

To deny people access to cheap energy (coal) is to deny them development.

<http://wattsupwiththat.com/2013/03/15/james-hansens-policies-are-shafting-the-poor/>

Climate and Public Policy

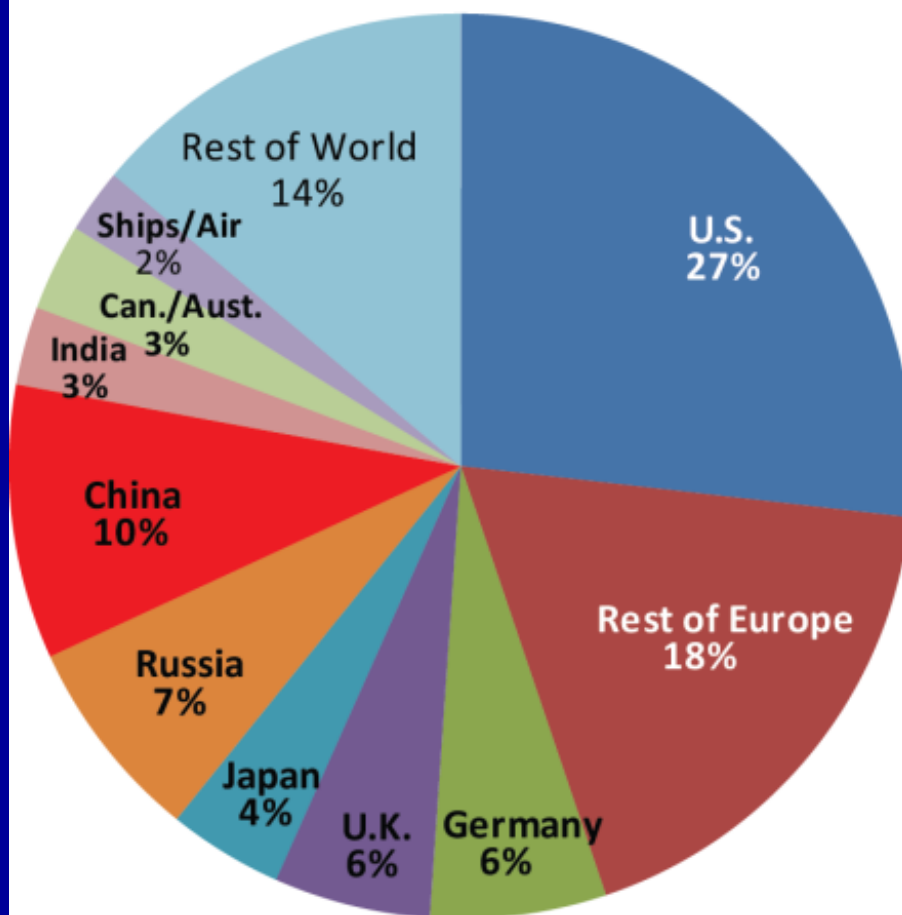
Hans Rosling

Ted talks and progress on controlling
population growth

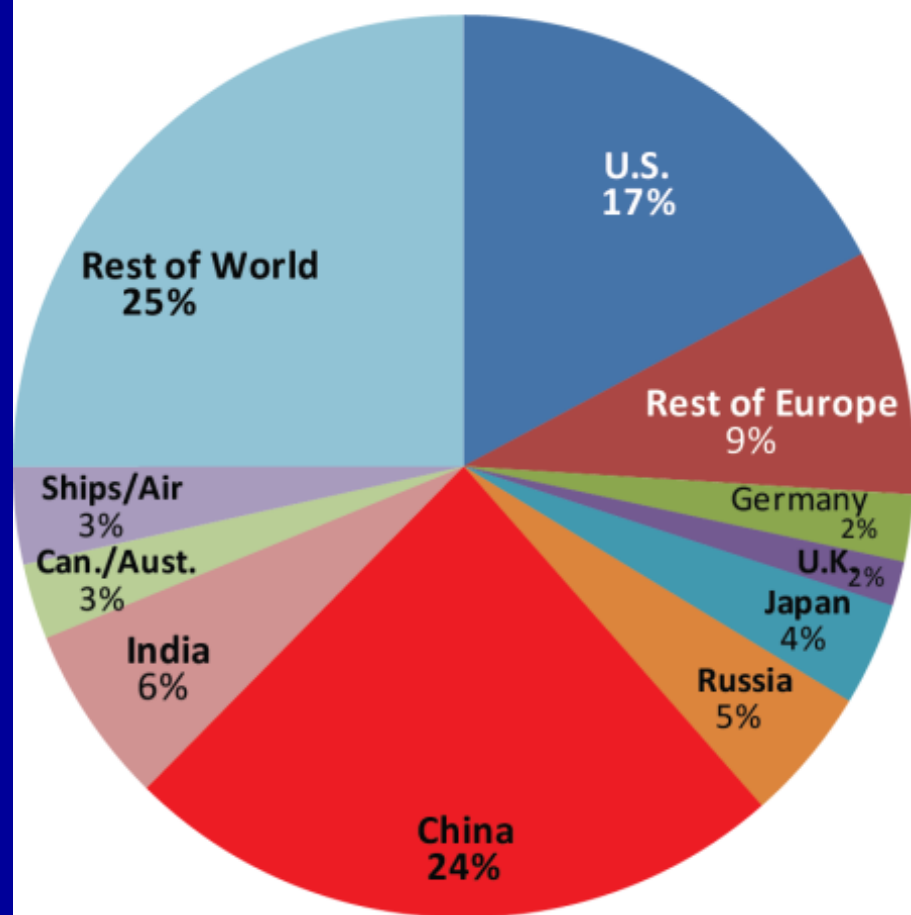
Google *GapMinder* for a fact-based world view

Fossil Fuel Emissions

Accumulated Emissions: 1751-2010



2010 Emissions

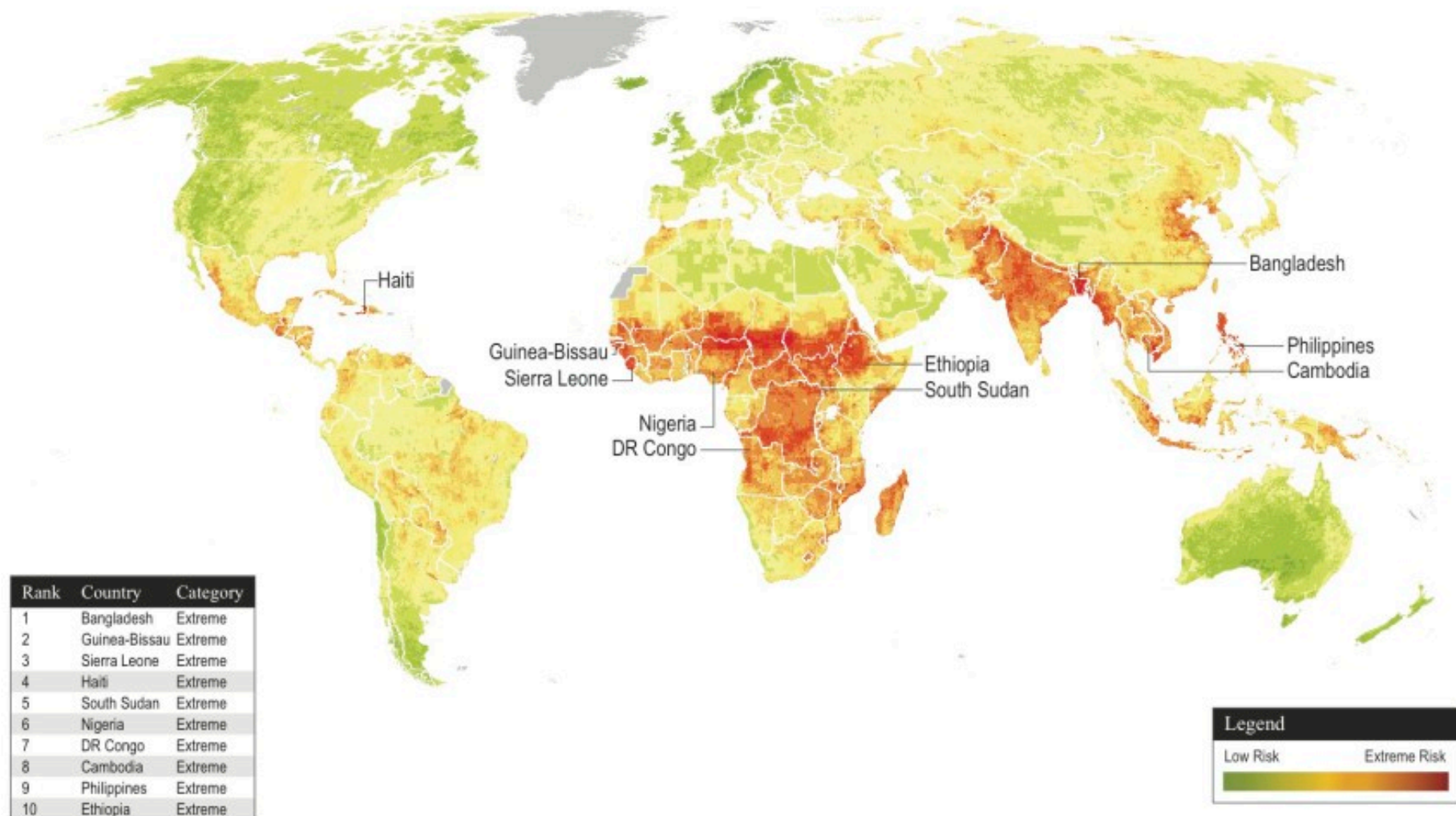


Whose problem is this?

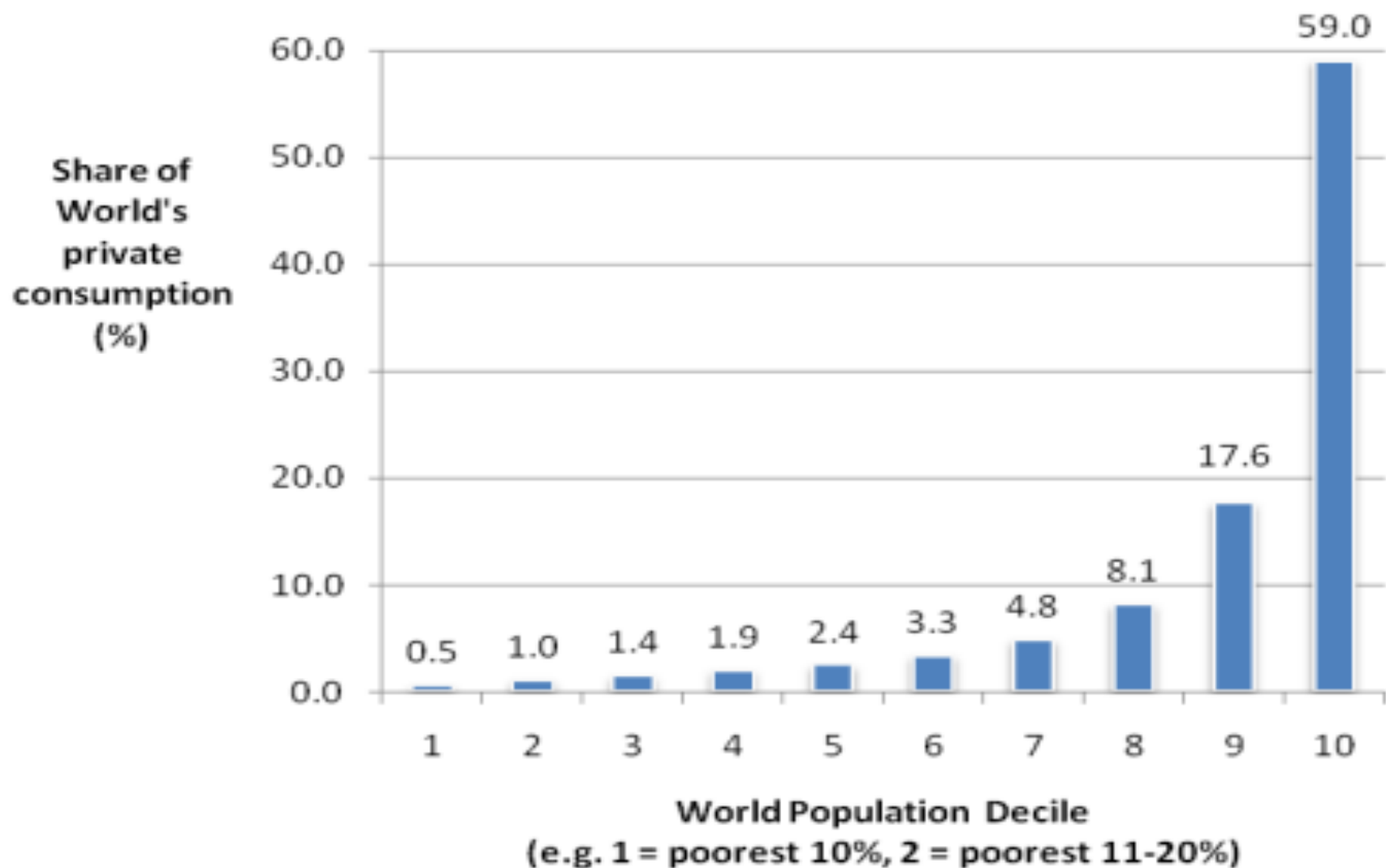
Third world gets hit hardest;
First world is struggling with the
refugees already.

Prime example: drought in Syria
led to civil war there.

Climate Change Vulnerability Index 2014



Inequality of Consumption, 2005



Source: World Bank Development Indicators 2008

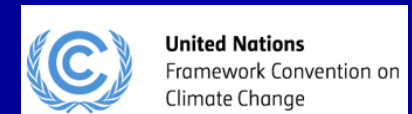
Public policy and climate change

- Don't expect the government to "lead"
- Action comes when it is demanded by the citizenry
- The government is the "last to know" once it has become obvious to everyone else
- Government insurers are not including climate risk, on the other hand, private insurers have been considering climate change for 4 decades
- DoD takes climate change seriously

See <http://energy.lbl.gov/insurance/opportunities.html>

Terminology for Global Perspective

- IPCC - Intergovernmental Panel on Climate Change (IPCC)
 - World Meteorological Organization [WMO](#) and UN Environment Programme [UNEP](#) establish the Intergovernmental Panel on Climate Change [IPCC](#) in 1988.
- UNFCCC – United Nations Framework Convention on Climate Change (UNFCCC) in 1994.
- COP - Conference of the Parties, 1995
- INDC - Intended Nationally Determined Contributions (INDC)
- COP21 (aka Paris Agreement) - 21st meeting.
- The planet now has a goal:
 - “hold the increase in global average temperature to well below 2 deg C above pre-industrial levels **and to pursue efforts to limit the temperature increase to 1.5 deg C**”



UNFCCC

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

IPCC Reports

- IPCC reports are developed through multiple rounds of drafting and review.

IPCC member Governments endorse the report based on a dialogue between those who will use the report – the governments – and those who write it – the scientists.

- Endorsement is intended to underpin the report's authority.
- Endorsement does not guarantee any government action.

Assessment Reports AR

1990, FAR, First

1995 SAR, Second

2001, TAR, Third

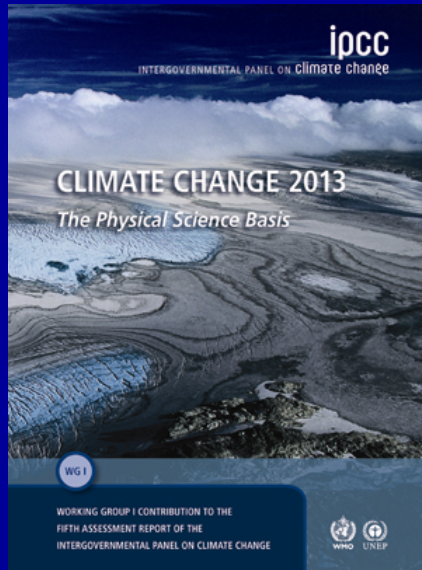
2007, AR4, forth

2014, AR5, fifth

Not infallible. Mention error in AR4.

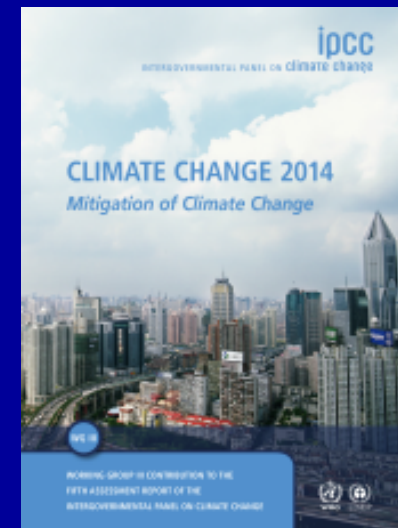
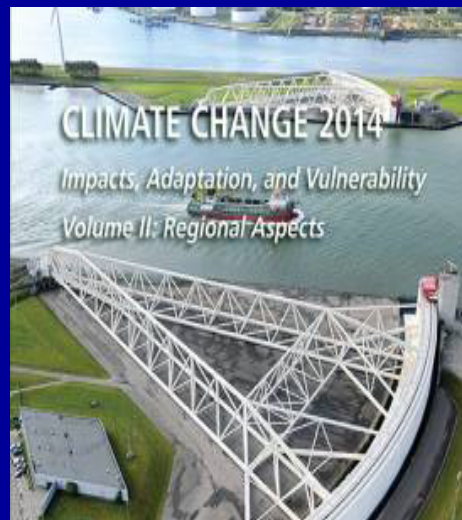


3 Major IPCC working groups



Assessment reports
major working group reports
(almost 800 authors)
Various supporting materials

- I. The Physical Science Basis
- II. Impacts, Adaptation and Vulnerability
- III. Mitigation of Climate Change



http://www.ipcc.ch/working_groups/working_groups.shtml

Progression in IPCC reports

- First (FAR 1990): Summary for Policymakers report says they are certain that emissions resulting from **human activities** are substantially increasing the atmospheric concentrations of the greenhouse gases, resulting on average in an additional warming of the Earth's surface.
- Second (SAR 1995): The balance of evidence suggests a **discernible human influence** on global climate.
- Third (TAR 2001): Since the mid-20th century, most of the observed warming is "**likely**" (greater than 66% probability, based on expert judgment) due to human activities.
- Fourth (AR4 2007): Most of the global average warming over the past 50 years is "**very likely**" (greater than 90% probability, based on expert judgment) due to human activities.
- Fifth (AR5 2014): Human influence on the climate system is clear. It is **extremely likely** (95-100% probability) that human influence was the dominant cause of global warming between 1951-2010.

National Climate Assessment (May 2014)

- Melting permafrost in Alaska
- Ocean acidification
- Rising sea level, especially along east coast
- Heat waves in the west
- More severe winter storms and hurricanes



World's Largest Polluters Strike Deal to Curb Global Warming

US and China agree on approaches.

Nov. 12, 2014

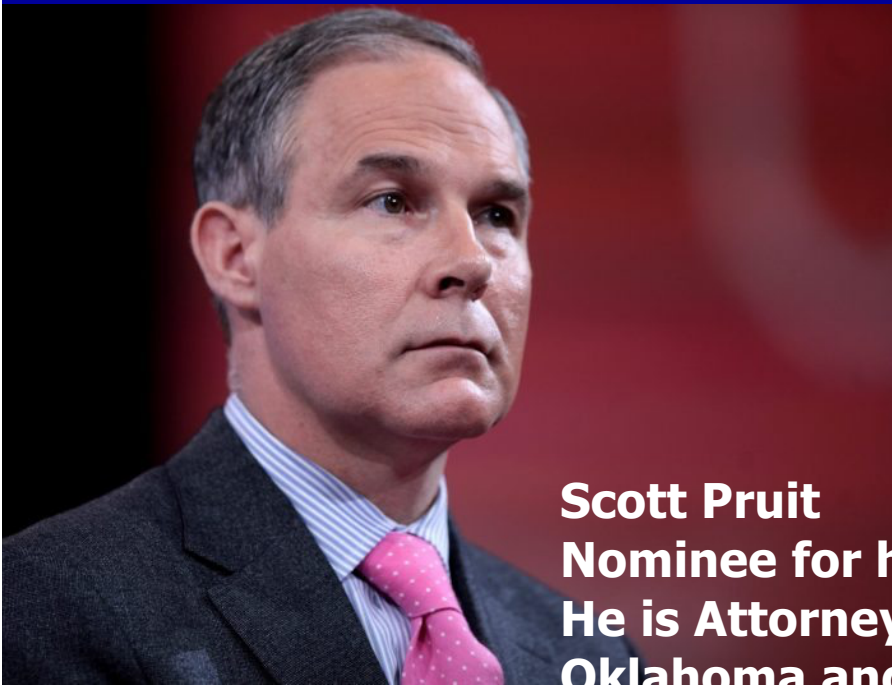
U.S. and Chinese presidents Barack Obama and Xi Jinping signed a deal that will cut greenhouse gases and pledged to work together toward a global deal in 2015.

Culminated in the COP21 agreement
To limit the temperature rise to 2 deg C with
a goal of a 1.5 deg C rise (reference
temperature start of **industrial revolution**).



Obama administration tried!

Will an “open minded” President undo all this?



**Scott Pruitt
Nominee for head of EPA.
He is Attorney General of
Oklahoma and in the
pocket of oil interests.**



EPAs Clean Power Plan

- Supreme Ct. stayed implementation
 - EPA believes they have strong scientific and legal foundation.
- Many states are already moving in this direction
 - State choice on how to implement
 - Targets are reasonable and can be met

For details see:

<http://www.c2es.org/docUploads/insights-comparative-analysis-clean-power-plan-modeling.pdf>

International agreements in place

- international community objective to limit the increase of mean global T < **2° C** (3.6°F) above pre-industrial levels
 - requires global greenhouse gas emissions to peak by 2020 or sooner
 - limit the atmospheric CO₂ < 450 ppm
- This agreement was made in a number of international meetings: G8 2009/2010, G20 2009, UN General Assembly 2009/2010, Copenhagen Conference 2009.

Laudato Si' (Praised Be)

24 May 2015

"The time for seeking global solutions is running out. We can find suitable solutions only if we act together and in agreement."

- Pope Francis



http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html

Paris accord: COP21 aka 2015 Paris Climate Conference

Dec 7,8, 2015

- First international agreement on GHG
- Limit ΔT to $<2^{\circ}\text{C}$ (already have 0.8°C)
 - Try to hold ΔT to $<1.5^{\circ}\text{C}$
- Statements of intention with tracking
- Arguments about enforcement

Rio Earth Summit in 1992
established the Conference of Parties (hence COP)

<http://www.cop21paris.org>

2015 Paris Agreement - Highlights

- Global Response – COP21, the 21st Family Reunion about Climate Change
- 195 “parties” involved expressed concern about our planet
- Grave concern about our cousins living on island nations.
-
- Article 2 of the Agreement
- 1) ...this agreement,...aims to strengthen the global response to the threat of climate change.... By:
 - a) Holding the increase in global average temperature to well below 2 deg C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 deg C ... recognizing this would significantly reduce the risks and impacts of climate change.
 - b) Increasing the ability to adapt to adverse impacts of climate change ...
 - c) Making finances flow ...towards low greenhouse gas emissions and climate-resilient development.

Kerry promises at COP21

- “We will not leave the most vulnerable nations among us to, quite literally, weather the storm alone”, he declared, saying that today, “the United States is committing to double [...] public, grant-based adaptation investments by the year 2020”, in reference to the measures that will help face up to the consequences of global warming such as building embankments, reforestation, and weather warning systems. These funds totalled \$430 million in 2014, according to American officials.
- More generally, “the United States already contributes more than 2.5 billion to climate finance annually”, according to Secretary Kerry.

The new administration can easily change this commitment.

INDC Analyses Show Need for Radical Action

News 2 May 2016:

The UNFCCC Secretariat has released an updated synthesis report outlining the aggregate effect of the intended nationally determined contributions (INDCs) submitted by 189 Parties as of 4 April 2016.

The report finds ... the INDCs would result in total aggregate global emission levels of 55 Gt carbon dioxide (CO₂)-equivalent (eq) in 2025 and 56 Gt CO₂-eq in 2030....this emissions trajectory ...is far from ...the goal of limiting warming to 2° C or 1.5° C above pre-industrial levels.

... [the] 17 INDCs that cover 78% of global energy-related CO₂ emissions ... finds that the energy supply must be more rapidly de-carbonized and energy productivity ... improved at a much greater rate than these 17 Parties committed to in their INDCs.

read more: <http://climate-l.iisd.org/news/indc-analyses-show-improvement-need-for-radical-action/>

US to Fail Paris Emissions Pledge Without 'Fundamental Change'

Report

Published on Monday, September 26, 2016 by [Common Dreams](#)

US to Fail Paris Emissions Pledge Without 'Fundamental Change': Report

'This is a call to action to ensure we close the remaining gap' By [Nadia Prupis, staff writer](#)

Scientists at a University of Oxford conference last week similarly [warned](#) that greenhouse gas emissions are not being reduced quickly enough to prevent the Earth from reaching the agreed-upon 1.5°C global warming threshold in a decade.

Meanwhile, a report by the environmental group Oil Change International also released last week [found](#) that the world has 17 years to get off fossil fuels entirely to prevent reaching the even more lenient 2°C warming threshold.

<http://www.commondreams.org/news/2016/09/26/us-fail-paris-emissions-pledge-without-fundamental-change-report>

COP21 update

- As of 5 Oct. 2016, 122/197 had ratified the COP21 agreement.
- So it is in force.
- If the USA wants out, there is a complex 4 year withdrawal process.
- We can pull out of the UNFCCC, the controlling UN body for the COP with a 1 year notice.
- The risk is alienating the international community.

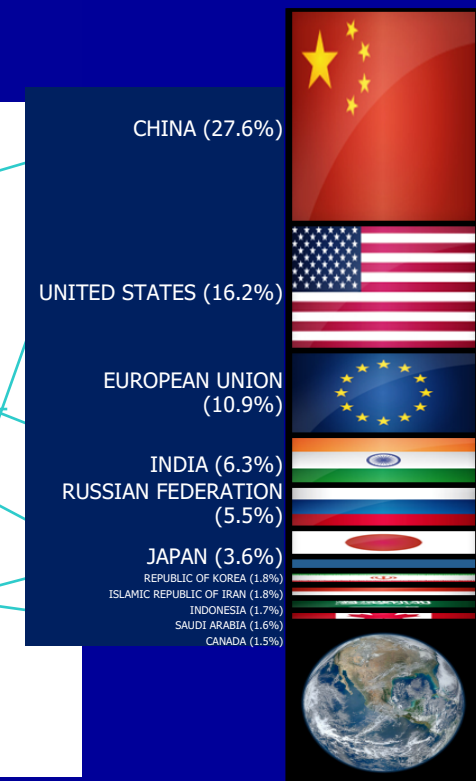
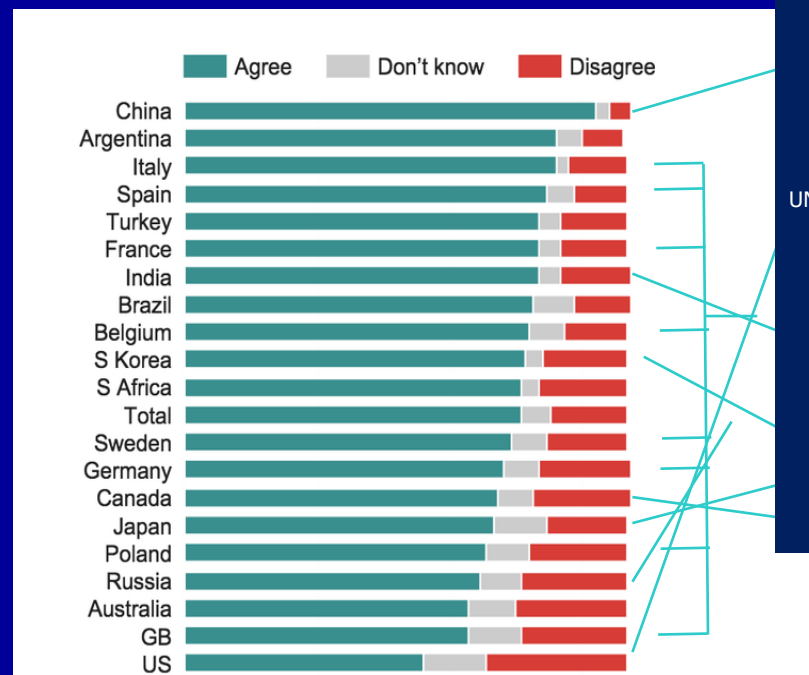
<https://www.scientificamerican.com/article/could-trump-simply-withdraw-u-s-from-paris-climate-agreement/>

Where in the World Is Climate Change Science Denial Most Prevalent?

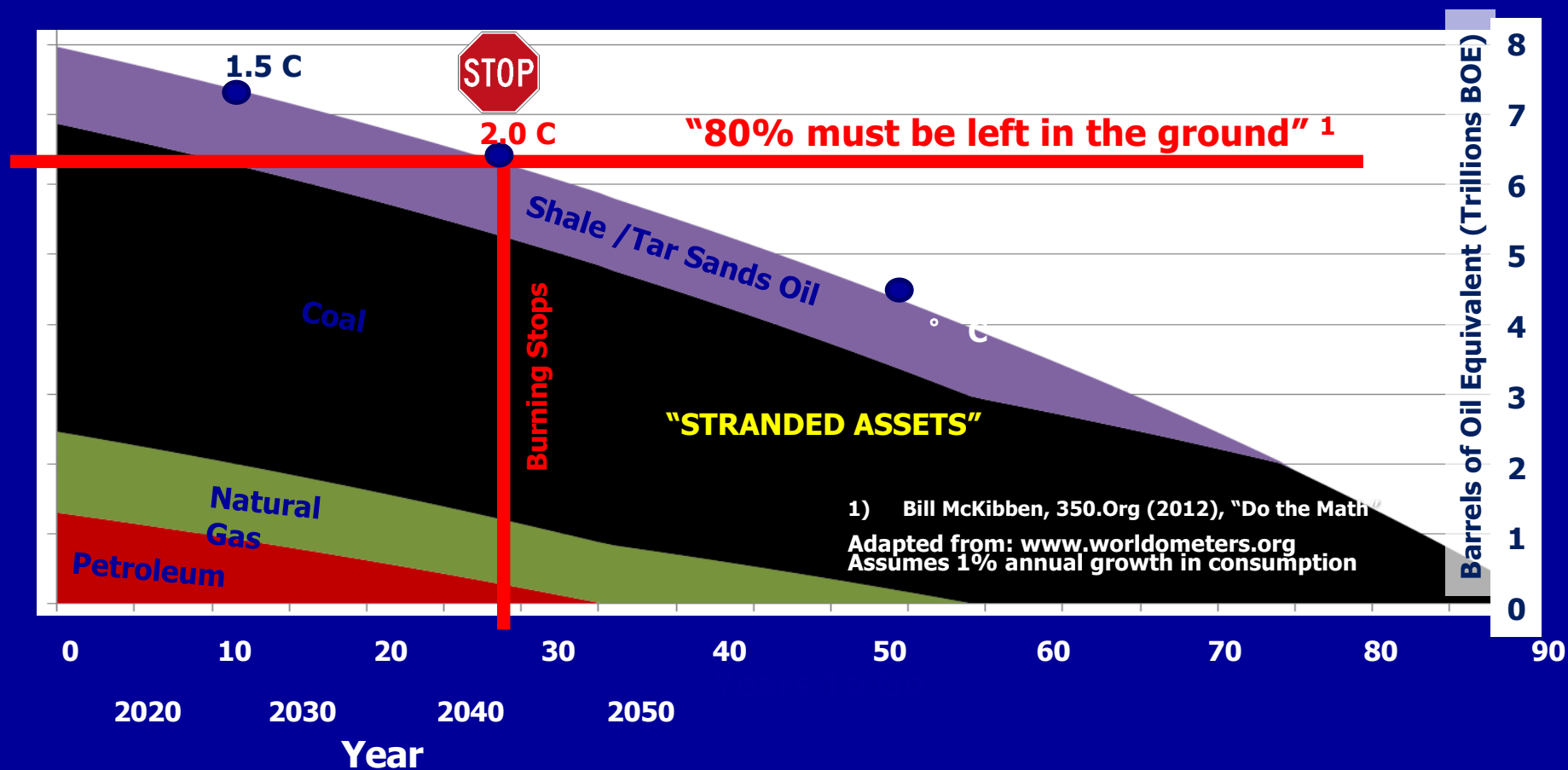
- Results from a question about views on climate change from a 2014 global report, "Global Trends 2014" report, Ipsos MORI

- Ref 1)
<http://www.nytimes.com/interactive/projects/cp/climate/2015-paris-climate-talks/where-in-the-world-is-climate-denial-most-prevalent>
- Ref 2)
<http://www.ipsosglobaltrends.com/environment.html>

To what extent do you agree or disagree?
The climate change we are currently seeing is largely the result of human activity



Transition from Fossil Fuel is Inevitable – Do the Math



Credit: Milt Hetrick