

Climate Change and Heritage Buildings: how using the past can help us prepare for a climate changed future

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Pollution Probe is a Canadian non-profit organization that:

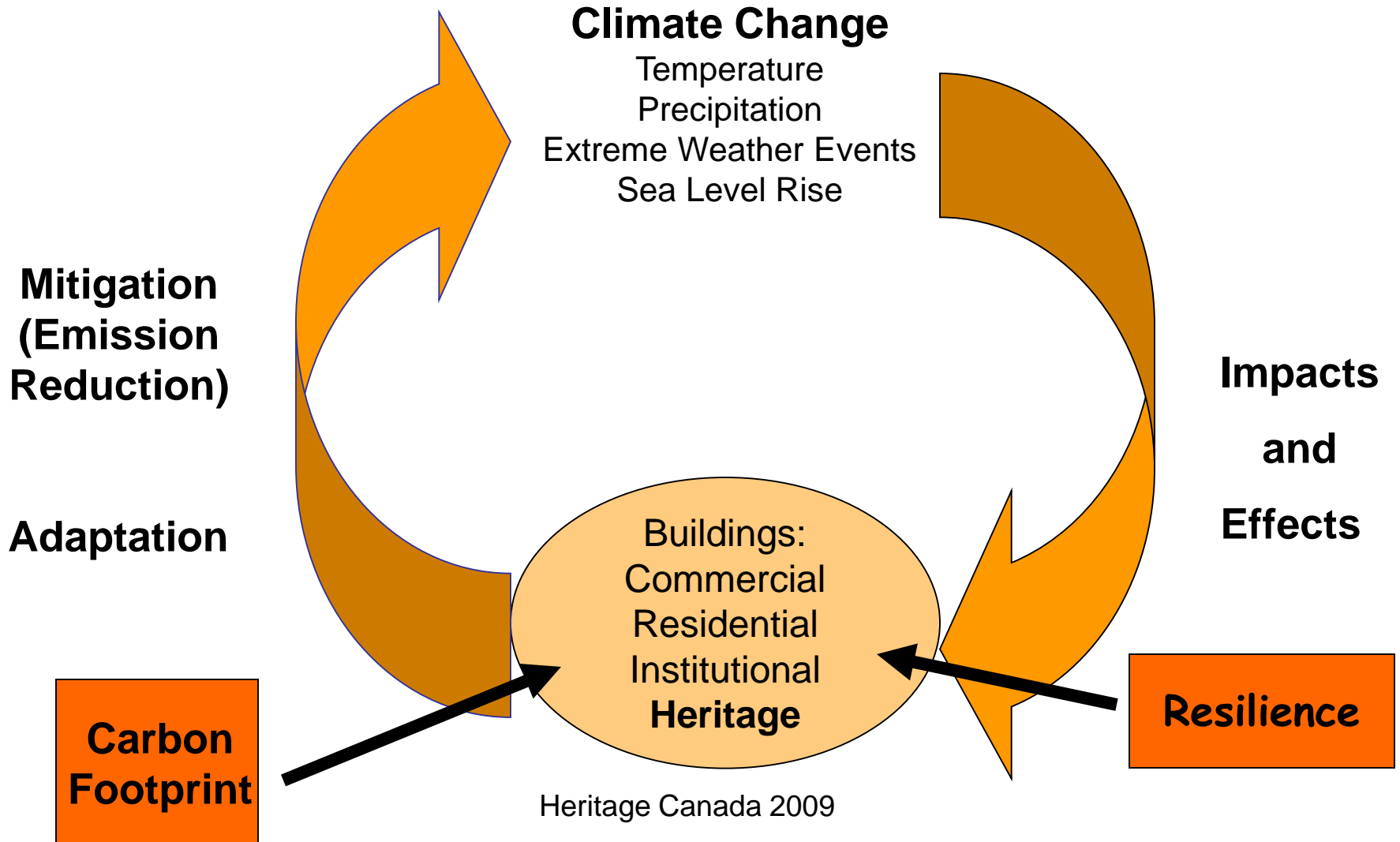
- approaches issues fair-mindedly, based upon fact
- is a partnership-building, donor-based, non-profit organization with charitable status
- seeks to represent the needs of the public, and are results oriented

Pollution Probe is dedicated to achieving positive and tangible environmental change.

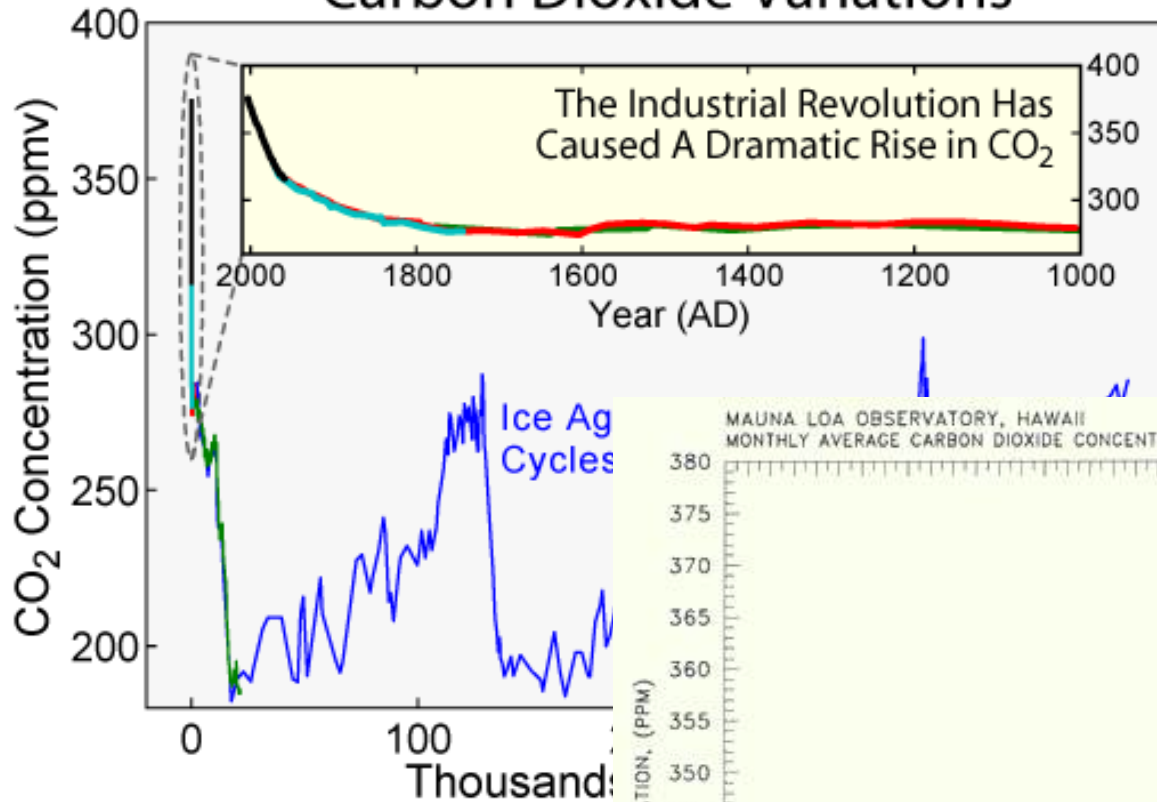
Key Messages

- Climate change is real, and is already happening now – past conditions no indicator of the future
- Urgency to take “mitigation” action now and reduce emissions, largely through reduced combustion of fossil fuels
- Need to adapt to an inevitable degree of climate change – the forgotten response
- No exceptions to the rule
- Heritage Buildings can do both

Responding to Climate Change

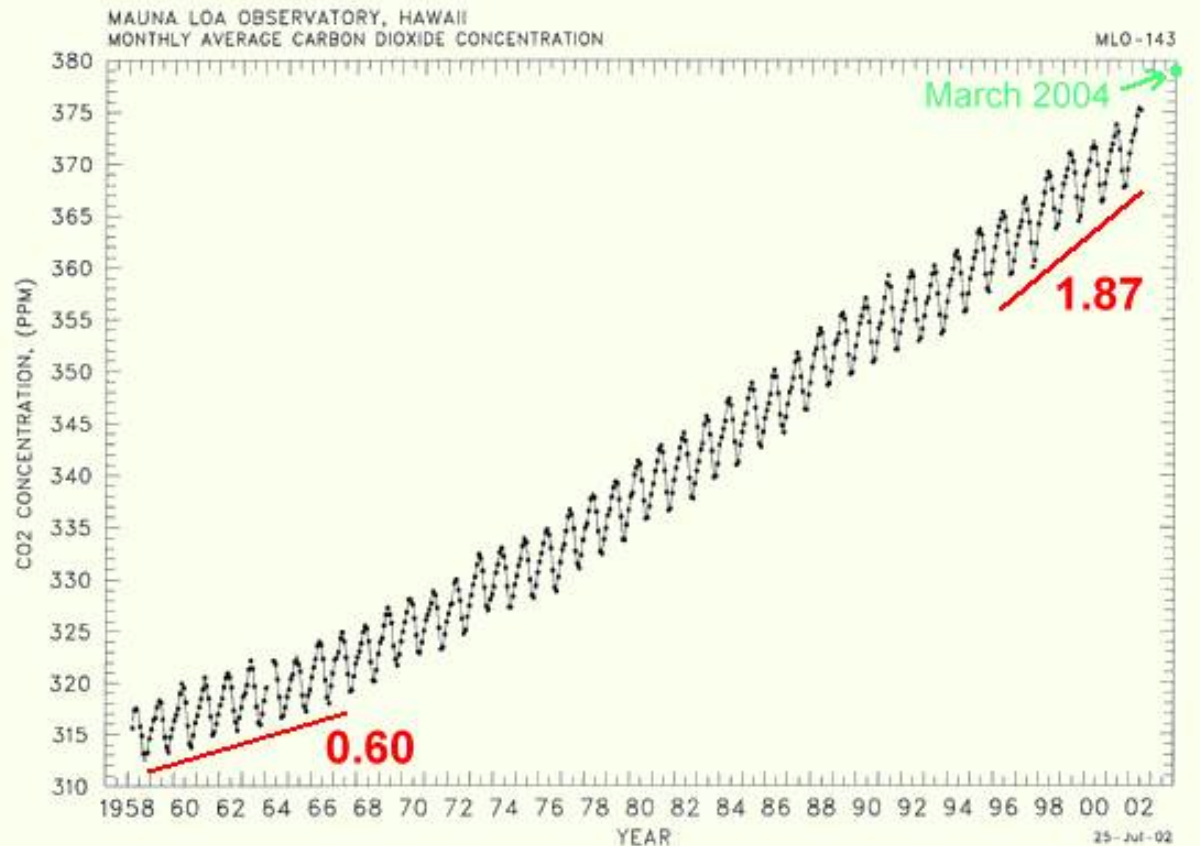


Carbon Dioxide Variations



**Current CO₂ is
380 ppm;
CO₂e is
430 ppm**

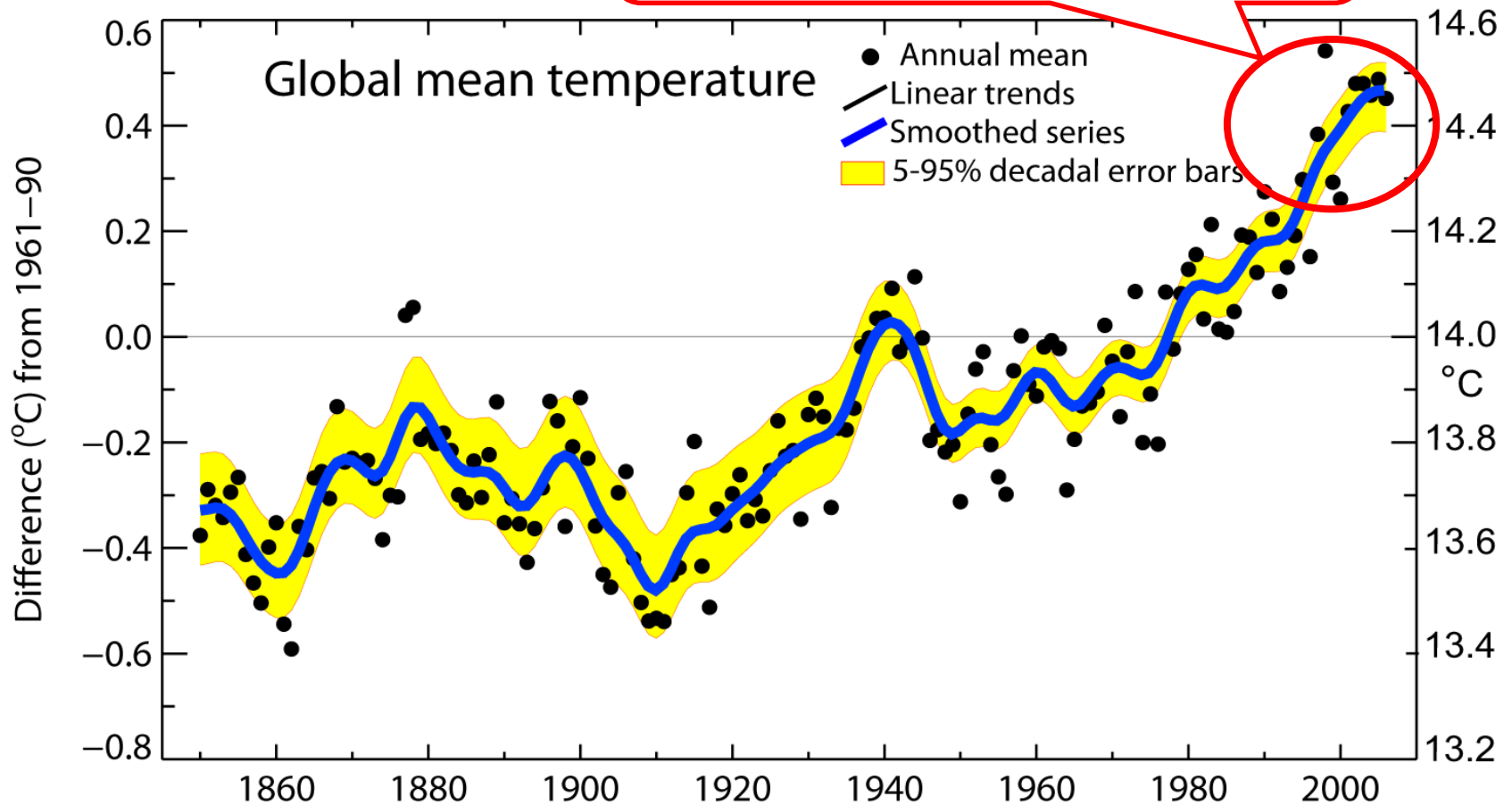
**Pre-industrial levels
were 275 ppm
2xCO₂ = 550 ppm**



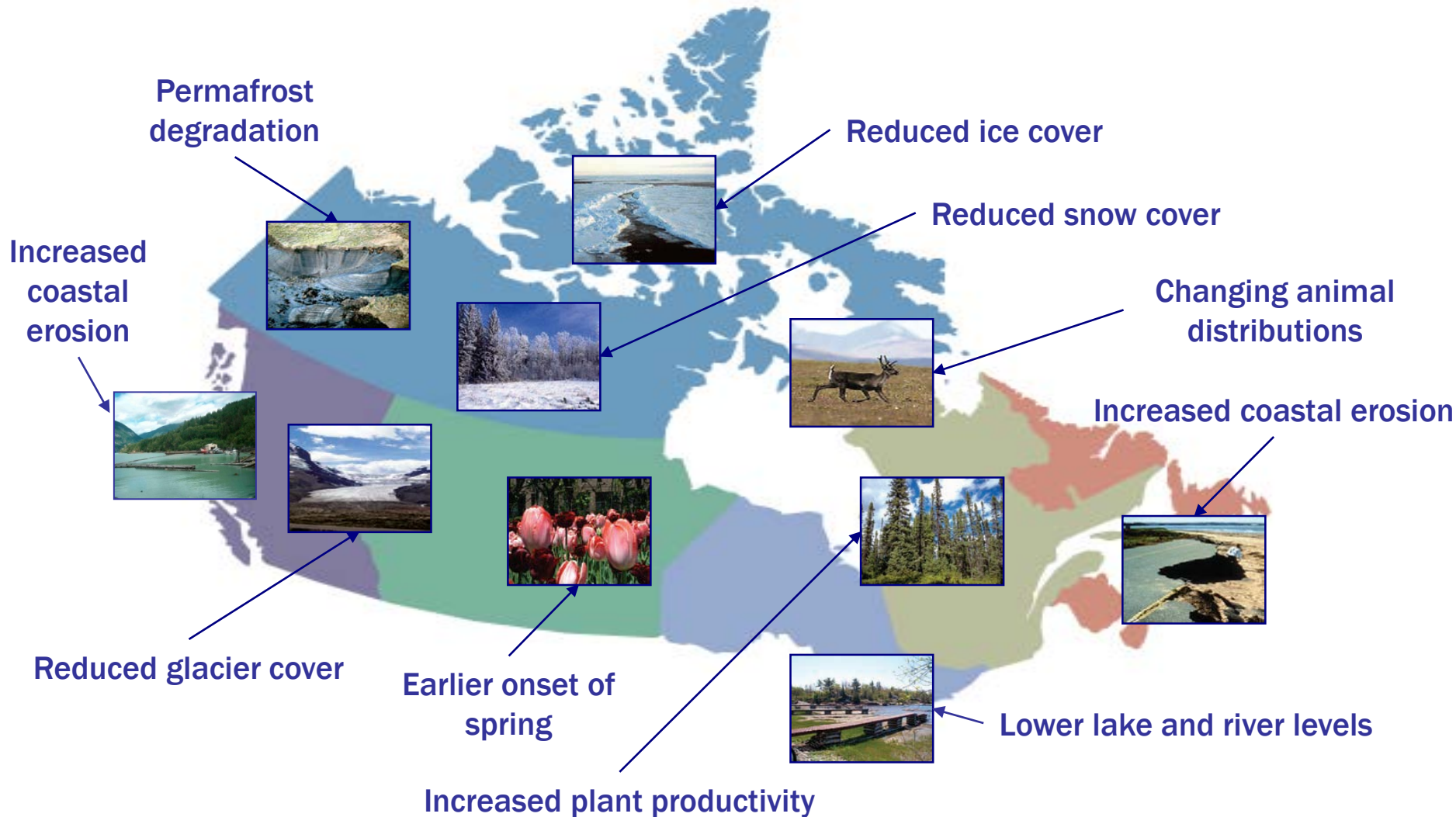
“Warming of the climate system is unequivocal”

IPCC Fourth Assessment Report, 2007

**Warmest 12 years:
1998, 2005, 2003, 2002, 2004, 2006
2001, 1997, 1995, 1999, 1990, 2000**



The impacts of changing climate are already evident in every region of Canada.







Climate Change 2007: The Physical Science Basis

Summary for Policymakers

Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change

This Summary for Policymakers was formally approved at the 19th Session of Working Group I of the IPCC, Paris, February 2007.

Note:

Text, tables and figures given here are final but subject to copy-editing.

Corrections made as of February 26th, 2007

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<http://www.ipcc.ch/>

IPCC FAR 1990

IPCC SAR 1995

IPCC TAR 2001

IPCC ARF 2007

Consensus that climate change is real and is already happening

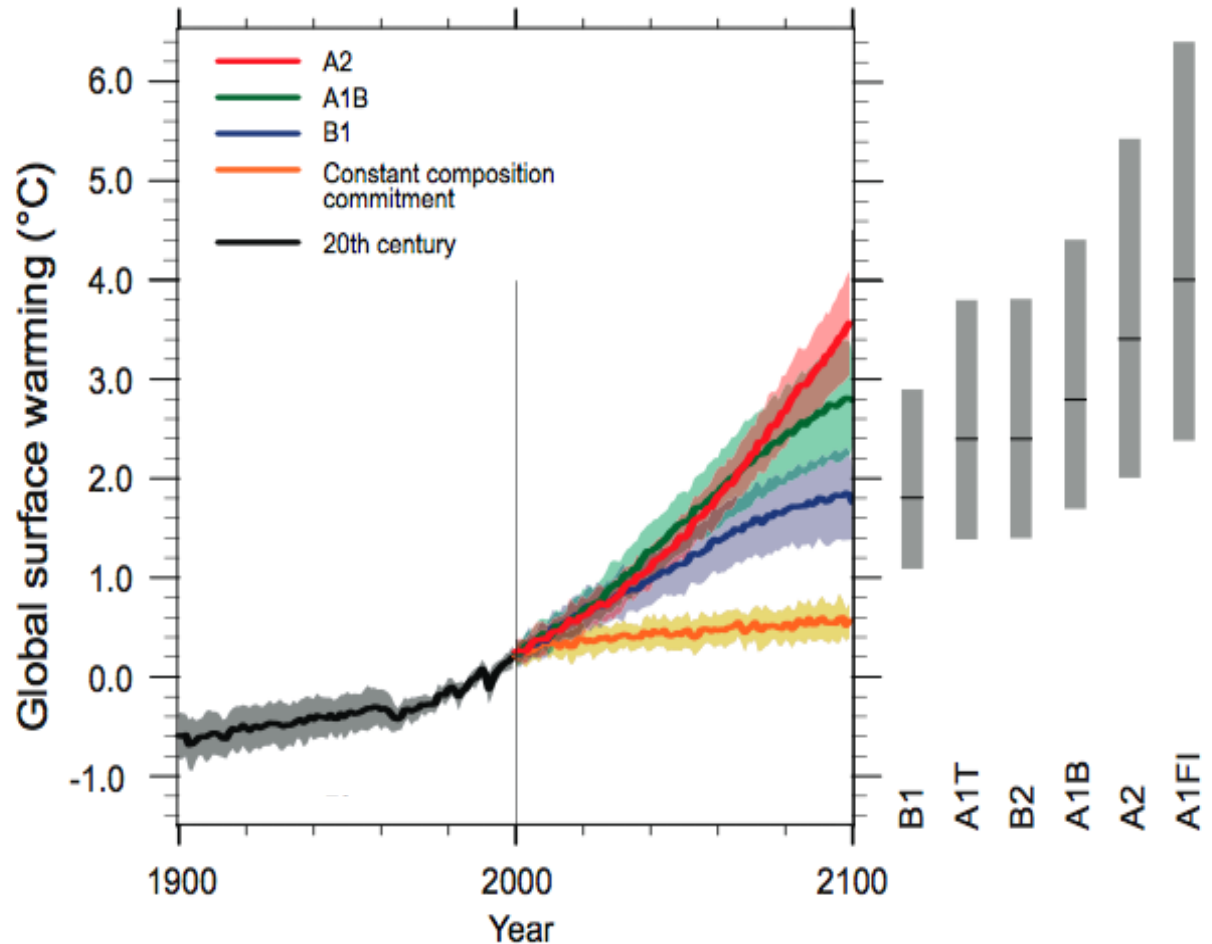
The questions are: How much warming will there be? How rapid will climate change?

Climate Change Projections

Mean for low scenario (B1) is **1.8°C** (range is **1.1°C to 2.9°C**).

For high scenario (A1FI) mean is **4.0°C** (range is **2.4°C to 6.4°C**).

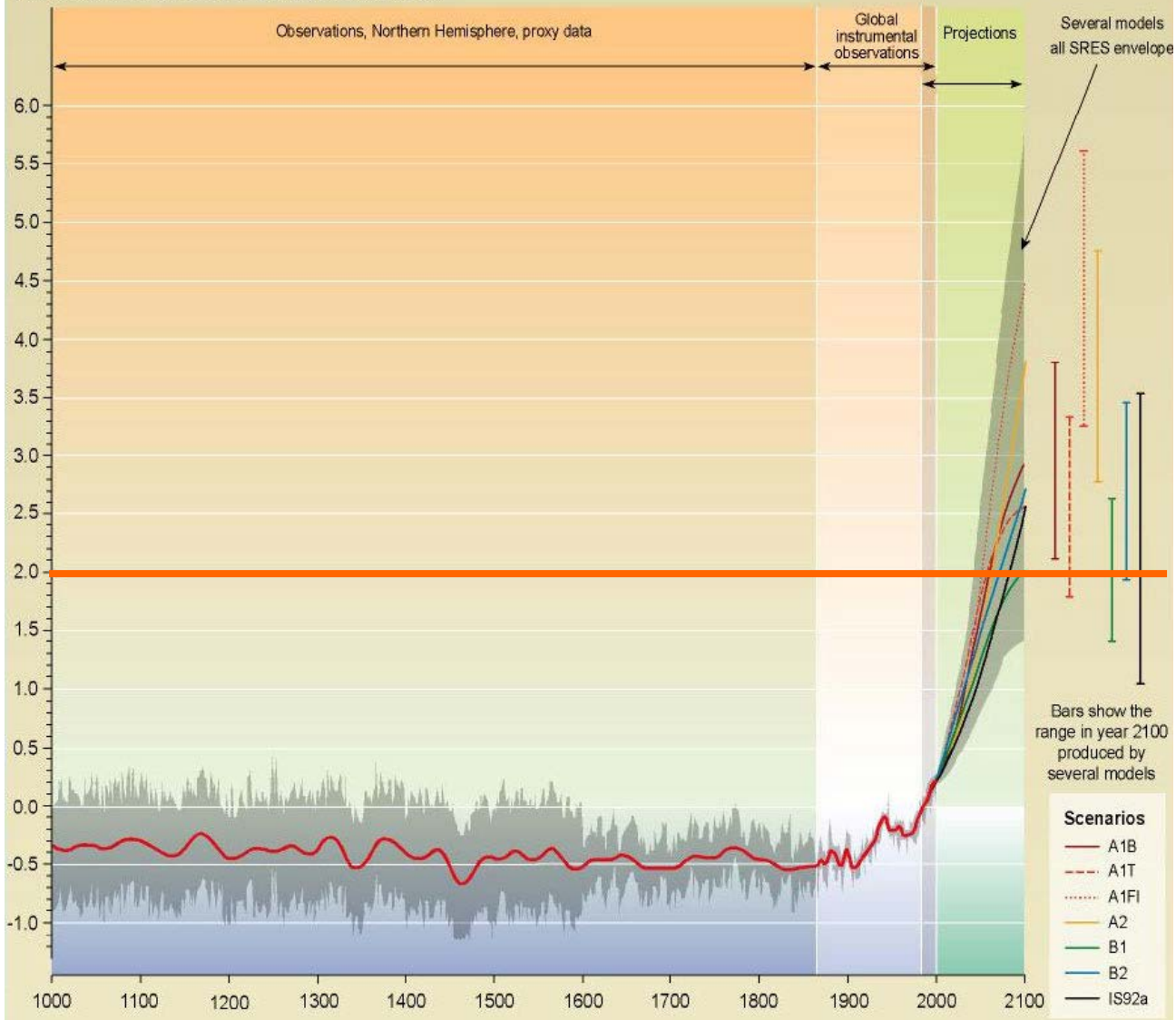
Across all scenarios mean is **3.0°C**; range is **2.0-4.5°C**.



Source: Multiple climate models, WPG1, IPCC, 4AR

Variations of the Earth's surface temperature: year 1000 to year 2100

Departures in temperature in °C (from the 1990 value)

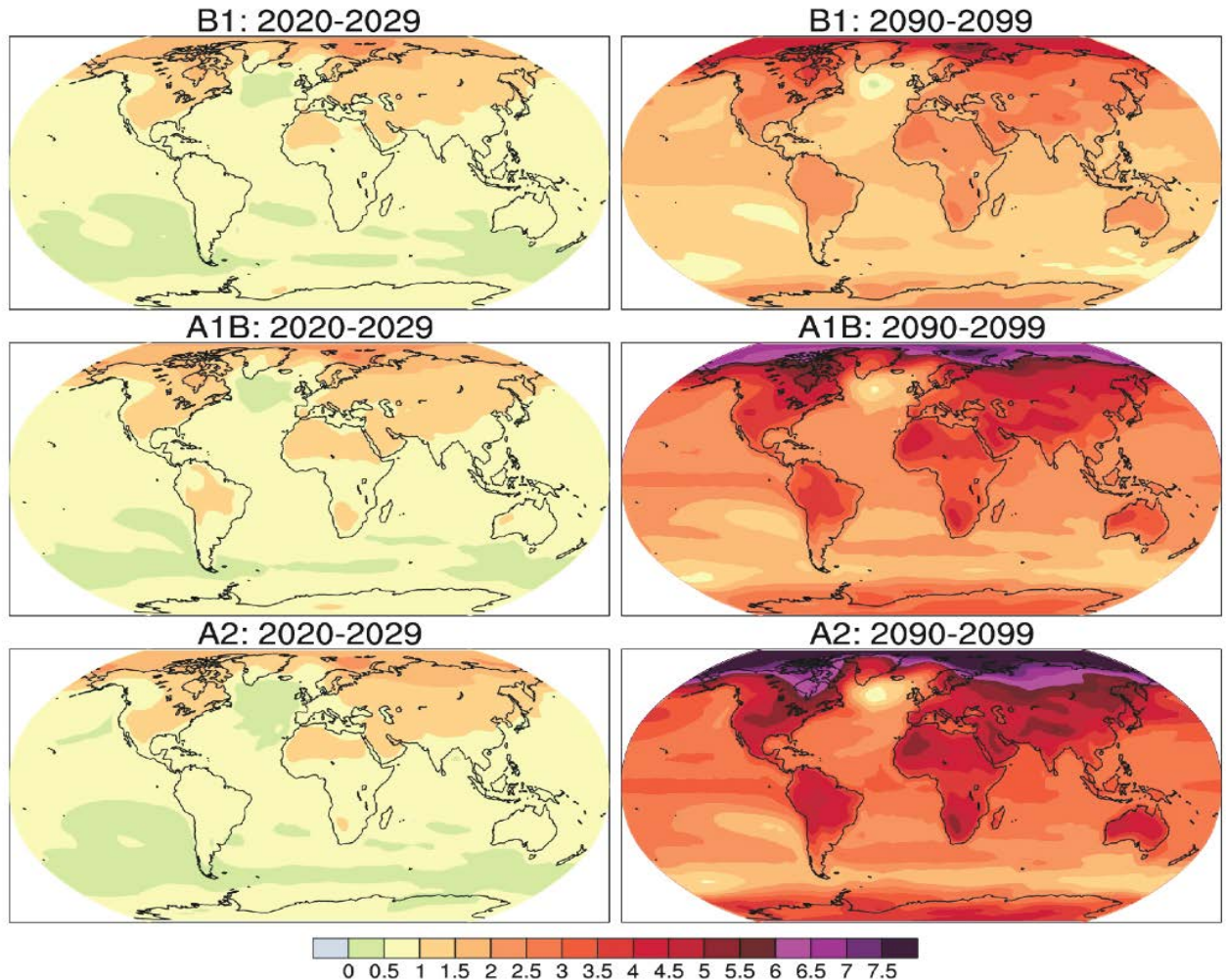


Projections of Future Changes in Climate

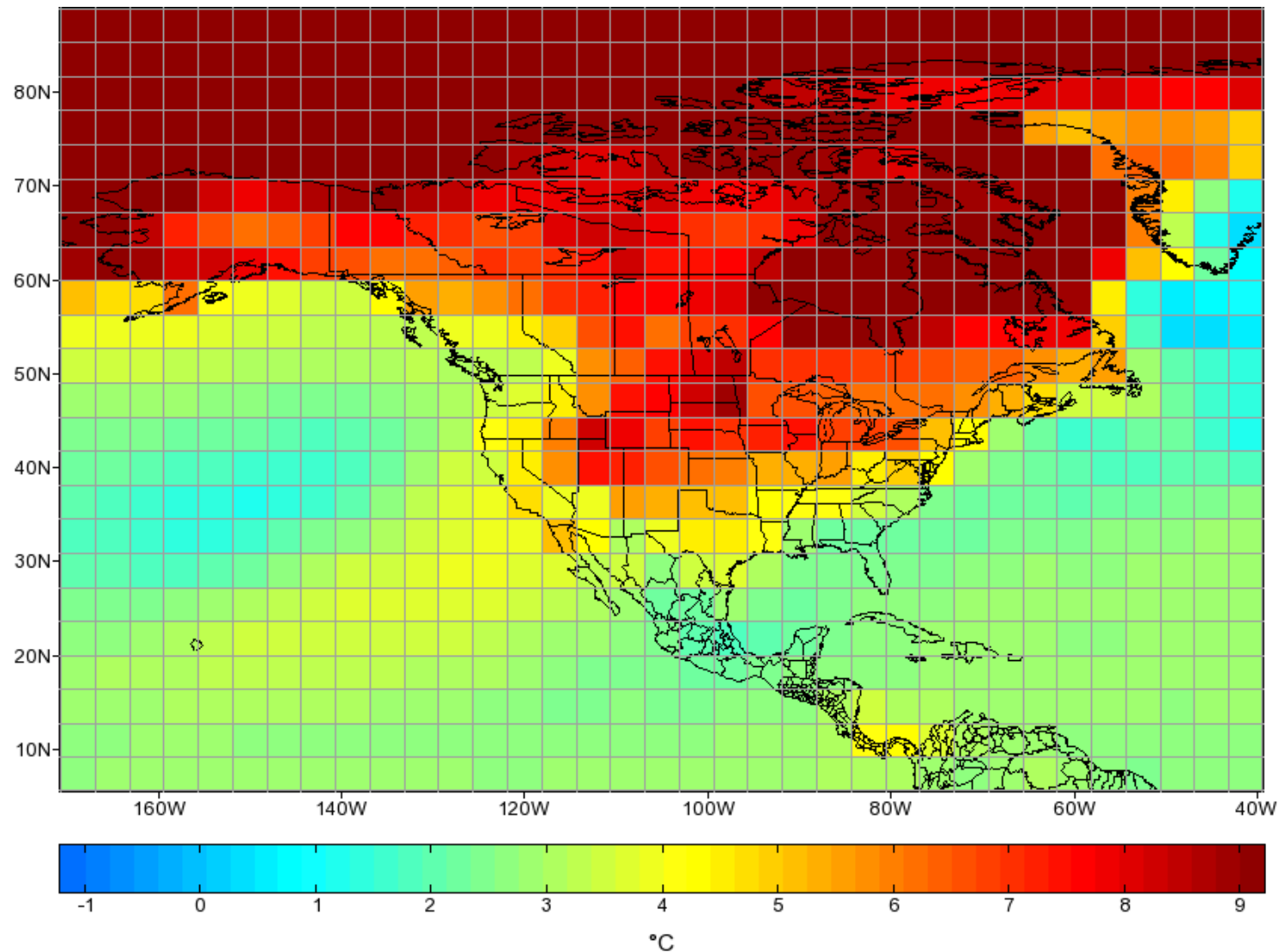
Projected warming
in 21st century
expected to be

greatest over land
and at most high
northern latitudes

and least over the
Southern Ocean
and parts of the
North Atlantic
Ocean



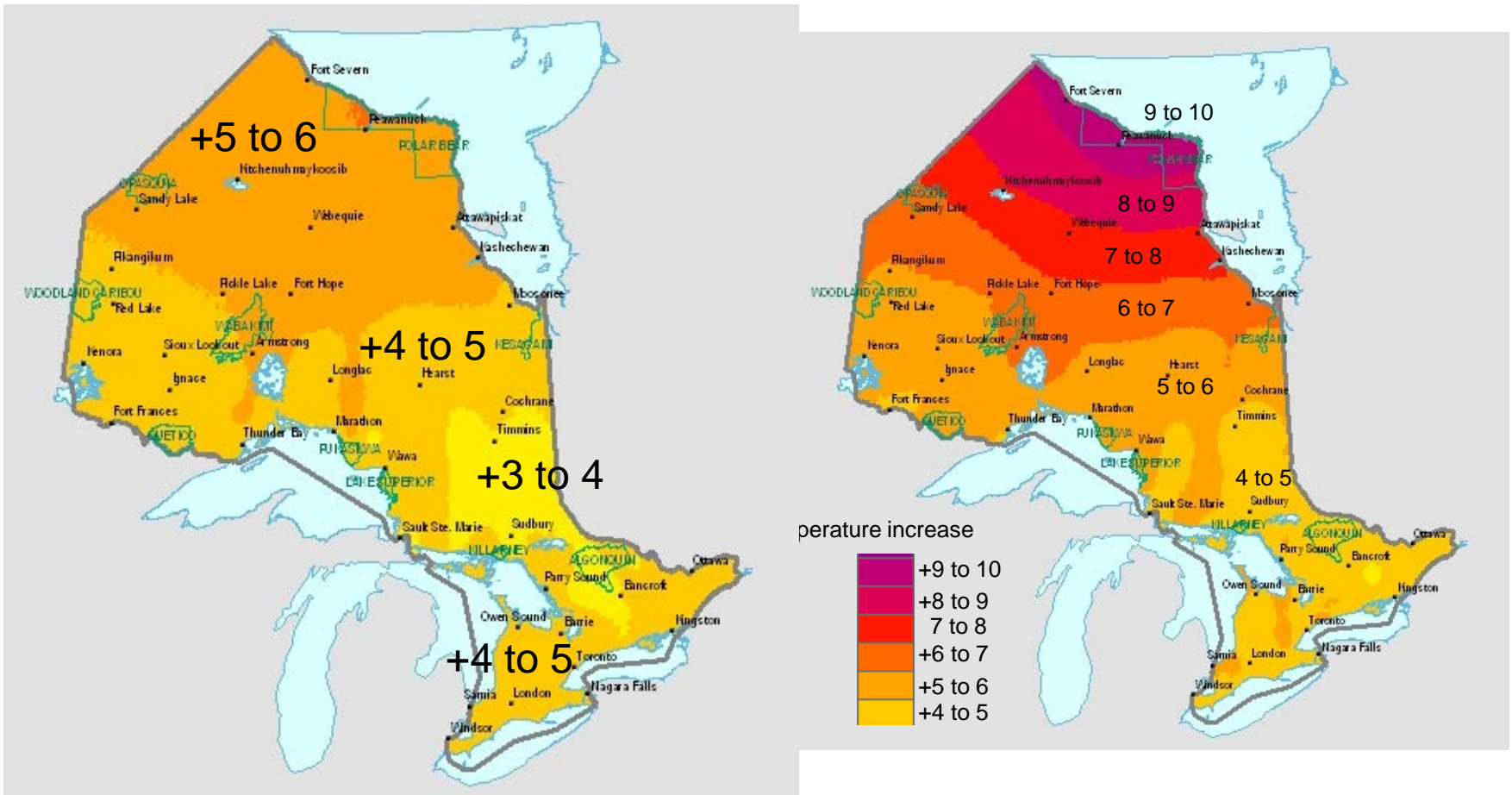
Winter Temperature Change 2080s



Ontario Temperature Change 2071-2100

Summer

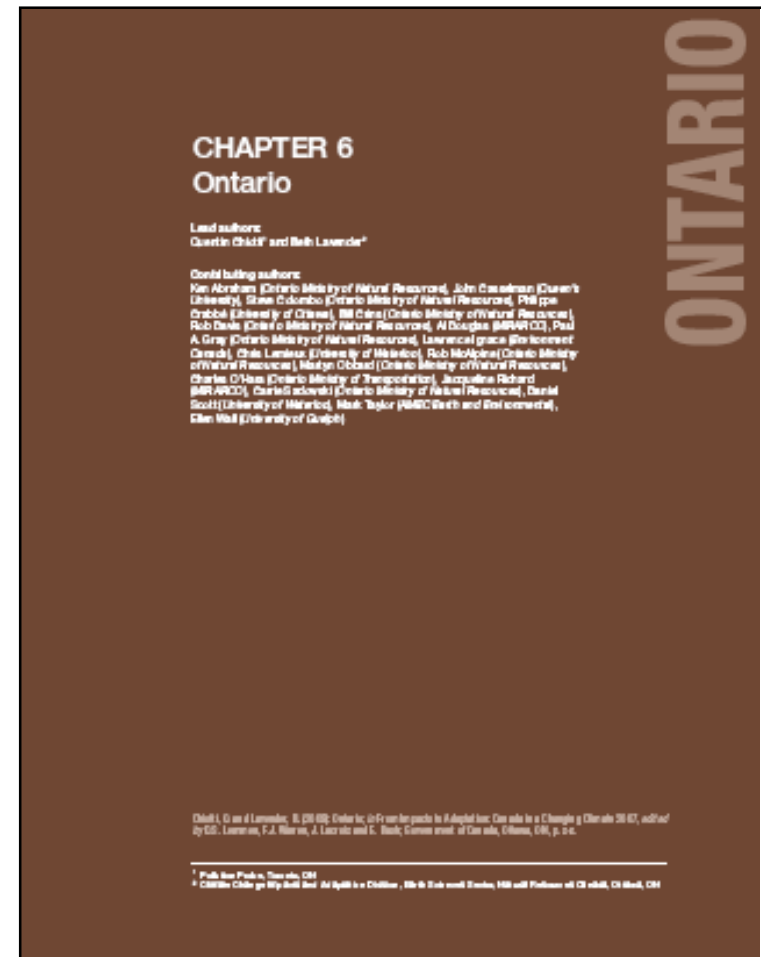
Winter



Average summer and winter temperature, CGCM2, A2 scenario

Climate Change Impacts in Ontario

- Projections also indicate that intense rainfall events, heat waves and smog episodes are likely to become more frequent.
- Impacts include disruptions to critical infrastructure; water shortages; increased health risks; remote and resource-based communities; unmanaged and managed ecosystems
- Ontario has a strong capacity to adapt to climate change, but it is not uniform across sub-regions and sectors.



The Inevitability of Climate Change

“The overwhelming majority of scientific experts, whilst recognizing that scientific uncertainties exist, nonetheless believe that human-induced climate change is inevitable. **The question is not whether climate will change... but rather how much... how fast, and where**”

Robert Watson, Chair of IPCC to CoP6 Delegates, The Hague, November 2000

“The effects of our actions now on future changes in the climate have long lead times. What we do now can have only a limited effect on the climate over the next 40 or 50 years. On the other hand what we do in the next 10 or 20 years can have a profound effect on the climate in the second half of this century and in the next.” (Stern Review 2007)

10-15 Years Window
Adaptation is necessary
More mitigation is needed

UN Framework Convention on Climate Change

- **Article 2**
- “ ... stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent **dangerous** anthropogenic interference with the climate system.

Dangerous – how much change?

Stabilization – at what level?

The EU has chosen 2C global warming as the “dangerous” level – only 1.3C more warming.

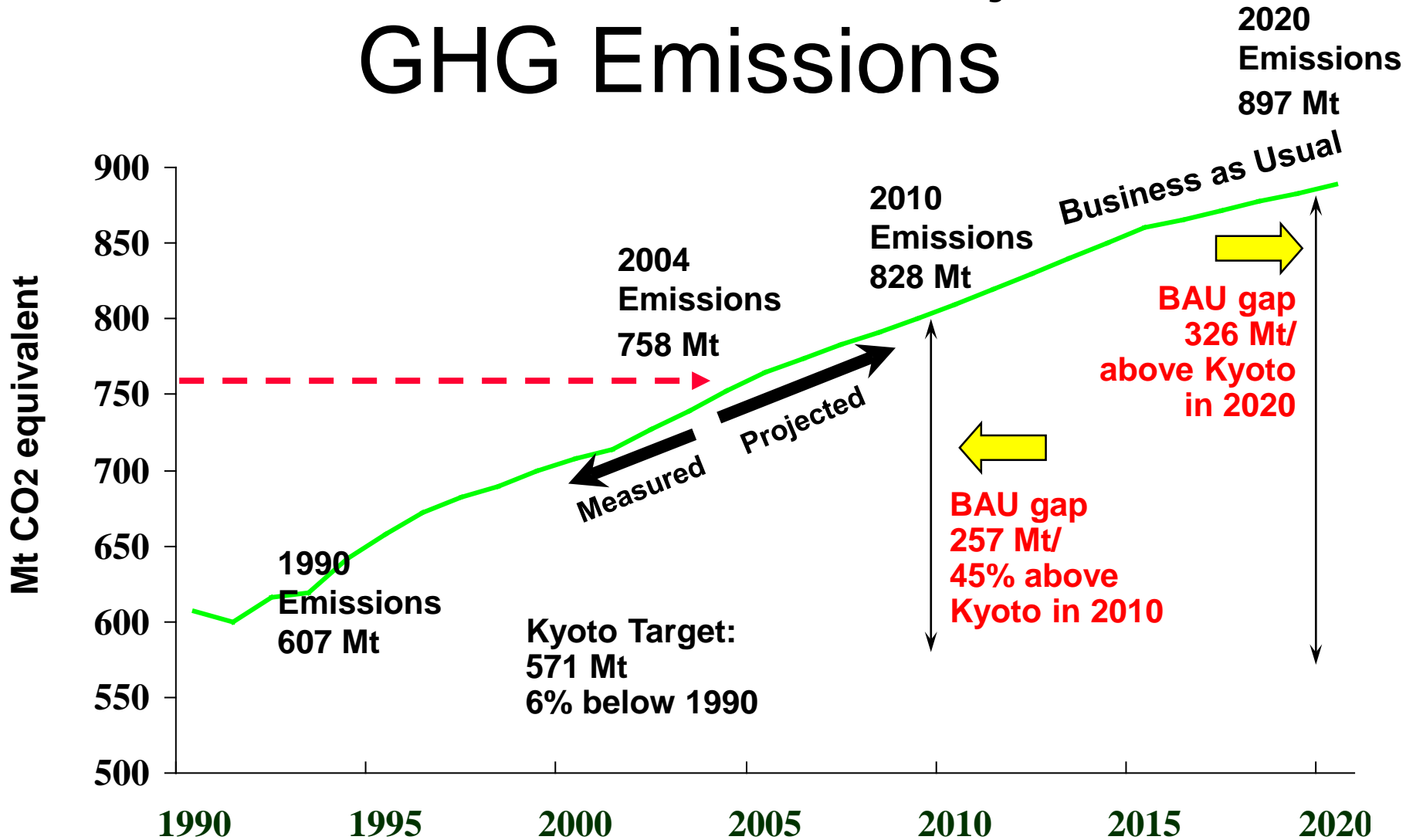
Pathways towards stabilization

Characteristics of stabilization scenarios

Stabilization level (ppm CO ₂ -eq)	Global mean temp. increase at equilibrium (°C)	Year CO ₂ needs to peak	Year CO ₂ emissions back at 2000 level	Reduction in 2050 CO ₂ emissions compared to 2000
445 – 490	2.0 – 2.4	2000 - 2015	2000- 2030	-85 to -50
490 – 535	2.4 – 2.8	2000 - 2020	2000- 2040	-60 to -30
535 – 590	2.8 – 3.2	2010 - 2030	2020- 2060	-30 to +5
590 – 710	3.2 – 4.0	2020 - 2060	2050- 2100	+10 to +60
710 – 855	4.0 – 4.9	2050 - 2080		+25 to +85
855 – 1130	4.9 – 6.1	2060 - 2090		+90 to +140

◆ Mitigation efforts over the next two to three decades will have a large impact on opportunities to achieve lower stabilization levels

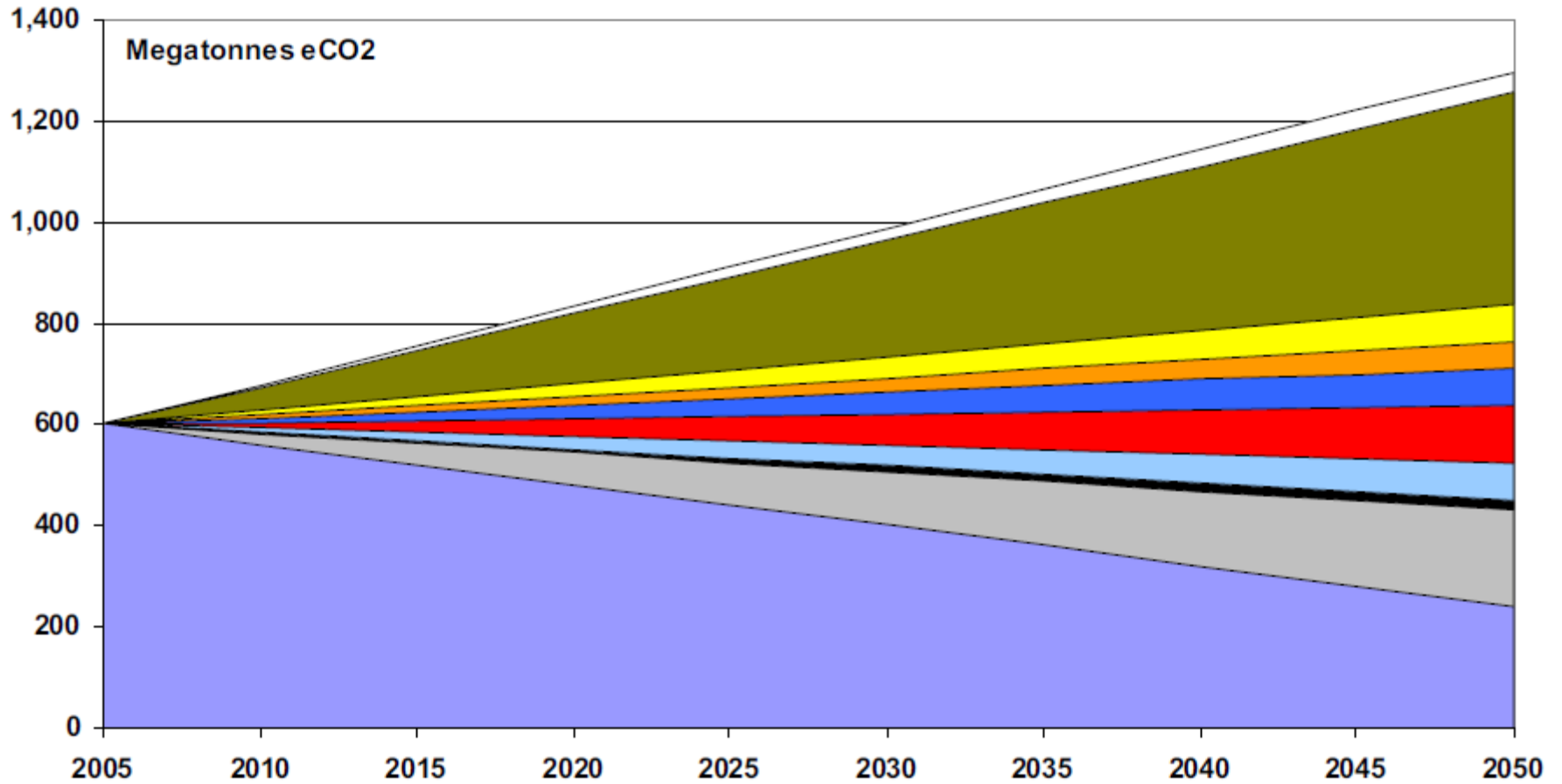
Canada's Past & Projected GHG Emissions



GHG Emissions and Sources in Canada 1990 and 2004 in Mt

GHG Source	1990	2004
Electricity and Fossil Fuels	199	285
Transportation	129	169
Mining & Manufacturing Industries	131	139
Solvent and other product use	0.42	0.48
Residential, Commercial and Institutional	70	81
Agriculture	45	55
Waste	25	29
Totals	599	758

GHG Reduction Diagram for Canada -- Aggregate Wedges



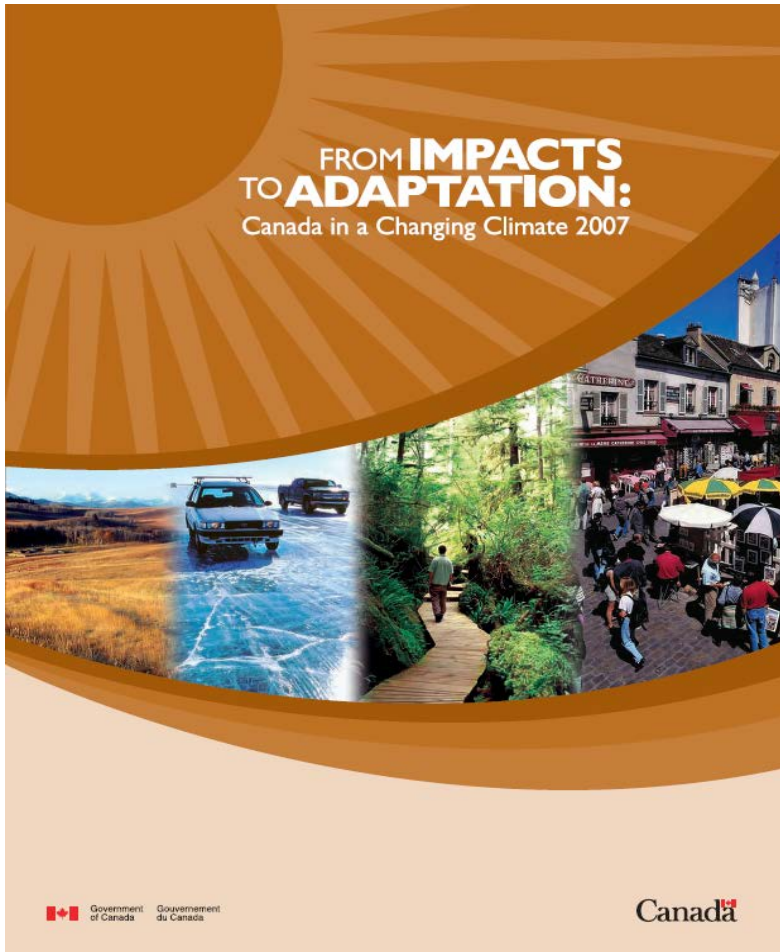
- Target
- Carbon Capture
- Nuclear
- Biofuels and alt fuels
- Renewable Electricity
- Energy Intensity
- Urban Form
- Cogeneration
- Energy Eff and Conservation
- Residual



Heritage Buildings

- Low carbon footprint
- Symbolism and social mobilization
- Challenges for energy efficiency, re. insulation, breathability, indoor environments
- Other options: energy efficient boilers, photovoltaics, combined heat and power
- Adaptation: resilient to extremes?
- Site characteristics may increase vulnerability

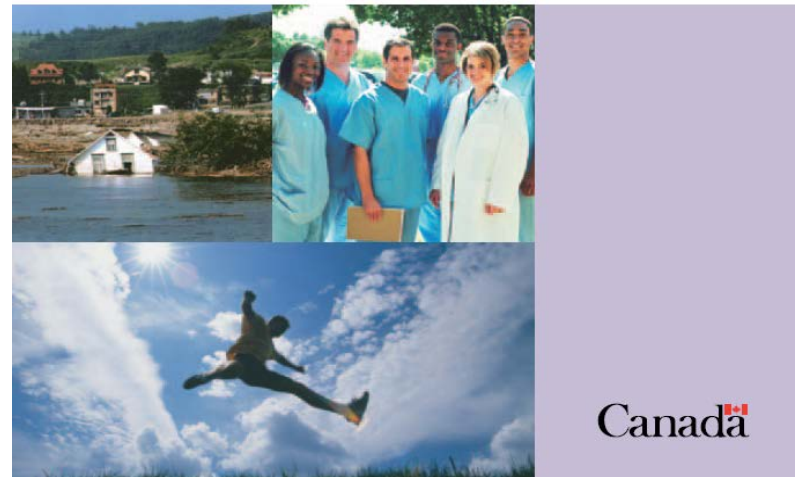
Impacts and Adaptation: Two National Assessment Reports



 Health Canada Santé Canada *Your health and safety... our priority.* *Votre santé et votre sécurité... notre priorité.*

Human Health in a Changing Climate:

A Canadian Assessment of Vulnerabilities and Adaptive Capacity



http://www.adaptation.nrcan.gc.ca/assess/2007/index_e.php

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Thank You

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