

Climate Change The New Reality



www.climatereality.org.in



The Climate
Reality Project
INDIA



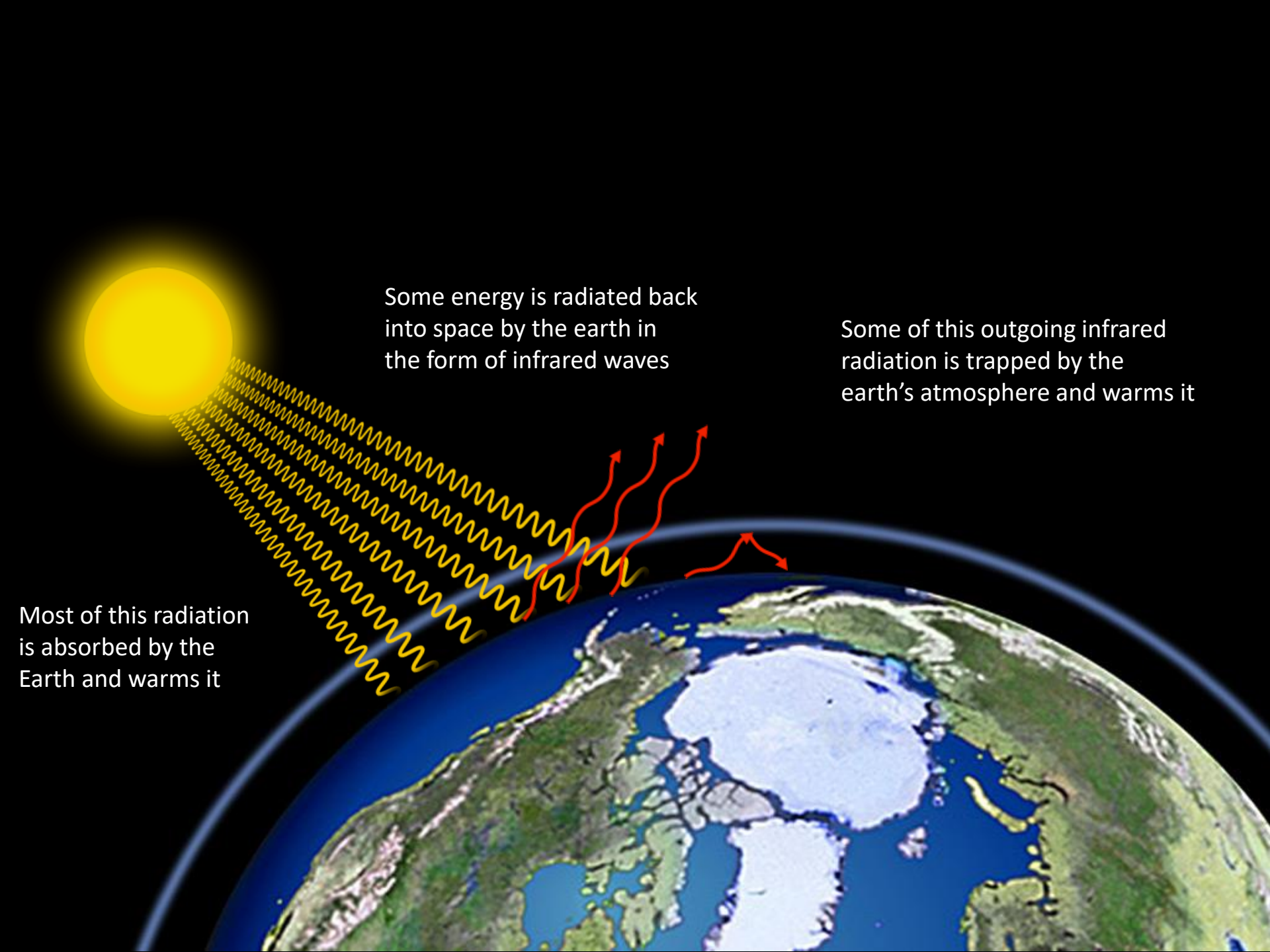
**The Climate
Reality Project®**



Source: NASA



Source: NASA



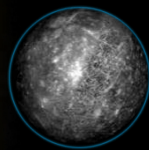
Some energy is radiated back
into space by the earth in
the form of infrared waves

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



Mercury
167° C



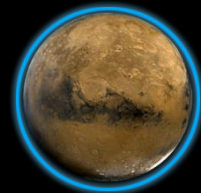
Venus
+457° C

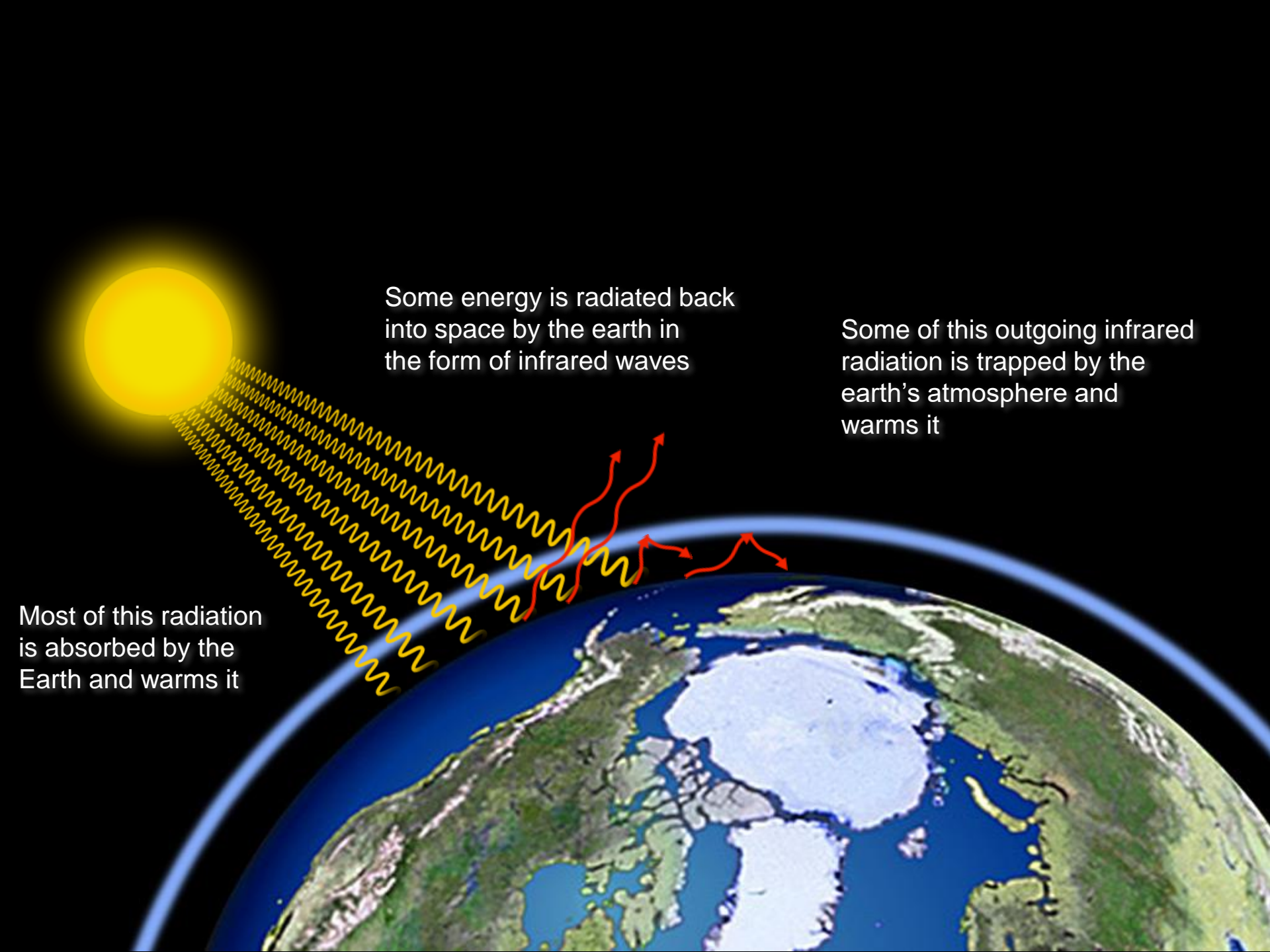


Earth
15° C



Mars
-55° C





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

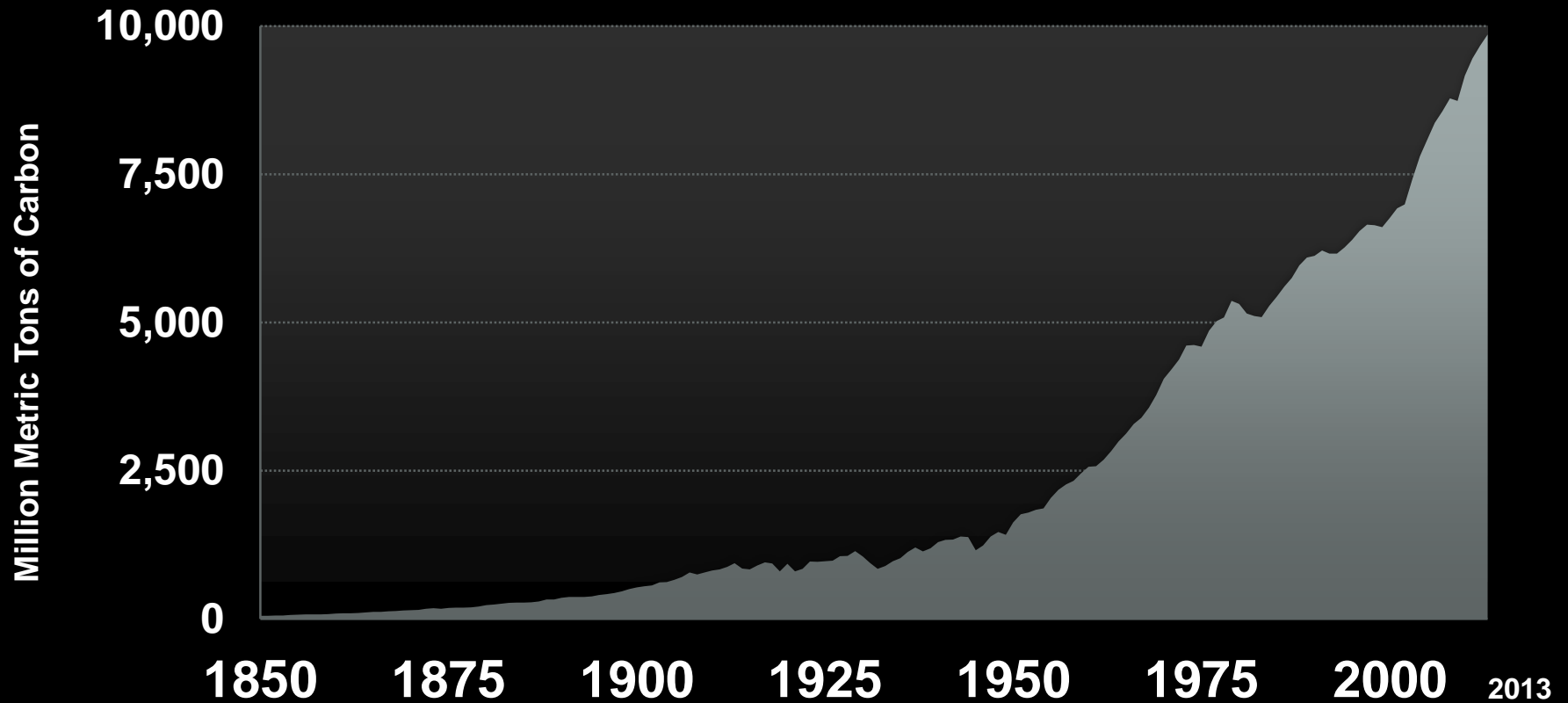
Some of this outgoing infrared radiation is trapped by the earth's atmosphere and warms it

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





Global Carbon Emissions from Fossil Fuels



Data: U.S. Department of Energy/CDIAC

CO₂ is being released
into the atmosphere
faster than at any time in
at least the last
66 million years.

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

400,000

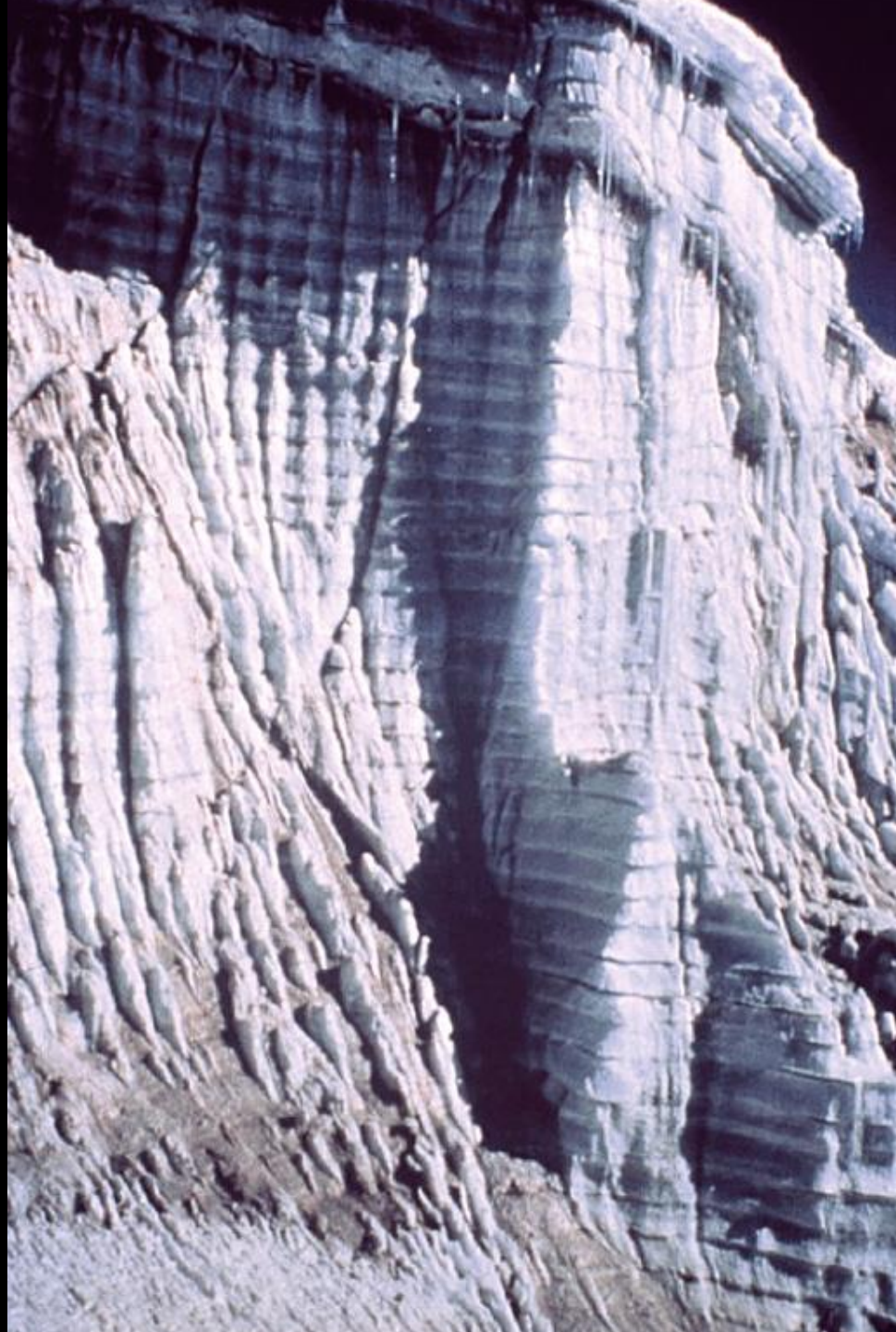
Times per day

Hiroshima atomic bombs
per day 365 days per year.”

James Hansen
Former Director, NASA Goddard Institute for Space Studies

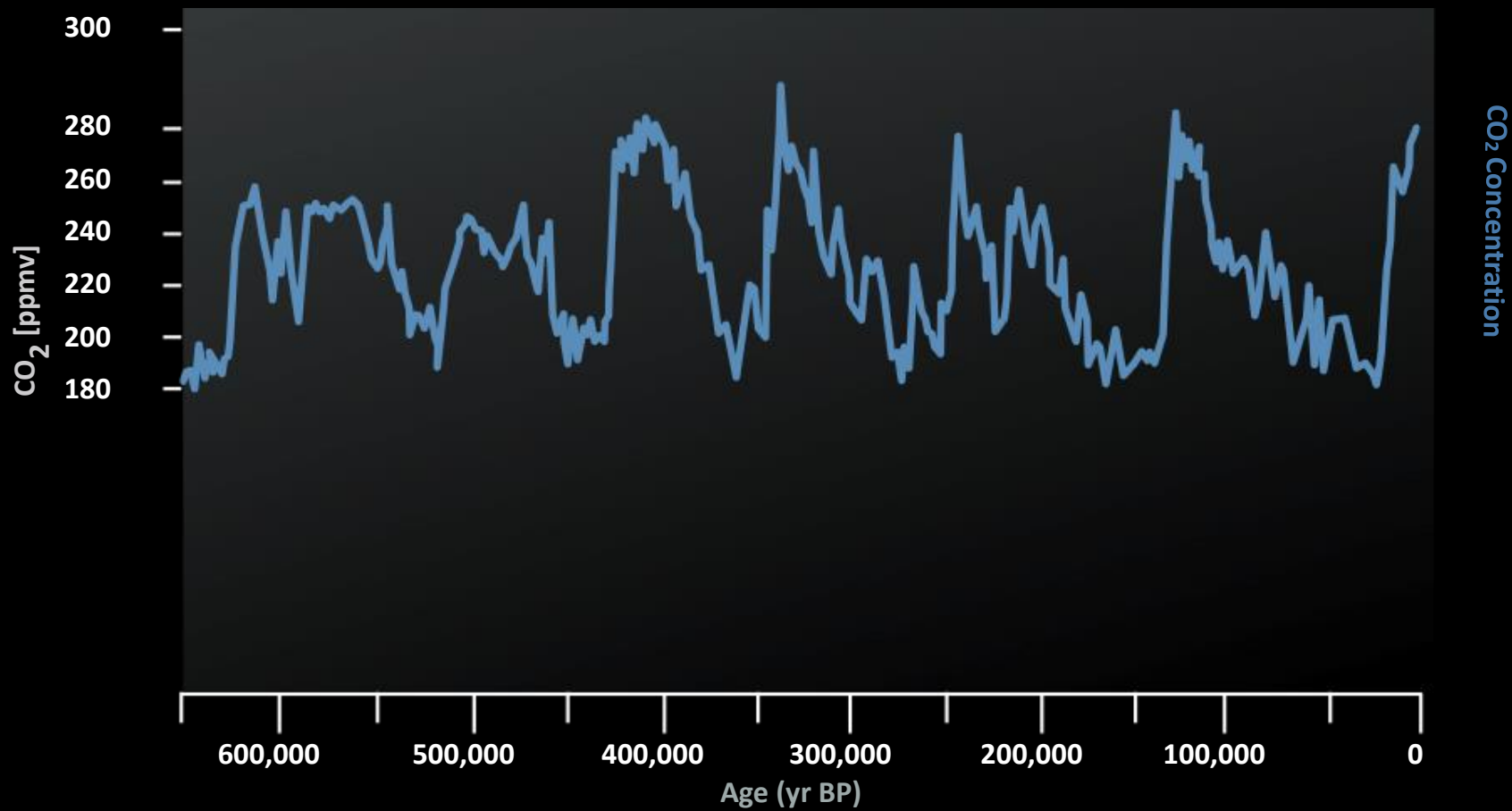
Quelccaya Ice Cap

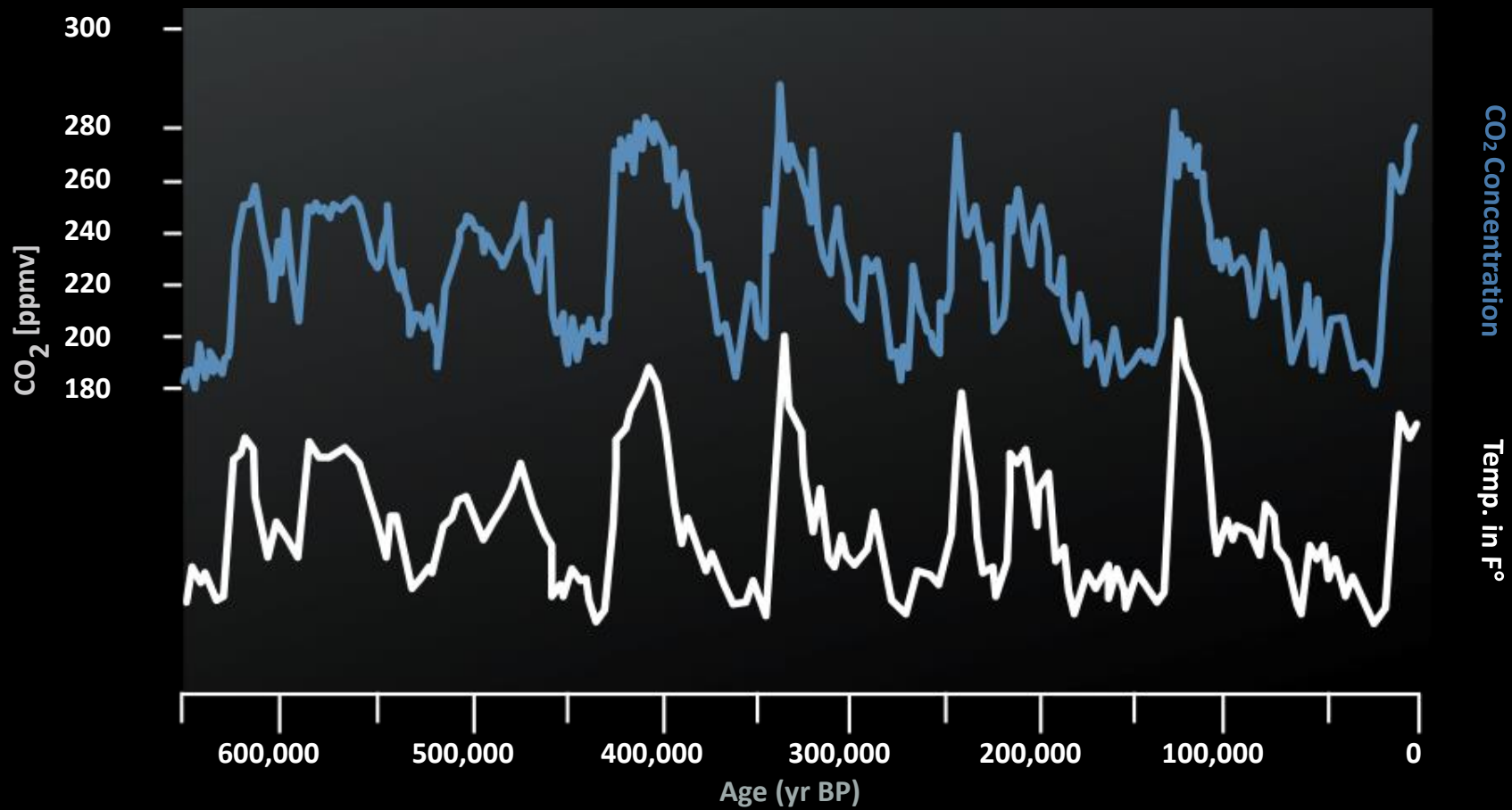
Peru, 1977

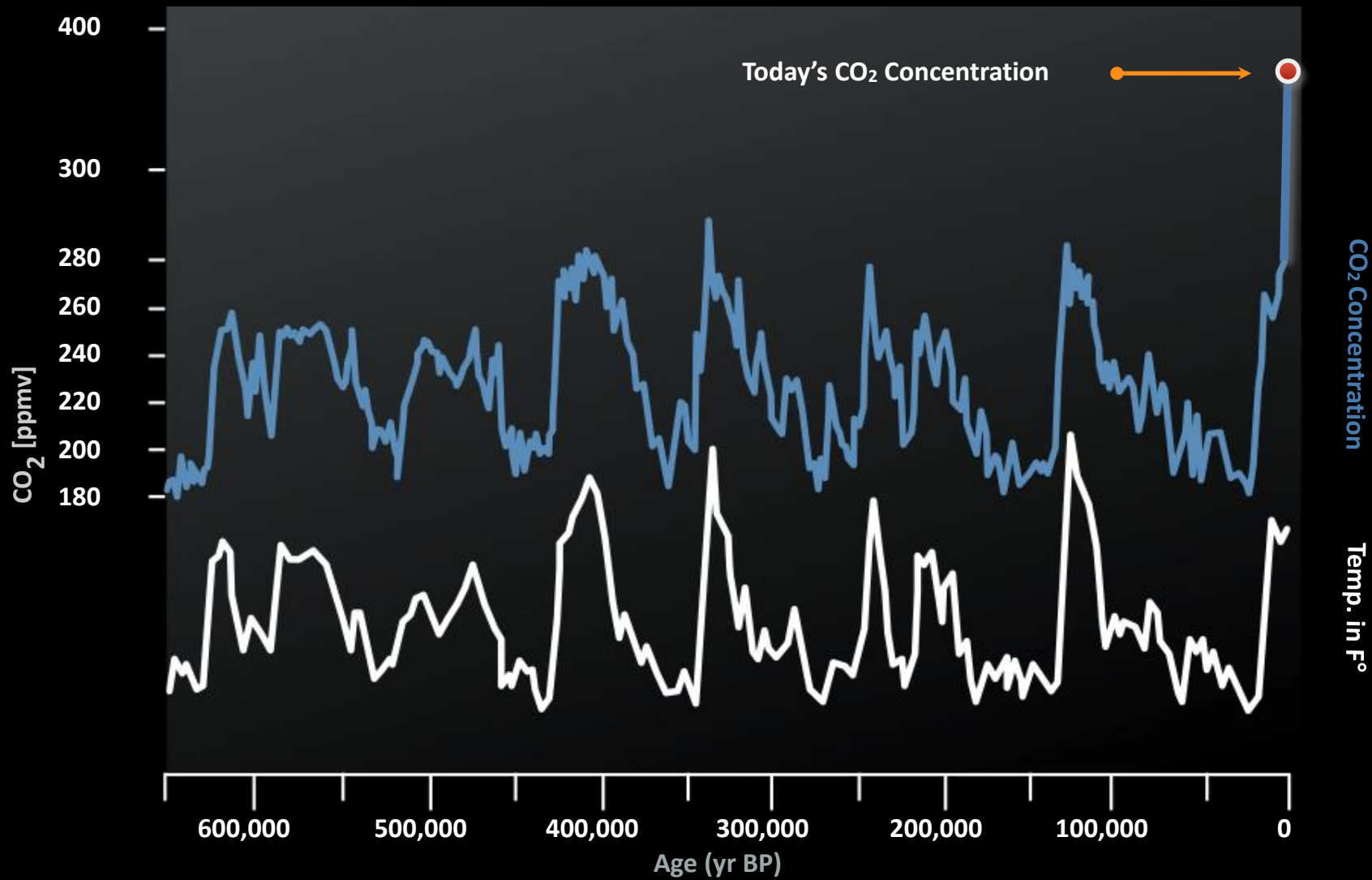




Source: Lonnie G. Thompson



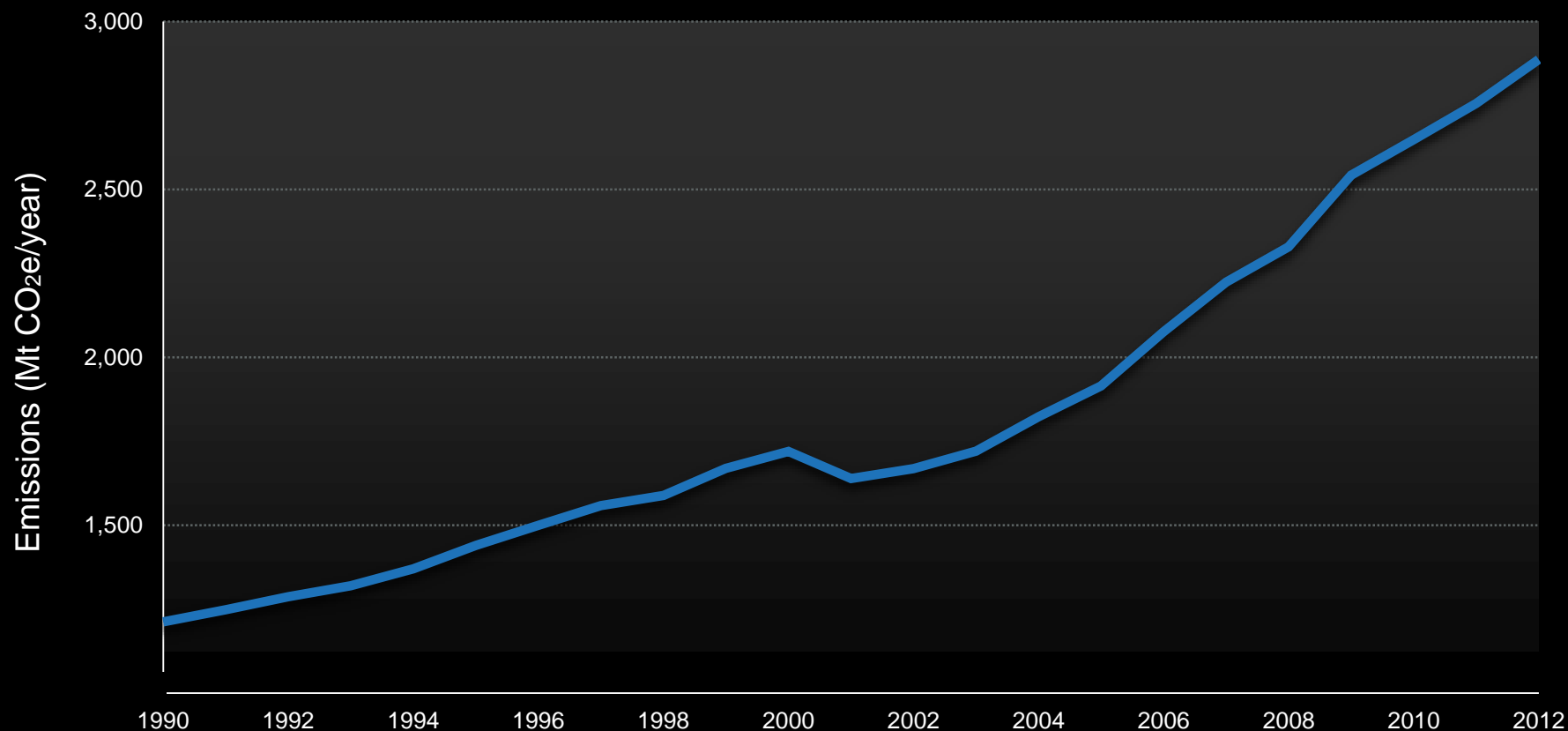




The Top 24 Greenhouse Gas Emitters

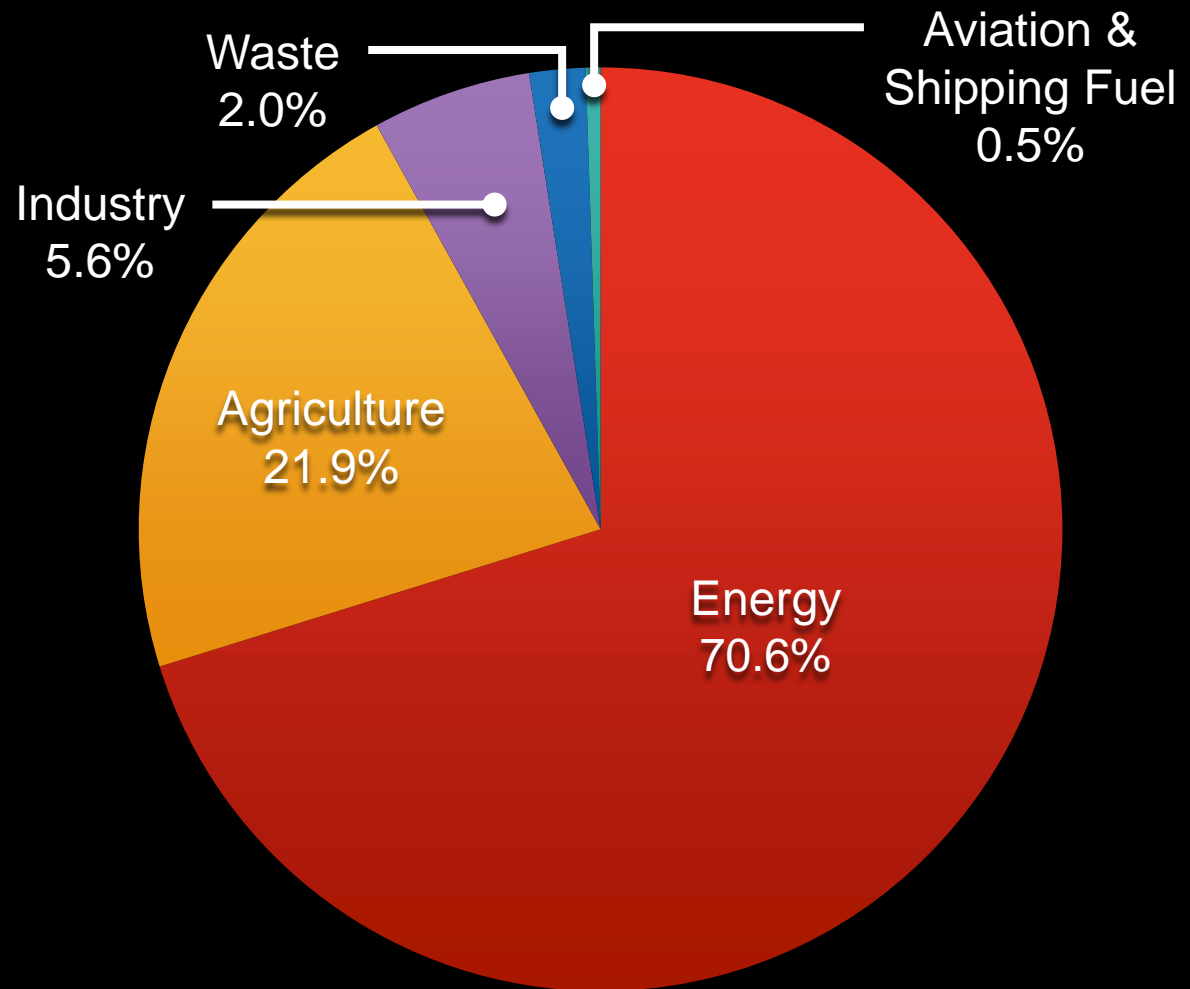
- 
- The background of the slide is a photograph of the Taj Mahal in Agra, India, during sunset. The white marble mausoleum is illuminated by the warm, golden light of the setting sun, which is visible on the horizon behind the building. The sky is a mix of orange, yellow, and dark blue. The surrounding gardens and reflecting pool are visible in the foreground, though slightly darker.
1. China
 2. United States
 3. India
 4. Russia
 5. Indonesia
 6. Brazil
 7. Japan
 8. Canada
 9. Germany
 10. Mexico
 11. Iran
 12. Australia
 13. South Korea
 14. United Kingdom
 15. Saudi Arabia
 16. Nigeria
 17. South Africa
 18. Malaysia
 19. France
 20. Italy
 21. Argentina
 22. Venezuela
 23. Turkey
 24. Thailand

India's Greenhouse Gas Emissions



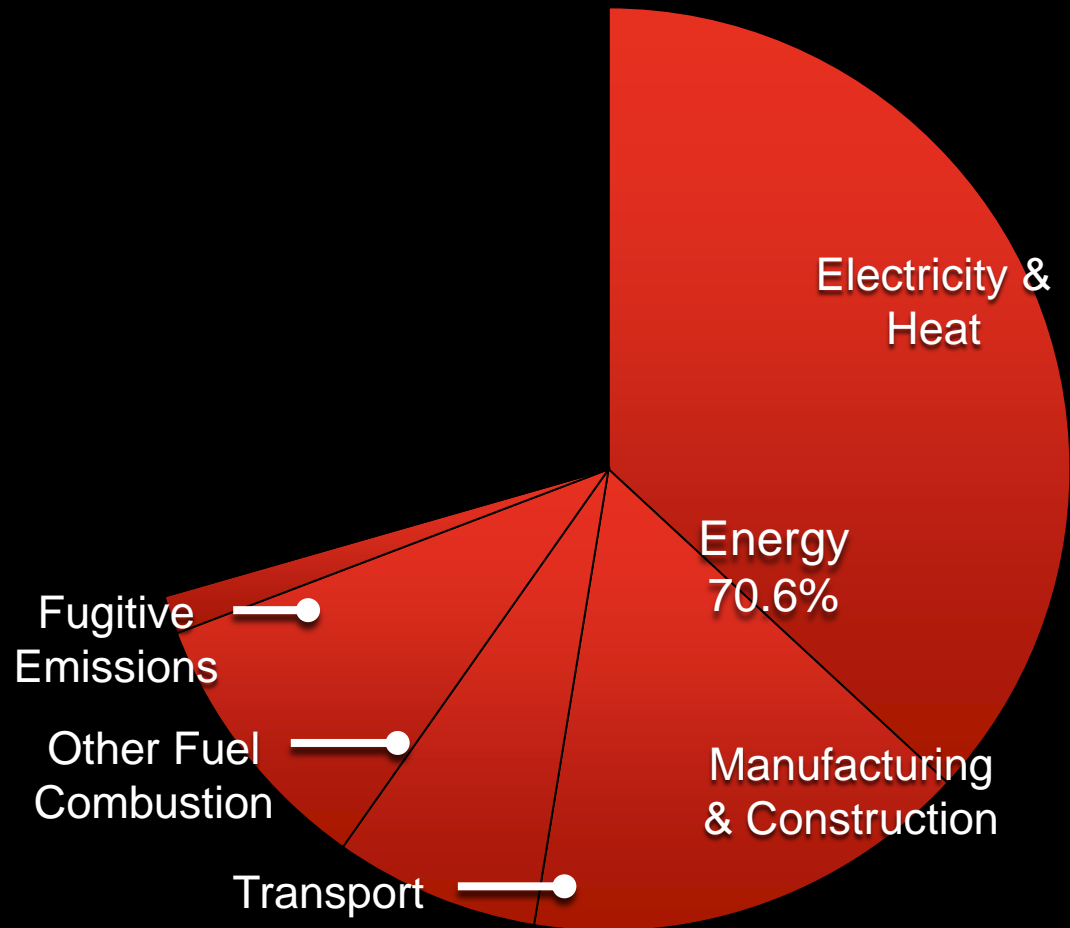
2012 Data
Data: © 2016 CAIT/World Resources Institute cc by 4.0

Where Do India's Emissions Come From?



2012 Data

Where Do India's Emissions Come From?



The Hottest Year Ever Measured...

14 of the 15 Hottest Years on Record Have Occurred Since the Year 2001

2016

2015

2014

2010

2005

2007

2013

2009

2012

2006

1998

2002

2003

2011

Jammu, India

• June 7, 2014



Hatay, Turkey

- July 4, 2017



This road melted
in the heat.

A photograph showing a man's face and head being doused with water poured from a plastic bottle. The man has dark skin and is looking upwards. The background is a dry, outdoor area with some greenery and a tree. The scene is brightly lit, suggesting a sunny day.

Ahmedabad, India

• May 21, 2015

**At least 2,330 people died
in the 2015 India heat wave**

New Delhi, India May 19, 2016



The Indian government distributed drinking water as temperatures set new records.

© 2016 Photo by Ajay Aggarwal/Hindustan Times via Getty Images

On May 19, 2016
India set a new all-time
high temperature record of

123.8° F (51° C)

Quetta, Pakistan

• June 2, 2017



The nearby town of Turbat, Pakistan set an all-time, country-wide record of **129.2° F (54° C)** on May 28, 2017.

On July 22nd, 2016
Basra, Iraq reached
129.0° F (53.9° C)

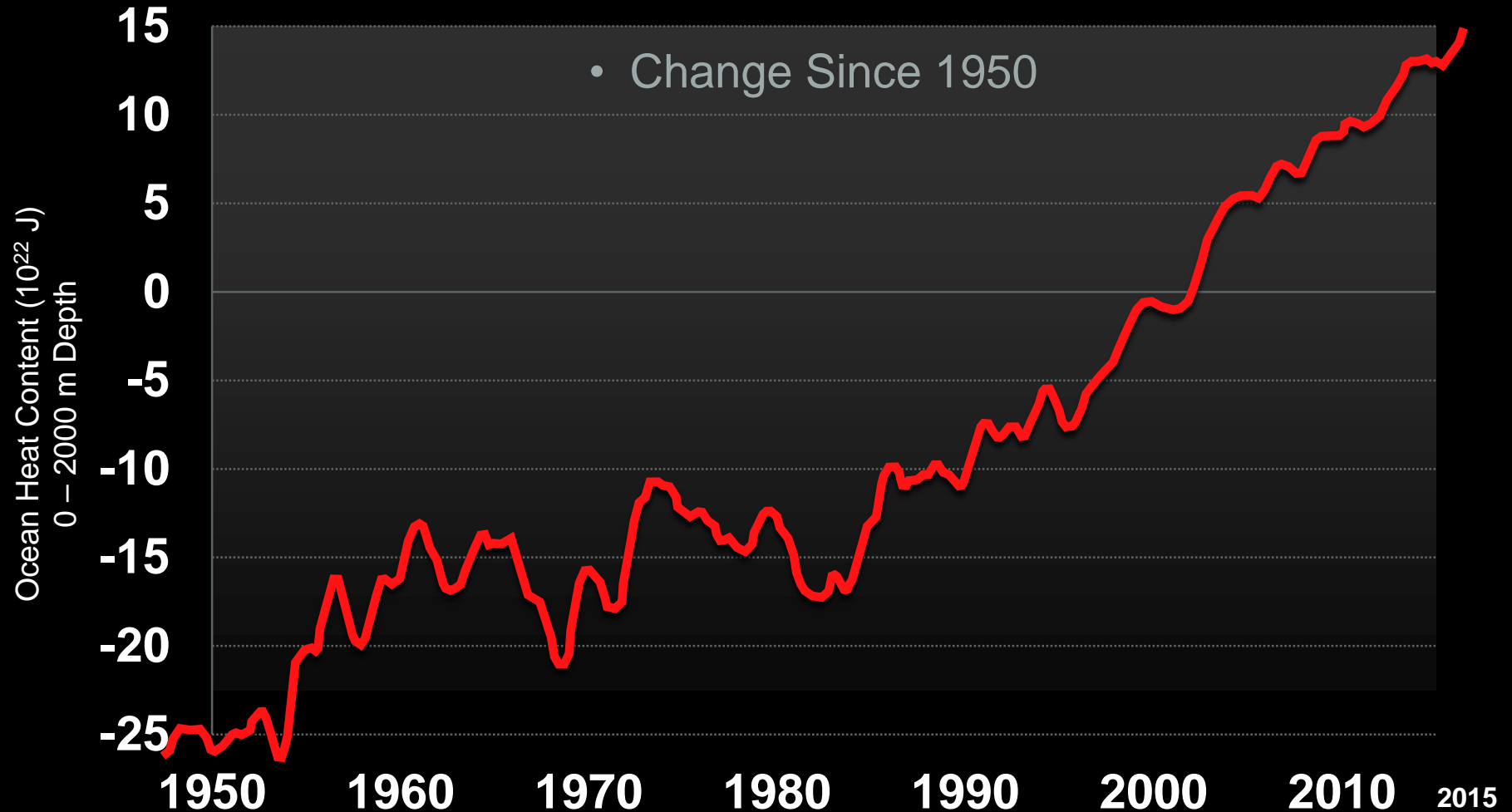
On July 21st, 2016
Mitribah, Kuwait
reached
129.2° F (54° C)



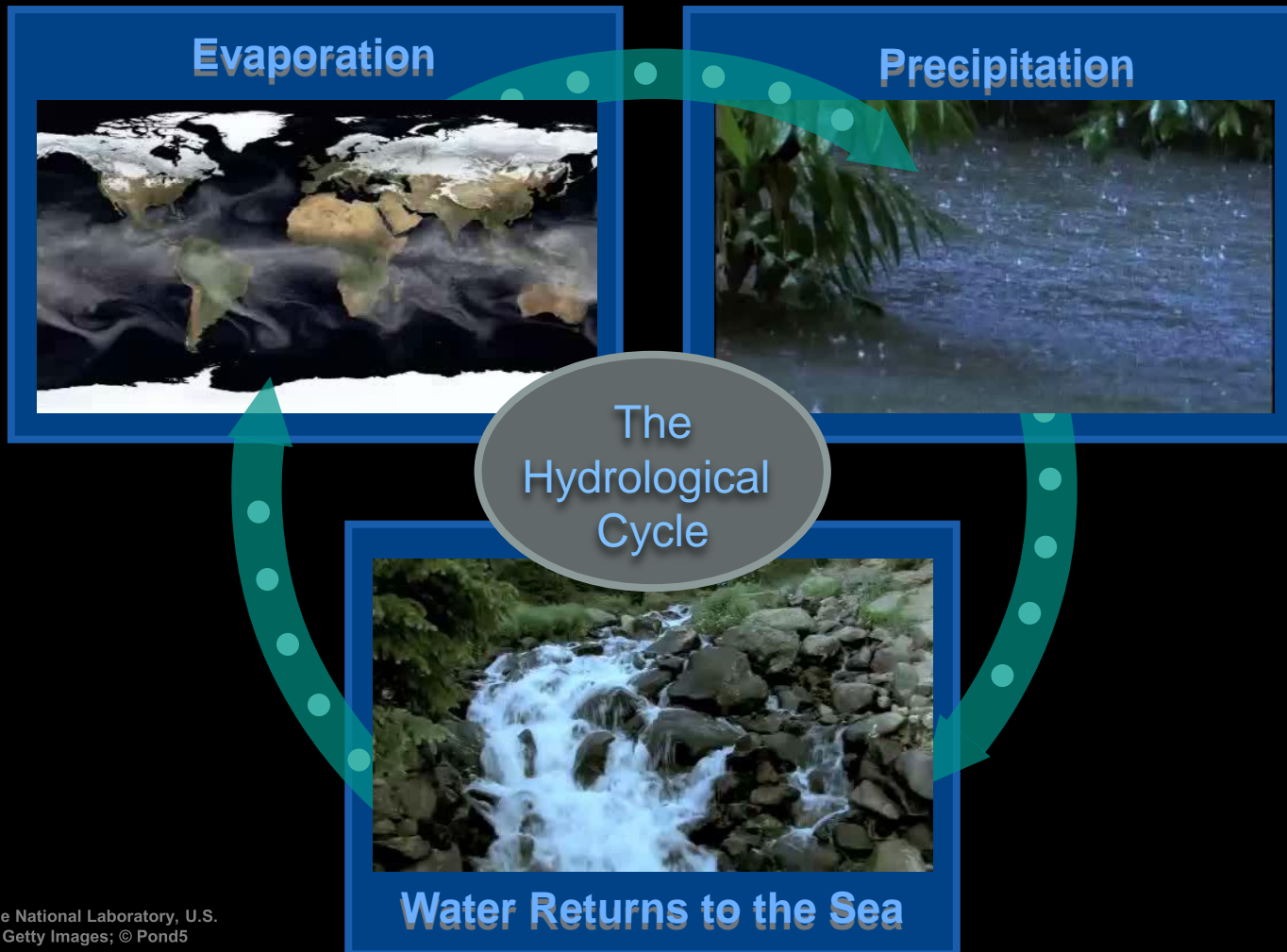
**What happens to our Earth when the
average temperature goes up?**

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

Global Ocean Heat Content



Data: L. Cheng, K. E. Trenberth, et al., "Improved estimates of ocean heat content from 1960 to 2015," *Science Advances*, 10 March 2017



Sources: Oak Ridge National Laboratory, U.S.
Dept. of Energy; © Getty Images; © Pond5

Hurricane Harvey

August 26, 2017

nsified from a
pression to a
hurricane in
two days.

Houston

Source: 2017 Space Science and Engineering Center, UW-Madison

24 AUG 17 – 01:30 UTC



Harvey dropped a total of
33 trillion gallons
(125 billion cubic metres)
of water on the United States

That's equal to the flow
of Niagara Falls for
509 days

Houston, Texas

- August 27, 2017



© 2017 Jon Shapley/Houston Chronicle via AP

Dickinson, Texas

- August 27, 2017



Dickinson, Texas

- August 27, 2017



© 2017 Kelsey Walling/The Galveston County Daily News via AP

Hurricane Irma, French St. Martin, Caribbean

• September 13, 2017



Hurricane Irma, Dutch St. Maarten, Caribbean

• September 6, 2017



Hurricane Sandy

• October 29, 2012

© 2012 NASA Photo via Getty
Images



Manhattan, New York


• October 29, 2012



On August 29, 2017,
Mumbai received one month's
worth of rain in one day.

Mumbai, India

• August 29, 2017



At least 1,400 people have died
in flooding across South Asia
during the 2017 monsoon.

Mount Abu, India received
83.3 inches (2,116 mm)
of rain from July 23 – 27, 2017.

The region's **average annual** rainfall is
61.2 inches (1,554 mm).

Ahmedabad, Gujarat, India

• July 24, 2017



Dantiwada in Gujarat State received 31.5 inches (800 mm) of rain in 48 hours.

Agartala, India

• August 11, 2017



Hundreds of thousands of people have been affected by monsoon flooding in 2017.

Chennai, India

- November 17, 2015

The torrential rains in Tamil Nadu affected two million people.



Chennai, India

- May 18, 2016



Chennai received
203 mm (8") of rain
in three days.

Chennai Airport, India

- December 3, 2015



The number of extreme rainfall events in central India has doubled since the early 1950s

Rishikesh, Uttarakhand State, India

- June 18, 2013



Uttarakhand State, India

- June 18, 2013



Uttarakhand State, India

- June 18, 2013



Srinagar, India

• September 12, 2014



Bogra, Bangladesh

- August 20, 2017



One-third of Bangladesh was flooded in August 2017. Over 700,000 homes were damaged or destroyed.

Northwest Pakistan

- August 2010

Yongchuan District, Chongqing, China

- July 23, 2012



Liuzhou City, China

• July 12, 2017



Guangzhou, China

• May 7, 2017



Part of Guangzhou received 20.6 inches (524 mm) of rain in 24 hours.

Moorland, Somerset, England

• February 10, 2014





Deggendorf, Germany

• June 7, 2013

Rio de Janeiro, Brazil

- December 11, 2013



La Plata, Argentina

- April 3, 2013



Dalby, Queensland, Australia

- December 30, 2010

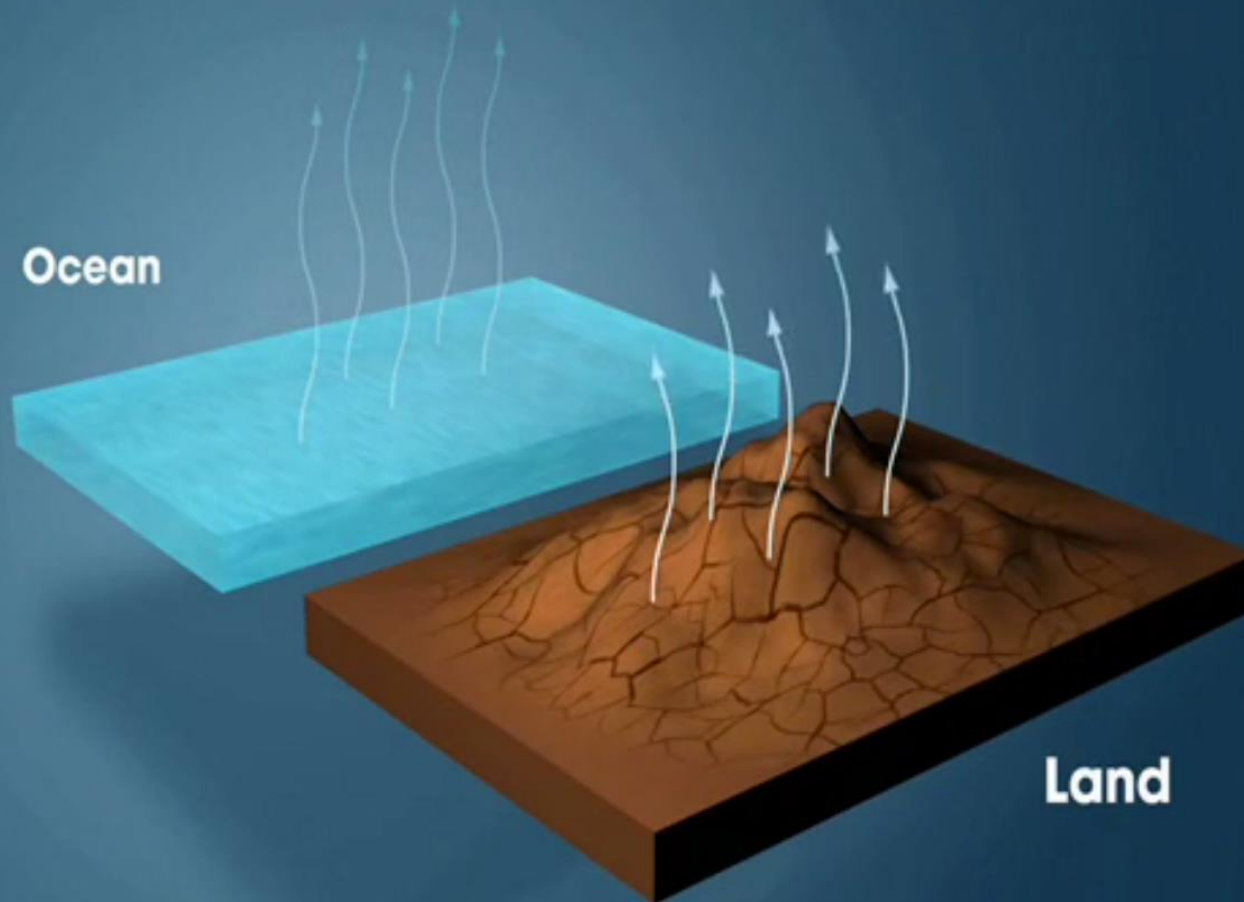


Rock Hampton, Queensland, Australia

- January 2, 2011



Rising temperatures remove moisture from the
Ocean and also from Land



Chennai, India

- May 17, 2017



Tamil Nadu is experiencing its worst drought in 140 years.

Maharashtra State, India

• May 19, 2016



Theewaterskloof Reservoir, Western Cape, South Africa

• May 23, 2017

South Africa's Western Cape province faces its worst water shortage in 113 years.

Ben Tre Province, Vietnam

- May 4, 2016



Vietnam's Mekong Delta has been hit by its worst drought in 90 years.

© 2016 Christian Berg/Getty Images

Nearly Dry Well, Gokwe, Zimbabwe

• May 20, 2015



Southern Africa is experiencing one of its worst droughts in years.

Tabasco, Mexico

• April 17, 2009

Worst drought in
six decades

Poyang Lake, Jiangxi Province, China

- May 4, 2011



Rio Negro, Manaus, Brazil

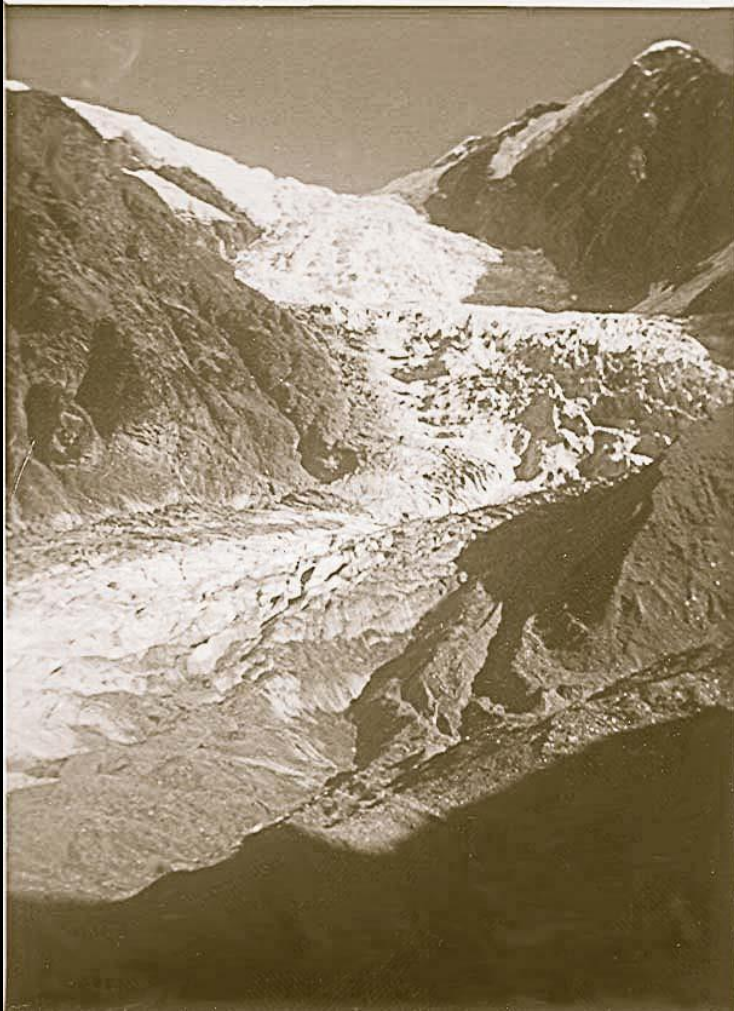
- October 21, 2010

© 2010 AP Photo/Agencia Estado/Euzivaldo Queiroz



Indian glaciers have already started melting....

Pindari Glacier, Himalayas



1936



2006



1780

1935

1956

1964

1971

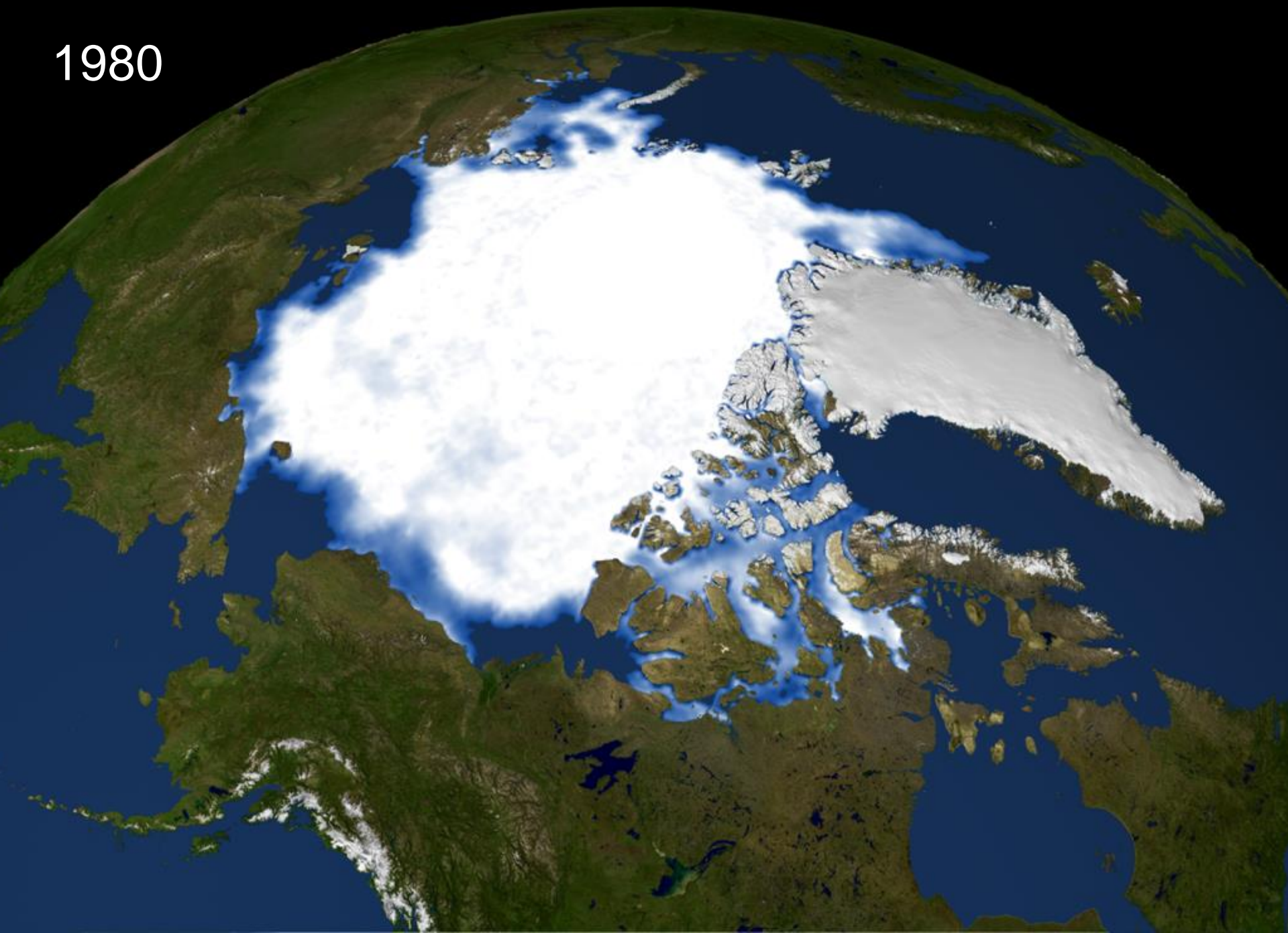
2001

Gangotri Glacier

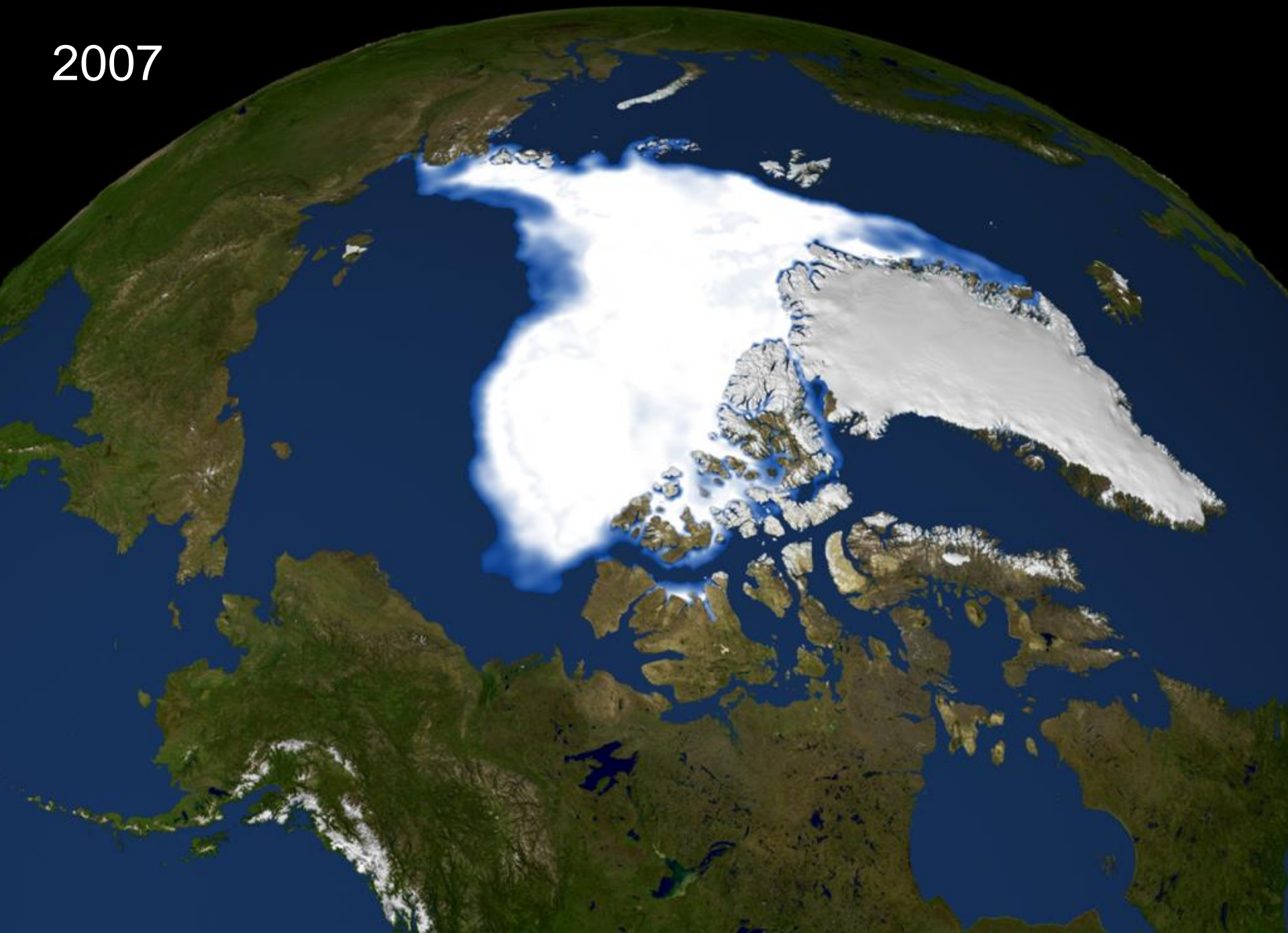
At very rapid rates...

Scale (km)

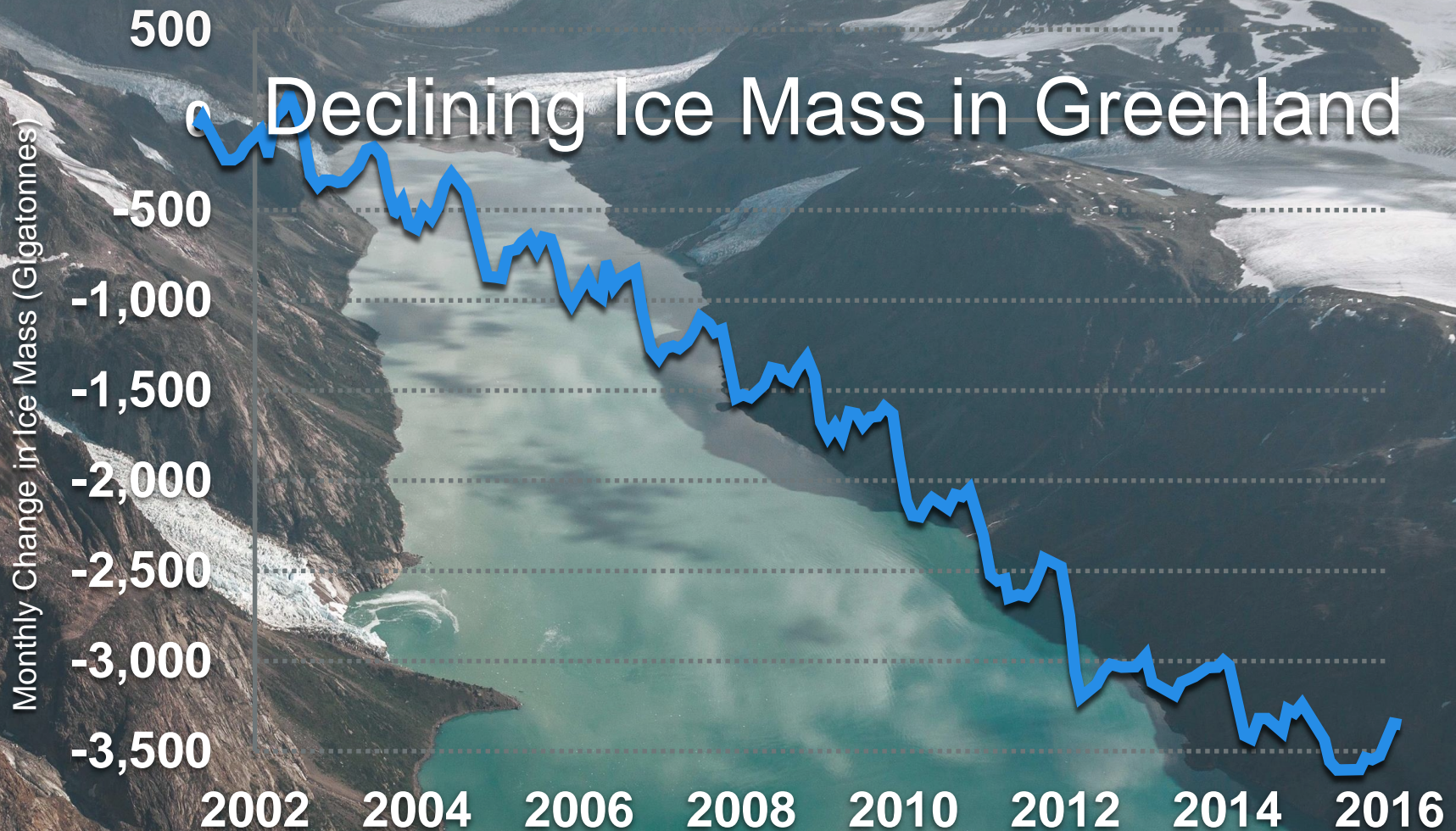
1980



2007

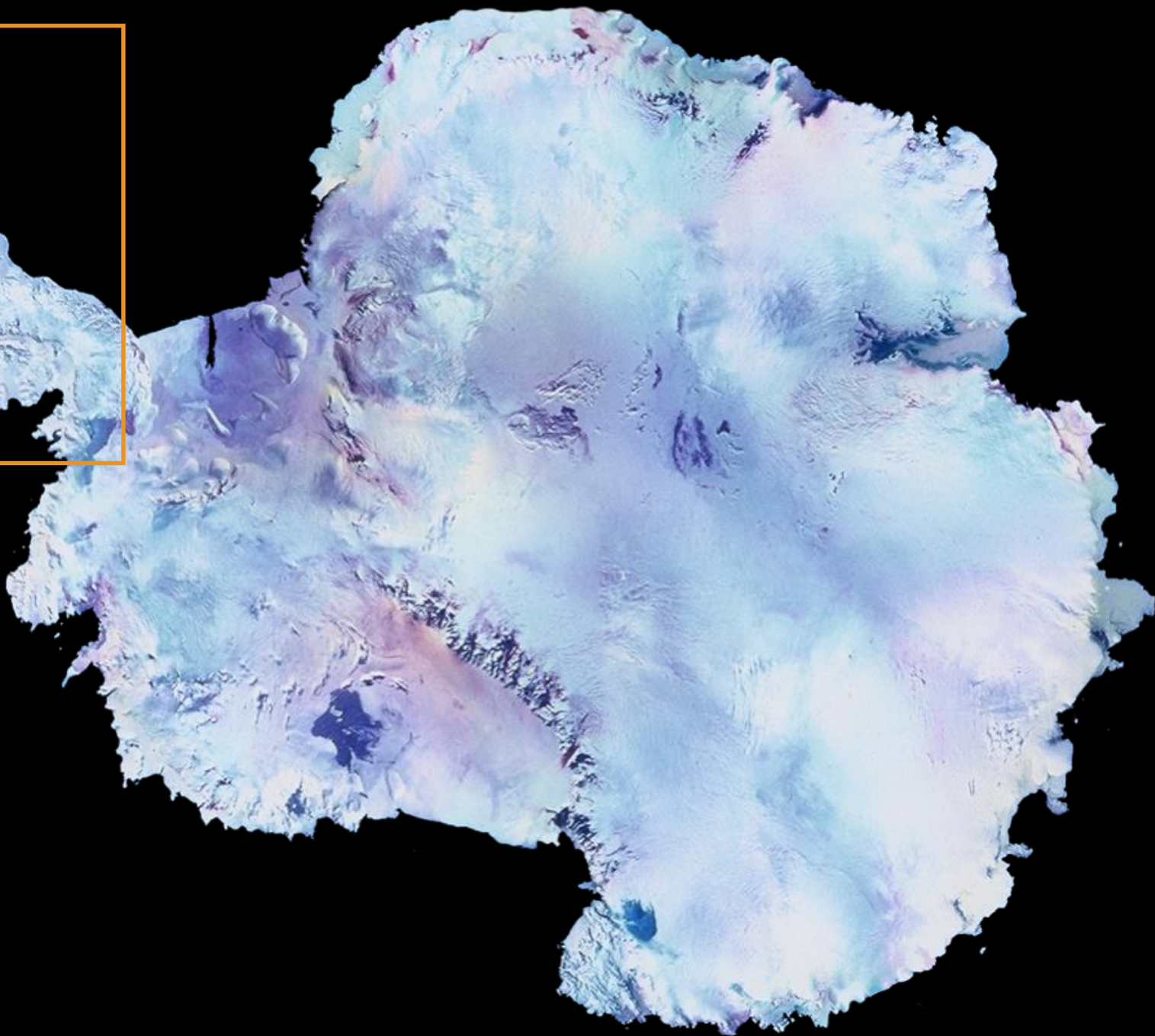


Declining Ice Mass in Greenland



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





We are already seeing the beginning...

**The Sunderbans mangroves have decreased by 20%
in the last 40 years...**



Flooding in Bangladesh

An aerial photograph showing a vast, flooded landscape in Bangladesh. The water is a murky, brownish-grey color, and the land is visible as irregular, dark green and brown patches. A single person is walking through the water in the center of the frame, carrying a long pole or stick over their shoulder. The overall scene conveys the extent of the flooding.

Flooding from sea level rise, storm surges and tidal surges are all leading to increased soil salinity in Bangladesh

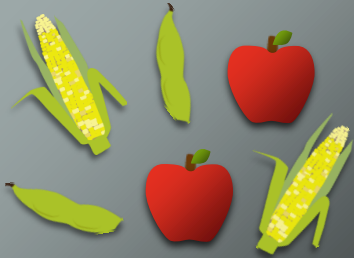
We now risk losing
up to
**50% of all
living species**
in this century



Source: Nicholas Stern, The Economics of Climate Change
Photo: © Dirk Ercken/Shutterstock

Global Systems Vulnerable to Climate

- Disruptions May Lead to Political or Societal Instability



Food Supply



Water



Global Health



Infrastructure



Rising concentrations of CO₂ are
threatening global nutrition by
reducing levels of nutrients
in food crops like rice, wheat, and soybeans.

Source: Bloom, et al., "Increasing CO₂ threatens human nutrition," *Nature*, April 2014
Photo: © 2007 iStockphoto/Anzelm

A collage of various grains including rice, wheat, corn, and lentils. The grains are arranged in a horizontal band across the top of the image, with different types of grains overlapping. The colors range from light yellow to dark brown. The text is overlaid on a dark, semi-transparent band in the center of the image.

Zinc, iron, copper, magnesium and calcium could decrease
by 5 to 10% in staple crops as CO₂ levels rise.

Data: U.S. Global Change Research Program, 2016
Photo: © Khudolij/Shutterstock



Gujarat State, India

- August 6, 2012



India faces a severe groundwater crisis, and 16.6 million acres of land have been lost to salinization

Delhi, India June 2014

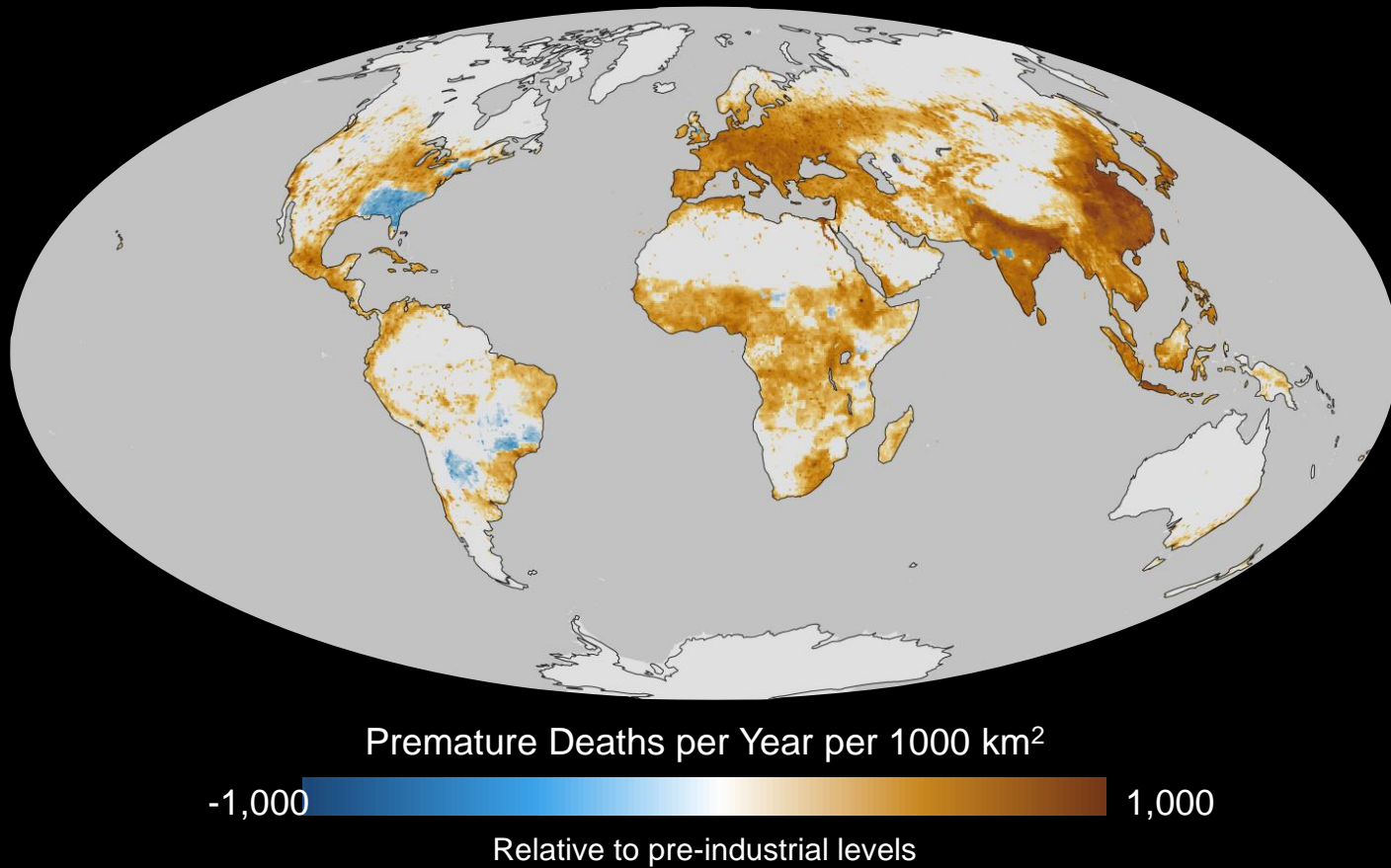


Residents crowd around a truck to collect drinking water during a heat wave.



Cases of malaria & dengue broke out in Mizoram, Arunachal Pradesh, and other states where they were historically non-existent.

Global Air Pollution Deaths



Source: NASA

New Delhi, India

- November 5, 2016

Delhi's schools
closed for three
days due to smog

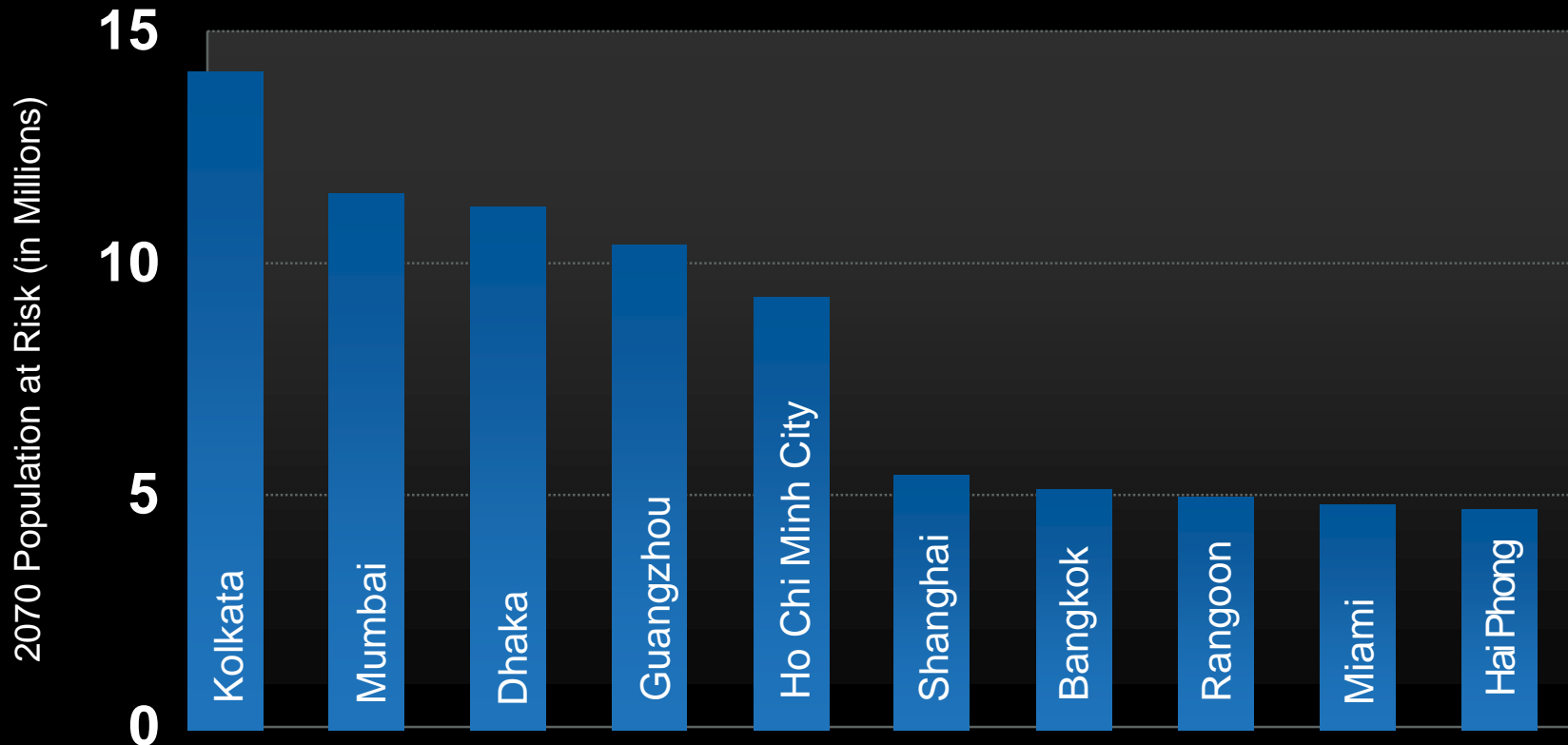
New Delhi, India

- January 5, 2016



Top 10 Cities at Risk from Sea Level Rise in 2070

- By Population at Risk



Data: Nichols, et al., 2007, OECD

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


World Energy Transition



Coal + Oil

**Natural Gas
Bio-Gas
Solar , Wind**

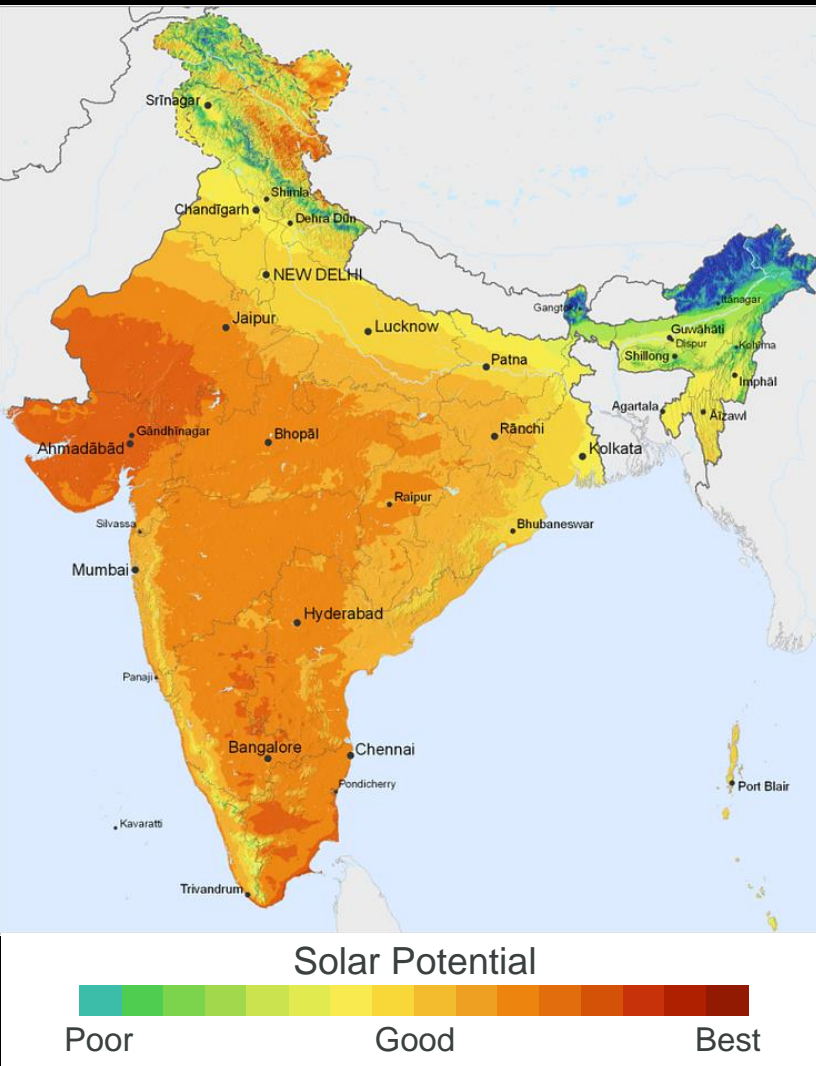
Totally Renewables



Delhi, India

Laws are being changed!

In September 2014, Delhi instituted net metering, allowing individuals to sell solar electricity to the grid.



“Solar power in
India is now
cheaper than coal”

Piyush Goyal,
India's Ex- Minister of State
for Power, Coal and New &
Renewable Energy


GHI Solar Map © 2016 Solargis cc by sa 3.0

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



Chandrasan Village, Gujarat



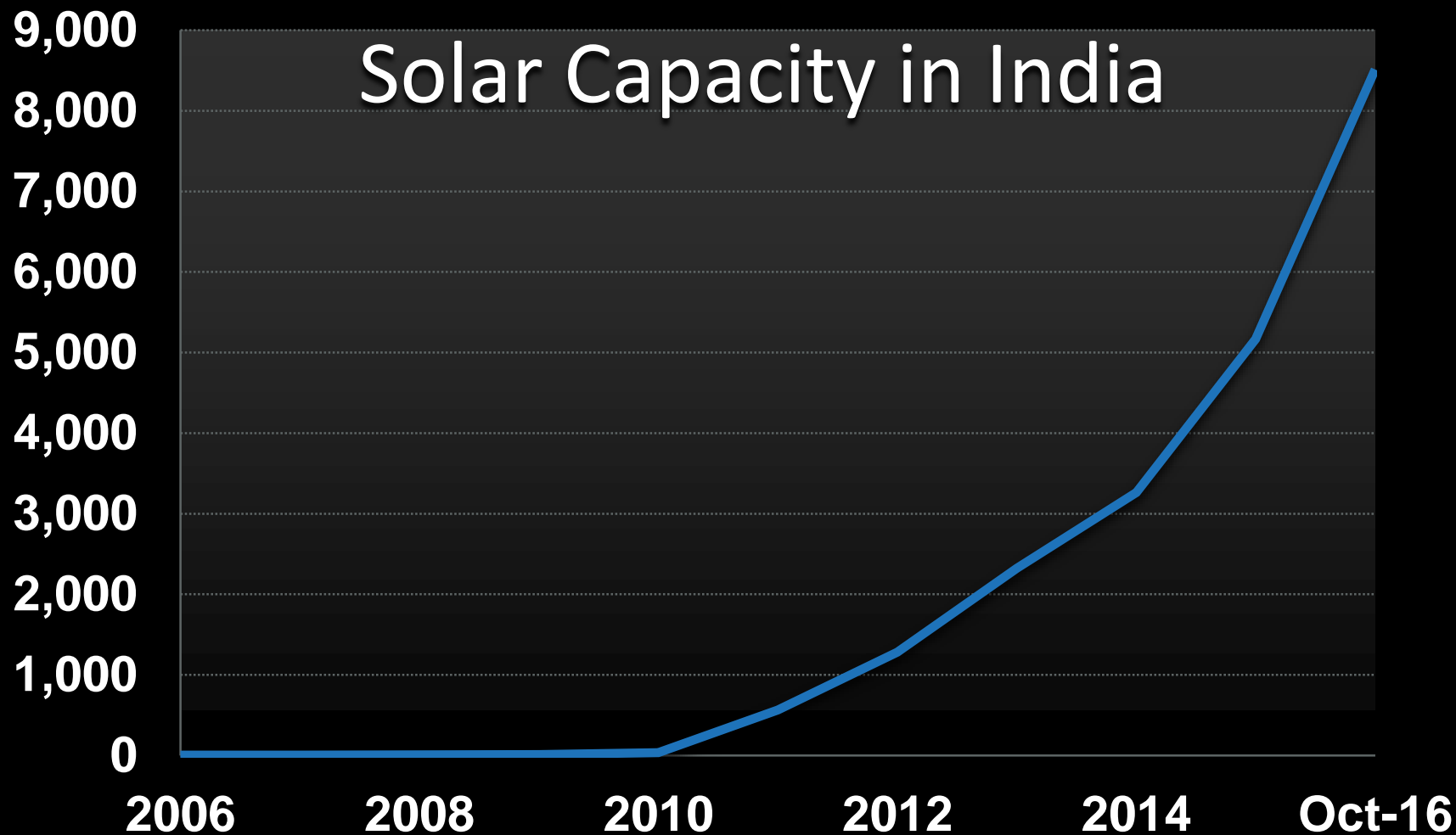
A wide-angle photograph of a massive solar farm. The image is dominated by a dense, repeating pattern of blue solar panels stretching towards the horizon. The panels are arranged in long, parallel rows, creating a strong sense of perspective. In the foreground, a dirt path runs alongside the solar array. Two people are walking on this path, providing a sense of scale to the enormous size of the installation. The sky is not visible, as the panels fill the upper portion of the frame.

The Indian states of Gujarat,
Andhra Pradesh, and
Telangana are all investing
in large-scale solar energy
initiatives.



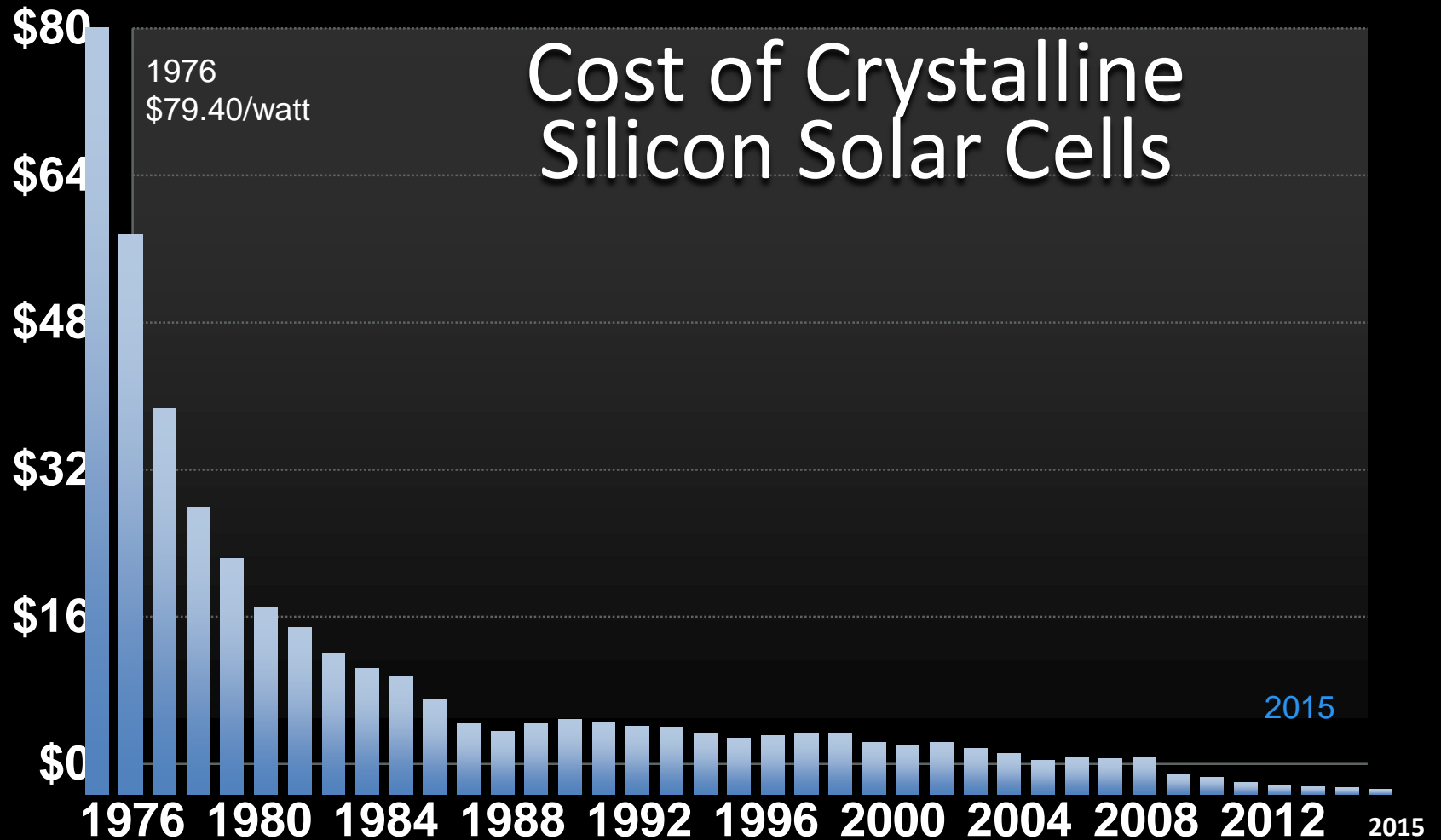
India will increase its solar
energy capacity 500% by 2022

Gujarat Solar Park, Charanka Village, India



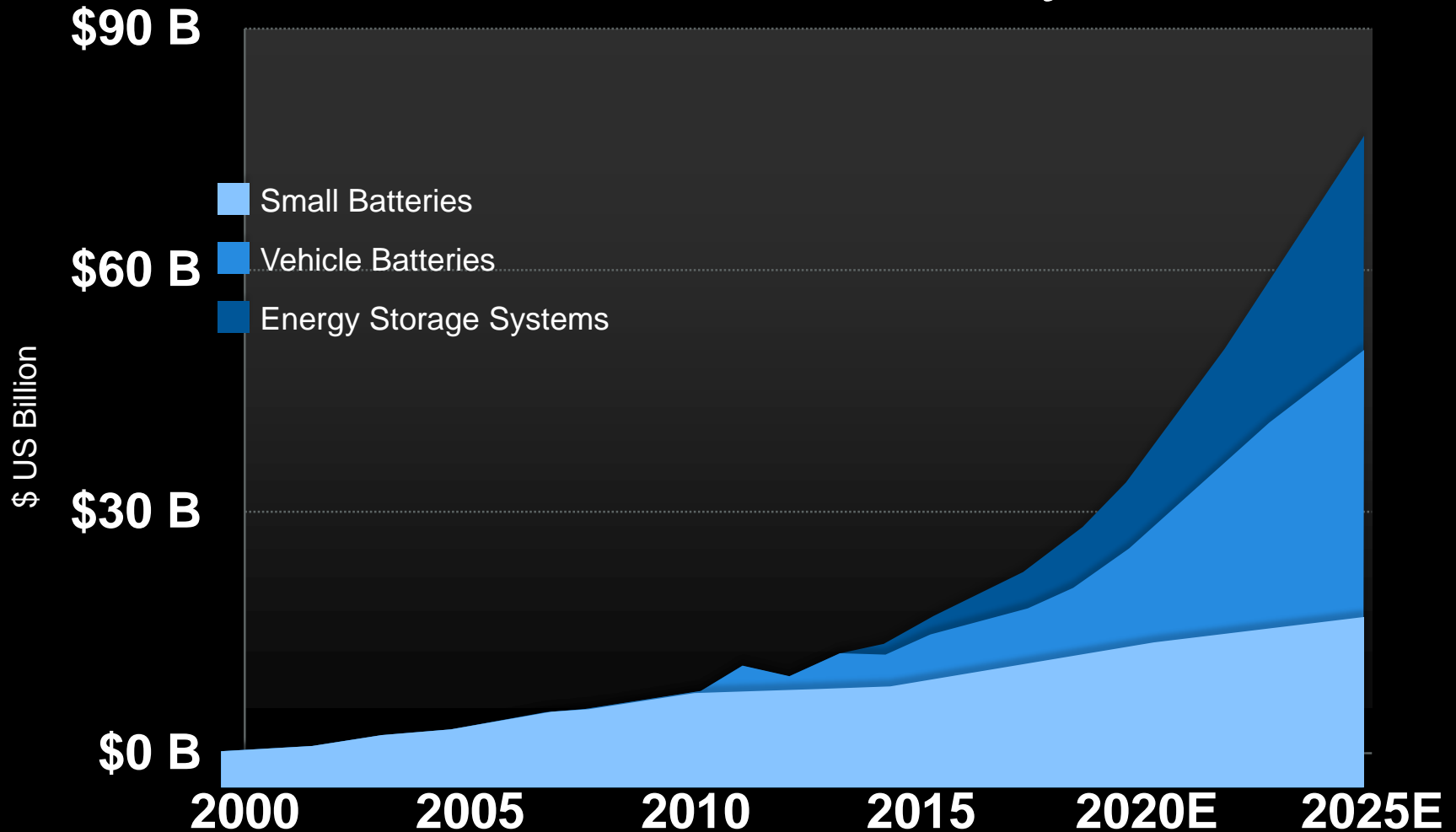
Data: IRENA, Renewable Energy Statistics 2016; Government of India Ministry of New and Renewable Energy

Cost of Crystalline Silicon Solar Cells



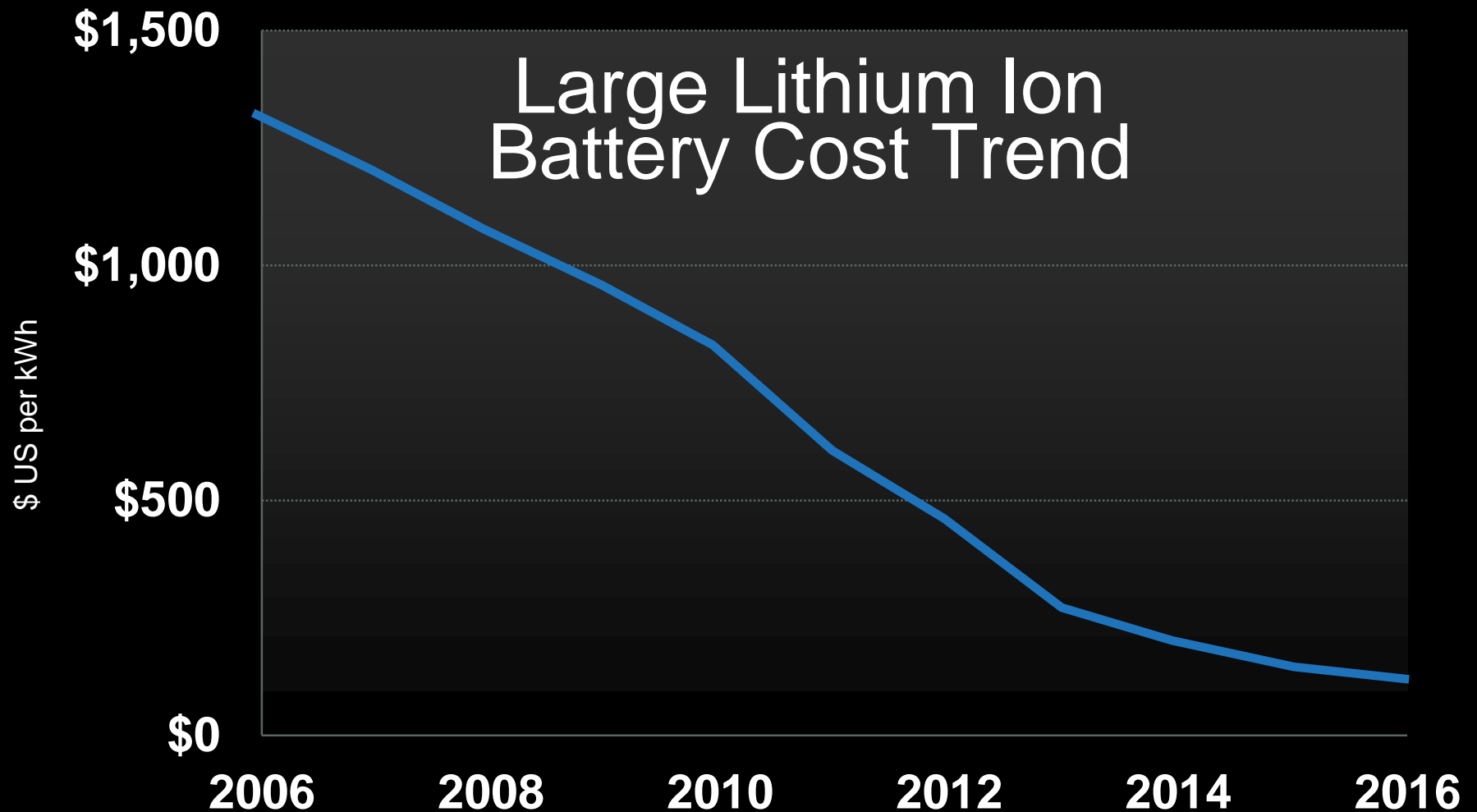
Data: Bloomberg New Energy Finance

Global Lithium Ion Battery Market



Source: Navigant and Bernstein estimates and analysis

Large Lithium Ion Battery Cost Trend

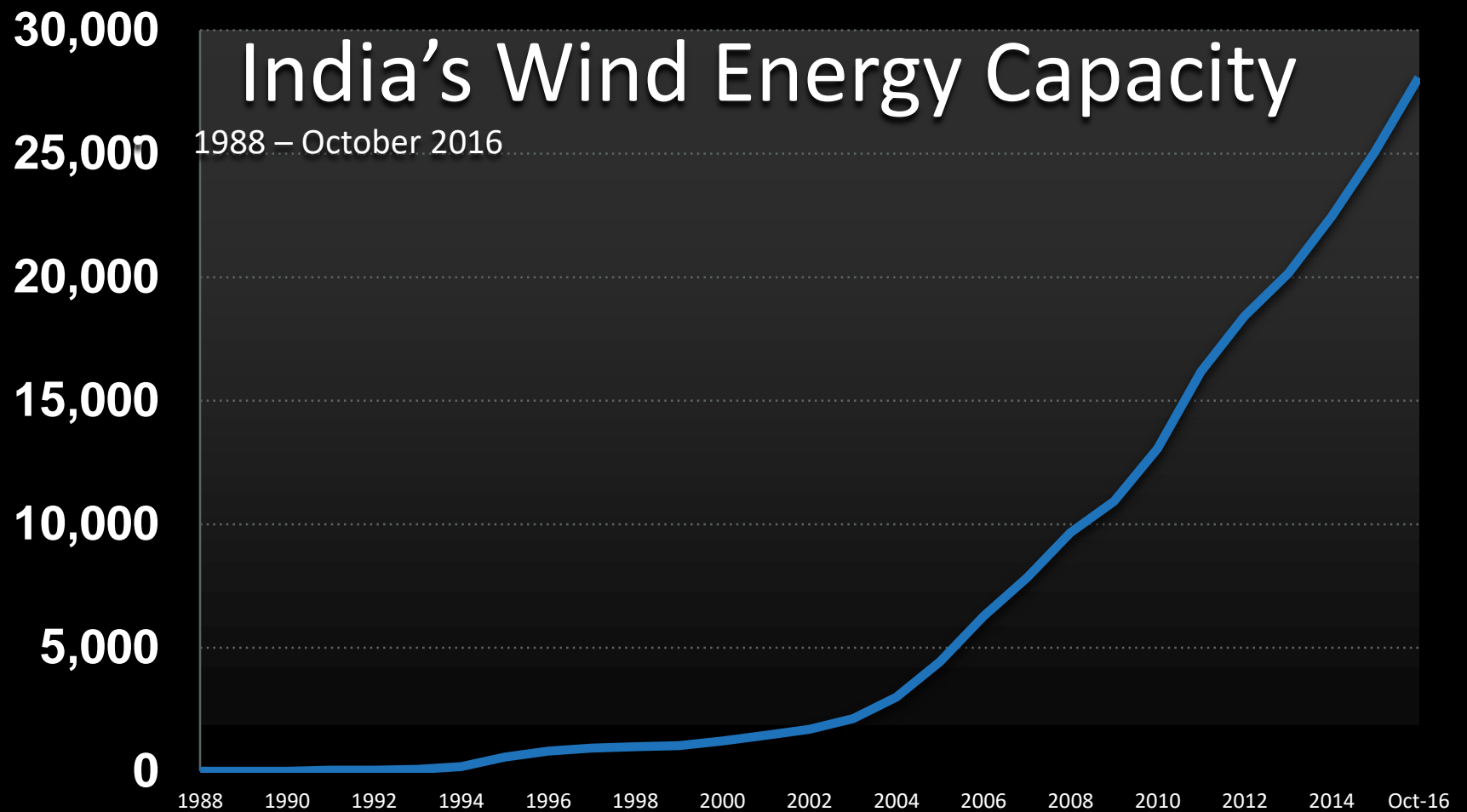


Data: 2014 Citigroup

Suzlon Wind Farm, Ahmedabad



9% of India's
electricity capacity is
in wind energy



Data: Earth Policy Institute; BP Statistical Review of World Energy 2016

[News](#) » [Auto](#) » [Miscellaneous](#) » India aiming for all-electric car fleet by 2030, petrol and diesel to be tanked

India aiming for all-electric car fleet by 2030, petrol and diesel to be tanked

PTI | Updated: Apr 30, 2017, 06.26 PM IST



A-

A+

Countries Planning a Fossil Fuel Vehicle Phase-Out:

<u>Country/State</u>	<u>Date of Phase Out</u>
Norway	2025
Netherlands	2025 (passed by Parliament, pending in Senate)
India	2030
China	"In the near future"
Scotland	2032
France	2040
Britain	2040
Germany	Date of phase-out pending. Merkel: "The approach is right."

Volvo has announced that as of 2019, all of its new models will be electric or hybrids.

A close-up photograph of a Volvo car's front grille. The Volvo logo, a silver circle with a blue horizontal bar across the center containing the word "VOLVO" in silver capital letters, is centered on the grille. The grille consists of several horizontal chrome bars. In the background, two orange and black charging cables are plugged into the car's charging port, which is visible on the left side of the image. The car's body is dark and reflective.


VOLVO



Volkswagen will offer electric versions of all 300 vehicles it makes by 2030.

Companies with Electric Models in Production

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



In the 2015 Paris Agreement, India and virtually every nation in the world agreed to work together to achieve net zero greenhouse gas emissions.



Paris, France

Prime Minister Modi and French President François Hollande launched the International Solar Alliance in Paris on November 30, 2015

Fourteen states representing one third of the American people have formed the United States Climate Alliance

Founding Members	Washington	New York	California
Additional States	Connecticut	Delaware	Hawaii
	Massachusetts	Oregon	Minnesota
	Rhode Island	Vermont	Virginia
	North Carolina	Colorado	<i>and Puerto Rico</i>



India's commitment for the 2015 Paris Agreement states that it will:

Reduce emissions intensity of GDP by 33-35% by 2030 below 2005 levels

Get about 40% of its electricity capacity from non-fossil fuel based energy by 2030

Increase forest and tree cover to create an additional carbon sink of 2.5 – 3 billion tonnes of CO₂ equivalent



**THINK OF YOUR
CHILDREN & GRAND CHILDREN
MOTHER EARTH OUR ONLY HOME
BORROWED FROM THEM
WE ARE TRUSTEES**



Source: NASA



Source: NASA



**“Be the change that
you want
to see in the world.”**

THANK YOU FOR YOUR TIME

PRESENTATION BY:

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www.climatereality.org.in



The Climate
Reality Project
INDIA