

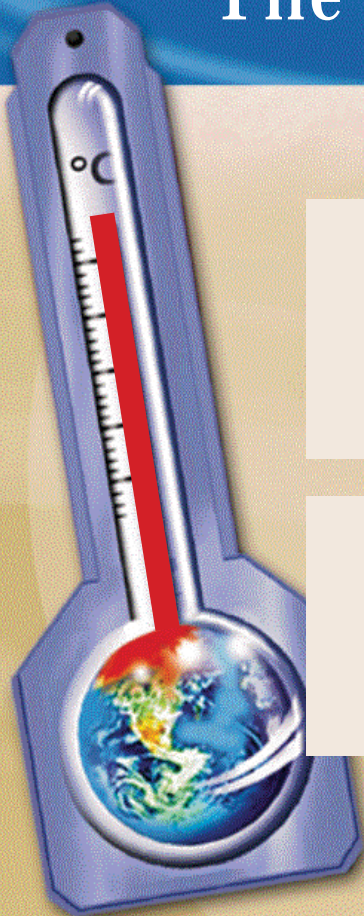
**Climate Change**

**Are you  
doing**

**your Bit?**



# The earth is getting warmer



- 20th century the warmest globally in past 1000 years
- 1980s and 1990s warmest decades on record

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# The warming will continue

- **Scientists predict average temperature increase of up to 1.4-5.8°C in next 100 years**
- **Small changes in average temperatures make a big difference:**
  - ✓ Average temperatures today are only about 5°C warmer than they were during the last Ice Age

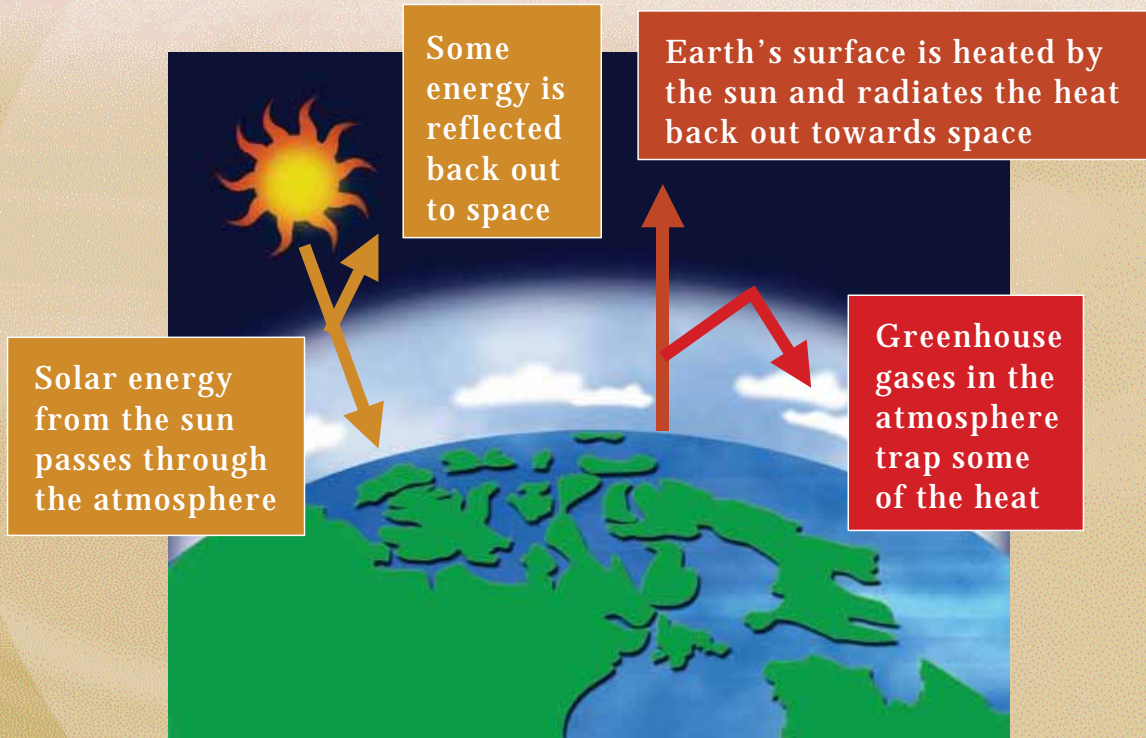
# Temperature changes will vary

- **Temperature changes in Canada won't be uniform**
- **Polar regions will warm more than mid-latitude regions**
- **The Atlantic will cool slightly**

The background is a blue-tinted image of a cloudy sky. A large, faint, stylized number '1' is overlaid on the left side of the image. The text 'Why is this happening?' is centered in the middle of the image.

Why is this  
happening?

# The greenhouse effect



Climate Change. Are you doing **your bit**?

# What are the greenhouse gases?

**Water vapour:**  
the most common gas



**Carbon dioxide:**  
released through burning  
fossil fuels

**Methane:**  
from wetlands, rice paddies,  
animal digestive processes,  
landfills and sewage treatments



**Nitrous oxide:**  
from soils and the ocean

**Ozone:**  
exists naturally in the  
upper atmosphere



**Halocarbons:**  
human-made chemicals

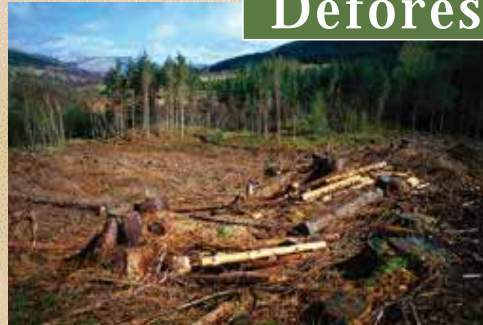
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# Human activities are intensifying the greenhouse effect

Electricity



Deforestation



Transportation



Industry



Climate Change. Are you doing **your bit?**

# Global trends in fossil fuel CO<sub>2</sub> emissions




Source: <sup>1</sup>1999: Marland, G. et. al., Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., USA.  
[http://cdiac.esd.ornl.gov/trends/emis/tre\\_glob.htm](http://cdiac.esd.ornl.gov/trends/emis/tre_glob.htm)

Climate Change. Are you doing **your bit**?

**“ There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities. ”**

Intergovernmental Panel on Climate Change  
2001



What's wrong  
with  
**warmer**  
temperatures?



**More severe  
weather events**

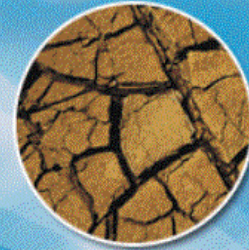


**Lowered  
freshwater levels**



**Longer and more  
intense heat waves**

- worse air pollution
- increase in heat-related illness



**Droughts**



**Sea-level rise  
on all three coasts**

What's wrong with warmer temperatures?

# More severe weather events

- **Tornadoes, thunderstorms, heavy rain, and hail exact heavy toll on life and property**

e.g., 1997 Red River Flood:

- 29,000 people were evacuees
- losses of more than \$815 million
- Marked increase in spring flows – 1890 to 1945 peaked twice, 1945 – 1999 peaked 11 times
- Peak is in excess of 2000 cubic metres per second.

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What's wrong with warmer temperatures?

## Longer and more intense heat waves

- **Winnipeg: av. # of days above 30°C, increases from 13 to 37 between now and 2075.**
- **By 2020, heat-related deaths in Toronto could incr. fr. 20 to 290**
- **More air pollution, smog = incr. health risks from asthma, respiratory illness, especially for children, the elderly**

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What's wrong with warmer temperatures?

# Lowered freshwater levels

- Water levels in Great Lakes are forecast to lower by up to 1 metre in the next 100 yrs (For every cm below av., cargo must be reduced 50-100 tonnes)
- Cool-water zooplankton (who sustain whitefish) may disappear from Lake Winnipeg as temp. range rises by 5°C
- Reduced hydro-electricity generation capability

Climate Change. Are you doing **your bit?**

# FOREST RESOURCES & MANITOBANS

- Over 3300 Manitobans are directly employed by the forestry industry in logging and pulp production

[Middlebro, B. 2001. Directory of Primary Wood Using Industries in Manitoba. Canadian Forest Services, Natural Resources Canada. ]

- At least 7000 others work in related fields, benefiting indirectly from the harvest of Manitoba's forests.

## AS CLIMATE CHANGES: IMPACTS

- Temp. increases may change the range and growth patterns of boreal, with implications for wildlife, hunters, forest industry, tourism ... everybody!!!

- The southern margin of the boreal forest will likely shift 150 - 200 km to the north

[Stennes, B., E. Krcmar-Nozic and G.C. van Kooten. 1998. Climate Change and Forestry: What Policy for Canada? Forest Economics and Policy Analysis Research Unit, University of British Columbia. Vancouver, B.C. 13pp].

## AS CLIMATE CHANGES: IMPACTS

- While temperatures may allow for tree growth beyond the current range, the arctic soils could prevent the forest from spreading further.
- In the south, warmer, drier conditions would lead to the loss of drought-intolerant species, especially economically important hardwoods such as aspen

[Hogg, T. 1995. Biological Effects of Climate Change: The Western Canadian Boreal Forest. The Ecological Monitoring and Assessment Network. First National Meeting Report].

## AS CLIMATE CHANGES: IMPACTS

- The frosts that limit the geographic range of defoliating insects won't be as frequent or temperatures as cold.
- Pests develop faster and become more abundant as the climate warms, killing off more trees.
- An abundance of dead trees places sick forests at a greater risk of fire.

## AS CLIMATE CHANGES: IMPACTS

- As carbon dioxide levels double in the atmosphere, the seasonal severity rating (SSR) for forest fires are expected to increase by 40%.
- Loss of waterfowl habitat due to drying up of lakes and sloughs.
- Less habitat for threatened species like the woodland caribou and the grey fox.

# Climate change in Manitoba




- Loss of forest area
- Species loss
- Water quantity and quality issues
- Severe weather & heat stress
- Reduced winter/ice roads in North. Melting of permafrost.
- Loss of traditional economies

Climate Change. Are you doing **your bit?**

# Personal GHG Emissions



Climate Change. Are you doing **your bit?**



Actions by individuals  
account for **28%** of GHG  
emissions each year -  
equal to **six tonnes** per year

Climate Change. Are you doing **your bit?**