Sustainability:

There is no solution. There are solutions.

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Michigan State University occupies the ancestral, traditional, and contemporary Lands of the Anishinaabeg – Three Fires Confederacy of Ojibwe, Odawa, and Potawatomi peoples. The University resides on Land ceded in the 1819 Treaty of Saginaw.

Thanks to Diana Wall, SOGES and everyone at CSU for inviting me!

“Everything has been said before, but since nobody listens we have to keep going back and begin all over again."

–Andre Gide

“All models are wrong. Some models are useful.”

--George E.P. Box

“In his writings, a wise Italian says that the best is the enemy of the good.”

--Voltaire

Take away messages:

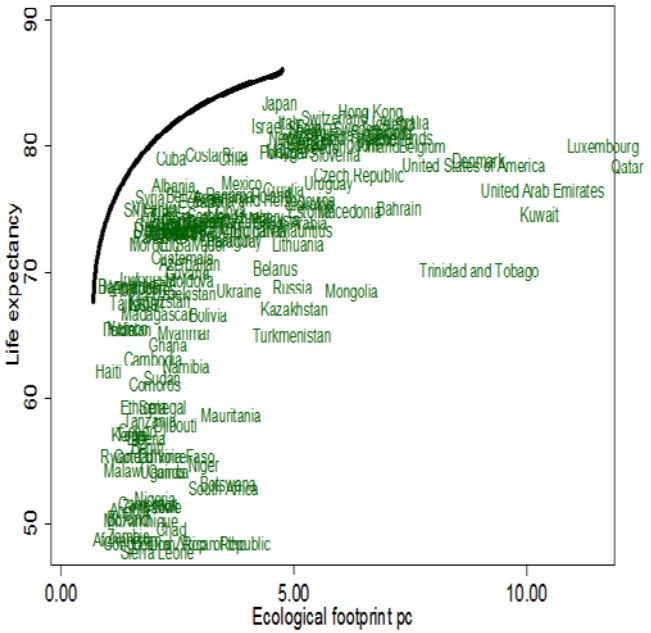
Solutions, rather than a solution, means two things:

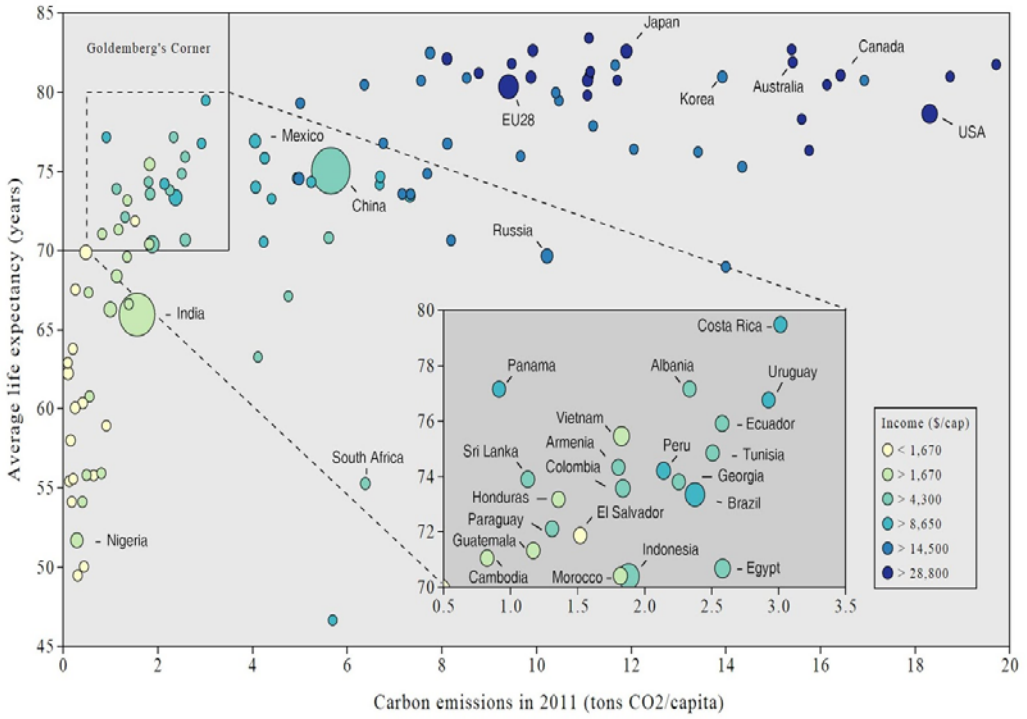
- There is no single strategy or approach that can address all the challenges we face. We need to combine strategies and approaches and learn as we go.
- We need different strategies and approaches for different communities and contexts. Given the diversity of the world, including unfortunate histories of exploitation and discrimination in many places, we need solutions that make sense in specific contexts.

Solutions. How can we make better decisions?

1. **Sustainability and progress**
2. Challenges: old, modern and emerging
3. No single solution
4. Problems in making decisions
5. Bringing in Science: Facts and values
6. Doing better
7. Thinking about what you can do

Well-being and the environment





(Roberts et al. 2020)

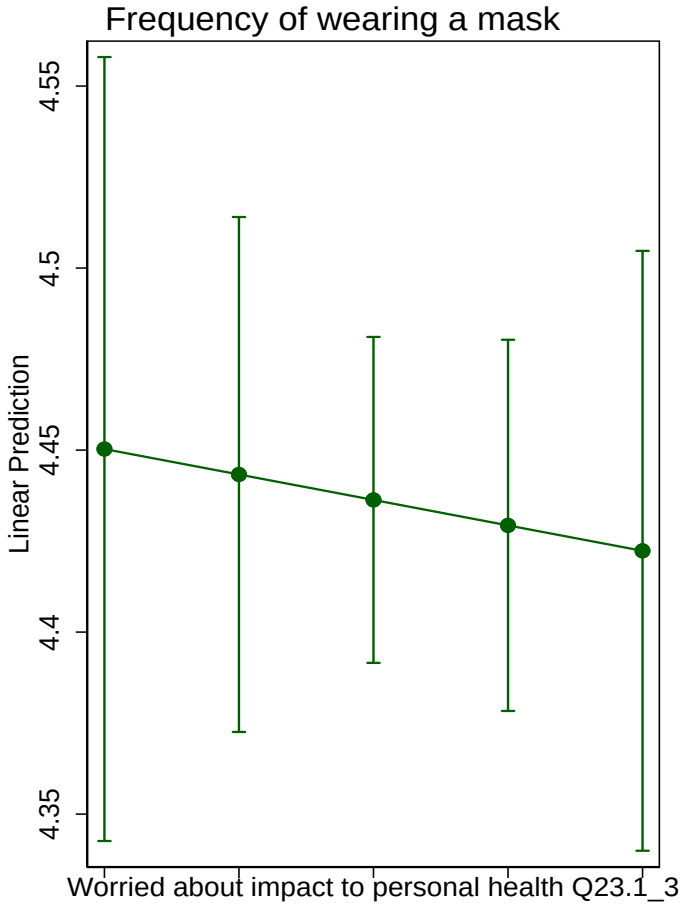
I think of sustainability as improving the well-being of humans and other species while reducing stress on the environment.

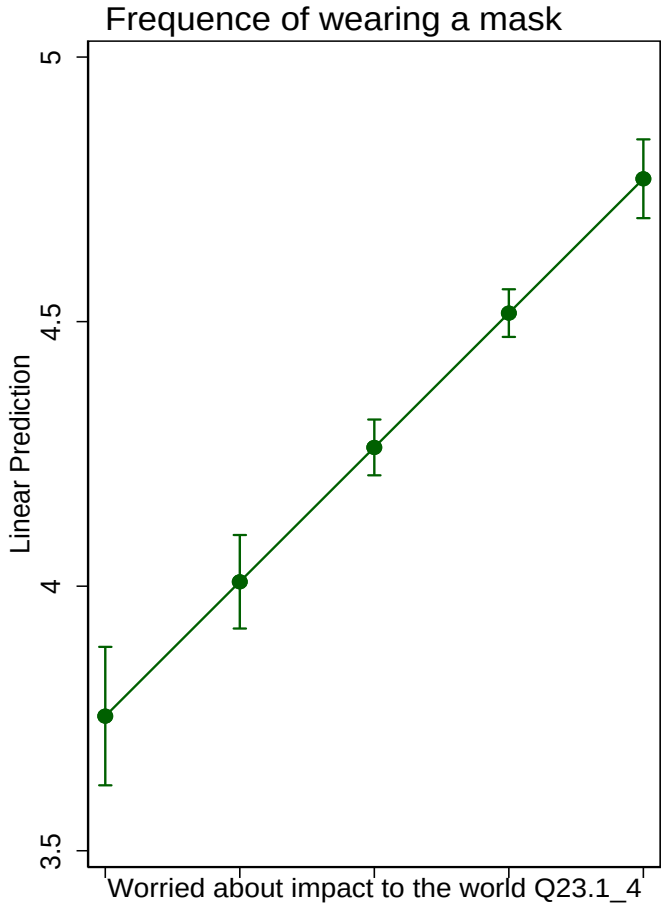
We have examples of doing well in improving well-being and reducing stress on the environment.

We are learning what helps us achieve these goals. There is a literature on what helps and hinders sustainability (Ecological Intensity of Well-Being). It pays attention to inequality as a driver and diversity in what matters. For example, international trade helps some countries and harms others. (Xu et al. 2020)

Consider the pandemic. We are capable of rapid, positive responses to crises. (Bouman, Steg and Dietz 2020)

- Most evidence suggests that most people felt their personal risk was modest but that others were at risk.
- The change in behavior seems to have been driven by personal norms—a sense of what "I should do" as an ethical, responsible person. Later social norms came into play as people observed the behavior of others.
- Still later there was push-back and politicization.
- There are lessons here for other issues where public action matters. But need to understand both why it can happen and what gets in the way.





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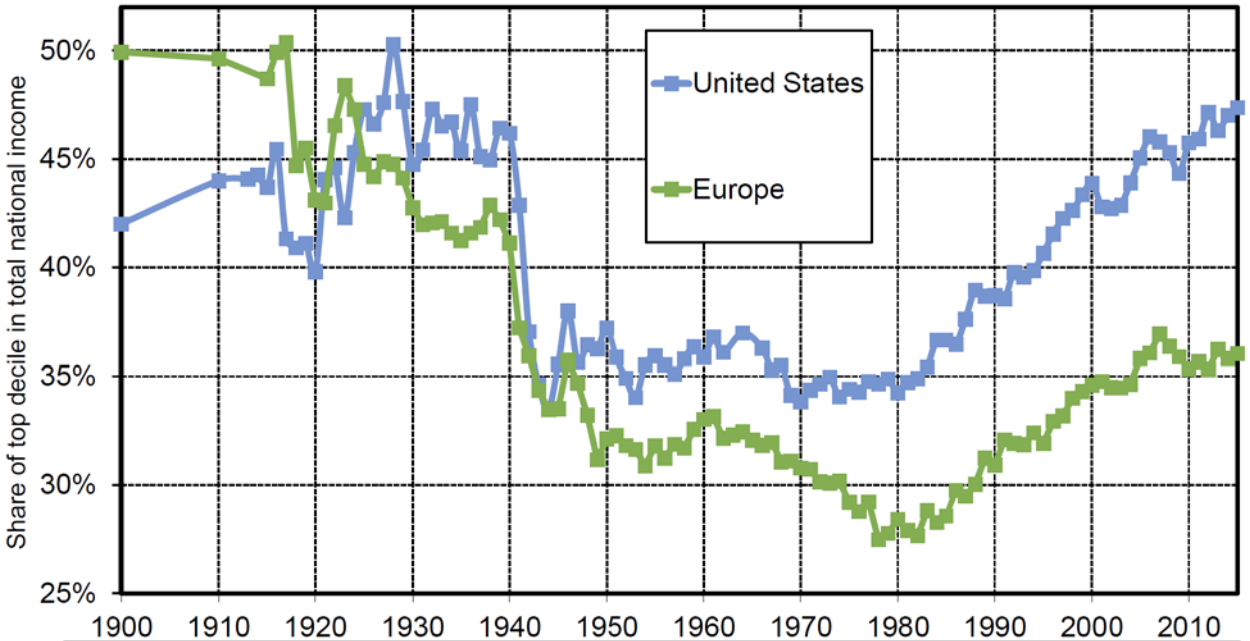
We face old, contemporary and emerging challenge

The old problems of prejudice, violence and inequality are still with us.

Starting in the 1980s strong influence of conservative /libertarian/ neo-liberal economic theory in policy circles :

- Reduce taxes on the richest and on corporations,
- Use markets for everything, including private prisons, reduced welfare supports,
- Attacks on unions,
- Blocking of government regulation in general and environmental regulation in particular,
- Continue a long patterns of questioning science.

Figure 10.1. Income inequality: Europe and the U.S. 1900-2015

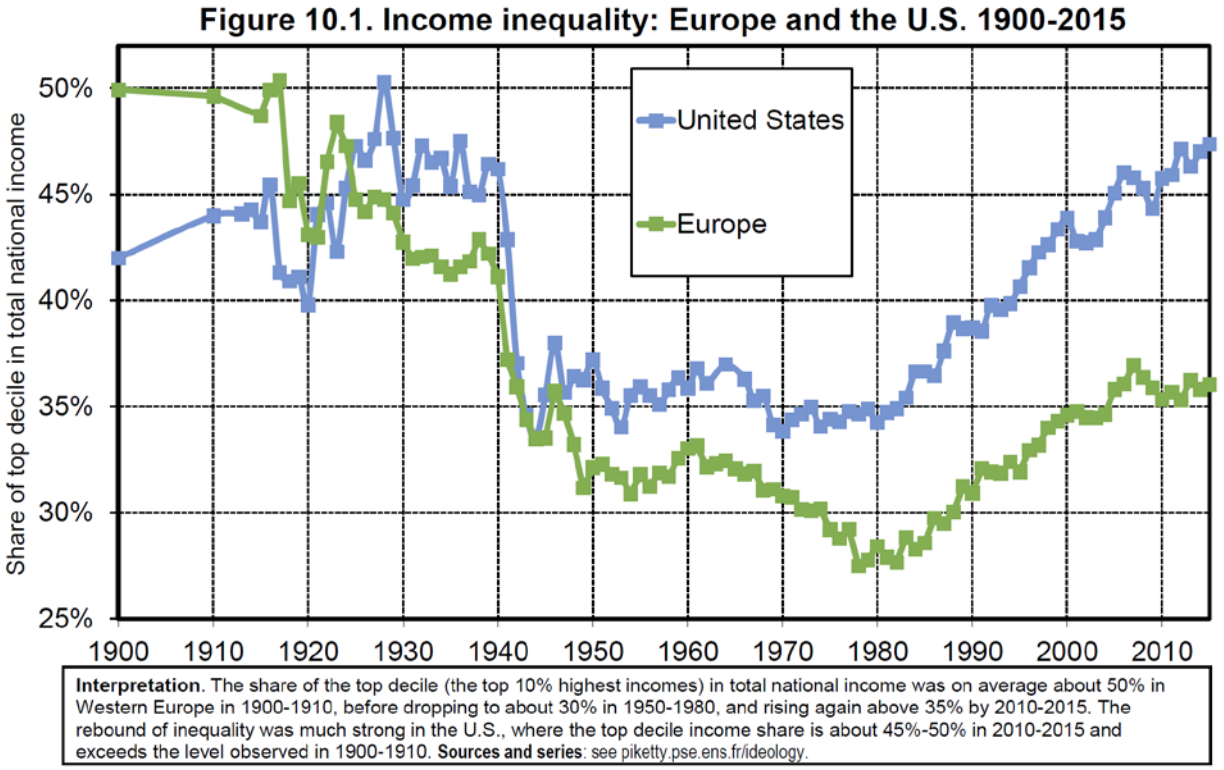


Interpretation. The share of the top decile (the top 10% highest incomes) in total national income was on average about 50% in Western Europe in 1900-1910, before dropping to about 30% in 1950-1980, and rising again above 35% by 2010-2015. The rebound of inequality was much strong in the U.S., where the top decile income share is about 45%-50% in 2010-2015 and exceeds the level observed in 1900-1910. **Sources and series**: see piketty.pse.ens.fr/ideology.

Implications

- In the U.S. government pays ~1/3 the cost of college education. In Austria, Denmark, Germany, Norway, Sweden it's 90%+.

- Consider support for social change. It would take hundreds of regular citizens contributing to raise the funds a billionaire can easily deploy for political causes.



	Annual Income	0.1% income	Friends persuaded	Funds for campaign
Worker	$30,000	$30	29	$900
Billionaire	$50,000,000	$50,000	0	$50,000

The long trajectory of coupled human and natural systems

- Sharp accelerations ~1500-1750, ~1950
- Key transitions: Colonialization, industrialization, globalization, capitalism, fossil fuel use. Acceleration post WWII.
- And always remember that the effects are not equally distributed across countries, regions or social groups. There is always a major environmental justice component—something we emphasized at the first Earth Day events in Spring of 1970. (Dietz 2020)

Global Environmental Change

- Species extinction rates 1000 times what is typical
- Climate that we haven't seen in 100,000 years
- CO2 concentrations we haven't seen 800,000 years
- Ocean acidification we haven't seen in several million years
- Many chemicals to which the biosphere has never been exposed.

One tragic example. European incursion into the Americas led to the deaths of 90% of indigenous population—55 million people—the Great Dying. That led to 56 M hectares of land going back to forest, etc. That absorbed so much CO2 that it substantially contributed to the "little ice age" of 1500-1800. (Koch et al. 2019)

- Glacier National Park with few glaciers.
- Joshua Tree without Joshua trees.
- Everglades mostly under water.
- Arcadia changed by sea level rise and species shifts
- Isle Royale will have wolves only via periodic reintroductions

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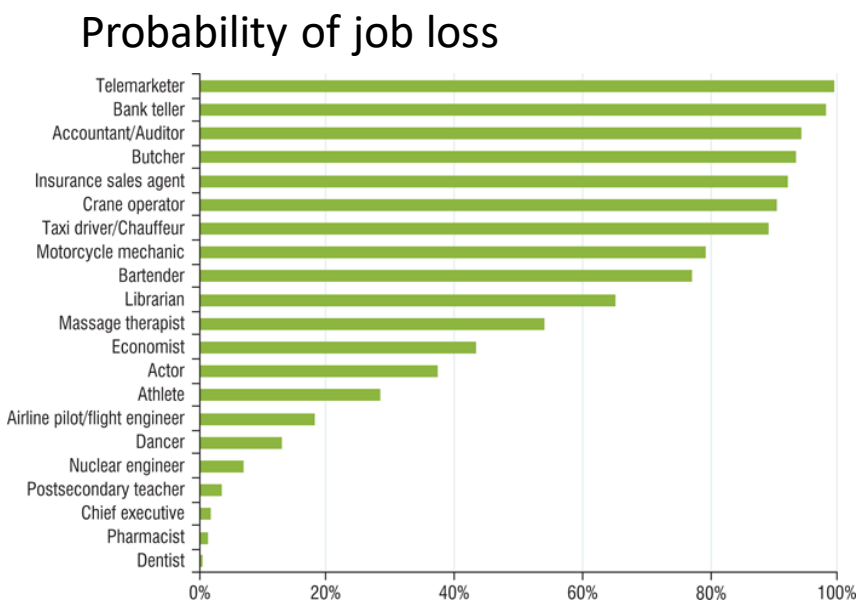
Rolf Peterson

Emerging challenges: NBIC—nano, bio, info, cognitive technologies.

- How should self-driving cars and combat robots make life and death decisions?
- What if AI and robots eliminate large categories of jobs? The 20 hour work week or 50% unemployment?
- Will garage biotech labs be used for bioweapons?
- How do we decide about modifying genomes in populations?
- Who "win," who will "lose," who will decide?

The Blowfish combat drone



http://businessresearcher.sagepub.com/sbr-1645-94777-2641309/20150209/robots-and-automation

Solutions. How can we make better decisions?

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There is no solution.

Let’s take climate change as an example.

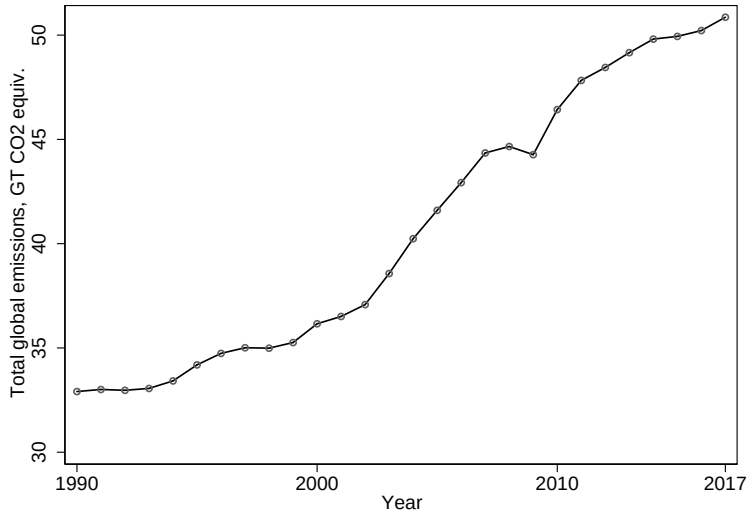
Consider the Paris Accord Goals as a benchmark:
Reduce current GHG emissions by 35-55% by 2030.
This is a path towards zero net emission by 2050.

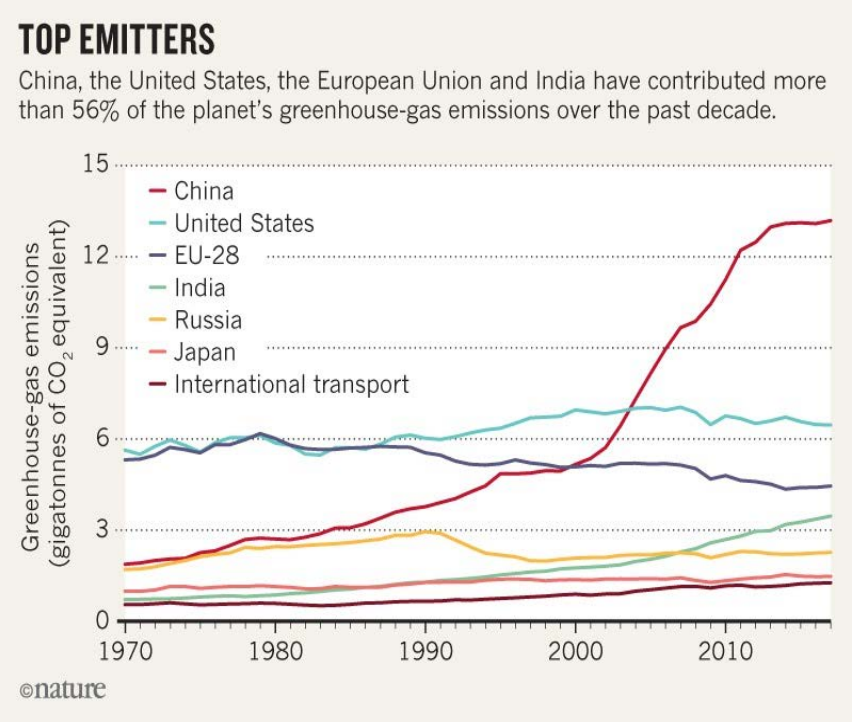
Best estimates:
Consumer action can easily and quickly reduce direct GHG emissions by 2.5-5% of global emission, or 5-14% of Paris goals.

Corporations could easily reduce by ~3% of global emissions, so ~5-8% of Paris goals.

Very little government action in most countries.

Calls for social transformation for sustainability go back at least to the first Earth Day 50 years ago.

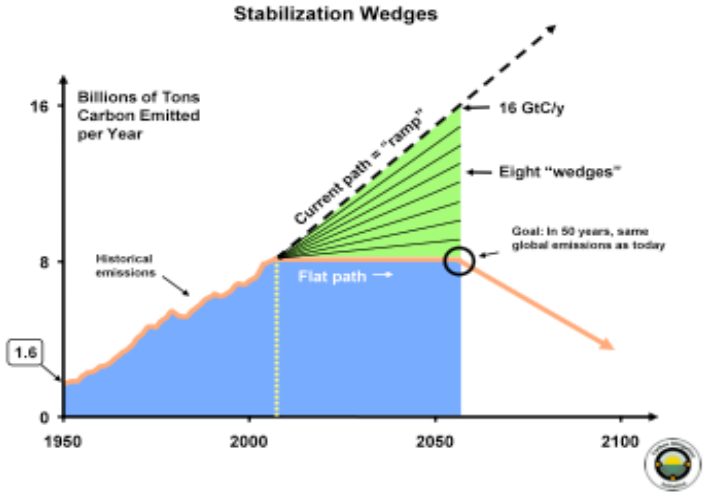




https://www.nature.com/articles/d41586-018-07566-9

Main points
There is no solution! There are solutions!

- If we are thoughtful about our decisions, small changes now can have a positive impact, and they establish a base that allows us to rachet up, and pave the way for big changes.
- Add up the contributions: 10-20% of Paris goals cost effectively by voluntary measures and on the shelf technology. Not a solution but part of a solution.
- The idea of multiple solutions to address climate change is not new. The idea of “wedges” to contribute to reducing GHG concentrations is well developed. Project Drawdown identifies >80 things that can contribute. (Dietz et al. 2009, Pacala and Socolow 2004)
- But what is emerging in the literature is a more comprehensive analysis of solutions to allow for better decisions. We need to move from an analysis of the technical potential to a full analysis of mitigation potential, a mitigation science.



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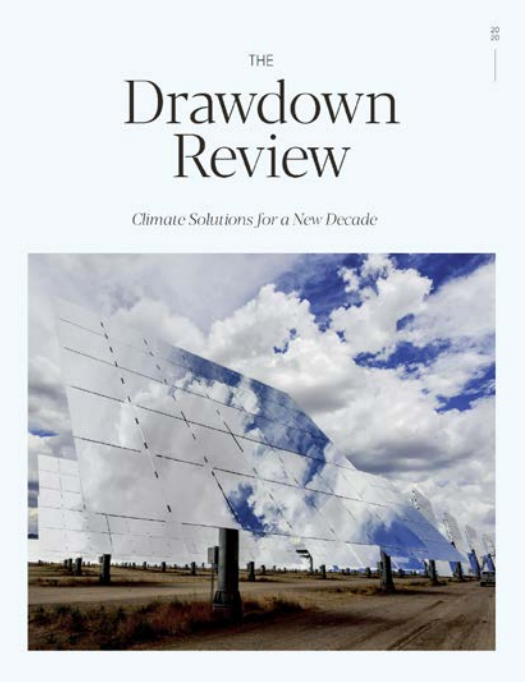

We need a mitigation science that considers:

--What are the direct impacts of an action if taken (direct Technical Potential)?

--What are the impacts up and down the supply chain (indirect Technical Potential)?

--How likely are people, organizations, governments to take the action (Behavioral Plasticity)?

--How likely are we to get we do to get policies, incentives, and programs to make taking the action more likely (increase BP) (Initiative Feasibility)?

--What kinds of indirect effects does the action have—spillover effects that encourage or discourage further actions by the actor and by others?

Note that a lot of what is needed is social science research. Right now about 0.12% of all research funding, or about 5% of climate change research funding, is spent mitigation social science. (Overland and Sovacool 2020)

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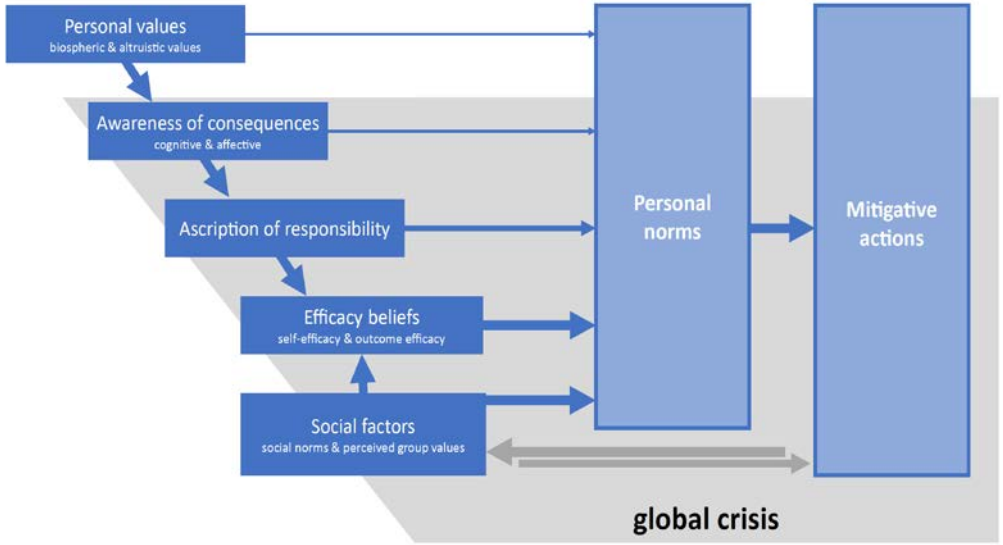
Decision making

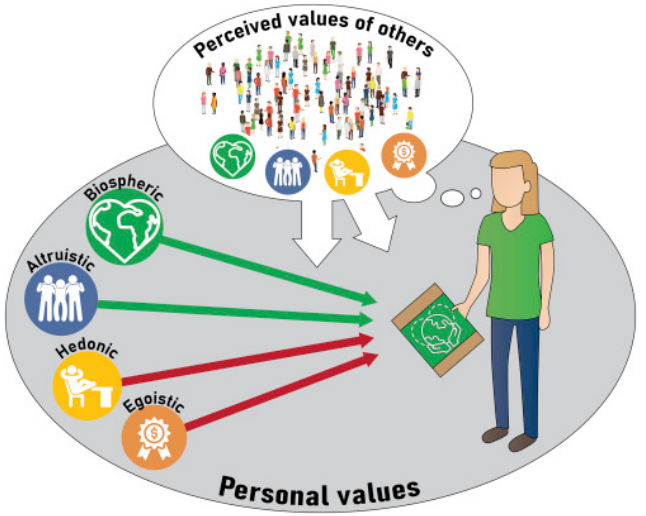
- Decision making is sometimes coolly rational but lots more goes on. And even Mr. Spock has values.
- We know a variety of values influence decision making. Values are hard to change but we can make people aware of the what values are in play in a decisions.
- As noted, norms can have a huge influence and are fairly easy to invoke and fairly easy to change.
- So if you want to have impact, think about how you can influence norms!



Values-beliefs-norms theory of pro-social action

(Bouman, Steg and Dietz 2020)

http://www.abc.net.au/news/2015-02-28/leonard-nimoy-and-mr-spock-in-their-own-words/6270640



(Bouman and Steg 2019)

We seem to have two systems for decision making: fast and slow.

Fast decision making by individuals.

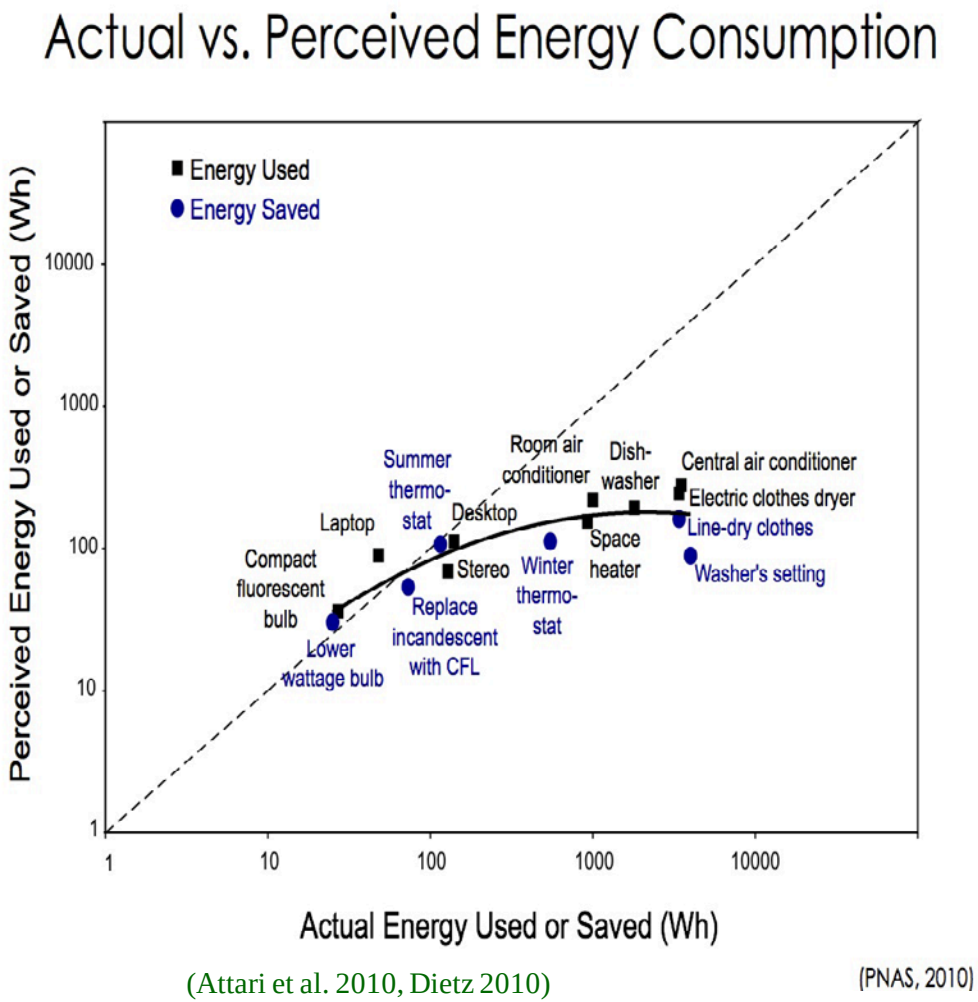
Highly efficient when decisions have to be quick. Probably worked well for much of human history. But…

--We often get numbers and probabilities wrong.

--Biased assimilation/ motivated reasoning—use prior beliefs more than evidence to decide on whether or not to accept new assertions of fact.

--Values influence acceptance of facts. Solutions bias: reject facts based on how you feel about solutions that will be proposed. "I don't want higher gas prices so I don't think climate change is real."

Very prone to suboptimal decisions and easy to manipulate.

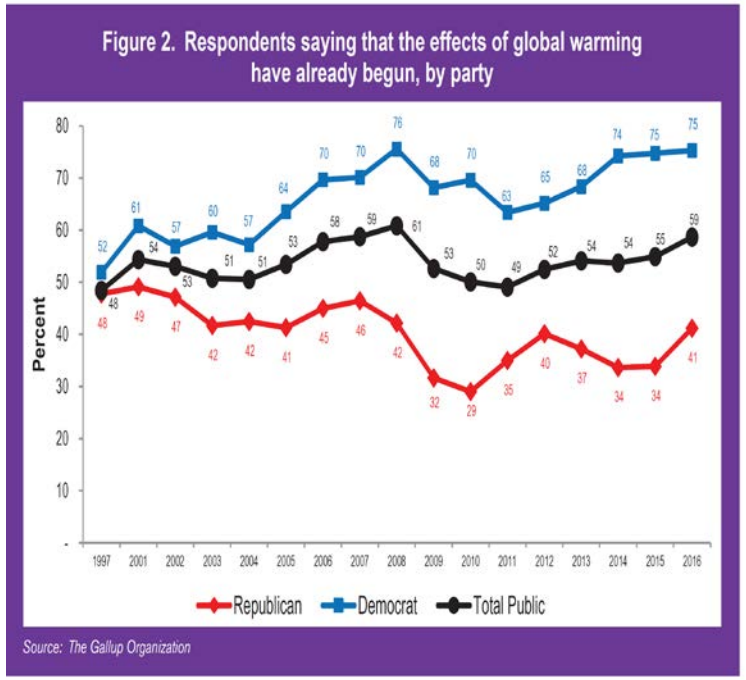


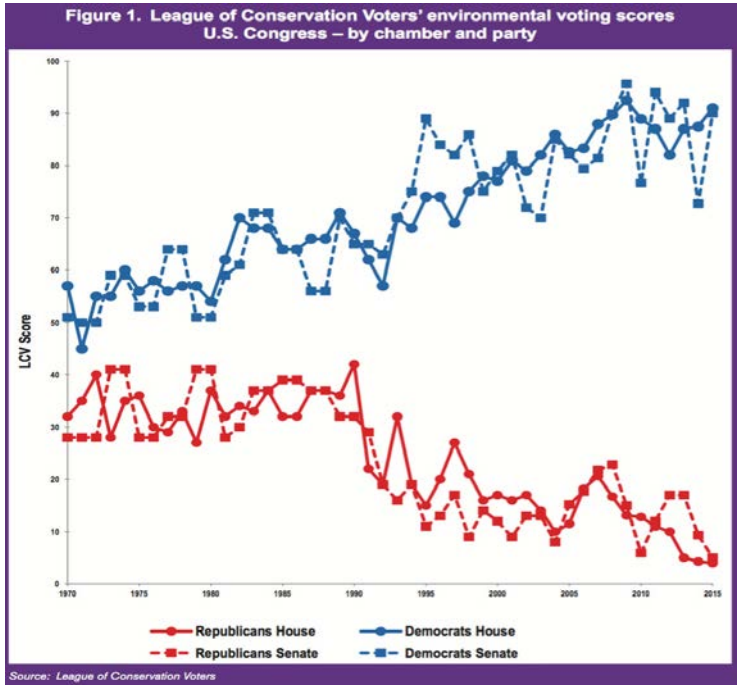
(Attari et al. 2010, Dietz 2010)

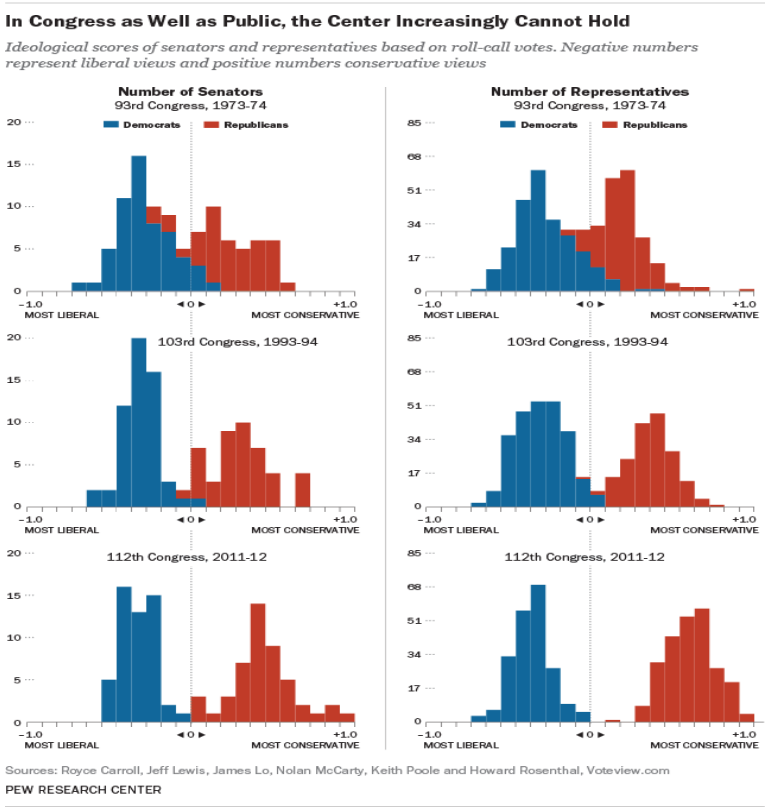
(PNAS, 2010)

Problems when we have to think in groups:

- Homophily—We associate with and listen to those who think like we do and avoid (strongly) those who think differently.
- This plus biased assimilation leads to groups—cliques—where everyone in the group thinks alike while groups grow more and more different from each other. Understanding social networks is crucial.
- Public opinion on climate change in the U.S. and Anglo-phone countries.
- Congressional ideology.
- Social media algorithms re-enforce this tendency.







Dunlap et al. 2016.

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Bringing in science.
Remember: decision are based on facts *and* values.

So, we have to keep in mind:

- The scientific processes is very effective at reducing the difficulties in our decision making to get better assessments of the facts.
- Scientists who are making decision recommendations are using values as well as science.
- Coming to common understanding of the facts (and their uncertainty) may not change decisions.
- Many assume that to get consensus on a decision we have to convince people about the facts—the information deficit model.
- The information deficit model assumes everyone has the same values—that there is value consensus. But that is seldom true.
- Finally, moving from general scientific understanding to specific contexts where decisions have to be made increases uncertainty and requires use of indigenous and local expertise (ILK).

Available at: nap.edu

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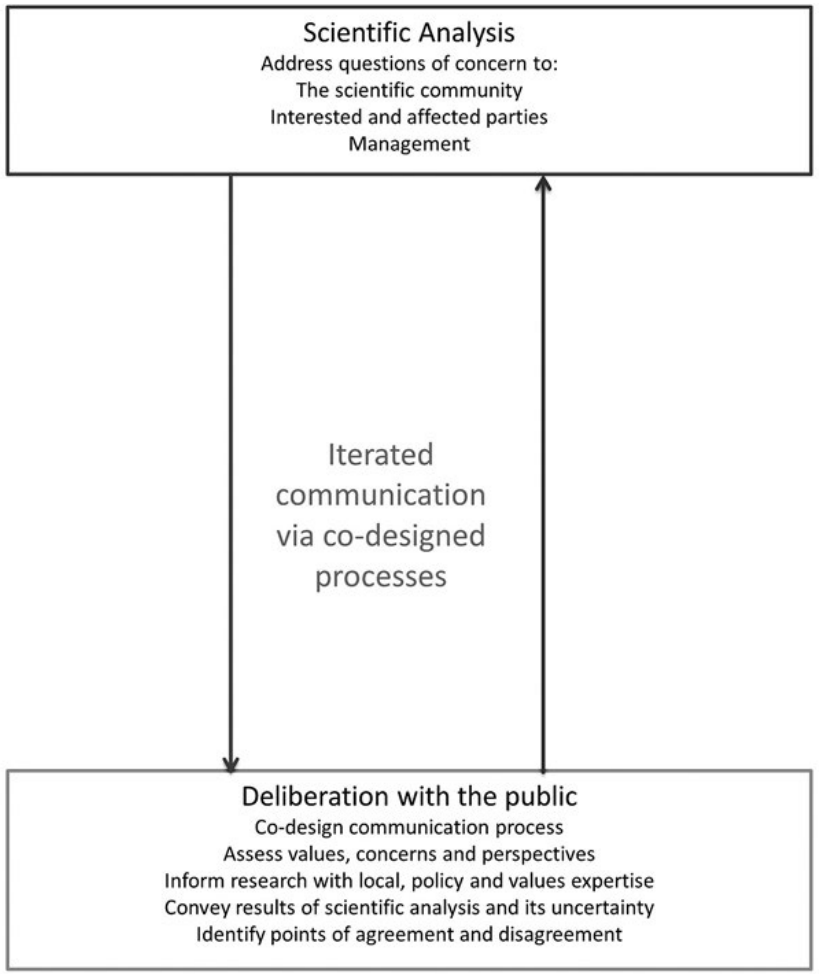
Linking analysis and deliberation

How do we make good use of the science in making decisions? The National Academies often recommend linking analysis and public deliberation.

+ Iterative process co-designed by all involved.
+ Getting the science right—community expertise can help.
+Getting the right science—addressing issues on the community agenda as well as those on the scientific agenda.
+Building trust in the science.

There is also the hope that fair and competent deliberative processes can:

--effectively meld facts and values to guide decisions,
--allow beliefs and values to evolve and
--build trust and competence.



(Dietz 2013, Dietz 2017)

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What can you do?

As a consumer:
What can you change that will have the greatest impact?

--What is the direct impact?

--How persistent is the impact?

--What are the indirect impacts up and down the supply chain?

--What signal are you sending to people who respect and observe you?

--What signal are you sending up and down the supply chain?

As a citizen:
What can you do that will have the greatest impact per unit effort?
--Voting!!
--Getting into the process of voting by registering people, by being a poll worker, poll watcher
Voter registration deadline in Colorado:
Online-Monday, 26 October
In person-Tuesday, November 3 Election Day!
--Participating in campaigns for candidates and issues and for parties at the local level.

Things that may have less impact:
--Trying to be persuasive on social media: You are talking to friends. People are not easily persuaded when in arguing mode.
--Demonstrations: Nice, empowering but a high ratio of effort to impact. Note that violence is often counter-productive.
--Making changes on campus: A very good thing but is it higher leverage than off-campus?

Seven criteria for decision making

Some members of the public will likely hold for the importance of each of these, and may challenge the legitimacy of others. (Dietz, in preparation)

1. Improve Human Well-Being and Reduce Environmental Stress (sustainability)
2. Efficiency (utilitarianism)
3. Enhancing freedom (libertarianism)
4. Competence about Facts and Values
5. Fairness in Process and Outcome (justice)
6. Relying on Human Cognitive Strengths, Not Weaknesses (avoiding heuristics and biases)
7. A Chance to Learn (adaptive)

How can we meet these criteria?

To summarize:
There is no simple highway to move us through the challenges we face, but many roads.

Decision making is challenging, but we can think through the multiple implications of our actions to make tentative decisions. We can then learn as we go and do better.

We always must attend to diversity.

I have not emphasized it enough, but some of biggest challenges but most interesting work is around our relationship to other species—Animal Studies is providing the scholarship.

Image by Joe Zammit-Lucia, used with permission.

Literature cited

Attari, Shahzeen Z, Michael L DeKay, Cliff I Davidson and Wandi Bruine De Bruien. 2010. "Public Perceptions of Energy Consumption and Savings." *Proceedings of the National Academy of Sciences, USA* 107(37):16054-59.

Bouman, Thijs and Linda Steg. 2019. "Motivating Society-Wide Pro-Environmental Change." *One Earth* 1(1):27-30.

Bouman, Thijs, Linda Steg and Thomas Dietz. 2020. "Lessons of Early Covid-Related Responses for Behavioural Research on Sustainability." *One Earth* forthcoming.

Dietz, Thomas, Gerald T. Gardner, Jonathan Gilligan, Paul C Stern and Michael P. Vandenbergh. 2009. "Household Actions Can Provide a Behavioral Wedge to Rapidly Reduce U.S. Carbon Emissions." *Proceedings of the National Academy of Sciences* 106:18452-56.

Dietz, Thomas, Eugene A Rosa and Richard York. 2009. "Environmentally Efficient Well-Being: Rethinking Sustainability as the Relationship between Human Well-Being and Environmental Impacts." *Human Ecology Review* 16(1):113-22.

Dietz, Thomas. 2010. "Narrowing the Us Energy Efficiency Gap." *Proceedings of the National Academy of Sciences, USA* 107(37):16007-08.

Dietz, Thomas. 2013. "Bringing Values and Deliberation to Science Communication." *Proceedings of the National Academy of Sciences* 110(10):14081-87.

Dietz, Thomas. 2015. "Prolegomenon to a Structural Human Ecology of Human Well-Being." *Sociology of Development* 1(1):123-48.

Dietz, Thomas. 2017. "Science, Values, and Conflict in the National Parks." Pp. 247-74 in *Science, Conservation, and National Parks*, edited by S. R. Beissinger, D. B. Ackerly, H. Doremus and G. E. Machlis. Chicago: University of Chicago Press.

Dietz, Thomas. 2020. "Earth Day: Fifty Years of Continuity and Change in Environmentalism." *One Earth* 2(4):306-08. doi: https://doi.org/10.1016/j.oneear.2020.04.003.

Dietz, Thomas, Rachael L Shwom and Cameron T Whitley. 2020. "Climate Change and Society." *Annual Review of Sociology* 46:135-58.

Jorgenson, Andrew K, Shirley Fiske, Klaus Hubacek, Jia Li, Tom McGovern, Torben Rick, Juliet B. Schor, William Solecki, Richard York and Ariela Zycherman. 2019. "Social Science Perspectives on Drivers of and Responses to Global Climate Change." *Wiley Interdisciplinary Reviews: Climate Change* 10(1):e554.

Koch, Alexander, Chris Brierley, Mark M. Maslin and Simon L. Lewis. 2019. "Earth System Impacts of the European Arrival and Great Dying in the Americas after 1492." *Quaternary Science Reviews* 207:13-36.

Overland, Indra and Benjamin K. Sovacool. 2020. "The Misallocation of Climate Research Funding." *Energy research & social science* 62:101349. doi: https://doi.org/10.1016/j.erss.2019.101349.

Pacala, Stephen and Robert Socolow. 2004. "Stablization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies." *Science* 305:968-72.

Roberts, J Timmons, Julia K Steinberger, Thomas Dietz, William F Lamb, Richard York, Andrew K Jorgenson, Jennifer E Givens, Paul Baer and Juliet B Schor. 2020. "Four Agendas for Research and Policy on Emissions and Well-Being." *Global Sustainability* 3(e3):1-7. doi: https://doi.org/10.1017/sus.2019.25.

U.S. National Academies of Science. 2016. *Communicating Science Effectively: A Research Agenda*. Washington, D.C.: National Academies Press

Xu, Zhenci, Yingjie Li, Sophia N. Chau, Thomas Dietz, Canbing Li, Luwen Wan, Jindong Zhang, Liwei Zhang, Yunkai Li, Min Gon Chung and Jianguo Liu. 2020. "Impacts of International Trade on Global Sustainable Development." *Nature Sustainability*. doi: 10.1038/s41893-020-0572-z.