

On Thursday July 12th, 2018, I was a guest KVEC's San Luis Obispo Dave Congalton radio show (hosted by Guy Rathbun)

During the discussion, a number of topics came up and it might be useful for readers to see links to more information on various topics. Here are some links (including some topics that did not come up) together with a few explanatory comments and a "myth" brought up by a caller at the very end of the program.

Communicating Climate Science to Skeptics:

Katharine Hayhoe's video "Why facts aren't enough"

<https://www.yaleclimateconnections.org/2017/01/video-why-facts-arent-enough/>

Her point is that for dealing with hard-core or almost-hard-core skeptics, simply explaining the science will do no good. Indeed, it is likely to be counter-productive and deepen the divide. They will simply go to some of the denier websites like "Watts Up with That" or "Climate Depot" and parrot some of the misrepresentations or come up with their own misconceptions, all as if they really understood the science. (Speaking of Climate Depot, I cannot resist pointing out the deception and dishonesty that such websites engage in: I have put at the end of this blog two images having to do with arctic sea ice volume, with a brief comment.)

The real issue, she correctly points out, is their core ideology and identity, and when you oppose their misrepresentation of the science they feel it as an attack on their ideological beliefs. She feels it is better to try and seek common ground over areas that you both genuinely care about, examples of which she gives in the video. I find this easier said than done however.

The only other point I would make is that there is a spectrum about climate change opinion from the deeply concerned, on one end, to the "it's a hoax and junk science" on the other. See for example the 'Six Americas':

<http://climatecommunication.yale.edu/about/projects/global-warmings-six-americas/>

This is a valuable resource on climate communication. I think Hayhoe's argument applies mainly to the "dismissive" last group which is small but highly influential and vocal. I do think however, that "facts" presented to the 3rd, 4th, and maybe even the 5th group have some chance of doing some good (called by the authors the "cautious", "disengaged" and "doubtful") The problem is how to get their attention at all. I very rarely get responses to my open invitation to meet with people who say they want to understand the science but have some doubts about it. (Also, in my own limited experience my impression is that the 5th and 6th groups are greater than the percentages assigned to them by the Six Americas survey.)

The video of hers above is one of a series by Hayhoe (a first-rate climate scientist and very effective communicator.) For others in this series, called "Global Weirding" google "Hayhoe Global Weirding video" and there are several links; Yale Climate Connections says they are reposting all of them.

The argument from some religious groups: "Human's don't control the climate, God does"

I have encountered this argument, though not as often as the “Dealing with climate science would mean more government interference so I will reject (or not listen to) the scientific evidence” group.

Katherine Hayhoe and her husband’s book for Evangelical Christians:

“A climate for change: Global warming facts for faith-based decisions”.

<http://climateforchangethebook.com/> Unfortunately, this book was out of print for a long time and is now very expensive to purchase. I have just come across another (not yet read), but I have some acquaintance with one of the authors, Paul Douglas, Minneapolis-based meteorologist (an evangelical) whose understanding of science is sound, so I will recommend it, as it is newer and much less expensive:

“Caring for Creation: The Evangelical’s Guide to Climate Change and a Healthy Environment”

Mitch Hescocox and Paul Douglas.

https://www.heartsandmindsbooks.com/2016/09/pre-order_caring_for_creation/

[There are many exciting technical innovations to reduce our use of fossil fuels. Here are 3:](#)

ARES (Advanced Rail Energy Storage):<https://www.aresnorthamerica.com/>

One of the key requirements for implementing large-scale use of intermittent sources of energy like wind and solar is the ability to store that energy for use when either of these sources are not available. Batteries are an obvious option, but they are still quite expensive. Huge amounts can be stored by pumping water up and down between two reservoirs. But in arid parts of the U.S., which is just where solar energy is most abundant, water is scarce and even where available pumped hydro tends to be expensive with a heavy environmental footprint.

The idea above is very attractive: it substitutes cement blocks for water and electric rail cars for water pumps. It also is attractive in that it can adjust very rapidly to changing demands for storing or releasing energy.

REHNU: <http://www.rehnu.com/>

This startup takes a sort of hybrid approach to solar energy. Sun-tracking inexpensive large mirrors concentrate sunlight on small optical components which distribute the sunlight over a small array of highly optimized photocells to generate electricity (and hot water in the bargain.)

The combination of always pointing at the sun and the high-efficiency cells leads to more than double the amount of power produced compared with flat-panel arrays with the same land area, and, if this technology can be scaled to utility scale generation, the cost is less than large solar farms.

TRANSATOMIC: <http://www.transatomicpower.com/>

This is another ‘startup’, one of the “Gen IV” nuclear reactor designs. It was founded by two young scientists when they were MIT graduate students in nuclear engineering. It is of a type known as ‘molten fuel’ reactors, but are several other “GEN IV” approaches. I am attracted to this one for a number of reasons: It is ‘walk-away’ safe as explained in the website, its spent fuel has very much shorter lifetime than the type of current reactors, it poses no risk of converting produces to weapons, and perhaps most importantly, it is much cheaper, Watt-for-Watt than current reactors.

A few comments on the role of nuclear energy in switching to low-emission energy: Among all those who agree on the need to deal with climate change, there is no more divisive issue. One camp is strongly opposed to any use of nuclear energy and believes that all the world’s energy can be

supplied by (mostly) wind and solar. The other camp believes that we must heavily rely on nuclear energy. I believe neither of these camps approach the problem in the most intelligent way: My opinion is that the proper mix will vary region by region across the nation and certainly around the world, depending upon the availability of wind, solar, geothermal and hydro-electric resources but also on the stability of the governments in question as well as the demographics of the region. In much or rural India and Africa, for example, distributed solar may make most sense while nuclear reactors (especially of the Gen IV type I advocate) may be the best approach. So, a cost/benefit approach for every situation, taking all the factors above into accounts, along with environmental impacts, is the way to go.

In any event I strongly support our Federal Government supporting innovative technology in wind, solar, Gen IV nuclear, biomass and carbon sequestration to get some of these 'startups' to the point where they can attract private capital. The jobs and economic growth opportunities are very significant.

What is the most politically viable option to get the Federal Government to lower carbon emissions?

The Carbon Fee and Dividend approach to reducing emissions was brought up. This was advocated for by, among others, prominent Republicans including former Secretary of State George Schultz and former Secretary of the Treasury Henry Paulson:

<https://www.clcouncil.org/media/TheConservativeCaseforCarbonDividends.pdf>

More recently, a similar proposal was made by a group including former Republican Mississippi Senator Trent Lott and former Democratic Louisiana Senator John Breaux.

<https://www.wsj.com/articles/new-conservative-political-group-to-push-for-u-s-carbon-tax-1529444820> though several liberal groups have criticized this proposal on several grounds.

In any case, I think the most thoughtful and careful proposal of this type is one proposed by the Citizens Climate Lobby (CCL): Here is the explanation for their Carbon Fee and Dividend approach:

<https://citizensclimatelobby.org/basics-carbon-fee-dividend/>

The CCL is a nation-wide organization and the CCL website gives locations of local chapters. In SLO County see: SLO Chapter of CCL: https://citizensclimatelobby.org/chapters/CA_San_Luis_Obispo/

Learning about Climate Science Basics:

A book review of "A Global Warming Primer": A simply explanation of climate change:

<https://skepticalscience.com/Book-Review-Global-Warming-Primer-Bennett.html>

I have not read the book yet myself, but I respect the folks and skeptical science and so feel happy about suggesting it.

The Economics of Dealing with, or not Dealing with, Climate Change:

Here is a summary of Nobel Laureate Economist Joseph Stiglitz' "friend of the court" brief on the economic impacts of taking no action on climate change compared with switching to low emission energy economy:

<https://insideclimatenews.org/news/11072018/joseph-stiglitz-kids-climate-change-lawsuit-global-warming-costs-economic-impact>

For those interested in another Economist's view on dealing with climate change I would also recommend: "The Climate Casino: Risks, Uncertainty and Economics for a Warming World" by Williams Nordhaus: <https://www.barnesandnoble.com/w/the-climate-casino-william-d-nordhaus/1125545174>

He first gives a good overview of the basic science and then goes on to find the "sweet spot" using a cost/benefit analysis to see what limit on temperature rise limit we should aim for. It was published in early 2015 and my own opinion is that the estimated risks have increased since then, while the costs of cutting emissions has decreased, so I think he has erred a bit on the "hot side", but it is an interesting read.

[Life-Long Learners of the Central Coast: John Lindsey and I will discuss "Extreme Weather and How to Prepare for it" in a one day two-hour session sometime this fall.](#)

See <https://www.lifelearnerscc.org/> for information, though not yet scheduled.

[The water vapor myth](#)

At the end of the show caller argued, in essence, that since water vapor is a substantially more powerful trapper of outgoing infrared radiation than carbon dioxide, it makes no sense to try to limit carbon dioxide. Coincidentally (maybe?) this same myth was stated about a month ago in a letter to the San Luis Obispo Tribune (I replied, but by mistake sent it to the New Times where it was published.)

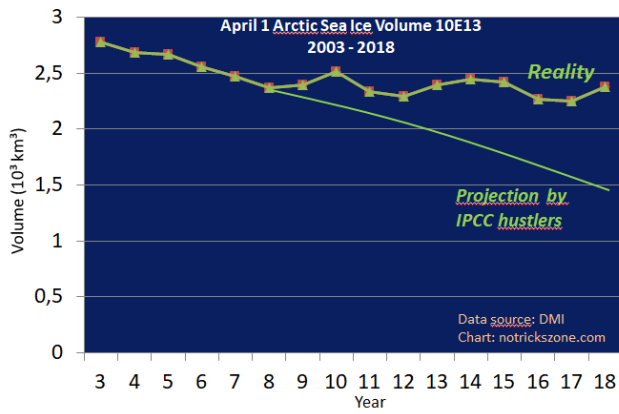
Since I have discussed this myth in detail in two of the "Updated Tutorials" on this website I will not repeat the response to this myth here. Please see topics 3 and 5 in the Updated Tutorials: <http://www.centralcoastclimatescience.org/updatedtutorial.html>

[The dishonesty of some of the climate denier blogs: an example from Climate Depot having to do with arctic sea ice volume.](#)

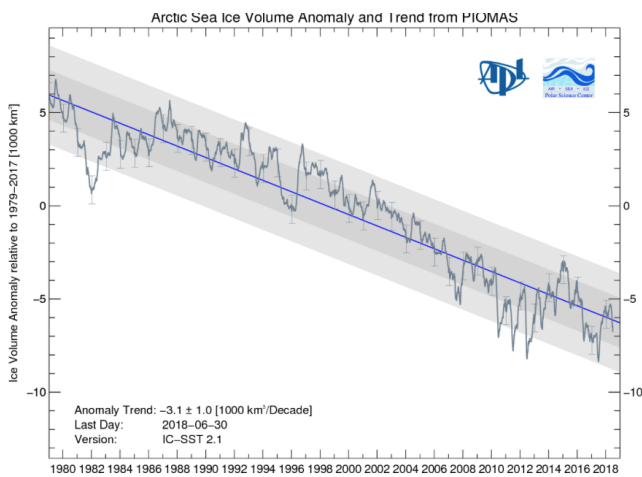
If you go to Climate Depot, you will learn that it is run by Marc Morano. Marc Morano was former communications staff director for Senator and leading climate denier James Inhofe. Morano credentials as a climate scientist is that he has a B.S. in political science.

On the other hand go to: <http://psc.apl.uw.edu/about/>, the Polar Science Center. There you will see an analysis of arctic sea ice volume using the PIOMAS analysis <http://psc.apl.uw.edu/research/projects/arctic-sea-ice-volume-anomaly/> where PIOMAS stands for "Pan-Arctic Ice Ocean Modeling and Assimilation System"

Here is the graph published by Climate Depot asserting that arctic sea ice is doing just fine, as measured by volume, and has stopped its decline:



Here is the Polar Science Center PIOMAS plot:



Which gives the most informative and honest picture of a long term trend?

By showing only selected data for a selected date “April 1” and/or only a short stretch of data you can “prove” whatever your ideological leanings want and that will be presented by other “skeptics” as their own ‘proof’—which is why I do not debate deniers.