WATTS on WATER
Innovative Solar Applications

Abstract:
Watts on Water is looking for assistance in developing cornerstone analyses and diagnostic systems that will precisely quantify the benefits of our floating and canopy solar systems compared to traditional solar systems, as well as optimize certain elements of our system design. We are seeking expertise and access to CFD simulation, sensory and diagnostics hardware design, and solar+battery micro grid design/setup. While our team is capable of achieving many of these milestones, assistance would great expedite our time to market while giving valuable outside perspective creating a more viable and valuable solution overall.
Furthermore, we hope to find additional assistance in financial analysis from a team with industry expertise, both in helping continue our funding acquisition and with setting up our sales platform for revenue generation.

Technical Assistance Requests:

Electromechanical Hardware:

1. Development of a diagnostics system with remote data reporting.
   In order to monitor and calculate efficiency and power on our prototype we would like to develop a DAQ system that will observe various sensor outputs, including; temperatures of panels, water, and air, solar irradiance, voltage, current, water velocity, cleaning system pressure, others. The system should integrate remote monitoring options, perhaps via cell tower or satellite.

2. Development of a control system with remote influence
   Various subsystems and commands would be ideally controlled from a remote location allowing for offsite testing and iteration of the prototype and eventually commercial systems.This would include operating an automated cleaning system or remote shutdown of any part of the system.

3. Development of a specific sensory method to measure evaporations rate and volume/time.
   A co-benefit of our technology is the reduction of evaporation from the water source covered. We want to report on those water savings from customers and municipalities through aggregate regional data. We would like assistance in designing a simple set of analog sensors that can integrate to our DAQ system and define necessary variables in an evaporation equation, to give accurate estimations without direct volumetric measurement. We would like a lab to help calibrate the equations and sensor set up through direct volumetric measurements under various conditions and produce a version we can scale to our commercial systems. To accurately report on this, we may need a small weather system local to each installation, this should be considered.

4. HALT testing of freshwater environments on panels.
   Most solar modules have built their specifications around ground mount applications and have not been tested for floating applications. We would like to test the lifetime change of certain brands of solar modules when held close to water and with high humidity. This may constitute as a version of HALT testing, based on efficiency/capacity curves. Any labs that may have tested this for panels under standard conditions we would like to work with and help expand testing/policy around floating applications in the US. This would help

determine operational limits and design limits of standard modules and perhaps direct further developments into improving panel lamination or packaging for these environments specifically.

5. Research and development of electric irrigation pump interface adaptor
   Some assistance in developing the simple interface with standard electric irrigation pumps would accelerate our product offering.

6. Solar+battery system setup/design assistance
   We require assistance in understanding a designing our full system integration, which would include identifying each subsystem(battery, panel, inverter, charge controller, etc.) and creating the functional flowchart, and wire diagram that would detail the full system operation. This would include documenting how the system changes as the system scales into larger sizes. This could be combined with assistance on vendor identification.

Simulation:

7. Development of CFD Simulation for water velocity on different float designs.
   Some farmers have faster moving water in their irrigation canals, current industry standard floats are limited to 1m/s flow velocity, we would like to simulate different design adjustments of float geometry that may allow for reduction in drag and therefore increased ceiling on water velocity specifications.

8. Development of CFD simulation on conductive and convective cooling designs of floating panels.
   Capitalizing on the panel efficiency gain from natural cooling of water could allow for large installation size on smaller bodies of water. Benchmarking standard convectively cooled floats, and convectively cooled canopies and then comparing results to various design adaptations could allow for better predictive efficiency models and potentially designs with significantly improved efficiency gains.

Business Development:

9. Build/develop a payment and client platform
   Help in taking our monitored power output data and developing our payment platform could help us bring a mature solution to our first customers. Our power data will be collected live and sent to our servers. Recommendation on how and when to charge customers would be welcome.

10. Assistance in the filing of various patents
    We have identified multiple areas of our technology that could be patented, our team members hold a multitude of patents but we have only filed as part of large organizations, we need assistance on the process as a small start up with limited capital.