

## CAR.Committee

---

**From:** Leslee Matthews <lesleedm@hawaii.edu>  
**Sent:** Monday, September 28, 2020 4:59 PM  
**To:** CAR.Committee  
**Subject:** CAR-23 presentation  
**Attachments:** 2020\_TruthInTen\_PDF\_USEnglish\_compressed.pdf

Please see attached

--

Leslee Matthews, Esq., LMSW  
Attorney | Social Worker | Advocate





**1. Must we change?**

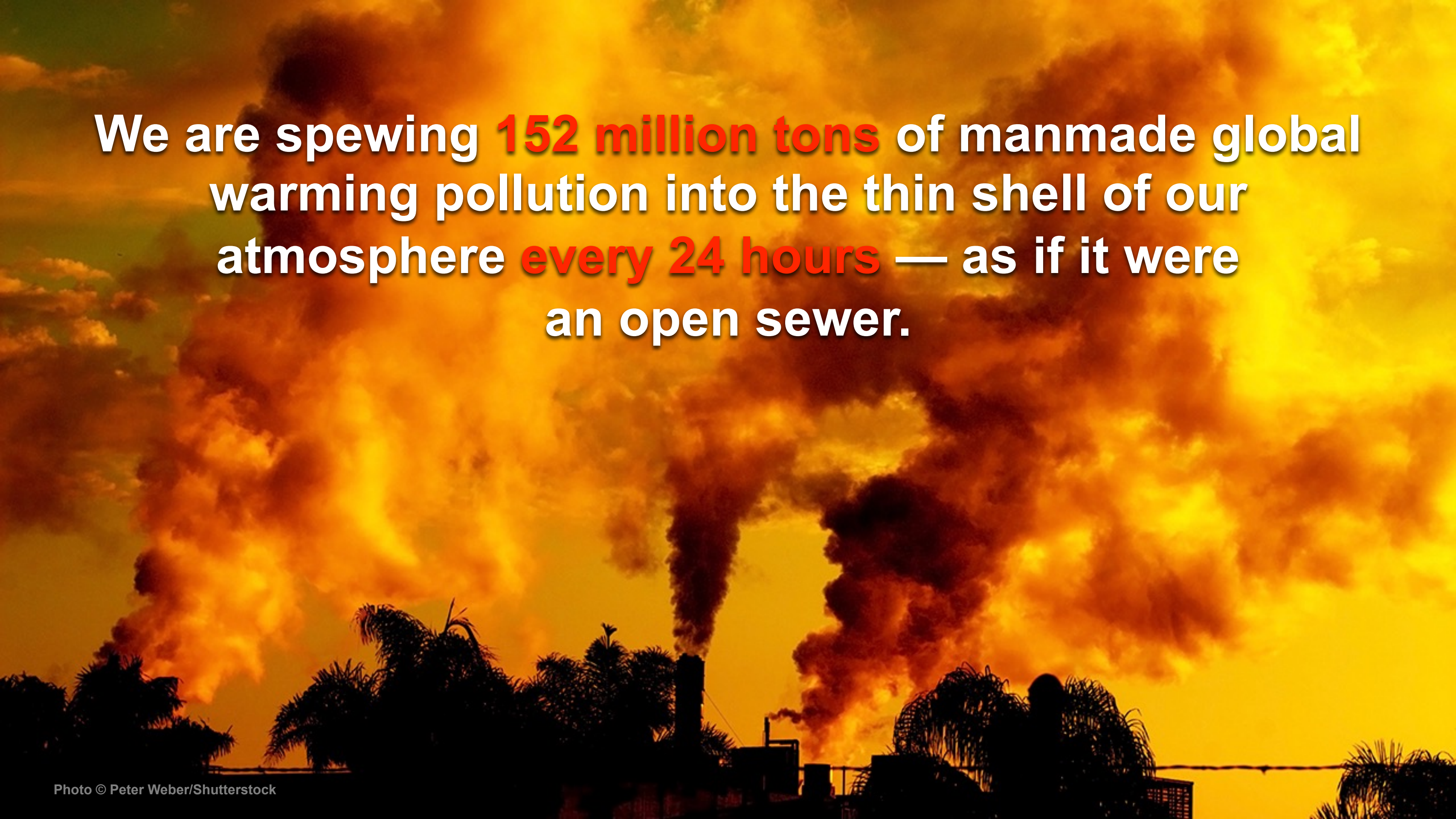
**2. Can we change?**

**3. Will we change?**



**1. Must we change?**





We are spewing **152 million tons** of manmade global warming pollution into the thin shell of our atmosphere **every 24 hours** — as if it were an open sewer.

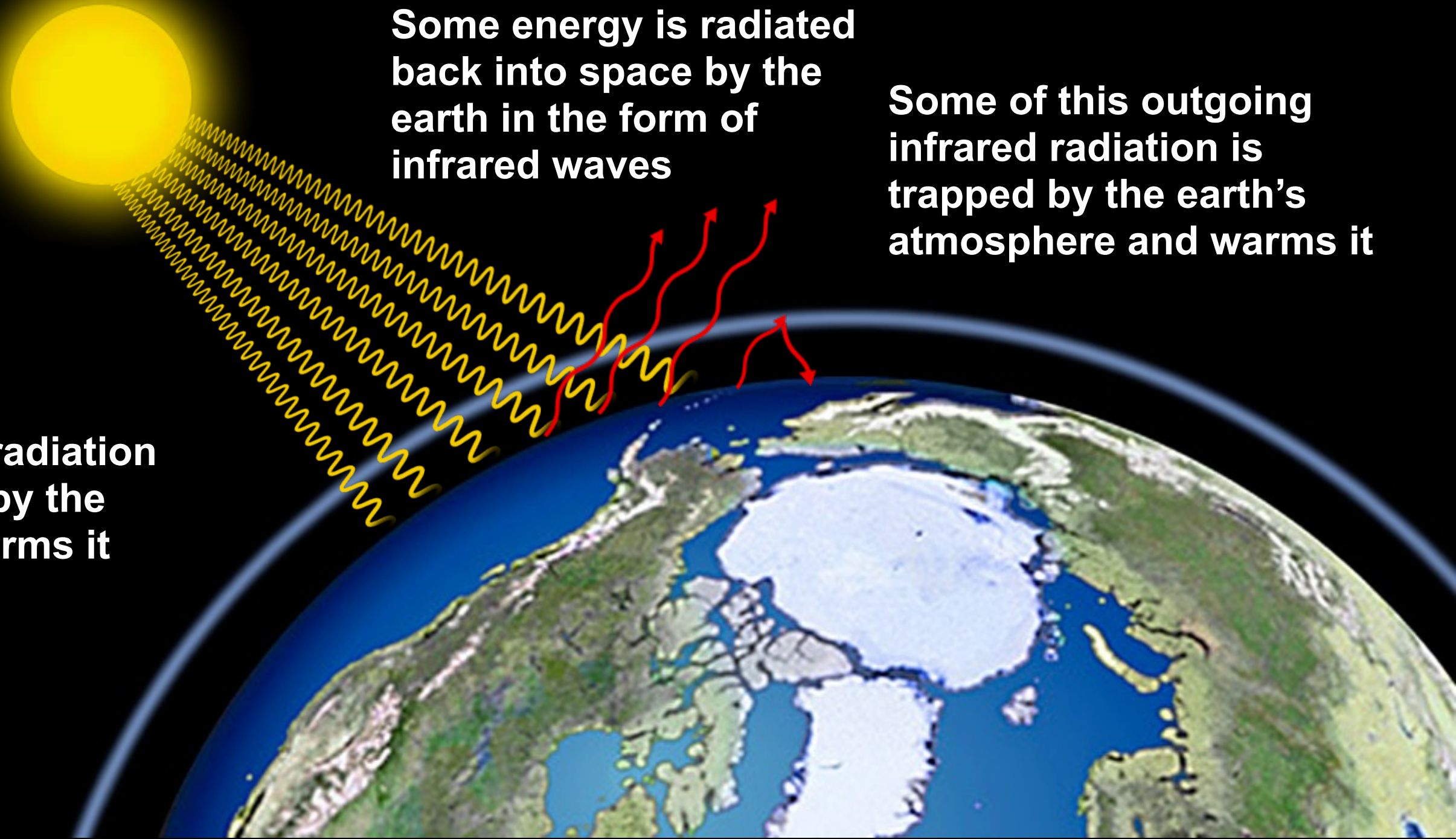


**Solar radiation  
in the form of lightwaves  
passes through the  
atmosphere**

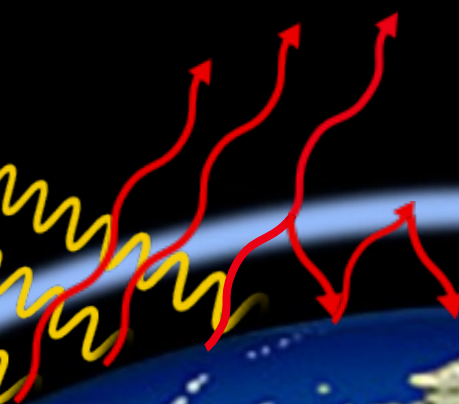
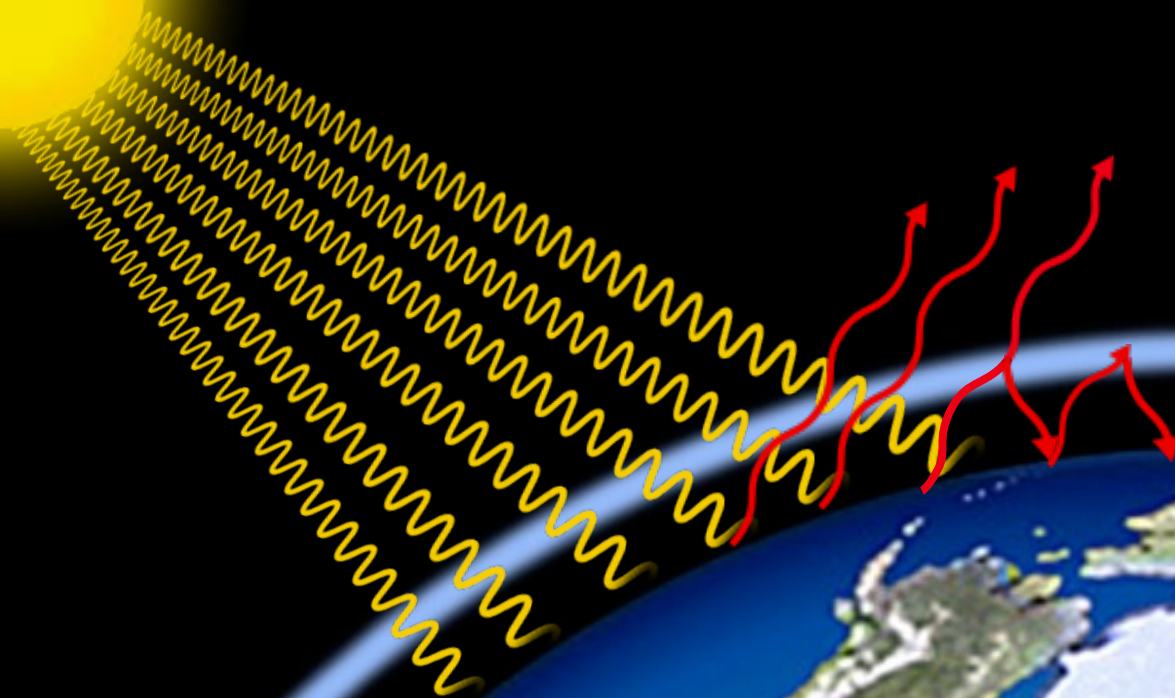
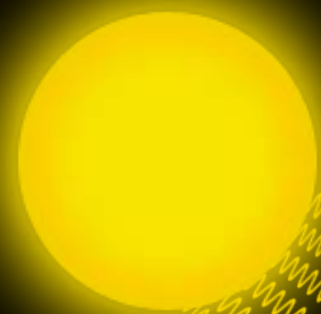
**Some energy is radiated  
back into space by the  
earth in the form of  
infrared waves**

**Some of this outgoing  
infrared radiation is  
trapped by the earth's  
atmosphere and warms it**

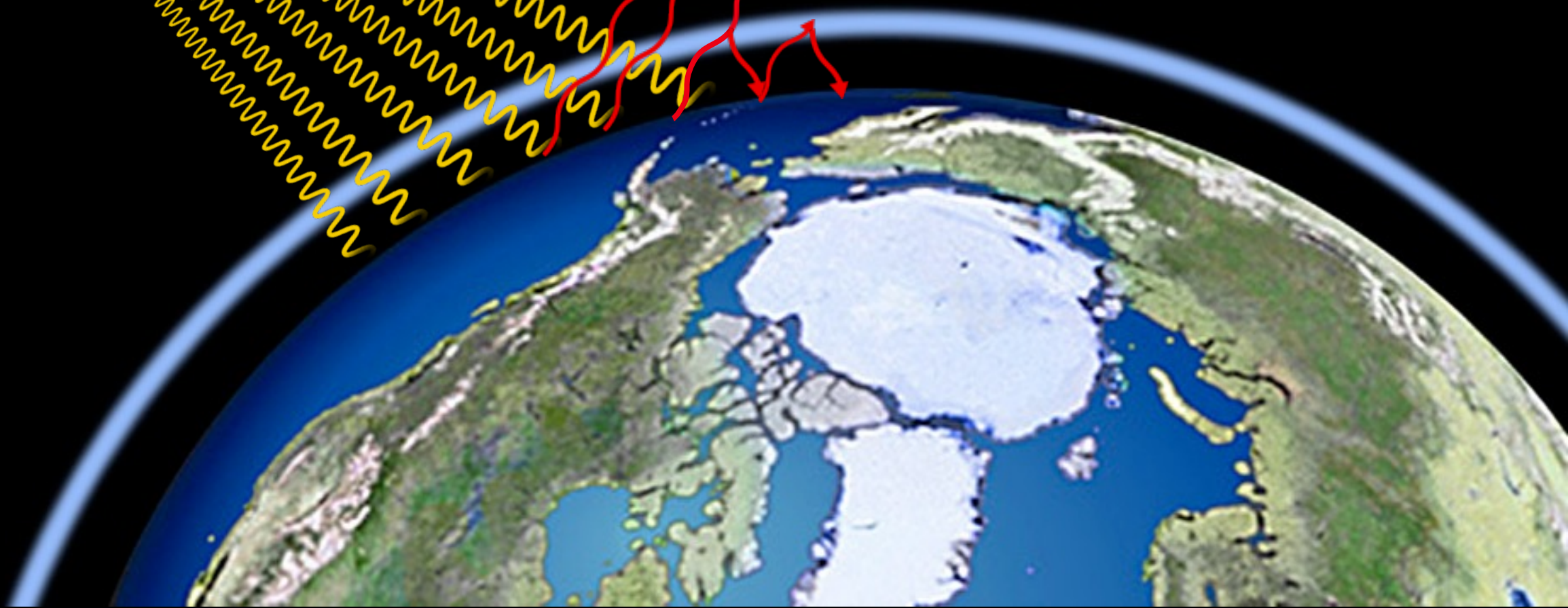
**Most of this radiation  
is absorbed by the  
Earth and warms it**







**As the CO<sub>2</sub> concentration increases, more of the outgoing infrared radiation is trapped.**





# THE BIGGEST SOURCES OF GREENHOUSE GASES



THAWING PERMAFROST

COAL MINING

COAL PLANTS

OIL PRODUCTION

CROP BURNING

FERTILIZATION

FOREST BURNING

INDUSTRIAL PROCESSES

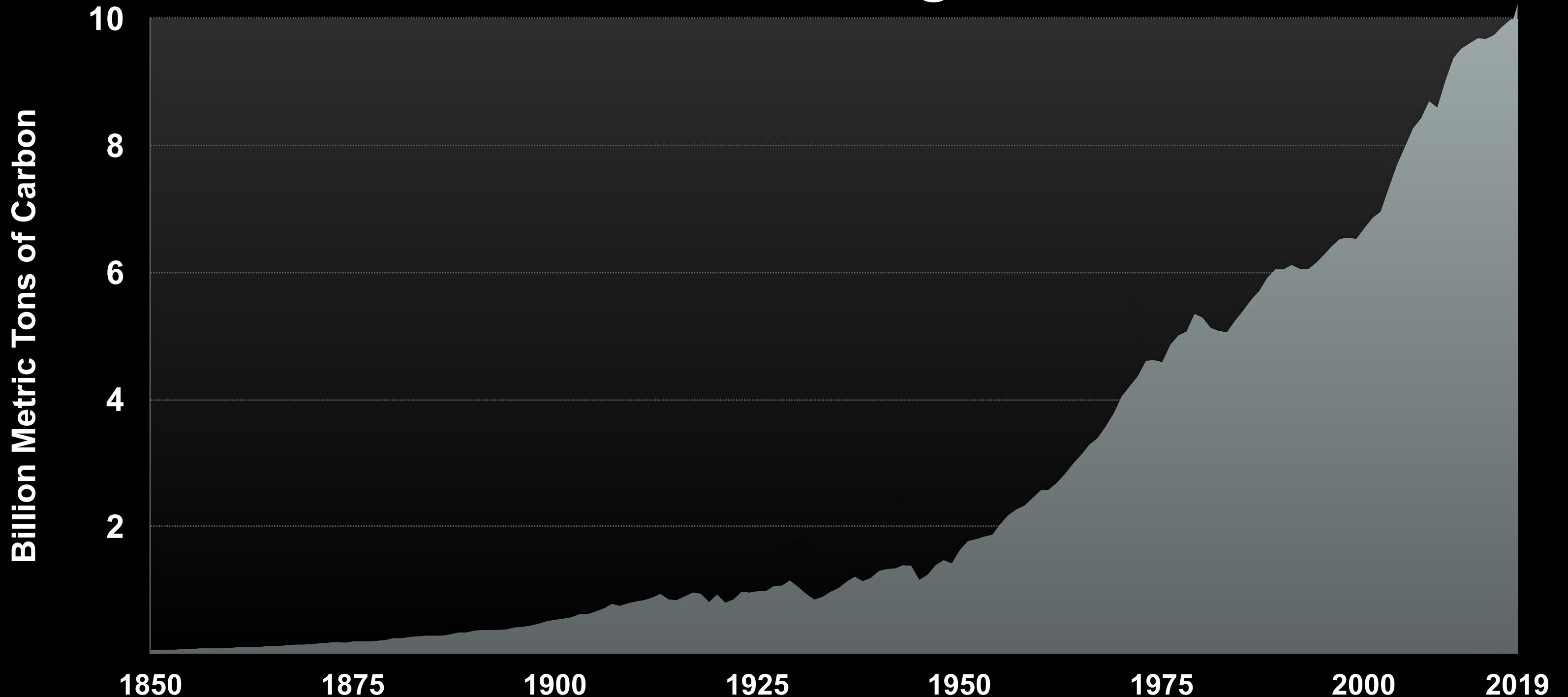
LAND TRANSPORT

INDUSTRIAL AGRICULTURE

LANDFILLS



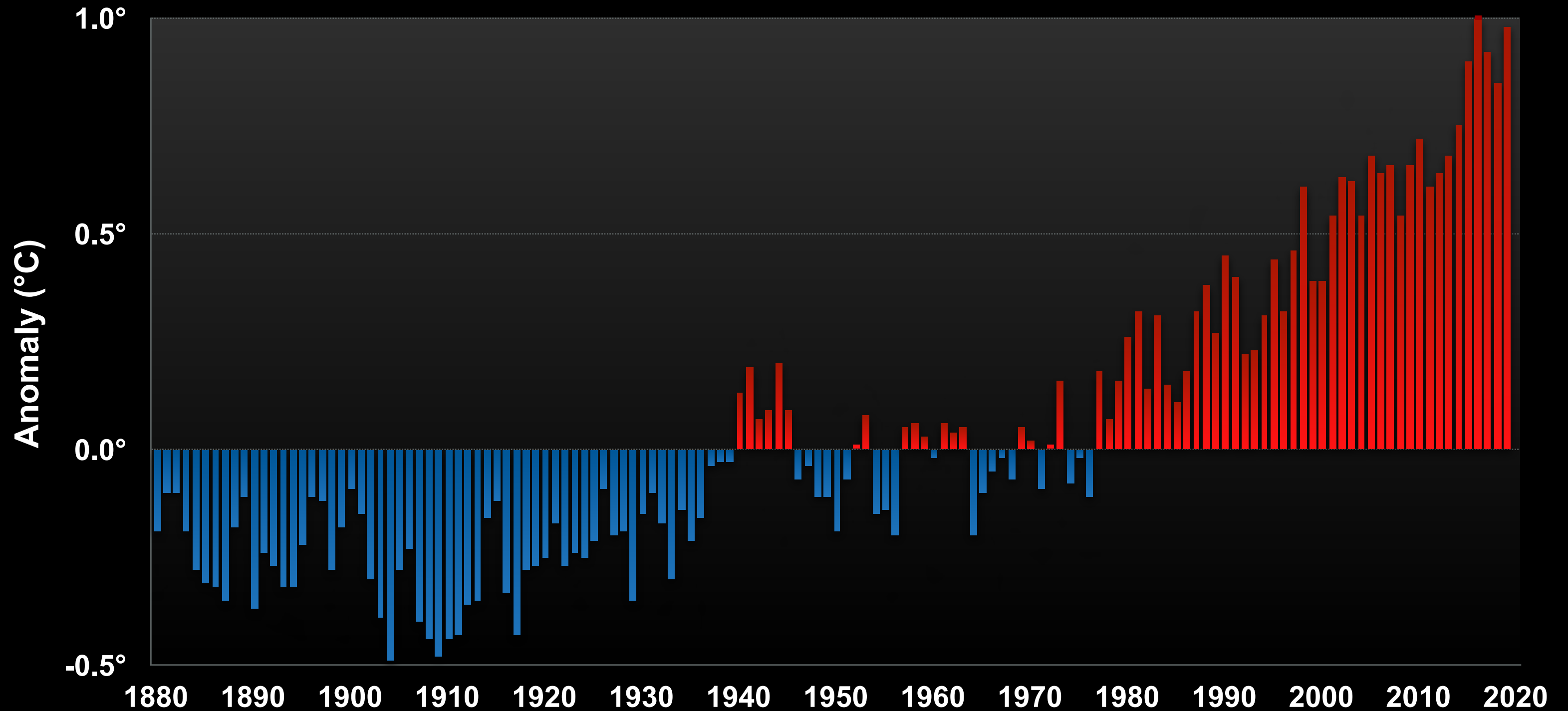
# The Largest Source of Global Warming Pollution Is the Burning of Fossil Fuels



Data: U.S. Department of Energy/CDIAC, updated: Peters, G.P. et al., Carbon dioxide emissions continue to grow amidst slowly emerging climate policies. Nat. Clim. Chang. 10, 3–6 (2020)

# Global Surface Temperature – Departure from Average

1880 – 2019





# 19 of the 20 Hottest Years on Record Have Occurred Since the Year 2001

2016

2019

2017

2015

2018

2014

2010

2013

2005

2009

2007

2012

2006

2002

2003

2011

1998

2008

2004

2001

# The Hottest of All Have Been the Last Five Years

**2016**

**2019**

**2017**

**2015**

**2018**







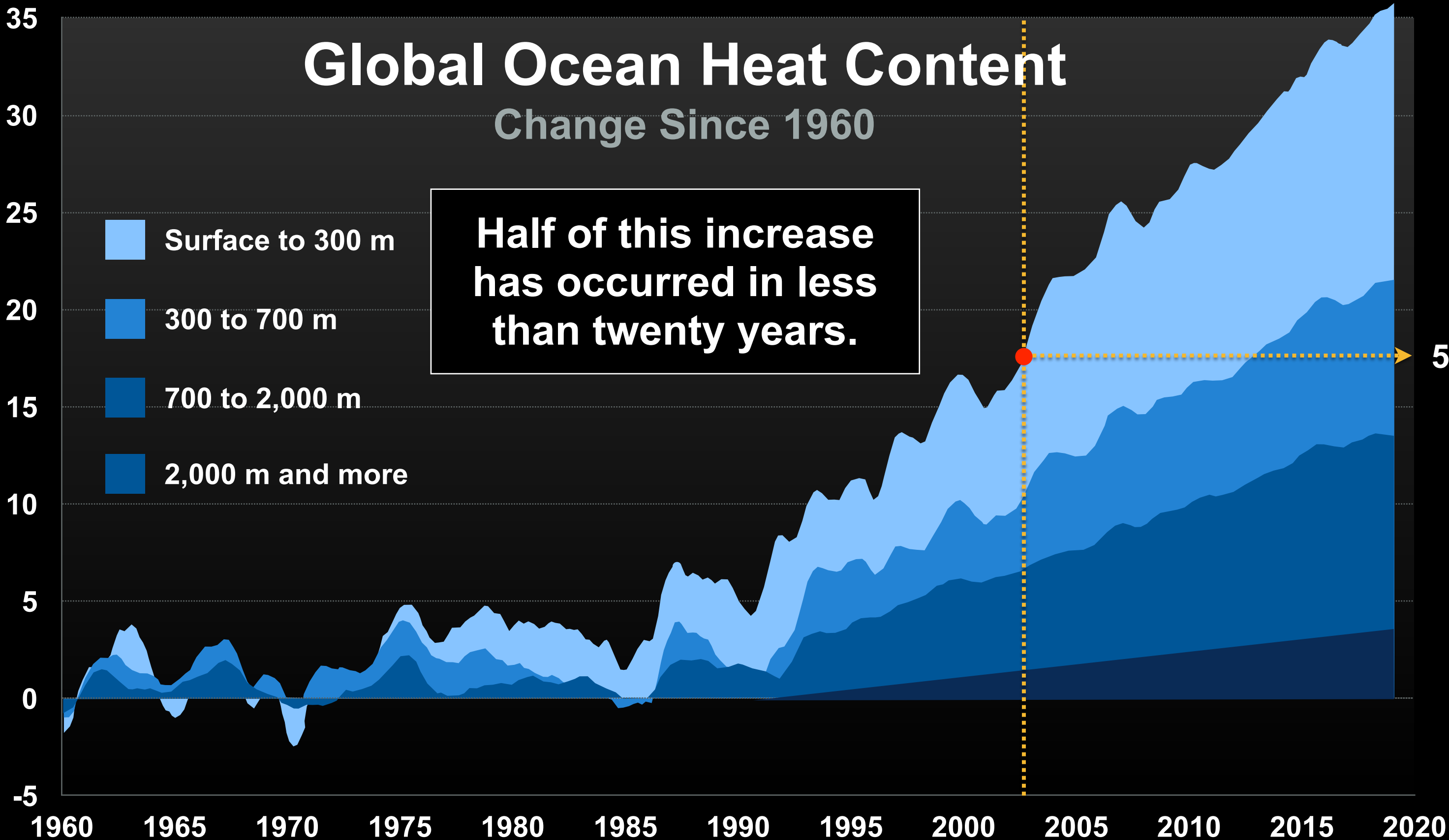
# Global Ocean Heat Content

## Change Since 1960

Ocean Heat Content ( $10^{22}$  J)  
0 – 2000 m Depth

- Surface to 300 m
- 300 to 700 m
- 700 to 2,000 m
- 2,000 m and more

Half of this increase  
has occurred in less  
than twenty years.





# Hurricane Florence

September 14, 2018

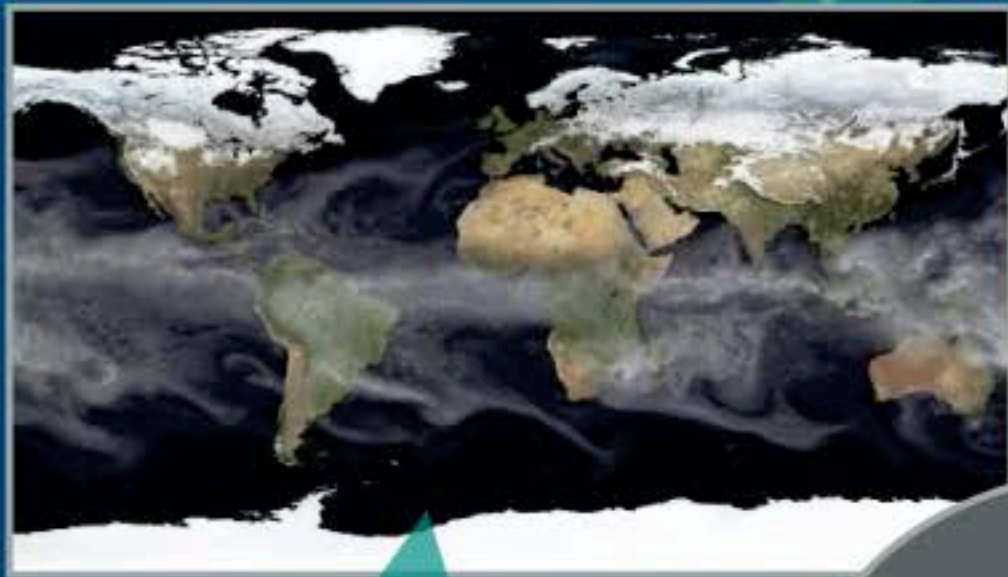
Wilmington NC



Source: 2018 NOAA-NESDIS



**Evaporation**



**Precipitation**



**The  
Hydrological  
Cycle**



**Water Returns to the Sea**







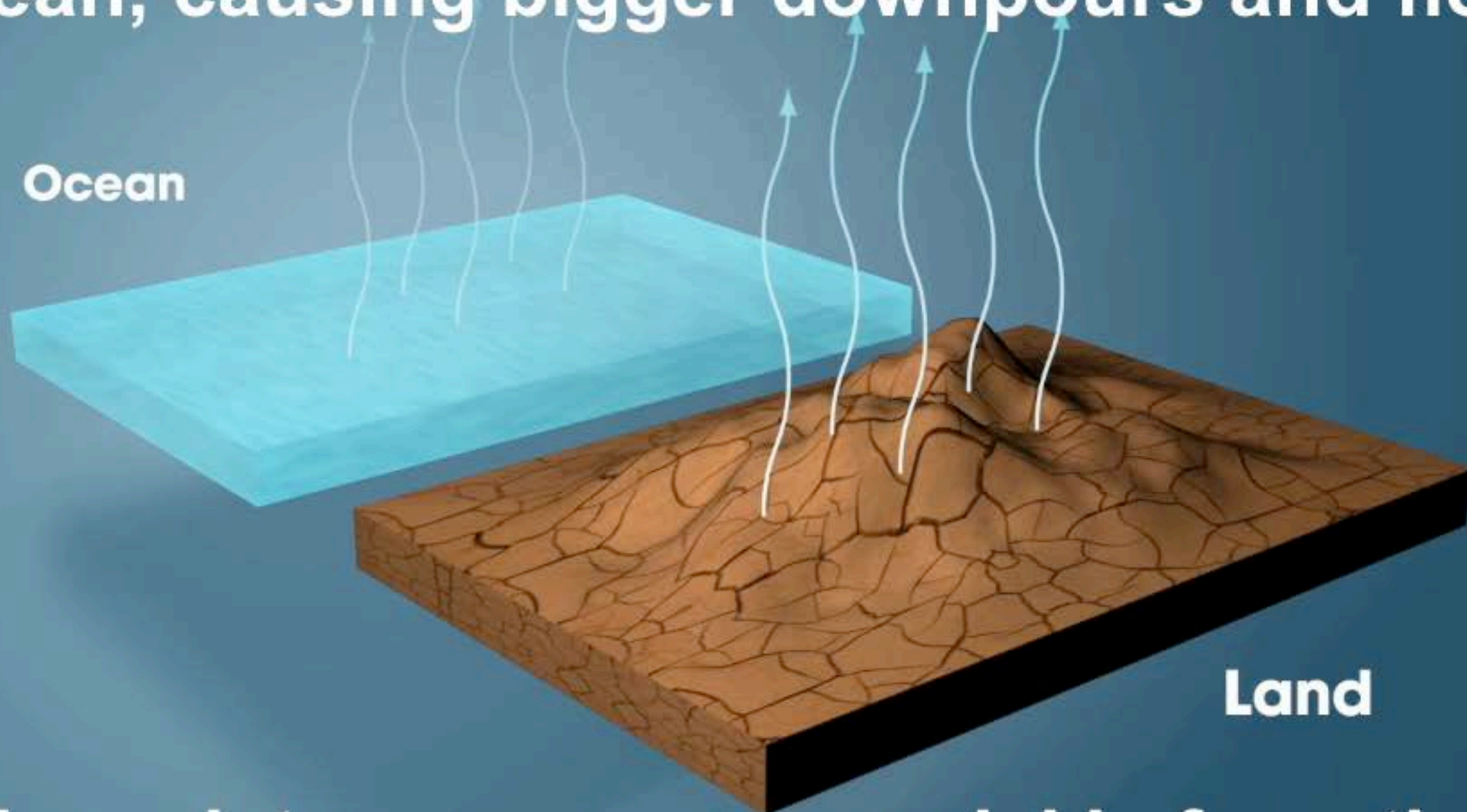
# Tamil Nadu, India

December 2, 2015





**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.**

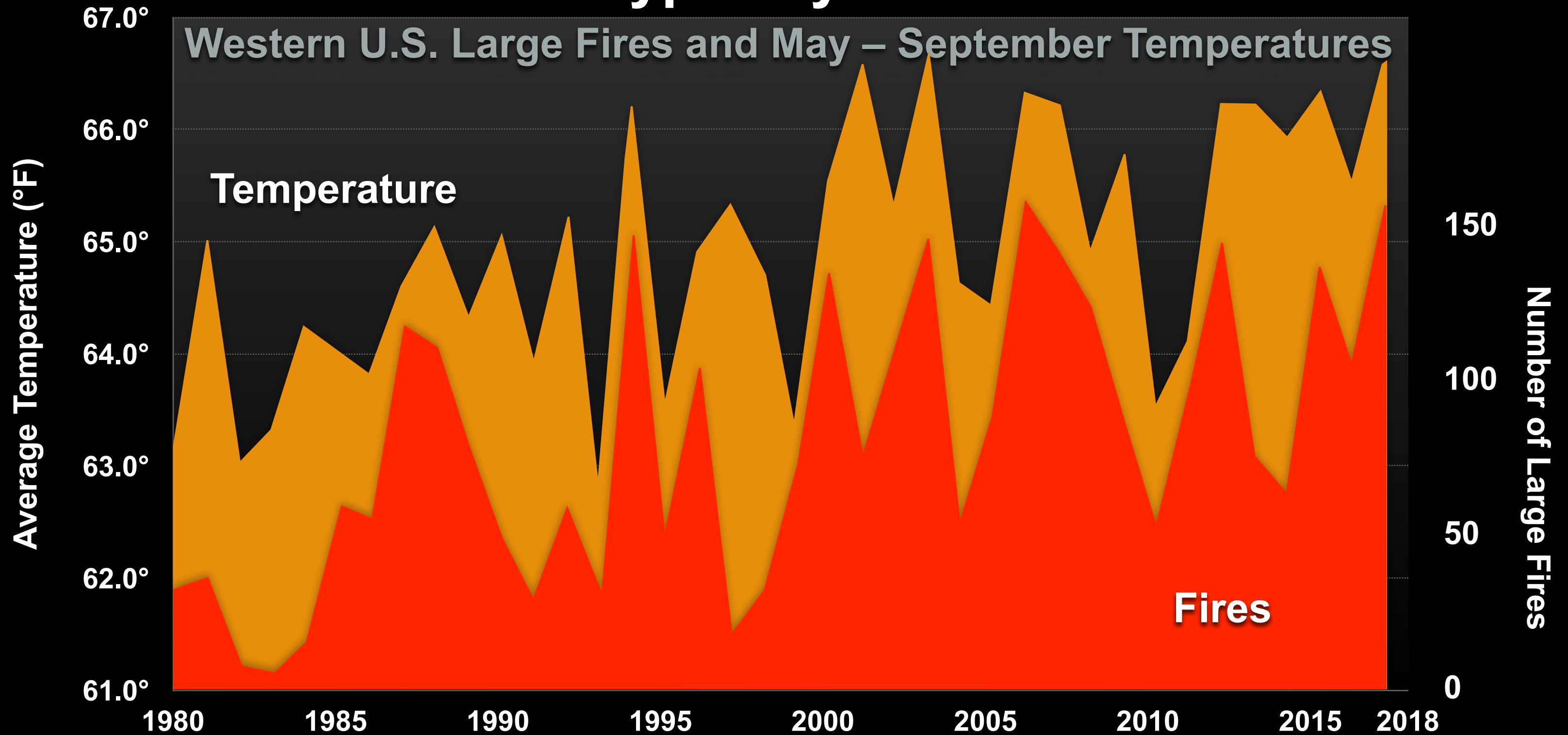


# São Paulo State, Brazil





# Hotter Years Typically Have More Fires





# Fort McMurray, Alberta, Canada

May 3, 2016

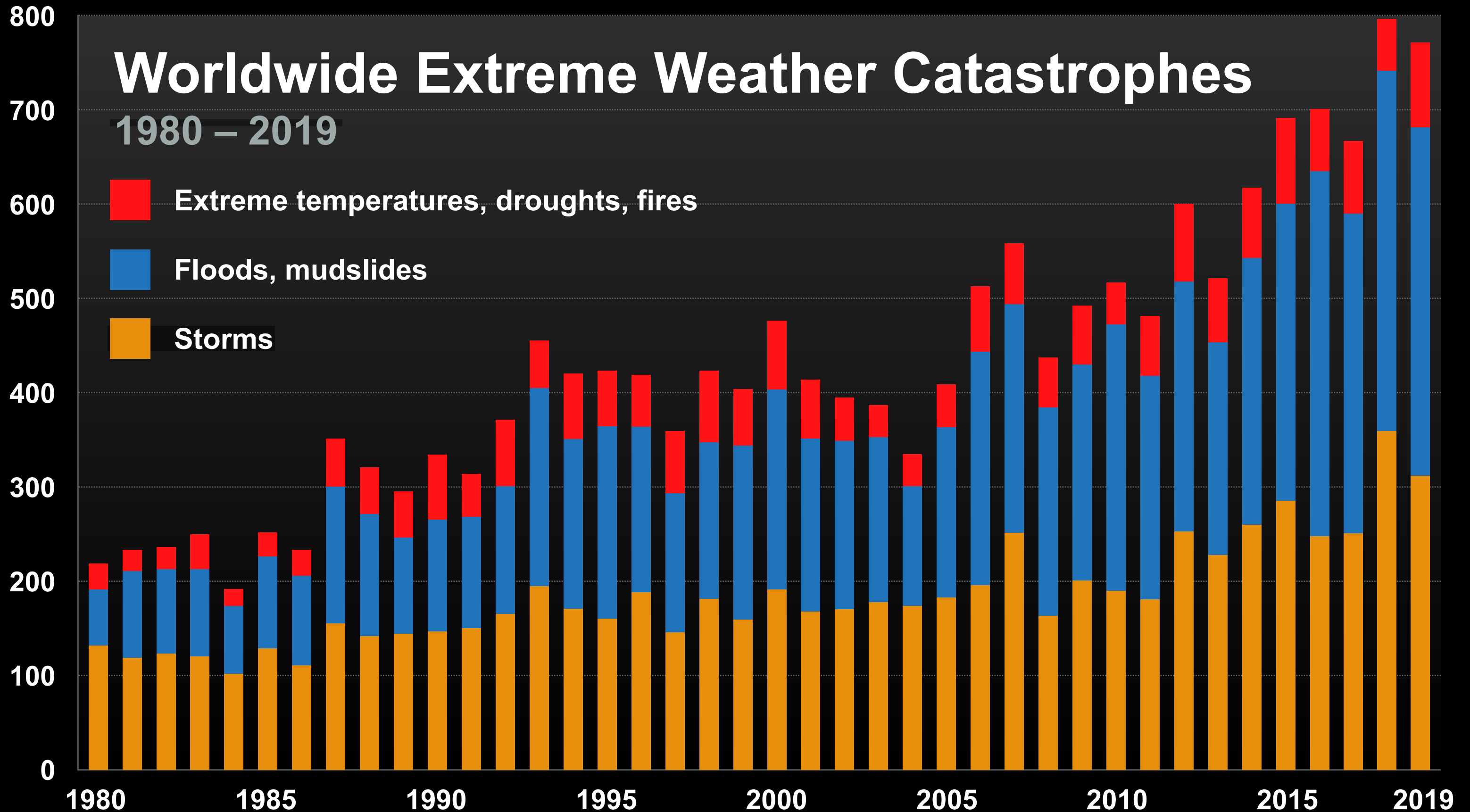


# Worldwide Extreme Weather Catastrophes

1980 – 2019

Number of Events

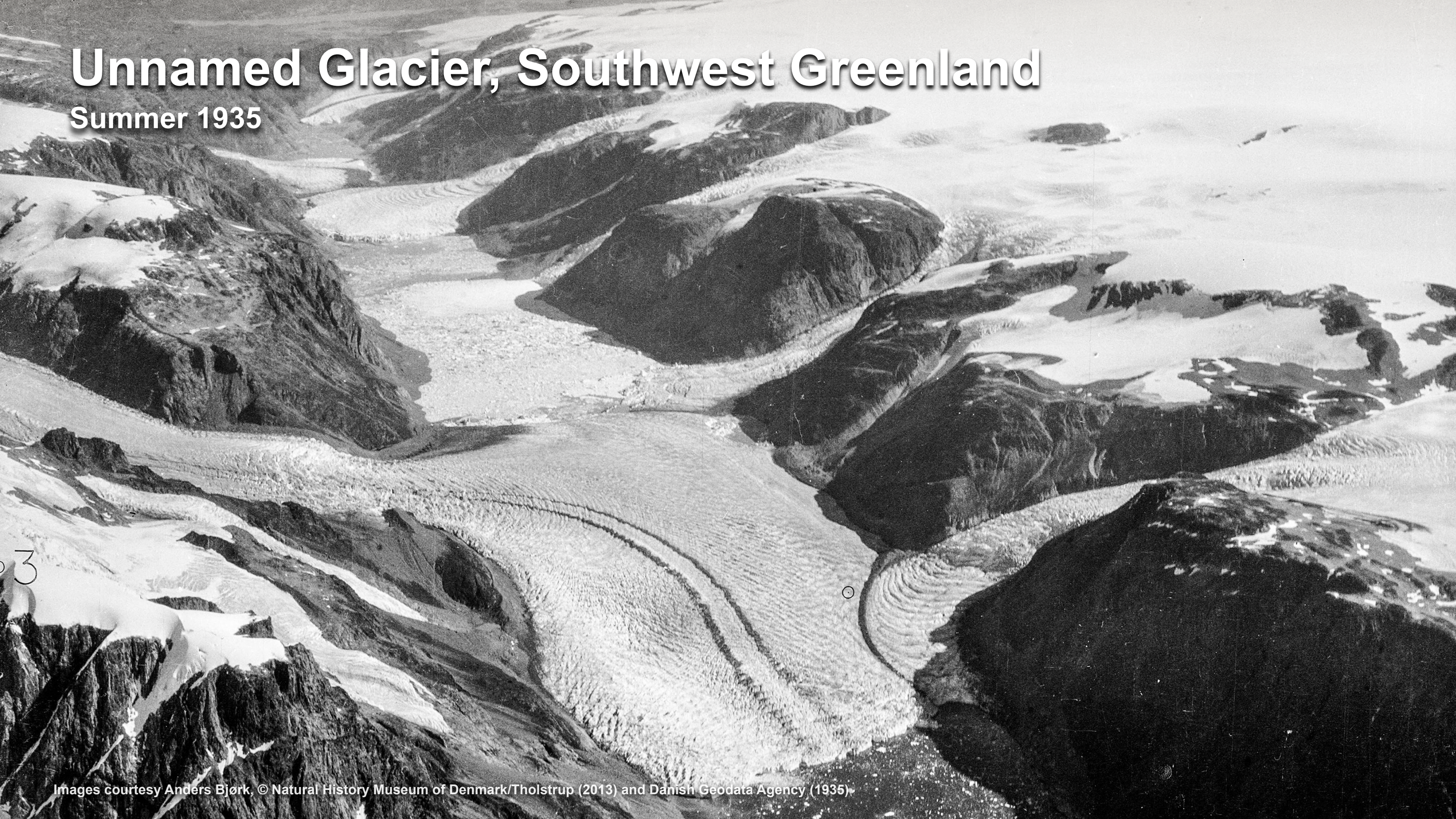
- Extreme temperatures, droughts, fires
- Floods, mudslides
- Storms





# Unnamed Glacier, Southwest Greenland

Summer 1935



3



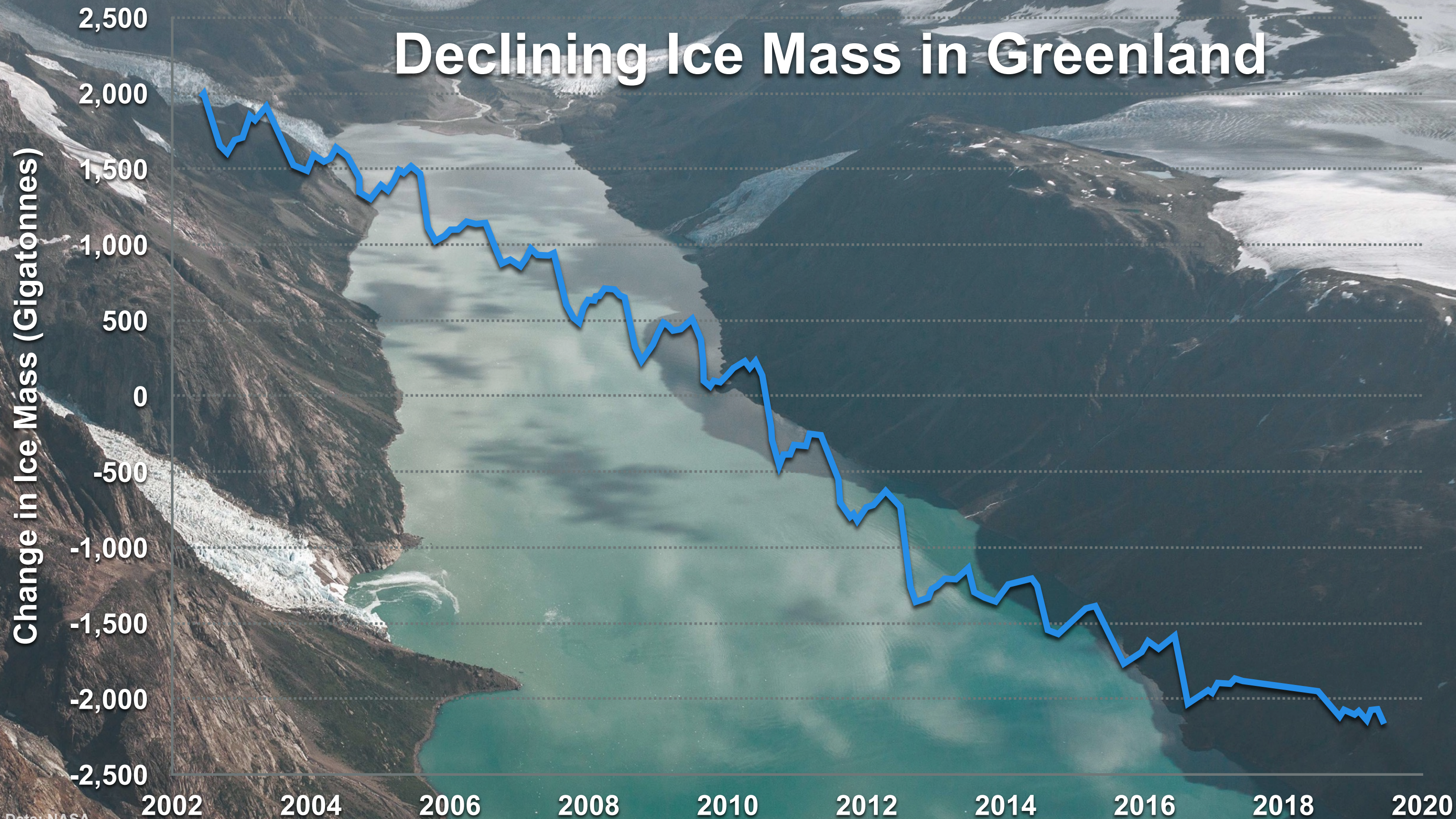


# Unnamed Glacier, Southwest Greenland

Summer 2013



# Declining Ice Mass in Greenland



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



# Miami Beach, Florida

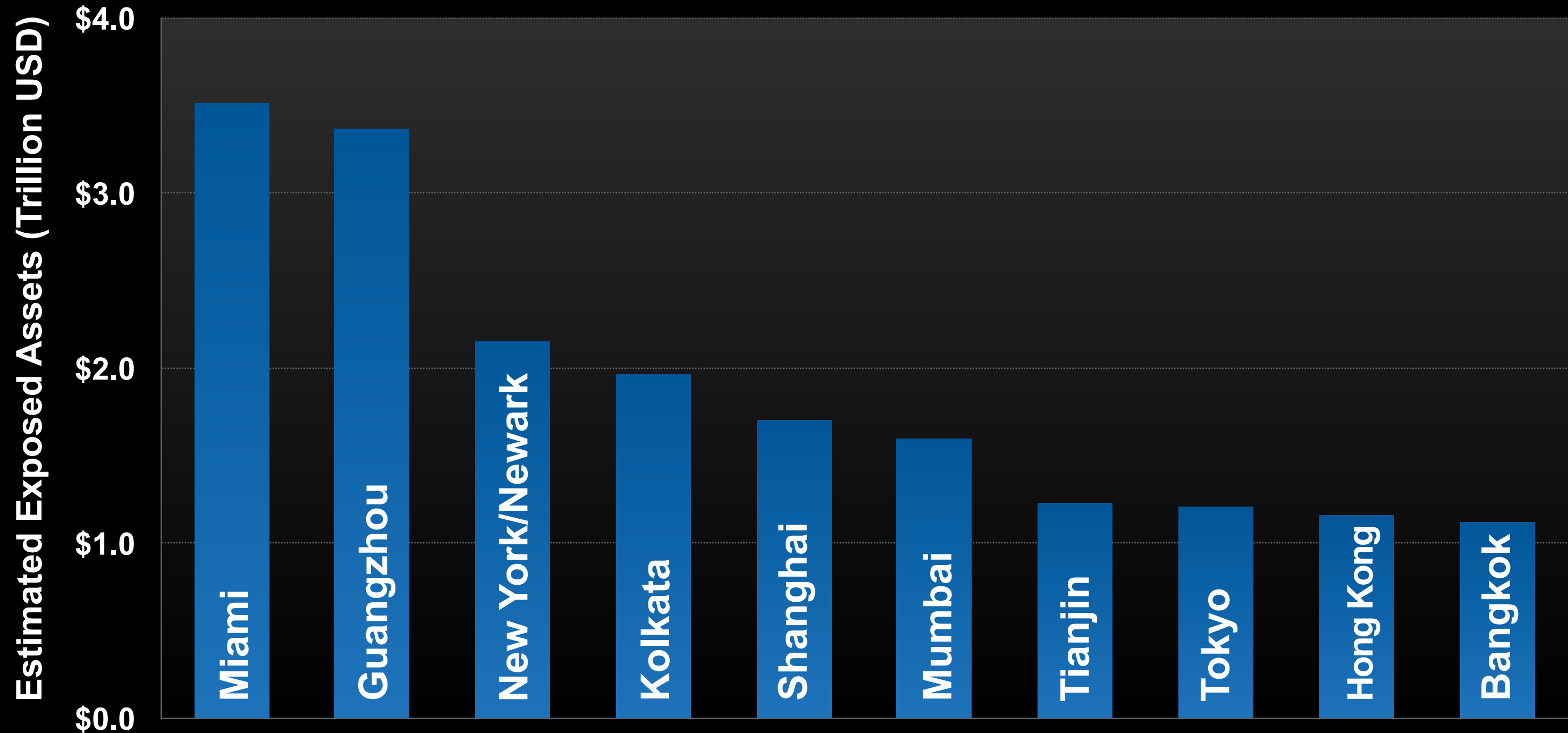
September 29, 2015





# Top 10 Cities at Risk from Sea Level Rise in 2070

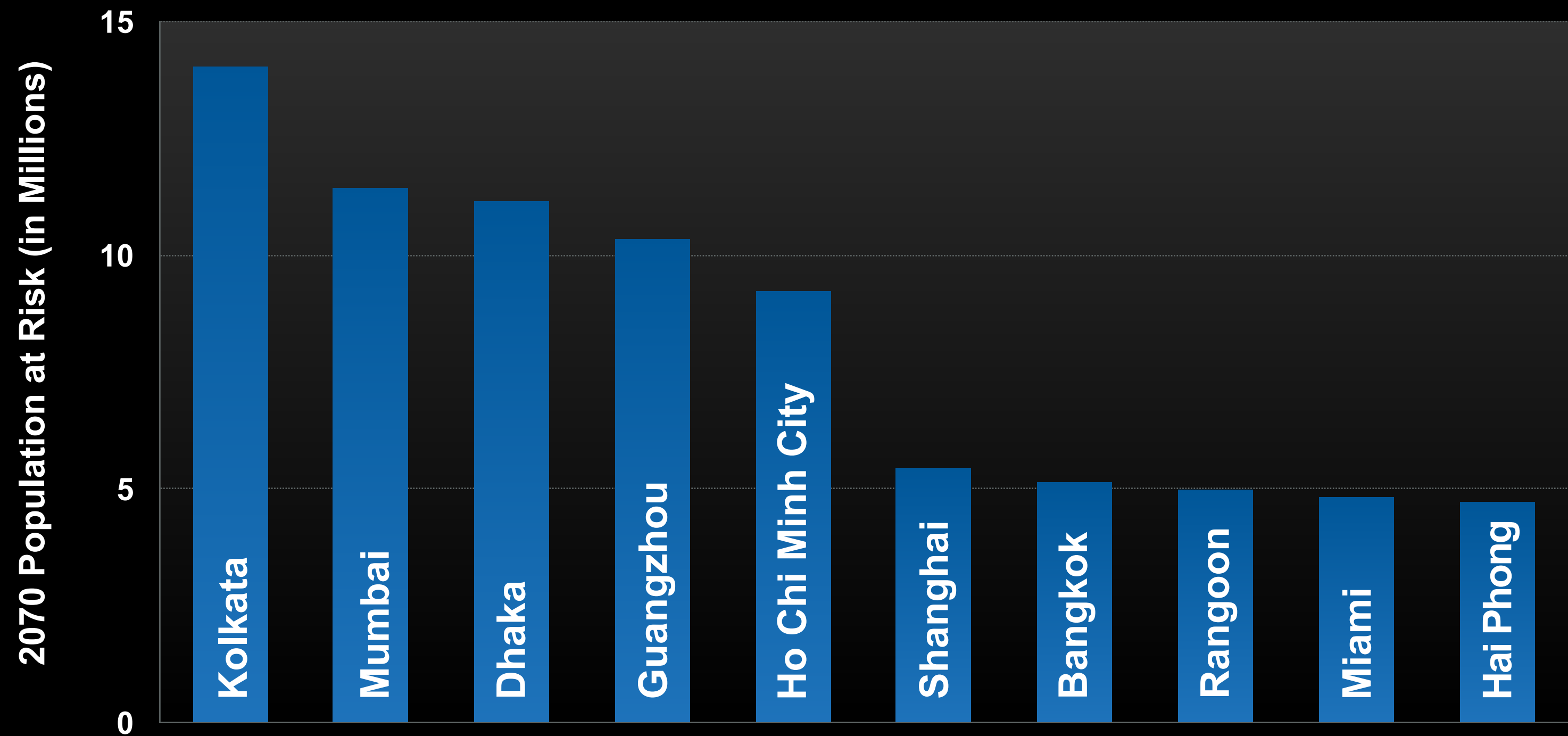
## By Assets at Risk





# Top 10 Cities at Risk from Sea Level Rise in 2070

By Population at Risk





October 13, 2014

**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... natural  
disasters in regions across the globe.”**





**“I think there’s been an under-recognition of just  
**how sensitive crops are to heat,**  
and how fast heat exposure is increasing.”**

**David Lobell, Stanford University**



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

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

**June 2015**



# Tropical Diseases on the Move



West Nile Virus

Rift Valley Fever

Chikungunya

Chagas Disease

Cryptococcus Gattii Fungus

Dengue Fever

Zika Virus





***Aedes aegypti*, the principal  
carrier of the Zika virus.**



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





# The Cost of Carbon

\$ *Political Instability*

\$ *Floods & Mudslides*

\$ *Wildfires*

\$ *Drought*

\$ *Storm Damage*

\$ *Ocean Acidification*

\$ *Infrastructure Loss*

\$ *Climate Refugees*

\$ *Species Extinction*

\$ *Melting Glaciers*

\$ *Famine*

\$ *Water Scarcity*

\$ *Ecosystem Loss*

\$ *Our Way of Life*

\$ *Infectious Diseases*

\$ *Sea Level Rise*



\$ *“The #1 Threat to the  
Global Economy”*

*... And much, much more*



**So...**

**Must we change?**

**Yes!**



**2. Can we change?**



**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 2019 that goal  
was exceeded by  
a factor of

**22 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

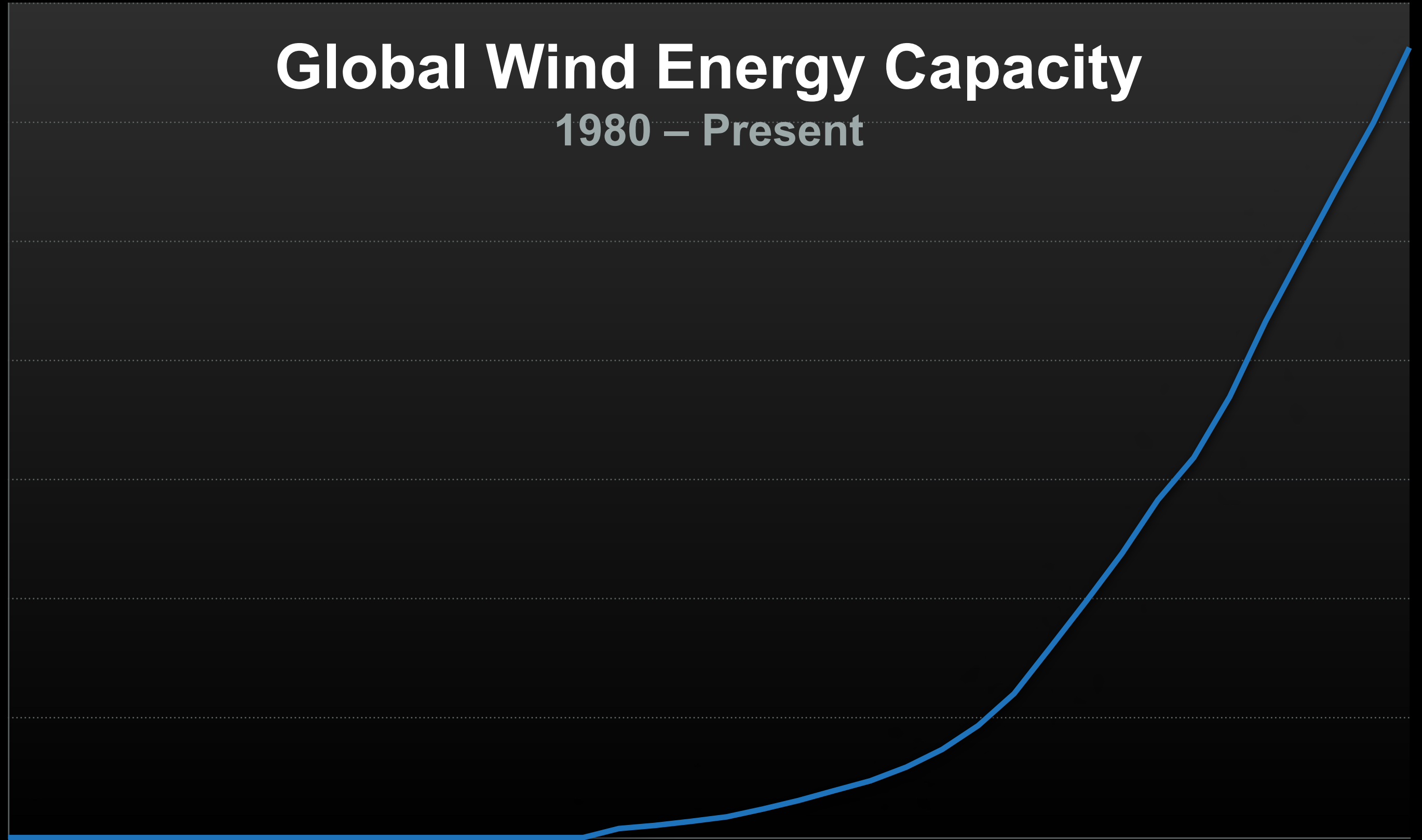
2005

2010

2015

2019

Data: Earth Policy Institute/Bloomberg New Energy Finance







**Globally, wind could  
supply worldwide  
electricity consumption  
40 times over**



# 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  
that goal was  
exceeded by

**17 x**



# Solar Energy Progress

How Do Projections Compare With Reality?

## 2002 Projection

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

## Reality

In 2019 it was  
exceeded by

**121 x**



# World Solar PV Installations

1980 – 2019

Gigawatts (Cumulative)

700  
600  
500  
400  
300  
200  
100

1980

1985

1990

1995

2000

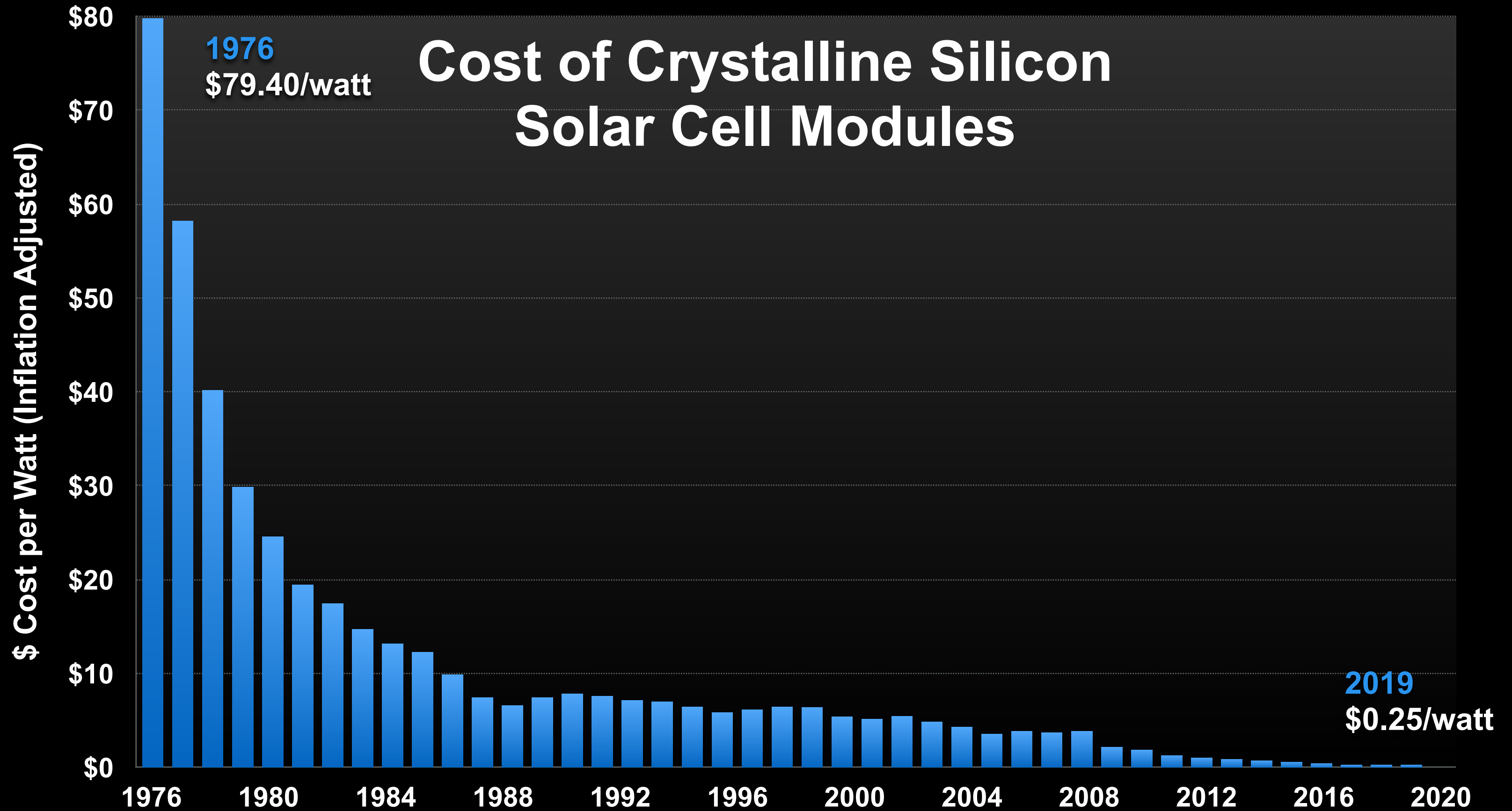
2005

2010

2015

2019







# Pay-as-you-go Solar Power

Low initial costs make small solar systems affordable in developing countries

Photo courtesy Azuri Technologies

Nimule, South Sudan



# 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

11 MW  
End of 2013

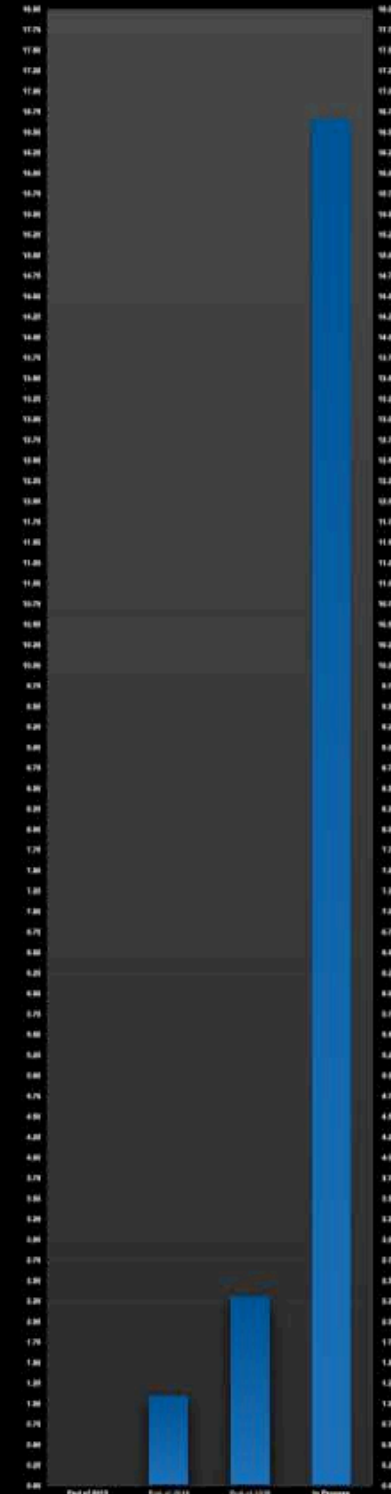
1.1 GW  
End of 2016

2.3 GW  
End of 2018



# The Chilean Solar Market

Installed Capacity (GW)



Chile has an additional **16.67 GW** of solar projects approved or under construction.



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

3.0  
2.5  
2.0  
1.5  
1.0  
0.5  
0.0

2011

2012

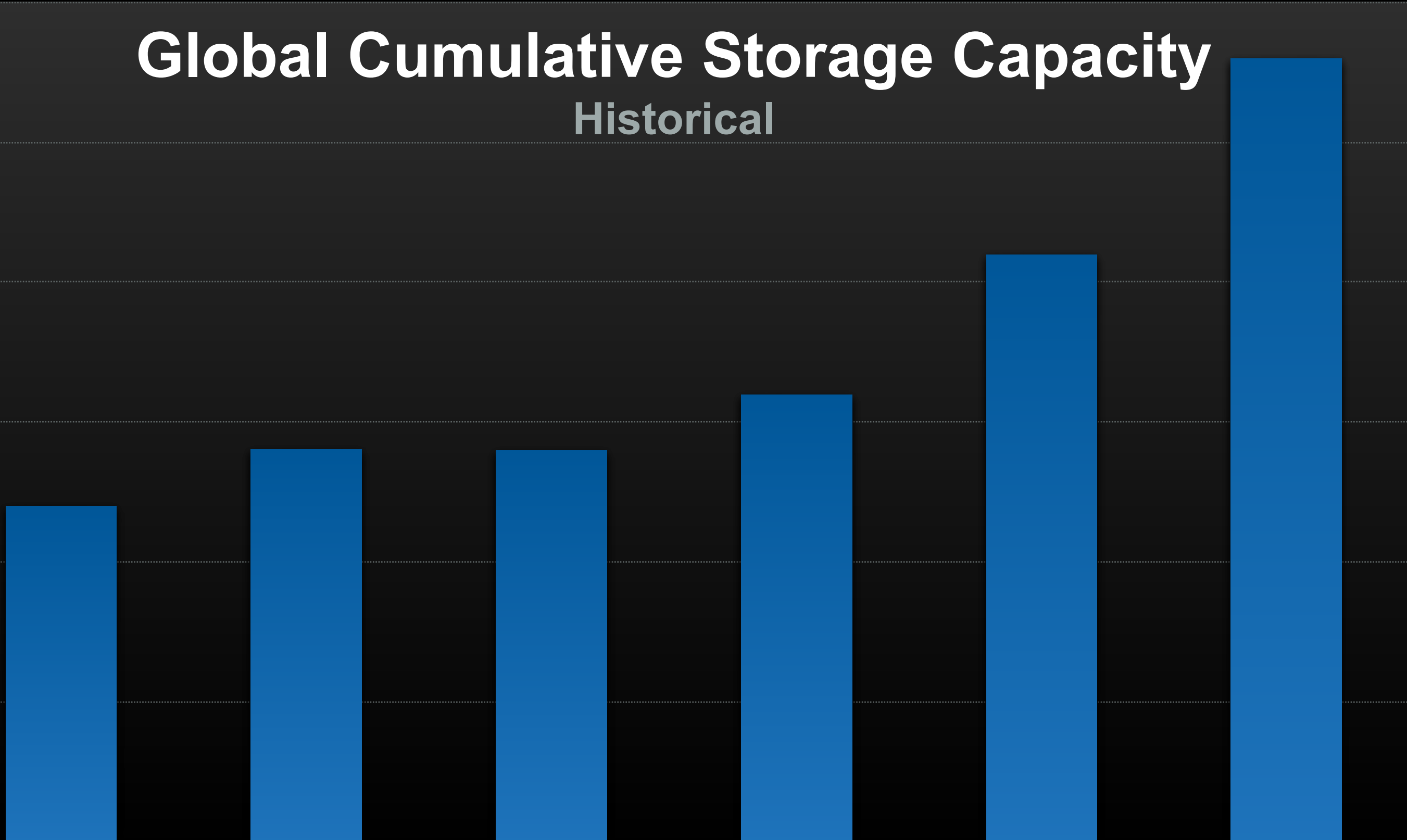
2013

2014

2015

2016

Data: Bloomberg New  
Energy Finance



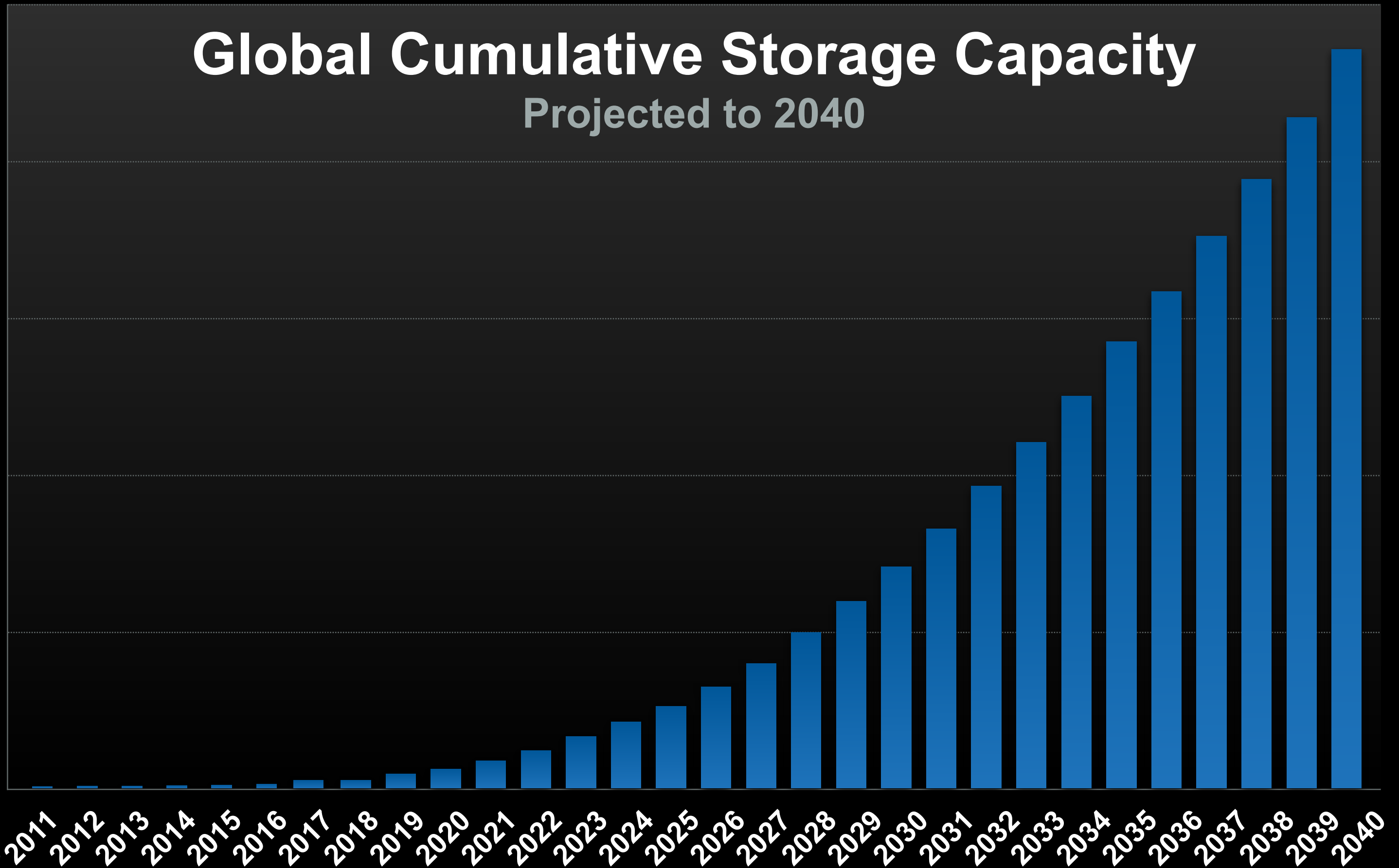


# Global Cumulative Storage Capacity

## Projected to 2040

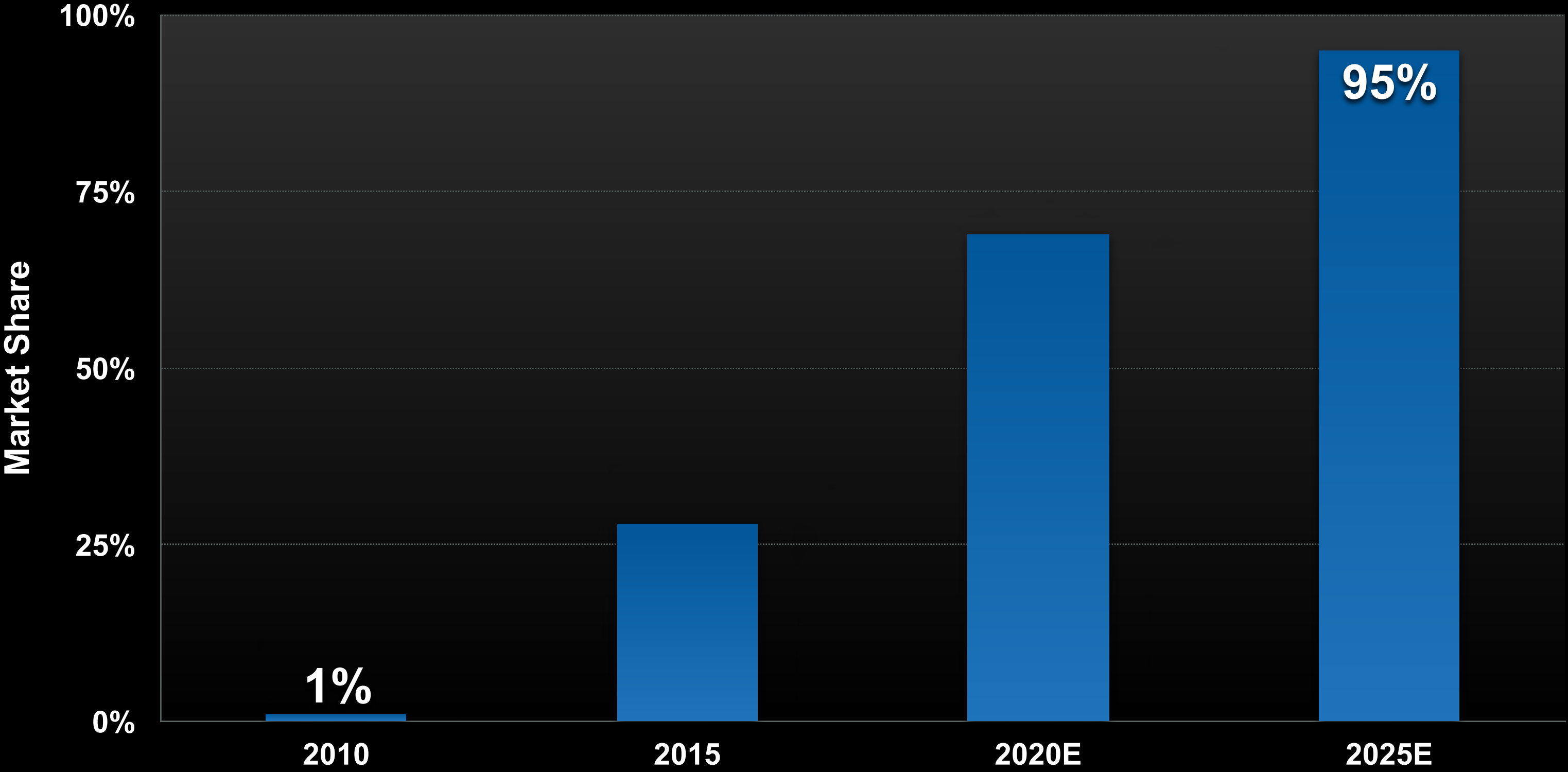
Gigawatts

1,000  
800  
600  
400  
200  
0





# LED Lights: Percentage of the Total Lighting Market





# Auto Manufacturers Are Moving to Electric Vehicles

Companies with Electric Models in Production

Aixam	Chevy	GM	Mercedes-Benz	\$mart
Aston Martin	Citroën	Goupil	Mitsubishi	Subaru
Audi	Citydom GmbH	Honda	Mullen	Tata
BAIC	CODA	Hyundai	NIO	Tesla
BMW	Daimler	JAC	Nissan	Toyota
Bolloré	Exagon	Kandi	Opel	Trumpchi
Buddy Electric	Fiat	Kantanka	Peugeot	Venturi
BYD	Fisker	Kia	Qiantu	Volkswagen
ChangAn	Ford	Kyburz	Rayttle	Zotye
Chery	Geely	Mahindra	Renault	



So...

Can we change?

Yes!

**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.

The U.S. cannot legally  
withdraw until the day after  
the 2020 Presidential election.



# People's Climate March, Washington, D.C.

April 29, 2017





**Join those who are using  
their **voices**  
their **votes**  
their **choices**  
to fight the climate crisis.**



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

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





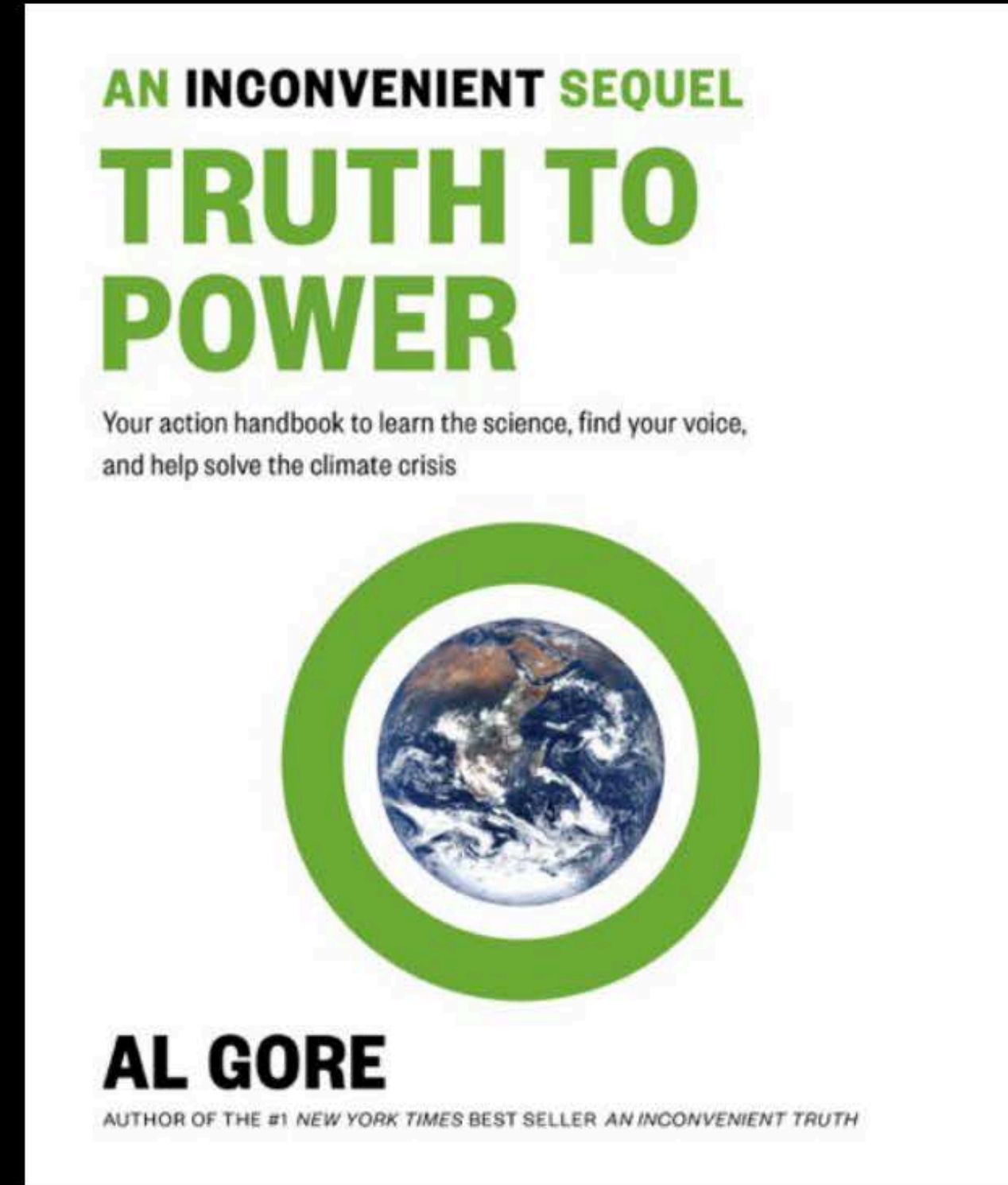
**Your world depends on it.**



# Take the Next Step—See the Movie and Read the Book



© 2017 Paramount Pictures. All Rights Reserved.



© 2017 Melcher Media/Rodale Inc.



