The project focused on implementing an Underwater Sea Turbine system to replace diesel as the primary source of electricity production in Savoonga, Alaska. Team 10 comprised members from diverse academic backgrounds, each bringing unique strengths in math, science, and engineering that combinedly propelled the project forward through interdisciplinary collaboration.

Alex Laird, an Environmental Engineering student, applied his proficiency in environmental systems and engineering principles to tackle critical aspects of turbine implementation. He addressed challenges such as optimal turbine placement, turbine models used in various countries (Nova Scotia, Canada and La Rance, France) , blade material selection, current flow analysis, and temperature adaptability specific to Savoonga. His work required a strong understanding of fluid dynamics, materials science, and environmental situations to ensure turbine efficiency and durability.

Terra Eubanks, currently studying Architectural Engineering, contributed her skills in spatial reasoning and CAD software to produce construction documents, architectural layouts, and turbine design plans (including 3-D design of the turbine prototype) . Her focus on aerodynamics, structural feasibility, and long-term maintenance helped ensure that the turbine design was both effective and sustainable, with minimized operational costs.

Shifan Abrar, a Computer Science student, utilized his analytical and problem-solving skills to handle data-driven components of the project. He organized and visualized test data, developed comparison graphs between turbine models, and applied algorithms for cost analysis and efficiency tracking. His work involved knowledge of data science, algorithm design, and statistical analysis, which were essential for interpreting results and guiding design decisions (including Python program to compare turbines, replace diesel, and calculate EROI.

While each member took on specialized roles, many tasks required close collaboration and integration of our knowledge across disciplines. As a team, we collectively worked on identifying the target population's energy needs, selecting the most suitable turbine type, estimating project costs, and designing test protocols. Our combined understanding of math, science, and engineering helped us to address complex challenges and develop a practical and innovative solution tailored to Savoonga’s unique environment. By leveraging each member’s expertise and fostering a collaborative approach, we successfully completed the tasks necessary to bring this project to life.

Every Design Process has the following steps: Empathize, Define, Ideate, Prototype, Test. Empathize means to know about your population and their needs. Our team had a few meetings for this step alone. Our goal was to design a product for a population in need. We discussed the issue of rising electricity bills for towns in the northern part of Alaksa which are off the diesel grid. Among them, the population of Savoonga was the most in need. We had to brainstorm the criterias we will use to define ‘need’. Being situated right between Russia and Alaska, being off the diesel grid, having harsh winters and low income, the Savoonga population needed a better energy source. We have done meetings to define the current problems and needs. Some other needs we have found were: 1. Low-income sources in Savoonga and 2. Global Warming effects. We have chosen the Energy generation problem because the electricity prices were about half of the monthly income of the Alaska population. This was because diesel fuel has to be flown out or shipped to this remote island, which was very expensive. Due to this reason, the younger population were migrating to less remote areas. As the main source of income was fishing, it was not sustainable for the elderly people. Our Solution was to design and implement an Underwater Sea Turbine which can generate a large amount of energy at a reasonably lower cost. While the initial investment budget was to be high, this will save a lot of money throughout the years. It will also be an eco-friendly and renewable solution. We then went on to the prototyping process, which required having different 3-D models, doing power generation test, materials test, cost efficiency tests etc. Through prototyping, we have decided that thermoplastic blades were a better fit as it had an higher EROI. We have designed it so that the turbine can be moved down using pillars and moved up for maintenance. We also chose Tidal Turbines over Tidal Barrage based on the location and types of tide. By thoroughly testing numerous design models, we have found the most effective prototype for this project.