Technical Assistance Request

Our challenge with taking our innovative idea and turning it into a commercialized product is mainly that it is expensive to prove concepts on our own. We lack needed software, materials, fabrication facility and resources to build and test a prototype and field test it. We need to put the unit through all the scenarios we describe—all weather and terrain to see if the OES can deliver the power needed the way we describe. Since we intend to be a power solution to disaster areas and underdeveloped areas, we must know that the OES can be reliable to those that need it the most.

We believe a member of the American-Made Network, a national lab or a private facility could assist us with our unique challenges and help us get closer to commercialization.

The technical questions we have in bringing this innovation to market are:

1) How to safely and effectively transport and encase the materials needed to generate the power:
    a. What materials could be used to reduce the weight of the unit without compromising its durability;
    b. How to isolate the PV modules as well as other delicate components to reduce the amount of shock and vibration they see during transportation;
2) How to keep the needed materials efficient in various weather conditions, environment and terrain:
    a. How will the modules and components be protected (insulated) against overheating or freezing, humidity or dust;
    b. How will the unit and its components be protected from impact (from shattering, for example) when deployed;
3) How to effectively deploy the materials and unit:
    a. How to machine and refabricate the frames of the modules to fit on the container to roll out/fold out when deployed;
    b. Can units be master/slave organized with one unit storing all the power from several satellite units collecting power?
4) How to make the unit easy to use allowing everyday people to effectively deploy the unit and have access to the stored energy of the unit.
    a. How the materials compromise (or not) how the energy is harnessed and eventually consumed.
    b. Is the unit easy to deploy and transport?

Polyurethane foam is a material that we have thought about in regards of how to encase components; one technique may be to mount components on vibration isolators, like rubbers bases that absorb some of the shock and vibration. There are some newer types of viscoelastic rubbers and vibration isolators that might be worth looking at as well.

As for the materials on the outer part of the unit: Aluminum weighs less than steel does, but aluminum costs more, requires more skill to weld and can be more problematic with long term fatigue. Carbon fiber could be great for the exterior panels and covers-- It’s very strong and lightweight. With our initial designs, we have examined the use of A500 Grade B carbon steel due to its durability, relative ease of use and availability but we are open to exploring different materials.

Machining and refabricating the frames of modules to fit the unique design of the OES requires testing. Since solar modules have a glass surface they can be delicate to work with. We need to explore how to affix the modules to the OES in a way that assures they roll/fold out when deployed as well as safely store inside the OES during transport.

The focus of our American Made project and a significant part of our development effort would be to study the behavior and reaction of these materials in certain environments while deploying solar modules and encased batteries with other sensitive components. This will enable us to understand how such materials will or will not interfere with the unit's components while the unit stores energy. We will study how these materials can impact the use of the power generated during deployment and while stationary. Finally, we will also examine the ease of use by the consumer, the ease of switching between various methods of transportation and measure any power output variations due from transportation, if any. If aspects of the design are not tested and explored, the OES cannot be reliable and transportable in any environment which hinders its ability to be commercially feasible and successful.

Our technical assistance milestones are:

1) Evaluate current design: determine how to safely protect the inner components, such as the modules, batteries, wiring and the stored equipment from movement, temperature, weather, vibration and impact to ensure deployment;
2) Build a prototype
3) Design and test the integration of automation of the unit;
4) Accomplish successful deployment of unit where modules and batteries operate to generate and store energy;
5) Field test the unit and expose it to various terrain and subject it to all modes of transportation; Test the ease of use: the ease of converting from stationary mode to trailer mode; Evaluate the reaction of the materials and the unit as a whole when airborne and parachuted to land; and Examine the ease of use: consuming the power; plugging in for use;
6) Explore the possibility of thermoelectric production from the heat produced by the unit and in turn use that towards the output of the system (a wish! But not dependent for design)
7) Examine ability of modularity of OES units for greater output; examine the module system expansion with "pup tents" or additional stand-alone modules.

We seek to prove the concept and initial design of the OES and produce a prototype ready for industry testing because we believe this unit has the potential to save and improve lives.

Thank you for the opportunity to help us get our product to market!