

Climate Change and What Engineers Should Do About It

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Climate Change according to the United Nations website refers to the long-term shifts in temperatures and weather patterns on our planet. With this, it is not about the heating of Earth but rather the change that is constantly occurring within our atmosphere. The Earth is in a sense, like the mood and personality of the very people that live on it. The Earth is constantly changing its moods (climate). Sometimes it gets angry (hot), other times it gets sad (cold). However, the Earth stays in a state of tranquility overall in which it is not too cold or too hot. Climate Change is something that will happen until the end of time. It has its ups and it has its downs. According to MIT, greenhouse gases, pollutants that come from the tailpipe of cars as well as naturally, absorb light and radiation and prevent some of those two things from escaping the Earth's atmosphere. This causes the atmosphere to slowly heat up and raise the average temperature within it. Therefore we see a change in the climate AKA Climate Change. With this comes an interesting talking point because, according to Professor Jones, former director of the University of East Anglia's Climatic Research Unit, the world in the medieval times was significantly warmer than it is today. In fact, he said that there has not been a significant warming of the Earth in the past 15 years. With this, two questions become very clear: Why was it so hot during that time, and because there were little to no man-made emissions and pollutants to the environment during the medieval times, why are we so concerned with manmade pollutants today. With the first question, the answer, according to the University of Texas is that a change in ocean circulation patterns caused water vapor (a greenhouse gas) to move over Europe, causing a warming period. The answer to the second question is that man-made pollutants are the only type of pollutants we can in fact control. The natural emissions from plants and animals are still something that we cannot fix as of yet. According to data from the IPCC introduced in Gregory Davis's *Viewpoints on Climate Change*, the main contribution to the Global Warming potential is water vapor like that of the medieval times. Water vapor represents 95% of the source of greenhouse gases whereas organic matter (plants and animals), natural phenomena and ocean biologic activity represents 4.72% of all greenhouse gases. That leaves the 0.28% of greenhouse gas emissions coming from human use. This is a very small yet big number when looking at the size of the Earth. So again, we ask the question of why do we care about the 0.28%. Pretty simple, if it keeps getting bigger its going to be difficult to fix and will become dangerous for us to even go outside and breathe. However, the question we should be asking is how can we enhance our own technology to get rid of the other 99.72%. That is the question that my generation and the generations after will have to try to solve and it's a big one. Life or death is a big thing to put in the hands of engineers, but as long as we continue to follow the path that we have been taught through various universities and work together, a solution can be found to regulate the greenhouse emissions that are slowly contributing to climate change.

We, as engineers can help society to prepare for the future in which there is some form of global warming issues. When you talk to most engineers and ask them why did you decide this life path, there is

a common answer that are relayed from their mouths. They want to solve problems and create things that matter and contribute to society in a great way. For many, the chance to do such is presented to us. With engineers, they are perfectly capable of solving even the most difficult of problems. There will obviously have to be cooperation with chemists and other different fields to solve this problem. However, engineers are most definitely capable contributing heavily with this issue. The only issue with this problem is that it does take time to solve, something that we are starting to run of slowly. With that being said, the question of whether or not engineers could solve our slightly increasing global warming problem, is a not starter. The engineers are the best of the best, its just a matter of how long will it take and will we be too late to the solution.

Now we must focus on the social responsibility of engineers to solve the global warming problem. First, we must define our knowns, the first being social responsibility. Social responsibility is according to Investopedia, a theory that businesses must act to help society not just their pocketbooks. This definition can be applied to engineers as well. It is something that should be in fact hardwired into every human's brain in my opinion. Caring about others around you is what makes a person good or not, if someone cares only about money they are most likely not the person that is wanted to be called upon to save the world because they will refuse. Therefore, with my view that all people should care about people, I believe that there is very much a social responsibility of engineers to solve the global warming problem. Although, it cannot be solved by just engineers, there is definitely a use for the engineers in solving this problem therefore there is an obligation to help. There is a moral obligation and social responsibility for engineers to help with solving the problem that is global warming.

With it determined that climate change is occurring due to a multitude of different variables and that engineers have a social responsibility to help and solve the issue, the big money question is HOW? There is not an extremely good answer to this question as of yet because we lack to all the technology to solve it at the moment. However, there is some current technology that can be used in sequence with the technology we don't possess to possibly help with this situation. The first thing with solving this problem is what type of greenhouse contributors are we trying to reduce. I believe that we should focus on getting some water vapor out of the air, not so much that is as dry as Death Valley but enough to where we see a reduction of greenhouse gases in the air by at least 30%. This, I believe, will cause a stop to our global warming a cause a flat line in temperatures. One technology that can be renovated to adhere to these desires is electrolysis. Electrolysis according to the Department of Energy is the process of using electricity to split water in hydrogen and oxygen. With this process, two different molecules are being created that are in fact not greenhouse gases. This will, because of the conversion, cause less water vapor in the atmosphere and in term cause a decrease in the temperature of the Earth. The problems currently with this method of

reducing greenhouse gases and cause a decrease in global warming is the energy required to power a big enough device to split the water molecules. With how many molecules there compared to how big the atmosphere is, it is almost impossible to produce enough electricity or build a big enough electrolyzer to be efficient to make a difference. Along with this we would need big anodes and cathodes with near impossible size electrolyzers to make this contraption work. In order to make this process useful in the long run, a method to create an Anode and Cathode made of gas and a electrolyzer that is big enough which as mentioned above is near impossible. Electrolysis could work to reduce water vapor and in time reduced the temperature of the Earth if enough innovation is done to meet an near ideal efficiency to energy ratio. This is the only current process used today to split water molecules and appears to be the best way to do so. To effectively reduce the water vapor in the world and reduce the overall temperature of the Earth we need to either reinvent the wheel when it comes to electrolysis or develop a whole new method that, like electrolysis, does not produce any greenhouse gases. Either way its going to take time and money.

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