Thesis Project Portfolio

Harvesting Wind Energy via the Triboelectric Effect

(Technical Report)

To Breach or Not To Breach: Ethical Implications of the Lower Snake River Dams From the Perspective of Care Ethics

(STS Research Paper)

An Undergraduate Thesis

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

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Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

My STS analysis and technical project are related through the common theme of the low environmental interference of clean energy infrastructure. This is an important consideration in terms of climate change due to the need for clean energy and environmental protection. In my technical project, my team engineered with consideration towards care ethics in terms of the environment with the purpose of achieving the goal of creating low environmental interference clean energy technologies. In order to gain insight on how care ethics can be misinterpreted, my STS research examines a hydroelectric dam which has a heavy impact on local ecology, and how the engineers who maintain it attempted to care for the environment, but have ultimately failed.

My technical project focused on creating an energy harvesting system for low wind speeds, specifically in densely populated areas. In these areas, turbulence is prevalent, which is what this project is harnessing to create energy from low wind speeds. This project was inspired by leaves flapping in turbulent and low wind speeds and triboelectric materials, which create an electrical charge when contact-separation is induced.

My STS research focused on the Lower Snake River Dams in Washington state. These dams are hydroelectric and provide a large amount of power to the surrounding region. However, they also have changed the local environment to a large degree, with the largest impact being a major decrease in salmon population, endangering several species. I analysed this conflict using the framework of care ethics applied to the environment, which necessitates attentiveness, responsibility, competence, and responsiveness.

While working on both of these projects simultaneously, I learned a lot about renewable energy production and the environmental impact of clean energy infrastructure. My STS research has given me a greater understanding of the environmental impacts and has opened my eyes to

the necessary adaptations clean energy technologies still need to achieve in order to be environmentally friendly. The aim of my technical project was to apply renewable energy technologies to densely populated areas so that environmentally healthy areas are not interfered with. My STS research has provided me with insight towards the downsides of clean energy infrastructure and I've been introduced to several concerns of which need to be considered when engineering renewable energy infrastructure.