

CLIMATE CHANGE WORKSHOP: 16^h February
2019

**SHOULD MSUNDUZI MUNICIPALITY
IGNORE CLIMATE CHANGE?**

**Dr Simon Taylor (PhD) Climate
Reality and UKZN-EDTEA RLEDI**



Photo: NASA

DAY ZERO

IS WHEN THE WATER RUNS OUT

But, we need to consider what will happen
if our water runs out and we reach Day Zero...

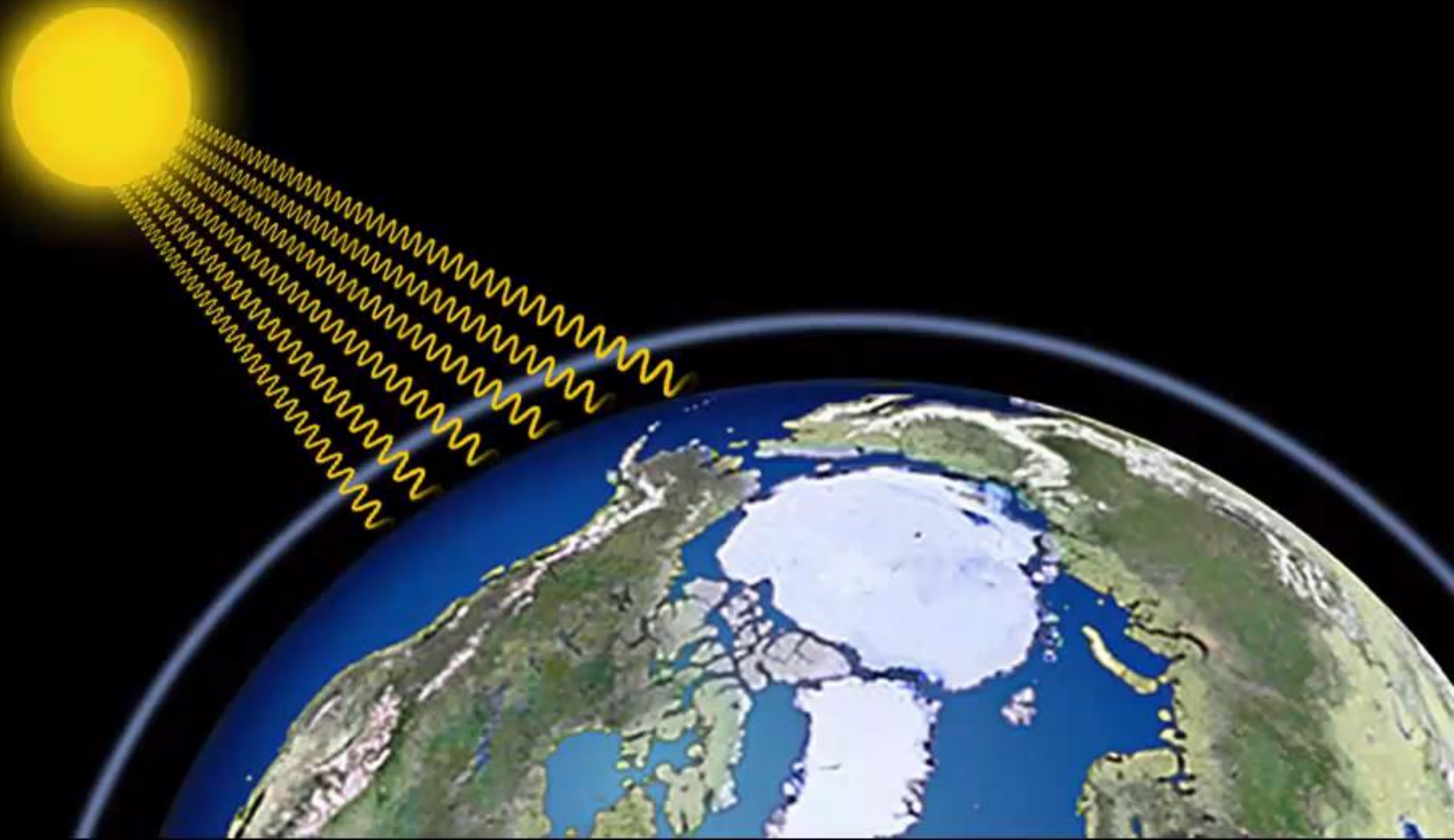
Food Grows Where Water Flows





We are Dumping 110 Million Tons of Manmade Global Warming Pollution into the Atmosphere every 24 Hours

Solar radiation
in the form of lightwaves
passes through the
atmosphere





THAWING PERMAFROST

COAL MINING

COAL PLANTS

AIR TRANSPORT

OIL PRODUCTION

FERTILIZATION

LAND TRANSPORT

LANDFILLS

INDUSTRIAL PROCESSES

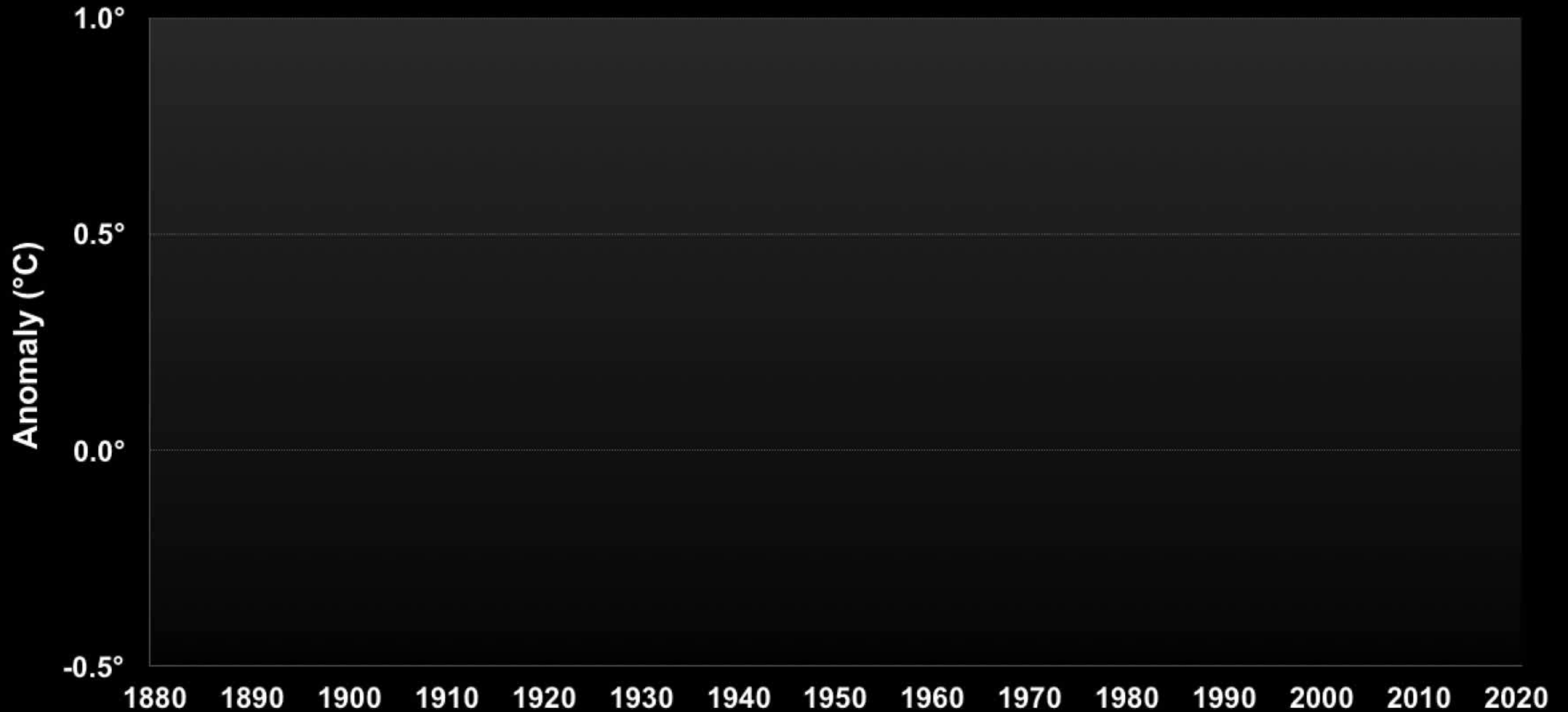
The Largest Source of Global Warming Pollution Is the Burning of Fossil Fuels



Data: U.S. Department of Energy/CDIAC

Global Surface Temperature – Departure from Average

1880 – 2016



16 of the 17 Hottest Years on Record Have Occurred Since the Year 2001



2016



Global Ocean Heat Content

Change Since 1950

Ocean Heat Content (10^{22} J)



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

Three Category 4 Hurricanes at One Time

August 30, 2015

Hawaii

**Hurricane
Kilo**

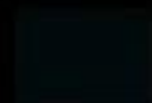
**Hurricane
Ignacio**

**Hurricane
Jimena**

NOAA

Source: NOAA

Evaporation



The Hydrological Cycle



Tamil Nadu, India

December 2, 2015



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

São Paulo State, Brazil



Cape Town, South Africa

<https://www.youtube.com/watch?v=RJ4Z2bOh5jo>



Hotter Years Typically Have More Fires

45 Years of Western U.S. Fires and Temperatures

65.0

63.3

61.5

59.8

58.0

1970

1975

1980

1985

1990

1995

2000

2005

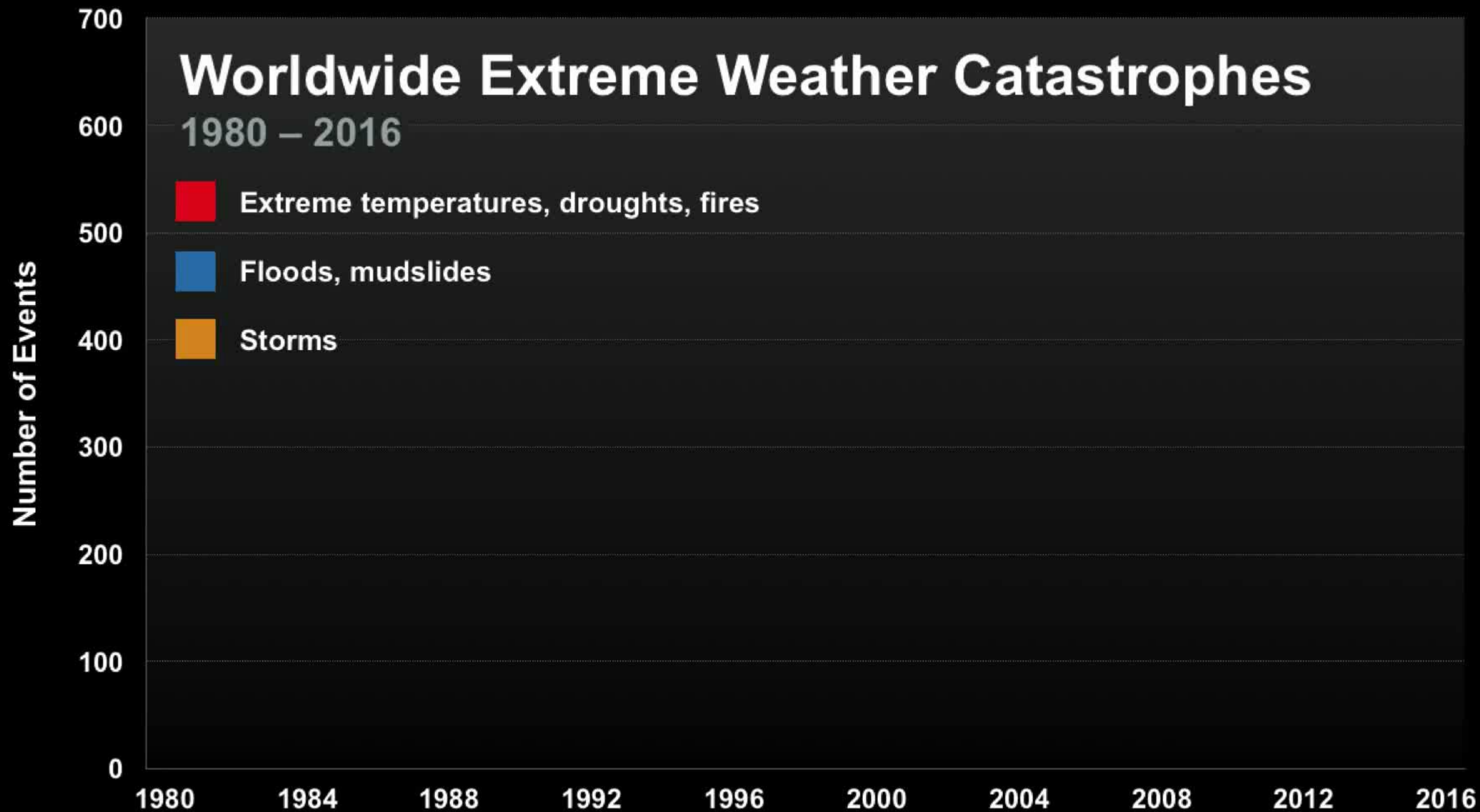
2010

2015

Fort McMurray, Alberta, Canada

May 3, 2016





3

Unnamed Glacier, Southwest Greenland
Summer 1935

©

Images courtesy Anders Black, © Natural History Museum of Denmark/Tholstrup (2013) and D. J. Hardy, © British Antarctic Survey (1994)

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Unnamed Glacier, Southwest Greenland
Summer 1935

©

Images courtesy Anders Black, © Natural History Museum of Denmark/Tholstrup (2013) and D. J. Hardy, © British Antarctic Survey (1994)

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Unnamed Glacier, Southwest Greenland
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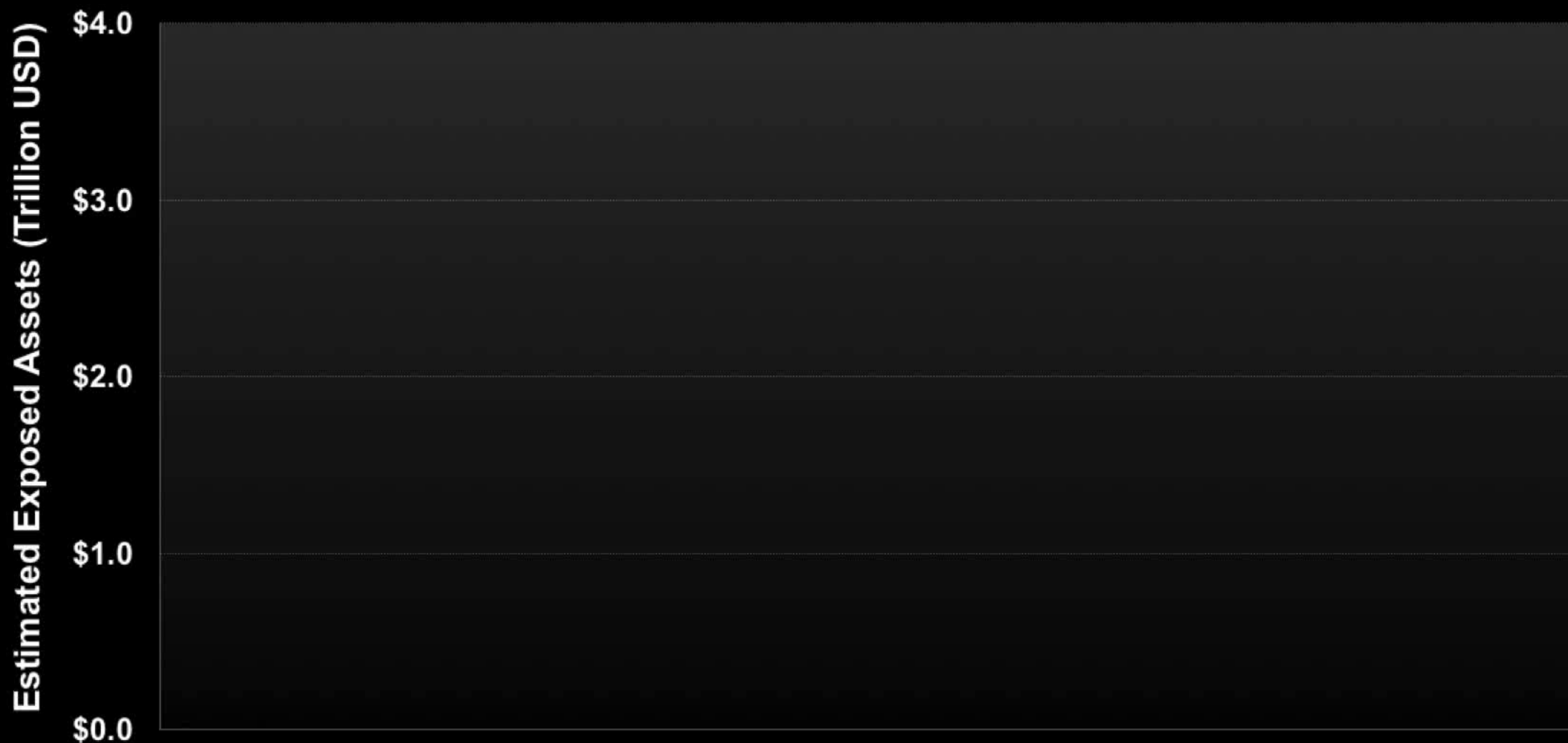
Miami Beach, Florida

September 29, 2015



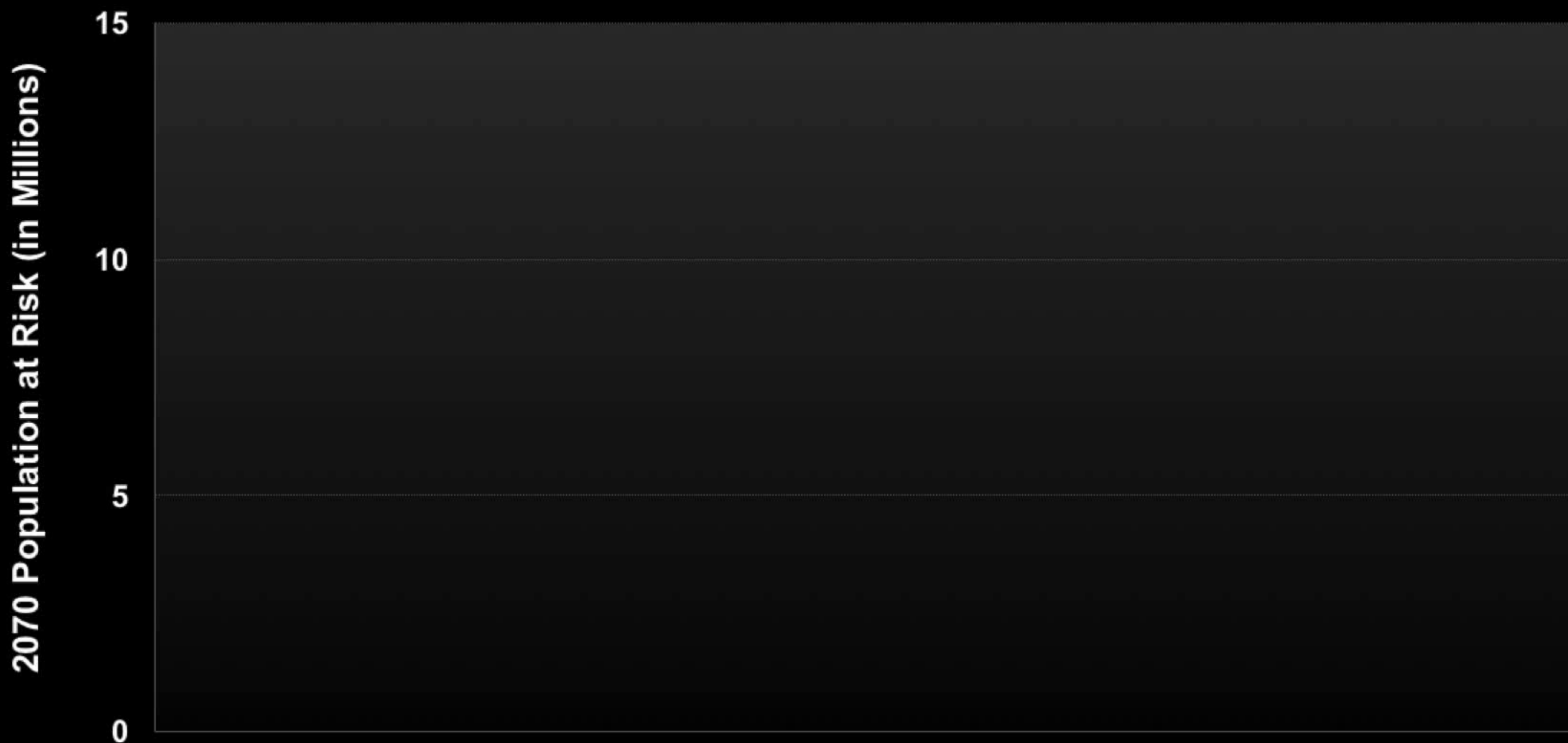
Top 10 Cities at Risk from Sea Level Rise in 2070

By Assets at Risk



Top 10 Cities at Risk from Sea Level Rise in 2070

By Population at Risk





**“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





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

\$



So...

Must we change?

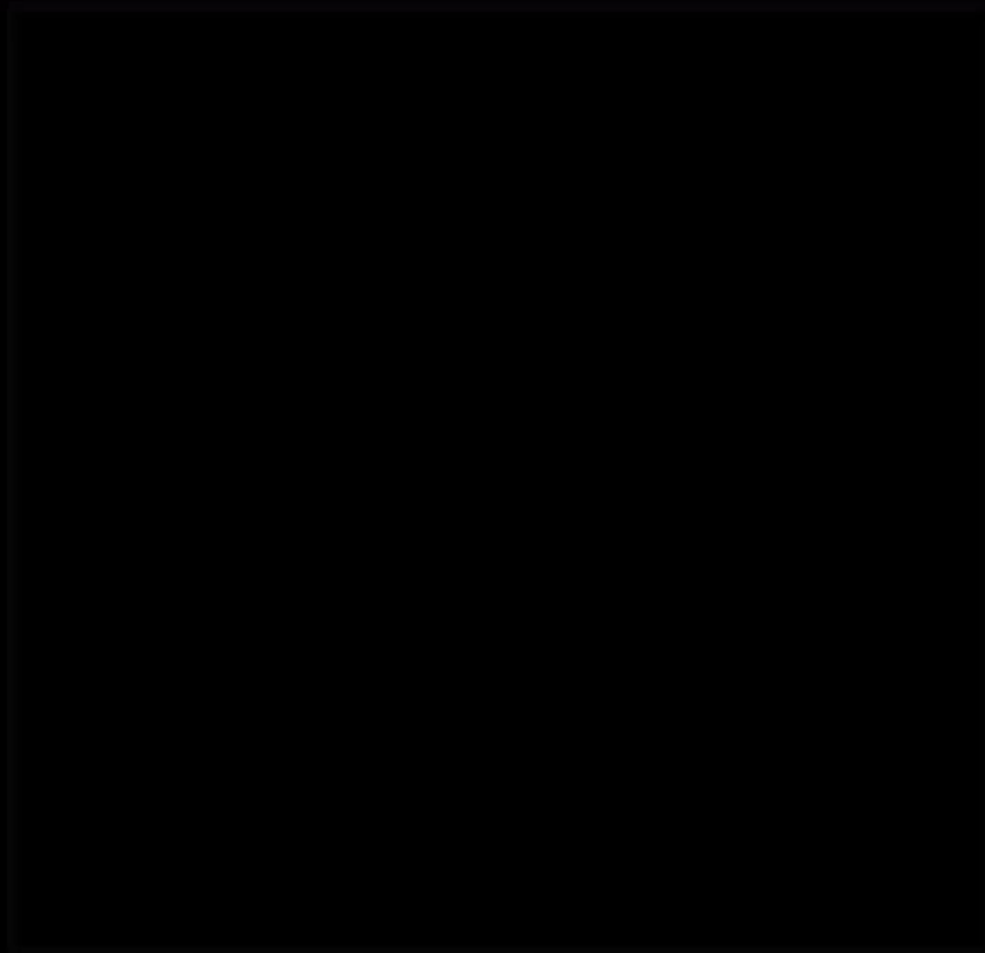
2. Can we change?

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

Green Energy Progress

How Do Projections Compare With Reality?

2000 Projection



Global Wind Energy Capacity

1980 – Present

Wind Capacity (Megawatts)

500,000
400,000
300,000
200,000
100,000

1980 1984 1988 1992 1996 2000 2004 2008 2012 2016

Data: Earth Policy Institute/BNEF



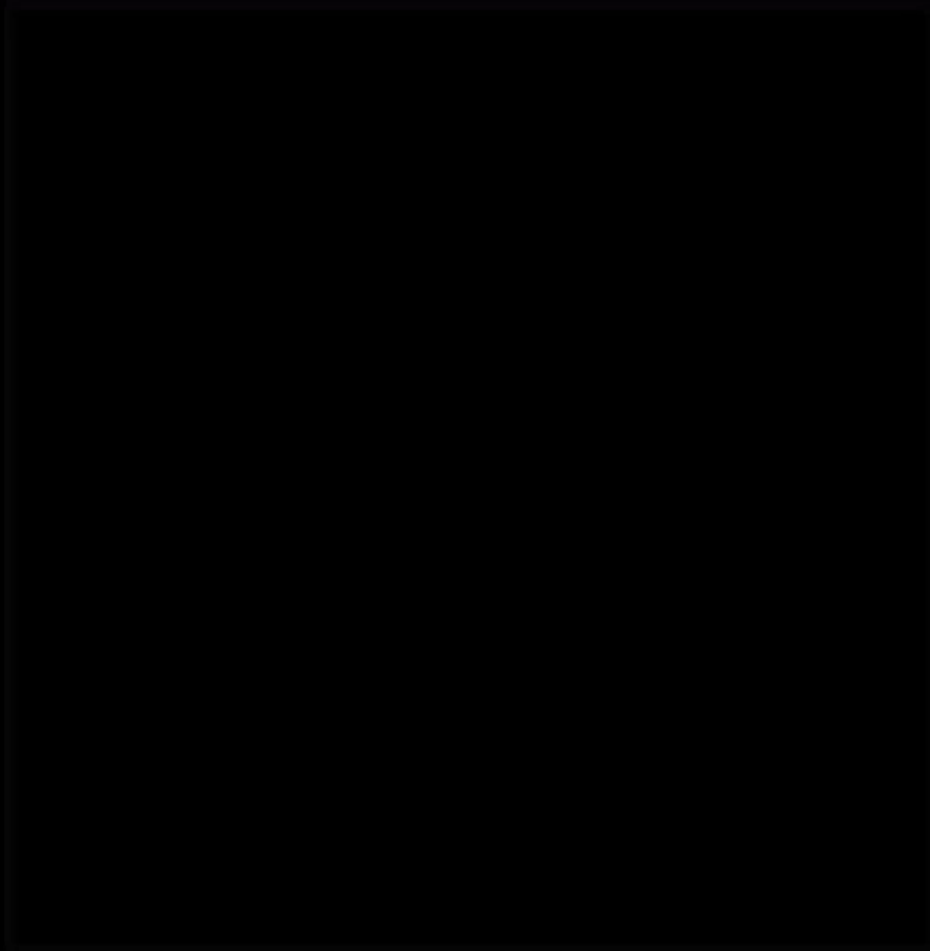


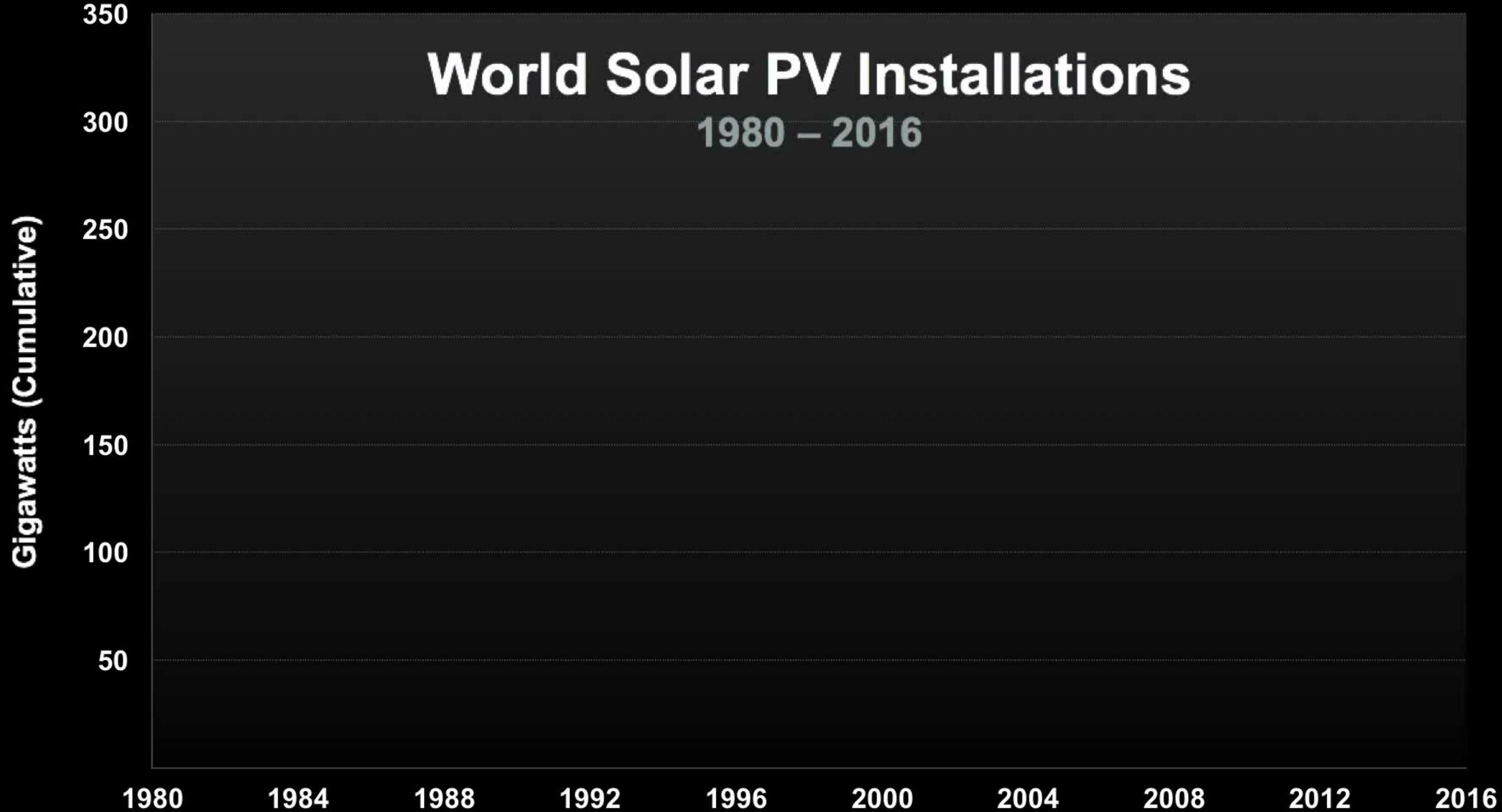
**Globally, wind could
supply worldwide
electricity consumption
40 times over**

Solar Energy Progress

How Do Projections Compare With Reality?

2002 Projection





Cost of Crystalline Silicon Solar Cells

\$ Cost per Watt (Inflation Adjusted)

\$80
\$70
\$60
\$50
\$40
\$30
\$20
\$10
\$0

1976 1980 1984 1988 1992 1996 2000 2004 2008 2012 2016



The Chilean Solar Market

Total Installed Solar Capacity (Gigawatts)

1.00

0.75

0.50

0.25

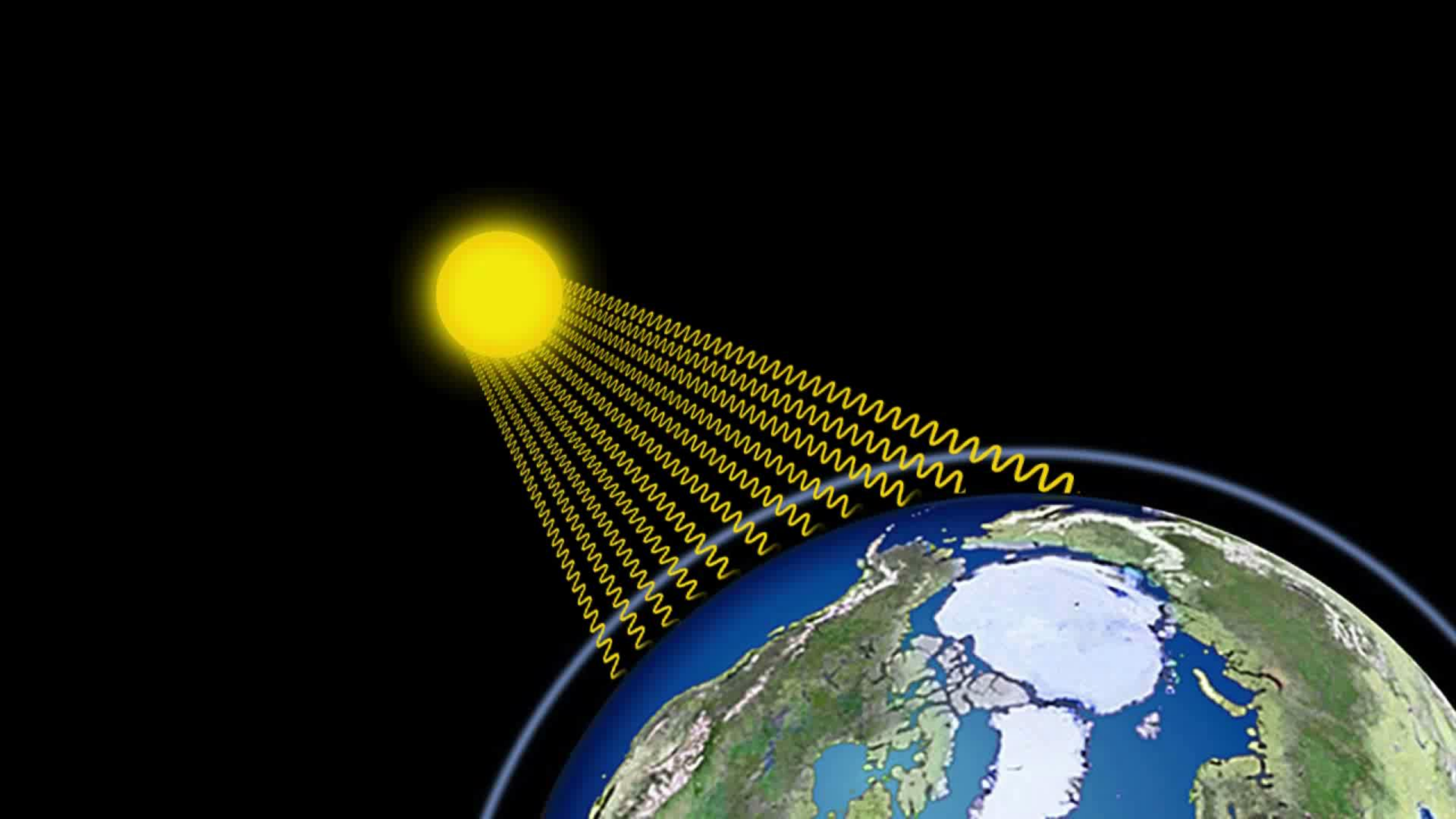
0.00

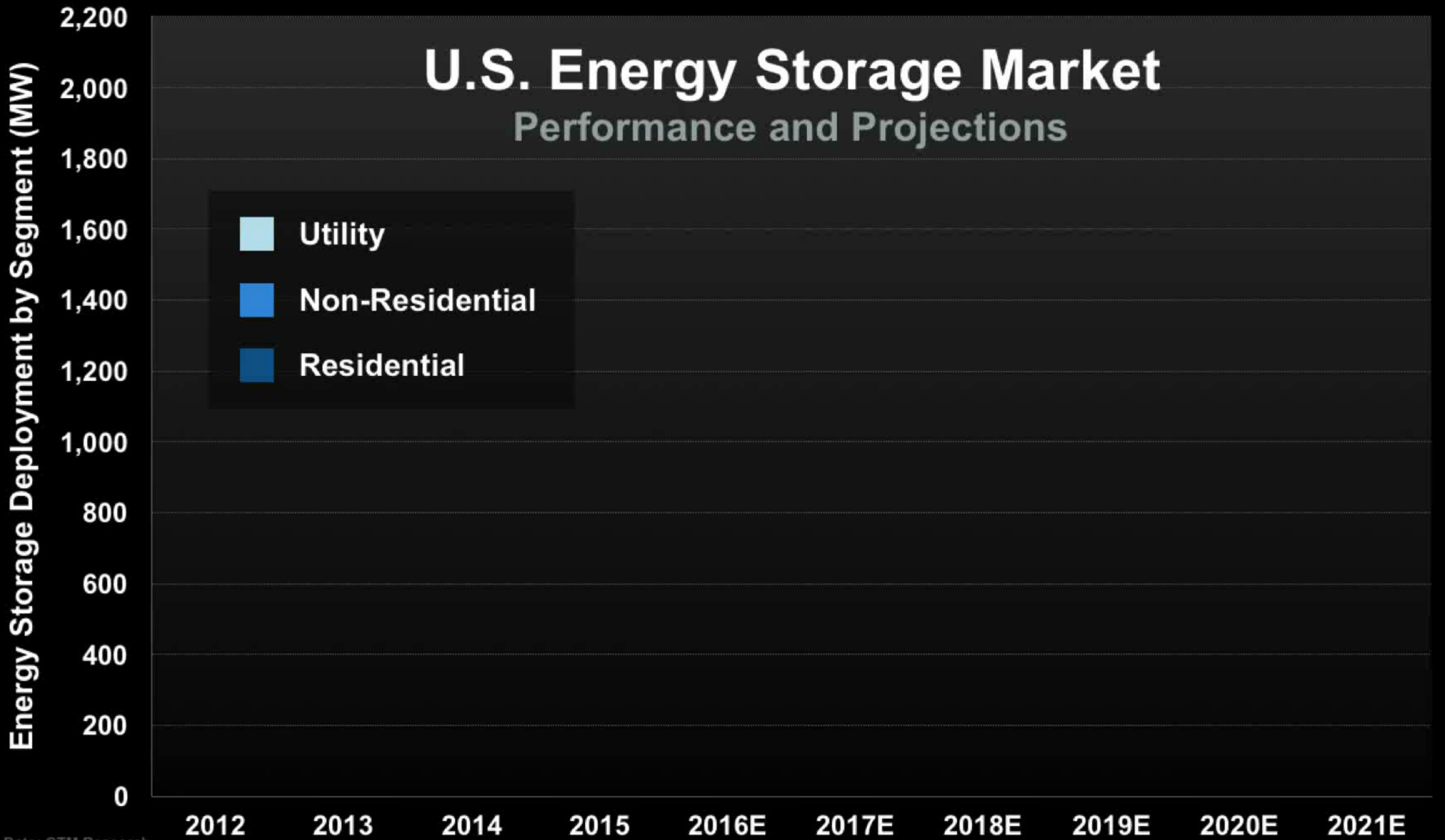
End of 2013

End of 2014

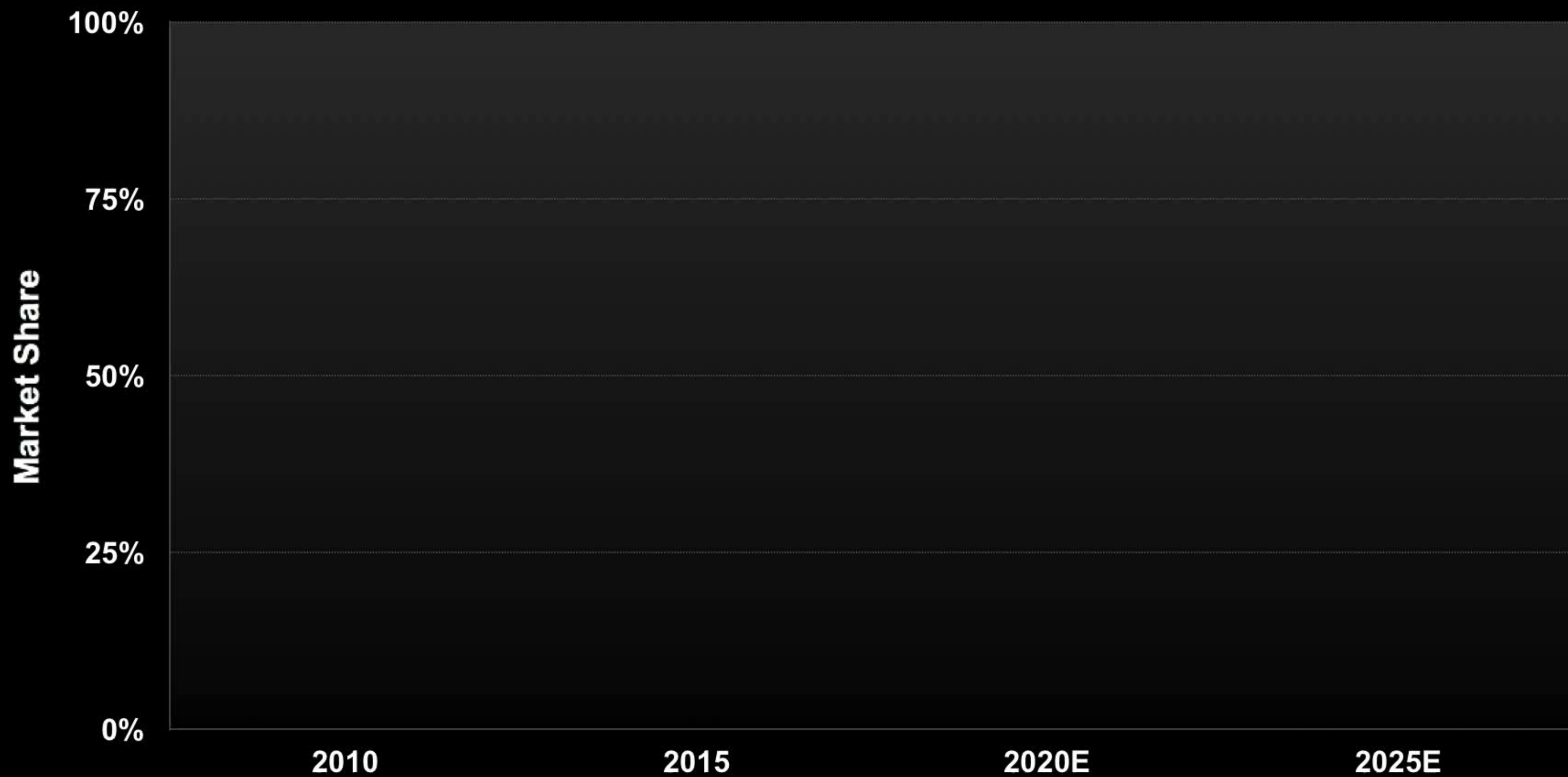
End of 2015

Data: Greentech Media, *Latin America PV Playbook*; CleanTechnica





LED Lights: Percentage of the Total Lighting Market



Auto Manufacturers Are Moving to Electric Vehicles

Companies with Electric Models in Production

So...

Can we change?

3. Will we change?



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

April 29, 2017



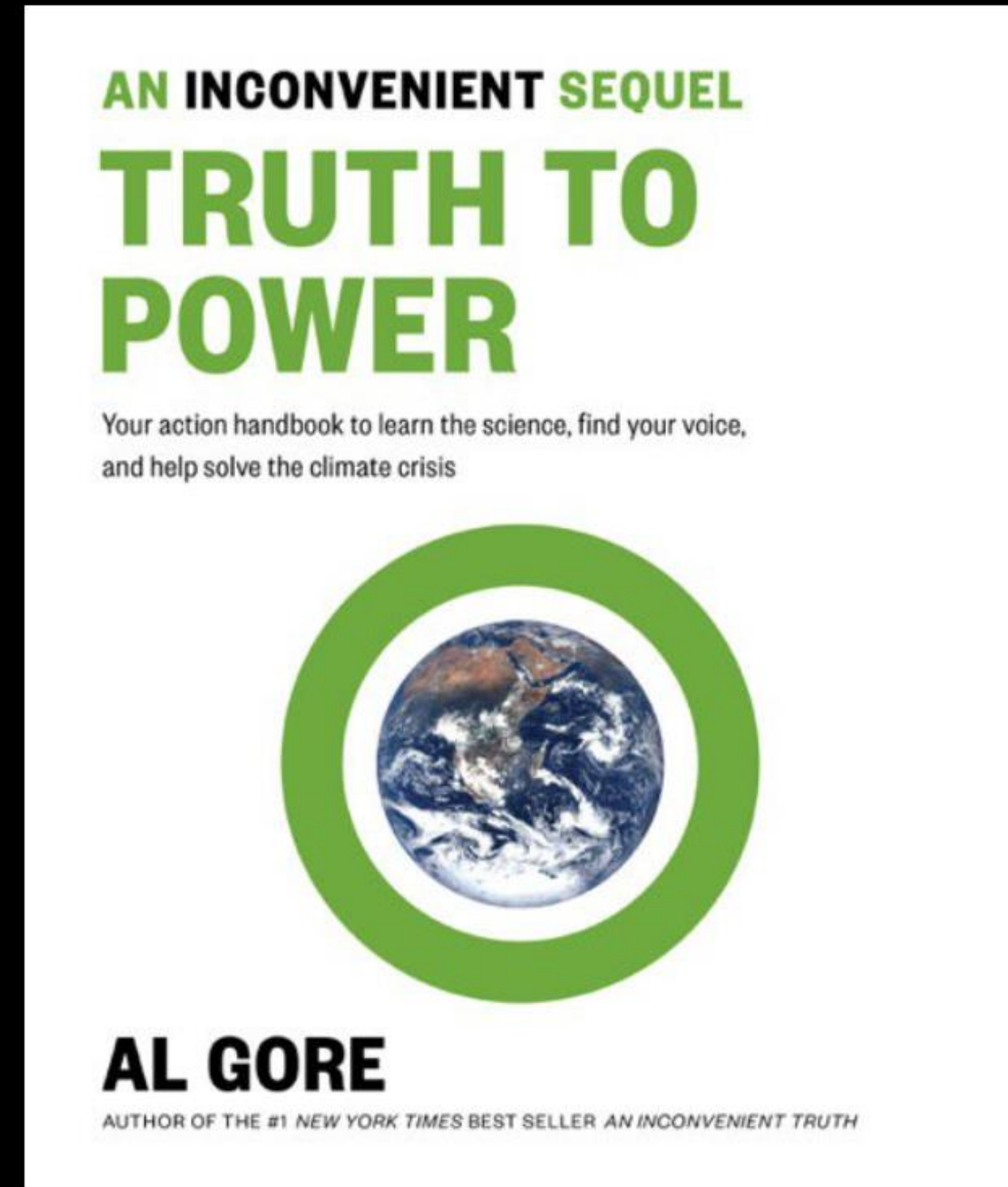


Your world depends on it.

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



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