



Redefining possible.

*IPCC'S SPECIAL REPORT:
GLOBAL WARMING OF 1.5 °C*

A PRIMER FOR ALBERTA'S.

Christian Reuten, PhD, ACM

RWDI AIR Inc.

EnviroTech 2019, Apr. 24, 2019

Agenda

- 1. Background on the Report**
- 2. On Scales and Perspectives**
- 3. Direct Impacts on Alberta**
- 4. Indirect Impacts on Alberta**
- 5. Feasible versus Realistic**
- 6. Transformative versus Incremental**
- 7. Speculating about the Future**
- 8. Summary**

Why 1.5 °C?

Because we pledged, sort of (Paris Agreement, 2015):

“Emphasizing with serious concern the urgent need to address the significant gap between the aggregate effect of Parties’ mitigation pledges in terms of global annual emissions of greenhouse gases by 2020 and aggregate emission pathways consistent with holding the increase in the global average temperature to well below 2 °C above preindustrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above preindustrial levels.”

Decision 1/CP.21, Section 21

**United Nations Framework Convention on Climate Change,
Conference of the Parties invited. IPCC delivered:**

***“An IPCC Special Report on the impacts of global warming of
1.5°C above pre-industrial levels and related global
greenhouse gas emission pathways, in the context of
strengthening the global response to the threat of climate
change, sustainable development, and efforts to eradicate
poverty”*** (report’s subtitle)

Why the Addendum?

Clarification:

Structure and context


Extension:

Assess threat of climate change within larger context

Reduction:

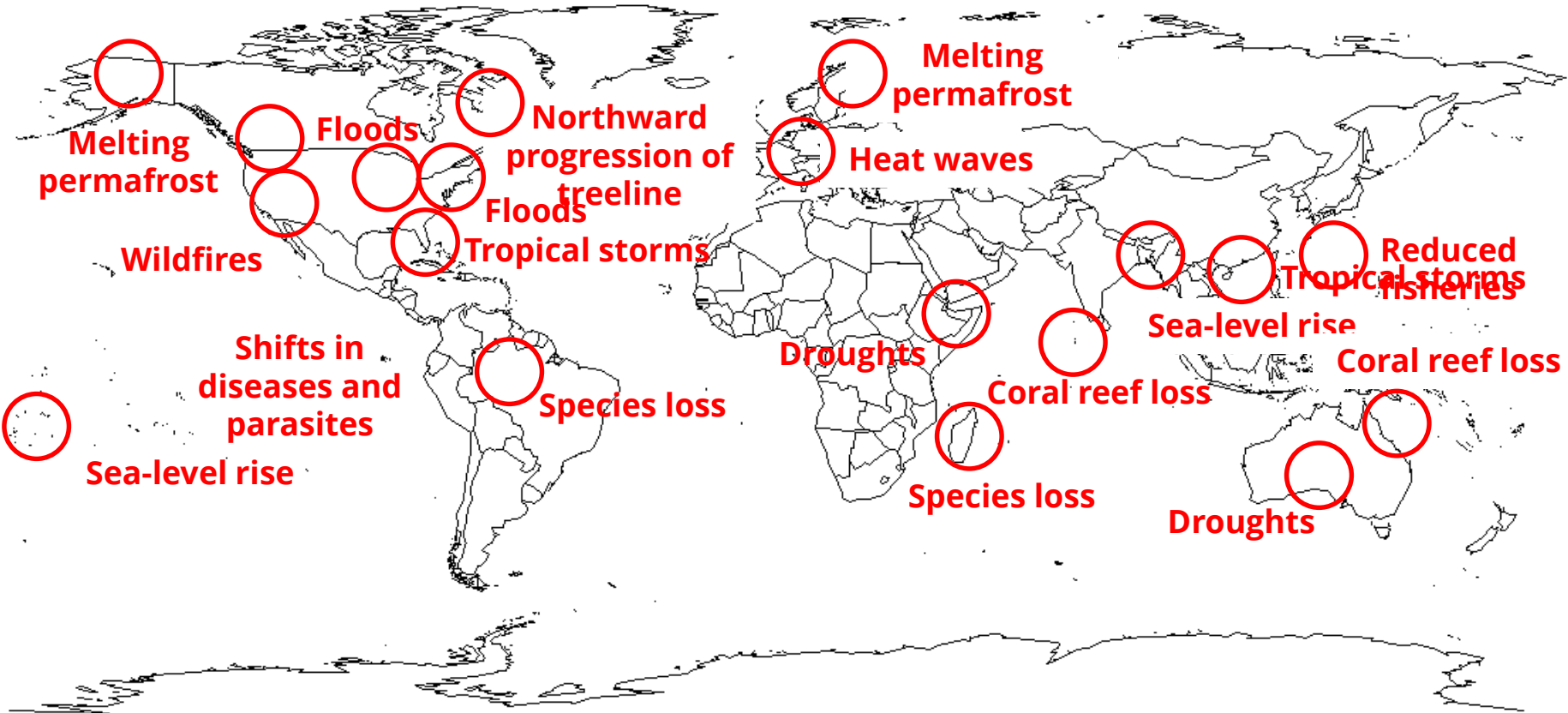
Only consider climate change mitigation and adaptation options in line with sustainable development goals and eradication of poverty

Take-Home Message #1

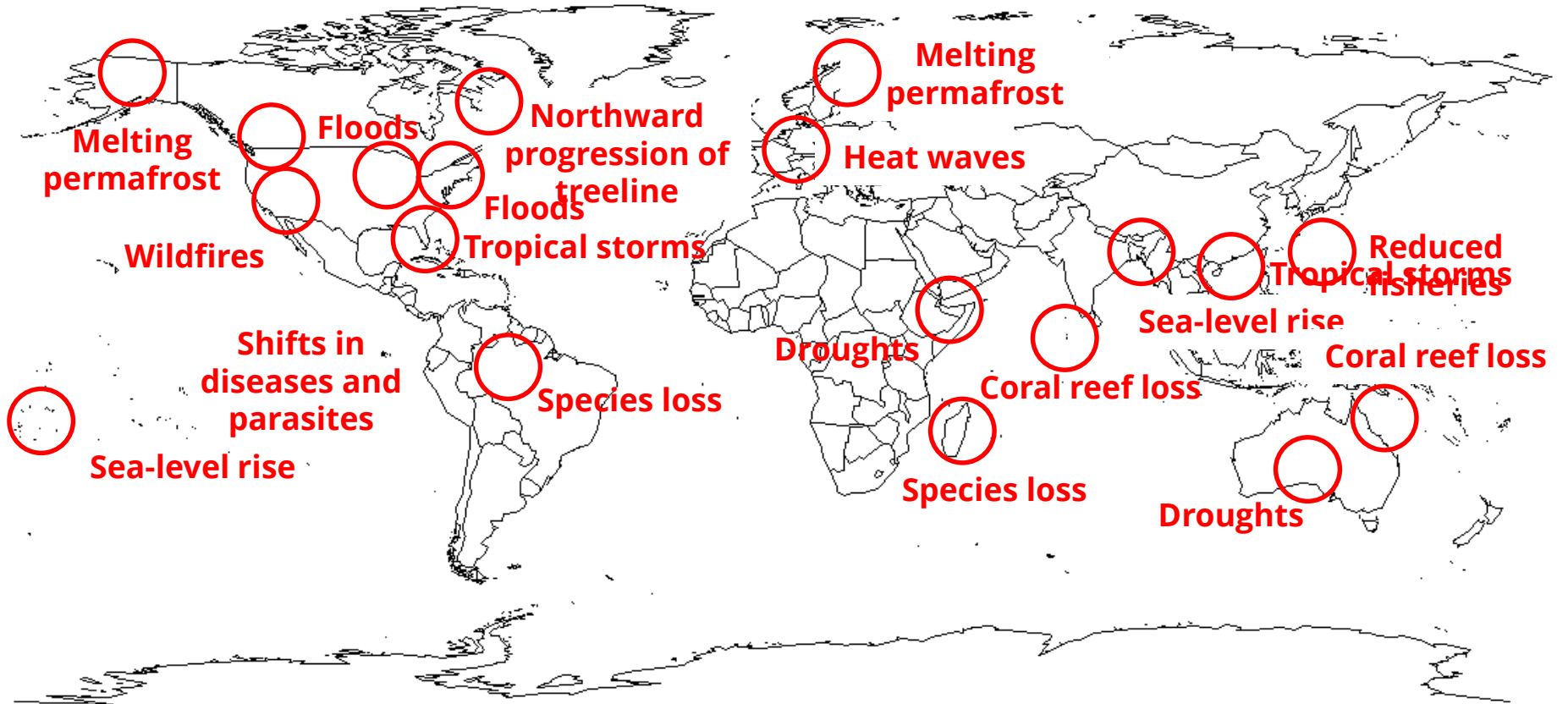


Climate change is an issue well beyond the economics of mitigation and adaptation.

On Scales and Perspectives



The World As It Is



The World As We See It

Warmer winters?

Might sound kind of appealing.



2

Take-Home Message #2

Despite major global climate-change issues, climate change might not be an obvious threat to Albertans.

2

Direct Impacts on Alberta

Attribution studies. How much did climate change contribute to:


- **2014 flood**
- **Mountain pine beetle**
- **Fort McMurray fires**
- **West Nile virus**

Other Likely Future Issues

- **More vector-borne diseases**
- **Other parasites**
- **Droughts**



Other Potential Negative Impacts

- 
- **Energy bottlenecks due to higher transmissions losses, less heat dissipation, weaker winds, and phase out of coal**
 - **Heat waves**
 - **Increased tornado activity**
 - **Heavier extreme precipitation**
 - **Larger Hail and stronger thunderstorm outbursts**
 - **More freeze-thaw cycles**
 - **Higher photochemical pollution**

Potential Positive Impacts

- **Longer growing and construction seasons**
- **Increased plant growth in some areas due to higher CO₂ and temperatures**
- **Less severe and fewer cold extremes**



Mitigation versus Adaptation Cost

Alberta:

Intuitively, economy highly sensitive to mitigation cost, while adaptation cost probably relatively low.

Globally:

The battle between economists continues: What is the present-day cost of future climate-change adaption (discount rate)?

Take-Home Message #3

Alberta *status quo*: Cost of mitigation might exceed cost of adaptation to direct impacts.

3

Indirect Impacts on Alberta

Fossil Fuel Supply:

- **Externally imposed costs and limitations, environmental opposition (pipelines; meat production; agriculture land-use and practices)**

Fossil Fuel Demand:

- **Pressure on global fossil fuel consumption**
- **Risks to global economic growth; increased poverty**

Beyond Fossil Fuels:

- **Stranded assets, missed new technologies, lost investments (Amazon HQ2; where are O&G companies on the list of top valued companies?)**
- **Rising food cost (e.g. sustainable management of land)**
- **Risks to global aggregated economic growth**

Take-Home Message #4

4

Alberta's future is determined by its adaptation to external forces.

Feasible versus Realistic

Feasible: “That can be done in practice.” (Wiktionary)

Realistic: “Expressed or represented as being accurate, **practicable**, or **not idealistic**.” (Wiktionary)

“Feasibility” mentioned **212** times in the report.

“Realistic” mentioned **8** times in the report.

Feasibility

Can be assessed **objectively** in 6 dimensions:

1. Geophysical
2. Environmental-ecological
3. Technological
4. Economic
5. Socio-cultural
6. Institutional

and 3 types of effects:

1. Systemic
2. Dynamic
3. Spatial

Realistic

Involves **subjective** assessment of the likelihood of future individual, collective, and organizational behaviours.

The report itself:

Does not alter the feasibility of limiting global warming to 1.5 °C but might affect how realistic it is.

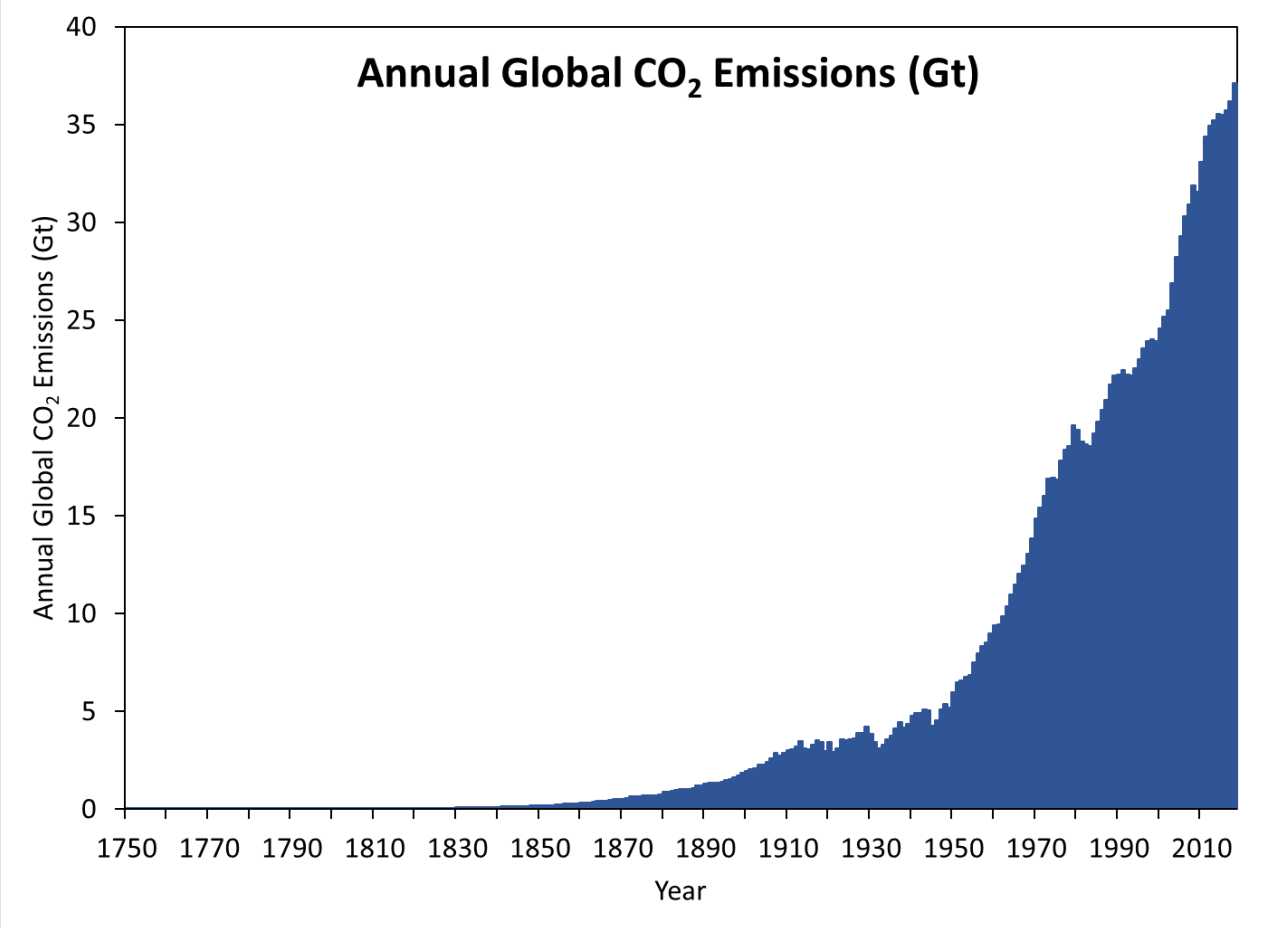
Take-Home Message #5

Limiting global warming to 1.5 °C is feasible. If it is realistic is a human choice.

5

Transformative versus Incremental

6



Scientific Evidence

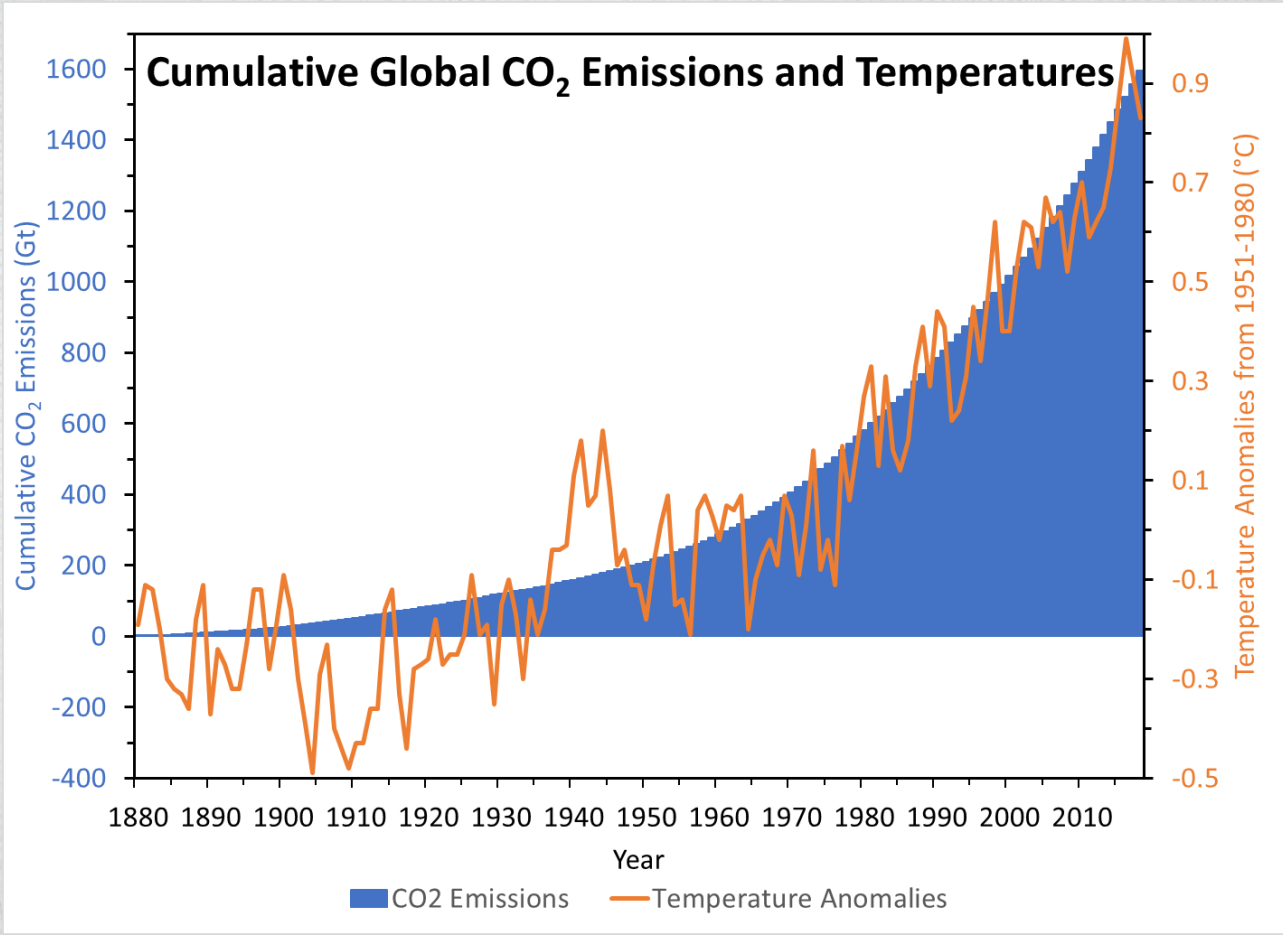
Global temperature increases since pre-industrial times are directly proportional to GHG emissions since pre-industrial times.

Every year we emit GHGs, the temperature rises.

We not only continue to emit GHGs every year, but our emissions increase every year.

Temperatures are not only increasing every year, they are increasing faster.

By contrast, very soon, we must have zero net GHG emissions if we want to limit global warming to 1.5 °C.

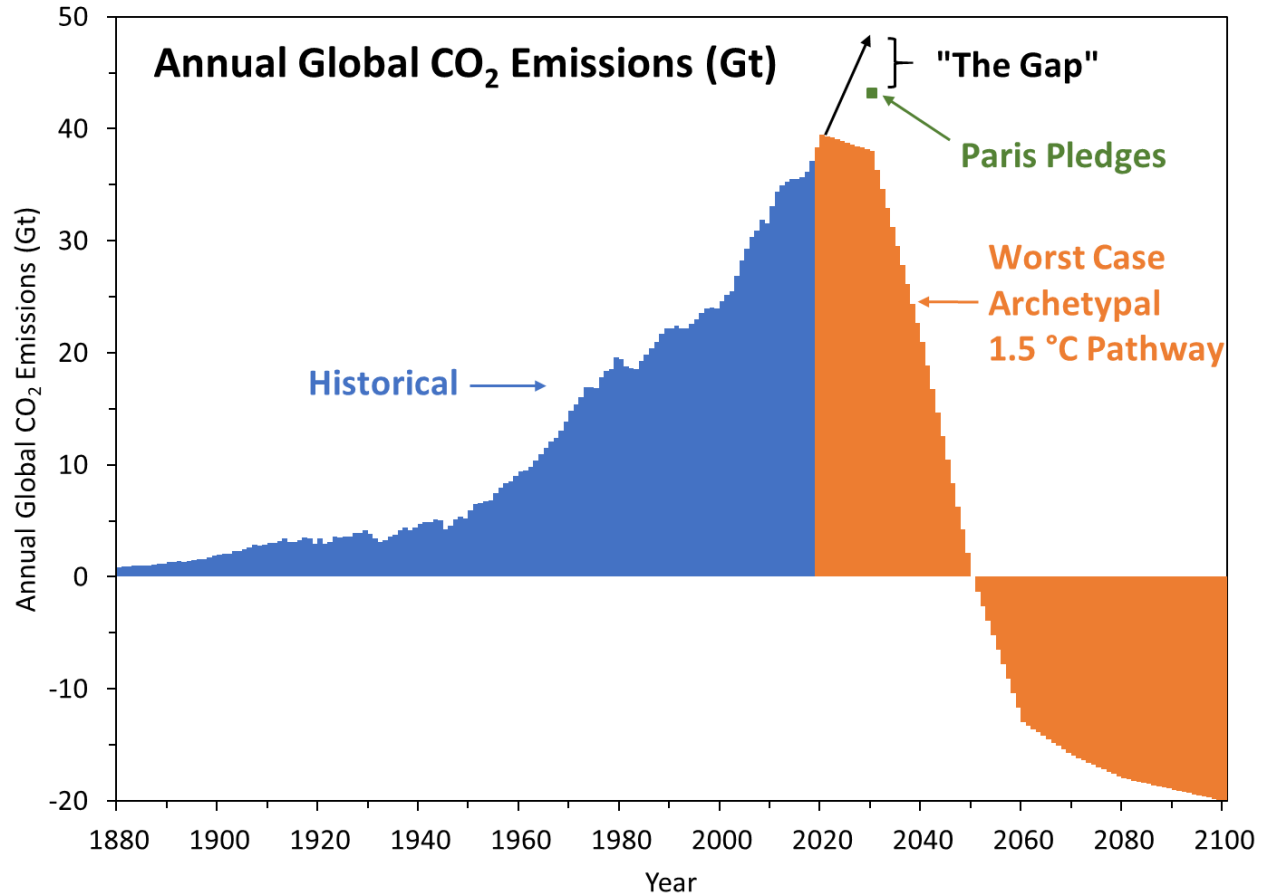


Where the World Stands Right Now

Paris pledges:
52-58 Gt CO₂e by year
by 2030

(2016: 52 Gt CO₂e)

“Most G20 countries
require new policies
and actions to
achieve their NDC
pledges.” Emissions
Gap Report 2017



What it Would Take

6

Incremental	Transformative
Reduce emissions intensity	Reduce emissions
Slow down emissions	Remove CO ₂
Replace coal with natural gas	Replace fossil fuels
Voluntary national pledges	New governance
2030 or 2050 emission targets	Annual emission targets
Uncertain; repeated setbacks	Determined, certain path forward
Slow uphill battle	Unstoppable momentum
Pay dearly for adaptation and regret	Look back and shake our heads

Take-Home Message #6

6

Limiting global warming to 1.5 °C requires transformative change.

Speculating about the Future

These are near certain speculations:

- 1. Under current governance structures, attempts at incremental climate-change mitigation will continue.**
- 2. Climate-change impacts will get worse increasingly faster.**
- 3. Cost of climate-change adaptation will eventually exceed cost of mitigation and reverse the economic argument.**

These are out for bets:

- 1. Will the above trigger transformative change?**
- 2. Will Alberta be ready?**

Take-Home Message #7

The economics and urgency of climate-change mitigation will change dramatically.



Summary

- 1. Climate change is an issue well beyond the economics of mitigation and adaptation.**
- 2. Despite major global climate-change issues, climate change might not be an obvious threat to Albertans.**
- 3. Alberta *status quo*: Cost of mitigation might exceed cost of adaptation to direct impacts.**
- 4. Alberta's future is determined by its adaptation to external forces.**
- 5. Limiting global warming to 1.5 °C is feasible. If it is realistic is a human choice.**
- 6. Limiting global warming to 1.5 °C requires transformative change.**
- 7. The economics and urgency of climate-change mitigation will change dramatically.**



References

- IPCC, 2018: Global Warming of 1.5°C. [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)]. (<https://www.ipcc.ch/sr15/>).
- Decision 1/CP.21, Section 21
(<https://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf>)
- https://cdiac.ess-dive.lbl.gov/ftp/ndp030/global.1751_2011.ems
- <https://www.co2.earth/global-co2-emissions#>
- <https://data.giss.nasa.gov/gistemp/>
- <https://www.icos-cp.eu/GCP/2018>
- <https://iopscience.iop.org/article/10.1088/1748-9326/aaf303>
- Emissions Gap Report 2017.
(<https://www.unenvironment.org/resources/emissions-gap-report-2017>)