Climate change frustration

WHAT ROLE FOR THE PUBLIC SCIENTIST?

Lesley Hughes
“It is time to stop waffling so much and say that the evidence is pretty strong that the greenhouse effect is here.”
What did we know when?

Why should we care?

Why is the message so hard?

How should scientists respond?
Jean-Baptiste Joseph Fourier
1768-1830

"Remarques Générales Sur Les Températures Du Globe Terrestre Et Des Espaces Planétaires" (1824)
John Tyndall
1820-1893

1859: generally credited as being the first to correctly measure the relative infrared absorptive powers of nitrogen, oxygen, CO$_2$, methane, water vapour, thus proving the Greenhouse Effect existed
Eunice Newton Foote
1819-1888

1856: research presented to conference that “The highest effects of the sun’s rays I have found to be in carbonic acid gas”
Arvid Högbom
1857-1940

First to quantify sources of CO$_2$ emissions (human and natural) to understand the carbon cycle
Svante Arrhenius
1859-1927

1896: realised that Högbom’s calculations meant that human influences could eventually lead to a doubling of atmospheric CO$_2$ – coined term “Greenhouse Effect”

$2 \times \text{CO}_2 \sim 5-6^\circ \text{C}$

Predicted warming of the earth….in thousands of years
Guy Callendar
1897-1964

1938: promoted the idea that rising CO$_2$ would promote warming (eventually known as the Callendar Effect) but thought this would be beneficial, delaying “the return of the deadly glaciers”
Charles Keeling
1928-2005
Climatic Change: Are We on the Brink of a Pronounced Global Warming?

Author(s): Wallace S. Broecker


Published by: American Association for the Advancement of Science
N=294,837

No. papers with (global warming) or (clim* change) in Web of Science 1981-2017
• “…warming of the globe of 0.3 – 0.6°C has taken place over the last century”

• “Emissions resulting from **human activities are substantially increasing** the atmospheric concentrations of the greenhouse”

"the observed trend in global mean temperature over the past 100 years is unlikely to be entirely natural in origin. ....... these results point towards a human influence on global climate".
“New and strong evidence that most of the warming observed over the last 50 years is attributed to human activities”

“Warming of the climate system is unequivocal”

“Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.”
“Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia”

“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”
…most scrutinised report in history?

- 3 Working Group Reports + Synthesis report
- ~2500 pages
- 4 drafts
- 800 authors (from 3000 nominations)
- 142,631 comments
Why should we care?
alarmist
əˈlɑːmɪst/

noun
1. someone who exaggerates a danger and so causes needless worry or panic

adjective
2. Creating needless alarm or panic
Climate changing 170 times faster (70s to 2016) than in previous 7000 years.
2016: another record year

- 2017 third warmest year in history
- Warmest non El Niño year
- 16 of the 17 warmest years occurred since 2000
Glaciers are retreating
- Himalaya-Hindu Kush mountain range & Tibetan Plateau
- Source of 10 major river systems, providing water for > 1.3 billion people – nearly 20% of world population
- Warming 2X global average, 500 glaciers already gone
Polar ice is melting
Sea level rise is accelerating
Pace has tripled since 1990s
- 50% Australian coastline vulnerable to recession by 2100
- In Sydney, 1-in-100 year flood could occur every day by 2100
- For 110cm m slr: >$200 billion assets at risk
Oceans 30% more acidic than pre-industrial
Coral reefs are bleaching
- 2016-17: catastrophic bleaching on Great Barrier Reef
- 93% individual reefs affected
- 50% mortality of bleached coral
- $7 billion
- >60,000 jobs
Europe: 2003
70,000 premature deaths
Russia: 2010
56,000 premature deaths
More than 370 deaths from heat-related causes during preceding week
North Atlantic hurricanes increasing
2007-2016: 46% increase in weather-related disasters

2015: 19 million people displaced
Tipping point

noun

the point at which a series of small changes or incidents becomes significant enough to cause larger, more important changes
Submergence of land currently occupied by 470-760 million people

Ganges megadelta, Bangladesh

Tuvalu 4.6m

Maldives 2.4 m
Beyond 5°C
“What is the difference between a 2°C and 4°C world?”

“Human civilisation”
So what are our chances?
Carbon budget

= quantity of greenhouse gas emissions that can be emitted in total over a specified time for a specified amount of warming
2015

2°C

1.5°C
2015

71% spent

~ 20 years emissions left
2015

2°C

71% spent

~ 20 years emissions left

1.5°C

95% spent

~ 3 years emissions left
2015

2°C

71% spent
~ 20 years emissions left

1.5°C

95% spent
~ 3 years emissions left
Unburnable coal

>90% Australia’s known extractable coal reserves must stay in ground
2% increase in 2017
Emissions Gap Report 2017

- highest CO$_2$ or at least 5 million years

- Last time CO$_2$ was this high, sea levels ~20m higher than present and global temperatures 2-3$^\circ$C higher

- Paris pledges only one third of what is needed for 2$^\circ$C target
Carbon pricing

Australian emissions have risen in every quarter since March 2015.
Climate Action Tracker estimates Australia on track to increase emissions 27% on 2005 by 2030.

“Australia stands out as having the largest relative gap between current policy projections for 2030 and the INDC target.”

Australia’s commitment

26-28% reduction on 2005, by 2030

(Climate Change Authority recommended 40-60% target)
## CCPI 2017 • Overall Results

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* New in the index, no previous year rating available.
* Not improved notably compared to previous year rating.
* ** improved notably compared to previous year rating.

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Australia
Why is the message so hard?
It’s complicated

likely

uncertain

probability

may

could
It’s scary
It’s sad
Often presented as “only” an environmental problem
It can seem like a long way off....
or happening to someone else
The tap keeps running after you turn it off
There are loud & powerful voices, ideology, and $$$ arrayed against
(Some of) the media continues to focus on the false debate
There are other important concerns
Tragedy of the commons problem like no other
Survey 2017

2,660 Australians across the country including 600 each in QLD, NSW and VIC, and 400 each in SA & WA

71% of Australians accept that climate change is taking place.
66% of Australians have a high level of concern about climate change.
87% of Australians do not want our country to step back from the Paris Agreement, with 61% wanting us to “work harder” with other countries to achieve its objectives.
72% of Australians think governments should implement a plan for the orderly closure of coal-fired power stations to replace them with clean energy.
96% of Australians want our primary source of energy to come from renewables (58% want an energy supply based on renewables supported by storage technologies, 38% prefer renewables supported by fossil fuels).
How should scientists respond?
Key messages

**The Science**
- 97% of climate scientists agree with AGW
- 3% disagree

**The Public**
- 55% think the science is unsettled or don't know
- 45% think there is scientific agreement on AGW
Is this how you feel?
(http://www.isthishowyoufeel.com/this-is-how-scientists-feel.html)
angry
furious
frustrated
overwhelmed
discouraged
powerless
desperate
nightmare
outraged
nobody’s listening
dismayed
perplexed
optimistic
powerless
desperate
unwilling to give up
depressed
sad
hope
outraged
scared
5 things I’ve learnt
1. More information doesn’t necessarily mean more understanding

& more understanding doesn’t necessarily mean more action

N=294,837
2. Need to continually search for more meaningful (local) narratives
2. Need to continually search for more meaningful (local) narratives
3. **advocacy** is not a dirty word

*Noun*

public support for or recommendation of a particular cause or policy
Finkel supports Labor's 50% renewables target
4. Need to overwhelm the negative with the positive……
California’s big utilities to reach 50% renewable energy in 2020

PG&E, SDG&E and SCE are expecting to meet the state’s ambitious 50% target 10 years early, with contract prices for utility-scale solar projects falling to below $30/megawatt-hour (MWh).

NOVEMBER 14, 2017  CHRISTIAN ROSELUND
5. We cannot be effective alone
THE REEF IS NOT A DUMP
We’ve crowd-funded $969,000* in a week!

Let’s raise
$1 MILLION
for people-powered science information

BY 2030 65% OF AUSTRALIA’S
COAL-FIRED POWER STATIONS WILL
BE OVER 40 YEARS OLD

29% of all coal fired power stations over 40 years
45% of all coal fired power stations over 40 years
65% of all coal fired power stations over 40 years

CLIMATE COUNCIL:
JOINT STATEMENT ON THE
HEALTH EFFECTS OF COAL IN
AUSTRALIA

BE PREPARED:
CLIMATE CHANGE AND THE
NSW BUSHEFIRE THREAT

COUNTING THE COSTS:
CLIMATE CHANGE AND COASTAL FLOODING

www.climatecouncil.org.au
www.facebook.com/climatecouncil
1988

2015

Nations Unies
les Changements Climatiques 2015
Paris, France

STORMS
OF MY GRANDCHILDREN
THE TRUTH ABOUT THE COMING CLIMATE CATASTROPHE AND OUR LAST CHANCE TO SAVE HUMANITY

JAMES HANSEN
The World's Leading Climate Scientist
activist ˈaktɪvɪst/

noun

a person who campaigns to bring about political or social change.
CLIMATE ACTION

PEOPLES CLIMATE MARCH
WE ARE THE ONES WE HAVE BEEN WAITING FOR!

12.12.15