Hydrokinetic Power in the Mississippi Riverbed

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The Mississippi River is a huge untapped kinetic energy source that flows at a rate of 1.6 million gallons of water per second. Meanwhile, burning fossil fuels produces 35 billion gigatons of carbon dioxide per year contributing to climate change and natural disasters. My research question, "Is hydrokinetic power a functional and feasible alternative to fossil fuels in New Orleans and the Gulf South region?", addresses this problem with a primary engineering goal of minimizing the impact on the benthic ecosystem. More specifically, my engineering goals were to (1) 3D model 2D National Oceanic and Atmospheric Administration (NOAA) charts of the Mississippi Riverbed and (2) model a hydrokinetic turbine. In order to complete these goals, I traced and divided a NOAA chart of the Mississippi Riverbed into 20ft intervals. I uploaded the annotated map into 3D modeling software where I traced and extruded the layers. Then I laser cut 50 individual pieces of wood that I glued together to create the physical Mississippi Riverbed model. For the turbine, I researched fish-friendly turbines then 3D modeled and animated one from an open-source image. Finally, I combined the riverbed model and turbine model both physically and in the 3D modeling software. The design of the final model provided for testing of water flow. I achieved my engineering goals by creating both 3D and physical models which successfully combined to support the development of sustainable hydrokinetic energy as a feasible way to combat global emissions and their detrimental environmental impacts.

Awards Won: