



Central Coast Climate Science Education
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**Reducing greenhouse gas emissions:
"But what about China"**

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Introduction

In my last essay "A Grand Solar Minimum would not cause a New Little Ice Age " (essay # 28 on this website) I concluded by saying that "We should... continue to try to reduce, and eventually eliminate, the rise in greenhouse gases caused by burning fossil fuels." In doing so we will still have to adjust to continued climate change, but we can avoid far more severe consequence of further warming by getting to "net zero" carbon emissions as quickly as possible. This is the course of action strongly urged upon us by the climate science community. Predictably, however, whenever I, or the climate science community, makes such a plea, one will receive the following comment: "The United States contributes only about 16% of the world's emissions, so why bother". Or, similarly, "But what about China". In this essay I want to respond to such comments.

This topic is especially pertinent just now, as in just a few months, beginning November 1, in Glasgow, Scotland, the 26th yearly "Conference of Parties" (COP) will convene. Their task will be to update and strengthen the pledges ("Nationally Determined Commitments", or NDCs) made by each country to reduce their emissions, with the goal of not exceeding a global temperature rise of 2 degrees centigrade, one of the goals of the Paris Agreement of 2015. And to underscore even further the urgency of this topic, the 6th climate assessment by the International Panel on Climate Change has recently been released. Unsurprisingly, the news is not good. You can read a summary of it here:¹ (Via footnotes, I have listed the URLs for source material I have used and I encourage readers to at least glance at many of these.)

In this essay I first present some data and comments on current and historical emissions by various countries to put into perspective where the world stands on emissions. I then summarize what the current prospects are for meeting the goals of the Paris Agreement with emphasis on China's current policies and finally, comment on various suggestions for meeting these goals when the current prospects seem to be falling short.

Some Data on Country-by-Country greenhouse gas emissions.

¹ <https://tinyurl.com/zfaumma>

The following table shows the total amounts of CO₂ yearly emission for the top 6 emitters as of 2018 (except for the EU which is for 2020.) I have lumped the countries of the European Union together since they have a fairly coherent emissions policy as described below; some sources break the EU down by Country, with Germany being the largest emitter.)²

Country	Emissions (gT/year)	% of total
China	10.06	30.0
United States	5.41	16.1
European Union	2.90	8.6
India	2.65	7.9
Russian Federation	1.71	5.1
Japan	1.16	3.5
Next 14 largest	5.91	17.7
Rest of world	3.70	11.1
World total.	33.50	

From this table it is striking that:

- * While the U.S. contributes "only" 16% of the total, it is far ahead of the next entry--the combined 27 countries in the European union
- * China and the U.S. make up nearly 50% of total emissions
- * The top 6 emitters account for over 71% of total emissions
- * The top 20 make up 89% of total emissions
- * The rest of roughly 180 other countries contribute just about 11% of global emissions.

So, while it is correct to say that emissions are a "global problem," if a multilateral agreement were reached with the top 6 emitters, or even the top three, as some advocate, this would deal with the bulk of the world's emissions.

There are also 3 other ways of examining emissions when it comes to the issue of fairness and responsibility.

If, instead of the raw country total, we examine the *emissions per capita*, then these top 6 emitters present a much different picture:

Country	Metric tons per person per year
U.S.	16.3
Russia	11.7
Japan	9.2
China	7.0

² See for example: See for one source: <https://www.ucsusa.org/resources/each-countrys-share-co2-emissions>. Different sources will give slightly different results; these data are for emissions from fossil fuel combustion. If deforestation were included then, for example, Brazil would rank higher.

European Union	6.5
India	1.9

There is yet another way of examining emissions if we want to address the issue of fairness and responsibility. Climate scientists have shown that the peak global temperature, which will be reached when emissions stabilize, scales quite closely with the *total cumulative* emissions since the industrial revolution. Once again listing the 6 leading emitters in terms of their *cumulative emissions* as a percentage of the world's total we find:

<u>Country</u>	<u>Percentage of Cumulative emissions since the industrial revolution</u>
U.S.	25%
EU	22%
China	13%
Russia	7%
Japan	4%
India	3%
rest of world	26%

And, as a fourth example, if we were to rank these *cumulative emissions* on a *per capita* basis (using the present populations, which of course have changed drastically over this period) then the U.S. and EU would stand even further above the rest of the world.

Finally, there is yet a 5th way to look at the issue of fairness and responsibility, although it is harder to quantify: The serious consequences of the climate disruption we are already experiencing tend to fall most heavily on those nations who have produced the least emission.

The Current Situation with respect to Chinese Climate Policies

Having put the emissions history of the various nations of the world into some perspective, nevertheless the inescapable reality is that China is now the largest contributor of greenhouse gases and will be for some time to come, and India's contribution is growing rapidly. It is thus rather discouraging that these two major emitting nations failed to submit their pledges (NDCs) for emissions reductions by the July 31st deadline for inclusion in the official UN report for COP26.³

China's situation is somewhat contradictory. It has produced an enormous amount of renewable energy for both internal use and exports and has the capacity to produce much more. And while China has announced its attention to become carbon neutral by 2060 (the U.S. has made a similar announcement, but by 2050), China's recent decisions to build a large number of new coal-fired generating plants is very discouraging news. The

³ <https://apnews.com/article/middle-east-china-environment-and-nature-india-united-nations-396d3d2ae7b2ff77fb99264d097bc594>

following summary is based upon a commentary by Dr. Daniel K. Gardner, Prof. Emeritus at Smith College and a specialist in Chinese Environmental issues.⁴

While coal consumption decreased in the years 2014-2016, since then it has increased slightly, although its share of the total world consumption of coal has also dropped slightly.⁵ China's CO2 emissions have also increased in this same period despite the economic slowdown caused by the pandemic.

More concerning, now quoting the Gardner opinion piece, is China's recent permitting of large amounts of coal-fired power:

"China added 38.4 gigawatts of new coal-fired power capacity in 2020 (a large power plant produces around 1 gigawatt), even as the rest of the world [reduced](#) its net capacity by 17.2 gigawatts. Worse, this increase is only the beginning. The Chinese government has approved construction of an additional 36.9 gigawatts of coal-fired power capacity, bringing the total under construction today to 88 gigawatts, with proposals to build an additional 158.7 gigawatts [in the pipeline](#). A Global Energy Monitor report⁶ concludes that if China continues to expand capacity to 1,400 gigawatts through 2035, ...“its coal-power generation alone will be 'more than three times as large' as the global limit on coal power use determined by the Intergovernmental Panel on Climate Change to keep global warming well below 2 degrees C.”

On the other hand, at the April 2021 White House Climate Summit hosted and organized by President Biden, China's President Xi, who was the first to speak, said it was China's goal to have carbon emissions peak by 2030 and to reach net zero emissions (as noted earlier) by 2060. (In the link to footnote 5 above, a Chinese perspective on calls for China to sharply reduce its emissions was given by Vice Minister of Foreign Affairs Yu Lecheng. He noted that China is still far behind the economic development of the West, and described calls for China to match the EU and United States in emissions reductions as akin to "expecting elementary and middle [or high] school students to graduate at the same time."

It is difficult to reconcile the data above on coal plants with having China's emissions peak by 2030. By the same token though, given the current political realities, not to mention the 180 degree swings in U.S. climate policies with recent changes in administrations, it is not clear that President Biden's goal of reducing emissions by 2030 to 50 percent of 2005 levels and net zero by 2050 will actually be achieved either.

U.S. Policy Approaches to Achieving Dramatic Reductions in Global Emissions

I see no easy answer to the optimum policy that the U.S. should adopt. But there is an easy answer to what the *worst* policy would be that the U.S. should adopt, namely: "If China doesn't take significant steps to reduce emissions, the U.S. shouldn't either." This

⁴ <https://www.latimes.com/opinion/story/2021-08-01/china-coal-consumption-global-warming-biden-danger>

⁵ <https://chinadialogue.net/en/climate/china-pledges-to-control-coal-power/>

⁶ <https://endcoal.org/wp-content/uploads/2019/11/Out-of-Step-English-final.pdf>

makes no more sense than a situation in which two heavy smokers have to share the same room, filled with second-hand smoke. One smoker says he is not really interested in reducing his smoking. It would be foolish for the second fellow to say that therefore he won't either. At least if he cares about his health, since every additional amount of smoke is that much worse. The same is true of global emissions. Every additional bit of carbon dioxide and other greenhouse gases will simply make the severity of a changing climate that much worse.

But there are two more compelling reasons for the U.S. to pursue a vigorous policy of transitioning to a net-zero emissions economy as quickly as possible.

First, it makes economic sense. Wind and solar are now competitive with, and in many circumstances cheaper than, fossil fuels, and there is the opportunity for enormous U.S. economic growth in these sectors. Detailed studies confirm this, for example in this recent peer-reviewed study published in a journal of the American Geophysical Union.⁷ The study is technical, but in the brief final concluding section (section 9) they state that *"we have shown that achieving net zero and net negative CO₂ emissions from energy and industry in the U.S. by mid-century can be done at low net cost... even with decarbonization, future energy costs as a share of GDP are expected to be lower than today's."*

Furthermore, there are very significant "hidden" or, as the economists say, "external" costs in the continued use of fossil fuels that can be eliminated. Economic losses in terms of storm damage, crop damage, and loss from fires are a few obvious examples, but equally notable is the huge impact on our health in the U.S. and the associated health costs. These health impacts are discussed in this report by the CDC⁸ and in a bit more depth by the U.S. Global Change Program⁹ where we read that *"Climate Change is a significant threat to the health of the American people"*. The report *"examines how climate change is already affecting human health and the change that may occur in the future."* An additional very readable study on low carbon electrification¹⁰ and transportation¹¹ goals and costs are found in these twin studies.

Second, the U.S. is still the most influential country in the world and what decisions it makes regarding its own emissions reductions will certainly influence decisions by other nations. As in the case of the proverbial drunken fellow sitting on the bar stool, preaching abstinence is not likely to be very persuasive. So, the U.S. must provide leadership by example and show that a strong emission reductions program is entirely compatible with a vibrant economy as well as a much healthier and cleaner environment, as described above.

⁷ <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2020AV000284>

⁸ <https://www.cdc.gov/climateandhealth/effects/default.htm>

⁹ <https://health2016.globalchange.gov>

¹⁰ <https://tinyurl.com/67exzcxh>

¹¹ <https://tinyurl.com/pm5easf5>

Nevertheless, these arguments alone may not move the Chinese (and the rest of the world) to move faster on their own reduction programs, especially to phase out coal more quickly. This is complicated by the tense relations between the U.S. and China over other issues like trade, human rights, and the China sea. So, progress on improving these relations would be an important step,

What approaches might one consider in negotiating with various other nations to get meaningful reductions? Recently the American Academy of Arts and Sciences asked three experts in the area of international climate relations to suggest their ideas under the title of "Steps Toward International Climate Governance."¹²

The first contributor, Nobel-winning climate economist William Nordhaus, points out that the present commitments by nations in the Paris Accord are woefully inadequate, and he is quite pessimistic about the future. He argues for across the board carbon pricing, though allowing that he *"would allow for different paths for poor countries, but we cannot make exceptions the rule."* He addresses the fairly obvious *"free-rider problem: the agreements are voluntary, there are no penalties for non-participation, and countries talk loudly but carry no stick."* He proposes a "climate compact" which countries join on a voluntary basis, but then *must* adopt a reduction program (by means of a carbon tax.) For the (free riding) countries declining to join, member countries impose significant tariffs on all imports.

Another contributor, Scott Barrett also addresses the "free rider" problem and advocates linking trade restrictions and action on climate change. He also advocates trying to get as many nations as possible to "join the club", otherwise there will be too many free riders.

The position of the third contributor, Pinelopi Goldberg, most closely aligns with my own inclination and I found her short essay to be very thoughtful. She advocates starting with the three major emitters, which as described above are China, the United States, and the European Union. The EU is already the most committed of these three to significant reductions, and the current devastating impacts of climate change in all three of these countries may outweigh the pressure China feels to continue to ramp up coal-fired production. Additionally, China has enormous capacity to produce non-emitting electricity in the form of solar panels, wind turbines and nuclear energy. It also is poised to be the leader in electric vehicles.

The enormous political and economic clout that these three entities wield suggests to me that they will be able to negotiate with India and Japan to follow suit. All three of these contributors would utilize a carbon tax, but Goldberg emphasizes that it must not be regressive (as an increase in a U.S. gasoline tax increase would be) and needs to be coupled with other policies that do not place the heaviest burden on those of lower income and which also address the needs of regions with economies where fossil fuels play a major role.

¹² <https://www.amacad.org/news/steps-toward-international-climate-governance>

Hong Yang, a Chinese woman with an American master's degree and who specializes in energy policy, feels that as China's middle class grows and their standard of living increases, they will come to demand more emphasis on a clean environment, even at the expense of slightly slower growth. She also points out that, ironically, the rapidly growing market for EVs in China is partly driving coal plant production because of the increased demand for electricity from EVs. Both she, and Goldberg are thus quite a bit less pessimistic than Nordhaus when it comes to avoiding catastrophic climate change.

The deepest concern I have is the divisive political instability right here in the United States. If every four years we swing back and forth between a policy of decisive action on climate change and one that ignores it, or even declares it a 'hoax,' it will be very hard for meaningful global action to occur. That is why all of us must be involved in the political process.

I mentioned above the *worst* course of action, which would be for we in the U.S. to say "Well if China won't reduce emissions as fast as we think they should, then why should we?" The *second worst* attitude is to throw up one's hand and say that "It's too late and we have missed a deadline" or "I give up, its hopeless". It is never "too late". Every pound of avoided greenhouse gas emissions will lessen the damage. In a recent book, *The Future We Choose*, authors Christiana Figueres and Tom Rivett-Carnac, both of whom played a pivotal role in the Paris Agreement, argue for the necessity of "stubborn optimism". We owe at least that much to future generations.

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