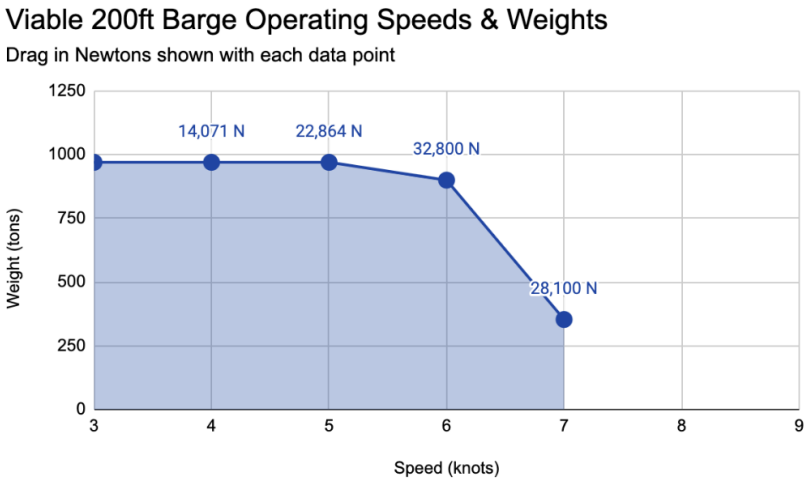
Voltic Shipping
Project: Solar Powered Cargo Shipping

TECHNICAL ASSISTANCE REQUEST

Overview
Voltic is unique in that we will be using existing solar technology but using it in an entirely new environment which we hope will increase solar technology use in the transportation industry. However, we recognize that using technology in a new environment comes with a lot of novel considerations. We will be working to build a first of its kind apparatus to support a large solar array in a maritime environment. Also, we will be implementing what is effectively an off-grid solar mobile solar system. With the assistance of the American Made network, we can ensure that we have addressed as many foreseen and unforeseen challenges our technology will face in its operating environment.

So far we have completed a detailed CAD for our proposed design. We have also completed a tentative selection of materials and suppliers. Specifically, the apparatus will be made out of a combination of galvanized steel and aluminum. Using these details to calculate key information such as the weight of the apparatus and effect on the center of gravity/buoyancy of the vessel, we have completed baseline computational fluid dynamics simulations of our proposed design under stagnant sea conditions. These results have given us a good baseline estimate for the drag our vessel will face as it moves through the water. A graph of a few of our results are included in the graph below.



Assistance Requests
There are a number of current problems or open questions we have about our design and simulation work that we believe National Labs or other members of the American Made Network would be very helpful in addressing. We are seeking assistance to both verify results that we

have found through our own work, as well as help us to address some concerns we have not examined as thoroughly. Specifically, assistance in the following areas would help us push our technology closer toward being ready to turn into a commercially viable prototype:

- Advance our understanding of operating conditions. As mentioned, we have a good idea of our vessels' tolerances and behavior in calm waters, but would like to expand the breadth of our simulations. Our beachhead market will consist of Mississippi River routes between Baton Rouge and Memphis.
- Measure the impact of river water and other conditions on panel efficiency. It is likely that the panel may become obstructed with water, sediment, bird droppings, or other unforeseen natural elements. While we intend to regularly clean the panel array, understanding how the efficiency of the panels is affected so we can understand any potential impact on our operating speed.
- Effect of a marine environment on sensitive areas of our design. Specifically, the gear and joints within our apparatus need to remain in good condition for the mechanics of the apparatus to work as intended. We have selected materials that should resist corrosion, however we still want to have an understanding of how many of the above mentioned natural interruptions may affect these sensitive moving pieces or if water getting stuck in a tight joint leads to quicker corrosion for example.
- In talking to our LOI partners and potential customers one consistent concern they share is the perceived stability of the vessel when the panel array is expanded. We believe a physical demonstration of a stable scale model would go a long way in solving this concern from the customer’s eyes. It would be great to be connected with a group who has access to a wave pool capable of simulating a variety of operating conditions in which we can test a scale vessel with the same mass distribution as our proposed design.

In addition to the specific area mentioned above, we would appreciate getting in touch with any experts in naval architecture, anyone with experience implementing an electric powertrain in a marine environment. As many warm introductions as we can get to individuals in this industry will help us expand the expertise and knowledge that has gone into our work.