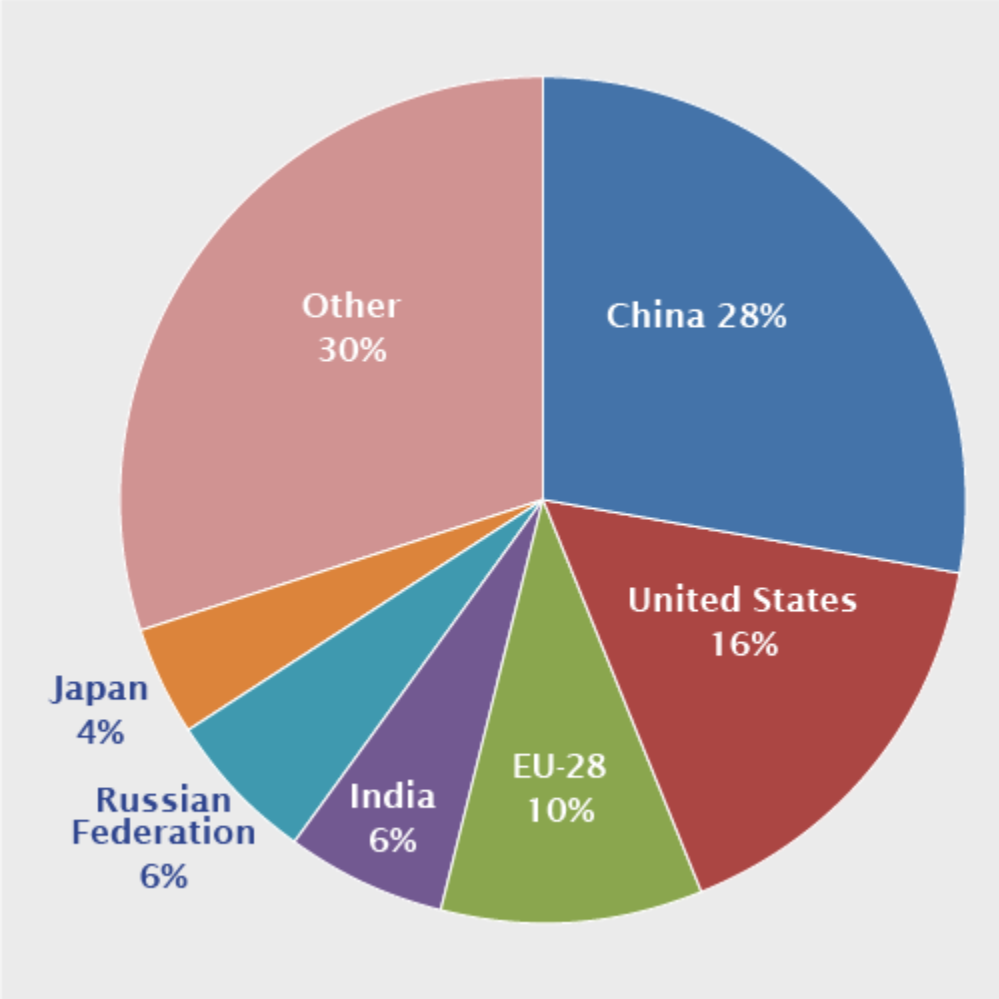
The Impending Doom of Island Nations and What Must Be Done to Save Them

A portion of the island nation of Tuvalu, located in the South Pacific

In the context of discussions on how best to address the threats posed by global warming, we often hear of sea level rise and the effect it will have on coastal cities. Places like Miami and New York City, for example, are said to be most at risk and that action must be taken to prevent coastal inundation. Why then, with the severity of such a threat looming, do we choose to do little to nothing as a nation to curb emissions and stop the trend of warming? Possibly because even in a worst case scenario, such cities would only be partially submerged, people could relocate and infrastructure rebuilt (albeit at a large cost), and we as Americans would move on. But for some, the answer is not so simple, and in fact far grimmer. Many island nations across the globe stand to be completely wiped from the face of the Earth if future predictions hold true. So what is

the cause of this seemingly counterintuitive disconnect between the apparent need to curb emissions and the lack of action to do so? There are a few reasons.



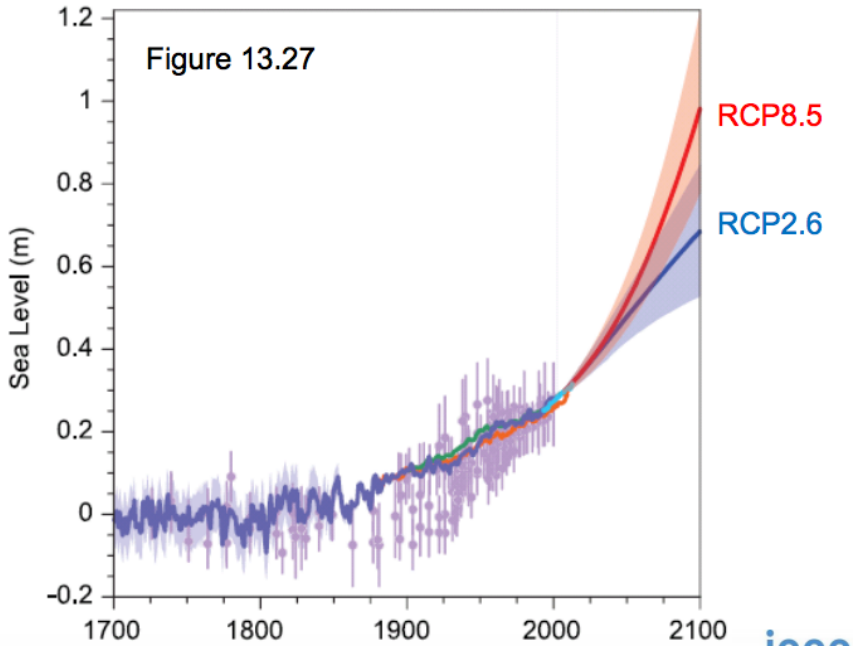
Breakdown of CO2 emissions by country, 2011

As illustrated in the graph above, the United States is among the most prolific emitters of carbon dioxide (CDIAC, 2011). All other countries listed are heavily developed and industrialized nations, leaving just 30% of CO2 emissions to be attributed to all other countries in the world, combined. With such knowledge, it seems obvious that such nations should take the lead in cutting back on emissions, so why don't they? The answer is as simple as international competition. While one of the

largest emitters, the United States has actually done the most to cut back on carbon emissions, eliminating 7.7% between 2006 and 2012 (Roberts, 2012). This can be attributed to a few factors, some related to active cutbacks, while others are a result of external factors such as the economic recession reducing demand for energy. But other nations such as India and China are a bit more reluctant to be so proactive. They argue that the United States is the world leader in quality of life, a goal to which the aforementioned nations aspire to. As such, they maintain that it is unfair to impose restrictions on them, which would be an economic burden and hinder their economic and social progress (Harris, 2013). Their arguments are not invalid. Indeed, as a world leader in quality of life, it would come across as slightly underhanded to suggest that nations struggling to catch up that they must either cut back on consumption or invest in expensive alternative energy. But regardless of the competition to provide for the people of such nations, the people of the other, poorer nations stand to lose the most.

The United States, among others, can be considered a “free rider” in the context of emissions, ranking in the top 20% of emissions while also being in the bottom 20% in terms of vulnerability to the effects of such emissions. The opposite end of the spectrum is known as the “forced riders”, those with relatively low emissions yet the highest vulnerability, often to sea level rise in the case of Kiribati, an island in the Pacific (Worland, 2016). As a result, the agreement from the Paris climate discussions recently includes many developed nations pledging billions of dollars to pay for both the adaptations required as well as for the loss and damages associated with the negative effects of climate change. But what specifically must be done to prevent nations such as Kiribati from being wiped from the planet?

While incredibly difficult to come up with an exact numerical relationship between atmospheric carbon levels, global temperature, and sea level, we can measure all three of those statistics over time and infer into the future based on their rates of change. In the rock record and by analyzing ice cores, we know that atmospheric CO2 concentrations decreased from 600-1400 ppm at the beginning of the last glaciation event to 400-700 ppm several million years later, eventually decreasing to a modern day average of around 250 ppm (Menke, 2014). This is consistent with modeling that gives a threshold for large-scale Antarctic meltdown occurring around 780 ppm. We currently experience concentrations above 400 ppm, and are on track to reach the 780 ppm threshold by 2150, if not sooner when considering the increasing levels of emissions.



However, far less than a meltdown of the entire Antarctic ice sheet is required to spell disaster for most of the forced rider island nations. Using the nation of Tuvalu as an example, since it represents a large portion of at risk islands in terms of

topography, the highest elevation on the island is only about 15 feet. However, most of the island's inhabitants and infrastructure lies near the coast, at much lesser elevation. Using a conservative estimate of 3 feet to represent the most at risk inhabitants and development, and comparing it to the projected sea level rise by the International Panel on Climate Change (IPCC) illustrated in the graph above, we can infer a 3 foot or 0.9 meter rise before 2075. Another fact to consider is that these incremental annual increases will continue for thousands of years, not just until the end of the century. The IPCC estimates an annual rise of 0.4 inches, however this rate will increase with time and persist well into the future (Menke, 2014). Knowing this, nations such as Tuvalu seem to be all but doomed. Clearly, something must be done to prevent the loss of invaluable cultures, traditions, and peoples.

It has already been proven that other developed nations such as India and China look to the United States as leaders in terms of infrastructure and quality of life. As such it is imperative, despite the fact that the US has already curbed emissions when other have not, that we continue to invest in alternative and clean energy technologies and prove to the other nations of the world that the shift can be made without sacrificing our economic well-being. As Klein points out in *Capitalism vs Climate,* the title inherently implies a tradeoff between mitigating climate change and economic growth. However, this does not have to remain the case. By investing as soon as possible in technologies such as solar, wind, hydroelectric, nuclear, and biofuels, we can work to reduce the cost of implementation over time. With regulatory incentives to promote their development, private corporations would be intrinsically motivated to pursue such campaigns. As the technology proliferates, fossil fuel usage will become less and less

profitable, meaning that the large energy corporations will begin to implement renewable energy sources under their own free will. As this trend continues, the eyes of the world will be on the United States, and it is our duty to set the example that change can happen feasibly, and we will be better off as a nation because of it. With mechanisms such as a carbon tax, which is proportional to the environmental harm done in the production of a product, as well as factors such as reduced health care expenses as a result of a cleaner environment, the cost of implementing alternative energy could be greatly offset. The EPA has created the Social Cost of Carbon (SC-CO2) index that assesses these tangential benefits, and has concluded that clean energy reformation is possible within the United States (EPA, 2016). Now, it is up to our political leaders to choose to make these decisions.

When discussing the feasibility of these proposals, I have mixed feelings. I truly believe, as do many others within the scientific community, that the United States has both the responsibility and the ability to proactively begin working to mitigate greenhouse gas emissions on a large scale. I also believe that were this to happen, other developed nations would be far more likely to take the same steps. However, it is likely too late to prevent harm to many. In a purely hypothetical scenario, if we were to cut our carbon emissions in the United States to zero starting today, global temperatures would continue to increase for roughly 50 years before tapering off[1], meaning a significant sea level rise on the order of roughly one half meter according to the IPCC projections. I also believe that the current political landscape is not likely to facilitate these changes in the near future due to widespread disinformation and political agendas. While the geologic record tells us quite objectively that these small island

[1] Personal knowledge from Intro to Global Climate Change

nations face devastation within the century, and catastrophic melting events affecting the entire world as soon as 2150, anthropogenic influences and ideology negate these facts. Any infeasibility of working to cut emissions and prevent sea level rise is almost entirely the fault of us as humans and our short-sightedness. The sooner we begin to take these steps, the smaller the economic burden will be. It is our duty as citizens of a country able to influence the decisions of many to make this knowledge as readily available as possible, in the hopes that the people making the relevant political decisions may eventually realize the harm done by doing nothing.

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