Ready! Contest Technical Narrative

TEAM: Rural Energy Partners

Project Title: Solar mixing to improve aquaculture

We are developing floating solar mixers to improve the U.S. aquaculture industry. Fish need oxygen to survive, and on American fish farms, mechanical aerators are used to make sure they have enough to thrive. These aerators use large amounts of electricity, and there are biological and economic reasons why this aeration is typically only done at night.

We are a team of engineers with experience helping farmers reduce their energy costs, and we have developed a method to reduce the amount of electricity used in aquaculture. Our idea is to take the excess oxygen produced by algae at the surface of the ponds during the day, and move it to the bottom of the pond where it can be stored until it is needed at night. This significantly reduces the power required to maintain necessary oxygen levels, and as an added bonus it prevents the dominance of some harmful algae types that can hurt the fish.

The power demanded by our daytime process is a perfect match for solar photovoltaic output, with both peaking at exactly the same time each day. However many of our partnering fish farms are located in areas with extremely low solar adoption rates due to unfavorable solar policies, where they are charged what is essentially a solar tax every year for each watt of grid-connected solar that they install.

We don’t have to wait for utility policies to change before increasing the adoption of solar in these underrepresented areas. We can use what we’ve learned from our grid-tied mixing equipment to manufacture off-grid, floating solar mixers. They will be cheaper to install than our current systems and can provide a greater reduction in the amount of nighttime aeration. By keeping them off-grid, we can avoid the solar taxes associated with grid-tied solar in these areas and increase solar adoption in one of the most underrepresented solar regions in the country.

In addition to the lack of solar adoption in the region, all of our partnering fish farms are located in opportunity zones, and our lead electrician is a minority headquartered in an opportunity zone.