

# **Global Warming's Effects: An Engineer's Responsibility**

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Climate change and global warming are two of the biggest issues plaguing modern society, and they impact every aspect of people's lives. The effects of global warming have been able to be seen more and more as the years have progressed due to an increase in use of fossil fuels for everything from power generation with a coal-fired power plant to warming a house using natural gas. The Earth is getting warmer every year, which impacts natural weather cycles, causes more natural disasters, and endangers wildlife. Engineers have a responsibility to society, to help make the world a better place and to serve the people of the world. As such, it is an engineers responsibility to do whatever possible in the fight against climate change and global warming.

Climate change is defined as "long-term shifts in temperatures and weather patterns" (UN.org). Climate change does happen naturally, with small changes on occasion due to a variety of factors, such as the Earth's position relative to the Sun. However, since the industrial revolution began, these cycles have sped up and have been creating more negative impacts than when the climate change was occurring naturally. Greenhouse gases are destroying the ozone layer, which allows more solar radiation to enter the atmosphere and is actively heating up the planet. Global warming is the heating of the planet caused by these greenhouse gases. The effects of global warming and climate change are numerous and present a significant threat to the global population.

There are a number of ways the world can change in a manner that will decrease the amount of greenhouse gases. Energy production currently has a large impact on the amount of greenhouse gases released into the atmosphere. Most of the world relies on either coal-fired power plants or natural gas-fired power plants. Both of these use a significant amount of fossil fuels, which release harmful byproducts into the air. There needs to be a push for green energy production, specifically in ways that also do not create a large amount of greenhouse gases in any step of their production, use, or disposal.

Nuclear power is the highest producing and most widely used "clean" method of energy production. While there are many benefits to nuclear power, there are also many issues, including the fact that they are very expensive to run and maintain, which makes it less likely to be implemented, and the byproduct of nuclear waste. Solar energy is another decent alternative, however, they have to be placed in very specific areas and it is very hard to store this energy for any period of time. Hydroelectric dams are very good at producing energy, but they have to be located along critical points within rivers, meaning they are not able to be used everywhere. The final widely used clean energy solution is wind energy. Wind energy is a very

clean type of energy, unless you look at the production and disposal of the wind turbines. The production of these turbines releases a number of greenhouse gases into the atmosphere. They tend to have a lifespan of nearly thirty years, which means after these thirty years, they have to be disposed of. Currently, the only “easy” method of disposal is putting the blades into the landfill. The blades are often made of a composite fiberglass material, which means that they are extremely difficult to recycle but fairly easy to place in a landfill. These blades do not decompose, meaning they are in a landfill forever, which leads to the production of methane gas. Methane gas is a common byproduct of landfills, and it is one of the most harmful greenhouse gases.

As none of the current methods of clean energy production actually have a realistic long-term implementation, there needs to be a better solution engineered. One of the most promising solutions is hydrogen fuel cells. Hydrogen fuel cells only produce “electricity, water, and heat” (energy.gov). These fuel cells produce enough energy to power anything from a laptop to a power station, which provides a promising outlook (energy.gov). With the only byproducts being water and heat, no greenhouse gases are produced and therefore, there is no contribution to global warming or climate change. Fuel cells, but specifically hydrogen fuel cells, are the most promising energy production method to help slow down global warming and climate change.

Another contributing factor to global warming and climate change is automobiles. Currently, most automobiles run on petroleum gasoline, which is a fossil fuel. As the automobiles combust this gasoline, they exhaust harmful gases into the air, which contribute to the reduction of the ozone layer. The clean alternative to traditional internal combustion vehicles is electric vehicles. Electric vehicles run on batteries, which need to be charged in order to continue running. This produces the main issue against electric vehicles: they are using the power grid to continue running, and the power grid utilizes fossil fuels to produce energy. While they do tend to be cleaner due to using less fuel to charge than an internal combustion vehicle uses to run, it is still something that needs to be addressed. However, if there is a way that hydrogen fuel cells can be implemented in a way that it is able to become the main source of energy, this would no longer be an issue.

Due to this need for cleaner energy production and cleaner ways of transportation, it is vital that engineers play their part and recognize their responsibility to society. The Order of the Engineer, a professional society that recognizes the responsibility of an engineer, has an oath that members take as they are inducted to the society. This oath states “my skill and knowledge shall be given without reservation for the public good” (order-of-the-engineer.org). This oath

acknowledges that all engineers have the responsibility to work for the good of the public. Additionally, the oath states that engineers should always use the Earth's resources in a responsible manner. The National Society of Professional Engineers also has a pledge, which states that members will place "public welfare above all other considerations" (nspe.org). The sense of responsibility for the greater good is instilled into engineers many times throughout their career.

Climate change and global warming is going to continue to get worse if there are not enough engineers who understand their responsibility for helping public welfare. As outdated technologies continue to run without check, more greenhouse gases will be released into the atmosphere and cause damage to Earth and its precious resources. The oceans will rise and begin to swallow up land, meaning people will have to move and habitats will be destroyed. Engineers helped to introduce these harmful technologies to the world, which means it is even more important to help produce new technologies that will either stop or reverse the effects of global warming on the population of the Earth.

The need for socially responsible engineers is beginning to become dire, as we approach critical points of global warming and climate change. The Earth will never be the same again, but engineers have the ability to make a real difference in the world and try to reverse the effects of years and years of damage. Many everyday activities contribute to global warming and climate change, but new methods for fixing this are regularly being introduced by those engineers who have realized their responsibility towards to public welfare. Hydrogen fuel cells and electric vehicles are just two of the ways that engineers have contributed to the betterment of the world in recent years. As there are more engineers who are soon to graduate or have recently graduated and are seeing the effects of global warming on not only the world, but also their hometowns and places close to their hearts, there are more engineers that will be working on solutions to improve the world and contribute less to global warming and climate change.

The effects of global warming and climate change are becoming more extreme with every passing day, and if engineers are not willing to step up to help stop it, then the world will likely reach a critical point when there is absolutely no return. There are solutions that have been proposed and even implemented on small scales, but these solutions need to be mass distributed to actively fight against global warming and climate change. Without socially responsible engineers, the world will cease to be livable, and humans and animals alike will die and Earth will have no salvation.

## References

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Footnote: Current co-op employer is at a power plant, so there is lots of previous knowledge within this essay