional practice and that they create a clear record of the outcomes of those considerations.
- Nine principles that constitute the scope of professional practice for Engineers to initiate climate change adaptation actions

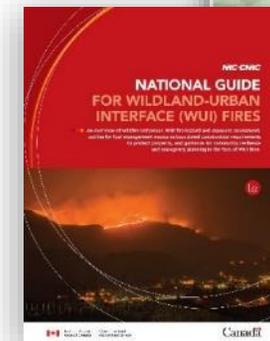


Principles of Climate Change Adaptation  
for Engineers



# National Research Council

- NRC's Climate Resilient Buildings and Core Public Infrastructure Initiative (CRBCPI)
  - Partnership with Infrastructure Canada
  - **Enabling Canada to design and build for the future:** Integrating climate resiliency into national codes, standards and guidance for buildings and infrastructure.
  - Significantly advanced the field of climate change adaptation for buildings and infrastructure, and is at the leading edge of this effort internationally
  - Developed a suite of evidence-based guidance documents on how to adapt



# PCIC's Newest Analysis Tool: Design Value Explorer

The [DVE](#) is tailored to users who consult the **National Building Code of Canada** and the **Canadian Highway Bridge Design Code** as part of their work.

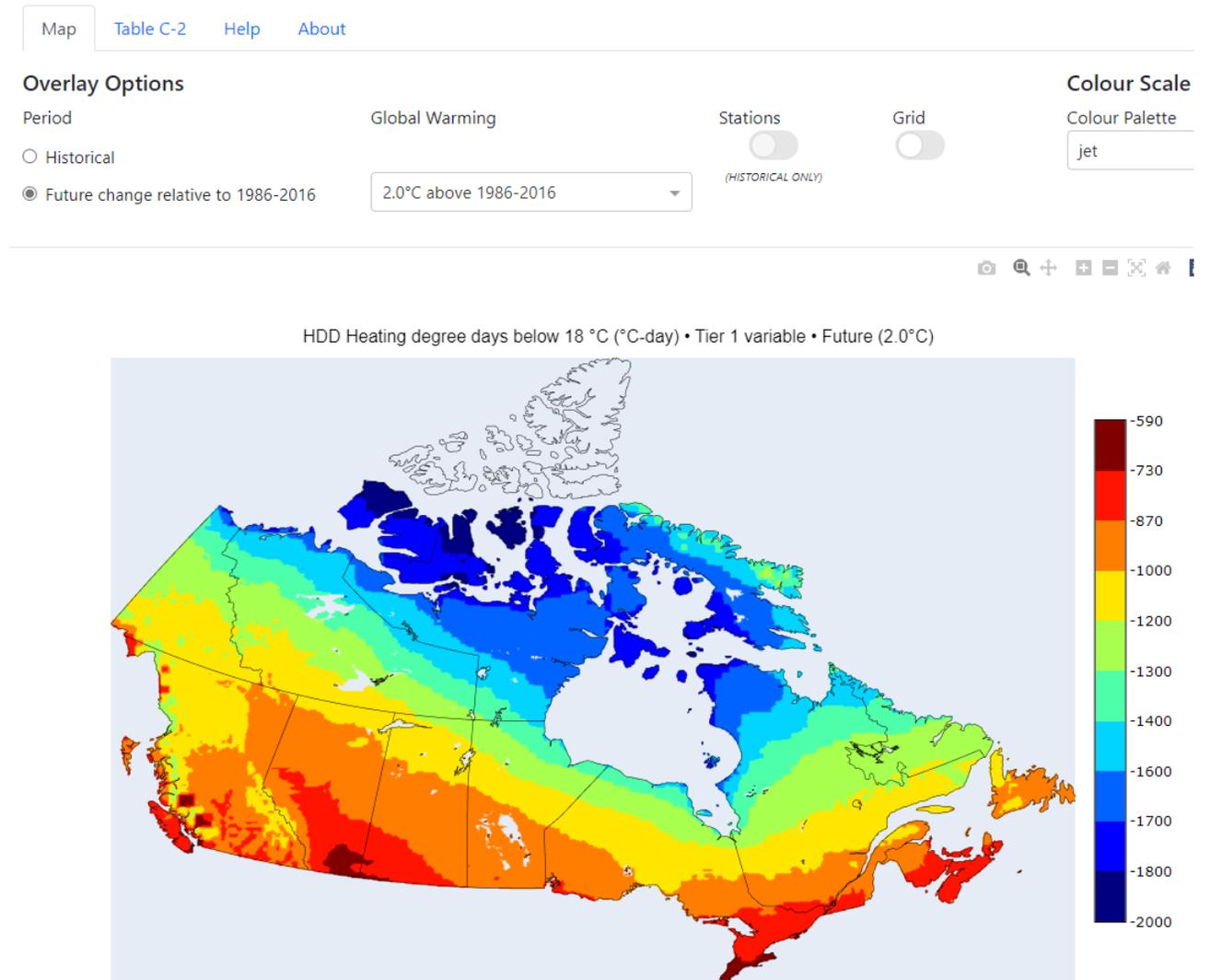
## The DVE allows users to:

- View historical design values maps over Canada;
- Display design values at an arbitrary location indicated on the map;
- View future-projected change maps for any design value;
- Download customizable maps in PNG format and tables in CSV format.
- And more!

## Questions?

Stacey O'Sullivan - [sosullivan@uvic.ca](mailto:sosullivan@uvic.ca)

Technical questions: Charles Curry – [cc@uvic.ca](mailto:cc@uvic.ca)



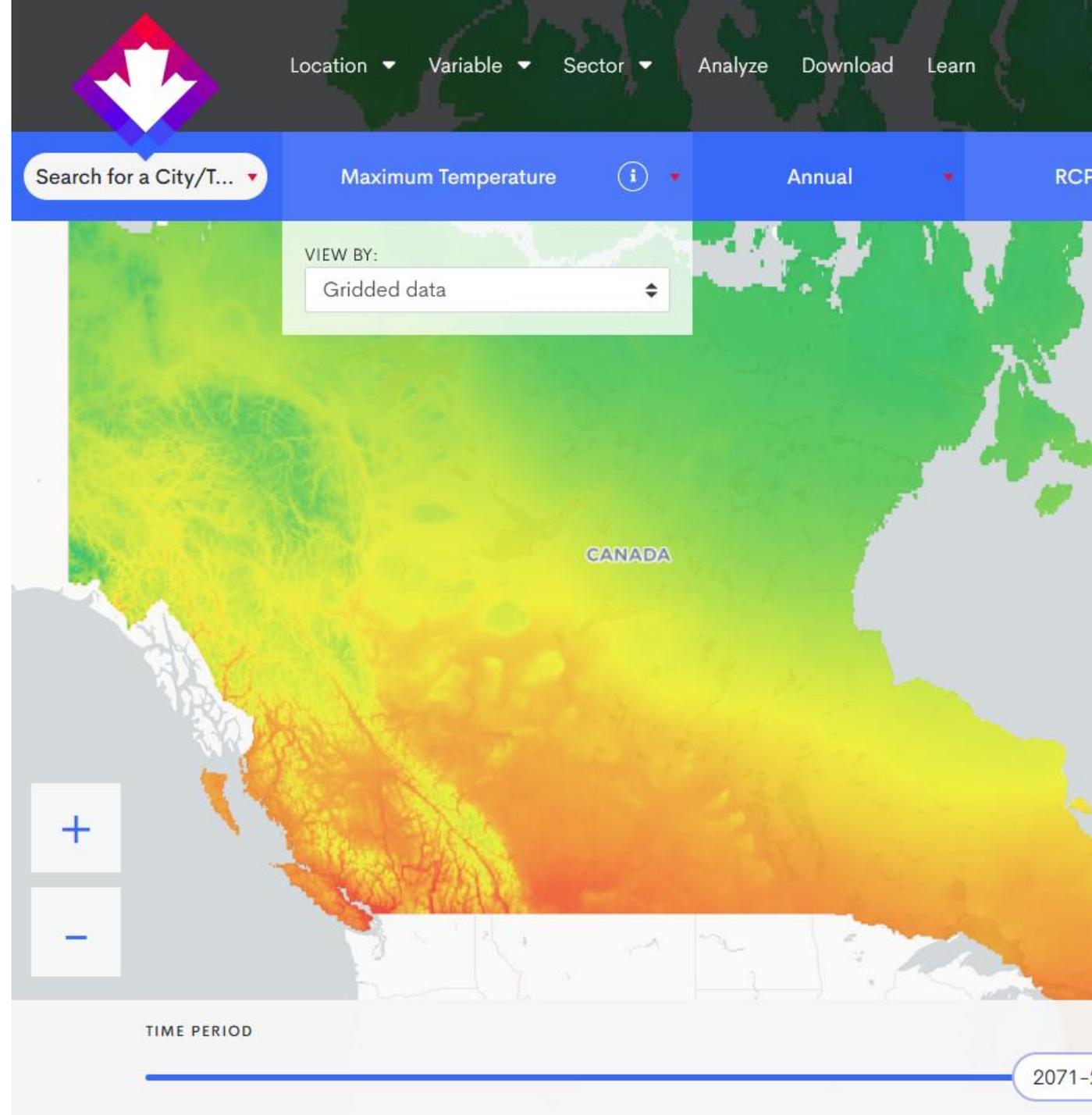
# ClimateData.ca

## Climate Data

- Climate Data
- High resolution climate data
- Temperature and precipitation variables and climate indices
- Sea level rise
- Observed climate normals and daily data download
- Intensity Duration Frequency (IDF) curves
- Local and national scale charts and maps
- Ability to compare emission scenarios
- Customizable tools to analyze and extract data

## Helpful Resources

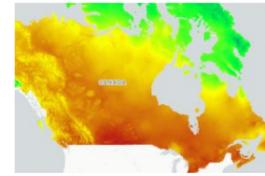
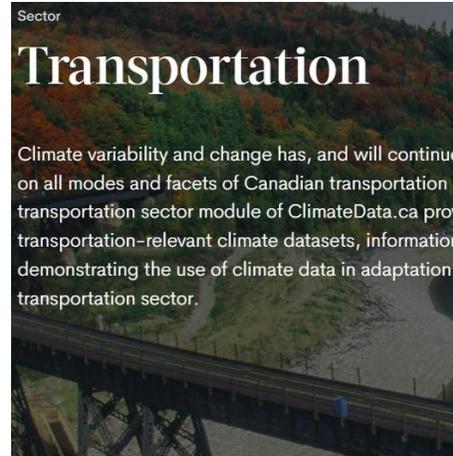
- Sector modules with tailored case studies
- Learning Zone



# Transportation Module

- How climate change impacts transportation systems
- Transportation-specific case studies
- Sector resources
- Related variables
- And more

## Case Studies



## Related Variables

Explore variables to learn about how data was used to impact climate related decisions in specific contexts.

### Hottest Day

The *Hottest Day* describes the warmest daytime temperature in the selected time period. In general, the hottest day of the year occurs during the summer months.

High temperatures are important. They determine if plants and animals can thrive, they limit or enable outdoor activities, define how we design our buildings and vehicles, and shape our transportation and energy use. However, when temperatures are very hot, people – especially the elderly – are much more likely to suffer from heat exhaustion and heat stroke. Many outdoor activities become dangerous or impossible in very high temperatures.

### Assessing Highway Vulnerabilities with the PIEVC Protocol

Across Canada, engineers who design public infrastructure realised that their projects were vulnerable to climate change and in response they developed the PIEVC Protocol to address the impacts of climate variability and change for their transportation infrastructure projects. This case study shares how it was applied in BC.

[Explore](#)

### Metrolinx: Mainstreaming Climate Risk Assessment

The implementation of the PIEVC Protocol across Metrolinx, Canada's largest transit authority, supported the development of an organization-wide adaptation strategy and a commitment to the ongoing understanding of climate change impacts of specific interest to the organization.

[Explore](#)

### Pavement and Extreme Temperatures in the City of Toronto

Increasing maximum daily temperatures can have negative impacts on roadway pavements. In response to the potential costs and mobility delays caused by premature pavement deterioration, proactive increases to pavement performance grades have been implemented in the City of Toronto.

[Explore](#)

# ClimateData.ca Learning Zone

## ClimateData.ca/learn/

- Introduction to climate information for decision making
- Understanding historical data
- How to use ClimateData.ca
- Downloadable training materials
- *More coming soon!*

**Historical Weather Station Observations**

Learn about Canada's weather station monitoring network and how long-term observations from these stations help build Canada's climate record.

FORMAT  TIME TO COMPLETION **2 min**

**Gridded Historical Data**

How are weather station observations used to create a country-wide view of Canada's weather? Learn about ANUSPLIN, the interpolation tool used to create gridded historical datasets.

FORMAT  TIME TO COMPLETION **2 min**

**Modelled Historical Data**

ClimateData.ca provides historical climate simulations from 24 climate models developed by scientists from around the world. Learn why climate models are run over the historical period and how you can access this data.

FORMAT  TIME TO COMPLETION **3 min**

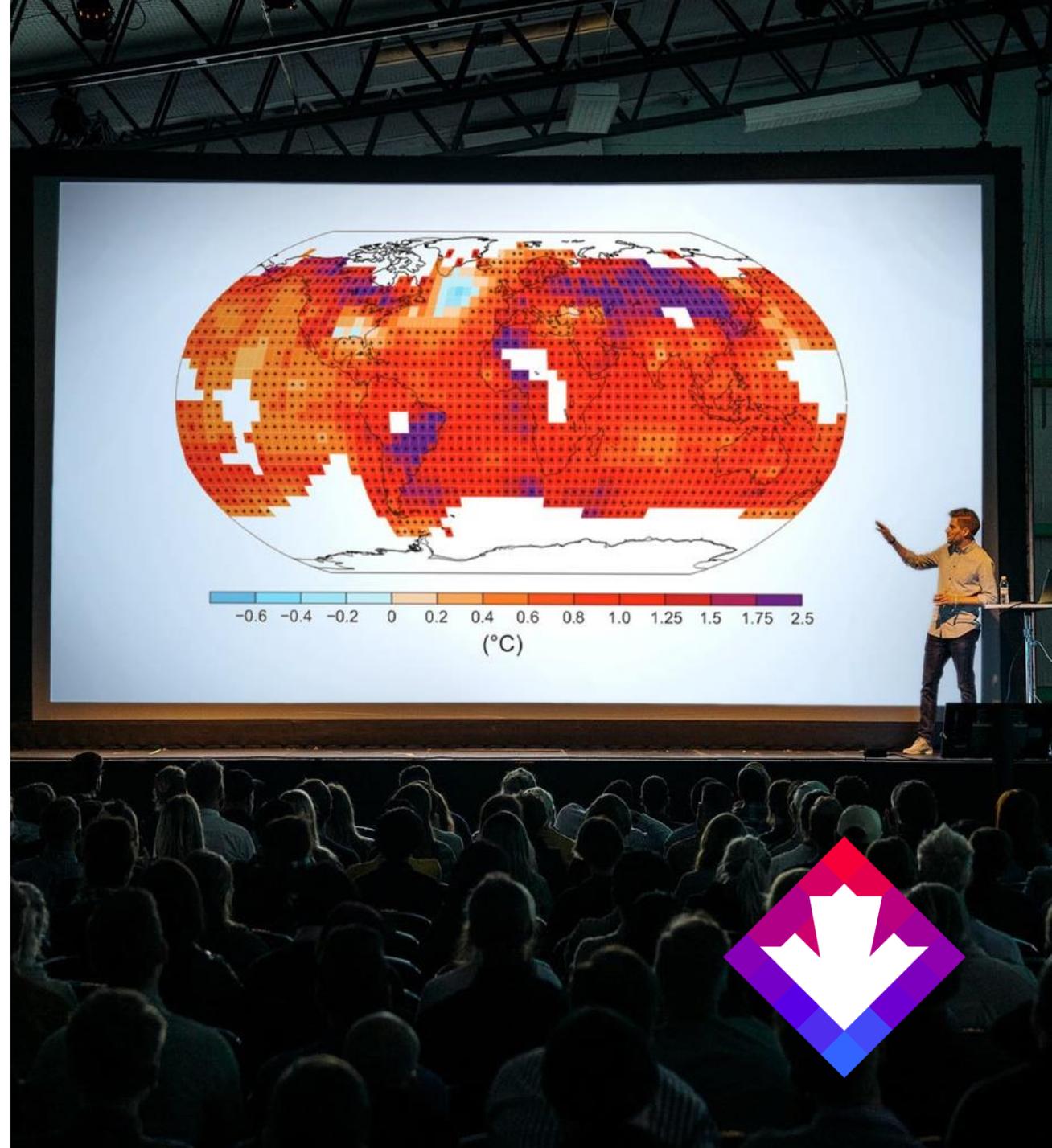
**Which Historical Data Set Should I Use?**

Learn about four types of historical data: historical weather station data, adjusted and homogenized data, gridded historical data, and modelled historical data. Find out which ones could be most relevant to you.

FORMAT  TIME TO COMPLETION **3 min**

# Training Materials

- Understand the importance of considering climate change in decision-making
- Be more familiar with key concepts regarding historical climate trends and future climate
- Understand the basics of climate projections and emissions scenarios
- Understand there is a range of possible climate futures
- Be aware of possible applications of climate information
- Know where to find climate information



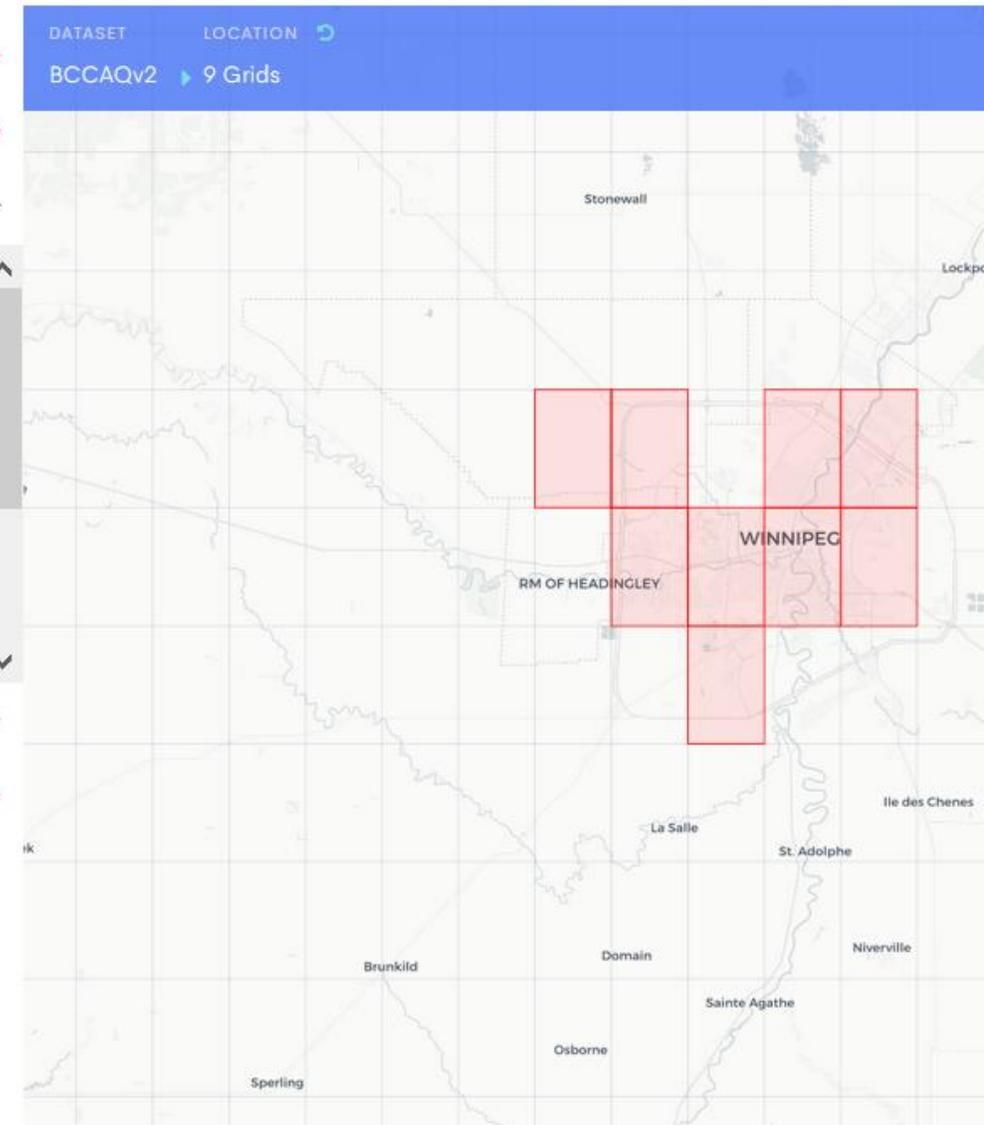
# ClimateData.ca Analysis Page

## ClimateData.ca/analyze/

- Choose data set
- Select locations
- Customize variables
- Choose a timeframe
- Select advanced options
- *More coming soon!*

- 1 CHOOSE A DATASET
- 2 SELECT LOCATIONS
- 3 CUSTOMIZE VARIABLES
- 4 CHOOSE A TIMEFRAME
- 5 ADVANCED

- Wet Days
- Average 'Wet Day' Precipitation Intensity
- Maximum Consecutive Wet Days
- Maximum Consecutive Dry Days
- Days above Tmax and Tmin
- Days above Tmax
- Days above Tmin
- Days below Tmin
- Degree Days Above a Threshold
- Degree Days Below a Threshold



# PAVICS

[Pavics.Ouranos.ca](https://Pavics.Ouranos.ca)

- Virtual laboratory facilitating the analysis of climate data
- Access observations, climate projections and reanalysis datasets
- Use a Python programming environment to analyze data without downloading it



PAVICS

Power Analytics and  
Visualization for Climate  
Science

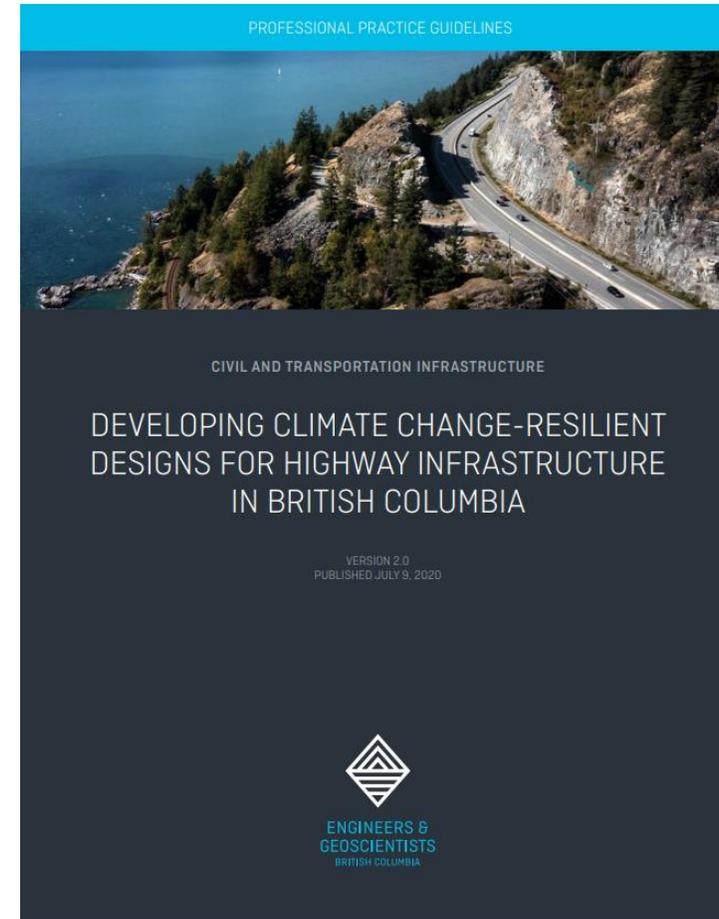
# Climate Change Resilience for Buildings

- Understand the causes of climate change and future projections within the context of the built environment.
- Recognize climate hazards for buildings in specific locations and prioritize vulnerabilities.
- Understand the LCR (Low Carbon Resilience) approach and its application to buildings.
- Access tools and processes to start planning LCR for new and existing buildings



# Climate-resilient Designs for Highway Infrastructure

- Guidance on professional practice for Engineering/Geoscience Professionals who carry out a range of activities related to Climate Change-Resilient Design for Highway Infrastructure
- For Qualified Professional who complete Climate Change Risk Assessments



# Library of Climate Resources

- **300+** links to climate datasets, tools, guidance and related resources
- Collection of **climate resilient standards**
- Useful for impact, vulnerability and risk **assessments**, and for adaptation **planning**
- **Search** using filters or keywords

**7 Steps to Assess Climate Change Vulnerability in Your Community** | Guidance

This workbook helps communities plan for climate change by assessing vulnerability to identified hazards.  
*Organization:* Government of Newfoundland and Labrador, Memorial University  
*Sub-organization:*  
*Resource formats:* **Vulnerability or risk assessment**

**A Guidebook on Climate Scenarios: Using Climate Information to Guide Adaptation Research and Decisions** | Guidance

This guidebook supports decision-makers in understanding climate information, modelling, and how climate change scenarios can be used to inform adaptation.  
*Organization:* Ouranos  
*Sub-organization:*  
*Resource formats:* **Scientific synthesis**

**A Made-in-Saskatchewan Climate Change Strategy** | Additional resources

This website provides an overview of climate change strategy of Saskatchewan  
*Organization:* Government of Saskatchewan  
*Sub-organization:*  
*Resource formats:* **Adaptation planning**

**A Practitioner's Guide to Climate Change Vulnerability and Risk Assessments** | Guidance

This guide provides tools and techniques for how climate change vulnerabilities and risks can be integrated into decision-making for ecosystems in Ontario.  
*Organization:* Government of Ontario, Resources (OCCO)  
*Sub-organization:* Government of Ontario, Ministry of Natural Resources and Forestry  
*Resource formats:* **Vulnerability or risk assessment**

**A Primer for Understanding Concepts, Principles and Language Use Across Disciplines** | Guidance

This primer helps engineers and climate specialists collaborate more effectively in carrying out climate change vulnerability and risk assessments. It does this by explaining important differences in how practitioners from these two respective disciplines understand particular concepts, principles, and vocabulary.  
*Organization:* Nodelcorp, Government of British Columbia, Pacific Climate Impacts Consortium  
*Sub-organization:* BC Ministry of Transportation and Infrastructure  
*Resource formats:* **Scientific synthesis** **Vulnerability or risk assessment**

**Adapting to a Changing Climate in Nova Scotia: Vulnerability Assessment and Adaptation Options** | Additional resources

**Sector**

- Agriculture (25)
- Coastal management (31)
- Ecosystems and biodiversity (22)
- Energy (3)
- Forests (22)

▼ Show more  
✕ Clear all

**Hazard / Impact**

- Air quality (6)
- Drought (18)
- Erosion (14)
- Extreme weather (27)
- Fire (16)

▼ Show more  
✕ Clear all

**Jurisdiction**

- Alberta (118)
- British Columbia (179)
- Manitoba (128)
- New Brunswick (135)
- Newfoundland and Labrador (142)

▼ Show more  
✕ Clear all

**Historical / Future**

- Future (96)
- Historical (182)

✕ Clear all

**Variables** **45**

- Cloud (9)
- Cooling degree days (22)

# Network of Regional Climate Service Providers

CCCS **supports** and **fosters** the development of regional climate organizations to provide localized services



**NATIONAL  
CLIMATE  
SERVICES  
PROVIDER**

Canadian Centre for Climate Services

[www.canada.ca/climate-services](http://www.canada.ca/climate-services)



Government  
of Canada

Gouvernement  
du Canada

**NATIONAL  
TOOLS**

Climate Atlas of Canada

[www.climateatlas.ca](http://www.climateatlas.ca)



Canadian Climate Data

[www.ClimateData.ca](http://www.ClimateData.ca)



Power Analytics & Visualization  
for Climate Science (PAVICS)



<https://pavics.ouranos.ca/>

**REGIONAL  
CLIMATE  
SERVICES  
PROVIDERS**

Ouranos

[www.ouranos.ca](http://www.ouranos.ca)

(region: mostly Quebec)



Pacific Climate Impacts  
Consortium

[www.pacificclimate.org](http://www.pacificclimate.org)

(region: mostly Pacific NW)



ClimateWest

[www.climatewest.ca](http://www.climatewest.ca)

(region: Prairies)



CLIMAtlantic

[www.climatlantic.ca](http://www.climatlantic.ca)

(region: Atlantic)



# Climate Services Support Desk

[ccsc-cccs@ec.gc.ca](mailto:ccsc-cccs@ec.gc.ca)

- Helps users find the **right datasets** and **information**
- Provides **guidance** for understanding and using data
- Draws on a **network of experts** to respond to inquiries



## Feedback

Your feedback is welcome.  
Leave us your comments and suggestions.



## Inquiry

Get help from our climate experts to find, understand, and use climate information.