

**Thesis Project Portfolio**

**Production of Cellulosic Ethanol from Mixed Paper**

(Technical Report)

**An Analysis of United States Ethanol Production & Policy**

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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## **Sociotechnical Synthesis**

This thesis project studies the production of ethanol in the United States through a technical project, which investigates the potential for production of ethanol using a non-competitive renewable resource as the primary feedstock, and a research project, which studies the current landscape of the ethanol industry in the U.S.. For the technical portion, a team of students designed a chemical processing plant utilizing recycled mixed papers to produce fuel-grade ethanol, with the goal of creating a process that is economically viable when compared to current production methods. This project ultimately found that while the plant design was technically feasible, it was not economically feasible as the cost of the plant and the materials was too high to generate profit with this design. For the research portion of the thesis, I researched and analyzed the use of cellulosic ethanol in the United States in the present and attempted to determine what factors are currently limiting its use as a renewable and sustainable energy and fuel source. These two projects are closely related as they research factors that are currently impeding widespread adoption of cellulose-based production methods. These methods currently have reduced economic viability and incentive over current methods used in the United States that are already heavily invested into and are more profitable, especially when compared to methods that use corn as the primary feedstock. However, cellulosic ethanol has many benefits over corn-based production with regards to sustainability and land use that encourage further research towards an economically competitive process for future development.