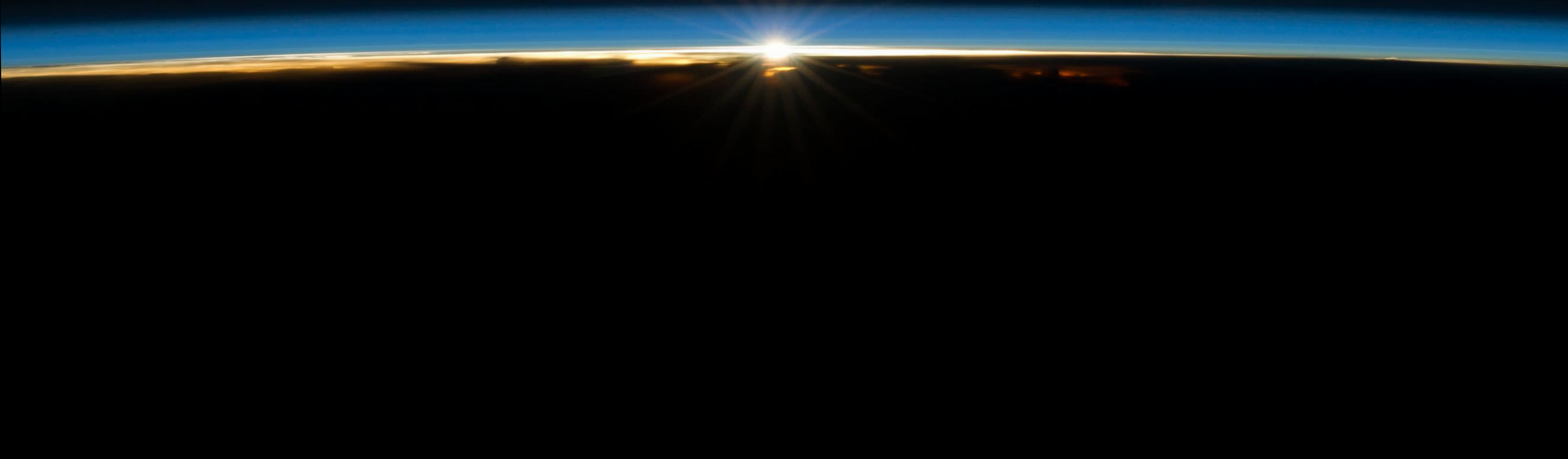


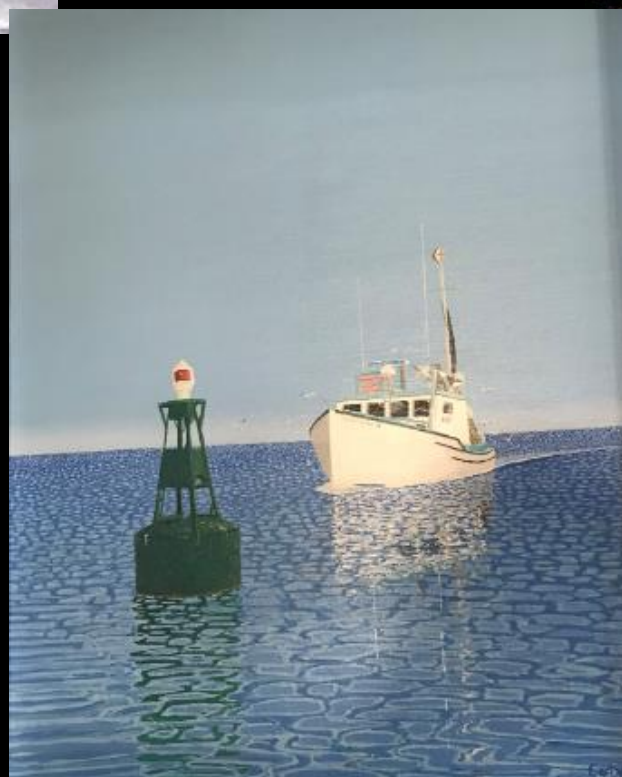
THE CLIMATE CRISIS
AND ITS SOLUTIONS





Source: NASA

A little bit about me

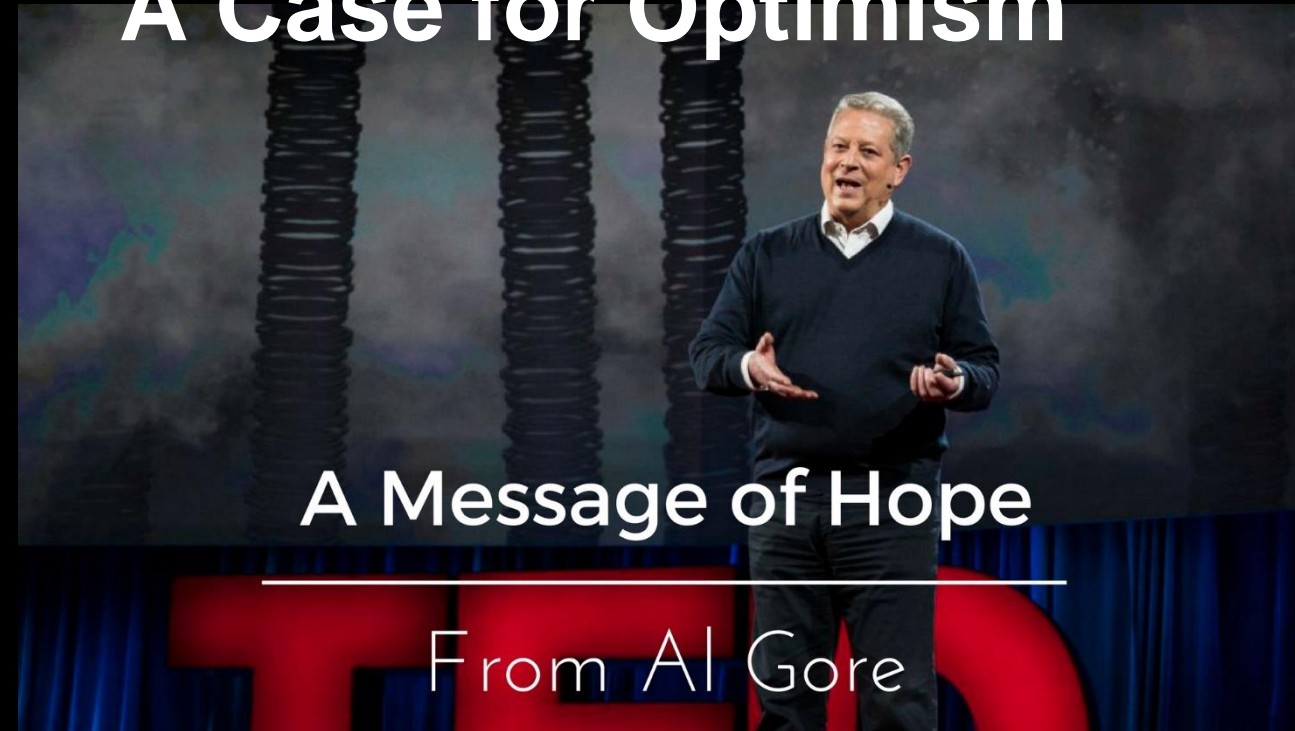


Why do I care so much now?

A Case for Optimism

A Message of Hope

From Al Gore



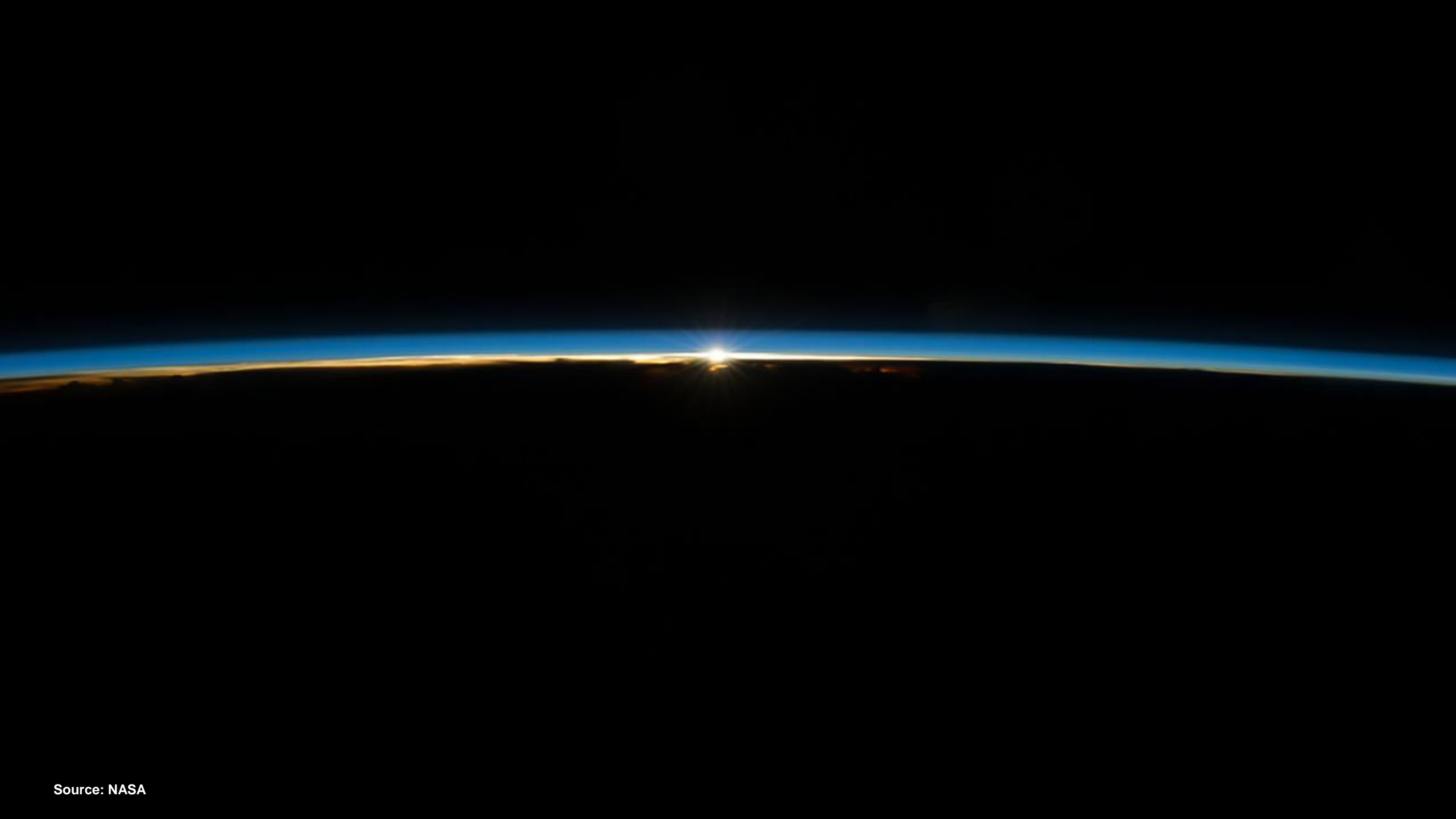
**Ecological
Footprint**

1. Must we change?

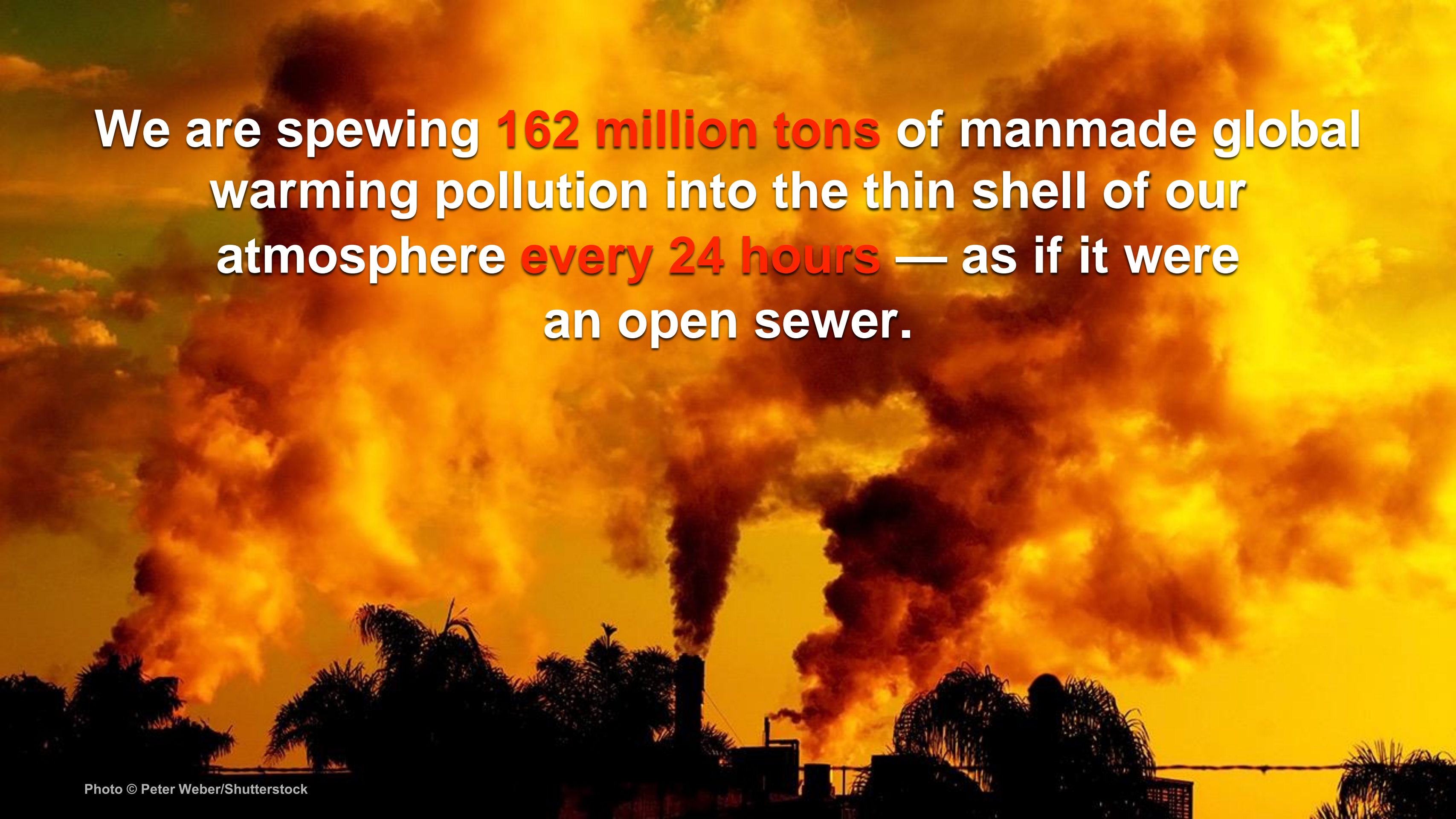
2. Can we change?

3. Will we change?

1. Must we change?



Source: NASA

A dramatic sunset or sunrise sky with a factory emitting smoke. The sky is filled with large, billowing clouds in shades of orange, yellow, and red. In the foreground, the silhouettes of palm trees and industrial structures are visible against the bright sky. A tall chimney in the center is emitting a thick plume of dark smoke that rises into the air.

We are spewing **162 million tons** of manmade global warming pollution into the thin shell of our atmosphere **every 24 hours** — as if it were an open sewer.

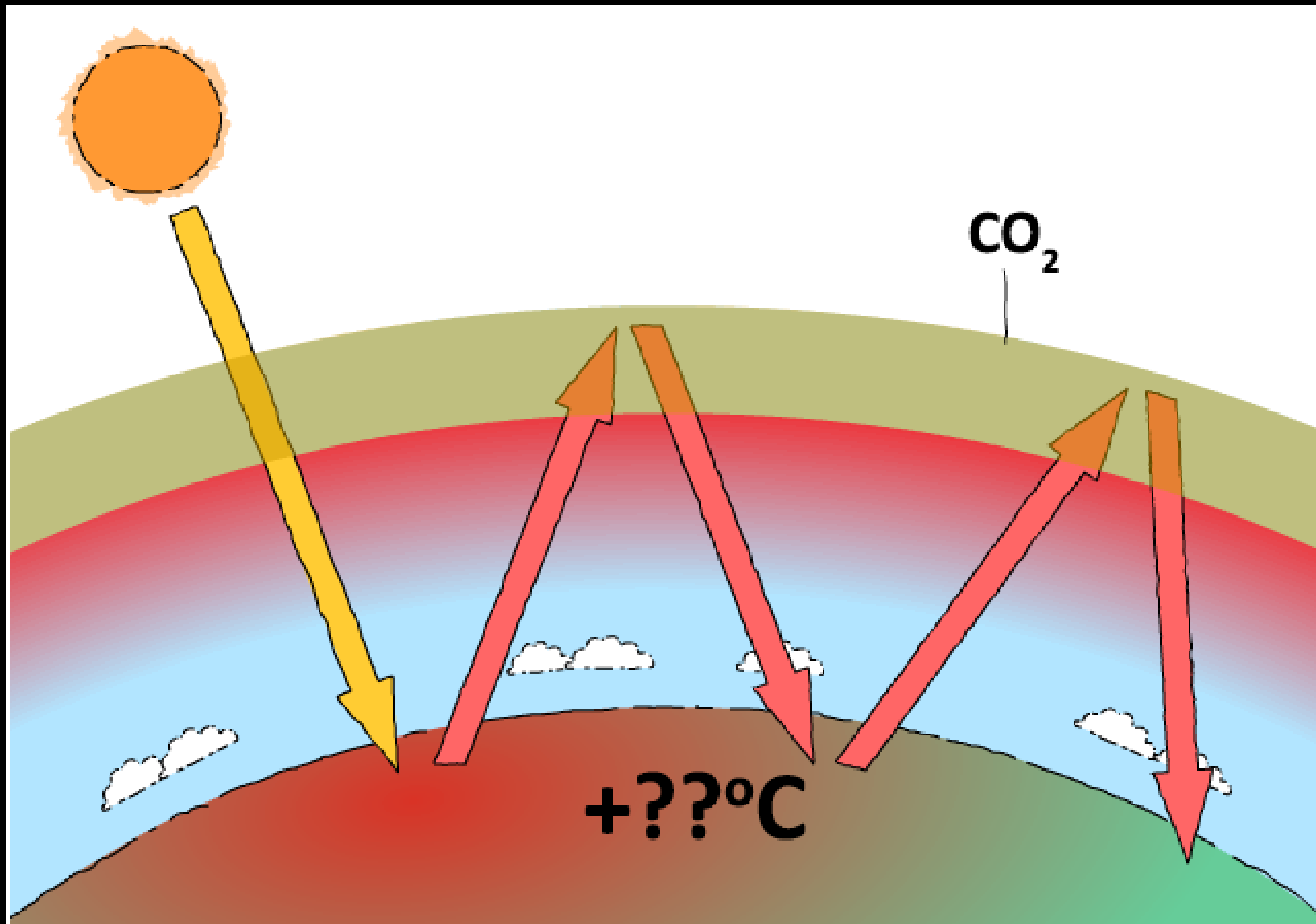
**The energy trapped by man-made
global warming pollution is now
“...equivalent to exploding**

600,000

**First-generation atomic bombs
per day 365 days per year.”**

James Hansen

Former Director, NASA Goddard Institute for Space Studies



What do you think the global average temperature was during the last Ice Age?

Between 9°C and 11°C!



AIR TRANSPORT

THAWING PERMAFROST

COAL MINING

OIL PRODUCTION

COAL PLANTS

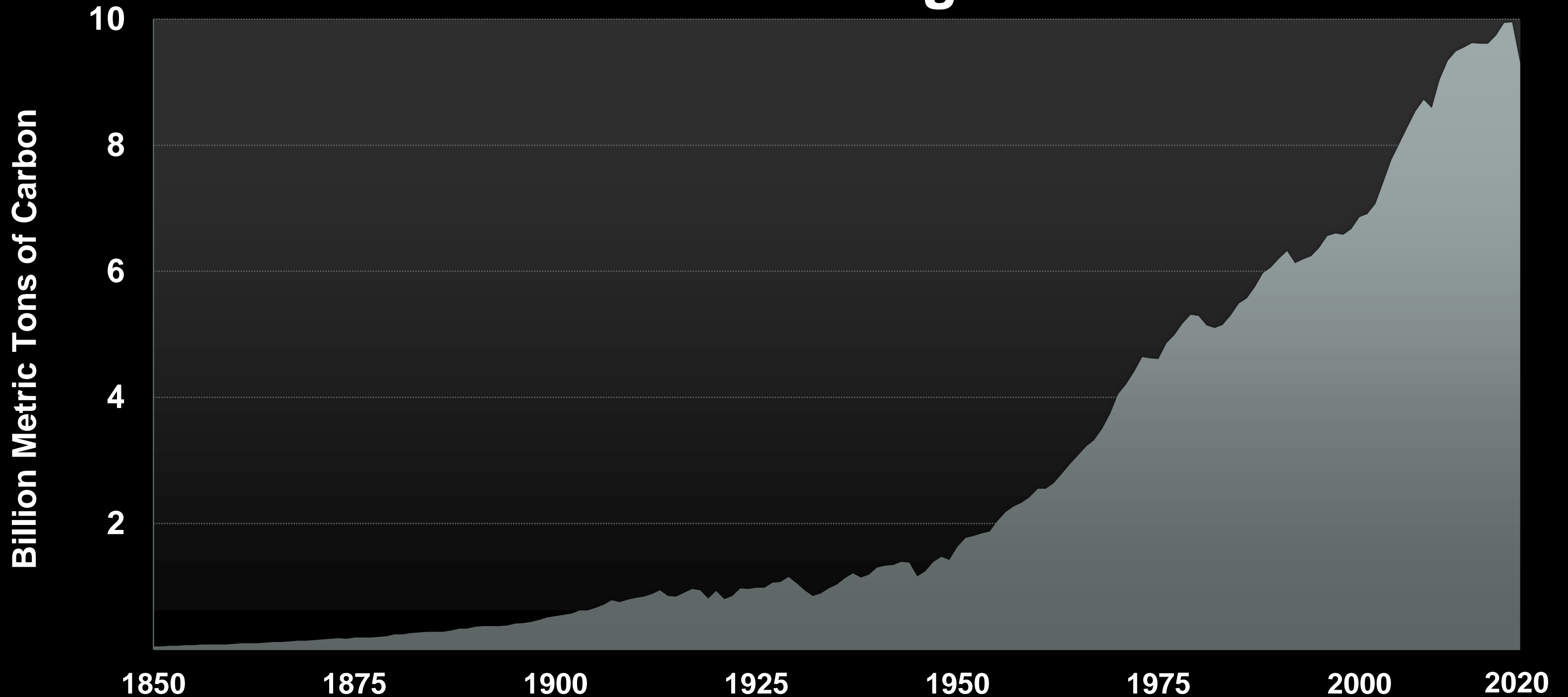
FERTILIZATION

INDUSTRIAL PROCESSES

LAND TRANSPORT

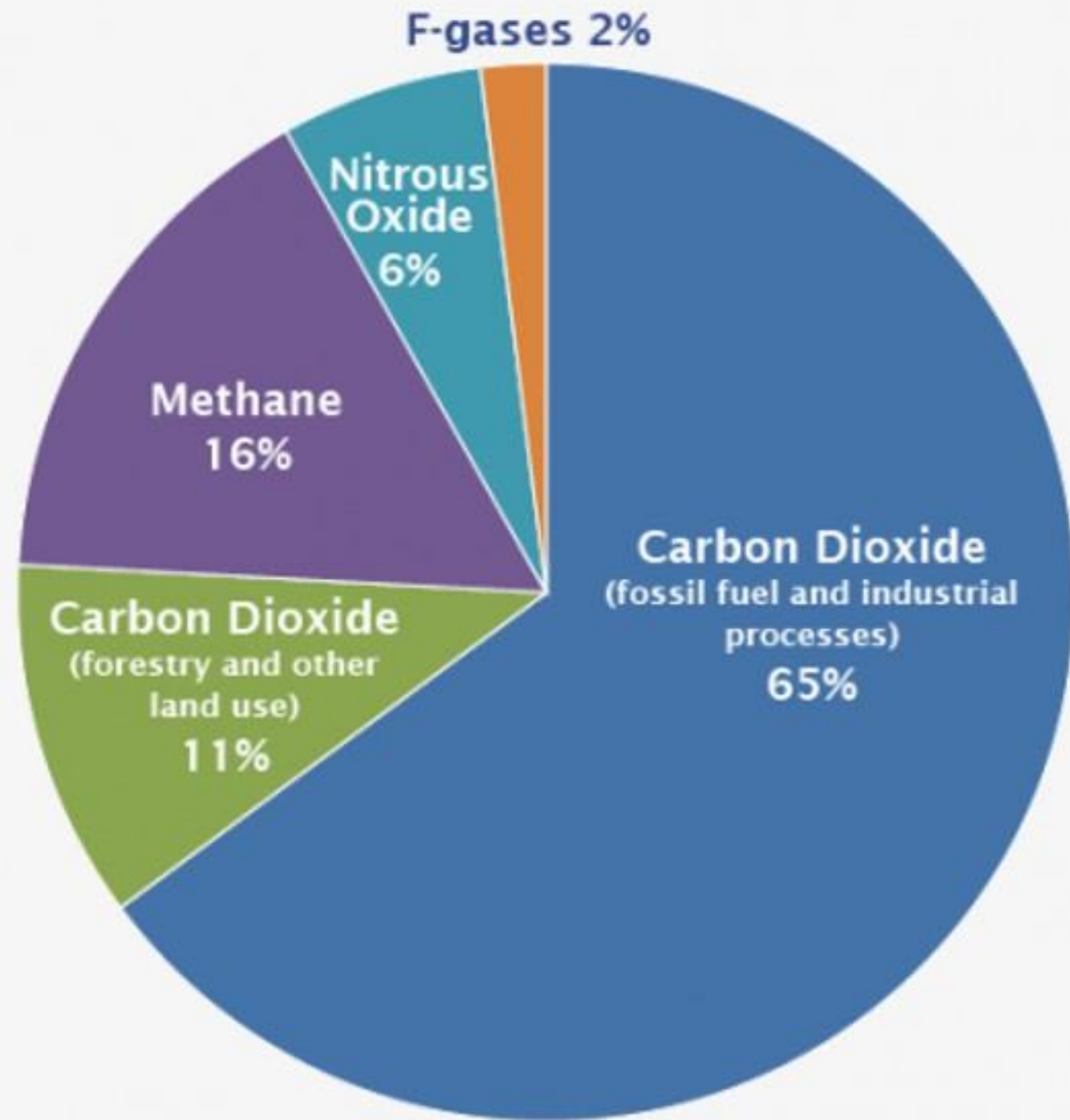
LANDFILLS

The Largest Source of Global Warming Pollution Is the Burning of Fossil Fuels

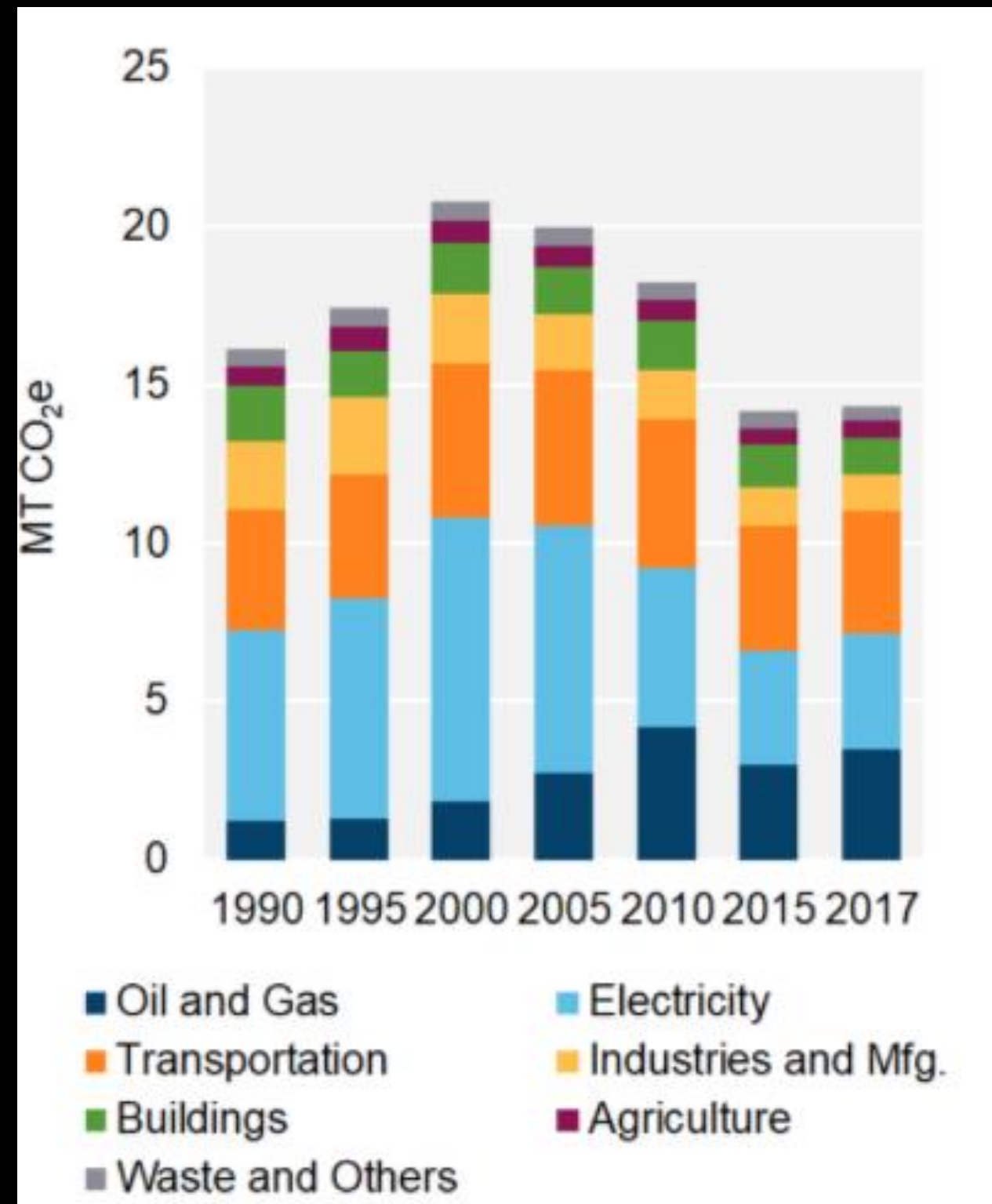


Data: U.S. Department of Energy/CDIAC/Global Carbon Project

Global Greenhouse Gas Emissions by Gas

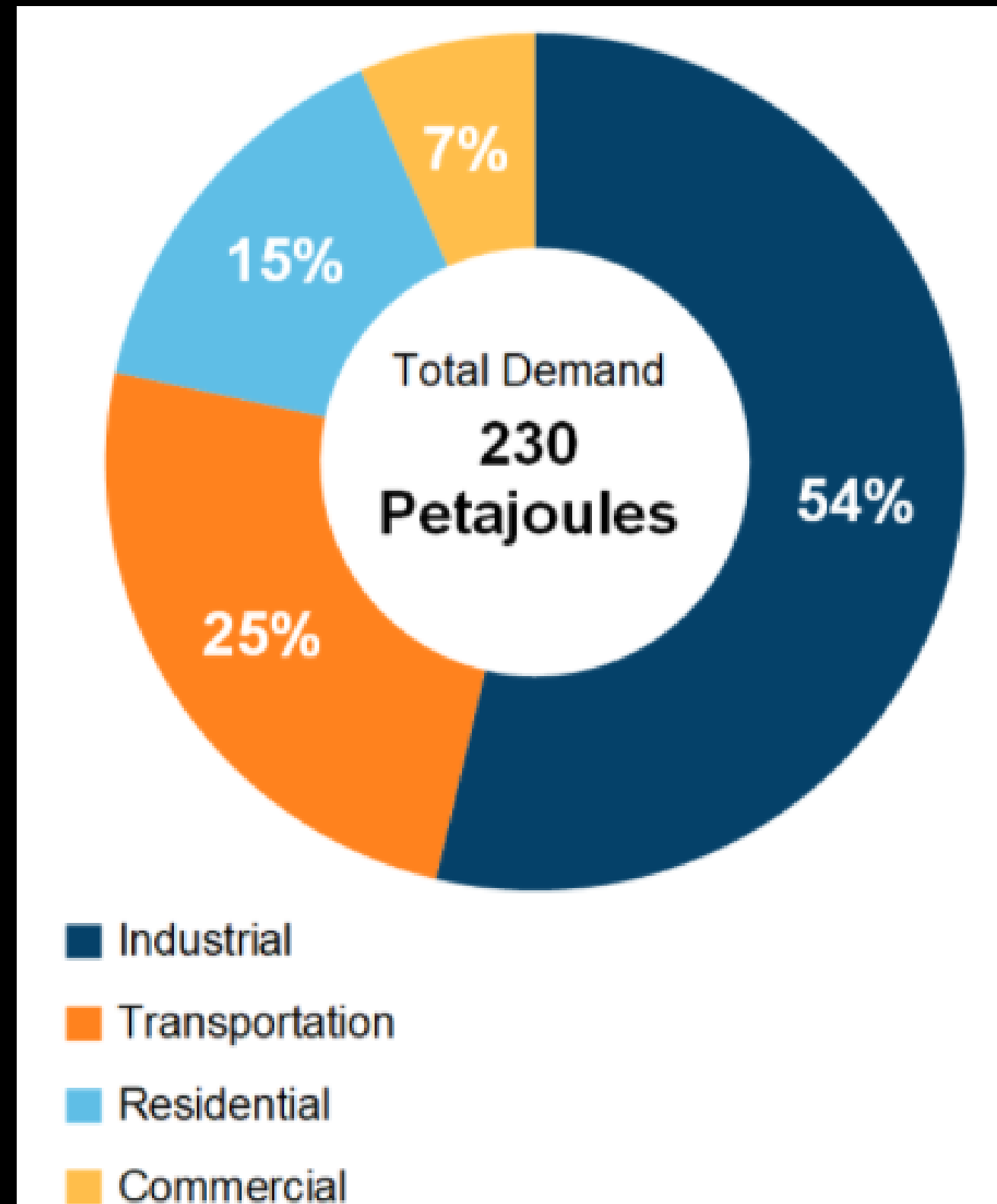


New Brunswick Greenhouse Gas Emissions by Sector



[Environment and Climate Change Canada – National Inventory Report](#)

New Brunswick's energy demand by sector (2017)



New Brunswick's Energy Generation Capacity

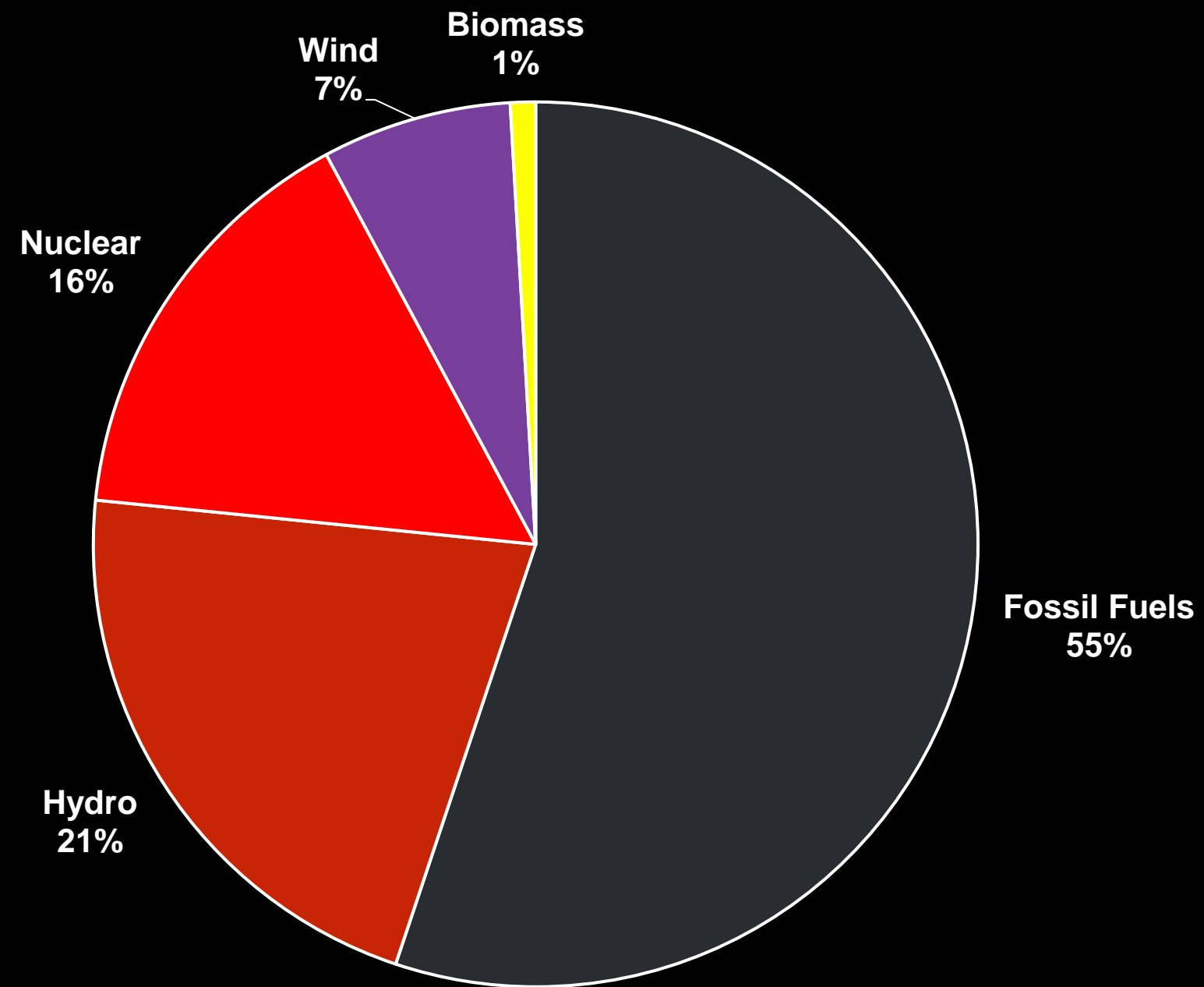
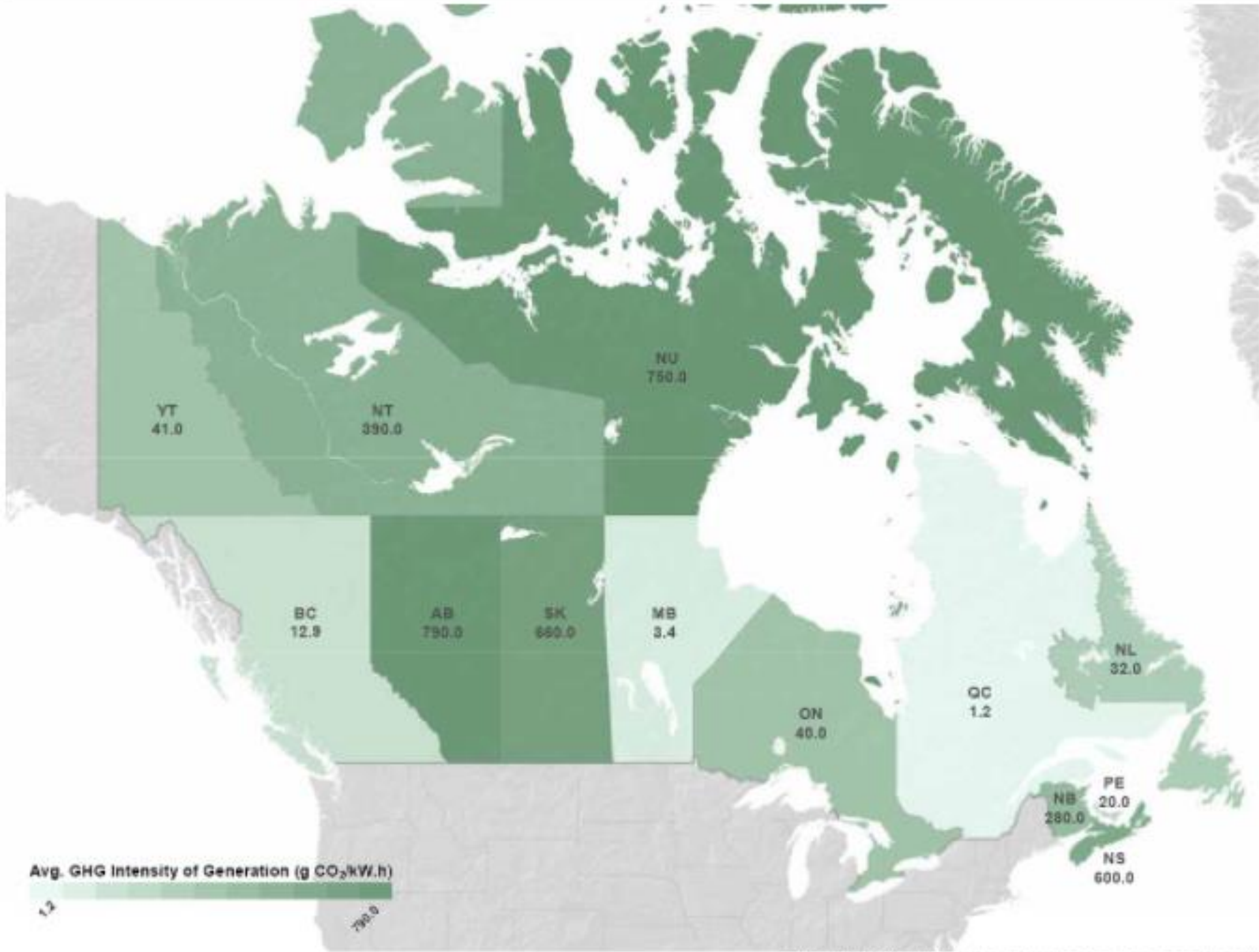


FIGURE 4 - Greenhouse gas intensity of electricity generation by province and territory



New Brunswick is not pulling its weight...

FIG. 4 (continued) by the NBS, ENR/10/17 2017. THE NBS IS A PARTNER MEMBERSHIP PROGRAM OF GREEN TECHNOLOGY BUSINESS INC.

Electricity in NB

Pt. Lepreau Nuclear Power Plant



- **Fuel: Uranium**
- **Capacity: 660 MW**
- **Built: 1983**
(renovated in 2012)
- **Capacity Factor: 89%**

Mactaquac Hydroelectric Power Plant

An aerial photograph of the Mactaquac Hydroelectric Power Plant. The image shows a large concrete dam with multiple spillways, situated on a river. The reservoir behind the dam is a deep blue color. The surrounding landscape is a mix of green fields and dark green forests. The sky is clear and blue.

- **Fuel: Water + Gravity**
- **Capacity: 668 MW**
- **Built: 1968 (renovations)**
- **Capacity Factor: 30%**

Kent Hills Wind Farm

- **Fuel: Wind**
- **Capacity: 150 MW**
- **Built: 2008**
(expanded in 2010)
- **Capacity Factor: 30%**

Belledune Thermal Power Plant



- **Fuel: Coal**
- **Capacity: 467 MW**
- **Built: 1993**
- **Capacity Factor: 80%**

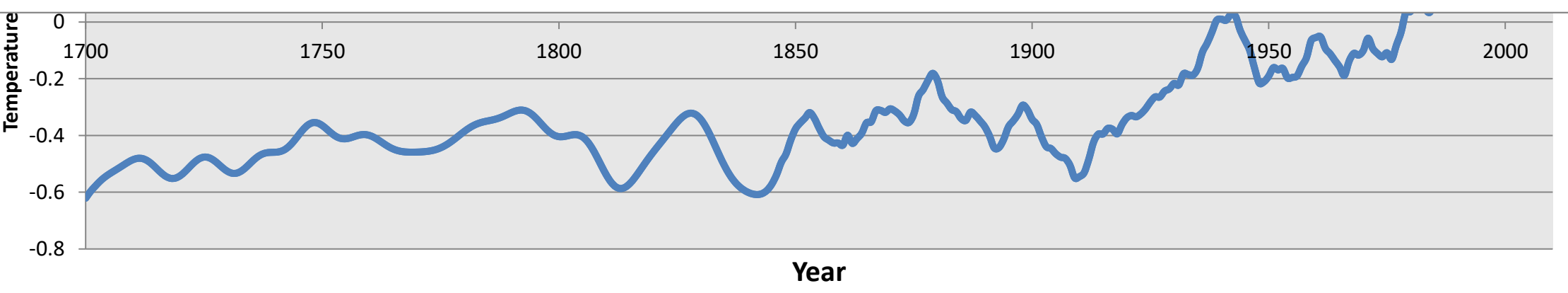
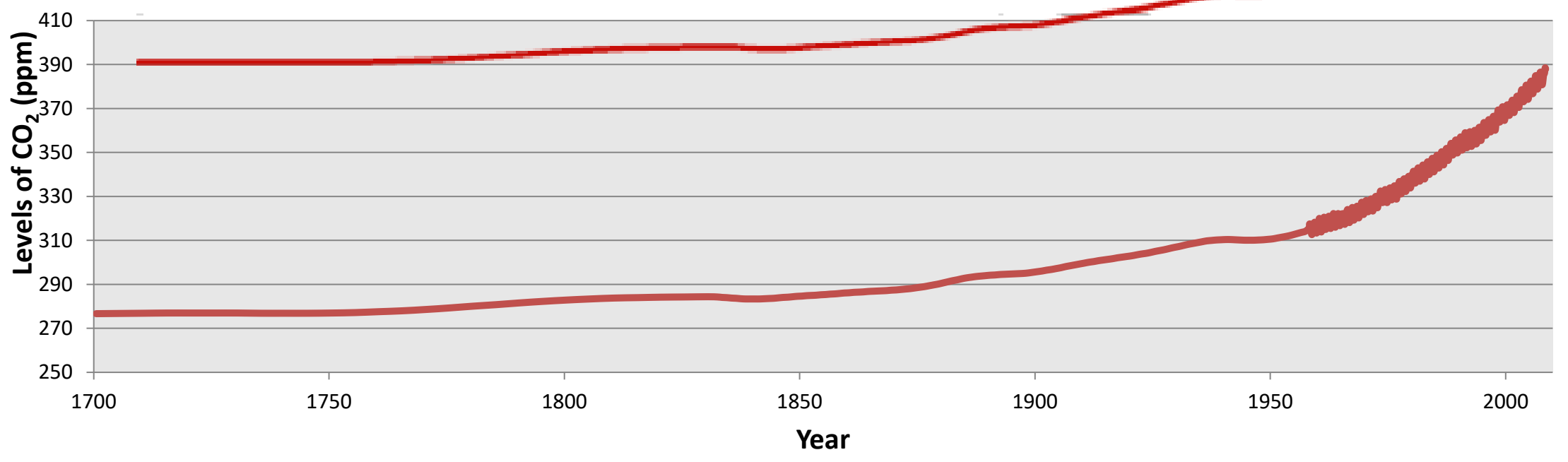
Coleson Cove Generating Station (fuel oil burning)



Bayside Natural Gas Power Plant – Saint John

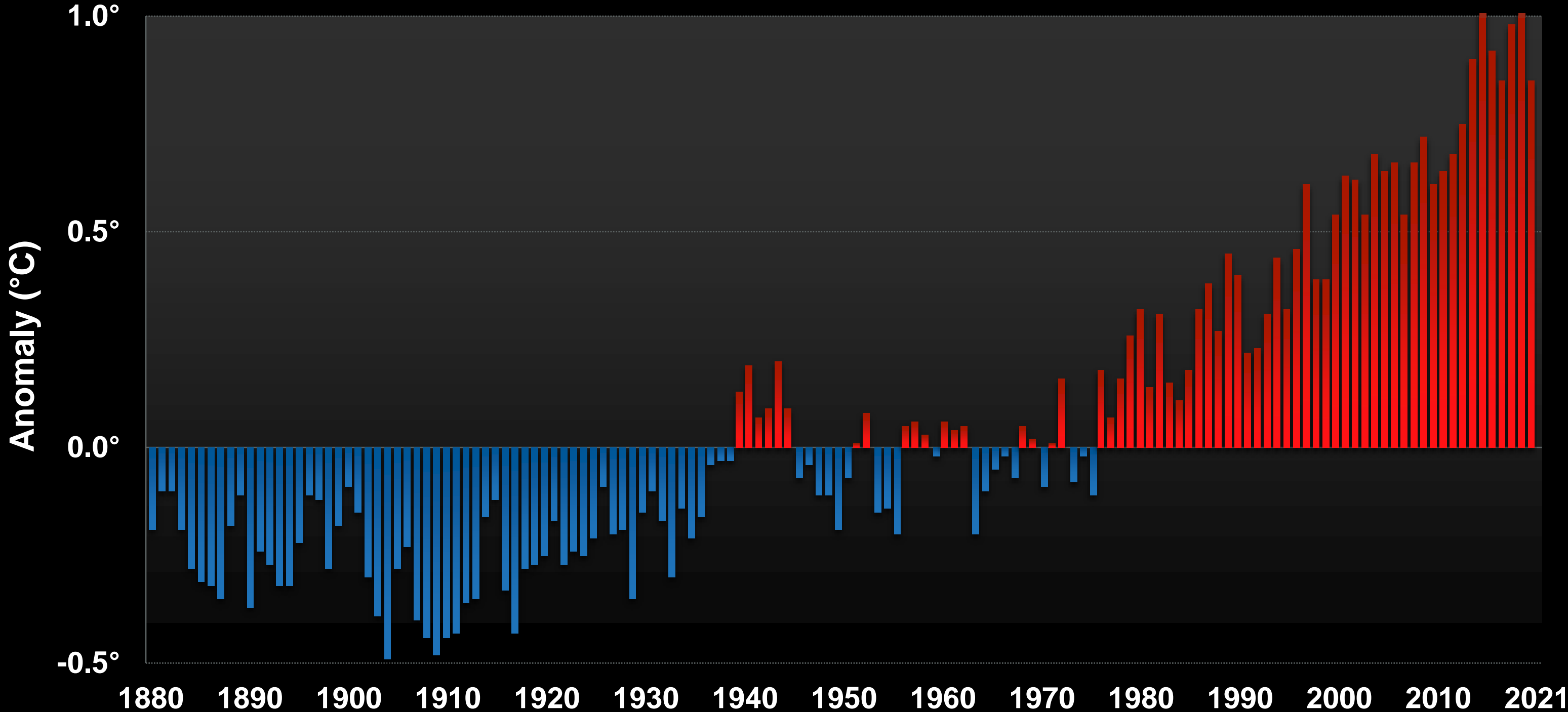


Historical levels of CO₂



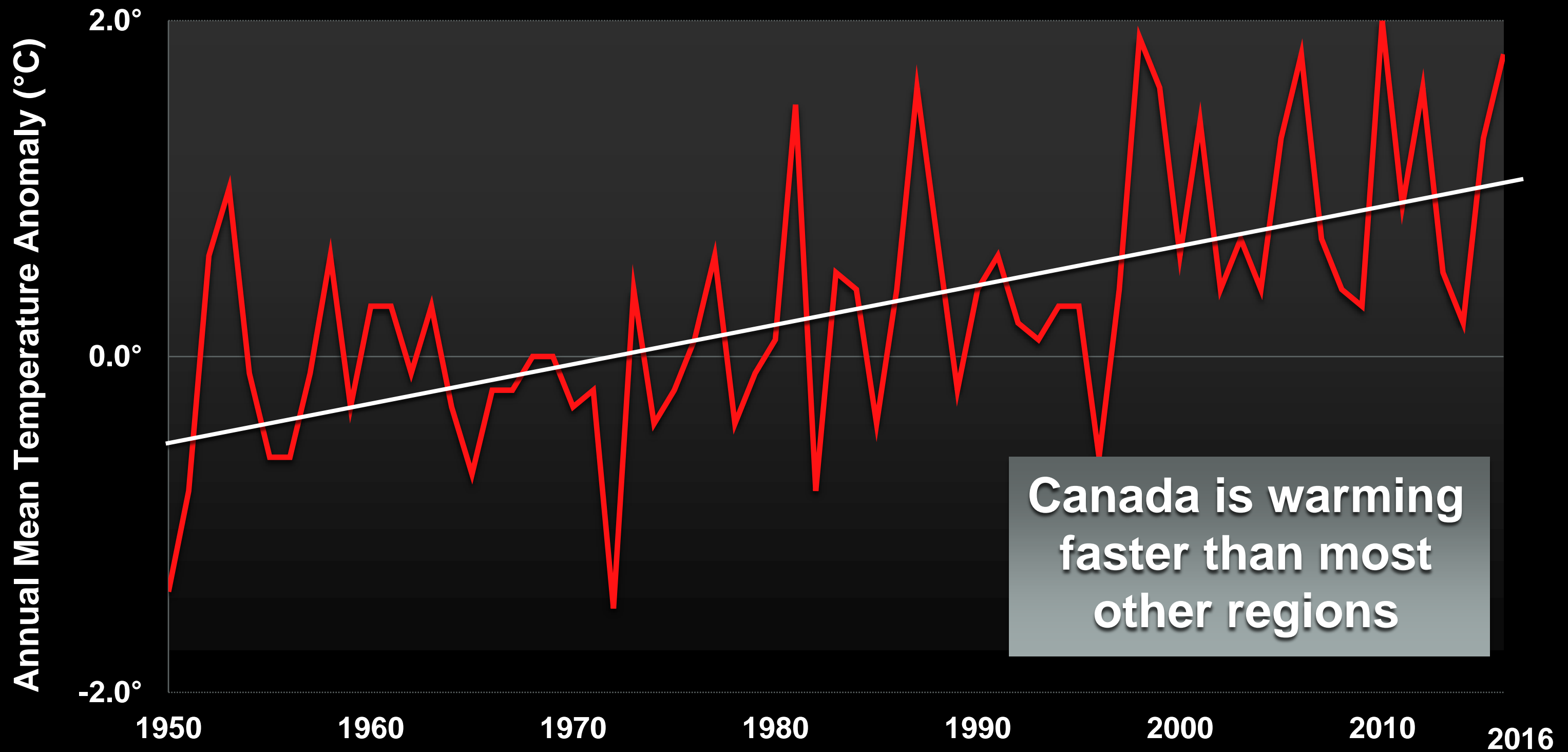
Global Surface Temperature – Departure from Average

1880 – 2021

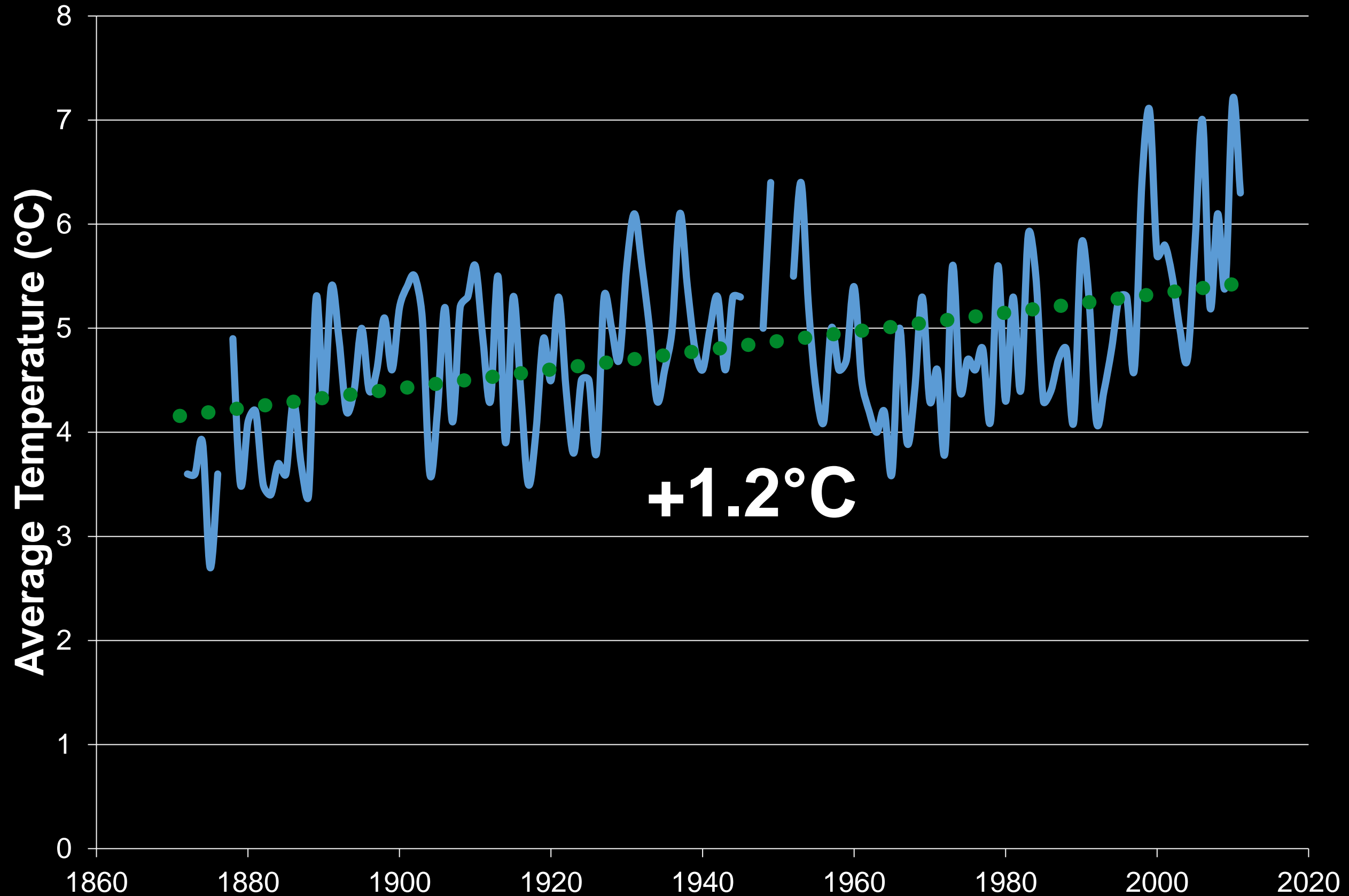


Source: NASA

Canadian Temperatures – Departure from Average *

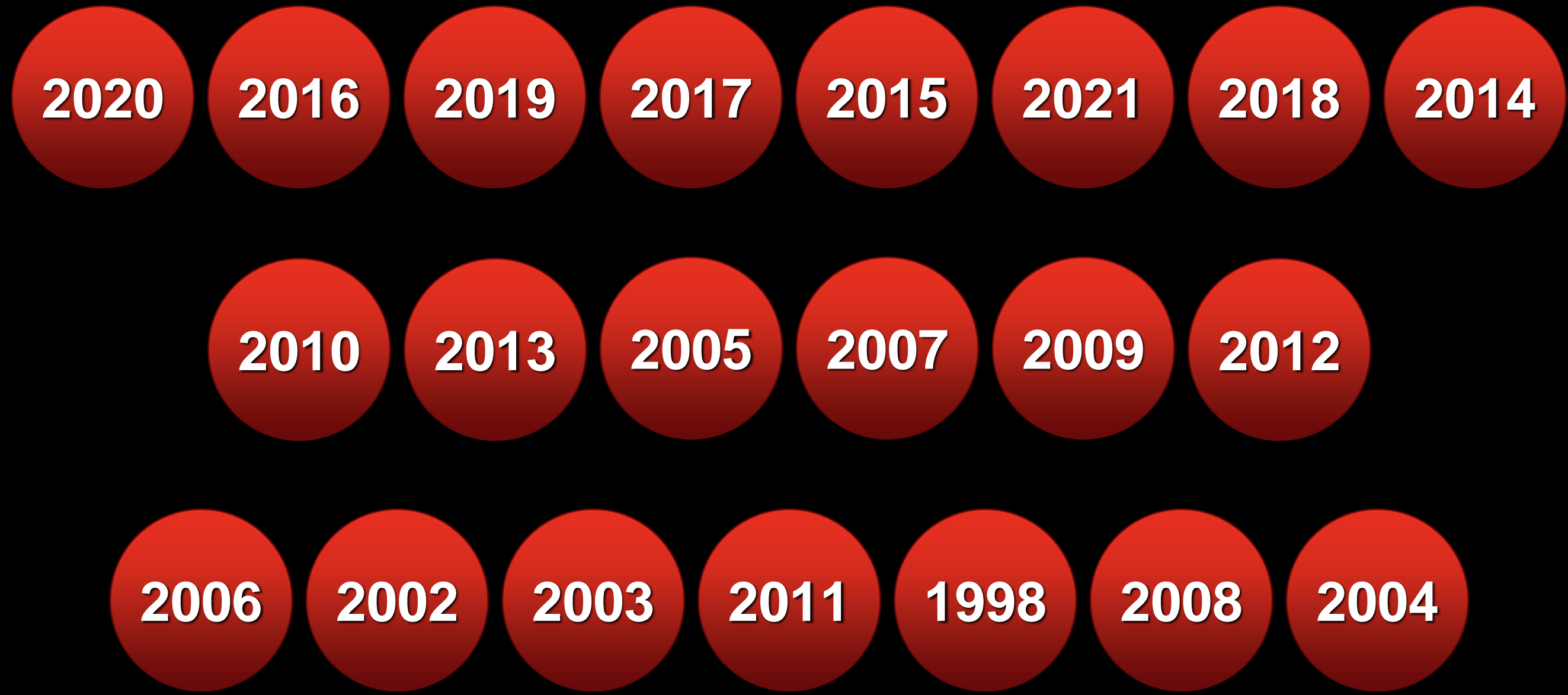


Saint John Temperature

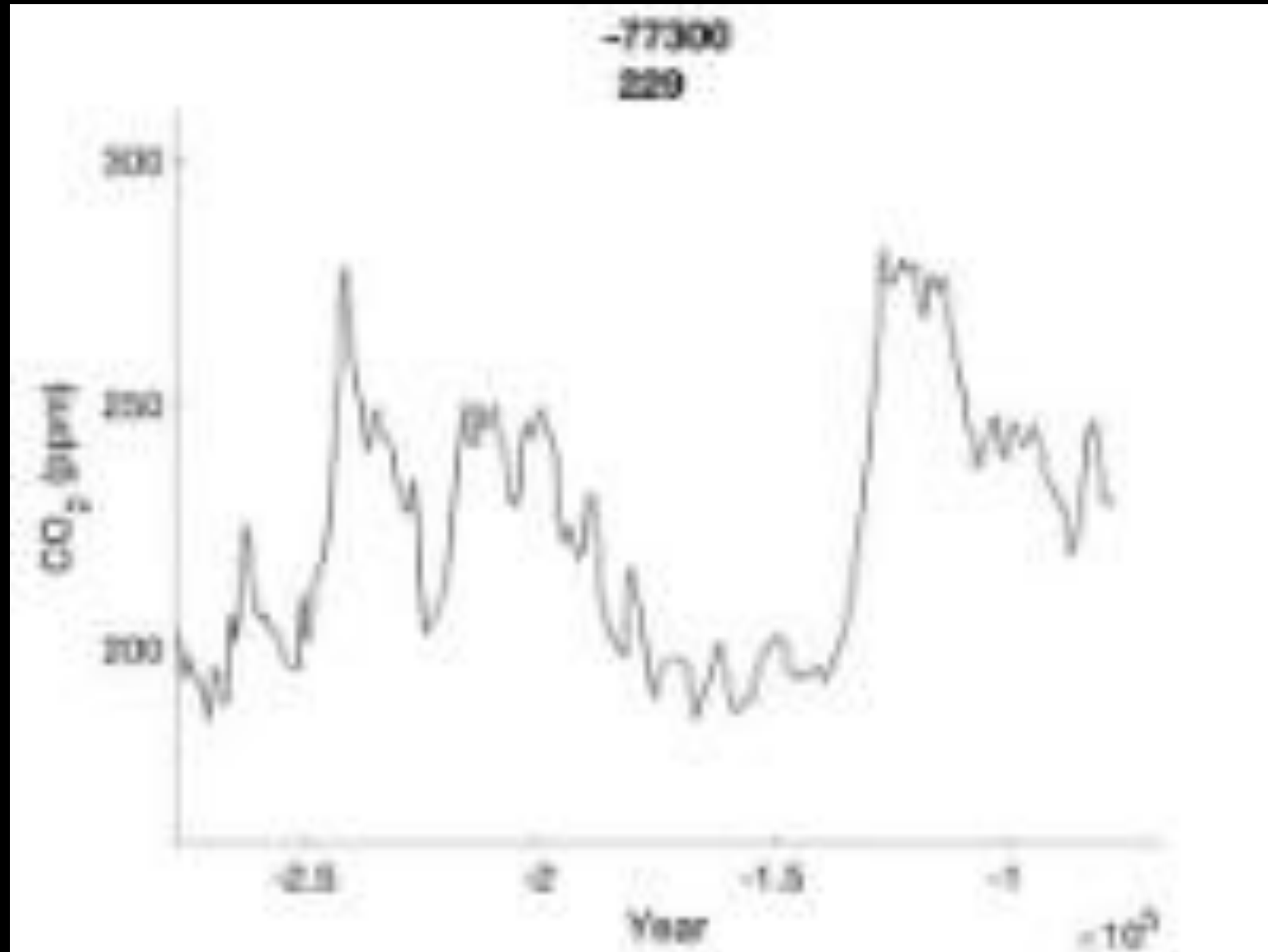


Made with Environment Canada Adjusted and Homogenized Canadian

The 20 warmest of 141 days at Bearston Reservoir have years occurred since the year 2002



#IPCC Report, - 800,000 years of Earth's CO2 history in 30 seconds



Los Angeles, California

September 6, 2020



Los Angeles County set a new all-time heat record of **121° F** (49.4° C) on September 6th.

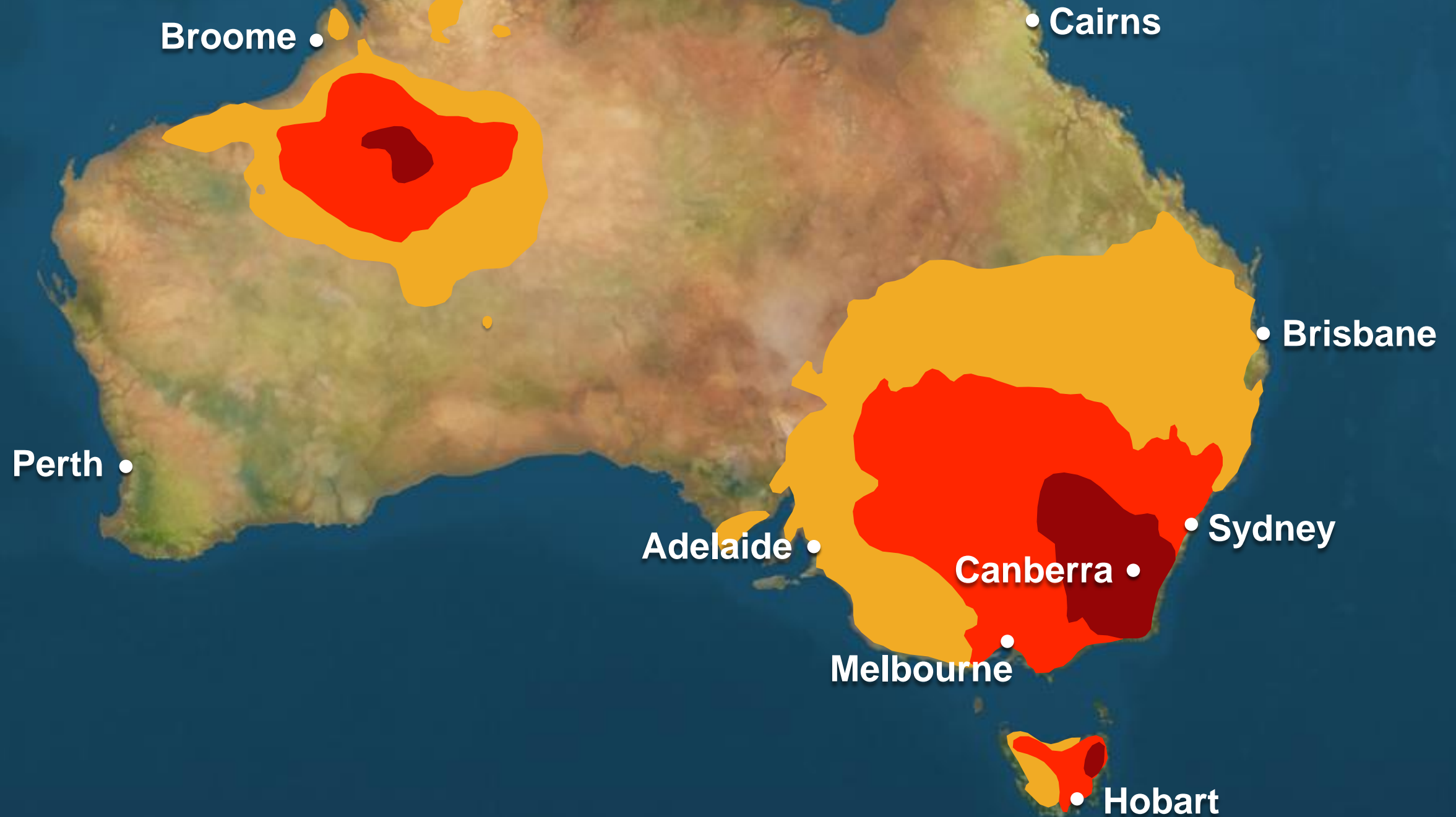
Australia Heatwave

January 30 – February 1, 2020

Extreme Heatwave

Severe Heatwave

Low-intensity Heatwave



Phoenix and Miami
both experienced their
hottest months ever
in July 2020.

Paris, France

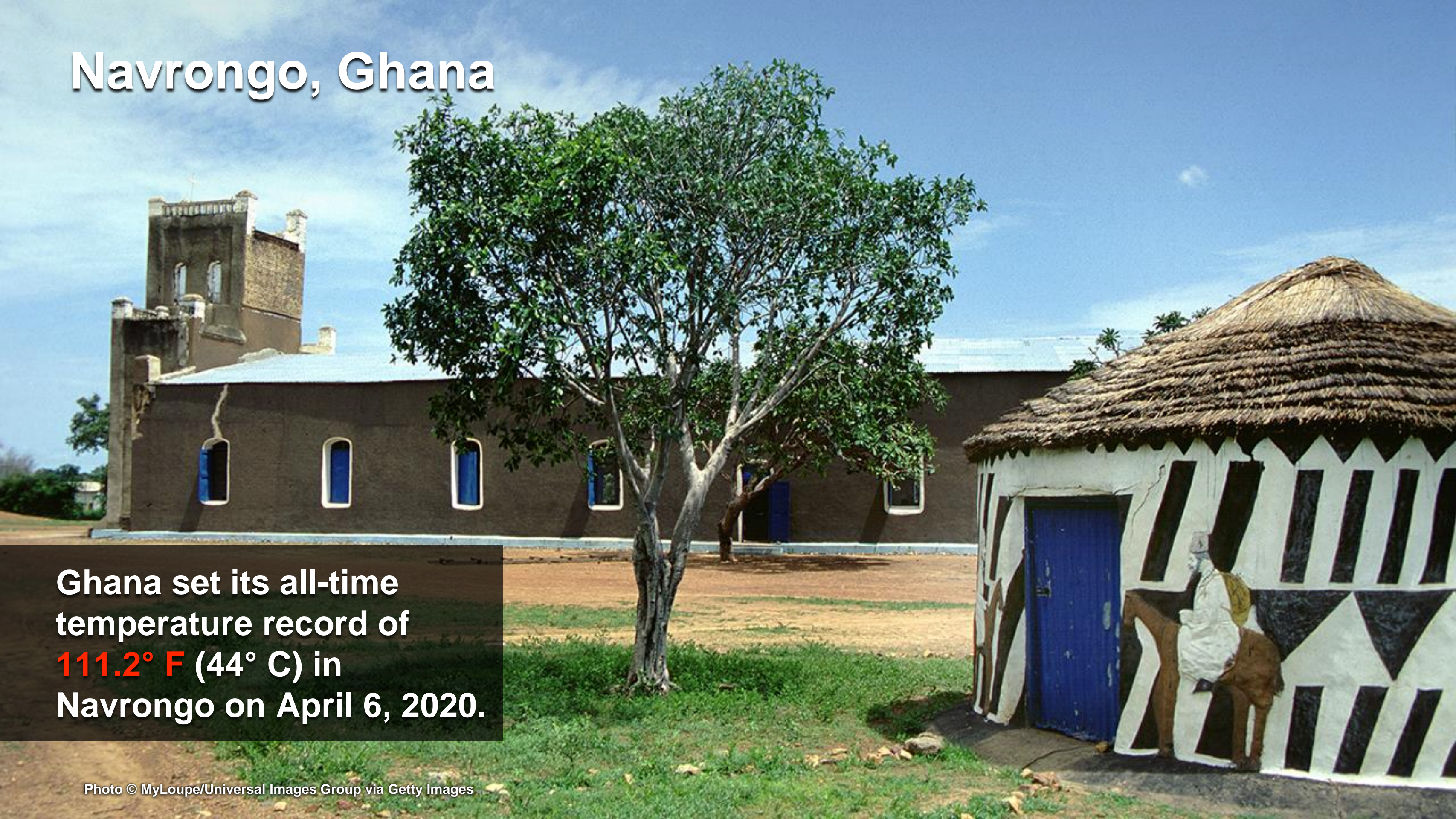
August 11, 2020



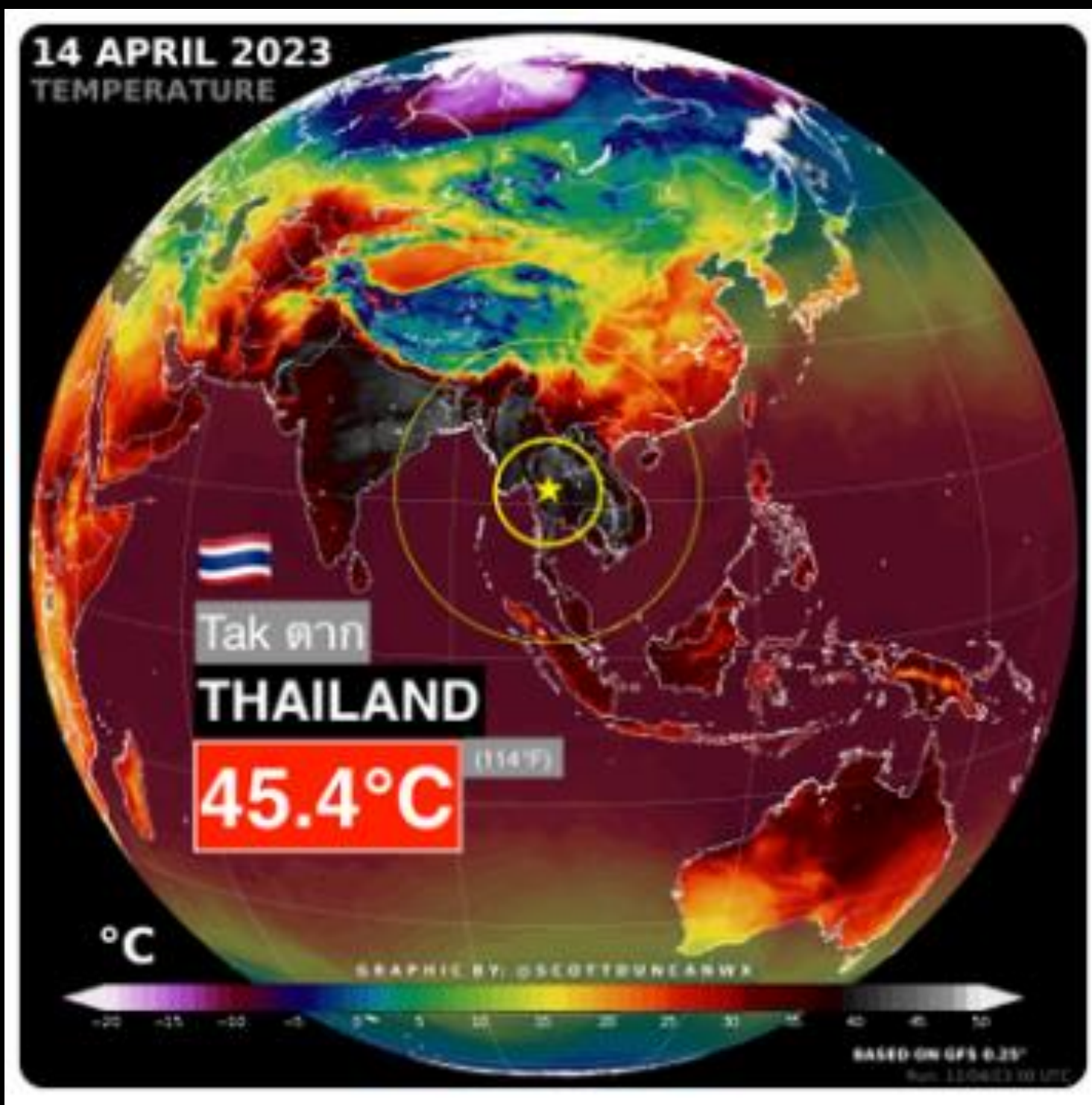
2020 was Europe's hottest year ever, breaking the record set in 2019.

Navrongo, Ghana

Ghana set its all-time temperature record of **111.2° F** (44° C) in Navrongo on April 6, 2020.



'Like none before:' Deadly, record-smashing heat wave scorches Asia



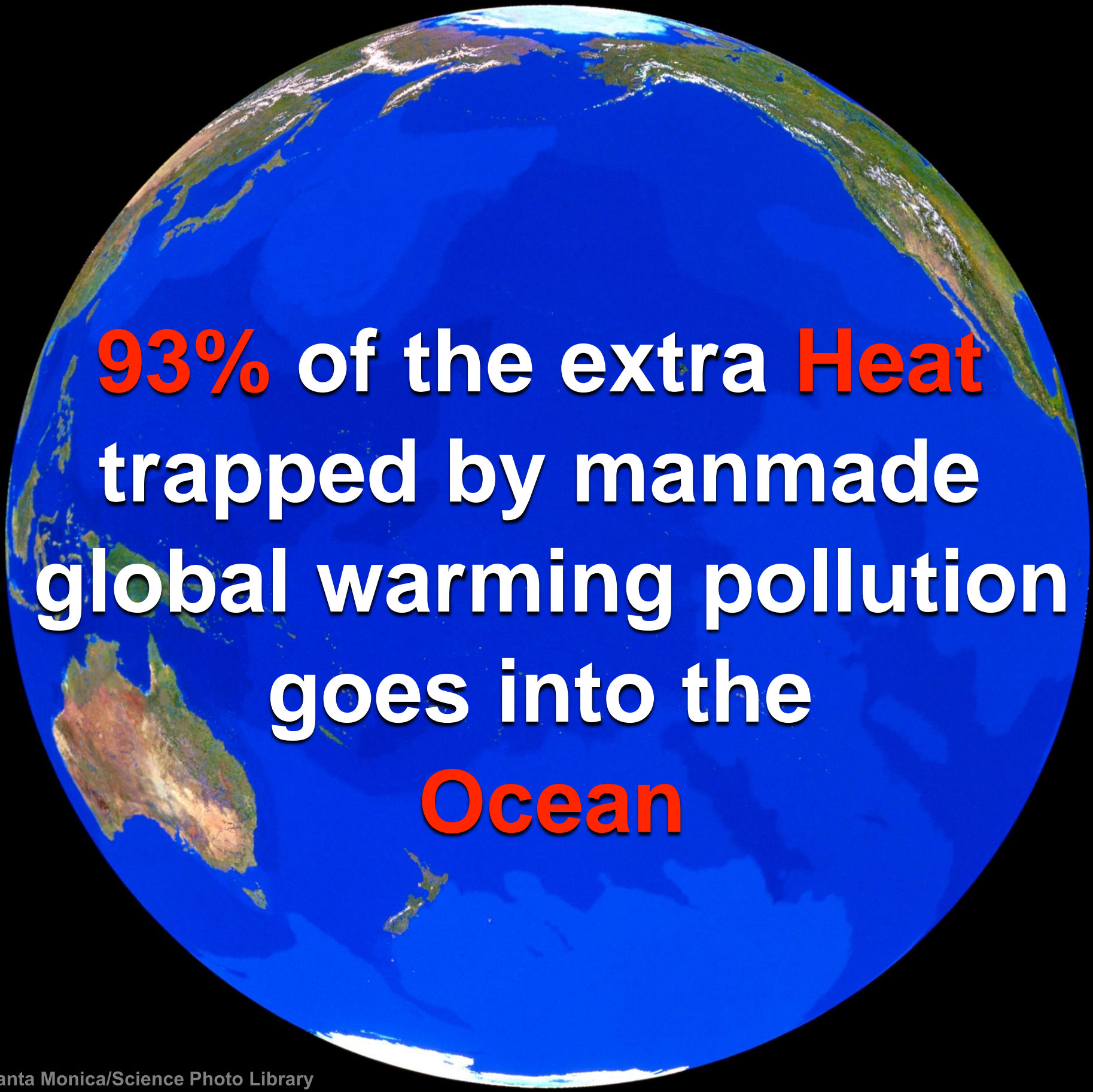
Siberia, Russia

June 21, 2020

Verkhoyansk

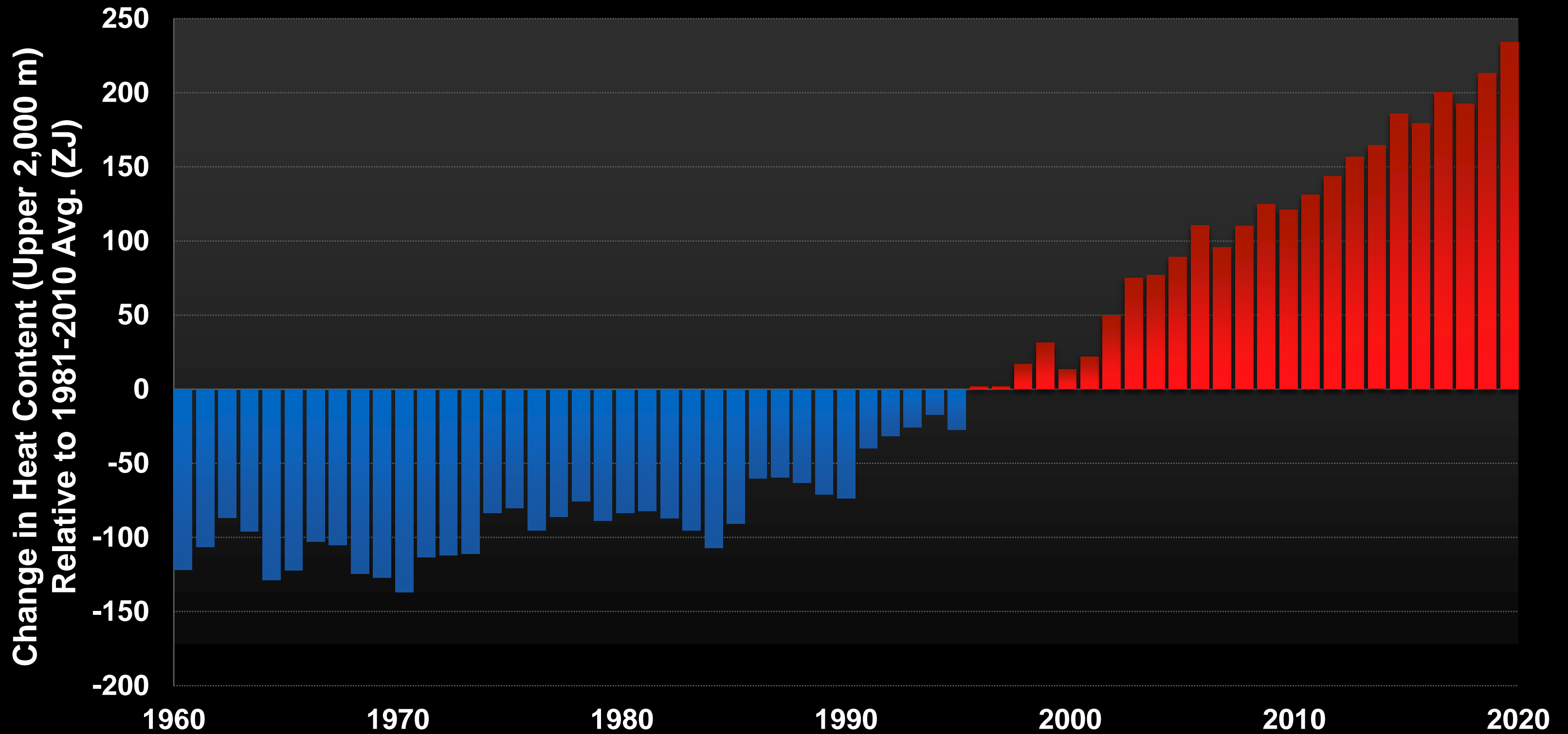


The temperature in Verkhoyansk, Siberia reached 38° C on June 20, 2020. This is the northernmost 100° temperature ever recorded, and the highest temperature on record in the Arctic.



93% of the extra **Heat**
trapped by manmade
global warming pollution
goes into the
Ocean

Ocean Temperatures Set a New Record in 2020

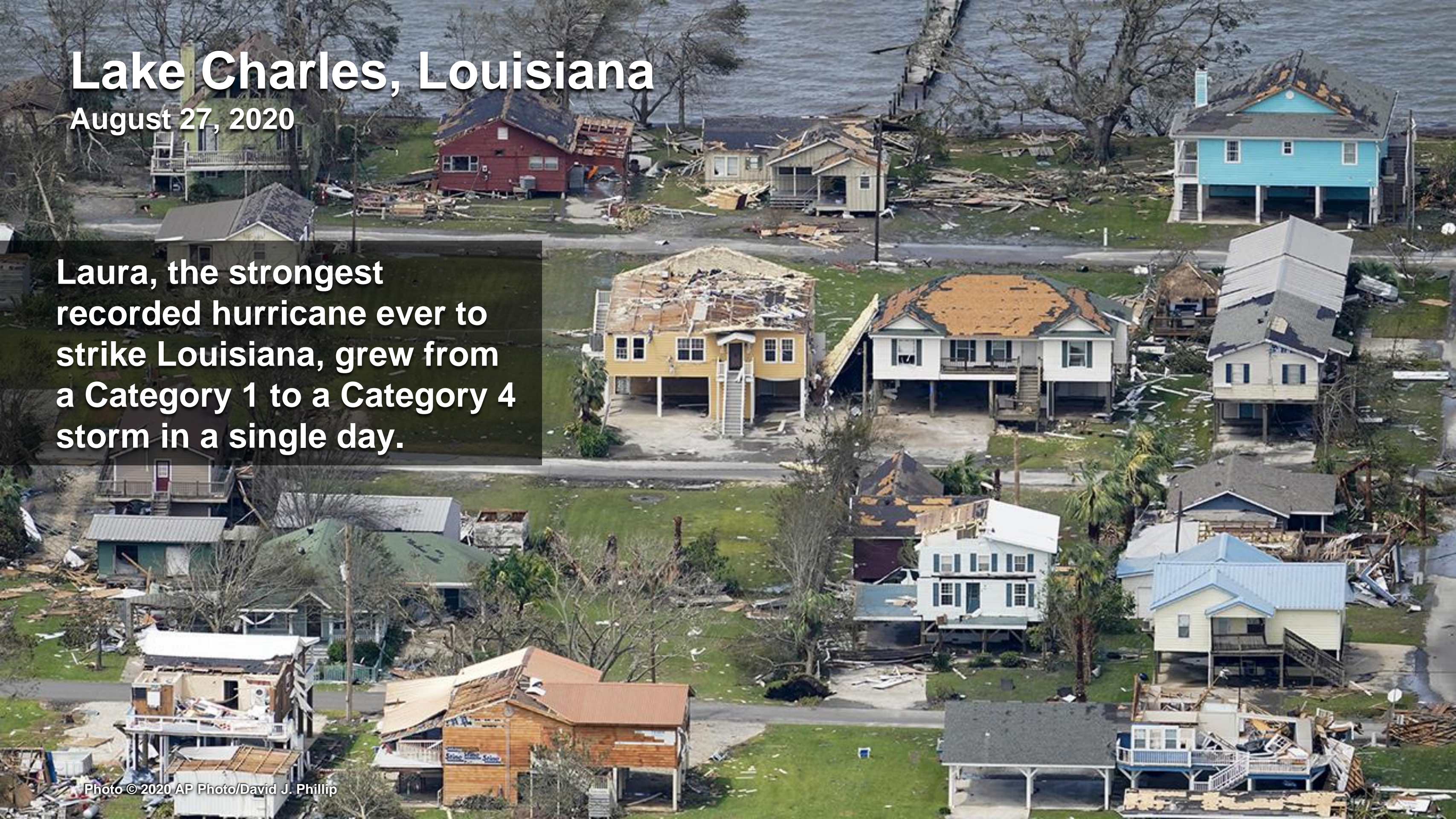


As Temperatures Increase, the Oceans Evaporate More Moisture into the Sky

Lake Charles, Louisiana

August 27, 2020

Laura, the strongest recorded hurricane ever to strike Louisiana, grew from a Category 1 to a Category 4 storm in a single day.



Guatemalan Refugees, Chiapas State, Mexico

January 21, 2021

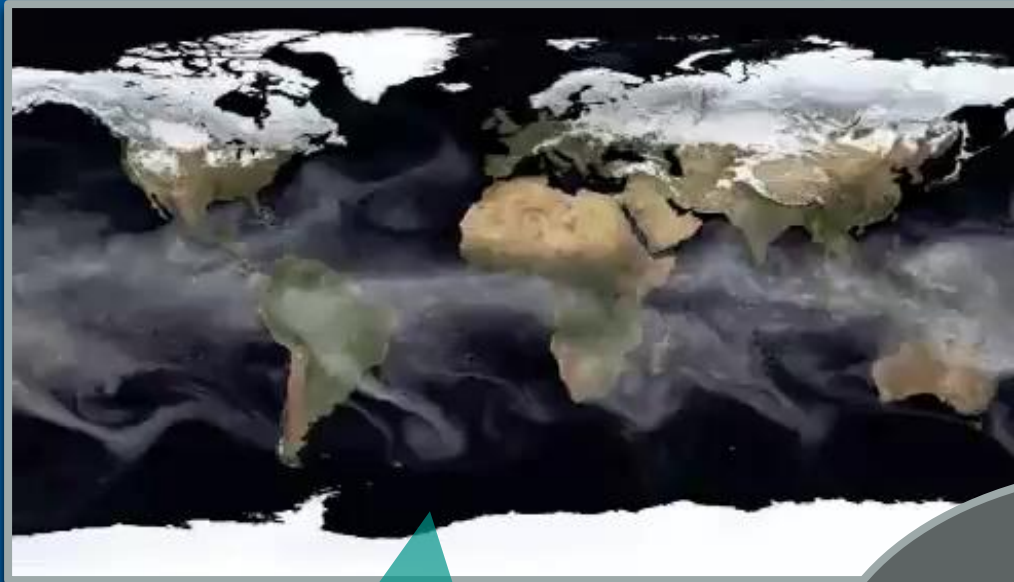
The 2020 hurricane season drove 10,000 additional migrants northward out of Central America.

Hurricane Fiona – September, 2022



[Hurricane Fiona shows how climate change is fueling severe weather events in Canada: expert](#)

Evaporation



Precipitation



**The
Hydrological
Cycle**



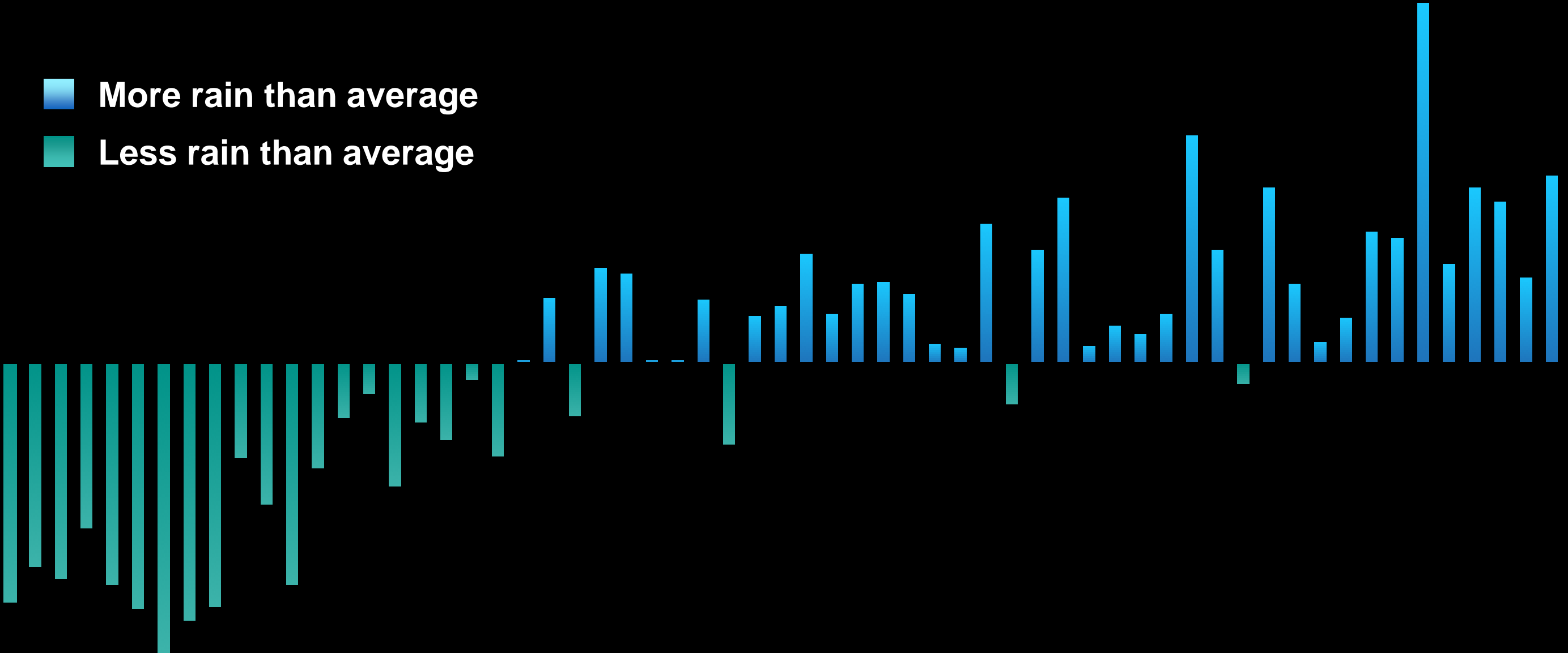
Water Returns to the Sea

Rainfall Anomalies in Canada

Departure from 1961 – 1990 Average

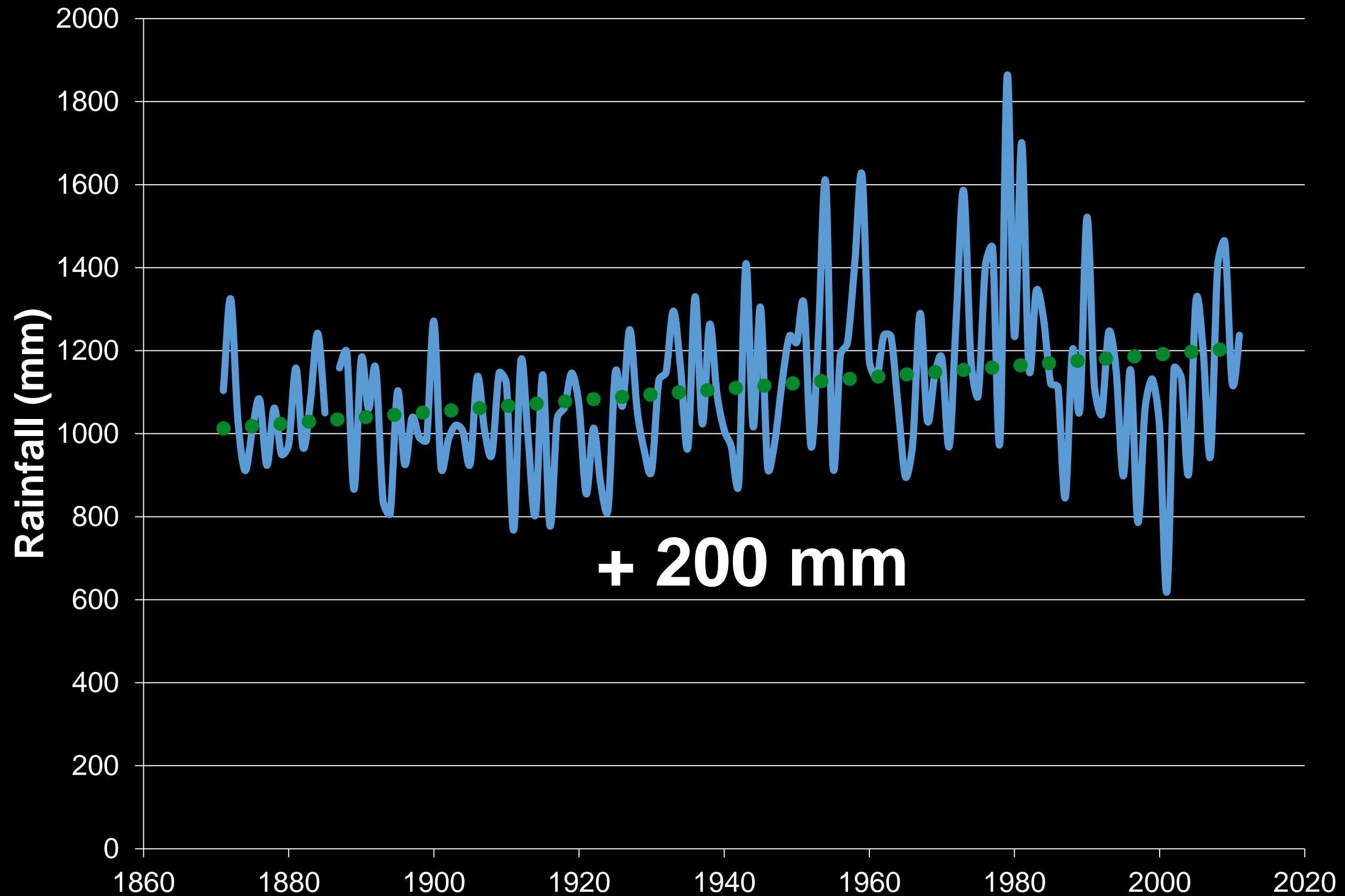
% Change from 1961 – 1990 Average

- More rain than average
- Less rain than average



Data: Mekis, É and L.A. Vincent, 2011: "An overview of the second generation adjusted daily precipitation dataset for trend analysis in Canada." *Atmosphere-Ocean*, Vol. 49, Iss. 2, pp. 163-177.

Saint John Rainfall



Abbotsford, BC

November, 2021



Flood waters cover Highway 1 in Abbotsford, B.C., on Nov. 16. (Jonathan Hayward/The Canadian Press)

Batch Springs, Texas (Near Dallas)

August 22, 2022



Parts of the Dallas metro area experienced a 1-in-1,000 year flood after receiving 9 inches (23 cm) of rain in three hours.

Pakistan

April 2022



Flooding in New Brunswick

Ainslee MacMillan



THE CANADIAN PRESS/Darren Calabrese



© S. Dietz, DCELG

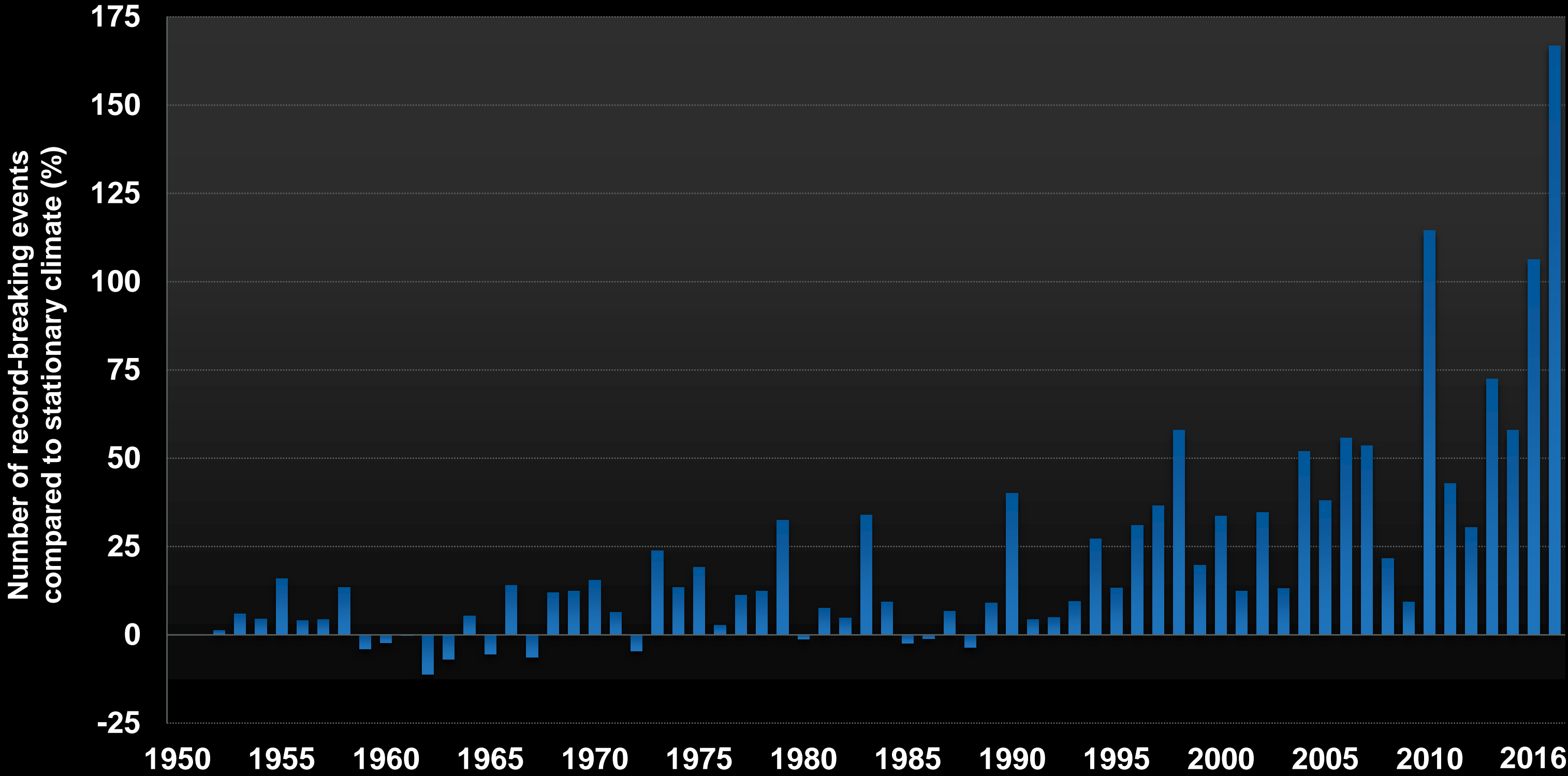


THE CANADIAN PRESS/Andrew Vaughan

A person wearing a dark jacket and a black and red knit hat with a pom-pom is looking out a window. The view outside is a heavily snow-covered landscape with a utility pole and power lines visible in the distance. The scene is overcast and hazy.

Dieppe, New Brunswick
February 15, 2015

Global Record-Breaking Precipitation Anomalies



Data: Jascha Lehmann, Potsdam Institute for Climate Impact Research

TORRENTIAL RAINS CAUSE MULTIMILLION-EMALANGENI DAMAGE...



Eswatini
Feb. 2023

Lethbridge, Alberta “Supercell”

July 17, 2013



Phoenix, Arizona

July 18, 2016



**Globally, floods and
extreme rainfall events
now occur
four times more often
than in 1980.**

The same extra heat that evaporates more water from the ocean, causing bigger downpours and floods...

...pulls moisture even more quickly from the soil, causing longer and deeper droughts.

Krakow am See, Poland

June 3, 2020

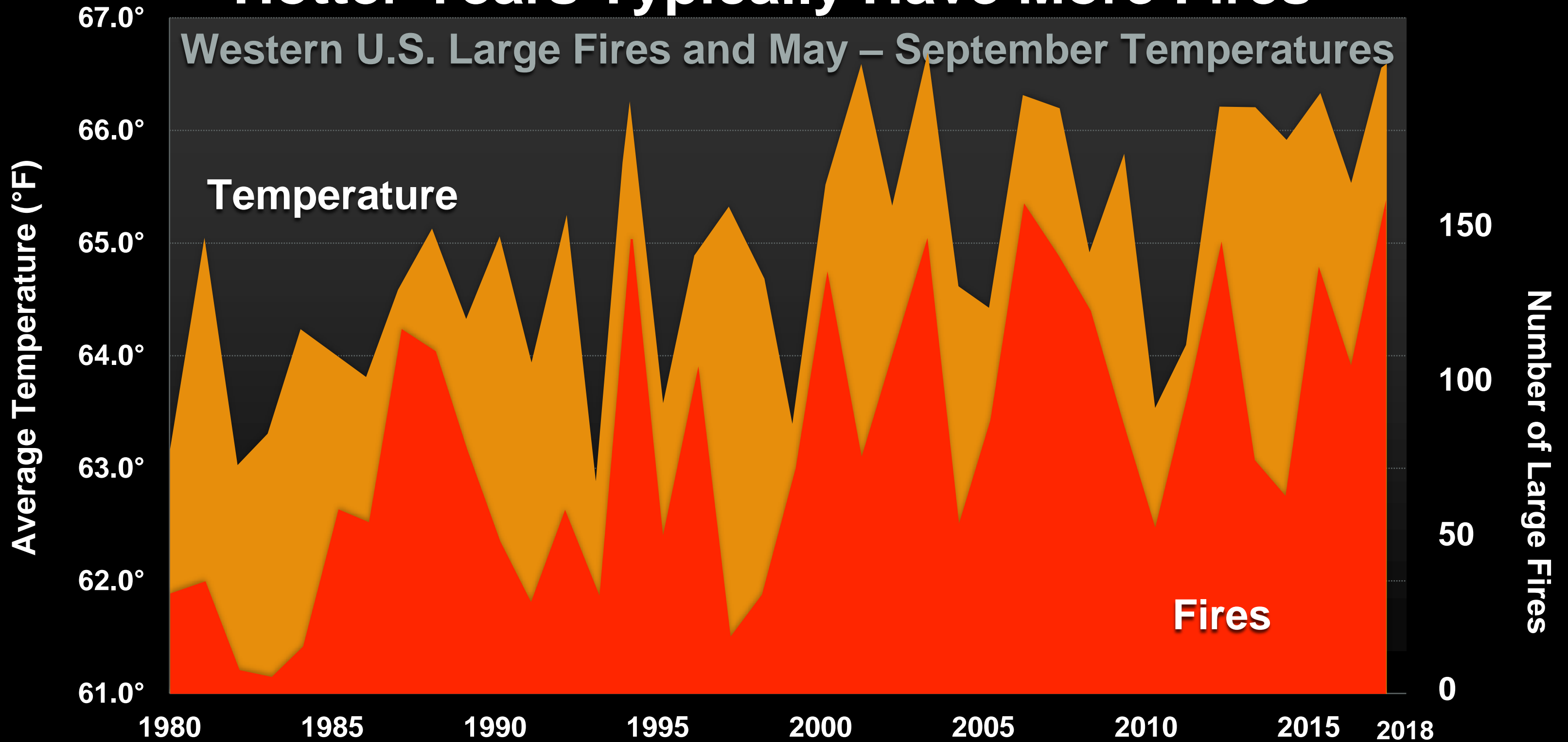
In parts of Poland and Romania, the drought is the worst in a century. In the Czech Republic it's the worst in 500 years.

**Severe drought in Western Canada will pressure food industry and
raise food prices**

Saskatchewan, July, 2021



Hotter Years Typically Have More Fires



Lytton, B.C. – July, 2021



The three most expensive wildfires in world history have happened in the last four years:

2018

Camp Fire

California

\$12 Billion

2017

Tubbs Fire

California

\$9 Billion

2018

Woolsey Fire

California

\$4.5 Billion

“Expensive” in terms of insured losses
Photo © 2018 AP Photo/Noah Berger
Data: Aon Benfield

Camp Fire Damage, Paradise, California

**The average amount of land in Canada
burned annually by wildfires has
doubled since the 1970s.**

**“And we expect another doubling to quadrupling
of fire over this next century.**

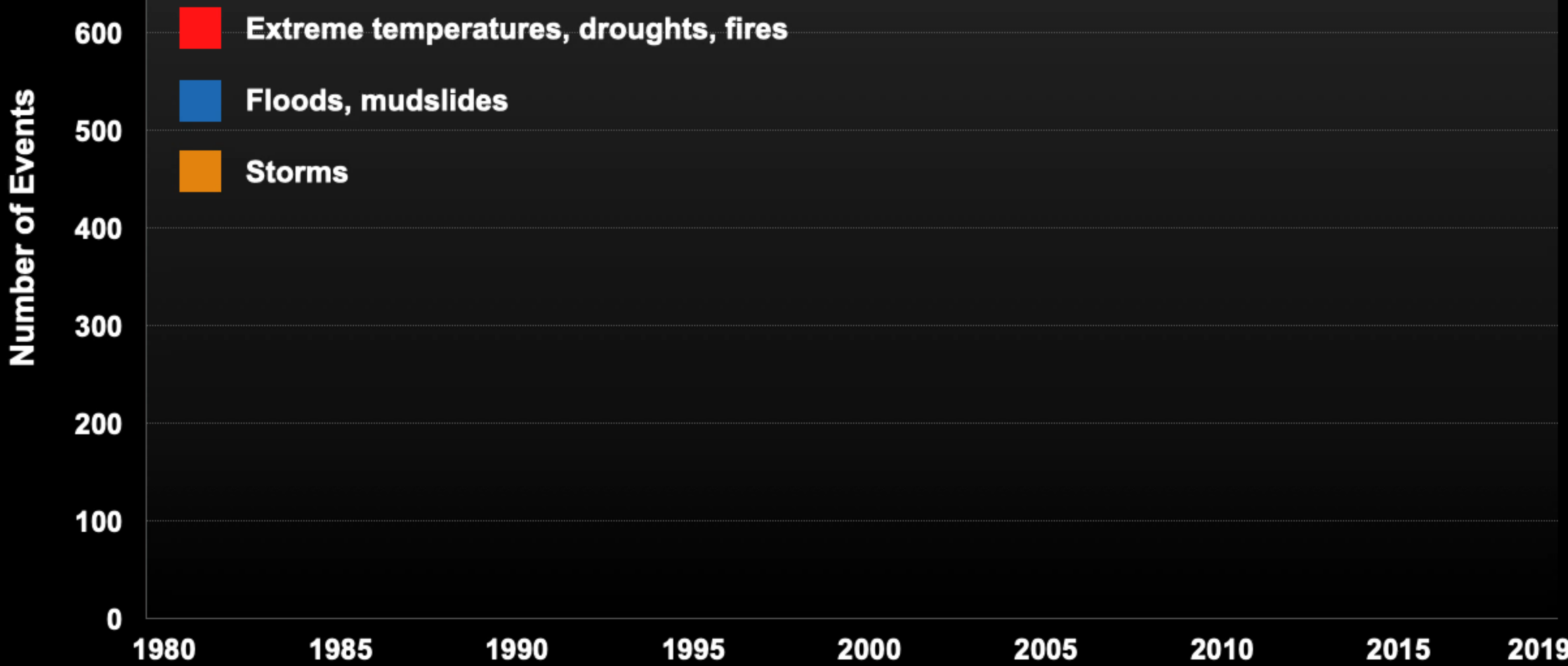
**We attribute this
— and I’ll be quite clear —
to human-caused climate change.”**

**Mike Flannigan, Professor of Wildland Fire
University of Alberta**

April 2013

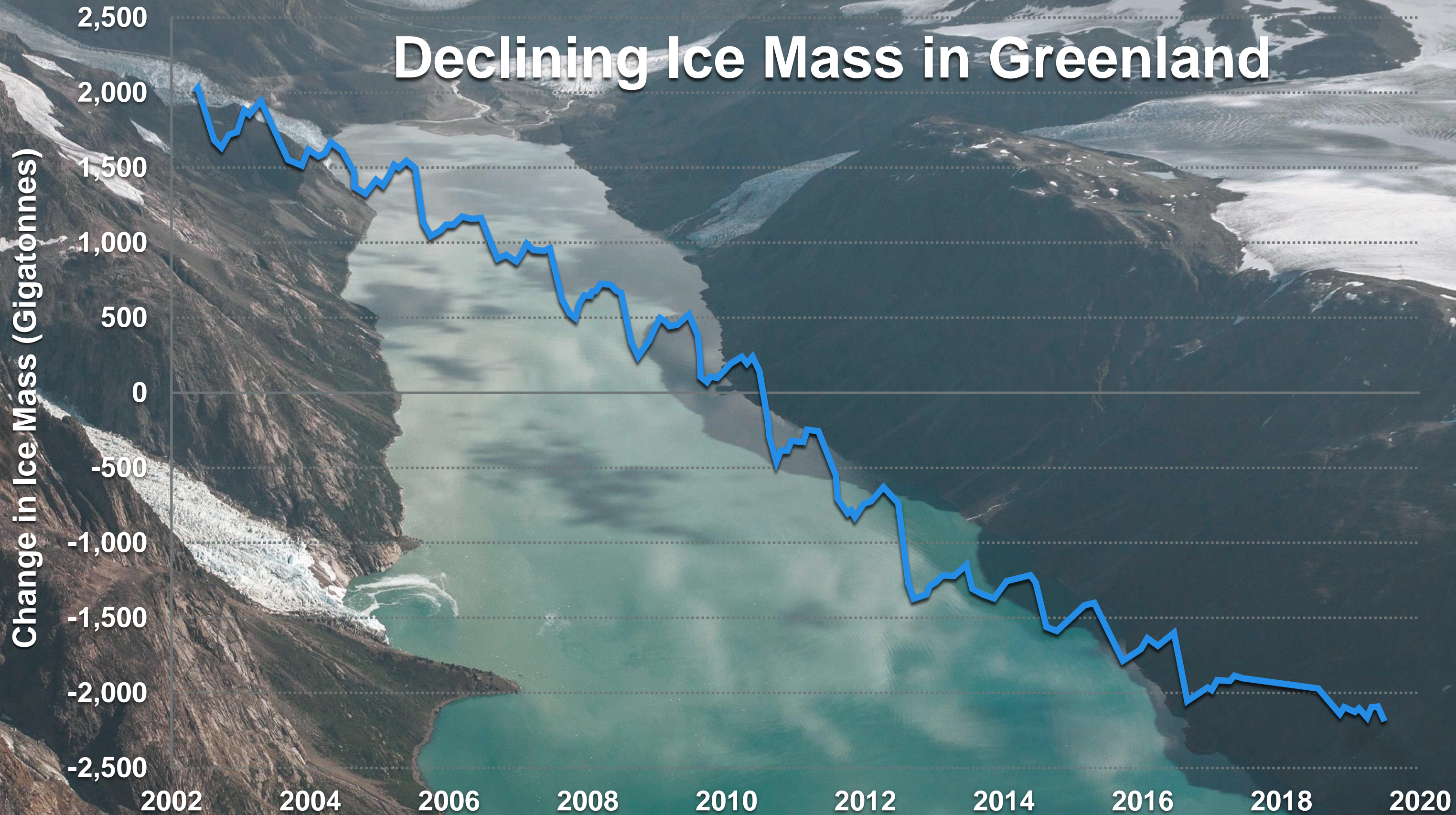
Worldwide Extreme Weather Catastrophes

1980 – 2019



Data: 2019 Munich Re, Geo Risks Research, NatCatSERVICE. As of January 2020.

Declining Ice Mass in Greenland



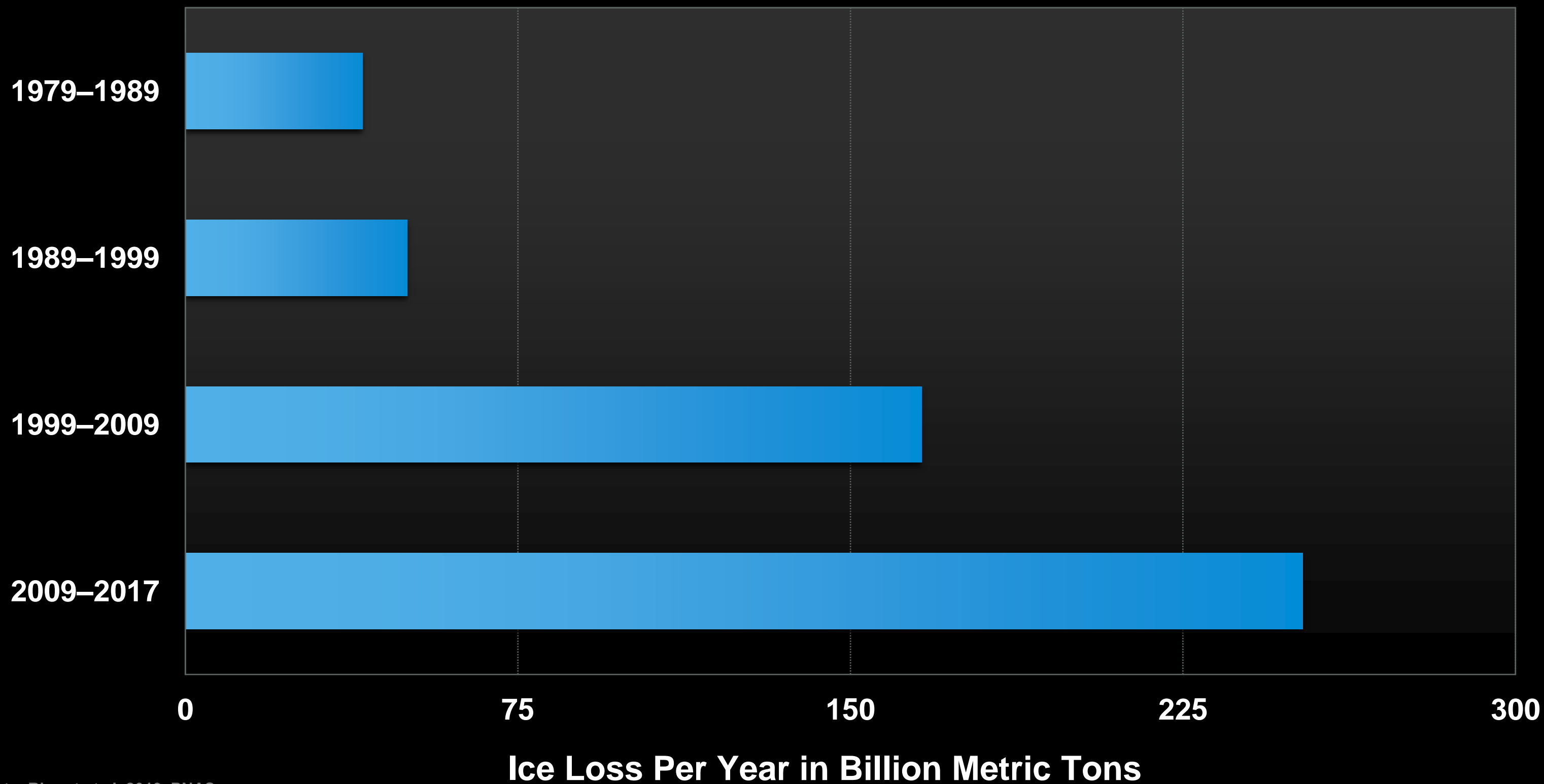
Data: NASA

Images courtesy Anders Bjørk, © Natural History Museum of Denmark/Tholstrup (2013) and Danish Geodata Agency (1935)

Ice Sheet, Kangerlussuaq, Greenland

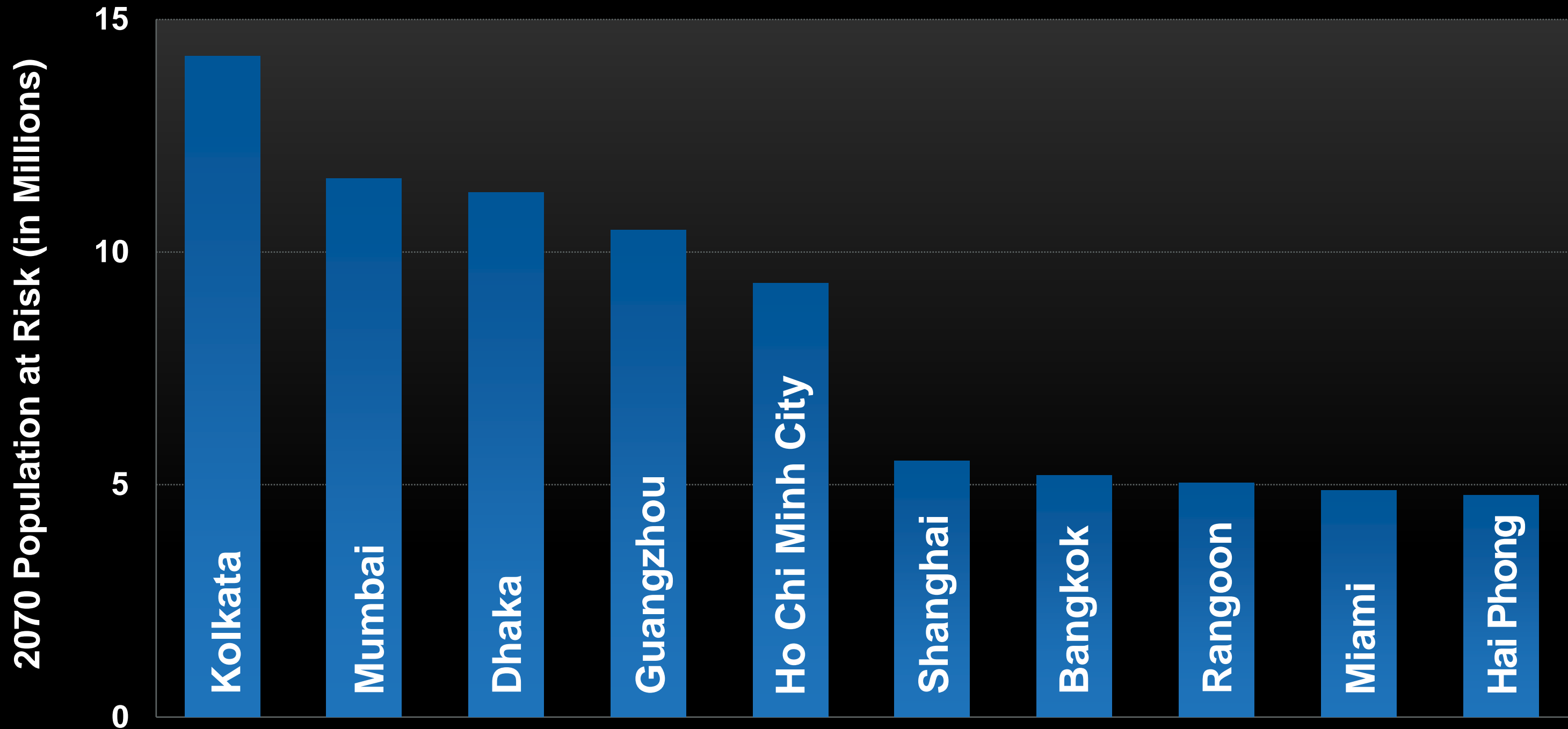
Greenland's ice is **melting four times faster** than originally thought, and more is melting from the permanent ice sheet than from glaciers.

Antarctic Ice Loss



Top 10 Cities at Risk from Sea Level Rise in 2070

By Population at Risk




Miami Beach, Florida

November 14, 2016



UN warns that world risks becoming
'uninhabitable hell' for millions unless leaders
take climate action

CTV New – October 13, 2020

A photograph of a person standing on a stone pier or breakwater, looking out at the ocean. The sky is filled with soft, white clouds, and the water is a deep blue-green. The person is silhouetted against the bright sky. The pier is made of large, rough-hewn stones and extends into the water. The overall mood is contemplative and serene.

Kiribati is the first nation to purchase land in another country to house its climate refugees.

U.S. Department of Defense
2014 Climate Change Adaptation Roadmap

Climate change
“will likely lead to
food and water shortages,
pandemic disease,
disputes over refugees and resources,
and destruction by natural disasters in
regions across the globe.”

Cyclone Evacuation Camp, Orissa, India

May 19, 2020



Assam, India

July 17, 2020



Nearly four million people in India and Nepal have been displaced by flooding and mudslides.

“...the gravest effects of all attacks on the environment are suffered by the poorest.”

**Encyclical Letter of
His Holiness, Pope Francis
On Care for our Common Home
June 18, 2015**

1 NO
POVERTY



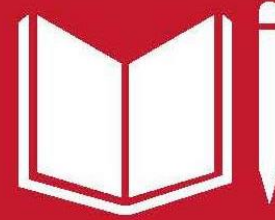
2 ZERO
HUNGER



3 GOOD HEALTH
AND WELL-BEING



4 QUALITY
EDUCATION



5 GENDER
EQUALITY



6 CLEAN WATER
AND SANITATION



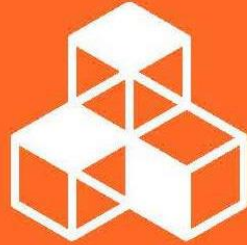
7 AFFORDABLE AND
CLEAN ENERGY



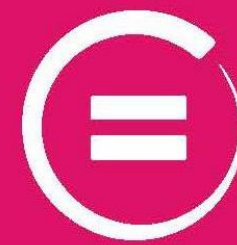
8 DECENT WORK AND
ECONOMIC GROWTH



9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



10 REDUCED
INEQUALITIES



11 SUSTAINABLE CITIES
AND COMMUNITIES



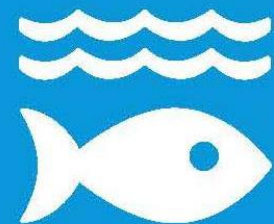
12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



13 CLIMATE
ACTION



14 LIFE
BELOW WATER



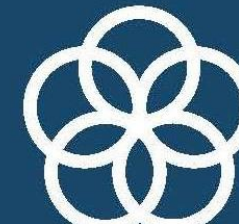
15 LIFE
ON LAND



16 PEACE, JUSTICE
AND STRONG
INSTITUTIONS



17 PARTNERSHIPS
FOR THE GOALS




SUSTAINABLE
DEVELOPMENT
GOALS

**“Climate Change
is a
Medical Emergency.”**

**Professor Hugh Montgomery, Co-Chair,
The 2015 Lancet Commission on
Health and Climate Change**

June 2015

Yunnan Province, China

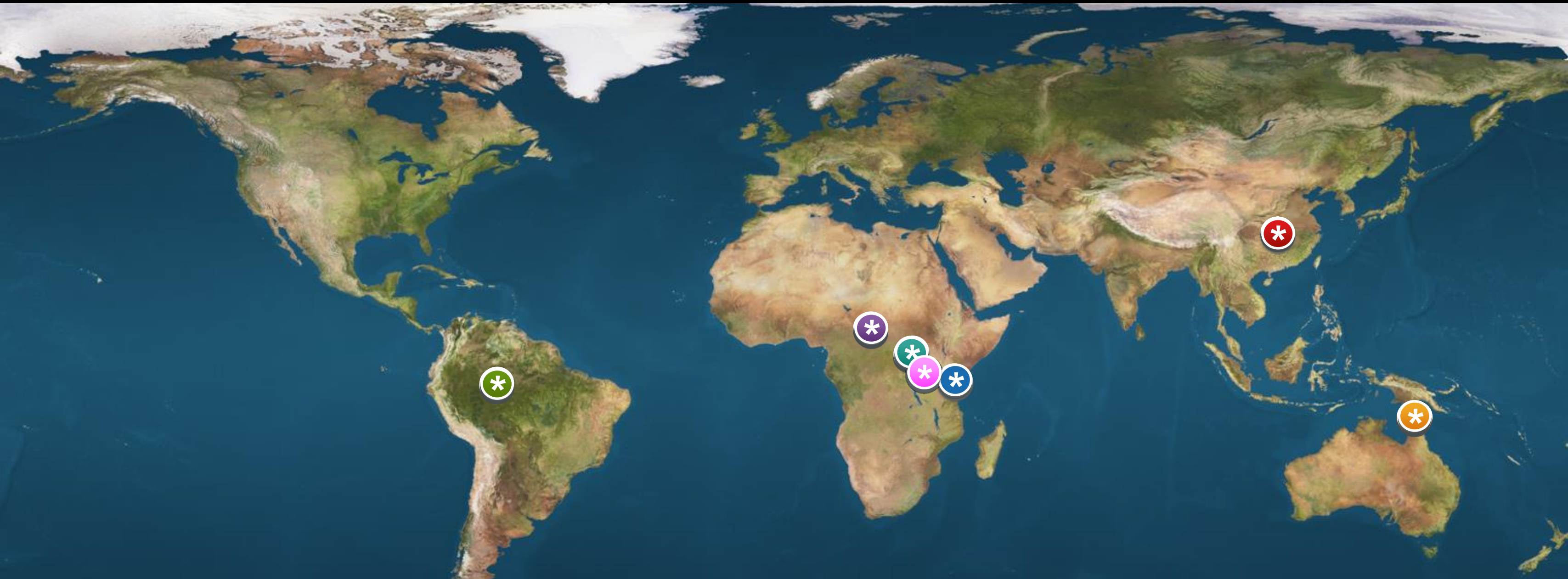
April 28, 2020

As the climate changes and humans expand further into Earth's remaining wild places, **five new infectious diseases** are emerging, on average **each year.**



75% of all new emerging infectious diseases are **zoonotic**, meaning they are transmitted from animals to humans.

Tropical Diseases on the Move



West Nile Virus

Chikungunya

Cryptococcus Gattii Fungus

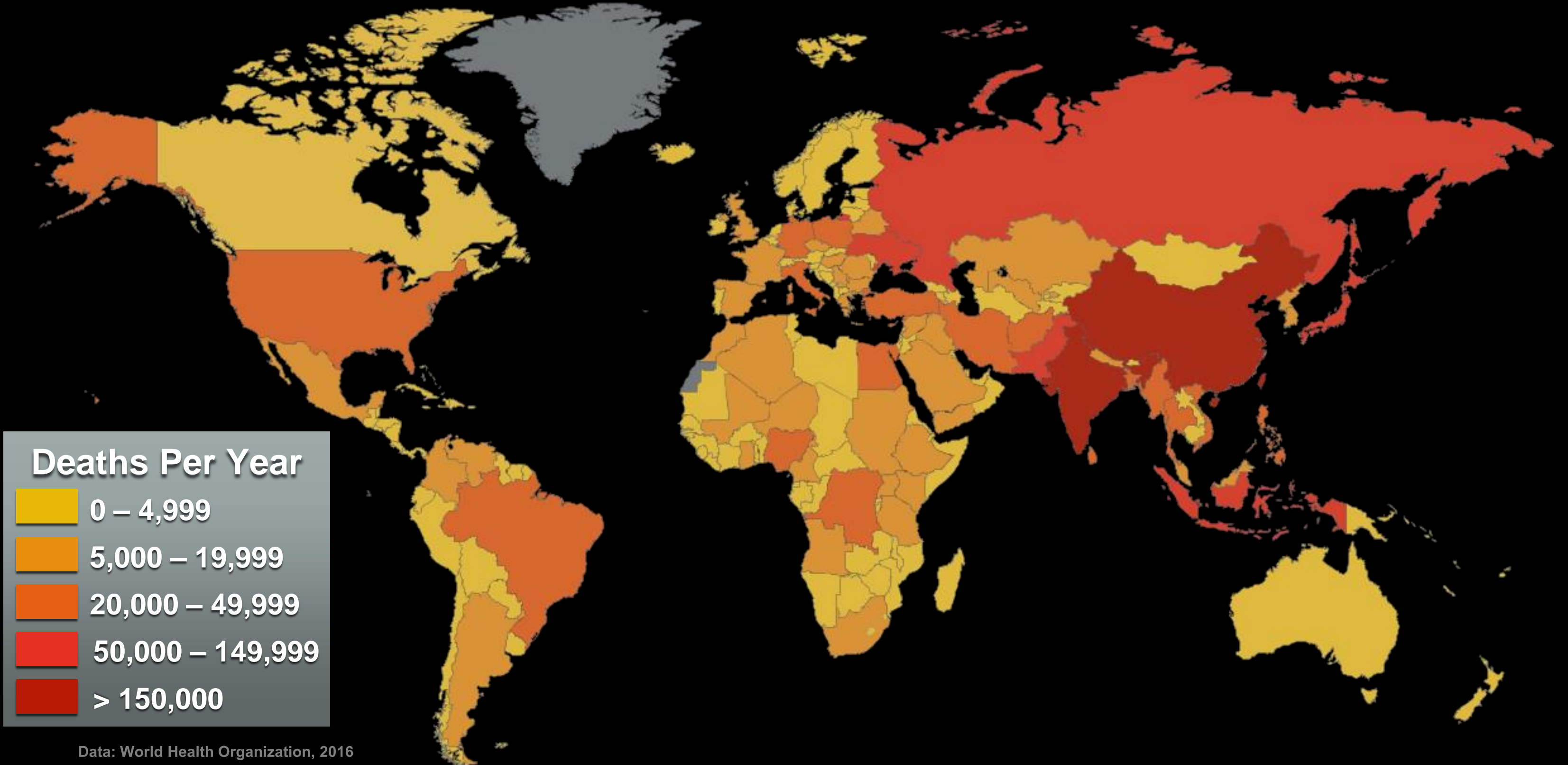
Zika Virus

Rift Valley Fever

Chagas Disease

Dengue Fever

Deaths Attributable to Ambient Air Pollution



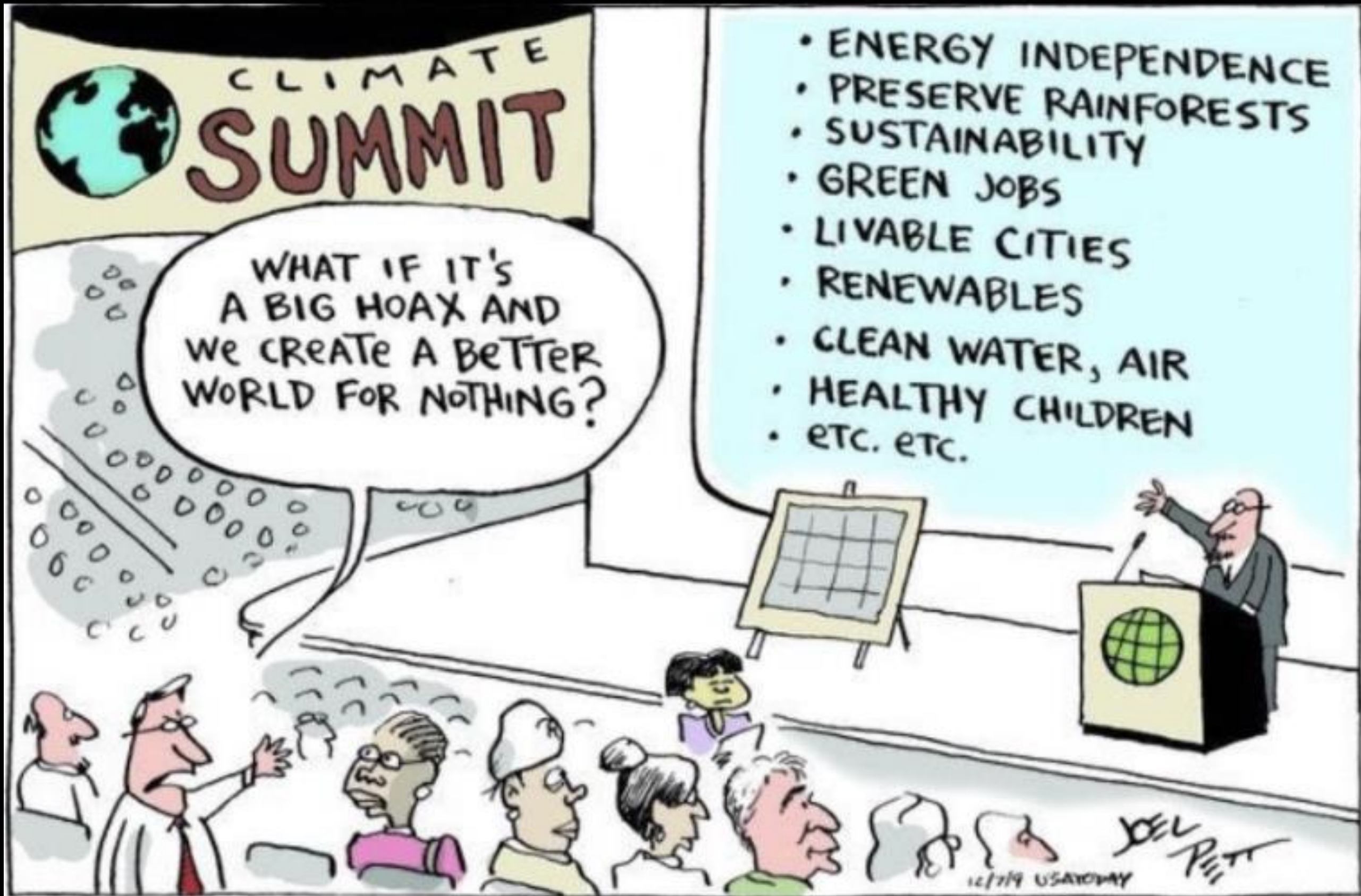
Data: World Health Organization, 2016

**We now risk
losing up to
50% of all
land-based
species
in this century**



So...
Yes!
Must we change?

What if it's a hoax?



- ENERGY INDEPENDENCE
- PRESERVE RAINFORESTS
- SUSTAINABILITY
- GREEN JOBS
- LIVABLE CITIES
- RENEWABLES
- CLEAN WATER, AIR
- HEALTHY CHILDREN
- etc. etc.

WHAT IF IT'S
A BIG HOAX AND
WE CREATE A BETTER
WORLD FOR NOTHING?

YOUNG PITT
12/19 USA TODAY

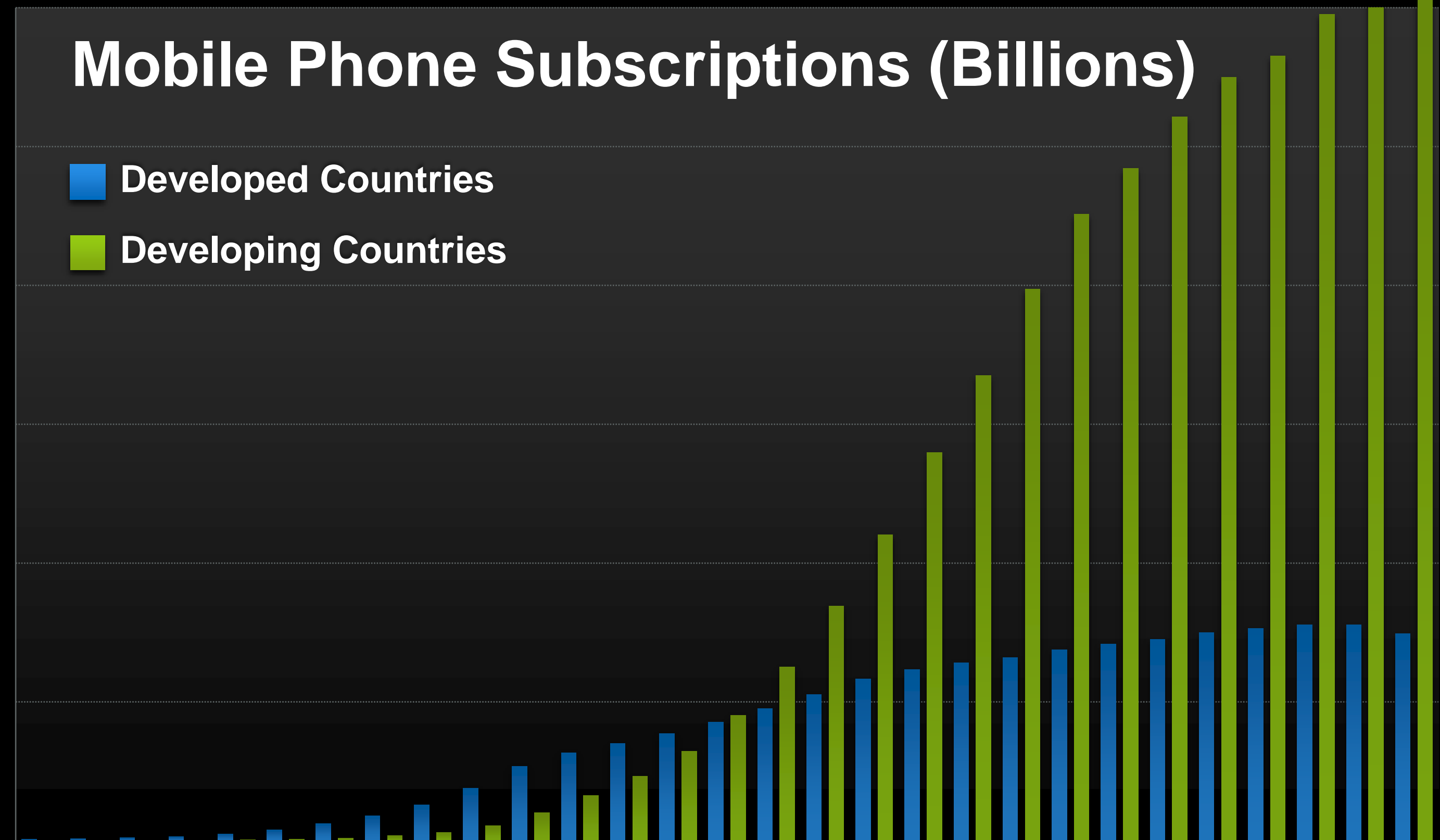
2. Can we change?

Mobile Phone Subscriptions (Billions)

Subscriptions

- Developed Countries
- Developing Countries

6 B
5 B
4 B
3 B
2 B
1 B



1990

1995

2000

2005

2010

2015

2018

1. The **Cost Dropped** Sharply, as
2. The **Quality Improved** Dramatically, and
3. All the **Low-Income** Nations With No Land-Line Grids **Leap-frogged** the Old Technology.

**We have
the solutions
at hand...**

Green Energy Progress

How Do Projections Compare With Reality?

2000 Projection

Worldwide
wind capacity
will reach 30
GW by 2010

Reality

By 2020 that goal
was exceeded by
a factor of

24 x

Global Wind Energy Capacity

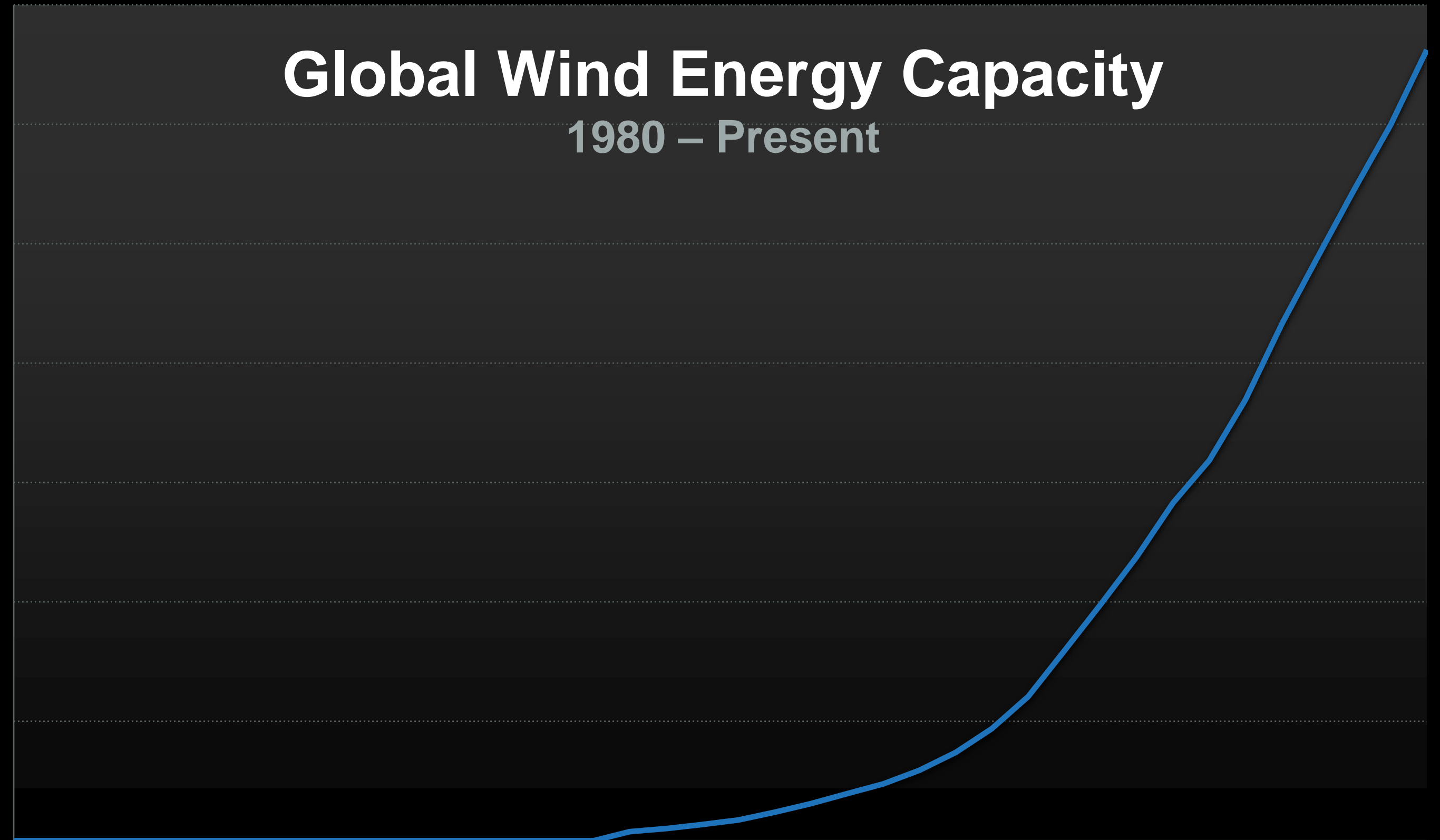
1980 – Present

Wind Capacity (Megawatts)

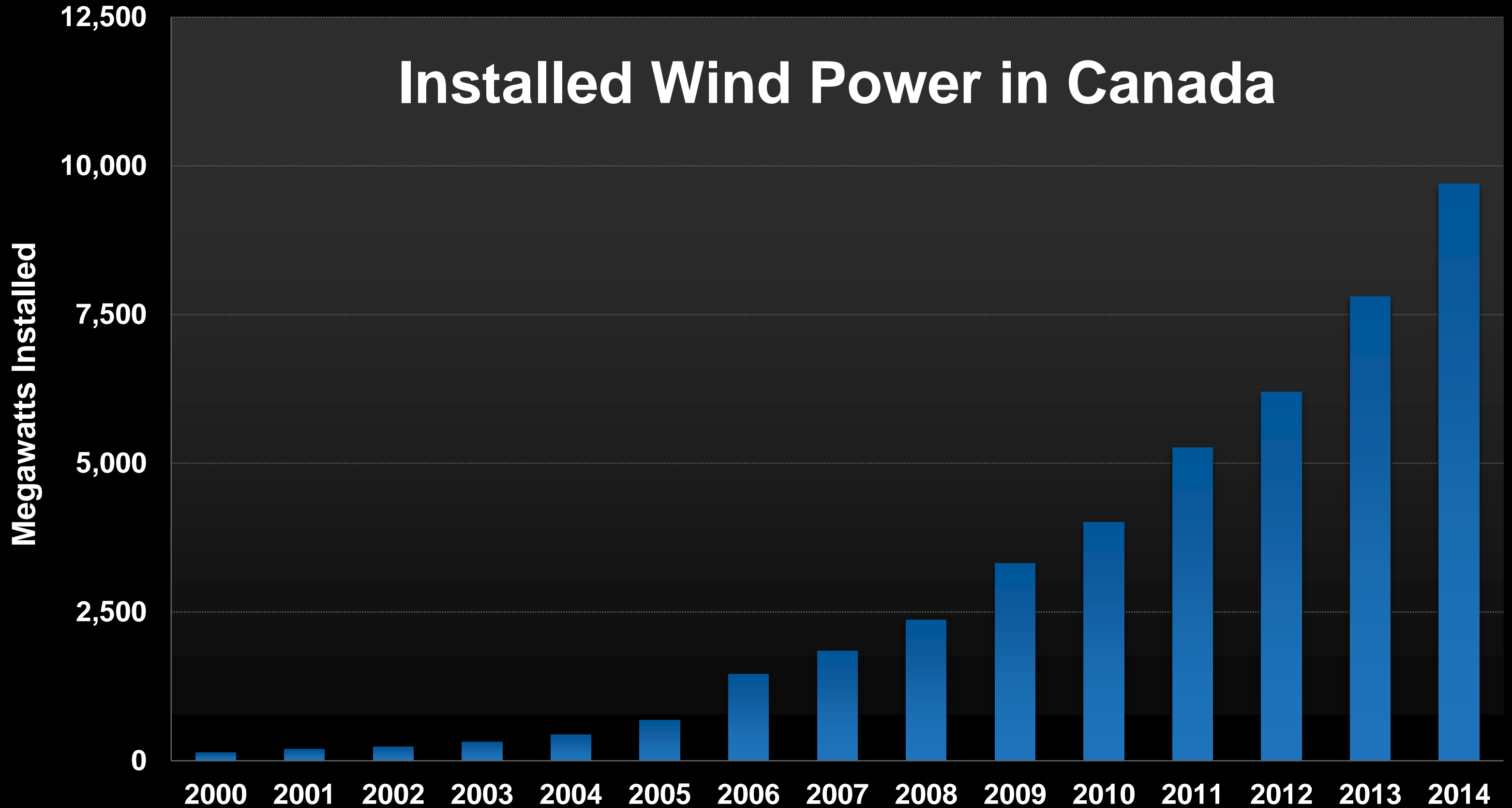
700,000
600,000
500,000
400,000
300,000
200,000
100,000

1980 1985 1990 1995 2000 2005 2010 2015 2019

Data: Earth Policy Institute/Bloomberg New Energy Finance



Installed Wind Power in Canada



Solar Energy Progress

How Do Projections Compare With Reality?

2002 Projection

The solar energy market will grow one gigawatt per year by 2010

Reality

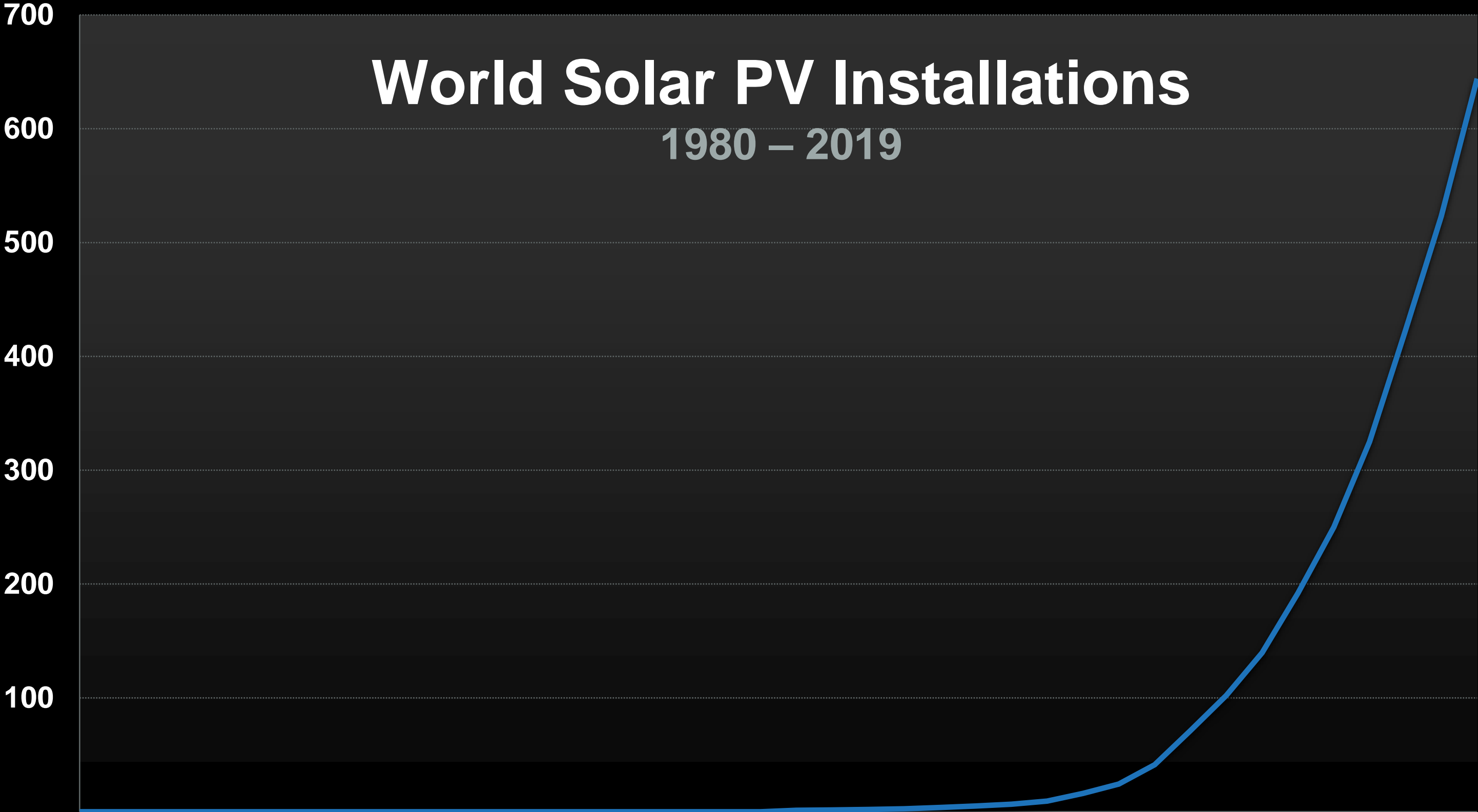
The reality is in 2020 it was exceeded by

132x

World Solar PV Installations

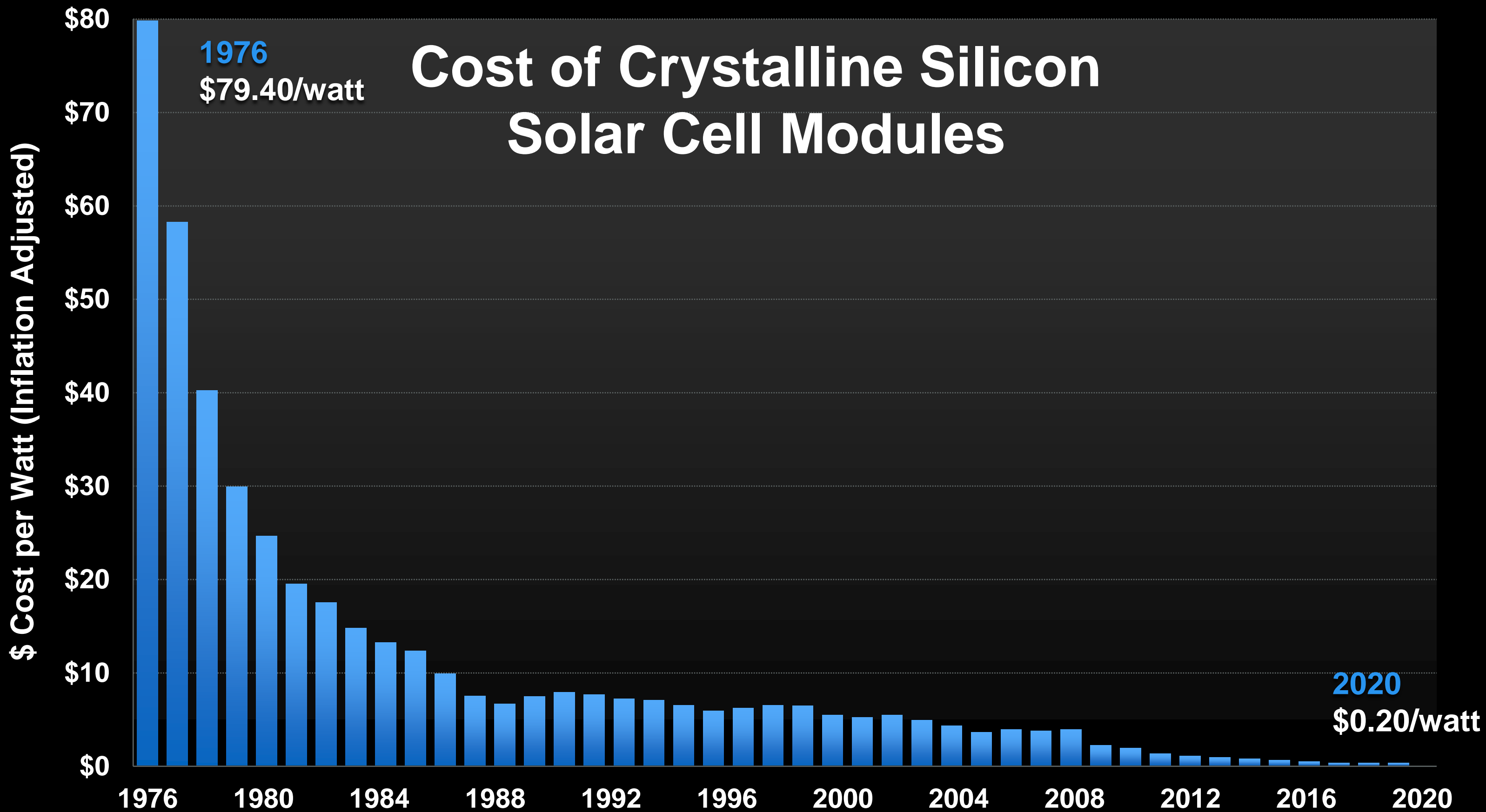
1980 – 2019

Gigawatts (Cumulative)



Data: Earth Policy Institute/BP, Statistical Review of World Energy June 2014 (London: 2014); Bloomberg New Energy Finance

Cost of Crystalline Silicon Solar Cell Modules

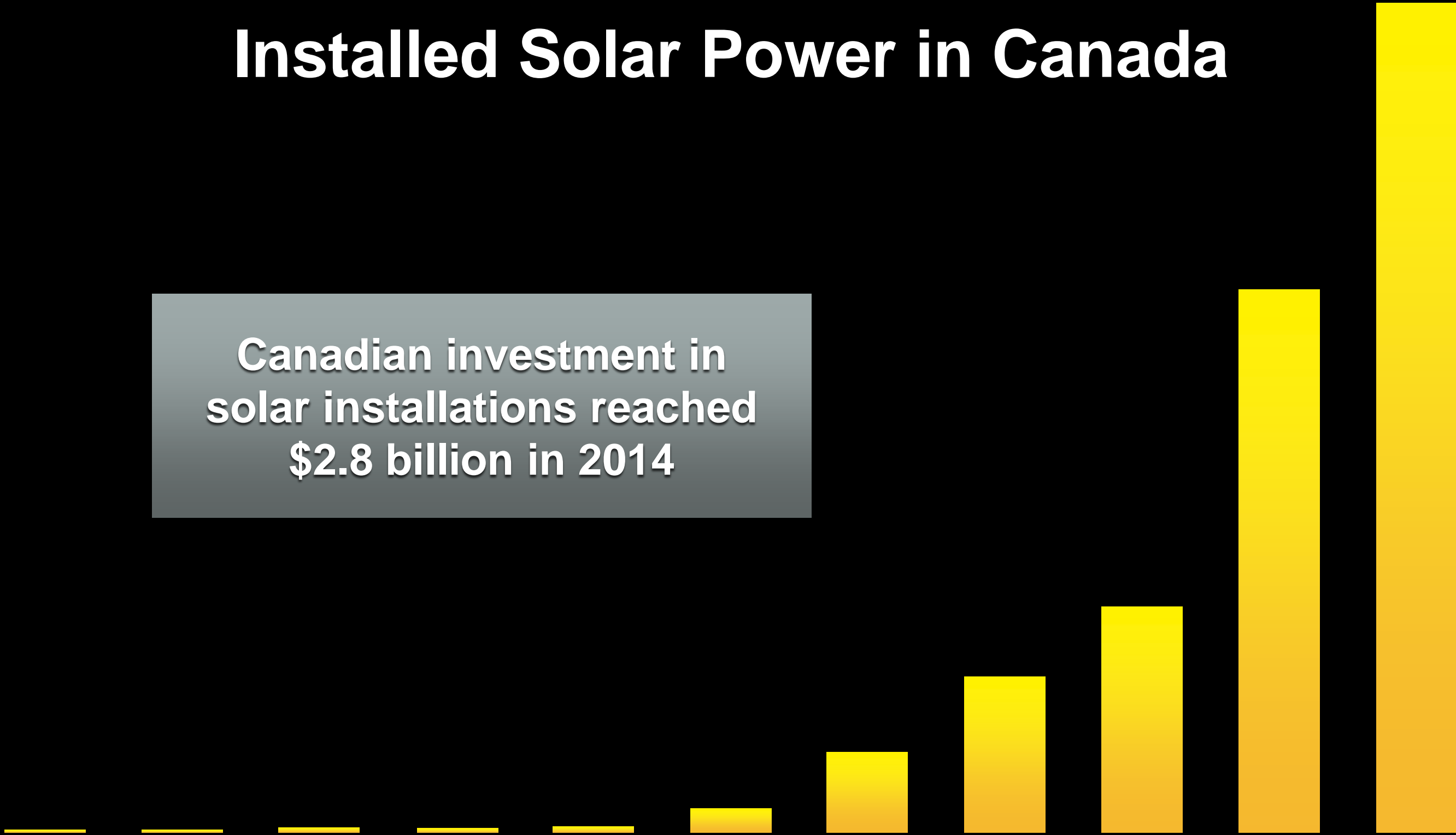


Data: Bloomberg New Energy Finance

Installed Solar Power in Canada

Megawatts Installed

Canadian investment in solar installations reached \$2.8 billion in 2014



Source: CanWEA

Pay-as-you-go Solar Power

Low initial costs make small solar systems affordable in developing countries

The Chilean Solar Market

Installed Capacity (GW)

2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00

2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00

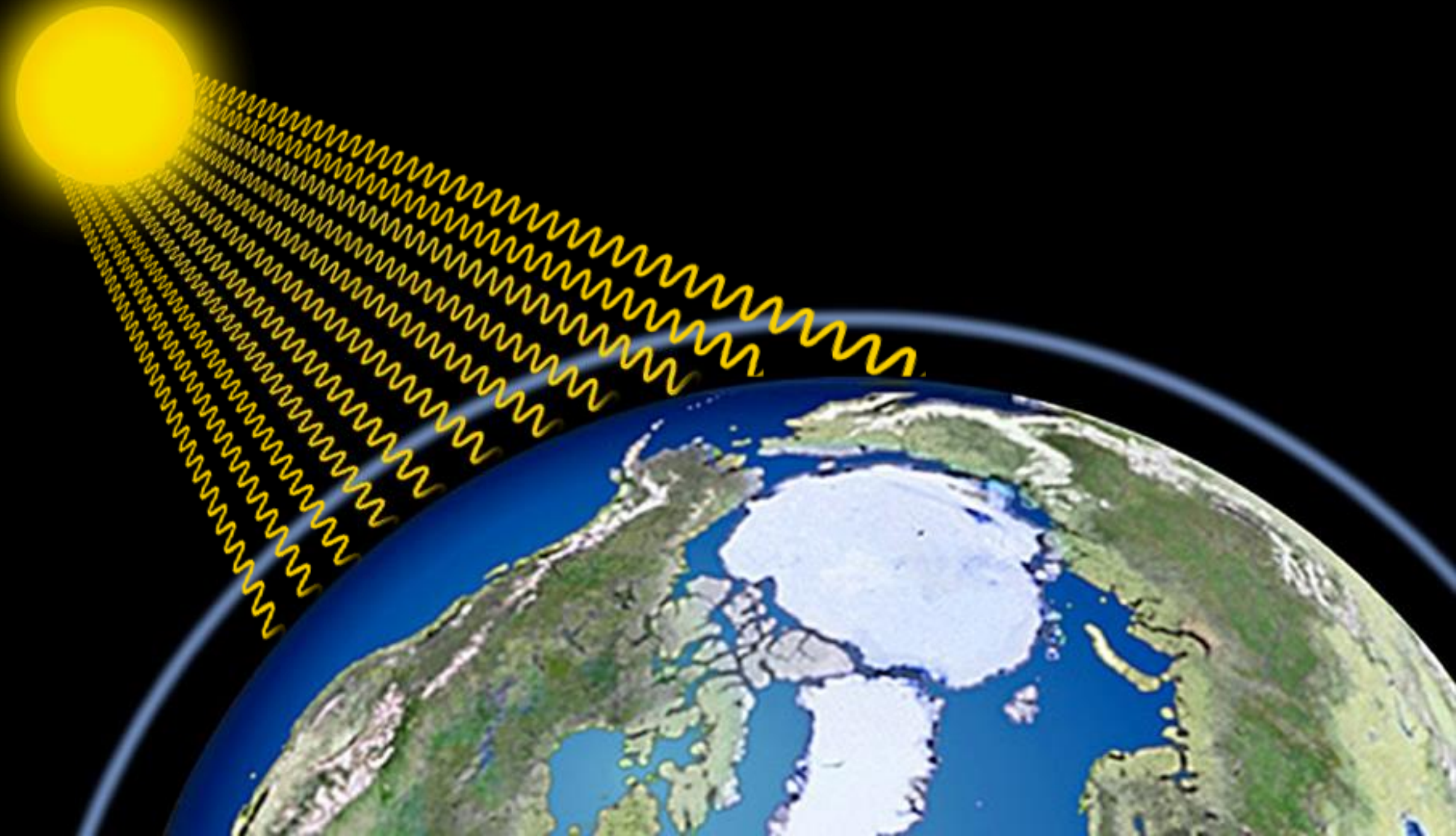
End of 2013

End of 2016

End of 2018

Data: La Comisión Nacional de Energía, Chile

Enough solar energy reaches Earth **every hour**
to fill all the world's energy needs **for a full year**

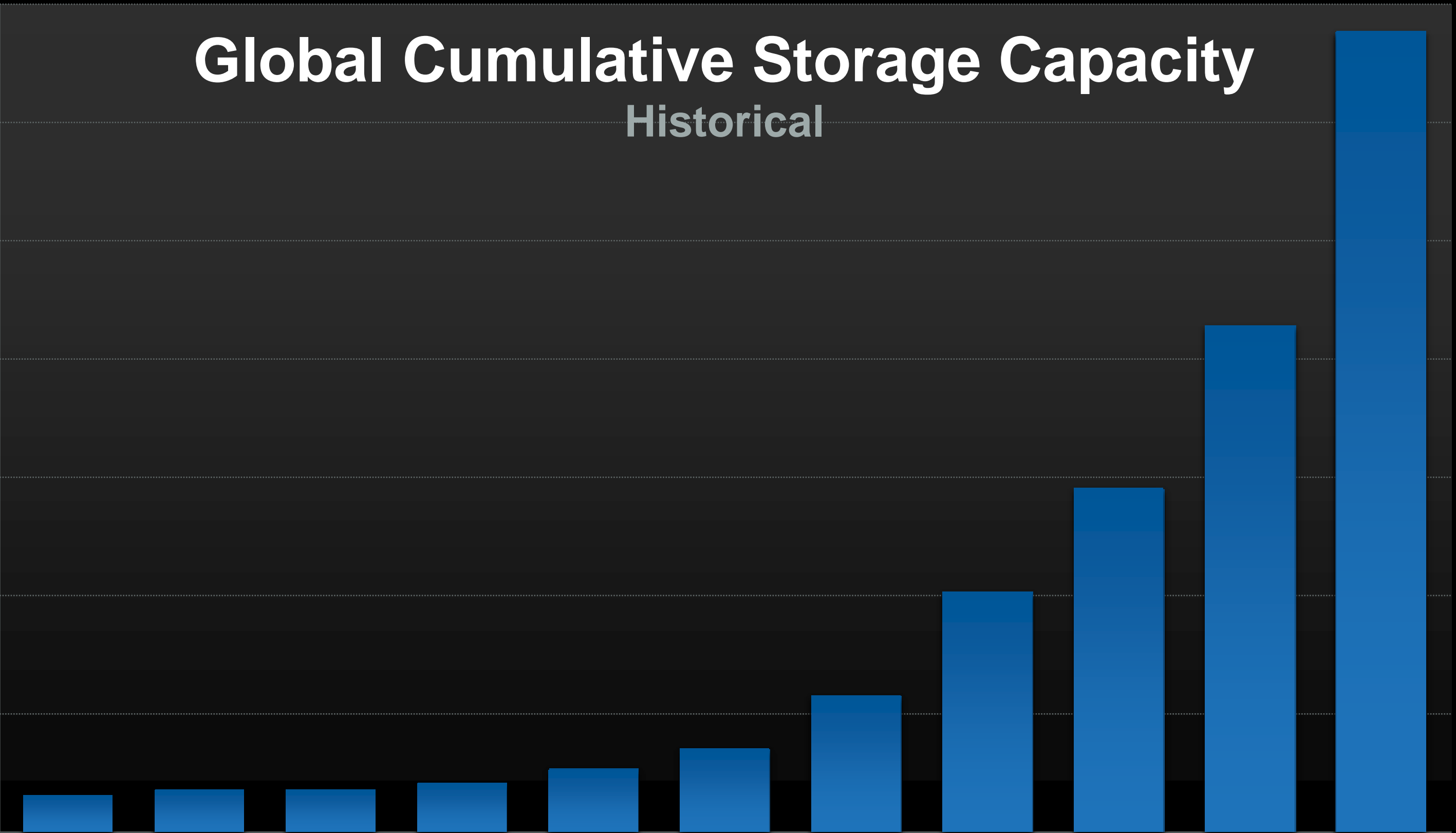


Global Cumulative Storage Capacity

Historical

Gigawatts

28
24
20
16
12
8
4
0



2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021

**“Solar-plus-batteries
is set to begin
a dramatic transformation
of human civilization.”**

Bloomberg View

April 8, 2015

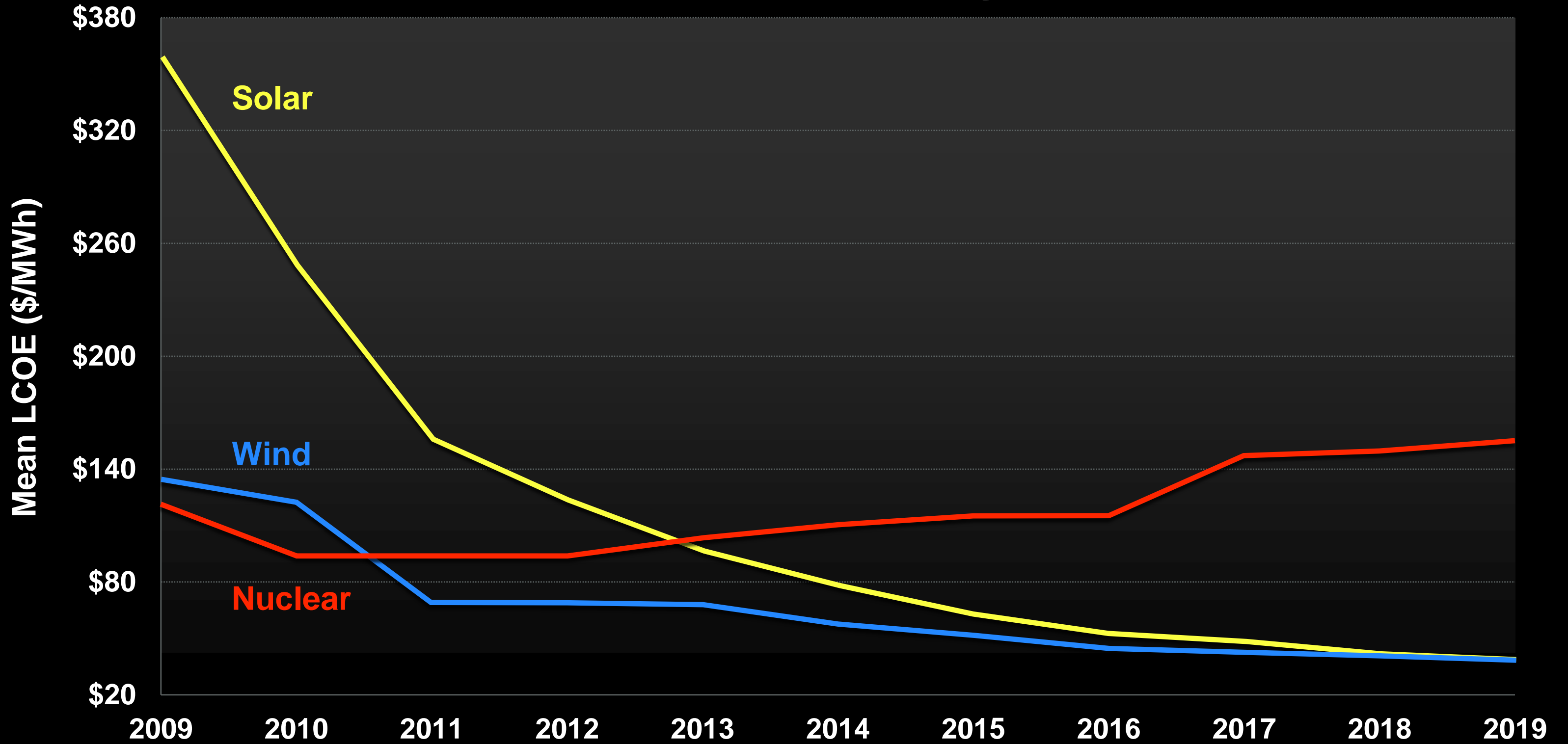
Hornsedale, South Australia

September 29, 2017



Tesla has built the
world's largest lithium ion battery
at a wind farm in South Australia

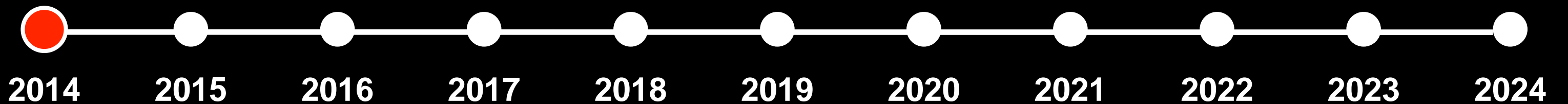
Levelized Cost of Energy in the U.S.



In 2014,
electricity
from solar and
wind was
cheaper than
new coal and
gas plants in
approximately
**1 percent of
the world.**

By 2019, only
five years
later, solar and
wind provided
the cheapest
sources of
new electricity
in **two-thirds
of the world.**

**Within five
more years,**
these sources
are expected
to provide the
cheapest new
electricity in
**the entire
world.**



Elgin, New Brunswick



Solar Power Plant in Sussex, N.B.



Auto Manufacturers Are Moving to Electric Vehicles

Companies with Electric Models in Production

Countries Planning a Fossil Fuel Vehicle Phase-Out:

<u>Country/State</u>	<u>Phase-Out Begins</u>	<u>Country/State</u>	<u>Phase-Out Begins</u>
Norway	2025	France	2040
Denmark	2030	Sri Lanka	2040*
Iceland	2030	Taiwan	2040
Ireland	2030	Singapore	2040
Israel	2030	Costa Rica	2050
Netherlands	2030	China	“In the near future”
Slovenia	2030	Germany	Date of phase-out pending. Merkel: “The approach is right.”
Sweden	2030		
Scotland	2032		
Britain	2035		
Canada	2040		

** Sri Lanka's phase-out will be complete by 2040*

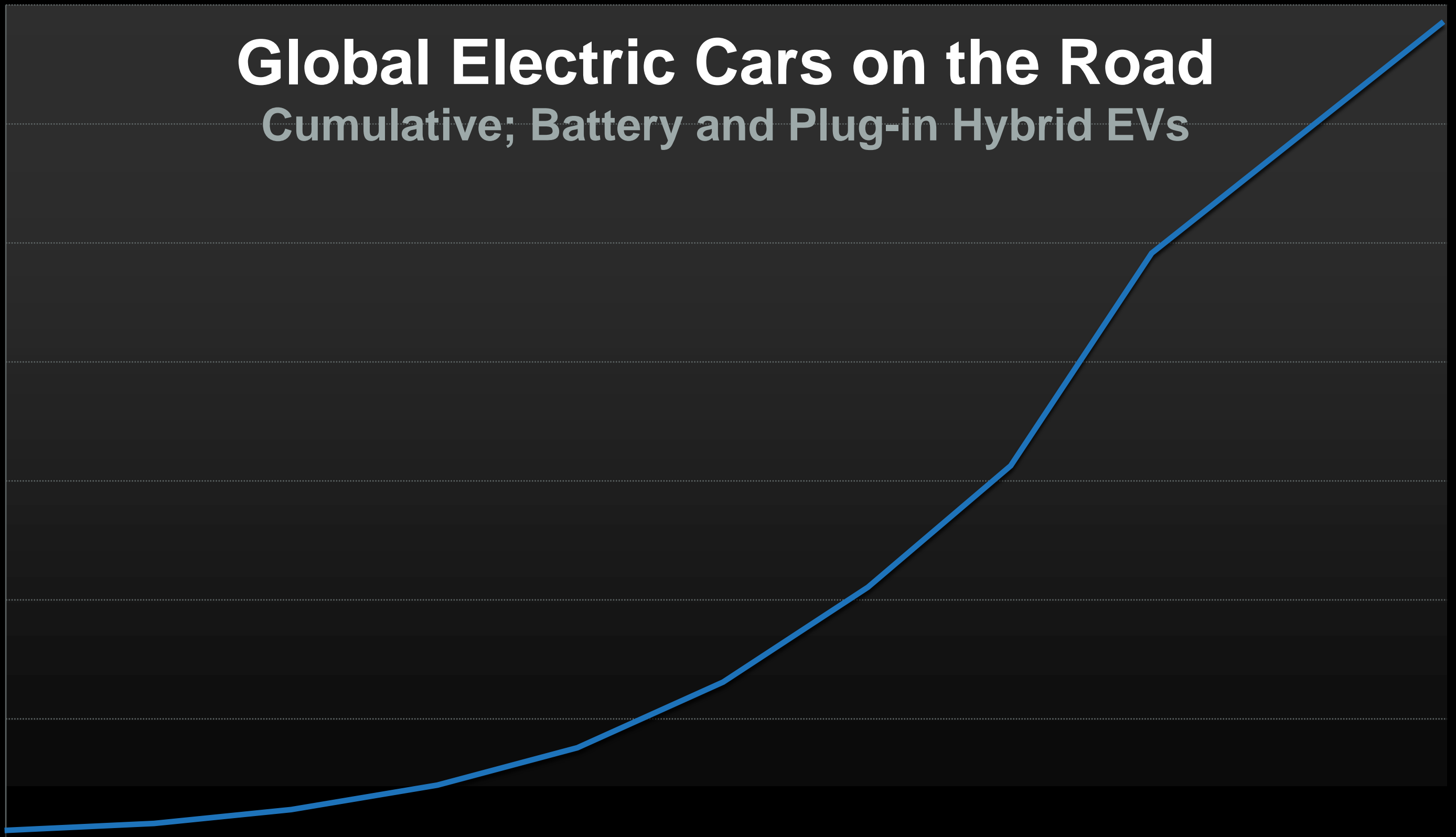
Global Electric Cars on the Road

Cumulative; Battery and Plug-in Hybrid EVs

Electric Car Stock (Millions)

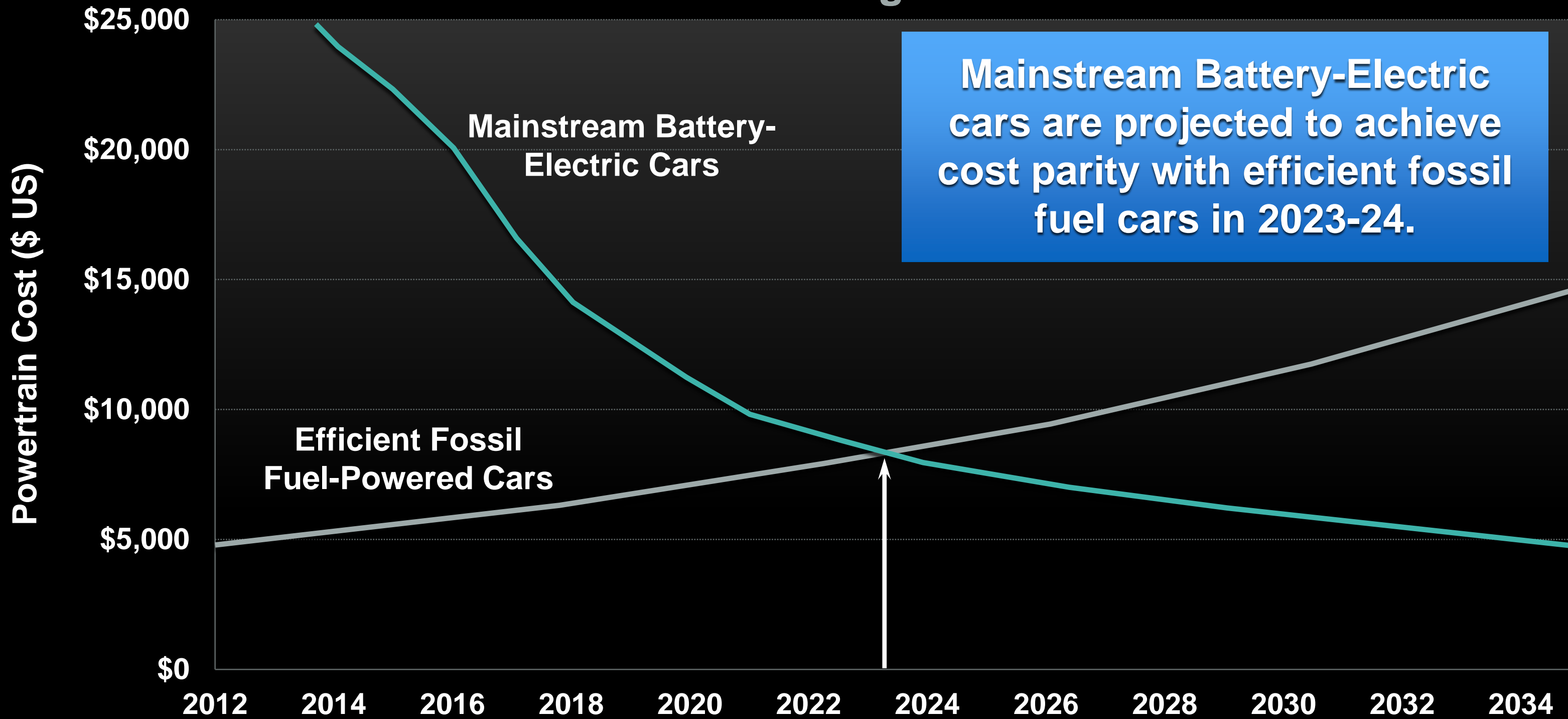
7.0 M
6.0 M
5.0 M
4.0 M
3.0 M
2.0 M
1.0 M

2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020



Powertrain Cost Comparison

60kWh / 500km Range Without Subsidies



Data: Bernstein, September 2017

I FEEL SO DIRTY !



I FEEL SO CLEAN !



Global Energy Subsidies

\$5.5 T
\$5.0 T
\$4.5 T
\$4.0 T
\$3.5 T
\$3.0 T
\$2.5 T
\$2.0 T
\$1.5 T
\$1.0 T
\$0.5 T
\$0.0 T

\$143 Billion

\$5.2 Trillion

36x

Renewables

Fossil Fuels

Investments in renewables and energy efficiency create three times more jobs, on average, than investments in fossil fuel technologies.

So...!
Yes!
Can we change?

3. Will we change?

In the 2015 Paris Agreement,
every nation in the world agreed
to work together to achieve net zero
greenhouse gas emissions by mid-century.

“(We) the BCMC call on the Government of Canada to engage with the Provinces and Big Cities in developing a national climate change strategy.”

Canada’s Big City Mayors’ Caucus

July 6, 2015

Signed by the Mayors of:

Brampton

Calgary

Edmonton

Gatineau

Halifax

Hamilton

Kitchener

Laval

London

Mississauga

Montréal

Ottawa

Québec

Regina

Saskatoon

St. John’s

Surrey

Toronto

Vancouver

Windsor

Winnipeg



© 2016 Fred Chartrand/The Canadian Press via AP

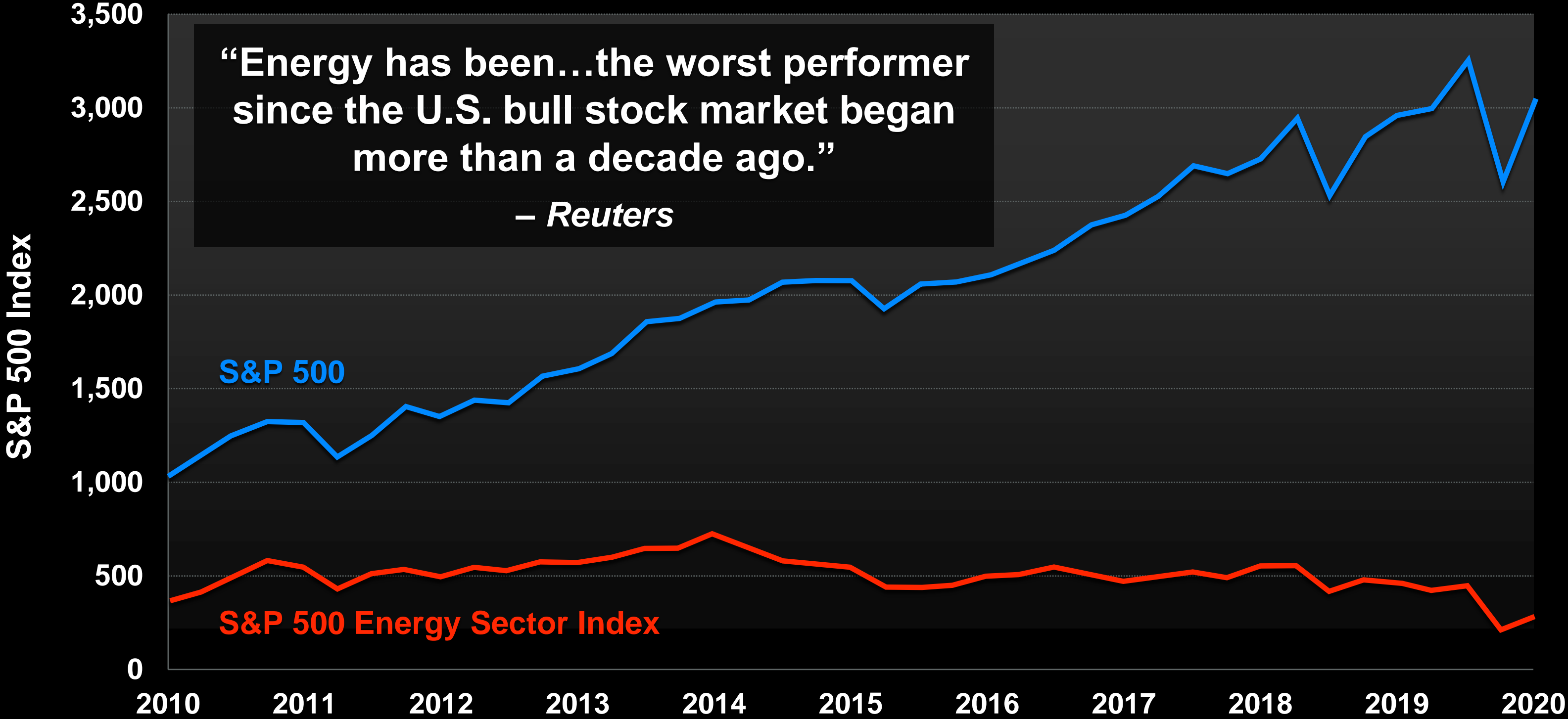
On June 29, 2016 the U.S., Mexico and Canada pledged that North America will get half its electricity from zero-emissions sources by 2025.



Over 290 global companies have made a commitment to go 100% renewable



Conventional Energy Stocks Are the Worst Investments



Data: MarketWatch

**Canada plans to phase out
coal-fired electricity by 2030**

In 2021, Canada has banned single-use plastics -- checkout bags, straws, stir sticks, six-pack rings, cutlery and even foodware made from hard-to-recycle plastics.

But... the International Monetary Fund found the production and burning of coal, oil and gas was 'subsidized' to the tune of \$5.9 trillion in 2020, that is \$11 million per minute...

What can you do?

Be part of the solution

Detroit, Michigan

July 30, 2019





Youth Climate Activists, Nairobi, Kenya

March 19, 2021

Kampala, Uganda

September 25, 2020



New Delhi, India

March 19, 2021



Madrid, Spain

December 11, 2020



Jakarta, Indonesia

November 27, 2020



HHS Climate Change Protest – September, 2019





**“This is a critical moment. Our children’s
future and the future of our common home**

depend on it.
Ecumenical Patriarch Bartholomew, Pope Francis & the Archbishop of Canterbury
Justin Welby

Joint Message on the Protection of Creation ☞ September 1,

**What can your church
do?**

**You can join other faith communities who are concerned
about the environment**



*For the fate of humans and the fate of animals is the same;
as one dies, so dies the other. They all have the same
breath, and humans have no advantage over the animals;
for all is vanity. (Ecclesiastes 3:19)*



THE COMMUNION FOREST

**To plant is to hope
To restore is to heal
To protect is to love**

The Communion Forest is a global initiative comprising local activities of forest protection, tree growing and eco-system restoration undertaken by provinces, dioceses and individual churches across the Anglican Communion to safeguard creation.

You can educate your congregations!

Christianity and Climate Change

with Dr. Katharine Hayhoe



You can partner with environmental organizations



Hampton High School Garden





Hampton Rain Garden!

You can feed people!



You can replace gas powered lawn tools with electric!



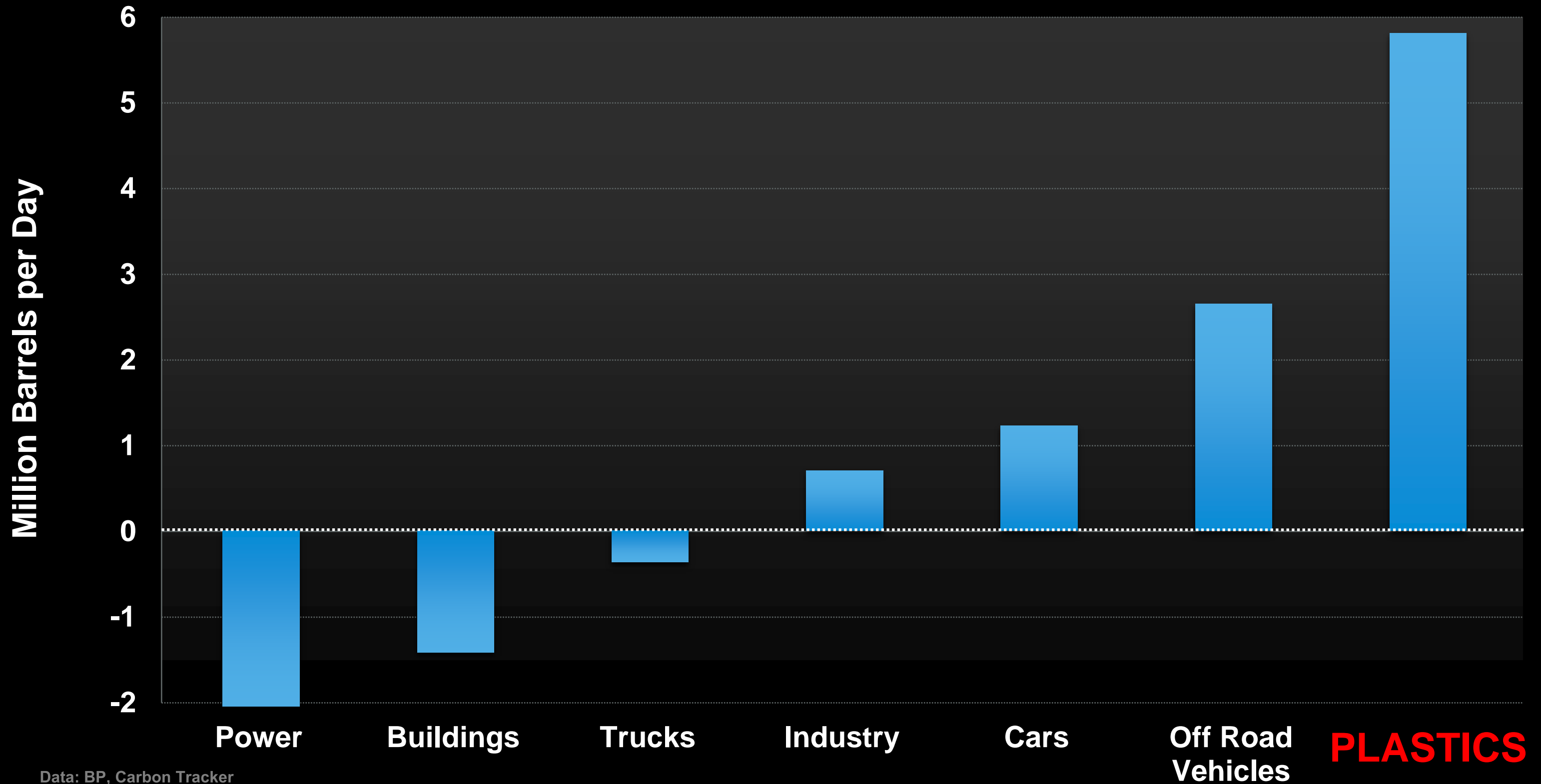
VS



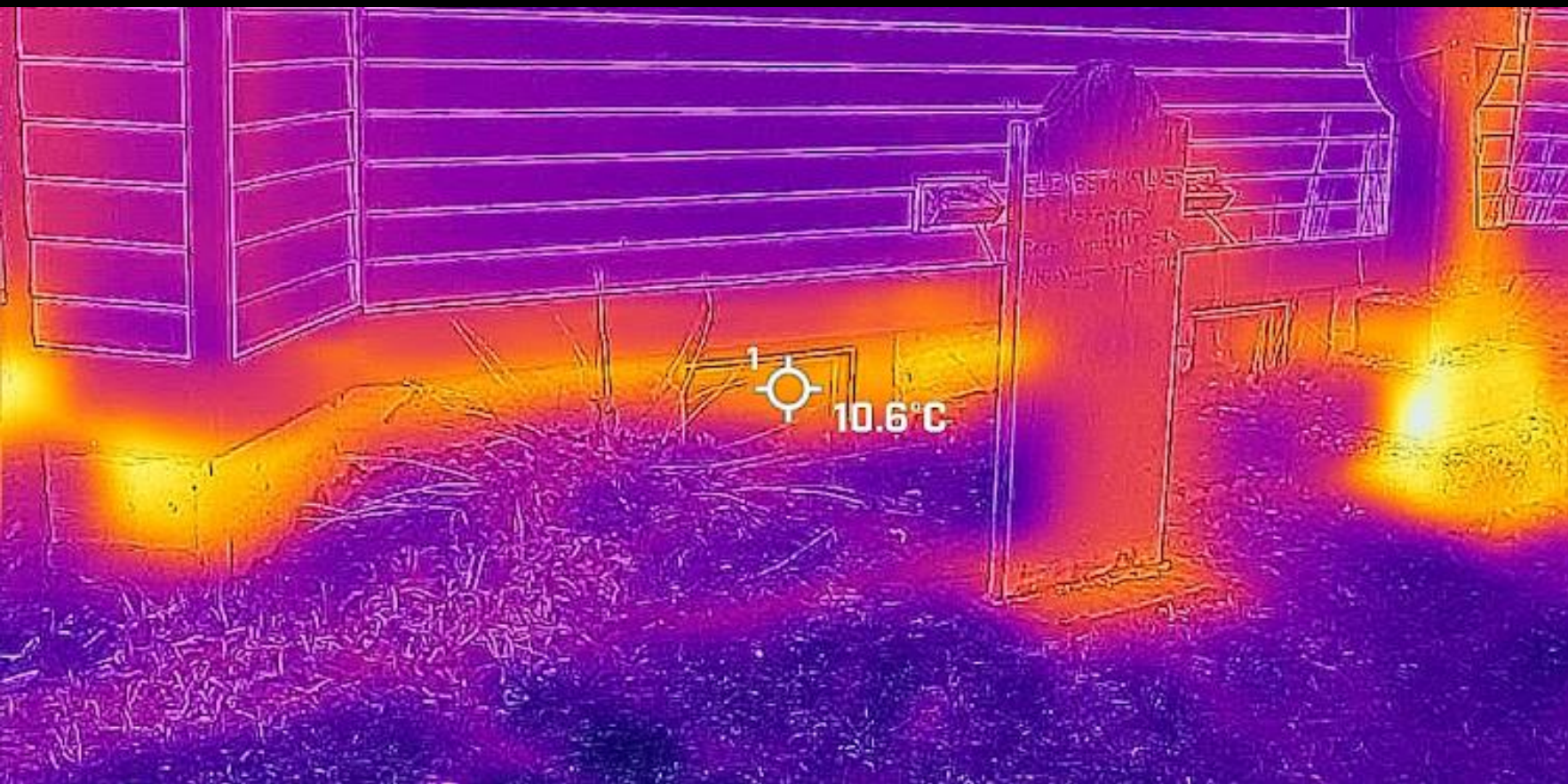
You can eliminate plastic packaging in the church



Oil Demand Growth Forecast, 2020 – 2040



You can look for ways to be more energy efficient





Commercial Buildings Retrofit Program

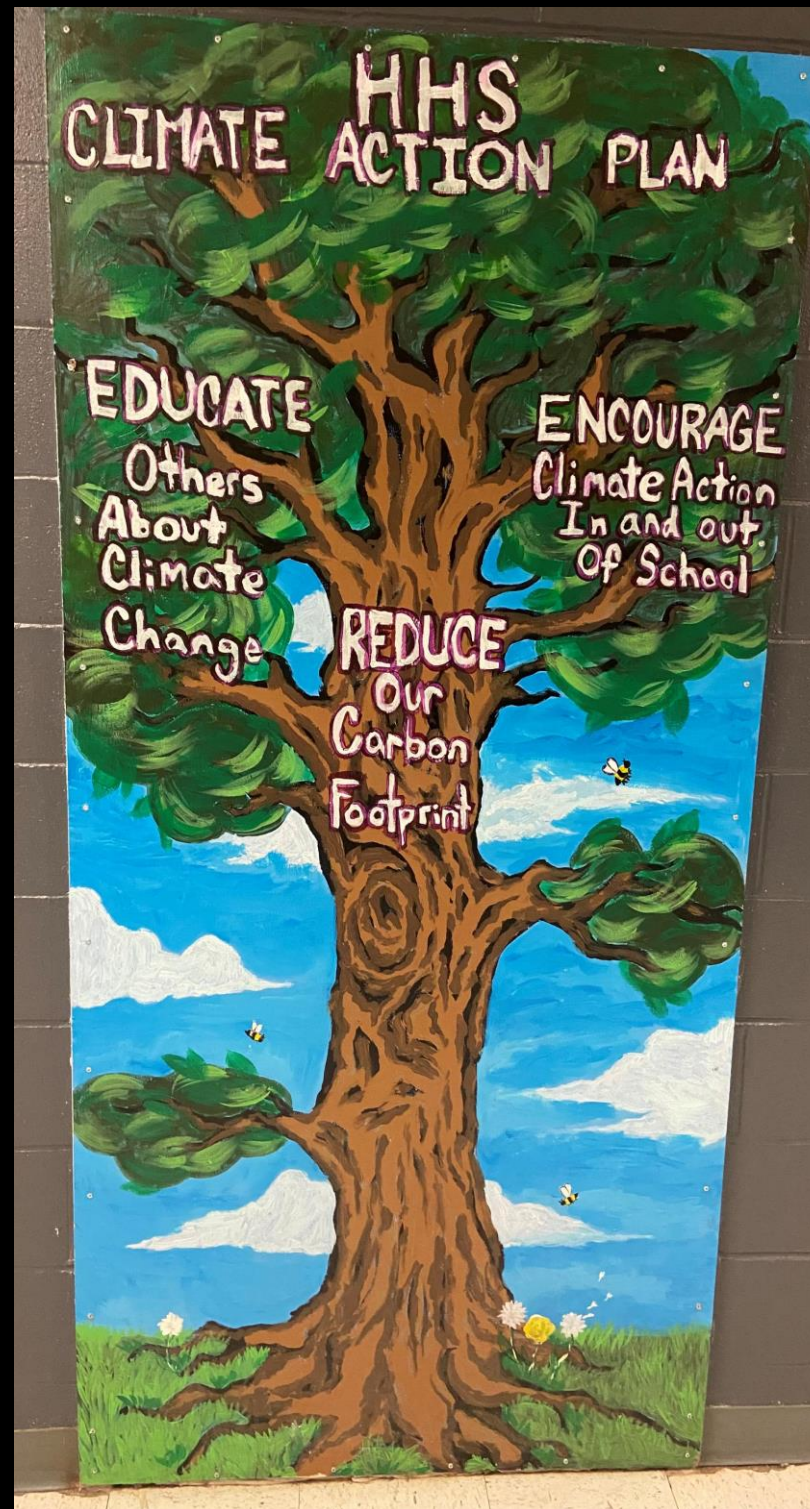
Get up to \$1.25 Million back for energy saving upgrades!

You can start a composting program

Food waste is responsible for 6% of global greenhouse gas emissions



You can start a climate action team



HHS Climate Action Plan

At HHS, we will **reduce** our energy consumption, waste production and carbon footprint by making environmentally conscious decisions in our school, our community and our personal lives.

At HHS, we will **encourage** climate action in and outside of school. We will inspire both students and members of the community to make changes to benefit our environment.

At HHS, we will **educate** those around us about climate change. We will raise awareness in younger students by encouraging environmentally sustaining activities.

And on a personal level...

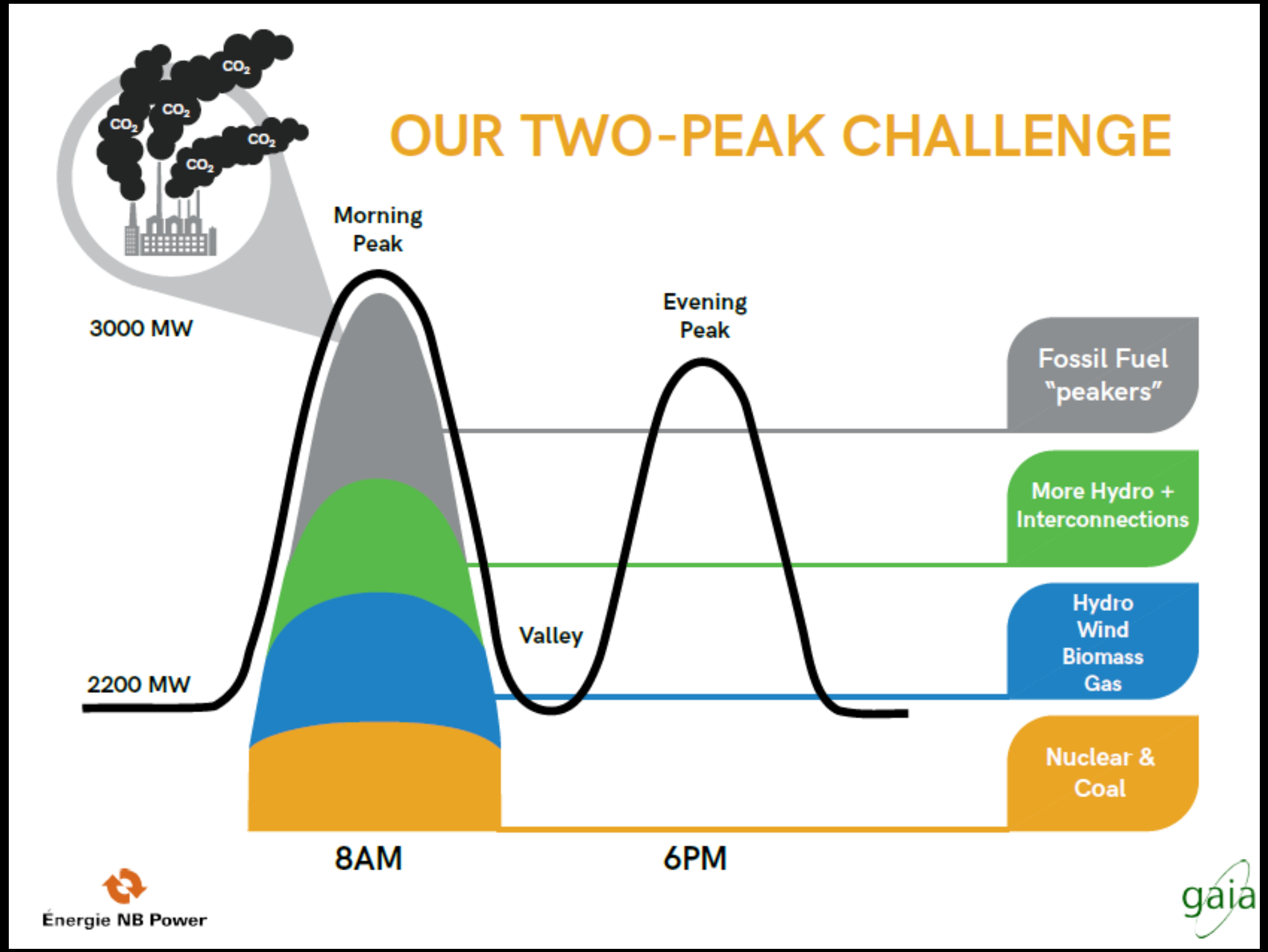
EVERY ACTION MATTERS

EVERY BIT OF WARMING MATTERS

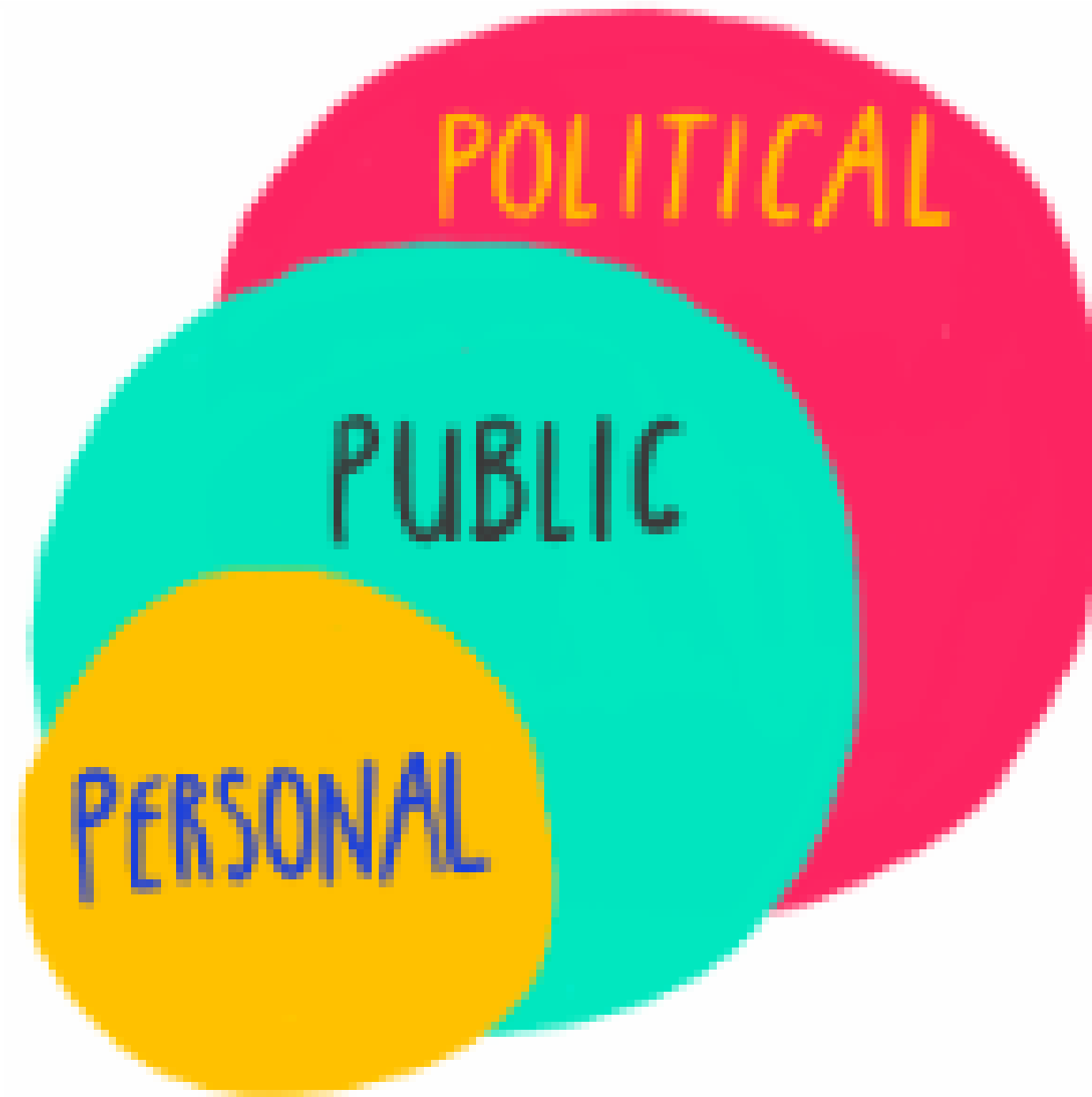
EVERY YEAR MATTERS

EVERY CHOICE MATTERS

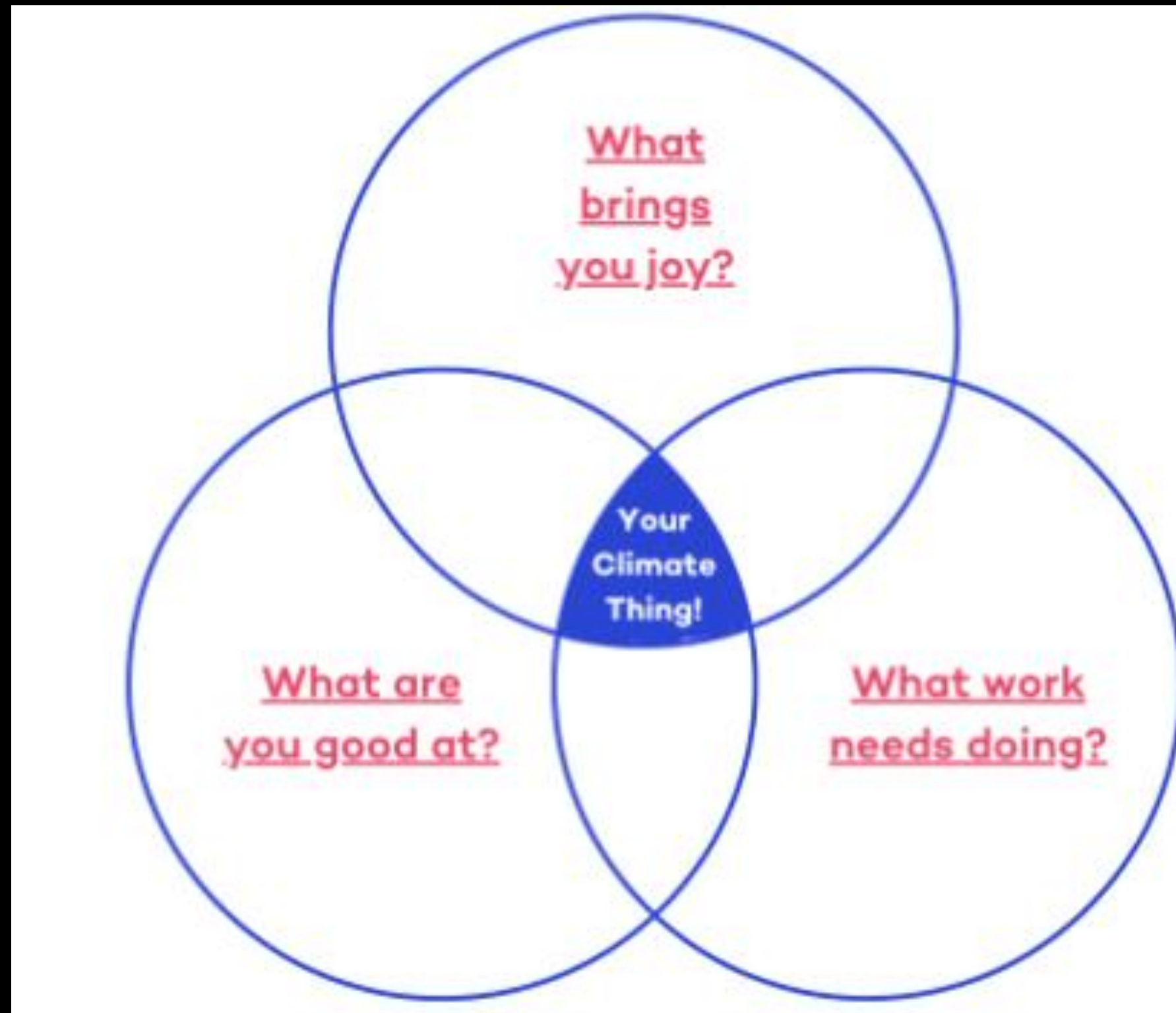
We can lessen our dependency on fossil fuels?



Spheres of influence



The most effective types of action combine what you are good at and what brings you joy!





Leaders in Energy

- ✓ Canada's largest refinery
- ✓ The Port of Belledune's Green Energy Hub
- ✓ North American first on Gen IV SMR industrial application
- ✓ Provincial Hydrogen Roadmap
- ✓ 40 years of nuclear leadership
- ✓ Canada's only operational LNG terminal
- ✓ Opening this energy gateway would be a first for Canada
- ✓ Rich natural gas opportunities



**Never doubt that a small group of thoughtful,
committed, citizens can change the world.
Indeed, it is the only thing that ever has.”**

Margaret Mead

Will we change?
Yes! So...

Join those who are using

their voices

their votes

their choices

**to fight for their future, their
community, and their world.**

Use your **voice**
your **vote**
your **choices**

Speak Truth to Power
like your world depends on it...



...because your world depends on it.

Questions?

Thank-you for listening!