Mitigating Global Warming: Is the 2 °C Goal Harder Than We Think?

Introduction

In late 2015, perhaps one of the most important documents in the history of environmental policy was drafted in Paris, France. The Paris Agreement laid the groundwork for a worldwide environmental policy restructuring, highlighted by a new set of goals with one outcome in mind: the mitigation of global warming. One of the key goals agreed upon in Paris is known as the 2-degree Celsius requirement. According to the White House: “The Agreement sets a goal of keeping warming well below 2 degrees Celsius and for the first time agrees to pursue efforts to limit the increase in temperatures to 1.5 degrees Celsius. It also acknowledges that in order to meet that target, countries should aim to peak greenhouse gas emissions as soon as possible. (Earnest, 2015)” This may seem like a straight forward task, but it presents a rather daunting challenge in a world currently thriving on environmentally harmful industries. After reading about the 2-degree requirement, I found myself wondering how the participating countries had planned to achieve this goal. Assuming renewable resource use would be at the forefront of any change, what percentage of non-renewables would need to be converted in order to meet the 2-degree Celsius requirement? I expect to find throughout my research that it will take roughly a 10% global conversion to renewable energy to meet the degree requirement, which may be much tougher to achieve than it sounds.
Background

Throughout the world, demand for energy use is increasing for several reasons, including social and economic development (Edenhofer, 2012). Many countries in Africa, Asia, and South America are still developing their economies, placing an emphasis on manufacturing. Similar to the Industrial Revolution in the United States, many of these countries are seeing rapid economic growth that has completely changed the lives of their citizens. However, this type of growth comes at a cost, just as it did for the United States and many other Western European countries roughly one hundred years ago. Industrial manufacturing can do serious damage to the environment, mainly from the release of fossil fuel emissions. Recent data has shown that the consumption of fossil fuels accounts for most of the global anthropogenic Greenhouse Gas emissions (Edenhofer, 2012). However, it’s hard to show this data to developing countries and ask them to limit their use of fossil fuels when the established countries of the world are hardly doing any better themselves. The United States consumes roughly 25% of the world’s energy, most of which is produced by fossil fuels (Diehl, 2008). If any sort of mitigation is going to happen in terms of global warming, an example must be set by the global economic powers; they have to show the rest of the world that it is possible to maintain economic growth with the use of cleaner energy.

At this point in time, it is not feasible to expect a total damnation of fossil fuel usage. Rather, we need to be smarter about the quantity of fossil fuels we’re using in order to reduce our Greenhouse Gas output. Currently, 60% of United States electricity is powered by coal, with another 30% generated by Nuclear Power/Natural Gas (Diehl, 2008); that is an extremely large amount of coal that is burned each year, followed by the copious amount of GHG emissions released into the atmosphere. Greenhouse Gas emissions stemming from energy output account
significantly for the historic rise of atmospheric Greenhouse Gas concentrations (Edenhofer, 2012). Any sort of successful global warming mitigation campaign will have to start with the energy sector, because it is currently responsible for the majority of our atmospheric problems. Fortunately, there are many ways in which we can lower Greenhouse Gas emissions from the energy sector while also meeting the global energy demand, such as: Energy Conservation, Fossil Fuel Switching, Renewable Energy, and Carbon Capture (Edenhofer, 2012). These alternative options could be the key to turning around the problem that has become climate change, but it will take a serious level of commitment to see the results that our planet currently depends on.

The term “Sustainable Energy” can mean many different things. The meaning could be as simple as a single wind turbine in a farmer’s back yard, or as broad as a worldwide initiative to create the kind of change that will save our planet. Sustainable energy encapsulates the many solutions that our global society must initiate in order to reverse the damage being done to Earth. Ban Ki-Moon, the Secretary-General of the United Nations, wrote a series of goals relating to sustainable energy in his 5-year agenda. One of the aforementioned goals, Sustainable Development Goal 7, provides a fresh perspective on the mitigation of climate change: “*Goal 7: ensure access to affordable, reliable, sustainable and modern energy for all. This will have an enormous impact on climate change. By reducing emissions, it will improve public health and safeguard economic growth, indirectly saving millions of lives.* (Ki-Moon, 2016)” The Secretary-General realizes that any sort of change must come from within, and that can only happen if society believes in what they’re doing. Ki-Moon understands that to help our planet, we must first help ourselves. The Secretary-General goes on to state in his 5-year agenda: “*Sustainable Development Goal 7 on sustainable energy is at the heart of development, since more than*
1 billion people in the world do not have access to electricity. Achieving Sustainable Development Goal 7 well before 2030 will vastly improve our chances of achieving the global goals on food security, health care, education, employment, sustainable cities and more. (Ki-Moon, 2016)” It seems as though the Secretary-General is alluding to the fact that we’re currently destroying our planet with fossil fuels that aren’t even accessible to everyone in the world. If Sustainable Energy convinces the global population that it is just as effective as fossil fuels, while also providing electricity to people that have never even had it before, this could prove to be a key in meeting the 2-degree Celsius requirement.

Similarly to the Secretary-General’s 5-year agenda, the Paris Agreement is an ambitious document. It is more than just the 2-Degree Celsius requirement, but rather a group of goals that set out to bring a globally unified stance on climate change. As described by the White House: “Under the Agreement, all countries will communicate their climate targets every five years, starting in 2020. Targets must be submitted 9-12 months before they are finalized, creating time for other countries and civil society to seek clarity about the targets submitted. (Earnest, 2015)” The Paris Agreement hinges on a certain level of accountability that each country will hold for one another. If any one of the countries contractually obligated to the agreement doesn’t seem to be pulling their weight regarding emission control, then they’re required to report it as a part of the agreement. This clause is laid out very clearly in the text of the Paris Agreement: “For the first time, the Agreement requires all countries to report on national inventories of emissions by source. This breakthrough will give unprecedented clarity to the public’s understanding of emissions and pollution in countries throughout the world. (Earnest, 2015)” Essentially, any country that signed the agreement on April 22, 2016 is required to be transparent with the public about their emission levels, and what sources are responsible for the emissions. This provides a
system of accountability not only from other countries around the world, but also from a domestic perspective as well. The pieces are very much in place for the Paris Agreement to be successful in its quest for climate change mitigation, but it will be up to the participating countries to hold each other accountable in order to see it through.

Analysis

It appears as though the transition from fossil fuels to renewable resources will take much longer than I had originally thought. Currently, 97% of the United States transportation sector relies on oil (Diehl, 2008). The bad news: it will likely take several years for the United States to convert any fossil fuel dependent transportation system into a renewable friendly system. The worse news: like many other established countries around the world, the citizens of the U.S. are very reluctant to give up convenience. For example, Electric powered railways are a reasonable alternative to the largely fossil fuel dependent bus systems; yet, railways can’t provide the convenience that comes with adaptable bus routes. However, the silver lining in this case is the fact that many countries in Europe have proven it possible to have a successful railway system. Unfortunately, the reality is that the United States has hardly shown any urgency in terms of implementing these types of systems, and will continue to look like environmental hypocrites until they do so.

Let’s get down to brass tacks here: the United States must be at the forefront of transition to alternative/renewable energy sources if the 2 degree goal is to be met. The United States accounts for roughly 25% of global energy use (Diehl, 2008). As if that weren’t enough of a reason to shift to renewable energy sources, the United States tends to set an example for many other countries around the world. With many countries around the world still working to grow
their economies, it is unfair to expect them to change their ways when one of the most established countries in the world is very lax in doing so. Obviously it’s a tall task to try and change energy use routines overnight, and it’s not reasonable to expect the United States to do so. However, there are ways for the United States to set an example while they try to figure out their own plan of action regarding the switch to renewable energy outlets. In this situation, the example would be set for the other global powers on Earth by incentivizing the developing countries to adopt more environmentally friendly industrial/transportation practices. The best way to achieve this in a timely manner would be to provide subsidies to countries that begin to shift their strategies away from fossil fuel use. In 2015, the United States spent over 400 million dollars in grants/subsidies on renewable energy research/development (Earnest, 2015). In the grand scheme of things, this is not a lot of money, but it does show that the United States government is willing to invest in the renewable energy sector. Realistically, it would be unfair to expect the United States to spend more money in foreign affairs than domestic energy. Yet, it would only take one subsidy to a country such as Ethiopia, who currently has the fastest growing economy in the world (Yong Kim, 2016), for the rest of the world powers to see the opportunity at hand. If the established powers of the world were to band together and subsidize renewable energy practices throughout the developing countries of the world, a uniformed commitment to global warming mitigation would become a reality.

One thing has become fairly apparent throughout the process of researching this topic: it is very likely that it will take much more than a 10% energy transition to renewable resources to meet the 2-degree Celsius goal of the Paris Agreement. Part of the problem lies in the fact that the current Greenhouse Gas Levels are steadily rising across the world (Edenhofer, 2012). One of the main contributors to Greenhouse Gas is carbon dioxide, a gas that is released when fossil
fuels are burnt. The Fossil Fuels producing this CO2 are the largest single contributor to Greenhouse Gas emissions globally (Edenhofer, 2012). According to a report by the International Energy Agency, efforts to reduce energy related CO2 emissions in a best-case scenario would be achieved by 2040 at the earliest (Birol, 2015). In that specific scenario, the following would have to occur: “In the 450 Scenario, many separate efforts help to reduce energy-related CO2 emissions by 113 gigatonnes (Gt) more than in the Bridge Scenario over the period 2015 to 2040 (Figure 4.1). Half of the additional emissions reductions come from de-carbonization efforts in power supply, followed by efforts in the industry sector (26% of total reductions), transport (16%) and buildings (6%). (Birol, 2015)” Unfortunately, these very CO2 emissions that seem extremely hard to reduce over the next 25 years are directly related to the warming of earth. As the scenario shows, half of the solution relies solely on the de-carbonization efforts in the energy sector, which we’ve established is still very pro fossil fuels globally. There is no clear-cut answer on what percentage of fossil fuels will have to be converted to renewable resources, but it seems as though it will have to be significantly more than 10%.

**Discussion**

The goals of the Paris Agreement, specifically the 2-degree Celsius requirement, are a huge step in the right direction for global environmental policy. However, if the timeline for the 2-degree requirement showed us anything, we must realize that these goals will take much more time to achieve than it may seem. Yet, I’m inclined to believe that the politicians/scientists who drafted the Paris Agreement recognized that there is no option to fail in this situation. If changes are not made regarding the use of fossil fuels, global warming will eventually reach a point at
which human life can no longer be sustained on Earth. There is a silver lining, though, in the fact that 195 countries recognize the urgency needed to address this topic. That being said, the Paris Agreement cannot be treated as a participation trophy. The world needs to see concrete, measurable results within the next 5-10 years proving a commitment to renewable energy. Otherwise, the Paris Agreement is relegated to a bundle of empty promises that creates mistrust and friction amongst the global population.

One of the major keys to successfully meeting the 2-degree Celsius requirement lies in the willingness of private energy companies, as well as car manufacturers, to be open to ideas of alternative/renewable resource use. Granted, these industries are very important to almost any economy across the globe, but that doesn’t reserve them the right to hold out on adapting to new circumstances. Like any private business, their goal is to turn as large of a profit as they can, which makes perfect sense. However, they must begin to realize that the current situation isn’t going to change any time soon, and they must put more effort into implementing alternatives to the status quo. It’s no secret that many of these companies, specifically in the United States, fight tooth and nail to sway government regulation in their favor. Rather than spending money on lobbyists and other influential expenditures, these companies must invest in the research and development of alternatives to fossil fuels; it could one day prove to be the vital turning point in achieving both the 2-degree requirement, as well as mitigating global warming as a whole.

**Recommendation**

If anything, the drafting and signing of the Paris Agreement will set a precedent for future generations to recognize global warming as a serious issue. Sadly, they’re going to be forced to deal with the repercussions from the actions of their ancestors. It’s entirely unfair for
someone to be born into a terrible situation and expect them to reverse it, but even less fair that
the situation was very preventable. Fortunately, the current generations have a chance to remedy
the problem before it’s too late. Both the United States and the world as a whole can mitigate
global warming, and more specifically achieve the 2-degree Celsius Requirement.

My advice to policy makers, specifically in the United States, would be to continue
subsidizing the Research & Development of renewable energy projects, as well as promoting a
nationwide percentage goal of fossil fuel reductions. One possible initiative could be similar to
the policy that Oregon has previously instituted, where citizens who limit their fuel consumption
below a certain point would be eligible for tax credits. In a perfect world, this initiative would
take place on a national scale, and could apply to federal taxes alongside state taxes. A policy
like this would be extremely important to meeting any sort of nationwide reduction goal.
Realistically, it is crucial to incentivize people to take part in these initiatives, or the programs
are sure to fail. Another possible program that is currently instituted, but could be much more
impactful if funded, would be to provide subsidies/tax credits to both citizens/businesses that
purchase or institute renewable energy practices. One of the problems with this type of program
is that it is extremely expensive for people to institute renewable practices on a small scale; we
need to make it cheaper for a person to buy solar panels for their home, as opposed to just paying
there normal electric bill. These programs are doable with the right kind of support, and would
go a very long way towards putting the United States at the forefront of sustainable energy
practices.

From more of a global point of view, a piece of advice for global policy makers is to set
examples and incentivize developing countries. Established countries should be at the forefront
of energy innovation and Greenhouse Gas Reduction. The United States and Western European
countries need to show the rest of the world that carbon reduction is possible, and that we can minimize the damage we’re doing in regards to global warming. One option is to set up a global renewable energy fund to subsidize developing countries that adopt renewable energy practices. Currently, there are some private funds similar to this, but none that are sponsored by a global coalition. It would be unprecedented if countries such as the United States, England, Germany, Russia, etc. were to fund a program that would invest in the expansion of renewable energy.

**Conclusion**

Before beginning the research for this topic, I had expected to find that the goals of the Paris Agreement could be met within 10-20 years. Frankly, I was flat out wrong, and the reality that worldwide carbon dioxide emissions are still on the rise points to a longer time frame in terms of meeting the goals. Commitment to initiatives that would see a reduction in the use of fossil fuels is crucial to following through on any of the goals laid out in the Paris Agreement. For example, we must seriously consider options such as renewable energy subsidies to developing countries, as well as domestic initiatives within each country that signed the agreement. Realistically, it seems as though it will take more than a 30% transition to renewable resources to meet the 2-degree Celsius goal, but a 10% transition from fossil fuels to renewable resources would be a giant leap in the right direction. This doesn’t mean that the goals are unattainable, though; it is important to keep in mind is that 195 countries across the world are invested in mitigating the problems that is global warming. The accountability system that the Paris Agreement has put in place should ensure that each country hold one another to their word, and do their best to work together and reverse the dangerous spiral that is global warming.
Unfortunately, they don’t really have much of a choice, because the other option is the eventual demise of the human race.


