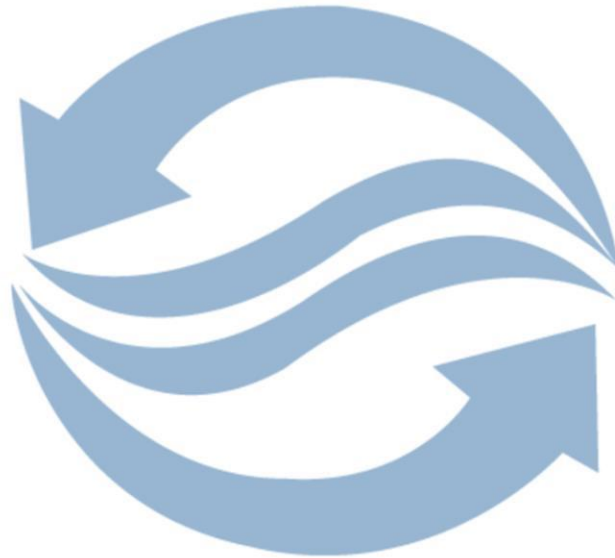


FACING CLIMATE CHANGE

April 4, 2017

Toronto City Hall

Dianne Saxe



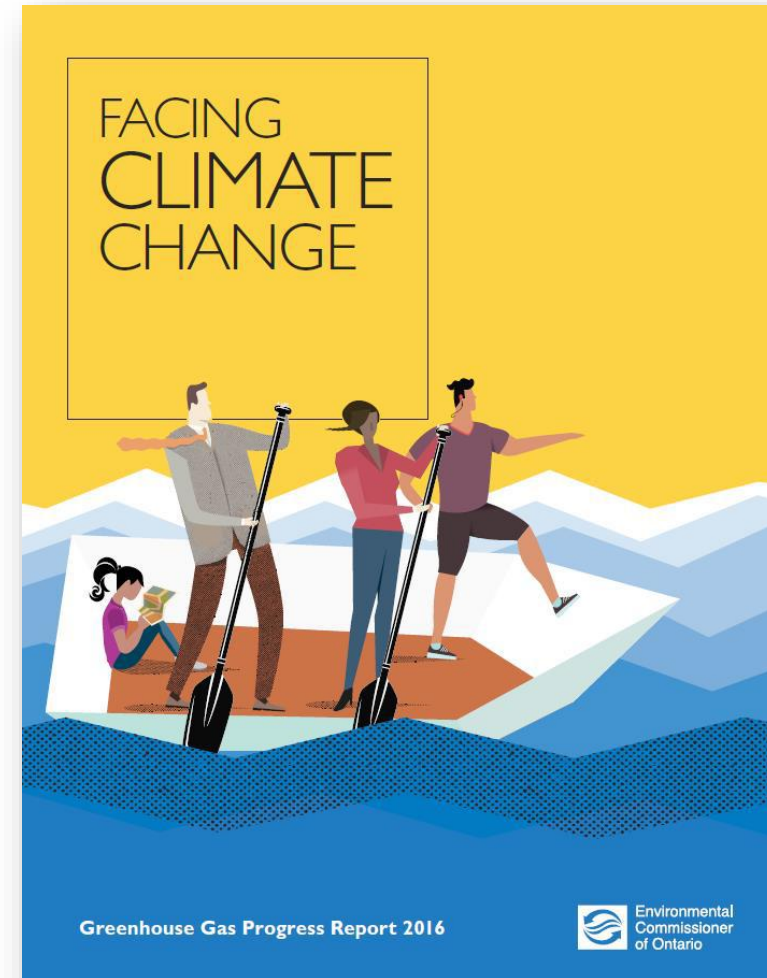
Overview

- 1: Who is the ECO?
2. Why I'm so passionate about climate change
3. What Ontario's doing

1: Who is the ECO?

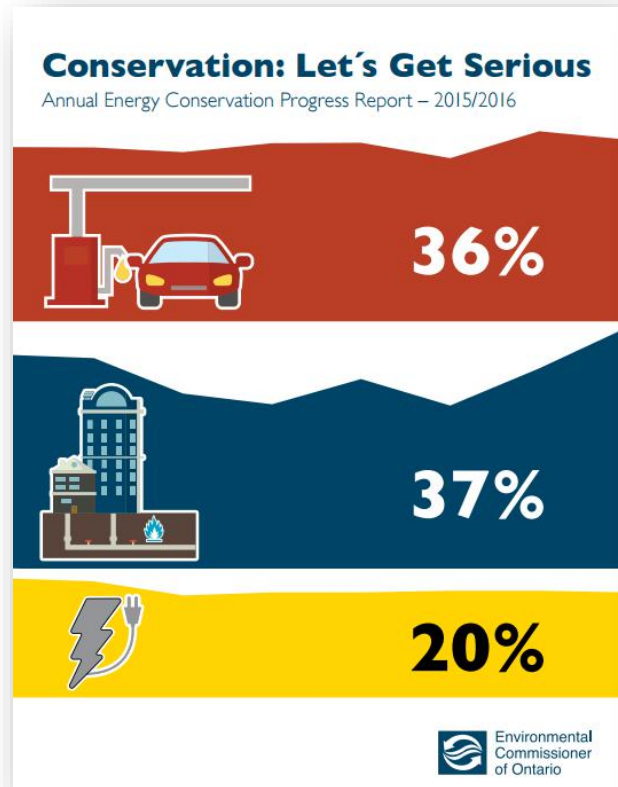
Who is the ECO?

- Impartial, independent
- Guardian of the *Environmental Bill of Rights*
- Watchdog on:
 - Greenhouse gas emissions in Ontario
 - Energy conservation
 - Environmental protection
- Driven by what I have learned in the last year

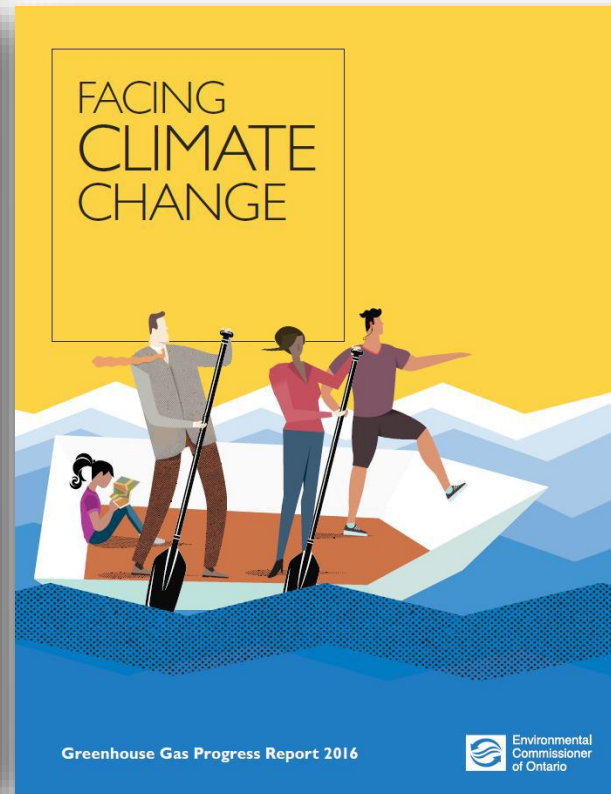


(7) Really Good Reports

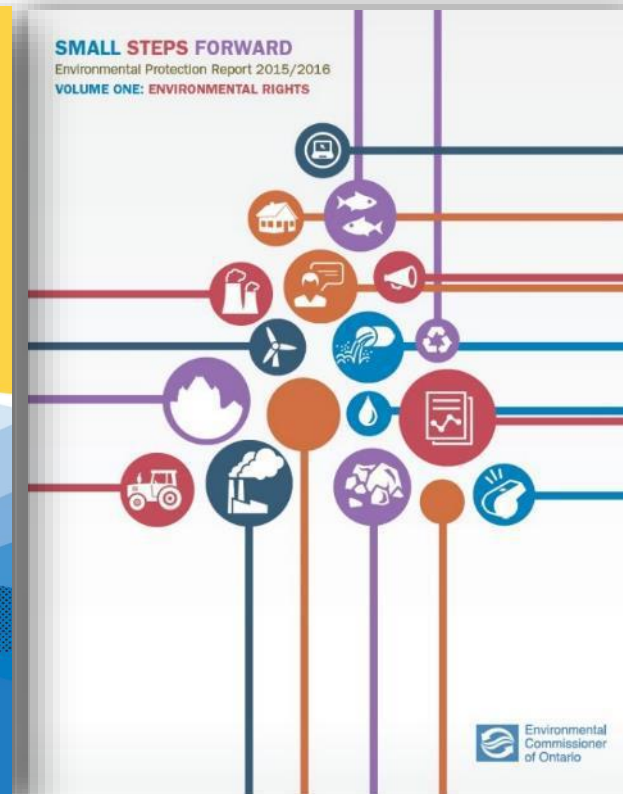
ENERGY CONSERVATION



CLIMATE



ENVIRONMENT




Find Them Here

The screenshot shows the homepage of the Environmental Commissioner of Ontario (ECO). At the top left is the logo and name: "Environmental Commissioner of Ontario" with the tagline "Your Environment, Your Rights". Contact information includes "1-800-701-6454 | 416-325-3377" and "commissioner@eco.on.ca". On the top right, there are links for "FRANÇAIS" and "CONTACT US", along with font size controls (A+, A, A-) and social media icons (Facebook, Twitter, YouTube, RSS). A search bar is also present.

The main navigation menu includes: HOME, ABOUT US, YOUR RIGHTS, OUR REPORTS, GOVERNMENT PERFORMANCE, and LEARN MORE. A red arrow points to the "OUR REPORTS" link.

The main content area is divided into two columns. The left column is titled "YOUR RIGHTS" and contains three interactive boxes: "WANT TO HAVE A SAY IN GOVERNMENT DECISIONS?" (with a "COMMENT ON REGISTRY PROPOSALS" button), "HAVE AN IDEA TO IMPROVE ENVIRONMENTAL PROTECTION?" (with an "ASK FOR A REVIEW" button), and "THINK SOMEONE IS BREAKING THE LAW?" (with an "ASK FOR AN INVESTIGATION" button). The right column is titled "CLIMATE, ENERGY, ENVIRONMENT" and contains three boxes: "WANT TO READ OUR REPORTS?" (with a "VIEW REPORTS" button), "INTERESTED IN A SPECIFIC ENVIRONMENTAL TOPIC?" (with a "VIEW THE TOPICS" button), and "HAVE AN ENVIRONMENTAL PROBLEM NOW?" (with a "CLICK HERE TO INQUIRE" button). A red arrow points to the "CLICK HERE TO INQUIRE" button.

At the bottom, there is a "WHO WE ARE" section with a brief description of the ECO's role and a "LEARN MORE ABOUT THE COMMISSIONER" button.



*Is it as bad as
we thought?*



It's worse

2: Why I'm so passionate about climate change

Who are you working for?



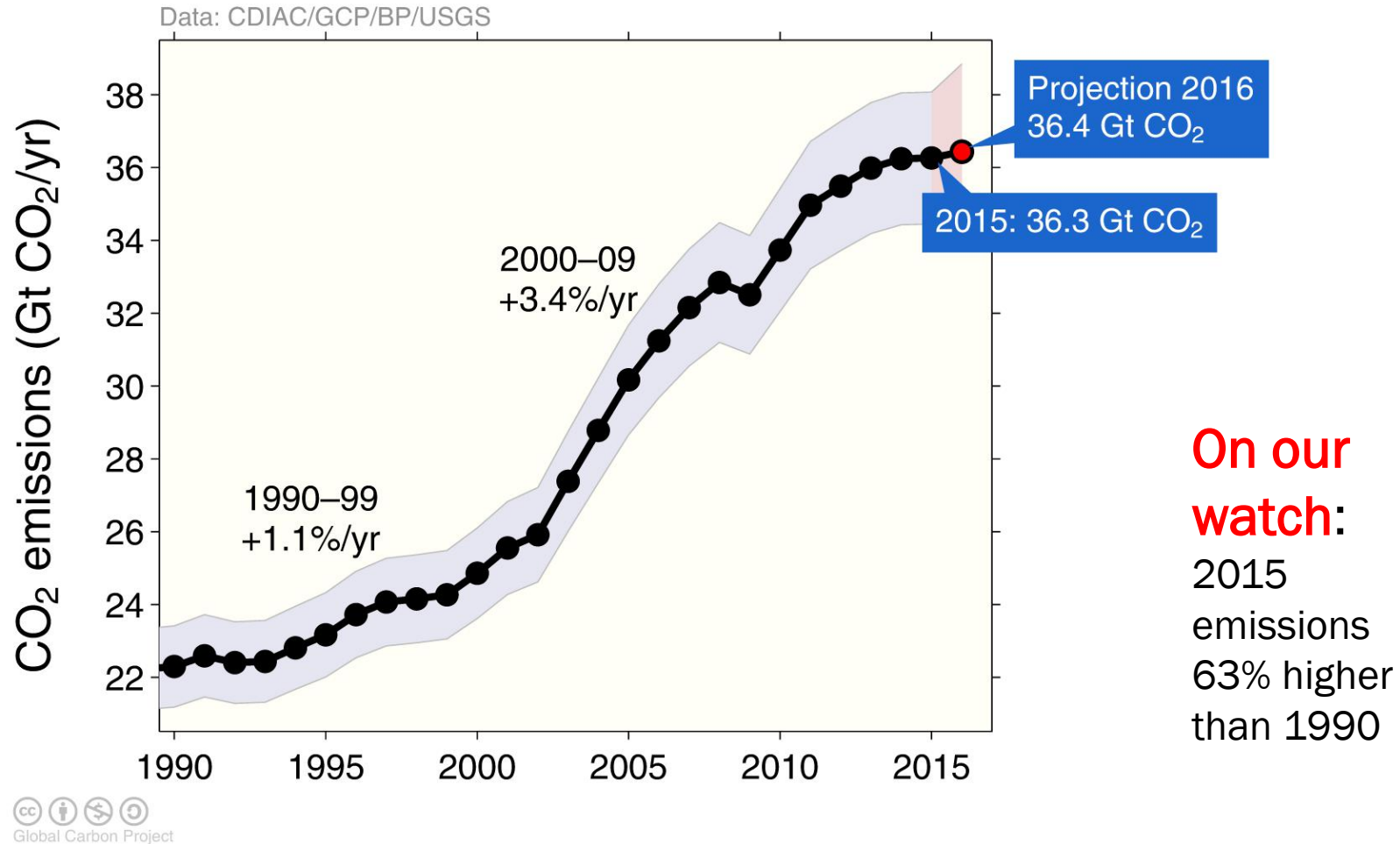
Your colleagues may know

- 97% of climate scientists agree:
- **Climate change is:**
 - Human-caused
 - Serious
 - Caused mostly by greenhouse gases in the atmosphere that keep solar heat from escaping
 - Primary GHG is CO₂ from fossil fuels
 - **Real**

But do they know?

- **Climate change is already here, now:**
 - Moving fast (“off the charts”)
 - \$Trillions financial opportunity and threat
 - Immense impact on environment and people
 - Huge implications for Ontario infrastructure and economy

Highest ever CO₂ emissions



Where does the CO₂ go? (2006-2015)



34.1 GtCO₂/yr
91%



9%
3.5 GtCO₂/yr

Sources = Sinks

16.4 GtCO₂/yr
44%



31%
11.6 GtCO₂/yr

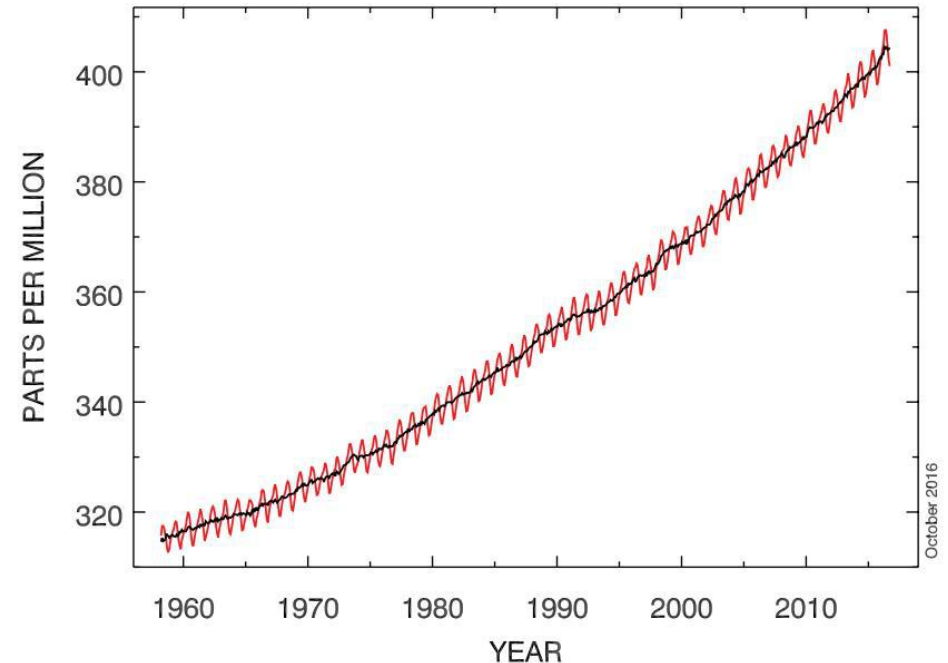


26%
9.7 GtCO₂/yr



Highest Air CO₂ in (Human) History

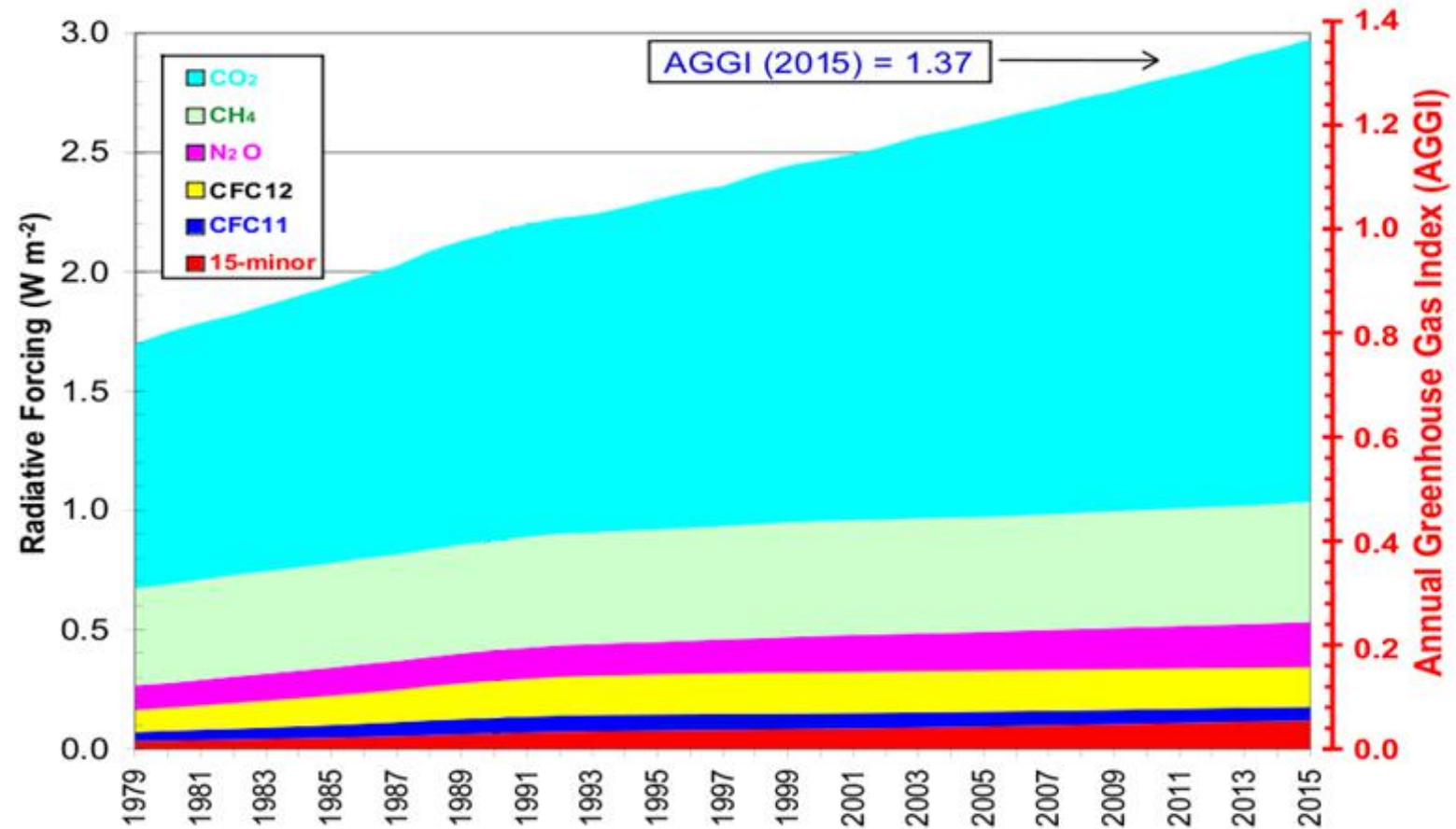
- Millions of years 180 - 280
 - 1860 280
 - 1988 350
 - 2016 406 ppm
-
- Now permanently above 400 ppm
 - Trapping extra heat



Source: National Oceanic and Atmospheric Administration, Trends in Atmospheric Carbon Dioxide at Mauna Loa Observatory (full record), 2016.

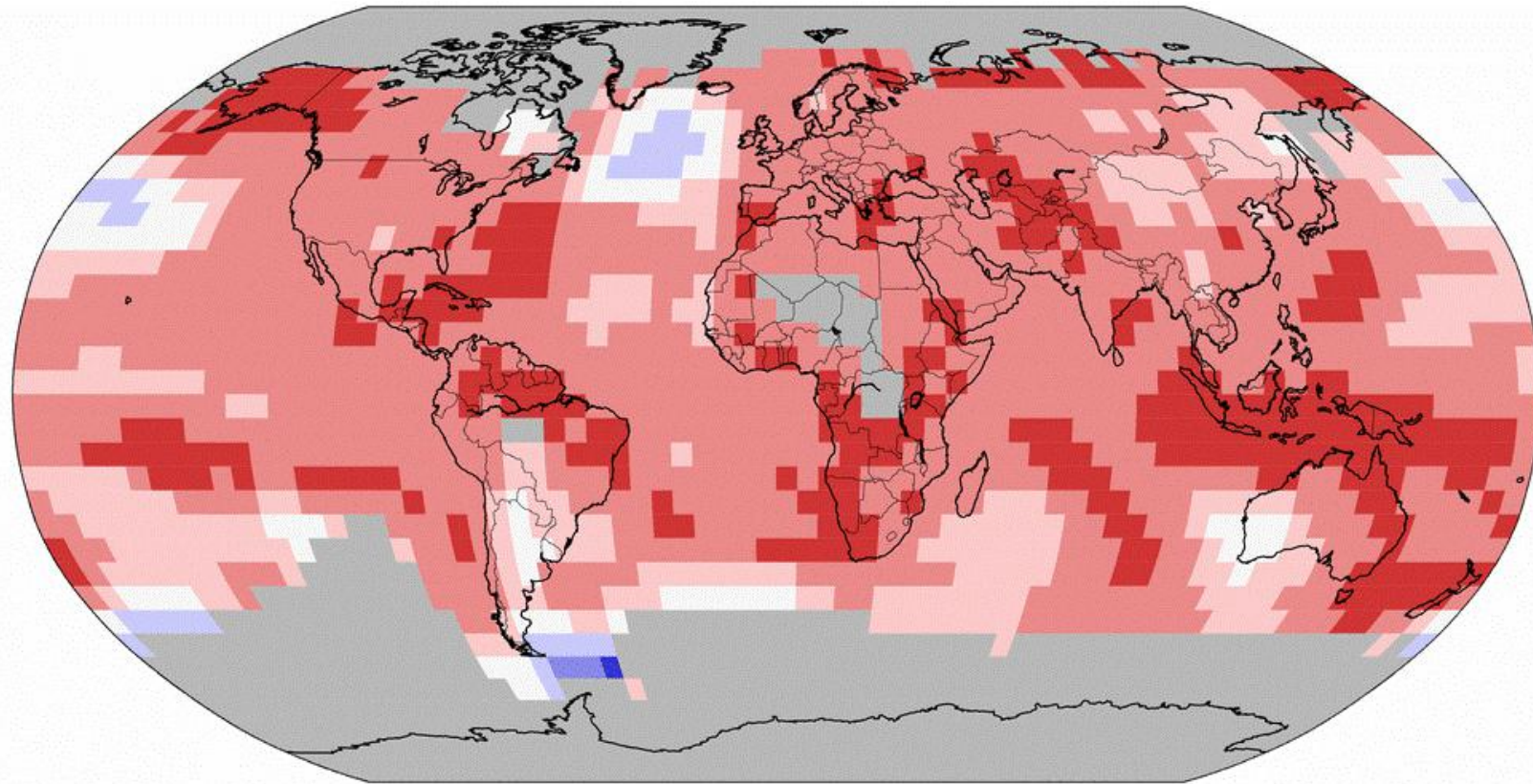
Not just CO₂

- ~50% more heat than CO₂ alone
- Methane
- Nitrous oxide
- Refrigerants

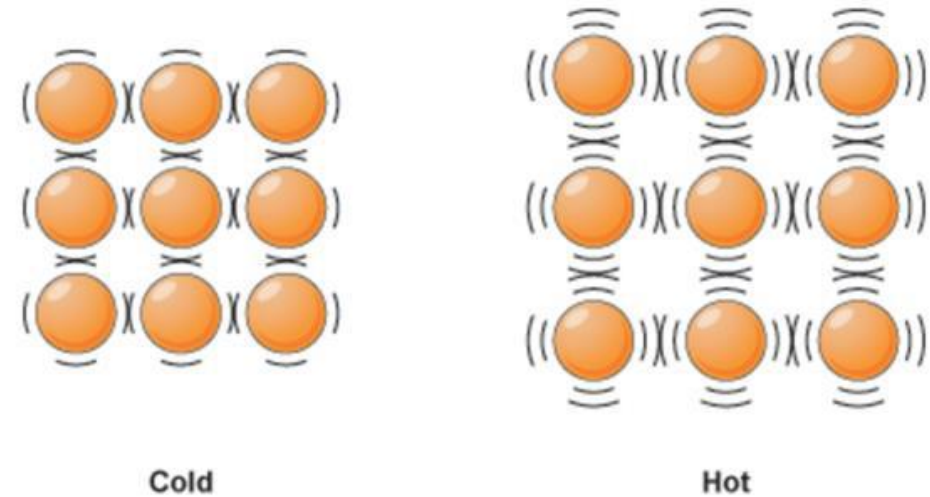
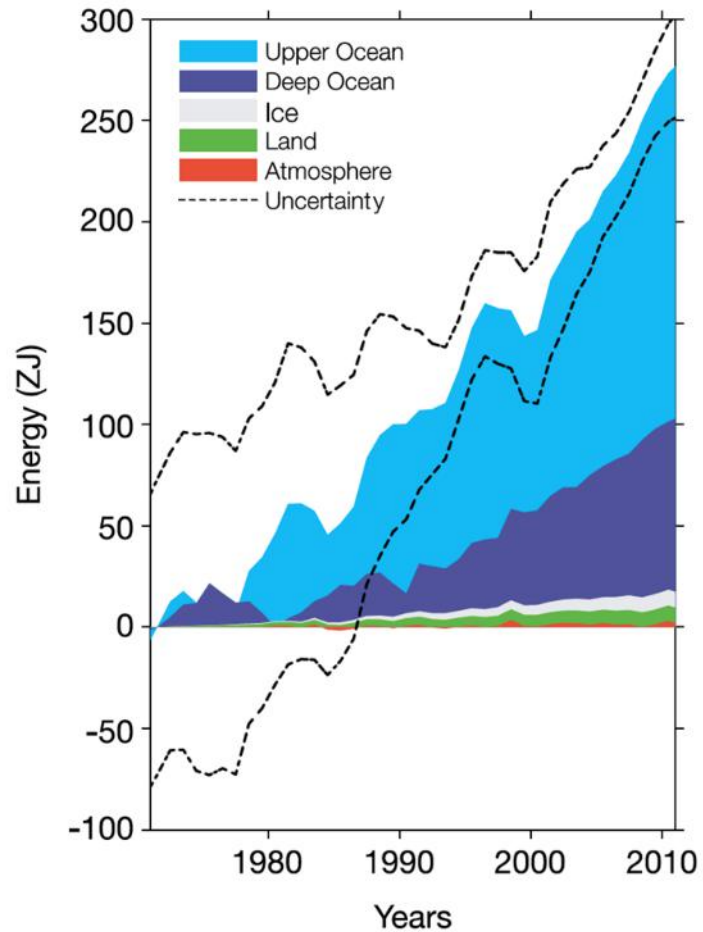


Source: National Oceanic and Atmospheric Administration, The NOAA Annual Greenhouse Gas Index (AGGI), 2016.

Highest temperatures in human history



93% of the Extra Heat is in Oceans, Lakes

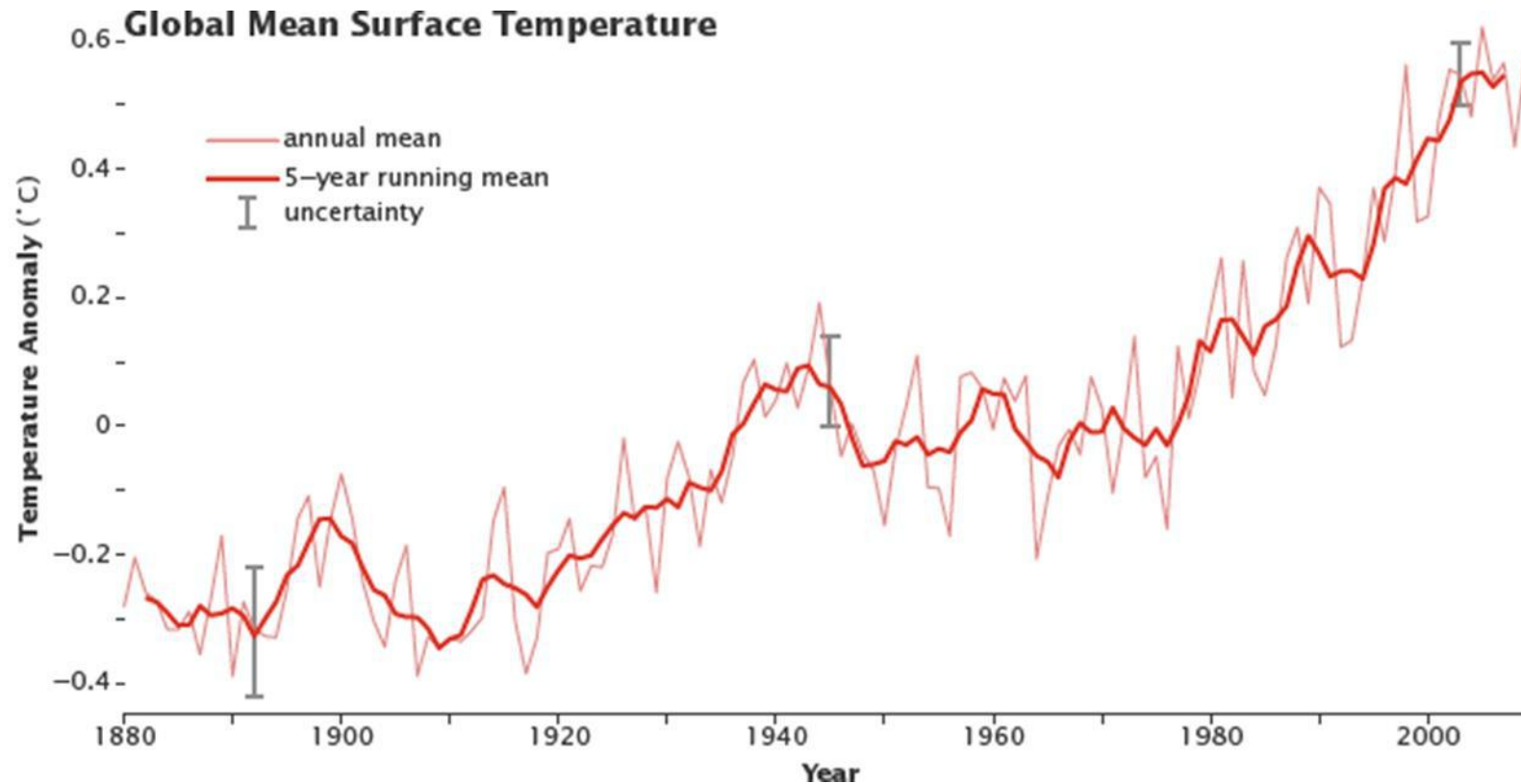


Warmer water takes up more space

Source: BBC, Behaviour of matter: Expansion and contraction, 2014.

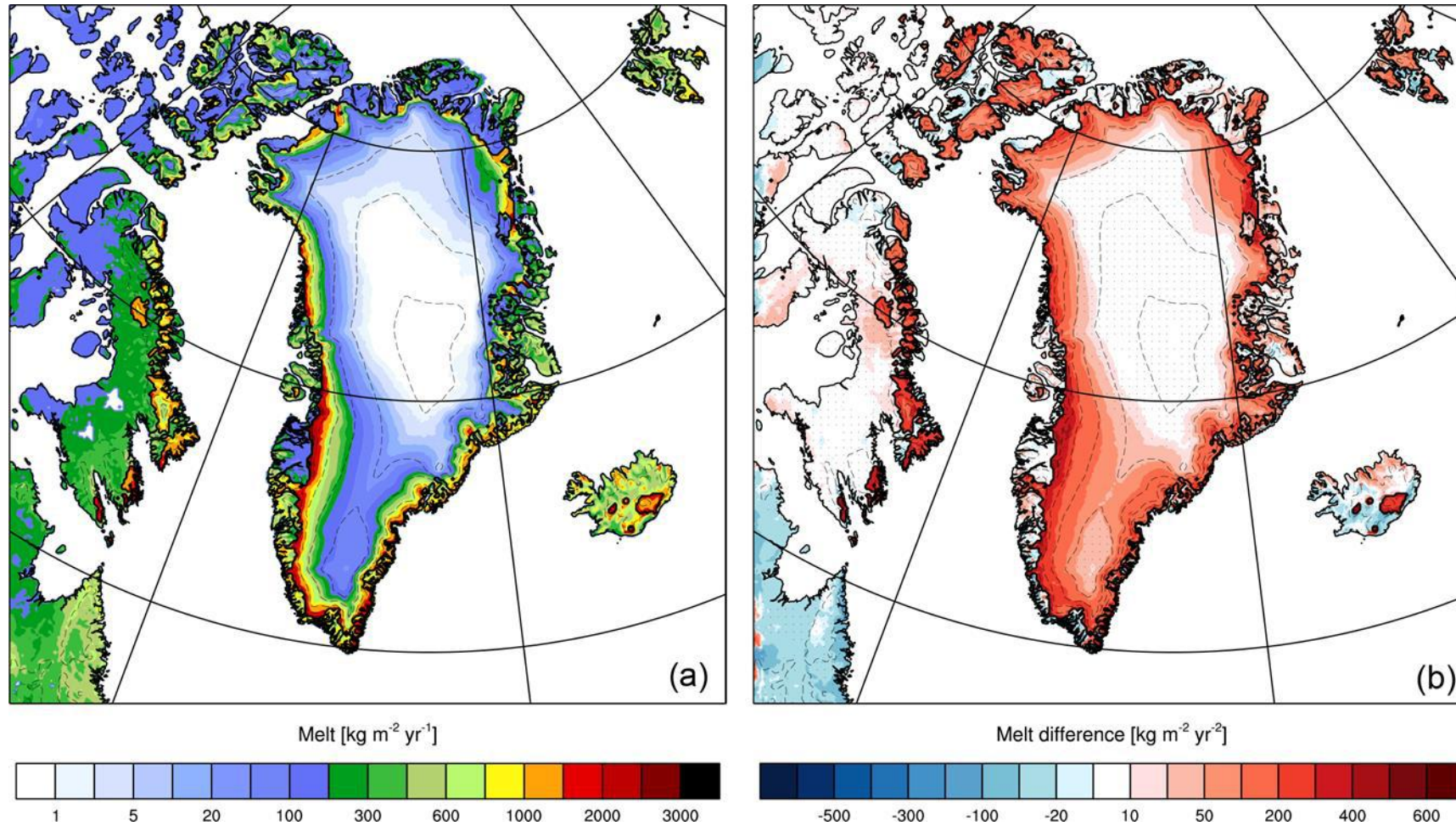
Source: Intergovernmental Panel on Climate Change, Chapter 3: Observations: Oceans in Climate Change 2013: The Physical Science Basis (contribution of Working Group 1 to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change), 2013.

Only 1% of the Heat in the Air

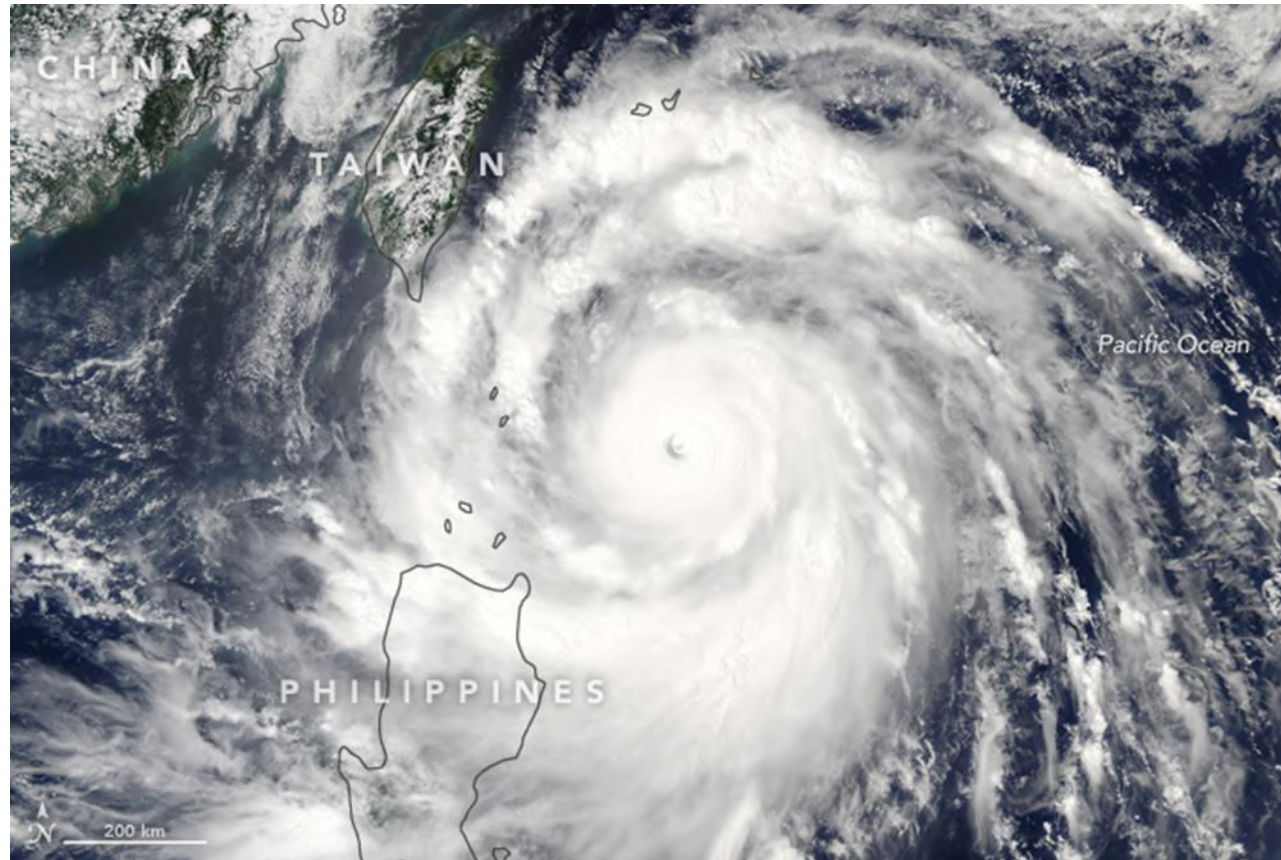


Source: National Aeronautics and Space Administration, Earth Observatory: 2010 Features – Global Warming, 2010.

4% of the Heat to Ice

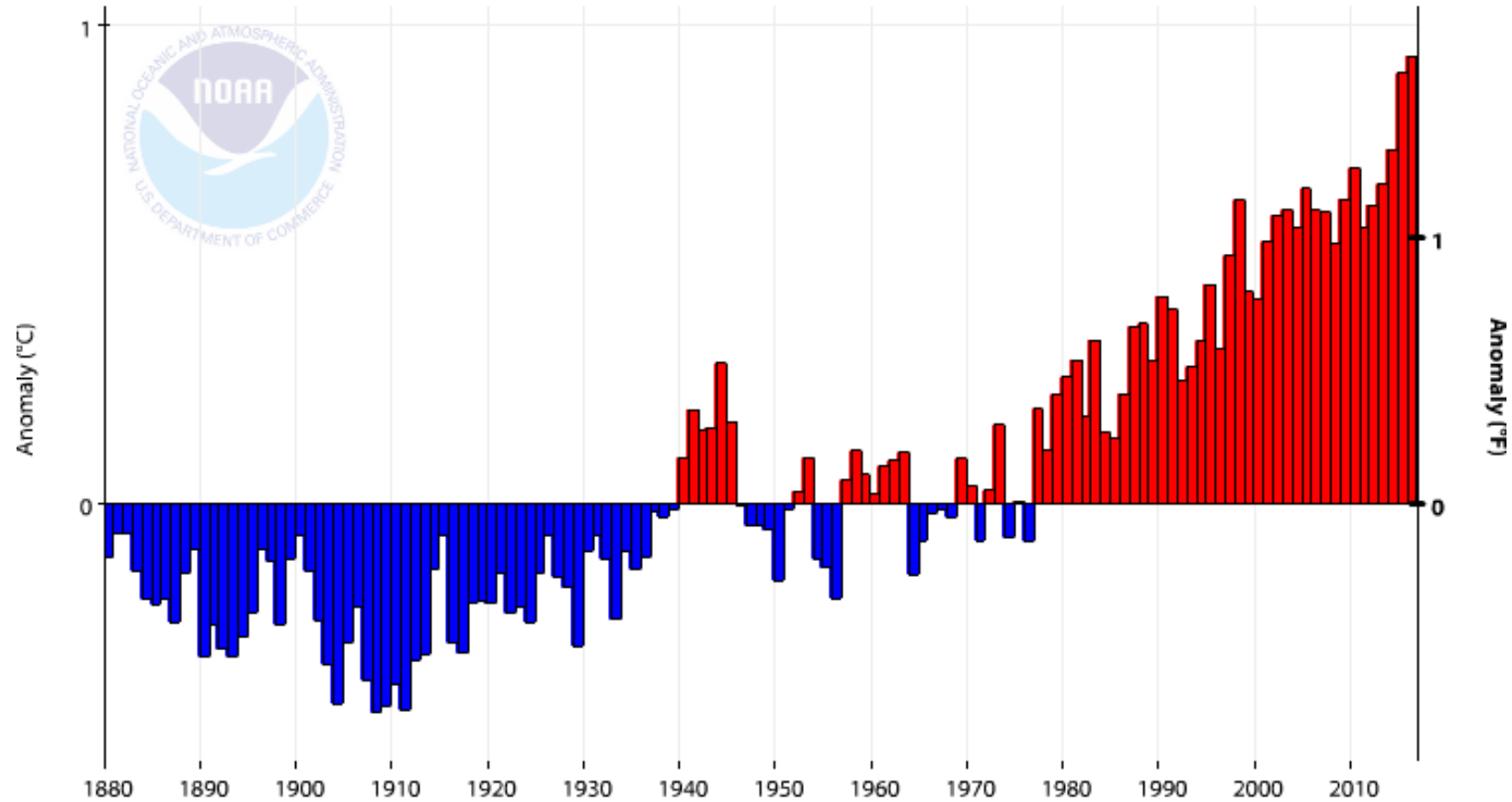


Higher Sea Levels, Wilder Storms



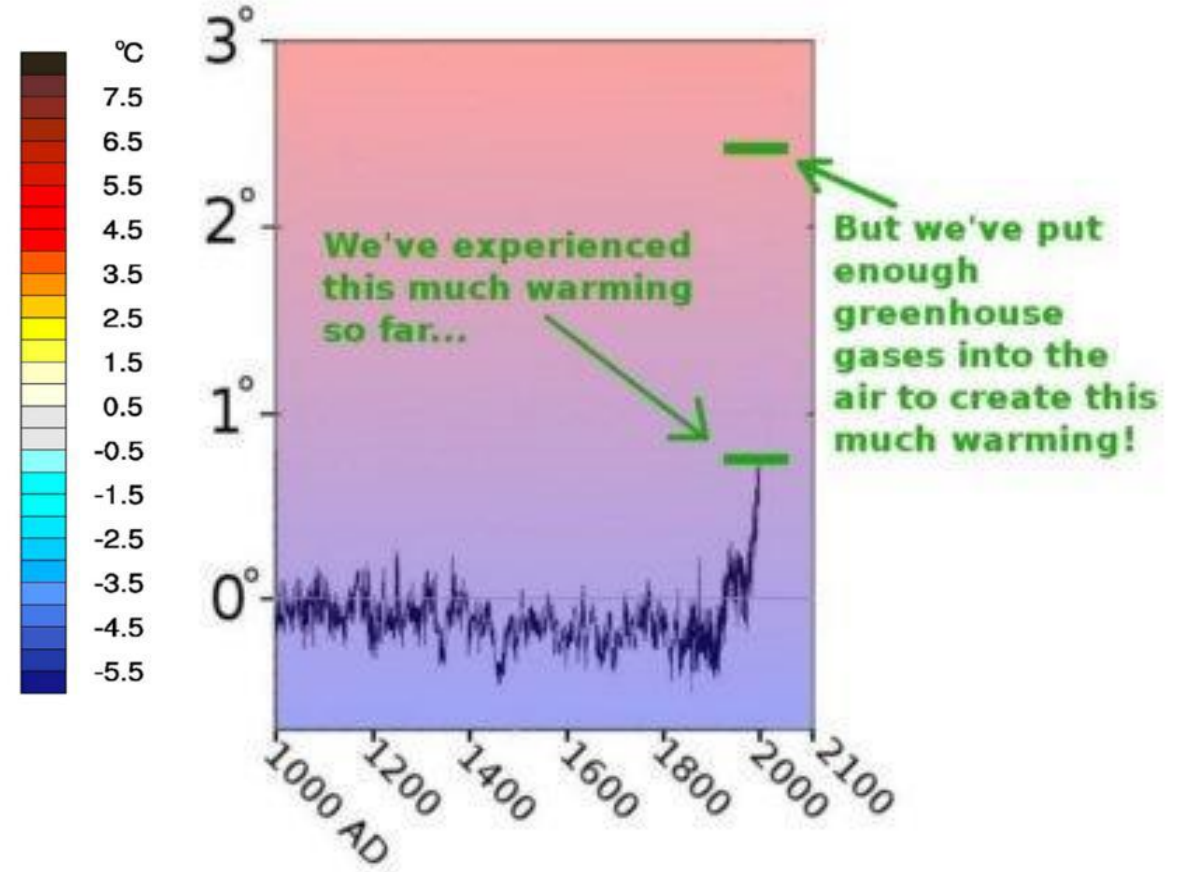
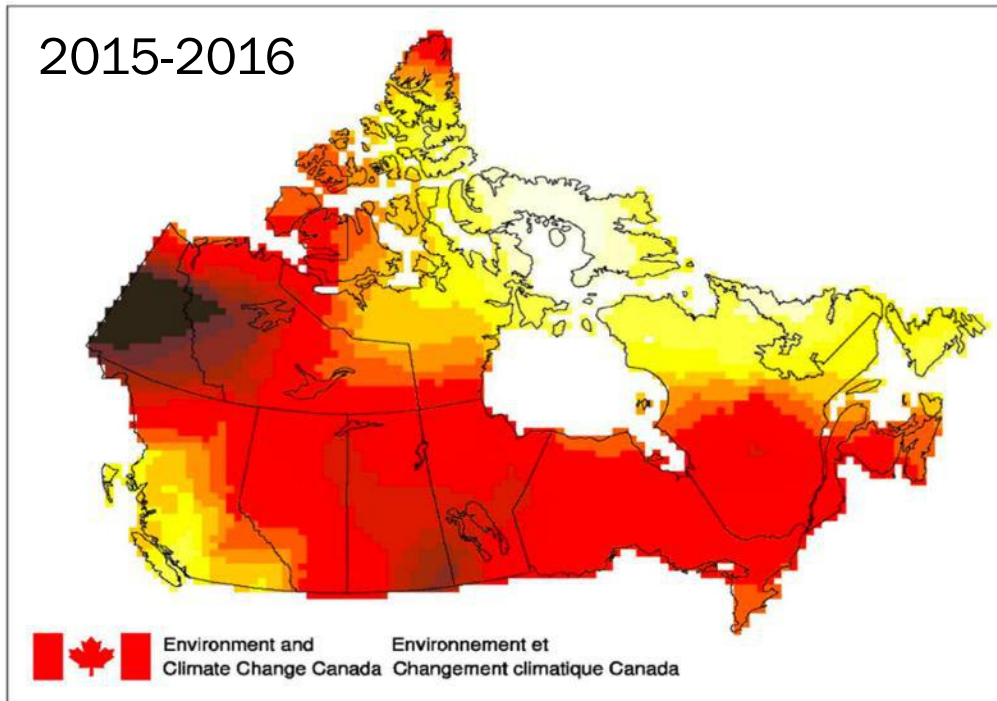
20th Century “Normal” is Gone

Global Land and Ocean Temperature Anomalies, January-December



Source: National Oceanic and Atmospheric Administration, [Climate Change – Global Temperature](#)

More already locked in



Source: Environment and Climate Change Canada, Climate Trends and Variations Bulletin, Winter 2015/2016, 2016.

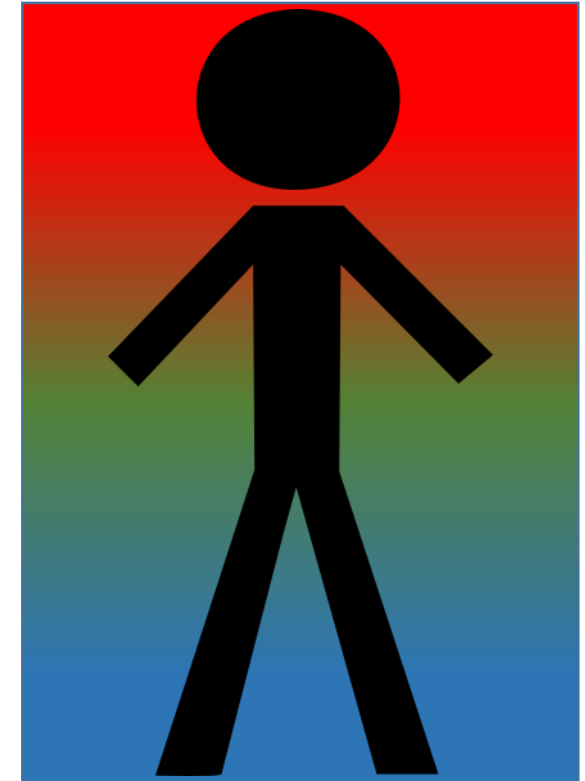
Source: climatevictory.org

“Global Warming”?

- ≠ Everywhere always warmer
- Higher average temperatures
 - But unevenly distributed
 - Disruption of natural cycles
- More damaging, more unpleasant extremes



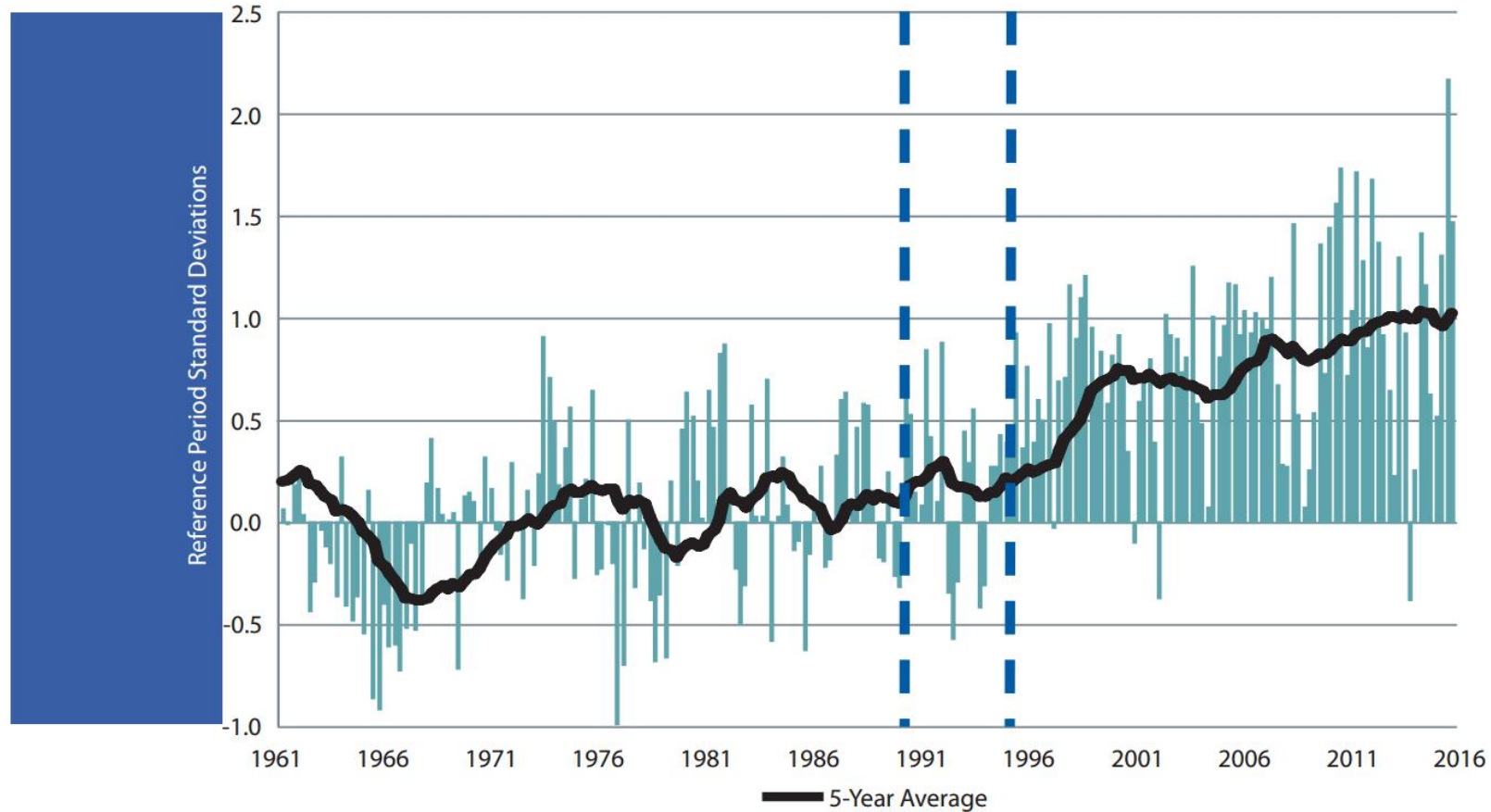
TOO HOT!



TOO COLD!

Extreme events have tripled

Figure 3. The Actuaries Climate Index for Canada and the United States.

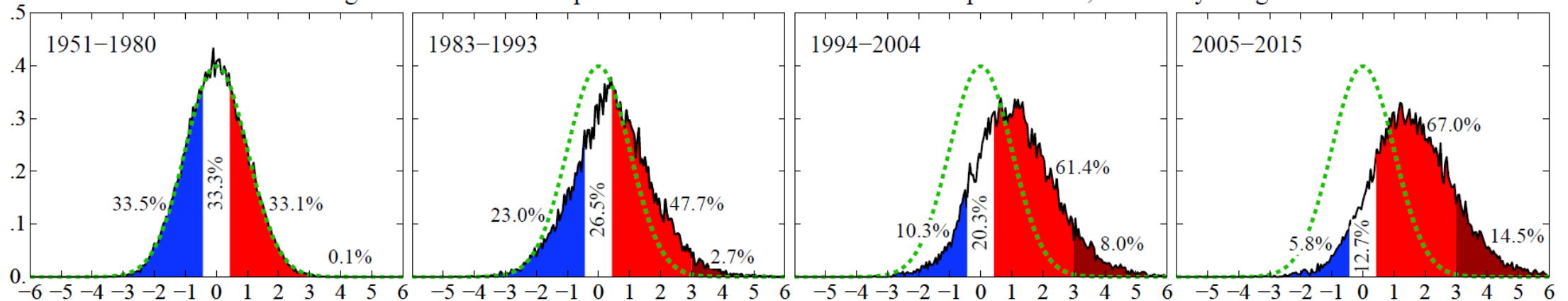


Source: Actuaries Climate Index, [Executive Summary](#)

More Extreme Temperatures

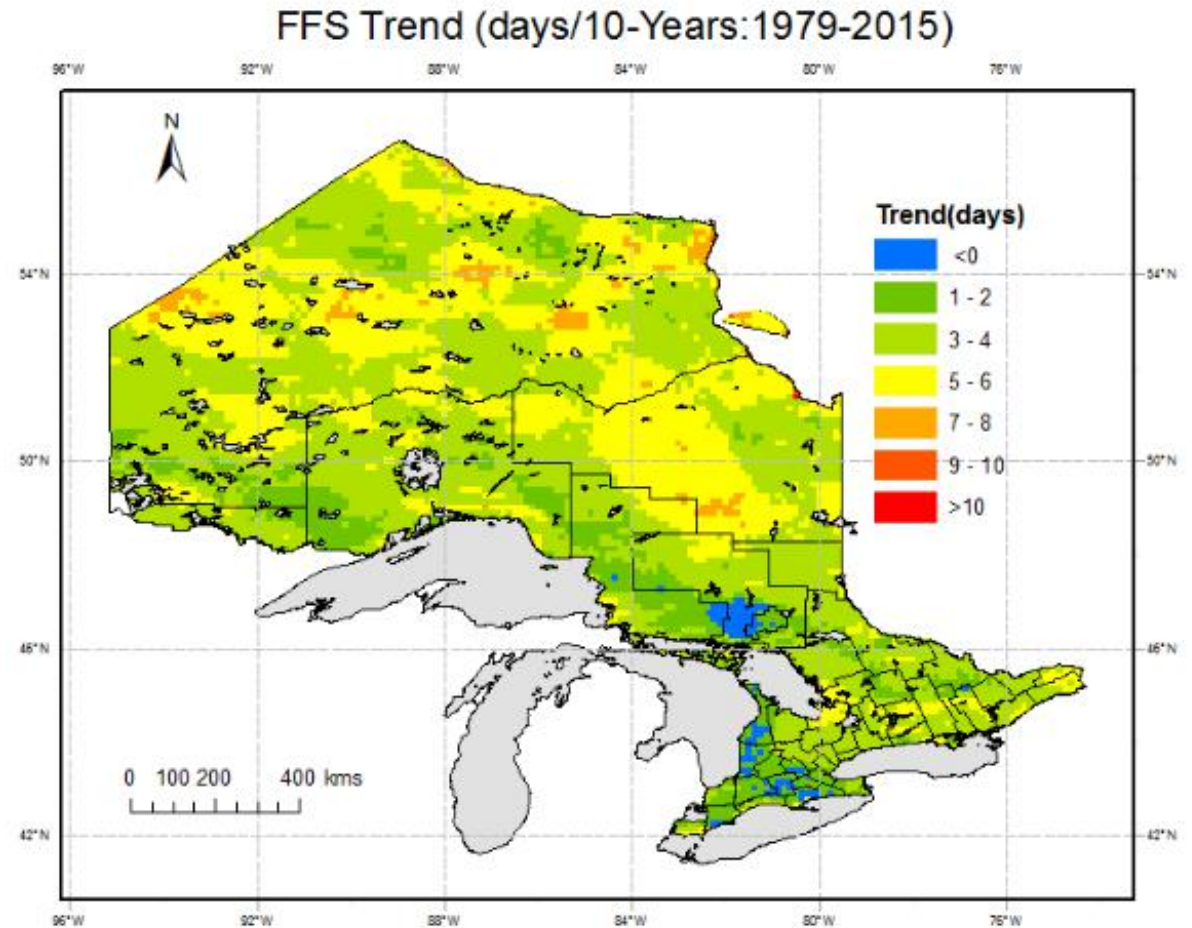
Deviation from mean 1951-1980 climate

Shifting Distribution of Temperature Anomalies: Northern Hemisphere Land, June–July–August



Ontario Warming Faster Than Average

- Ontario frost-free season increasing by **1-13 days** each decade
- **Differs by region**
 - Latitude, topography, water...



Ontario: When, not if

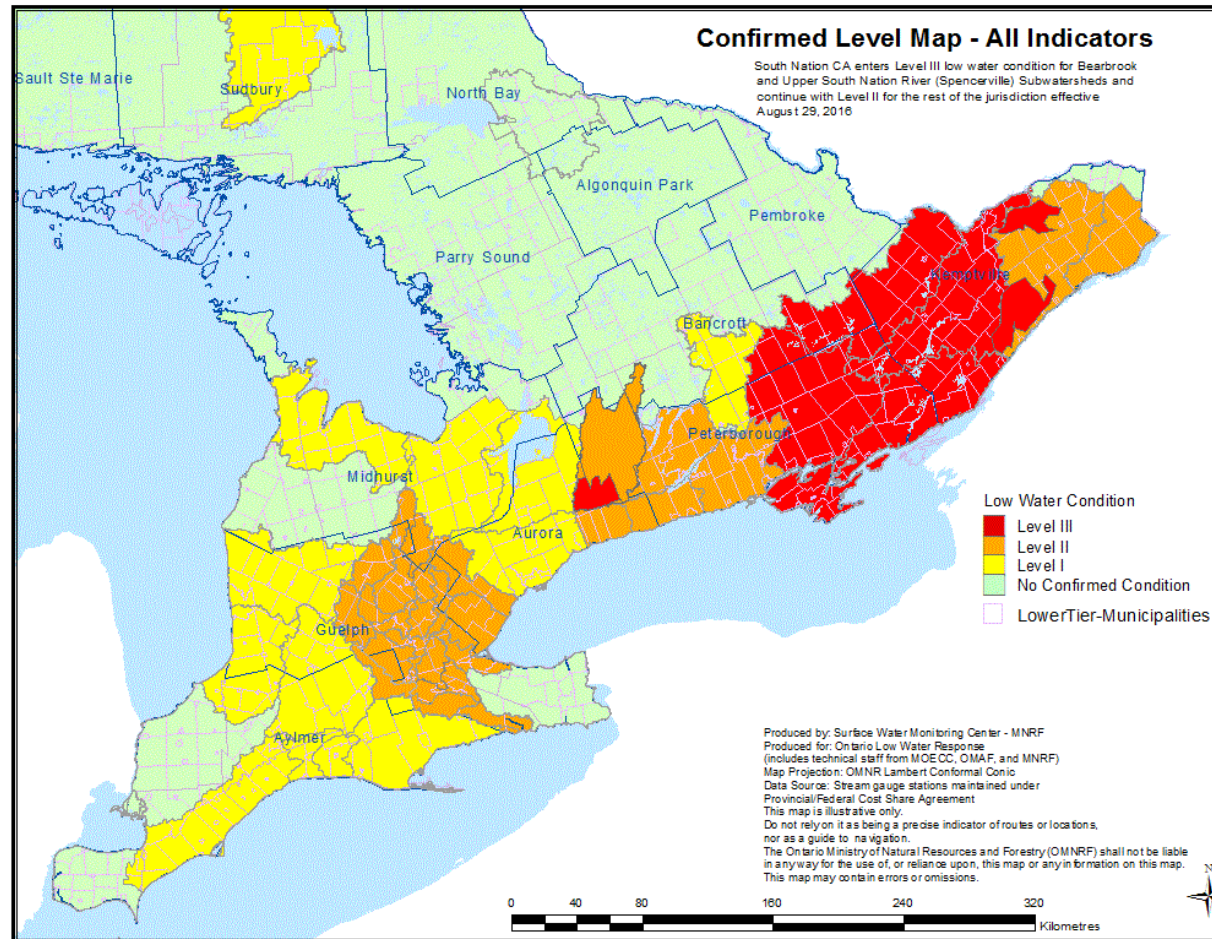
- Milder winters
 - Ice roads, winter sports, snow cover
- Wetter springs, faster melts
- Hotter, drier summers

- Storms, floods, droughts
- Forest fire
- Invasive species

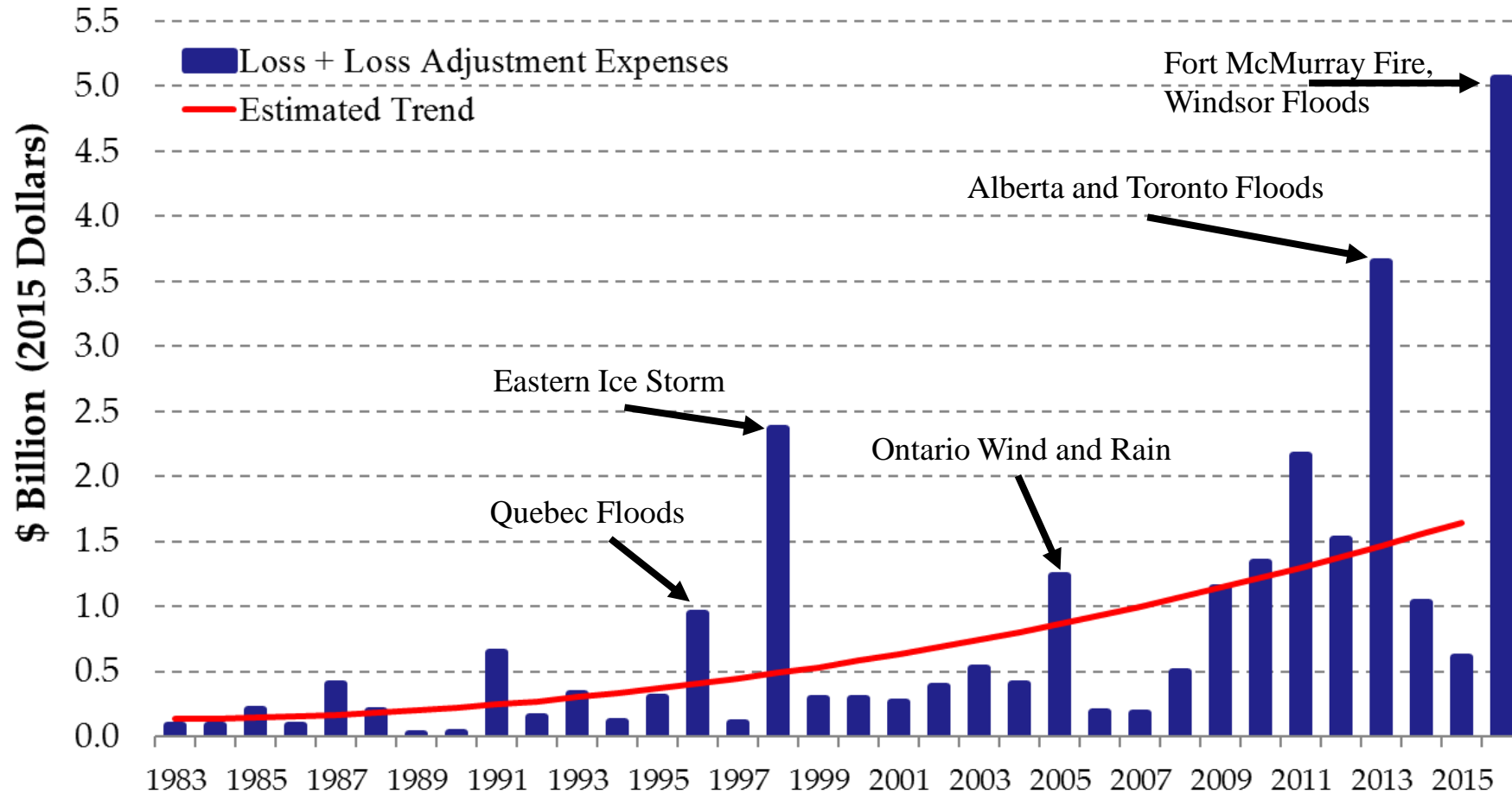


2016 Drought

Conditions as of July 31, 2016



Catastrophic Insured Losses - Canada



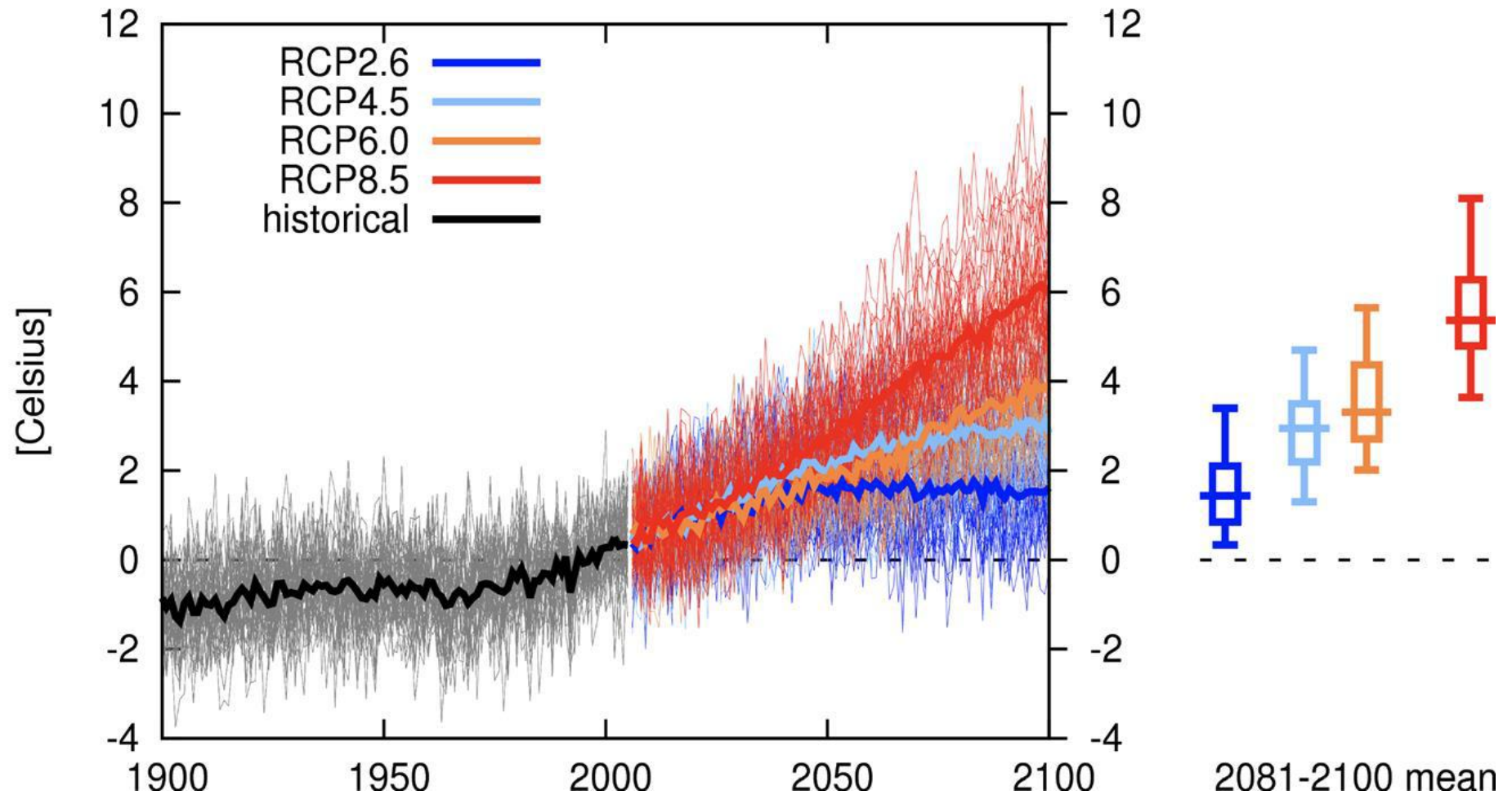
Source: Insurance Bureau of Canada, Lapo Calamai

Ontario: When, not if

- Health impacts, e.g. more:
- Infectious diseases
- Extreme weather events
- Extreme heat
- Poor air quality
- Water stress

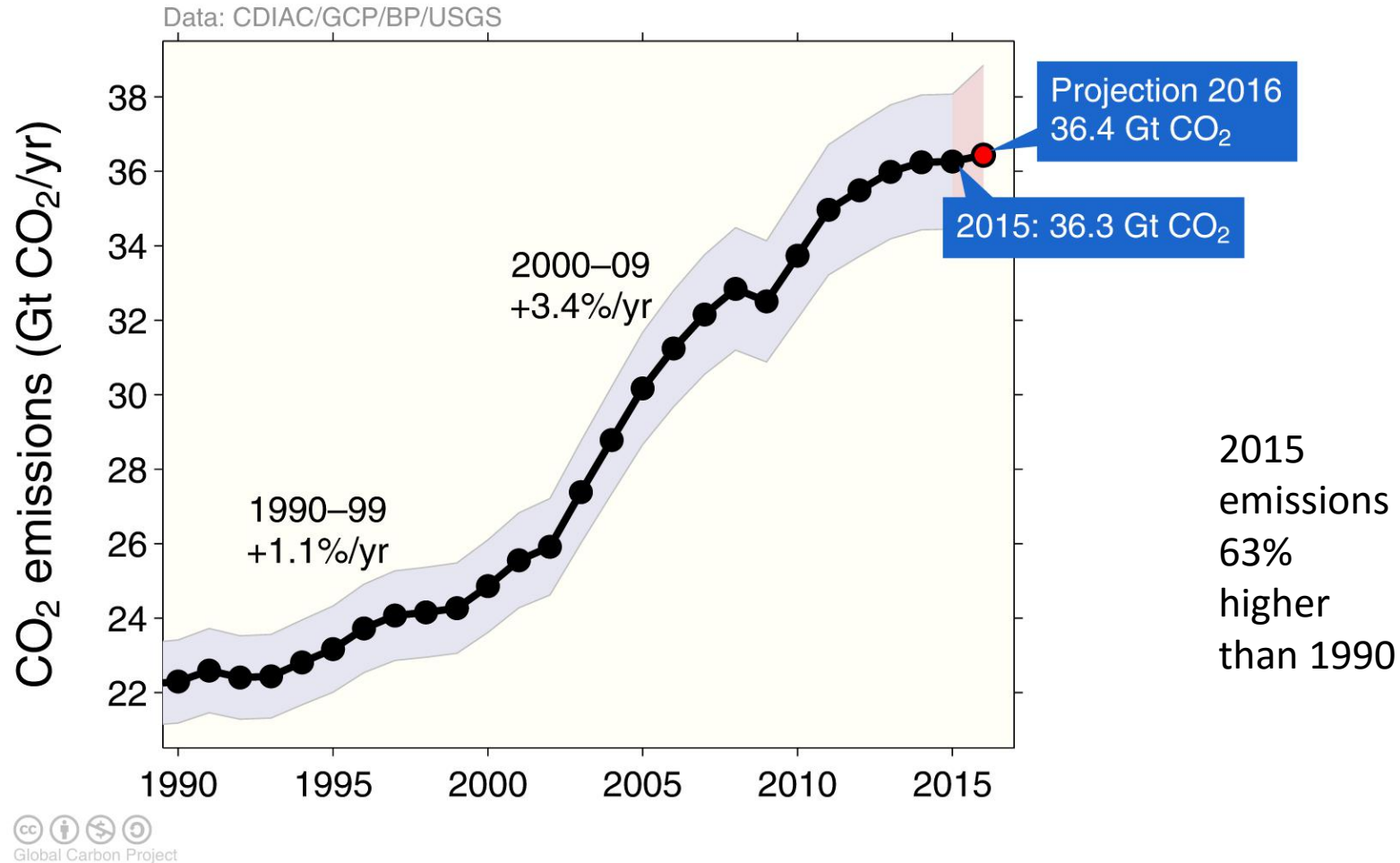


How Much Worse? Depends on Emissions

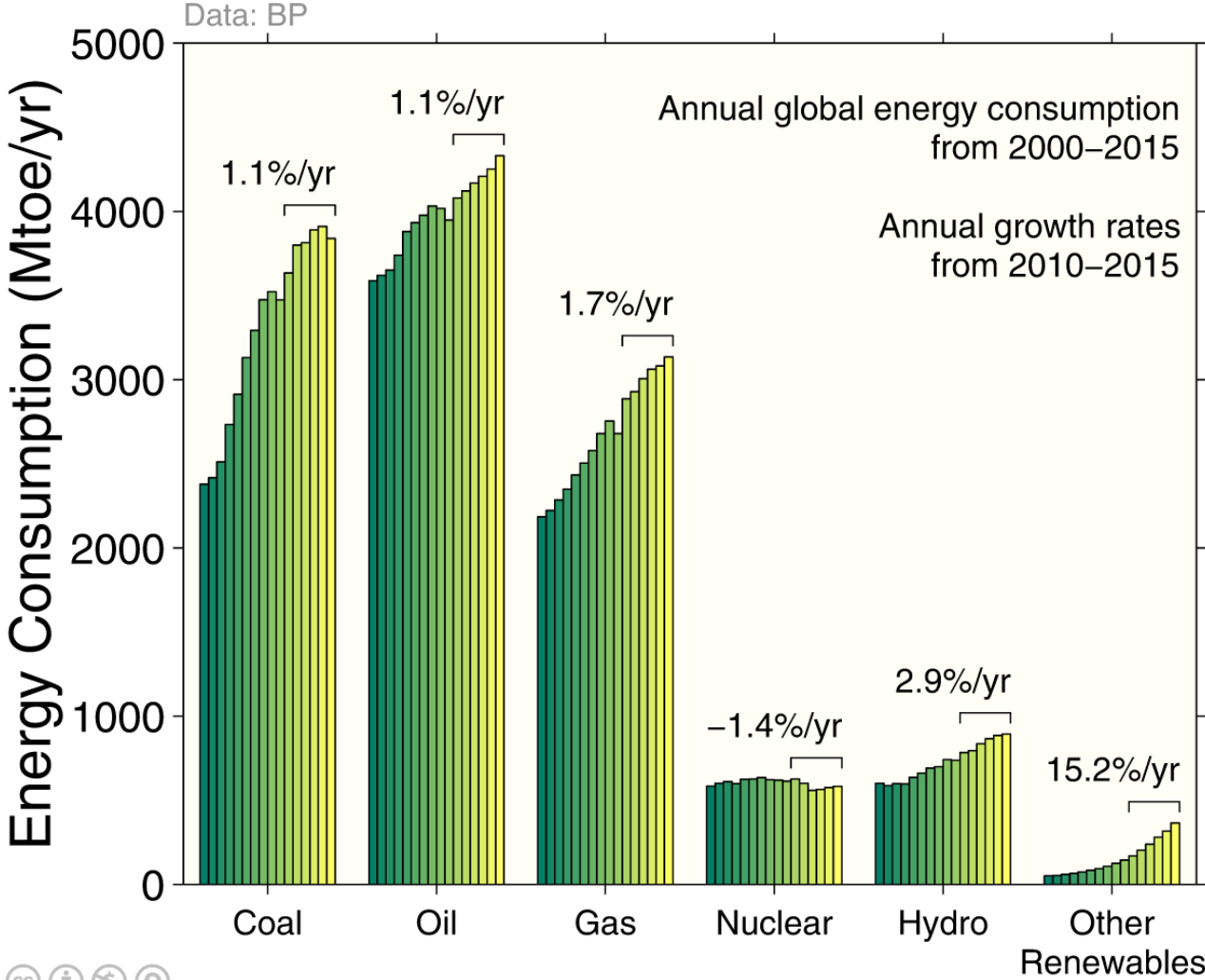


Source: Laboratory of Mathematical Parallel Systems (LAMPS) at York University, Temperature Change for 1900 to 2100 relative to 1986-2005 from AR5 CMIP5 subset, 2016.

Because emissions skyrocketed



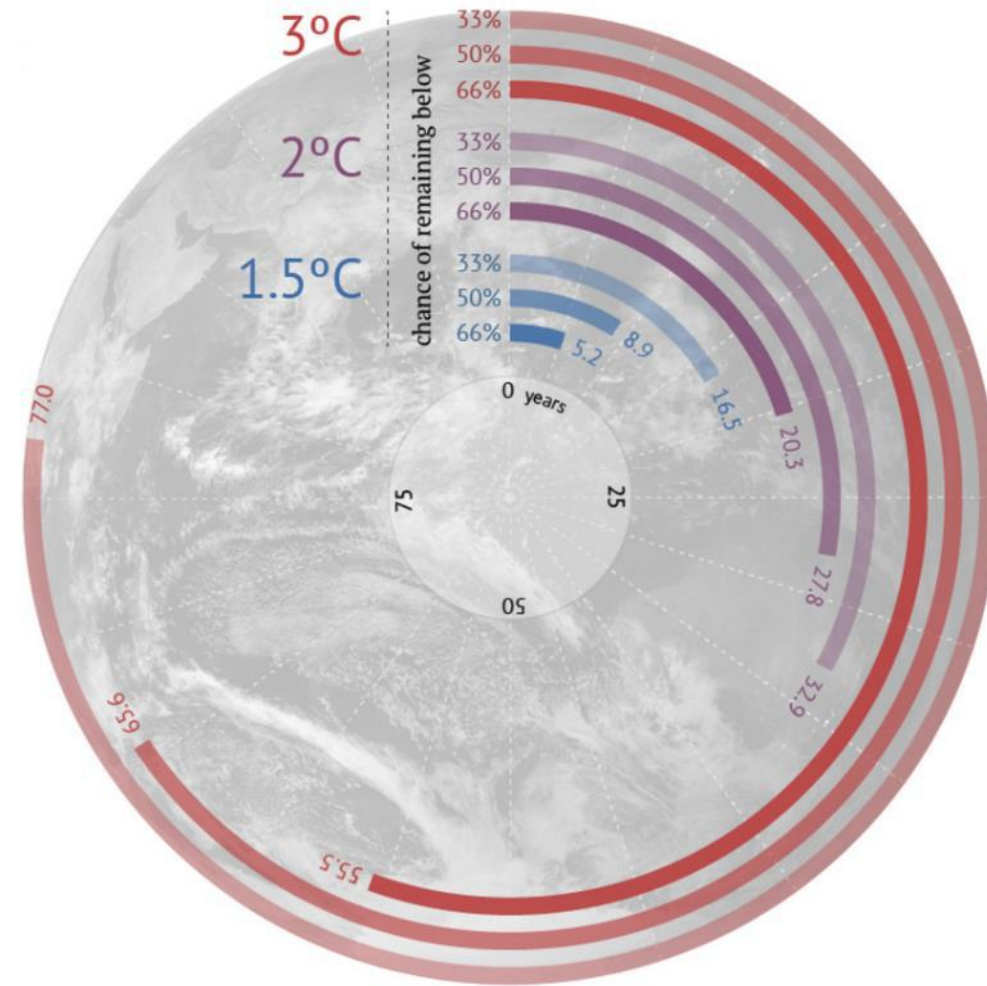
And are still growing



Source: [BP 2016](#); [Jackson et al 2015](#);
[Global Carbon Budget 2016](#)

Carbon budget running out

If we want a 2/3 chance of staying <2°C, most of proven fossil fuel reserves can not be burned

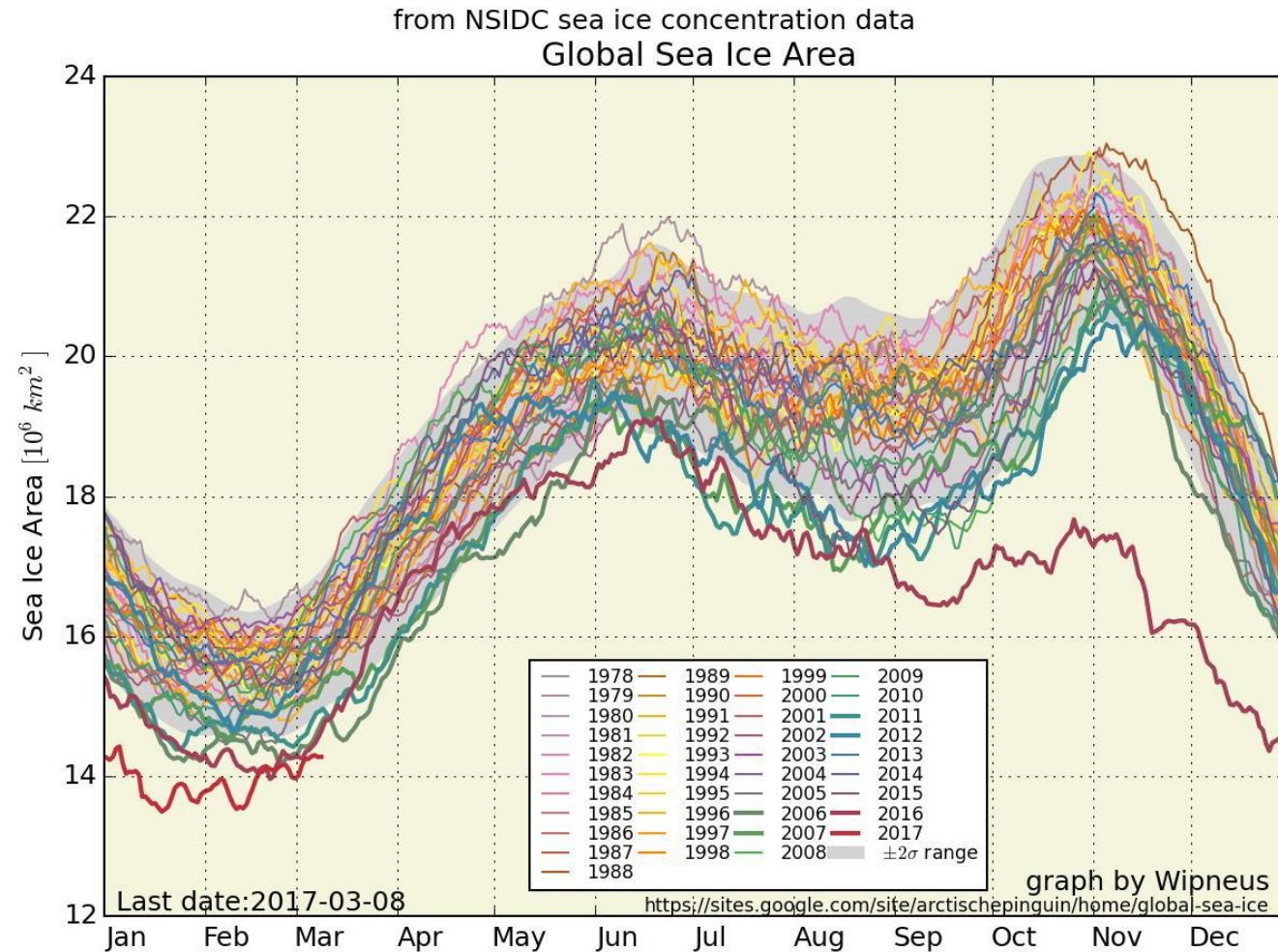


What else have we unleashed?

- Permafrost
- Soil carbon loss
- Forest die-back
- Ocean current changes
- Loss of sea ice

- **What would a tipping point look like?**

Global Sea Ice



Is it too late?

- We are in for big changes
- There is still a little time to have an impact on what's coming
- Our choices, right now, matter

3: What is Ontario doing

Ontario is doing so much right

Coal power plant closures

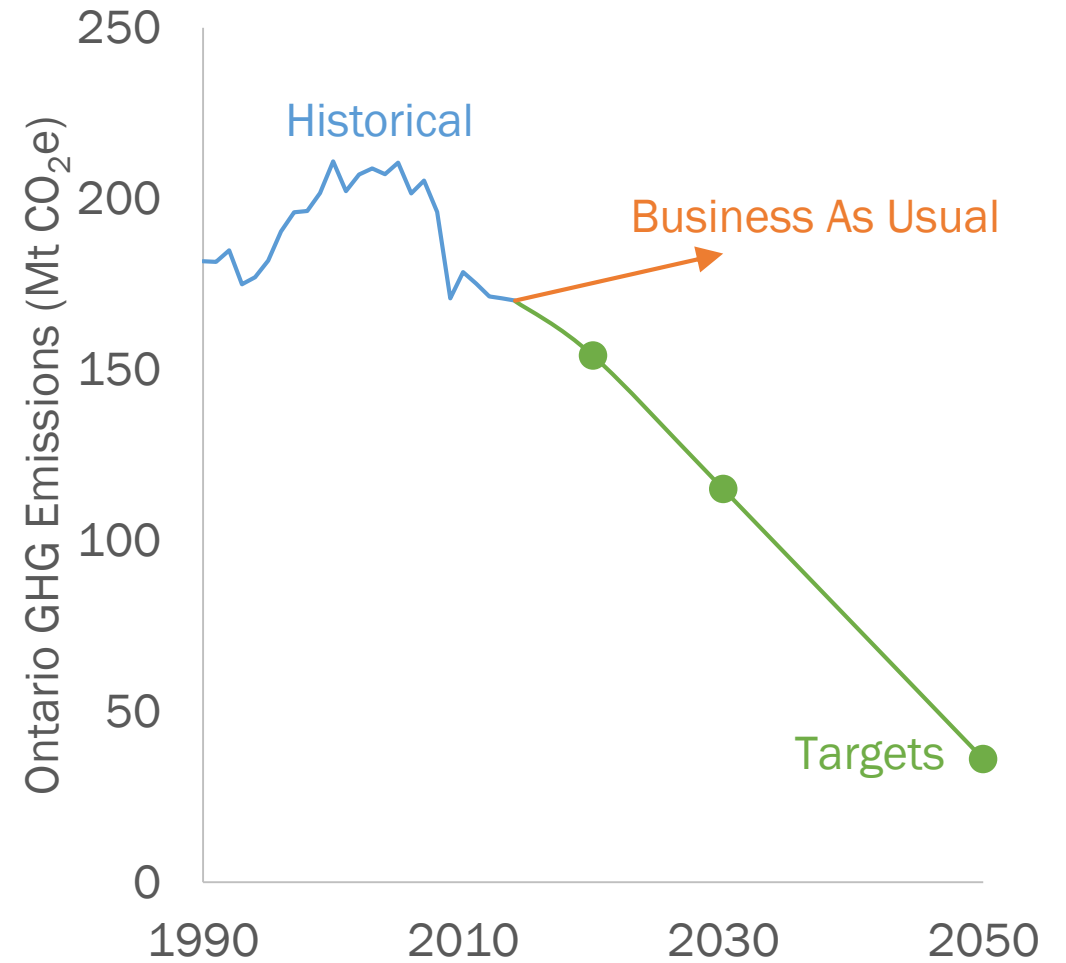
Price on carbon

Action Plan

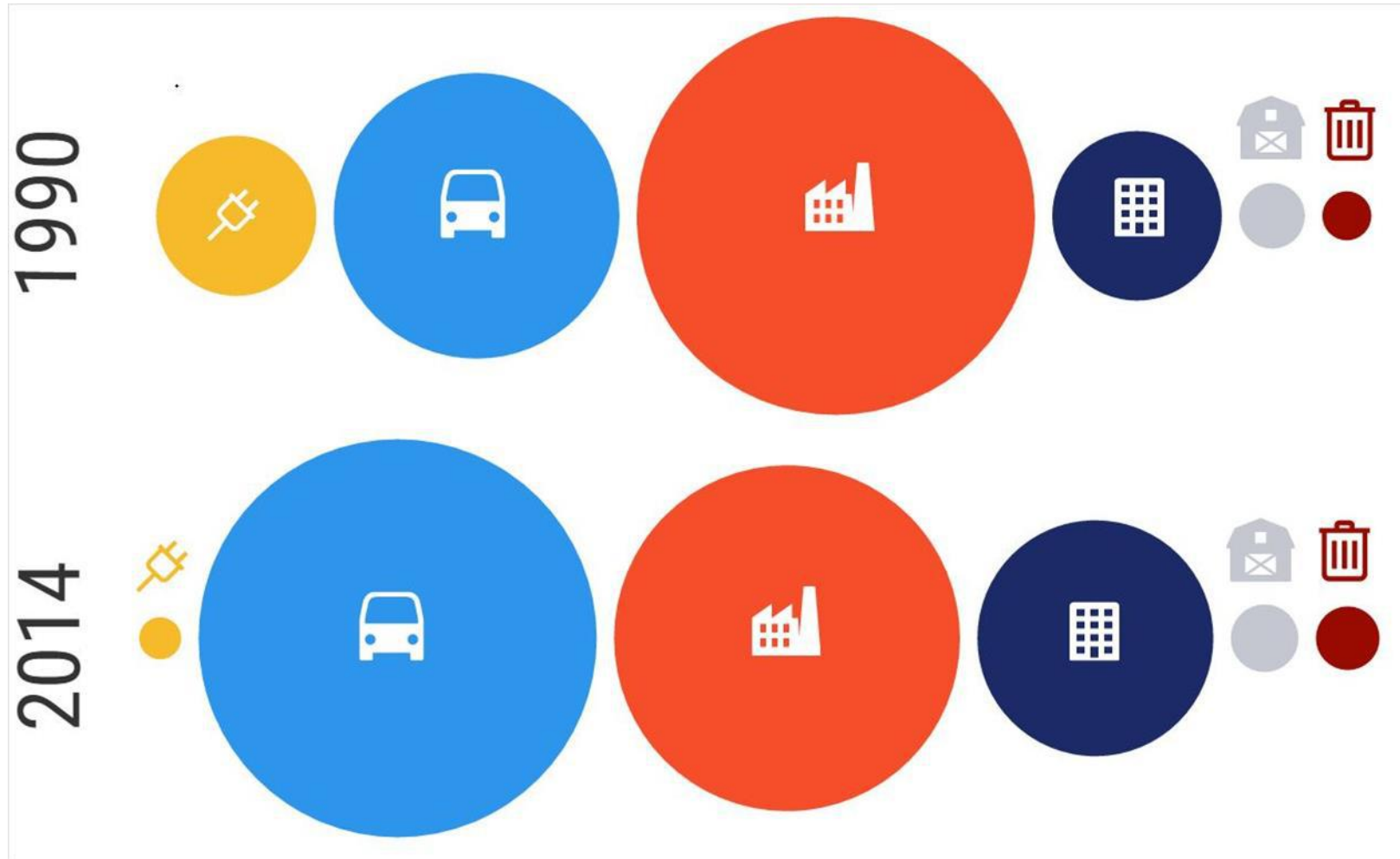
Climate Ready update?

New Climate Act

- Carbon pricing to increase fossil fuel costs
- Proceeds in Greenhouse Gas Reduction Account spent as per Action Plan
- Reduce GHGs by 80%?



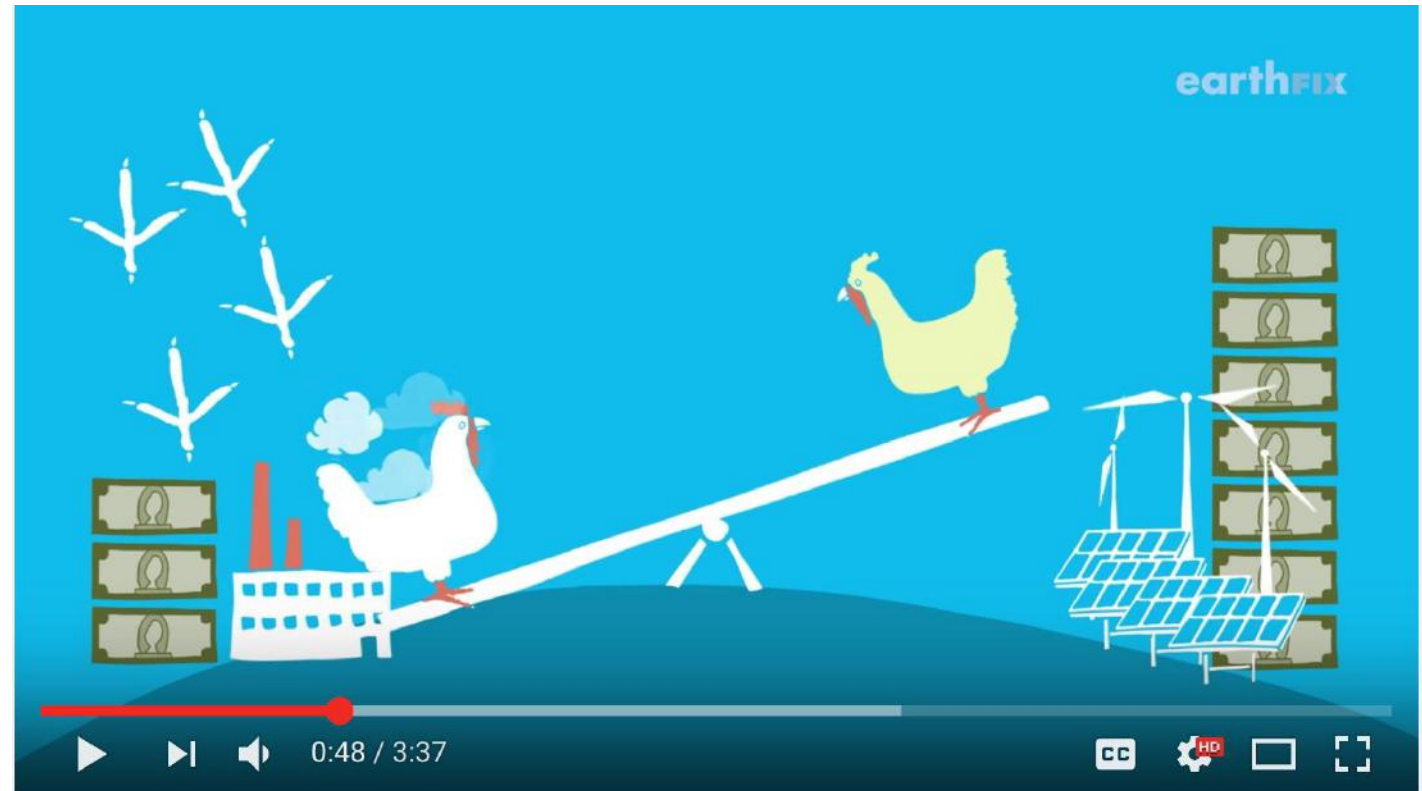
Though still a long way to go



Basic Theory – Polluter Pays

- To reduce GHG emissions, we must put a price on them
- GHG polluters would emit less if they had to pay for the privilege

<https://goo.gl/O4uUSH>



Carbon Tax vs Cap and Trade

Carbon Tax:
Gov't sets price

Cap and Trade:
Gov't sets cap

Simpler to understand

Lower cost GHG mitigation

Faster to implement

Doesn't include the term *tax*

Ontario's Design Choices

Ontario's cap and trade system is:

- Reasonable
- Appropriate for our economy

Challenges:

- It is complicated
- It will take time to work
- Needs longer-term certainty

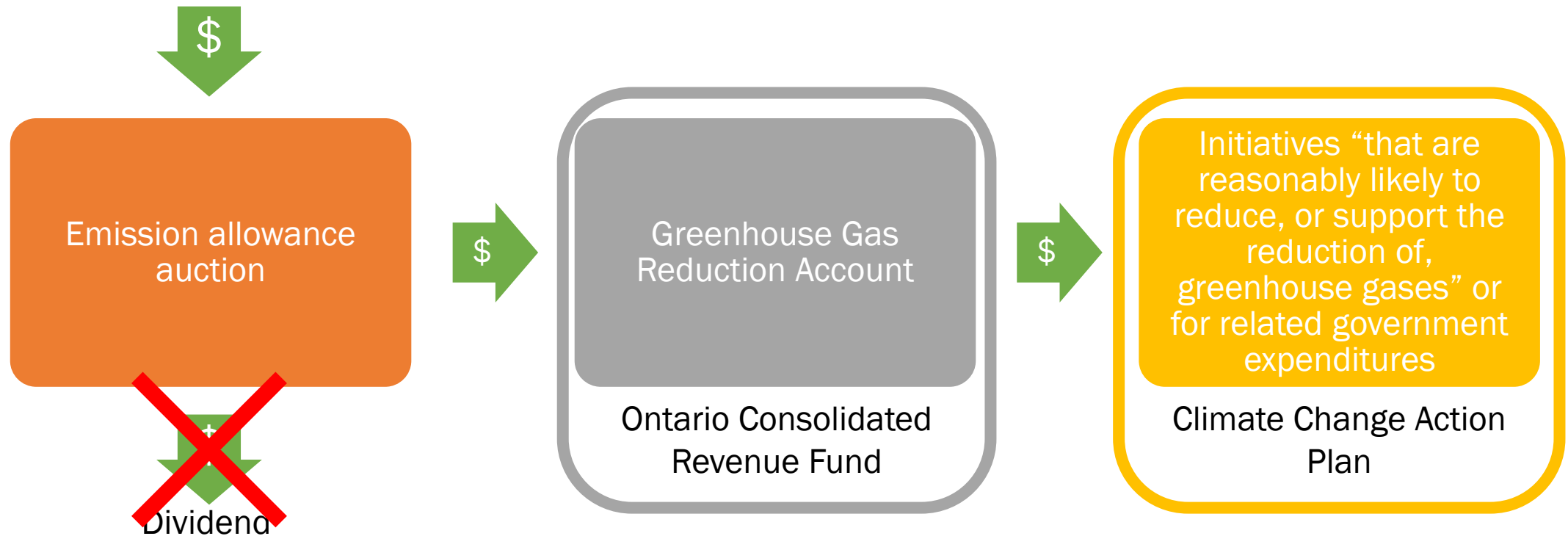
What will it cost if you change nothing?

Average household and energy price impacts with full auction for fuels in buildings and cars



Where does the money go?

- \$1.8 billion per year?
- Mostly from everyone who buys petroleum products and natural gas
- Limited impact to Large Final Emitters and electricity sector (90% fossil free)



*What should
Ontario do next?*

*And what
can I do?*

Knowledge + Action = Hope

No one can do everything, but everyone can do something

Lots of Progress

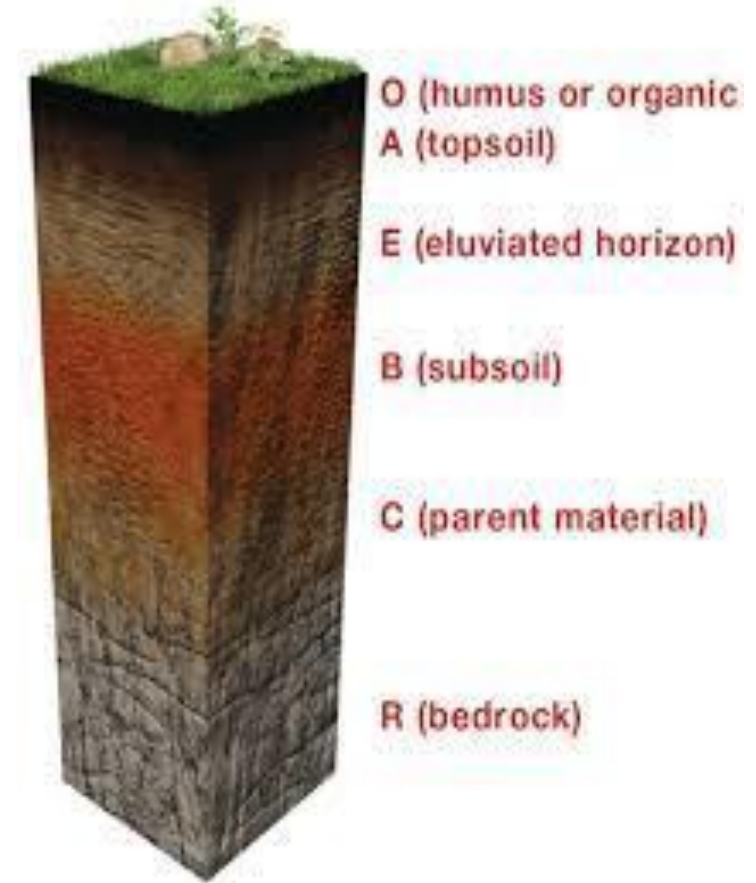
- Encouraging international, national, and provincial progress
- Paris Agreement – came into in force on November 4, 2016
- Kigali Amendment to Montreal Protocol – hydrofluorocarbons
- Carbon Offsetting and Reduction Scheme for International Aviation
- Pan-Canadian Framework
- Green Bonds >\$100 B

- Despite U.S. election...

Who is Leading by Example?

- MOHLTC: Health Impacts
- MTO: More transit, Cycling Strategy
- OMAFRA: Soil Carbon/Soil Health
- Toronto, Oxford County
- Region of Durham: Adaptation Plan
- Hamilton bio buses
- Waterfront Toronto: Green Procurement

- Task Force on Climate Related Risk Disclosure
- Universities?





WORKERS CLIMATE PLAN



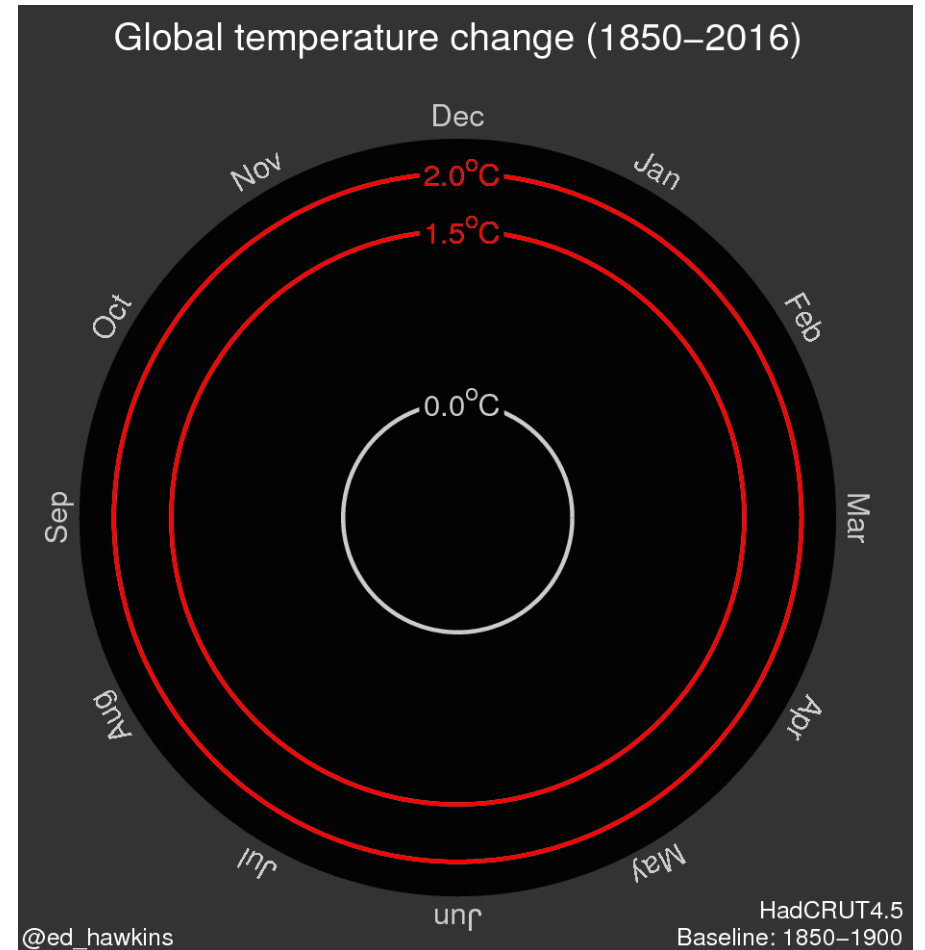
STAND WITH OIL SANDS WORKERS CALLING FOR TRAINING IN RENEWABLE ENERGY

 Call For Government Action



What will it take?

- Time to put an urgent climate lens on:
 - Procurement
 - Funding
 - Regulations
 - Incentives
 - Policies
 - Permitting
 - Planning....
- **Climate changes everything**



Source: [Climate Lab Book, 2016](#)

What Can I Do?

- Climate cannot be left entirely up to government

Reduce your carbon footprint

Get ready to adapt

Speak up, and teach children to

- It's not too late

Questions?

Download the Facing Climate Change report
and the Introduction to Cap and Trade in Ontario document: eco.on.ca

Contact us: commissioner@eco.on.ca

Environmental
Commissioner
of Ontario



Commissaire à
l'environnement
de l'Ontario