

Thesis Project Portfolio

Microalgal Production of Biodiesel and Lutein

(Technical Report)

**The Evolution of Renewable Energy Viewpoints,
What It Means for Algae Biofuels, And How It Affects the Energy Gap**

(STS Research Paper)

An Undergraduate Thesis

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As the push for renewable energy particularly in the United States becomes more prevalent, there is a clear lack of resources and infrastructure to complete a full transition to renewables now or even in the near future. As technology shifts from fossil fuels, it becomes necessary to look towards alternative fuels that can appropriately fill the gaps left behind.

To help solve this problem, biofuels could be implemented to support old technology systems that require liquid fuel. However, these biofuels come with new issues like an increased cost or a reputation associated with fossil fuels. Algae biofuels can be used to minimize the cost associated but this still leaves reputation. How consumers receive these algae biofuels and how they are implemented as part of a multifaceted solution will be crucial for the energy transition's feasibility on the community and individual level.

A successful transition hinges on people's willingness to pay for cleaner energy sources. This is further influenced by government regulations, companies, and political agendas. There are many who stand to gain money and power like renewable energy companies and political groups, while there are others like skilled fossil fuel workers and those in the oil industry who have the potential to lose their jobs. Anything less than a united approach has the potential to further divide U.S. liberals and conservatives where a lot of power is focused in an already volatile situation.

To establish current viewpoints and simulate a contemporary transition to algae biofuels, the theory of technological momentum, where technological systems exhibit growth patterns that merge with social and environmental systems, can be applied. To implement this, I researched the biases of renewable energy supporters and opposers and the biofuel ventures of large oil companies. Finally, to propose a solution to the energy gap, I researched effective new uses of older technology in different communities with similar outcomes. I found that the vast majority of liberals and a growing number of conservatives support renewable energy due to economic and environmental benefits while the opposition likes fossil fuel's security. A transition to algae biofuels in the near future would be rejected by these groups due to economic and reliability issues. To solve the gap, smaller scale solutions focusing on constituents need to be implemented.

This capstone project that aims to propose a method to create cost effective algae biofuels and STS research that culminates in a proposal for how to ease the energy gap could serve as a starting point for further research that leans away from combustible fuels. The implication being that algae biofuels and biofuels in general are not feasible due to capital costs and focus should be on improving current renewable infrastructure.