Provide a two-page description of the unique challenges and needs a national lab, private facility, and/or member of the American-Made Network could potentially help you resolve. The Prize Administrator will make this request broadly available so members of the American-Made Network can understand your needs and assist you through the voucher program or otherwise.

The Perovskite/Si Tandem for a Circular economy will need significant characterization and environmental testing. Controlled chambers plus outside exposure are needed. The national lab network would provide access to needed testing equipment such as “Damp-Heat” environmental chambers, solar simulator calibration for cell and module level data as well as interaction with area experts. The proper test setup for shading, hotspot generation, power gain, and environmental performance will need to structured by a fellow expert in the field to ensure that results are properly measured and communicated. The equipment available at the national laboratories is too expensive for occasional use at this stage in our company’s development but is also critical for market adoption. Additionally, the expertise required to operate and maintain such equipment is an expense that is happily avoided for a new company trying to innovate new solar technologies on a limited budget.

At present, the first Perovskite NICE module has been developed, built, and tested using university partners such as Georgia Institute of Technology and SBM Solar for module assembly. The use of university labs and private facilities is a significant expense item as well as a scheduling challenge. The need for higher volume testing and assembly will require additional solar industry partners to aid in accelerating the development of Integrated Solar PV technology. We would benefit from private industry partners with the ability to fabricate solar modules different bottom solar cell structures like Heterojunction Thin Film (HJT) or Passivated Emitter and Rear Contact cells (PERC). Later on, we will want to confirm we can scale production into the 10’s and 1000’s of solar modules. In addition, having strategic relationships/partnerships with private industry partners and/or national labs with the ability to help procure the needed raw materials such as silicon wafers, glass, deposition equipment, and automation would be helpful. In fact, the entire value chain of the solar industry is needed to fully evaluate the full benefits up to the end customer who uses Perovskite/Si Tandem solar modules for power generation. Installation data from field installations will provide useful real world data to confirm the laboratory findings on power, stability, and performance benefits. This real world data will help us understand how Perovskite NICE modules performs under various shading conditions over a period of weeks, months, and even years. So, to recap the needs for our technology are as follows:

<u>National Labs</u>

- Access to calibration standards for a unique set of solar cells and modules
- Access to measurement equipment such as solar simulators, reverse bias testing, and resistance probing.
- Access to characterization equipment such as electroluminescence, photoluminescence, electron lifetime photoconductance decay, and dark current-voltage
- Access to environmental chambers for damp heat testing at 85^{o}C and 85% humidity.

Private Industry

- Access to raw materials such as silicon solar cells, module glass, and deposition equipment.
- Access to consumables such metals for solar cells, copper ribbon interconnects, inert gas supplies.
- Access to production lines for solar cell production and solar module production.
- Access to installation partners for real world data on performance benefits for shading, hotspot generation, and power production.

Collaboration and partnerships of fellow American Made companies would be a valuable asset to help accelerate the development and adoption of artistic tandem Perovskite/Si NICE solar modules.