

Climate Change: Are Both Sides Wrong?

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Mitigation (not Adaptation)

There is remarkably little worth disagreeing over.

- ▶ that is
 - ▶ rational, and
 - ▶ plausibly actionable

Presentation Background

- ▶ Using numbers from IPCC Earth scientists
- ▶ = best authority on climate change (CC), but
- ▶ ... biased on CC “like” economists on free markets.
 - ▶ Who else? Politics? Greenpeace? Fossil-fuel industry, AEI, GOP circles, badly distorted (yet all have some points, too).
- ▶ (IPCC scientists \neq IPCC policy body)

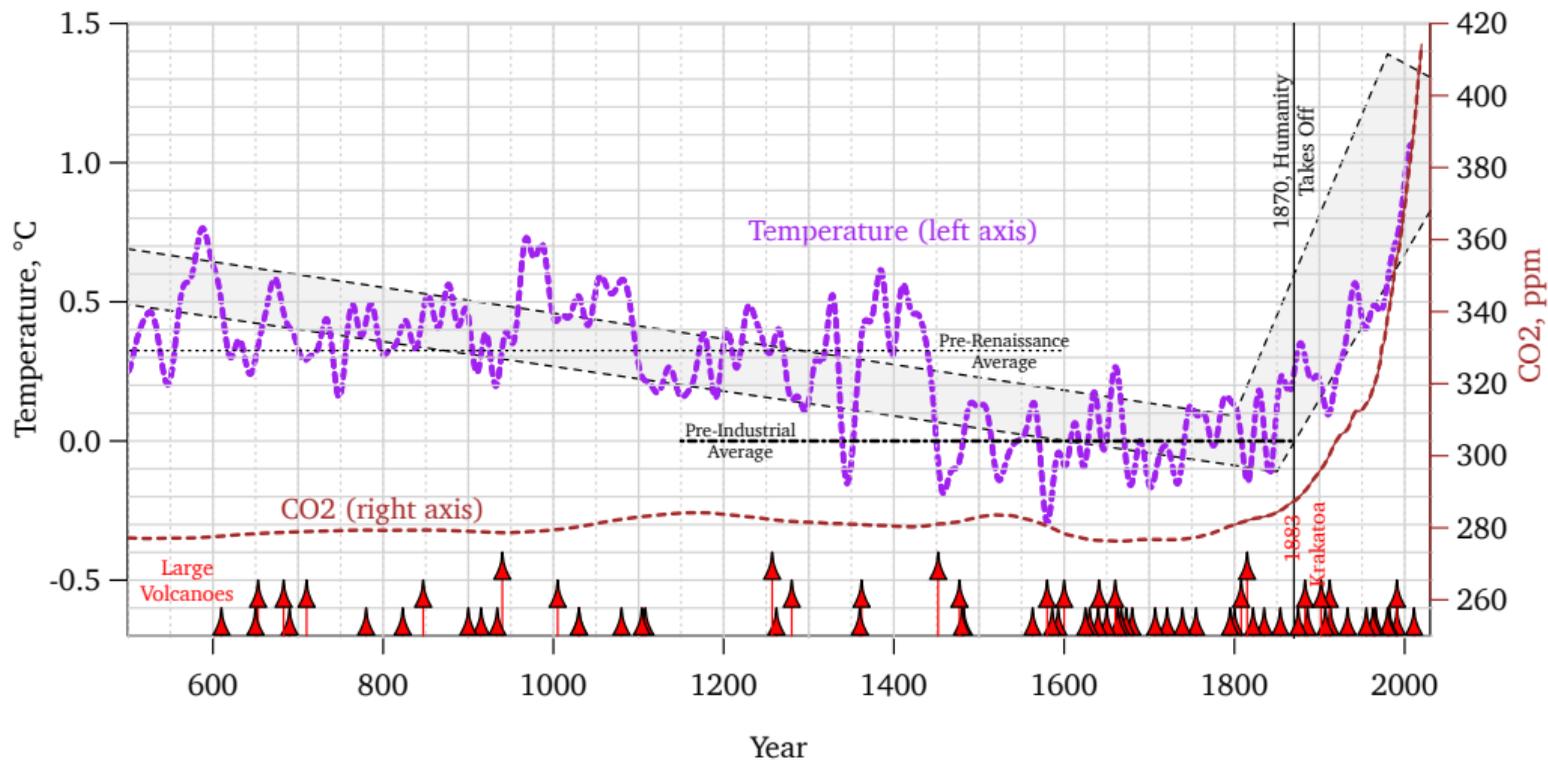
- ▶ You will probably not expect / like what you hear
 - ▶ many preconceptions, often 80% right
 - ▶ many emotions, political identities, etc.
 - ▶ I have no horse in this (non-)race.

- ▶ Fortunately
 - ▶ Usually Important \Rightarrow Agreeable (IA)
 - ▶ You should not reasonably disagree.
 - ▶ Often Unimportant \Rightarrow Disagreeable (UD)
 - ▶ Feel free to disagree.
 - ▶ Won't matter / affect IA

1. Is CC Real? (IA = indisputable, agreeable)

- ▶ Of course. Don't be stupid or political.
 - ▶ Yes, hockeystick

SKIP: Hockeystick



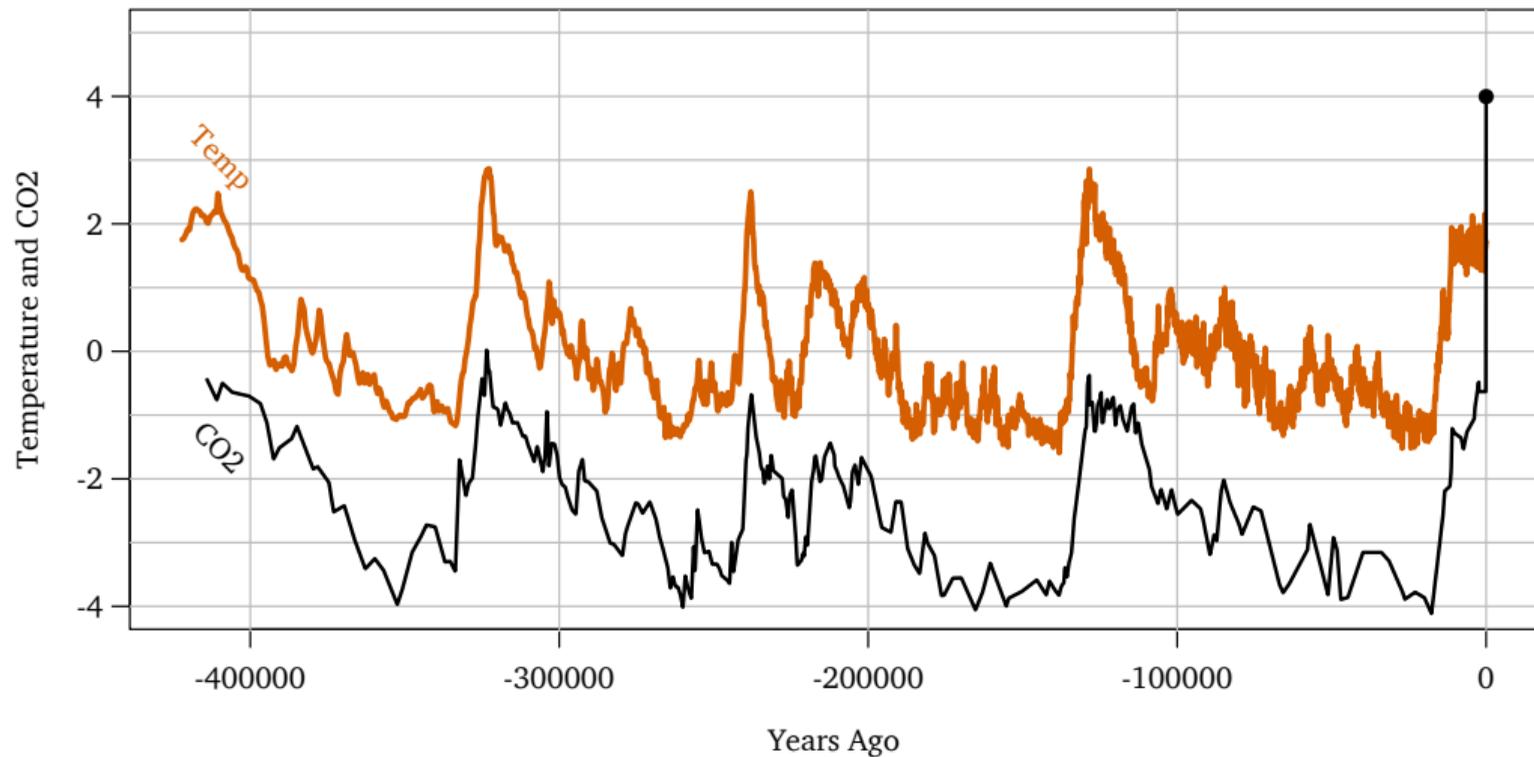
- ▶ Model-free CC evidence
 - ▶ No model of CO₂ needed (though easy to measure),
 - ▶ Regardless of your (political) biases
- ▶ Measure incoming and outgoing radiation by satellite
 - ▶ Accelerating radiation imbalance (heating effect)
- ▶ Human fossil-fuel CO₂ very likely to be **sole** culprit
 - ▶ isotope signature + theory + evidence
 - ▶ UD about other secondary CC contributors
 - ▶ leave those to connoisseurs

2. Wasn't CC “Worse” in the Past? (UD)

- ▶ Yes and No
 - ▶ often brandished as important evidence
 - ▶ interesting, but irrelevant
 - ▶ reason: no causality here (unlike today)
- ▶ CO₂ and Temp were higher 40-100 mya
 - ▶ before modern mammals appeared!
 - ▶ we are not dragonflies the size of plates
 - ▶ lots of stuff was different (incl. sun, continents)
 - ▶ ice age for 40my (year-round ice on poles), could end

- ▶ Humans: CO₂ and Temp were lower 30-100kya
 - ▶ we are in warmest part of 40my **Ice Age**
 - ▶ for 30ky now, defined by receding glaciers (not news!)
 - ▶ miracle that naked apes could survive *30kya*
- ▶ Very stable for about 10ky (/300ky of humanity)
 - ▶ when advanced civilization developed
 - ▶ perhaps not by accident?
 - ▶ but even then, past is no indication of future.

SKIP: 422,000 Years of Temp



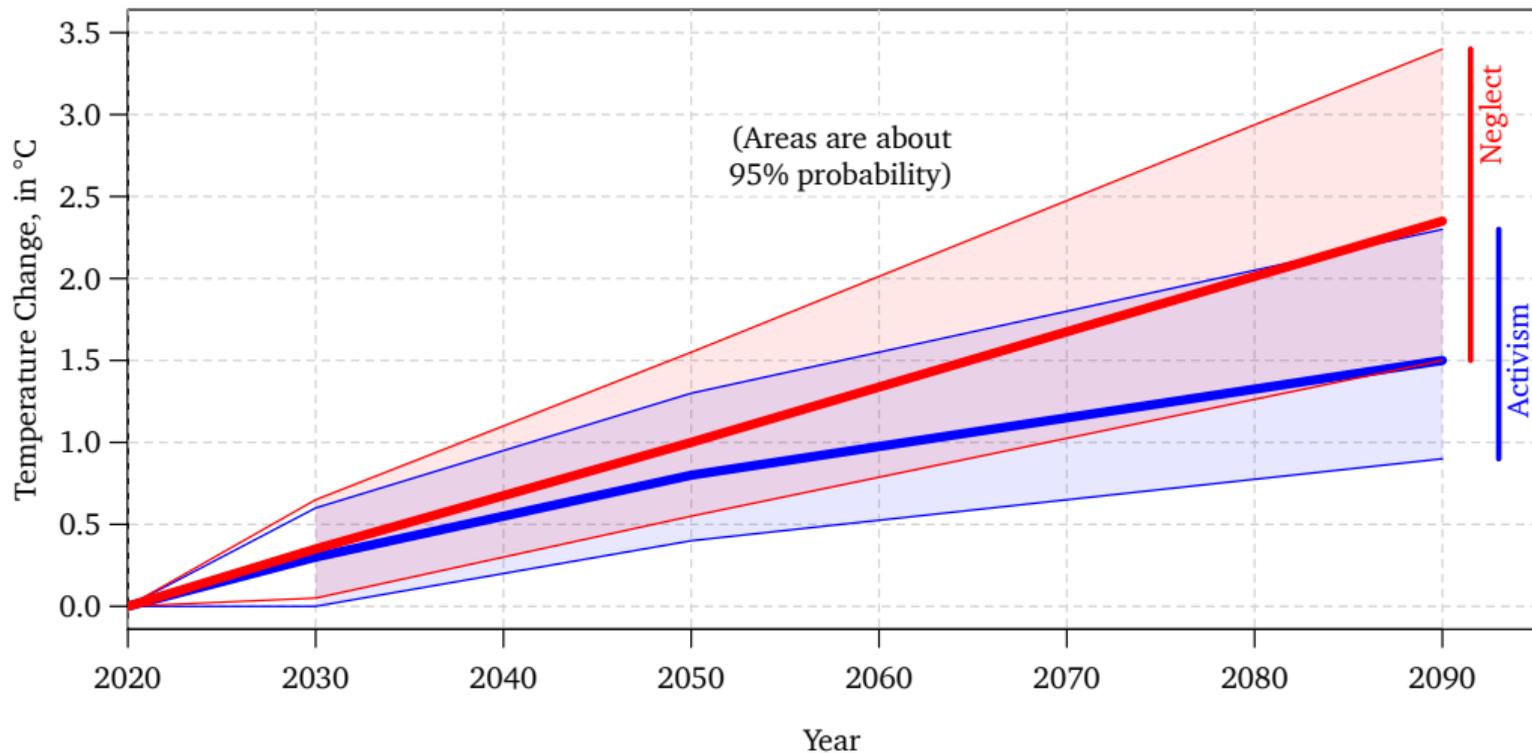
- ▶ Now, 20th Century:
 - ▶ warmest temp for 300k years, *plus*
 - ▶ temperature is “suddenly” ([1]30 years) moving up fast,
 - ▶ plus it is steeply accelerating

- ▶ Fortunately, humanity is more sophisticated than it has ever been, so hearing about some populations being wiped out by CC 5,000 years ago is not a relevant warning sign for us today.

3. How Bad *Will* Climate Change Be?

- ▶ Already (1800-2023): **=1.5°C**
 - ▶ (hockeystick, most from 1980-now)
- ▶ Benign Neglect (2020-2100): **+2.3°C**
- ▶ Aggressive Activism (2020-2100): **+1.8°C**
- ▶ Activism Delta: 0.5°C is planetarily a big deal
 - ▶ more than “Little Ice Age” in Europe of 0.4°C
- ▶ IPCC Worst (99%) Case : **+4°C**
 - ▶ incl. pos feedback, tipping points, etc.

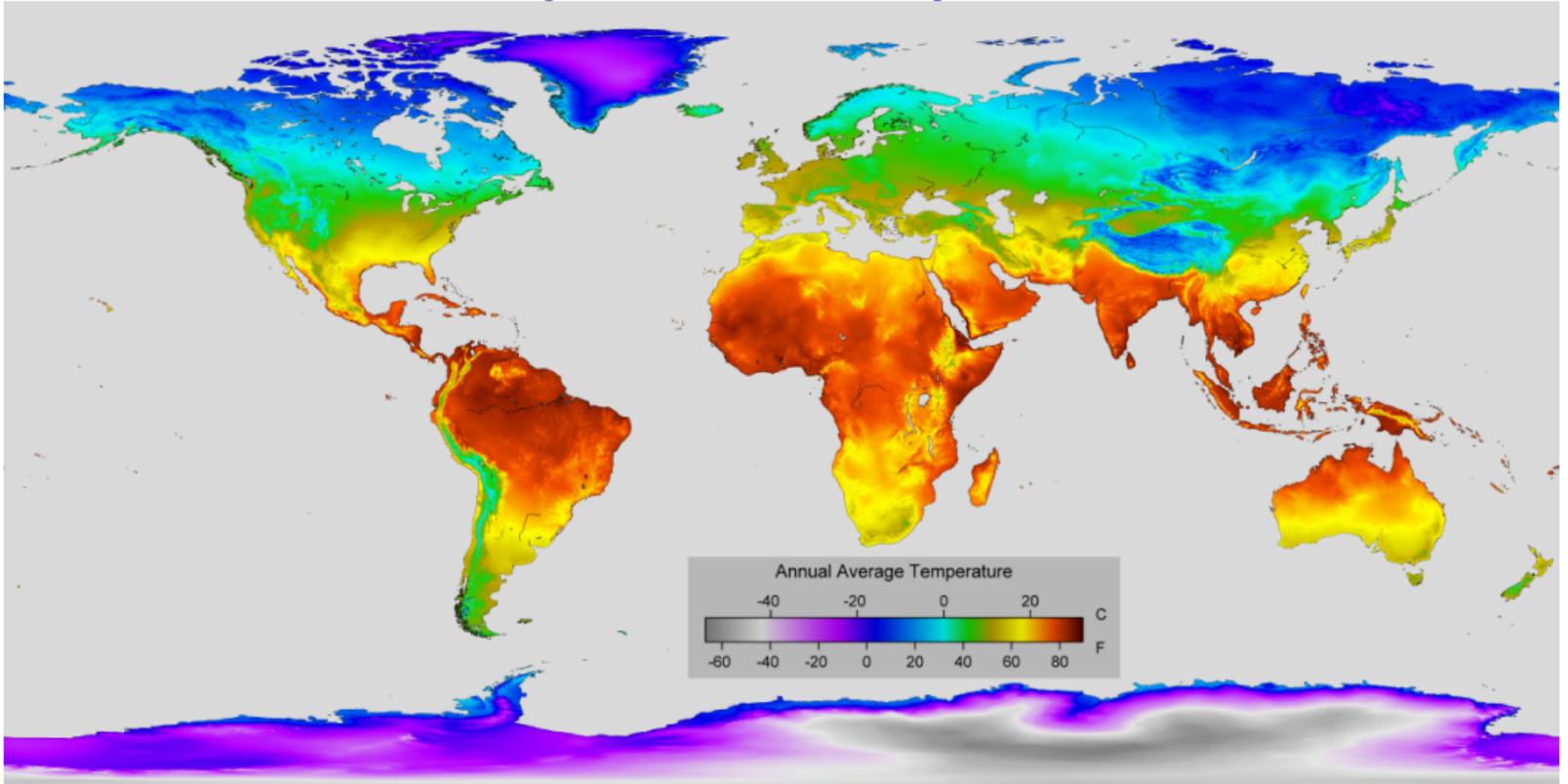
SKIP: Key Activist Scenarios, Expected Temp Inc



4. What Does CC Mean?

- ▶ Average temp gradient: 1°C per 100 miles
- ▶ 2°C (coming!):
 - ▶ Boston (11), NYC (13), DC (15), Atl (18)
 - ▶ Stckhlm (8), Brln (10), Mln (13), Rom (15), Plrmo (18)
 - ▶ Bejng (13), Toky (16), Shangh (17), HK (23), SG (28)
- ▶ 0.5°C (avoidable):
 - ▶ Queens vs. Manhattan
 - ▶ Beverly Hills vs. Santa Monica

SKIP: World Temperature Map



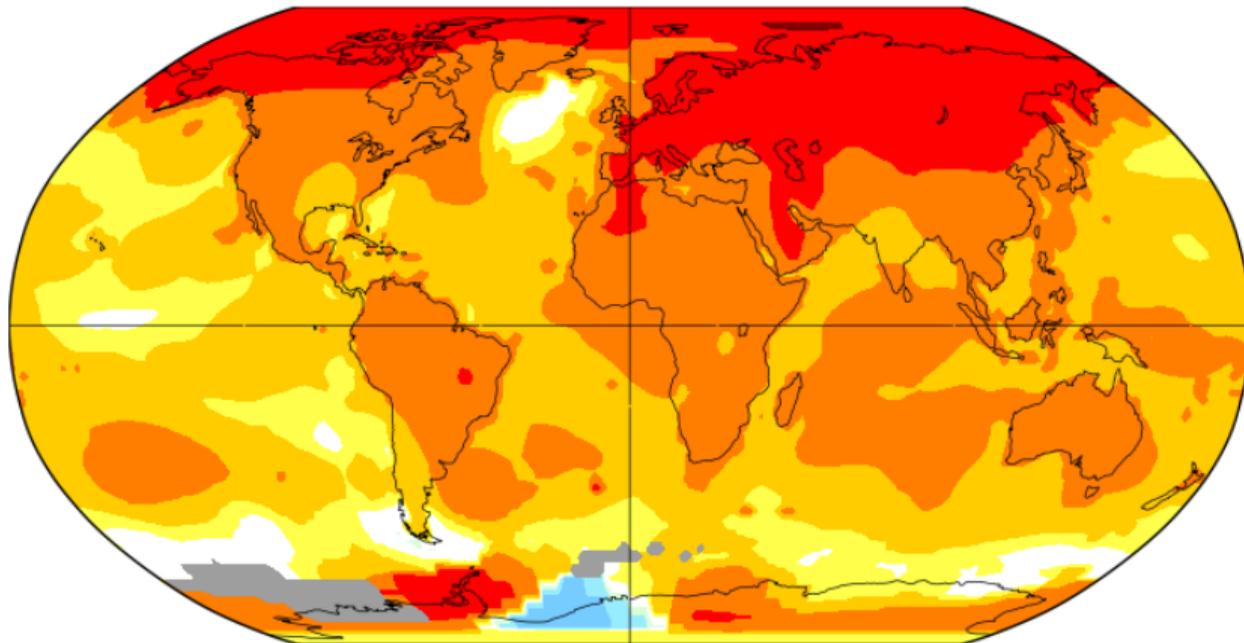
- ▶ Scientists are not good at localized predictions
- ▶ “On Average” means some bad surprises are coming
 - ▶ trigger localized stronger effects (UK?)
 - ▶ tiny prob Europe could become like Iceland (-10°C)

SKIP: “Sofar”

Annual J-D

L-OTI(°C) Change 1951-2022

1.08

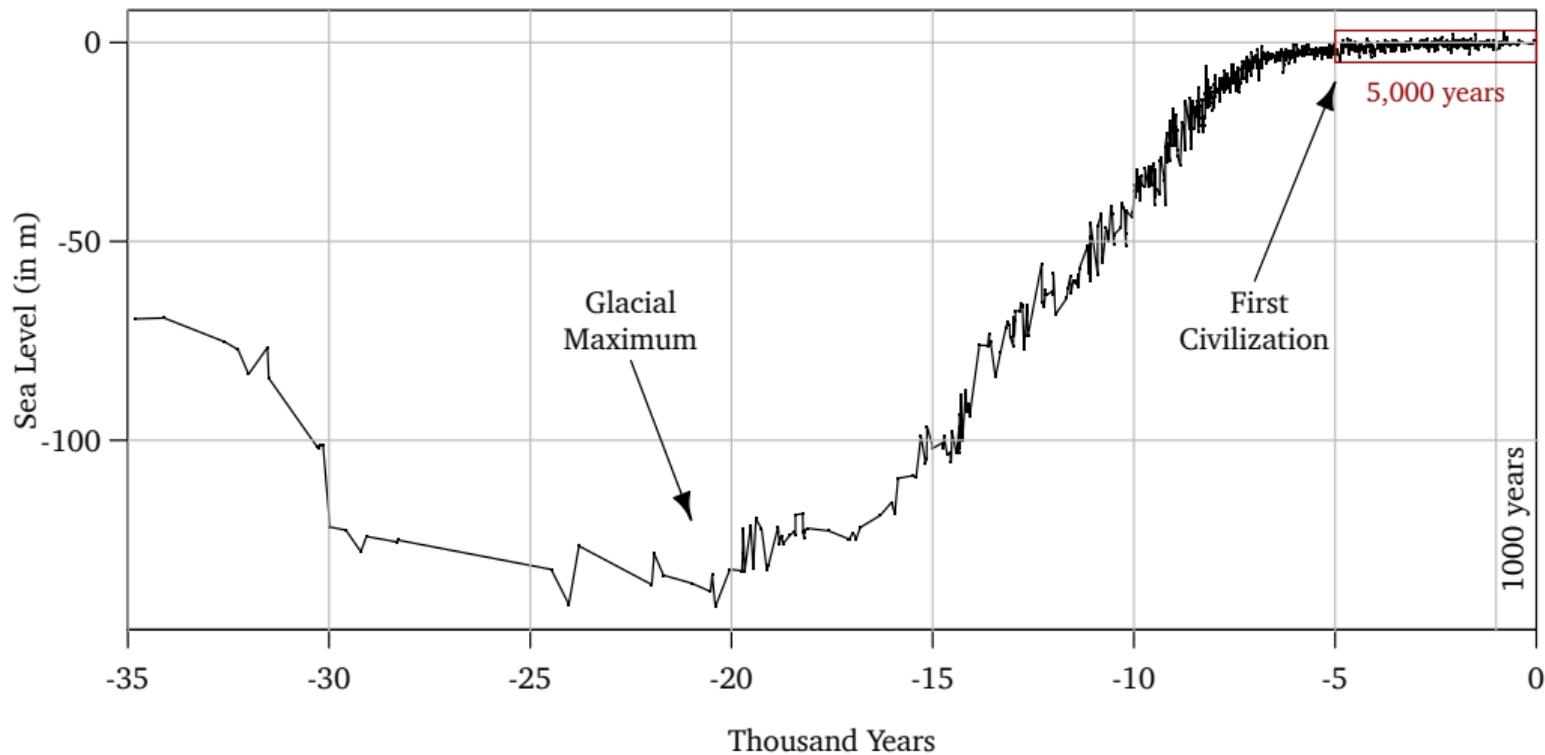


- ▶ Oceans warm slower and less; but also steadier and practically unstoppable
 - ▶ rise will continue. get ready — *centuries, though*
 - ▶ Koonin's “connoisseur” debate: 50cm or 80cm by 2100?

- ▶ Not discussing other ocean damage (overfishing) and cyclones for lack of time

- ▶ See below for *economic* damage assessments

SKIP: Sealevel, 30,000 Years



5. Will CC be a problem for USA? EU?

- ▶ Likely just a little
 - ▶ some better, some worse
 - ▶ “feeling” of many places will change
 - ▶ many transition costs
 - ▶ but no reliable forecasts of great harm so far
 - ▶ PS: MSL rise is slow but unstoppable
 - ▶ think FL and LO. “poor” Malibu?
 - ▶ Miami? Las Vegas? Phoenix?
 - ▶ already unbearable in summer — what’s another 3°C?
 - ▶ crank up A/C? move agriculture? costly, but not catastrophic.
 - ▶ we will be wealthier in future, too.

6. Where Is CC a Big Problem?

Most misery is expected in countries that are

1. Already Hot (ie not Mongolia or Afghanistan)
2. Very Poor (ie not Singapore, Saudi Arabia)
3. Very Populated (ie not Namibia or Sahara)

Think

- ▶ (West) Africa (1 → 4 billion), esp. Sahel latitudes
- ▶ (South) Indian Subcontinent (1-2 billion)
- ▶ Many (un)certain places (UK? Low Islands? etc)

7. Is CC a Global Existential Threat? (IA)

- ▶ Exceedingly, exceedingly unlikely.
- ▶ Unsophisticated humanity survived 5°C colder!
Humanity will *almost* surely survive +4°C warmer
 - ▶ Earth will not turn into Venus!

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Humanity will *almost* surely survive +4°C warmer
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- ▶ CC could cause millions of poor to die *in the future*
 - ▶ Abd many millions are dying *today* from poverty
 - ▶ We must worry about both...**smartly!**

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- ▶ **WW2 was bad, even if it did not end the world**
 - ▶ if we can reduce CO₂ emissions and warming affordably, the world overall will definitely be much better off
 - ▶ PS: even though adaptations will reduce harm (over generations, populations have been moving)
- ▶ **Actionable choices are still much the same, no matter whether you think CC is existential or just bad.**

8. Is CC a Singular Threat? (IA)

- ▶ Ecosystem Collapse (primarily population related)
- ▶ Epidemics (Malaria, Super-Covid, etc)
- ▶ Nuclear War
- ▶ Asteroid **Apophis** (more than all nuclear arsenals)
- ▶ Falling cost of WMDs
- ▶ AI?? ChatGPT??? Really?

- ▶ Yet, humanity's future still looks brighter than ever, given moving, shipping, adaptation, technology, living standards, medicine, etc.

9. What do we owe future generations? (UD)

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- ▶ A pristine planet ? Leave it like we got it?
- ▶ Thank God, our ancestors did not!
 - ▶ Life expectancy would still be 30-50 years
 - ▶ Most people lived in constant poverty and hunger
 - ▶ Famines killed millions every year
 - ▶ PS: Fossil fuels are making today's 8 billion possible
 - ▶ Short of unimaginable horror, there is no going back
- ▶ They did (and most do) not live in today's Sweden
 - ▶ Living standards are not about plastic bags, SUVs, Sweden

10. How do we make poor people and ecosystems more resilient against CC?

Fewer People Emit Less!

Richer People Can Do More!

but richer people also emit more

(Harnesses) capitalism is the only system ever to
have pulled countries out of poverty!

- ▶ Neither fair nor meritocratic nor ethical, **but it works**
- ▶ Ask activists which other system has ever succeeded
 - ▶ even poorest today are better off than 50-100-200 years ago
 - ▶ Think China, Europe, USA, etc. vs. Mexico, Nigeria, N Korea
- ▶ CC will hurt the poor,
 - ▶ but so will inefficient efforts to curb CC
 - ▶ Don't jeopardize better lives
 - ▶ First do no harm
- ▶ How bad will CC hurt the poor "on top"?

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- ▶ Zero vs. best response: **4.5x** richer vs. **5x** richer
 - ▶ (from **3.1%/y** to **2.8%/y**)
- ▶ Rich people will be better equipped to adapt
- ▶ Rich people will be better equipped to mitigate

10. Does This Mean We Shouldn't Care?

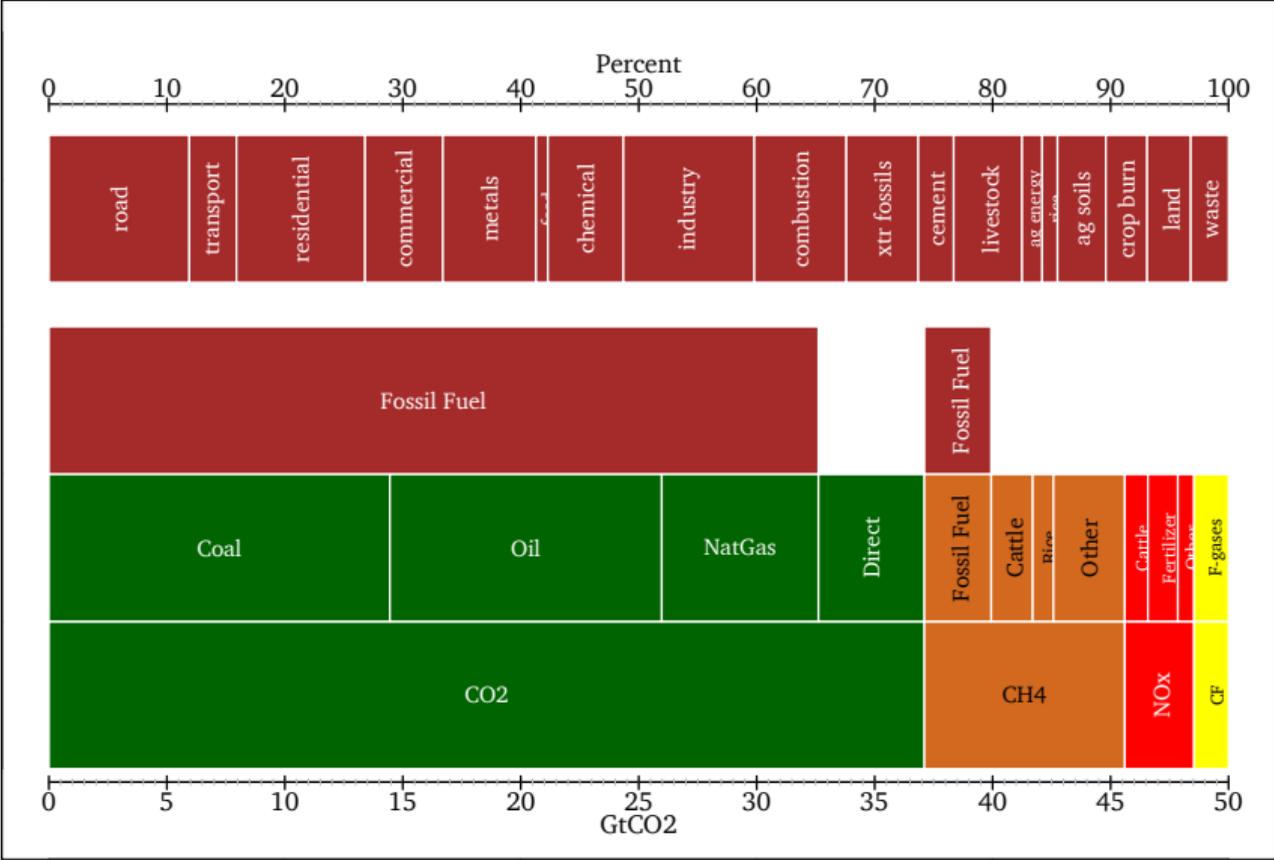
- ▶ Have you not paid attention?
- ▶ Of course, we should care.
- ▶ Hell, yes!
- ▶ World War 2 did not end the world, but it was awful.
 - ▶ Even a modest cost times 8 billion is huge, too
 - ▶ Do what you/we can to slow CC *smartly*

Care smartly and effectively

11. Should the World reduce Fossil Fuels?

- ▶ Hell, yes.
- ▶ But can't make removal not too sudden just yet
 - ▶ There is too much poverty today
 - ▶ It's not about concern about FF companies/barons
 - ▶ It's about a holocaust if we act stupidly
- ▶ But ideally reduce FF *asap* in great amounts!
 - ▶ FF impose big social costs, not properly internalized.

Skip: GHG Emits and Sources



11. Should we (US?) reduce Fossil Fuels? (IA)

- ▶ Yes, FFs are really bad **locally**
 - ▶ It's a big social cost, not properly internalized.
 - ▶ Particle and other emissions kill **millions** each year
 - ▶ This is not climate change, but fossil fuels.
- ▶ Yes, *if* done intelligently
 - ▶ Don't spend millions on decarbonizing UCLA!
 - ▶ Don't spend billions on ESG!
 - ▶ Don't become merely another huge boondoggle!

12. How can emissions be reduced? (IA)

- ▶ WW emissions are fairly predictable:
 - ▶ Population (P)
 - ▶ Women's rights and education
 - ▶ Living Standard (GDP/P)
 - ▶ Will (and should) go up.
 - ▶ Technology (Emit/GDP)
 - ▶ Emits/Person about constant

- ▶ Identity, not theory

- ▶ Africa, Bangladesh, India
 - ▶ bad now, due to heat and poverty,
 - ▶ bad future, due to heat, poverty, and CC
- ▶ CC is just the cherry on top.
- ▶ PS: 10x population is unsustainable by local agriculture
 - ▶ Even with modern (fossil-fueled) fertilizers
 - ▶ Fortunately, food is shippable
 - ▶ People will need to be fed with food from abroad,
 - ▶ as has been the case in Germany for decades, etc.
 - ▶ Great human potential, wasted for so many reasons

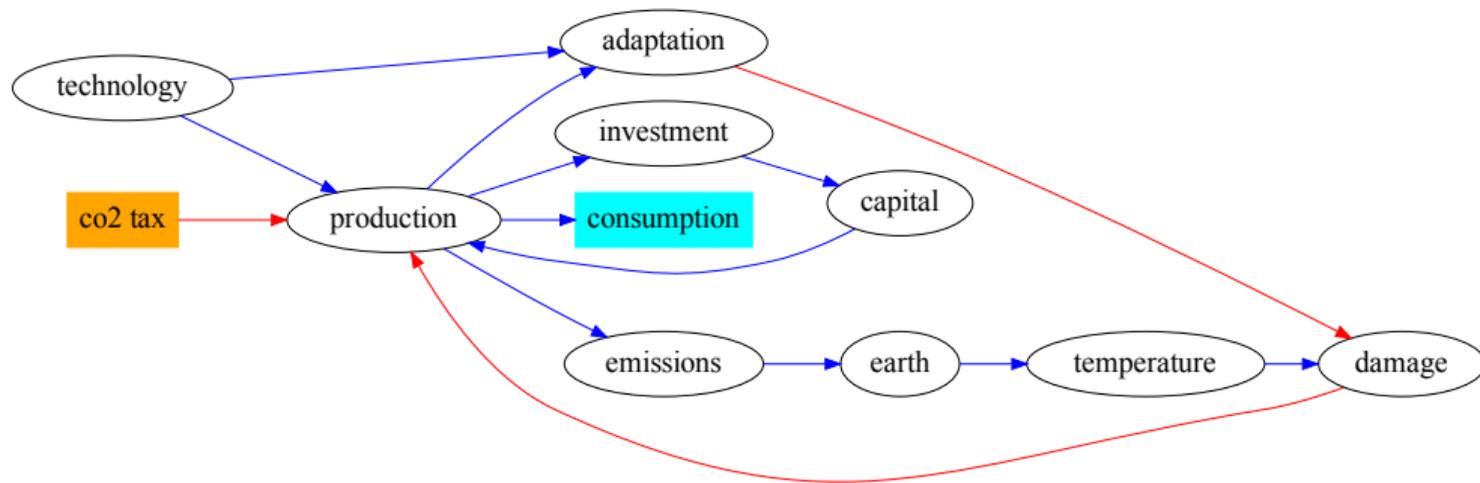
13. What is the Economic Solution For CC?

- ▶ Raise the price of emissions!

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- ▶ Raise the price of emissions!
- ▶ Nordhaus IAM: \$50/tCO₂. Could be \$100/tCO₂

SKIP: Typical IAM



Irrelevant!! (IA/UD)

Humanity is not the Borg

14. Why Is Cost of Carbon Irrelevant?? (UD)

- ▶ Not having militaries would be better for the world.
- ▶ Fewer emissions by each country would be better.
- ▶ Not in the self-interest of countries and people:
 - ▶ Thus, it won't happen
 - ▶ Why are you arguing what humanity should do?
 - ▶ Why are you even arguing about carbon price?

STOP

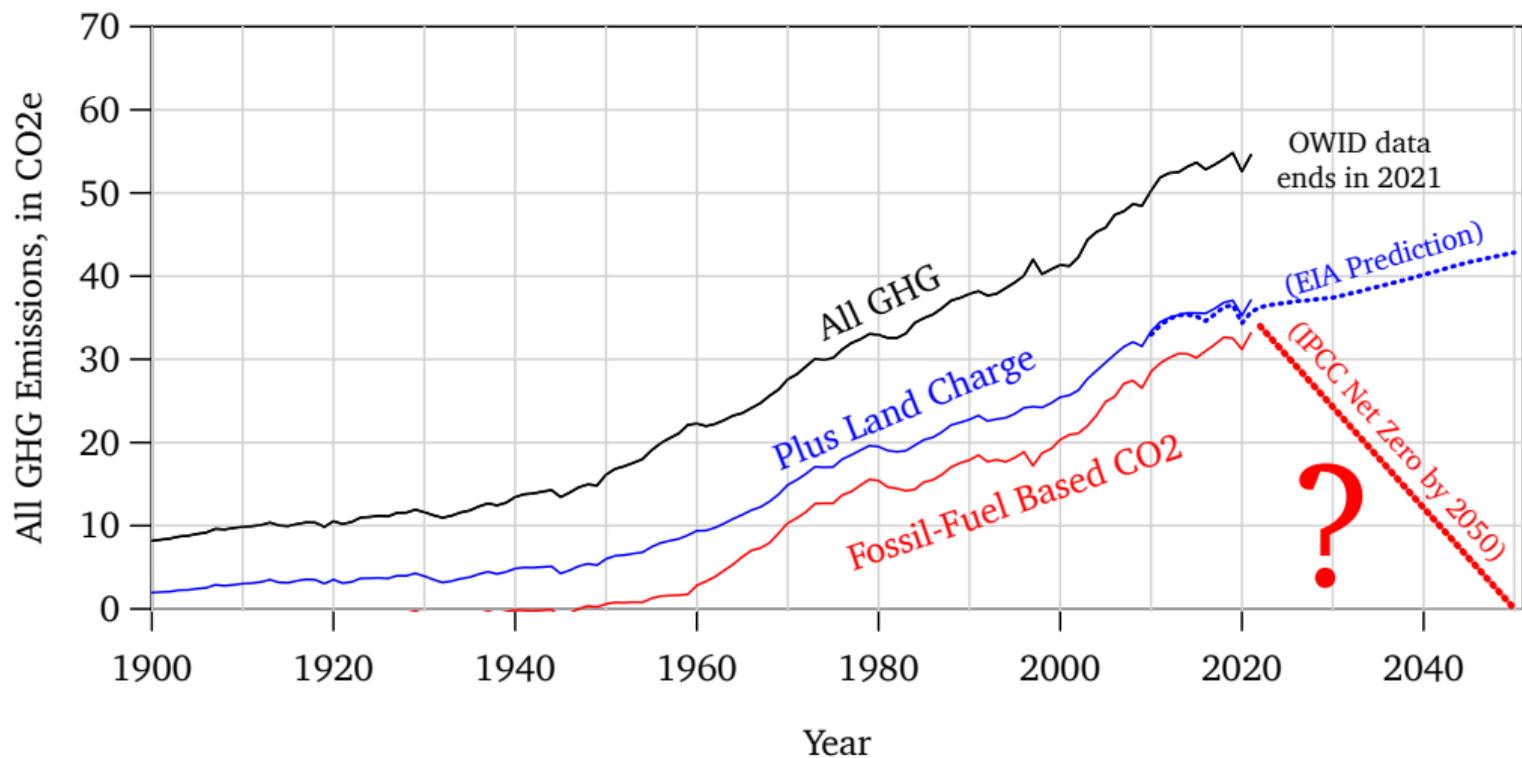
- ▶ It's a simple but pervasive fallacy to engage in fruitless ethical “should” discussions.
 - ▶ CO₂ emissions are no longer about the USA;
 - ▶ They are not even about OECD (see below).
- ▶ What matters is not “should”?
- ▶ What matters is “will/can and soon”

Why Is It Still News? Who Is Surprised?

- ▶ Every year, the media lament.
- ▶ The next year, we will do it again.

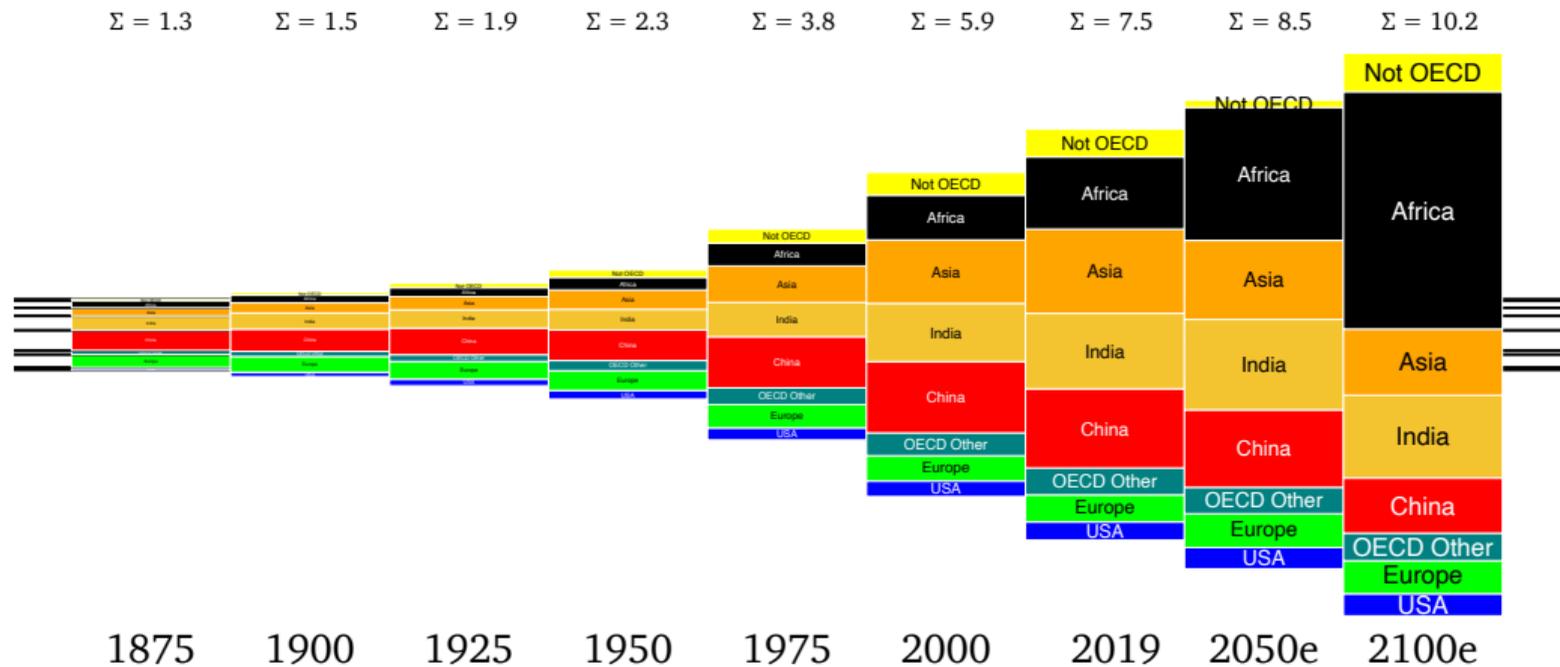
- ▶ IAMS: not everything is in IAMS. Environment. Again, still misses the point.

Skip: Emissions Projections



15. Can the OECD fix WW emissions ?

SKIP: Population (1/4?)



- ▶ Think OECD will be 1/4 of Population
- ▶ Think OECD will be 1/2 of GDP
- ▶ **Think OECD will emit 1/3 of GHGs (2050)**
 - ▶ By 2100, maybe 1/4
 - ▶ Ignoring 2/3-3/4 of emissions is a logical non-starter.
 - ▶ Start protesting in China and India — non-starter?
 - ▶ “Every little bit counts” matters little.
 - ▶ Tough sacrifices (without technological reduction) by OECD could reduce WW CC by 0.1-0.2°C — barely notable.

- ▶ Irrelevant: **Should** OECD pay the non-OECD not to pollute?
 - ▶ {PS: Do we get credit for technological help in the past, too?}
- ▶ Relevant: **Will** the OECD pay for pollution?
 - ▶ Soon, rest of world will be relatively richer
 - ▶ Who will send *trillions* to India and China?
 - ▶ Who will send *billions* to African warlords??
 - ▶ Even biggest advocates (Europe) won't.

16. Can we (OECD) stop CC locally? (IA)

- ▶ Can you eradicate WW dandelion on your lawn?
- ▶ Gotta get everyone to want to eradicate dandelions.
- ▶ Will work only if neighbors are not planting more dandelions, because it is in their interest to do so.

The Only Important Question Is:

How can we help making it in their interests?

17. International Treaties? (UD)

- ▶ Empty 30-year promises galore.
 - ▶ Where has progress actually come from?
- ▶ Not a single country has ever agreed to spend a large fraction of its GDP over decades on behalf of the global good when it was *not* in its interest.
 - ▶ NATO gives private benefits that non-members don't get.
 - ▶ Montreal ozone is actually not a counter but a good example.
- ▶ We can disagree. Do you really want to trust our future to the United Nations?
 - ▶ Have fun meeting in DOHA. (Agreed *finally* that FF are bad.)

18. Can Finance and ESG help? (IA)

- ▶ The entire OECD can't fix the problem, so
- ▶ How can decarbonizing Western companies (e.g., Google and UCLA) reduce CC??
 - ▶ “if everybody did it” — seriously?
 - ▶ if influence, be precise. Who? China? India?
 - ▶ it's no longer about the OECD or echo chambers!
- ▶ Not even clear if ESG is effective in reducing emissions
 - ▶ Very effective as employment vehicle for armies of consultants,
 - ▶ and for pyrrhic victories by ignorant environmentalists.

19. Can Newsom run as the candidate fighting against climate change? (IA/UD)

- ▶ The same way that he can run as candidate fighting for world peace.

20. Can Green Activism fight CC? (IA/UD)

- ▶ Heart is in the right place.
- ▶ Brain is not. Ignorance is widespread.
 - ▶ Fed by interest groups and well-meaning scientists
 - ▶ Fed by self-interested media and politicians
 - ▶ Panicked
- ▶ To fight against CC (or for world peace), think:

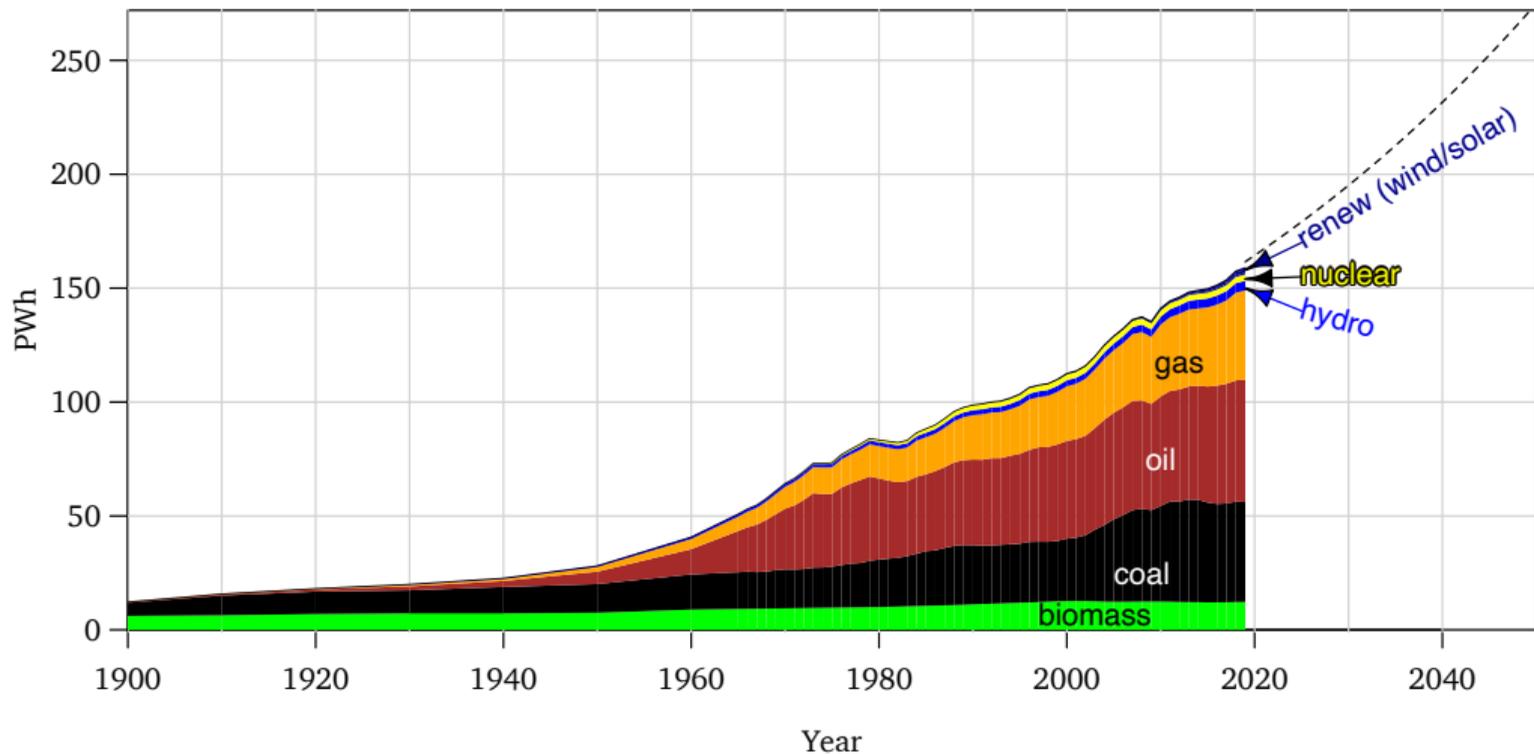
What's in the self-interest of actors?

How can we alter their behavior assuming
self-interest?

21. Can Technology Help? (IA)

- ▶ Best way to **globally** change the self-interests of actors
 - ▶ eg, LED lights, solar power, EVs soon
- ▶ Uses self-interest and capitalism.
- ▶ Fund relevant technological R&D:
 - ▶ Socially positive *local* investment.
 - ▶ But how good is government at investing?
 - ▶ You: Do impact investing, not ESG investing.
 - ▶ How good are *you* at impact investing?

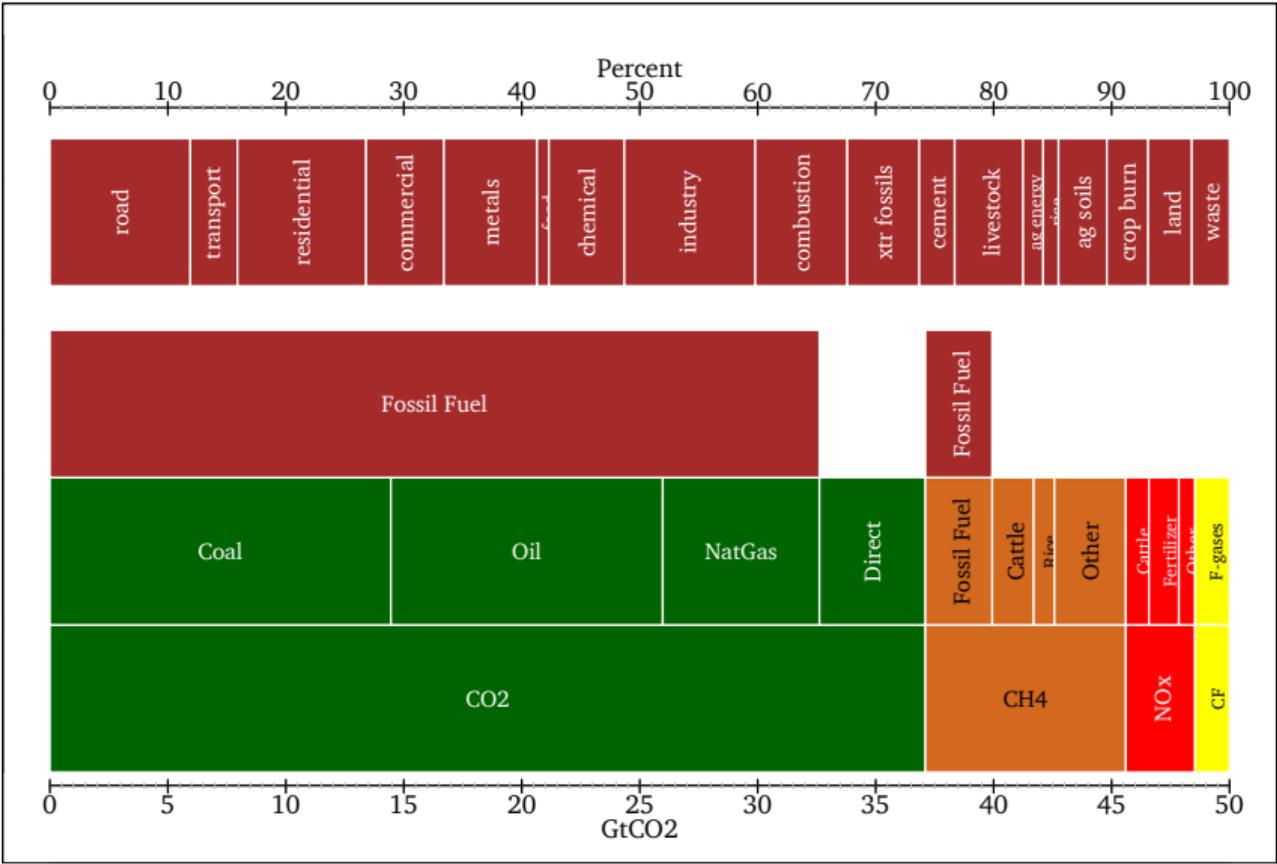
SKIP: Primary Energy Use (2/3 of Emits)



22. Clean Energy?

Among lowest hanging fruit, it is the biggest:

- ▶ 1/3 Already or Easily Electrified.
 - ▶ Ground transport, low heat.
- ▶ 1/3 Possibly Electrifiable.
 - ▶ Smelters? FF is one-trick pony (heat)
- ▶ 1/3 Non-Electrifiable for a long time
 - ▶ Air travel, certain agriculture



23. What are Electricity / Generation Costs?

- ▶ Retail: \$300-400/MWh
- ▶ Nuclear: \$100+/MWh (not just USA!)
- ▶ Coal and Oil: \$100/MWh
- ▶ NatGas: \$70/MWh (killed nuclear!)
- ▶ Solar/Wind: \$40/MWh today, going on \$20/MWh
- ▶ Solar/Wind + Battery: \$120/MWh, going on \$70/MWh

Government Arbitrages

- ▶ Dumb ideas = too expensive, usually subsidized.
- ▶ Hydrogen = Dumb Idea. 10x NatGas. Even 2x not viable.
- ▶ Industrial CO₂ Sequestration = Dumb Idea.
 - ▶ “Vitamins alone will not stop aging, ergo, take lead?”
 - ▶ In whose self-interest is expensive sequestration??
- ▶ Electric aircraft or ships (PS: use effing sails!)
- ▶ If/when new batteries comes through, new nuclear plants will be obsolete before complete. Who wants to invest their retirement funds in a nuclear plant?

24. Are There Other Good Ideas?

Many!!

- ▶ Plant trees for wood as material. (Local Benefits)
- ▶ Improve electric grid (dysfunctional? decentralize?)
- ▶ Many other “small” ideas (like better e-pricing).
- ▶ Emphasize local benefits. Deemphasize politics.

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- ▶ Emphasize local benefits. Deemphasize politics.
- ▶ Write a free book and inform people ;-)

25. What is important that is disagreeable?

- ▶ Stop lamenting the unchangeable
- ▶ Stop confusing cause and effect
 - ▶ COPAs made no difference, and never will
 - ▶ Advancement in solar/wind made all the difference
- ▶ Start on smart WW strategies
 - ▶ e.g., elec-storage R&D and business of implementation
- ▶ Avoid poisonous politics. Get started. Get rich.