Mitigating the devastating effects of climate change is a daunting task. Humanity has an ever-increasing hunger for energy with no signs of slowing down. Pollution is a growing threat to the well-being of life as we know it, and for many, the future looks bleak. But it is not all bad news. Resource efficiency is growing at an exponential rate, and the United Nations has set the extermination of absolute poverty defined at $1.25 per day by 2030 as its first of seventeen sustainable development goals. (United Nations, 2020, p. 8). While climate change is certainly a difficult problem to grapple with, much of the consensus seems to be that there is a solution however radical or unrealistic it may seem. The most widespread solutions rely on human ingenuity to develop innovative technologies in an incremental process towards a sustainable future. The best chance for success comes from first restoring environmental damage, followed by widespread sustainable solutions to resource acquisition and manufacturing. In doing so, humanity will be able to establish a conservation-minded, environmentally stable presence on Earth for a relatively indefinite time period.

The first step towards a clean future is striving to wind back the clock and reverse the damage that has already been done through technological means. One potentially effective solution is called “Solar Geoengineering.” What does that mean exactly? Breaking it down, it is engineering the earth on a global scale with regards to the sun and the energy that it provides. In his essay, “Geoengineering is a bonkers plan, but it may be needed to tackle global warming”, Gernot Wagner claims that solar Geoengineering through atmospheric sulfur dioxide injection is a fast, yet risky way to mitigate global warming.

Unfortunately, however, solar geoengineering has more than its fair share of drawbacks and risks: sulfur dioxide poisoning and the potential to render solar panels effectively useless to name a few. Still, desperate problems require desperate solutions, and it may be the only tenable way to get back the time we need to develop and implement large-scale sustainable solutions. The future of the climate, especially when it comes to quick damage relief, is shaping up to be heavily technologically driven. According to Wagner, solar geoengineering may be one of several geoengineering feats that may be necessarily implemented. He discusses the relatively short amount of time that sulfur dioxide lasts in the atmosphere when compared to carbon dioxide. To mitigate this issue, technologies such as air scrubbers, which physically remove carbon from the air, may be necessary. Independent of any particular method, the proximate future will be marked with technological advances in cleaning up the mess that has already been made.

While making environmental reparations are an important first step to tackling climate change, they are not realistic in the long term. There is, in fact, a significant difference between reversing damage and being sustainable. Undoing damages will require large-scale efforts and changes, while sustainability has to do with a lack of changes. The authors of *An Ecomodernist Manifesto* discuss just that – what it means to achieve a lack of environmental changes. They begin with the idea that despite humanity’s ever-increasing demand for energy, we may be able to achieve a net zero environmental impact within our lifetimes. They demand that in the long-term, a decoupling between human innovation and environmental changes must come to an end. Since the publishing of the manifesto, efficiency has increased to the point where the separation between resource consumption and environmental impact has already begun to take place. Sustainable development is on the horizon and progress is being made by the day. Renewable energy is continuously becoming both more accessible and more effective, and zero tailpipe emission vehicles have a larger market share than ever before.

Unfortunately, the ecomodernist ideology is far from a perfect solution. Take its stance on urbanization for instance. While it is certainly the case that it is highly efficient when it comes to the per capita land usage, it completely ignores glaring issues with large cities. In a political sense, corruption is rampant, access to quality schooling is hit-or-miss at best, and resolving individual conflicts with local governments is almost impossible in some cases. These political issues can almost certainly be resolved, but the urban lifestyle is certainly not for everyone. Between cramped living quarters, swarms of traffic, and a cultural lack of individual responsibility, urban life is in many ways unacceptable. While suburban life certainly lacks on the decoupling front, it thrives when it comes to comfort and individual wellbeing. Regardless, people will live where they choose. It is important to focus on variables that are controllable. Hence, why technological progress and sustainable engineering is so crucial to the solution.

Others, however, are less optimistic about our capacity as humans to thoughtfully plan and sustainably engineer our future. For example, Giorgos Kallis claims in his “The Degrowth Alternative,” that capitalistic growth-based economies are inevitably detrimental to the environment. He states, “ecology, with its focus on connecting humans with one another and with the non-human world, is inherently at odds with growth” (Kallis, 2015, p. 1). Instead of engineering progress, Kallis instead makes a call to action in the realm of social progress. Yet, it seems that degrowth might be its own worst enemy in a sense. There are two major facets to degrowth: universal equity and the elimination of investment-based capitalist systems. Without going deep into a criticism of collectivist movements, it is safe to say since equity is based on the equal sharing of resources and since the degrowth narrative is anti-resource, the two positions are likely at odds with one another. As Winston Churchill stated, under a system such as this the only form of equal sharing would be, “The equal sharing of misery” (Churchill, 1945, House of Commons).

However, even getting to equity assumes that capitalism can be done away with in the first place. Kallis makes the argument that, “A degrowth transition would likely follow a pattern similar to those of past systemic economic shifts” (Kallis 4). He points to our transition from feudalism to the free market as an example. However, he ignores the fact that degrowth is quite hypocritical in this sense. If growth is defined as investing resources in the hopes of getting something more valuable as a result, then degrowth *is* just a convoluted form of growth. For example, resources must be spent campaigning for degrowth, they must be spent developing new forms of governance, and they must be spent building infrastructure to equally distribute resources. For this reason, a degrowth response can be excused from any part of the solution.

Restoration and innovation are the best ways forward. In a sense, they have been the only ways forward the whole time. Not just since industrialization, but as humans, as living beings even. As part of the chain of evolution, we are tasked with growth and adaptation. We are challenged by nature to be the best, most responsible, most productive people we can be. We are part of the great superorganism we call planet Earth, and it is our duty to enrich and protect it. Human ingenuity has brought us a long way, and it will continue to carry us above and beyond our wildest imagination.

# References

Asafu-Adjaye, J., Foreman, C., Pritzker, R., Blomqvist, L., Keith, D., Roy, J., . . . Teague, P. (2015). *An Ecomodernist Manifesto.*

Churchill, W. (1945, October 22). House of Commons. United Kingdom.

Kallis, G. (2015). The Degrowth Alternative. 1,4.

(2020). *The Sustainable Development Goals Report 2020.* United Nations.