**ENED Presentation: Underwater Sea Turbine for replacing Diesel fuel in Savoonga**

To deliver a good product it has to be tested continuously. While testing is important, we also need to consider the type of testing. For our tidal turbine we have decided three types of tests which are i. Testing for cost effectiveness ii. Testing for replacing % amount of diesel fuel iii. Testing EROI. While we have not conducted testing on the product yet, I have made a python program that will help me compare our metrics in these areas with other well-known tidal turbines.

The program has 3 options for three types of tests. The first one takes in an excel file that has our test values. It runs it through an algorithm that calculates the total amount of power generated in Kilowatt Hour and the estimated amount of cost that it would take. As of right now I am using made up values in the excel file as we do not have test values. Then it directly compares it to turbines like Seagen turbine and Meygen Turbine and also diesel fuel and visualizes it in a Bar graph. We are aiming to get the highest amount of power possible like the Seagen turbine.

For the second part we are deciding on the % amount of diesel fuel that we want to replace. This is because our current plan is not to completely wipe out diesel fuel. We want to introduce a new stable source of energy to lower the electricity bill. Therefore, we want to reduce the dependency on diesel fuel. How much we want to do that will depend on the amount of funding that we have. To do this first we need to know the amount of Power already generated by diesel fuel in Savoonga. Then we have to figure out how much percentage of that we would like to replace. Then we will know the amount of Power we need to generate through our tidal turbine to make that possible. Then we can calculate the funding we will need to make that possible from the first graph. After that we can subtract from the original cost and figure out how much we saved in total. While this number can mean a lot of things we also have to consider that tidal turbines are more environmentally friendly and will also be less risky.

Thirdly we are calculating the EROI. This is basically the return on investment but for Energy. We need to be mindful about how much energy it is needed to produce the components of the turbine and how much energy it gives us it return. This program compares the EROI for the blades of the turbine. We had to make a decision on using either thermoplastic blades or thermoset blades for our turbines. We did this by finding out which turbine material has better EROI. How we calculate this was by finding out how much energy it is required to make a turbine with a specific type of blade. Then we found out how long the materials last and how much energy it can provide in its lifetime.