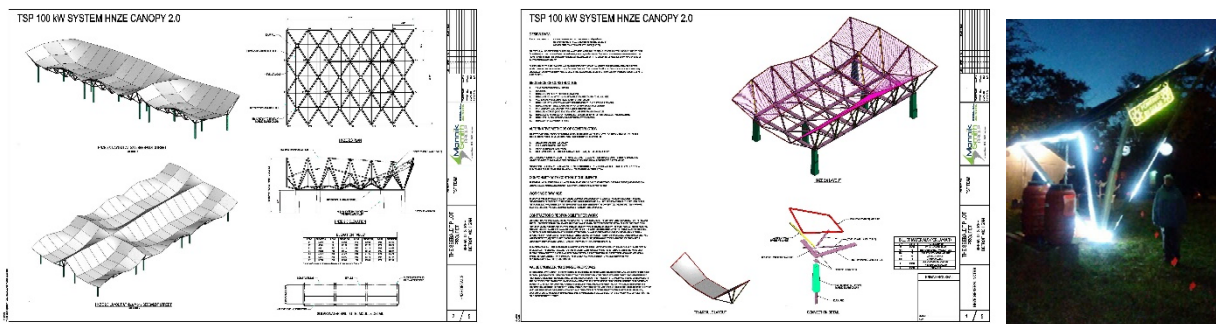


TECHNICAL ASSISTANCE REQUEST: HNZE CANOPY

Since 2016, our transdisciplinary team has focused on conceiving of, engineering, building, testing, securing IP, crafting a viable business venture, and installing a “proof of concept” for the Hybridized Net Zero Energy (HNZE) Canopy. Our technical process began with conceptual design in 2016 and continues to this day, including the successful “lighting” of the installed prototype (“powered by solar”) in October 2018.

Our team brings award-winning expertise and has put a lot of “blood sweat and tears” into the HNZE Canopy to date. Last Oct 31, 2018 we lit the installed prototype in Detroit (see video and below)! The prototype has been operational and producing 1 kW to onsite battery storage consistently for over a year (15 months). In early 2019, we were issued a US Design patent and copyright for the HNZE Canopy. Our Utility patent application is currently in publication/review. We have spent the majority of 2019 focused on creating a viable commercial venture for the HNZE Canopy, with the assistance of the local entrepreneurial ecosystem, which is encouraging tech ventures.



HNZE Canopy sealed Construction Documents, Mannik and Smith, Group, Inc., 2018. Proof of Concept, HNZE Prototype, October 2018. US Design Patent and Copyright issued to studio[Ci] 2019.

In 2020, we need access to the immense network of expertise and technical assistance which the American Made Solar Prize and NREL can bring. We have five (5) primary needs which a partnership with a national lab, private facility, and/or member of the American-Made Network which could take us to market:

1) Solar/Water Sail “Tri-Modules” – we wish to go through value engineering, produce new shop drawing, and gain prototype assistance to help us refine the “Tri-modules” which comprise the solar/water collection canopy surface (see figure, above). Our commercialization mentors have suggested the Tri-Modules might be a product unto themselves. We wish to investigate more robust architectural fabrics (Sheerfill, et.al.) for our substrates. Manufacturing partners might be a sail maker (as we engaged for the Prototype), or perhaps an awning maker, or any other partner who has experience with fabric welding, industrial sewing, and/or canopy assemblies.

2) Highest efficiency non-rigid PV – we have sourced PV thin film outside of the US, specifying and installing PV Thin Film in both our Prototype (Global Solar Power Flex SG4 185W) and in our Construction Documents for the 112 kW System (Miasole Flex

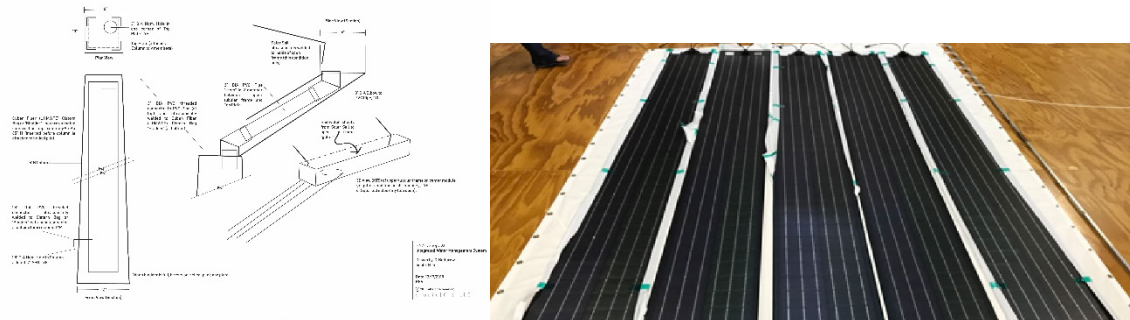
TESS-E SYSTEMS

03-130N). We are excited to collaborate with NREL and their researchers, and/or other research institutions who are innovating and can assist us in specifying the most flexible, powerful, lightweight solar product with the highest efficiency in order to source other opportunities.

3) Water storage bladder – we need assistance in prototyping and identifying a fabrication partner who works with ultra-high molecular weight polyethylene (UHMWPE) such as cuben fiber (or a material with similar properties) to refine our existing shop drawings and to prototype our proposed water storage bladders. For the prototype in 2018, we integrated a more conventional water management/collection system (storage cisterns augmented by overflows into onsite green infrastructure BMP - bioswales). We hope through the prize that we may connect with partners who will help us achieve our submitted patent approach of integral conveyance and storage (see figure below).

4) Continuing development of our business plan – we are based in Detroit, MI, USA and wish to build the HNZE Canopy right here. However, the substantial regional tech sector is focused more on mobility than on renewables. We understand other states are much further ahead of Michigan in incenting and implementing renewables, and, more to the point, in encouraging commercial ventures around renewables. We wish to leverage NREL's extensive network and expertise to advise us on establishing TESS-E Systems and launching scaled production of the HNZE Canopy. We are open to exploring alternative locations and production models, e.g., going into production ourselves, establishing manufacturing partners, and/or licensing.

5) Space – our team needs access to appropriate spaces to iterate, refine, and prototype. In the past, we have taken advantage of local university fabrication labs to which we had access. However, as we are evolving into a viable commercial venture, we need access to the resources which NREL may offer via the prize.



HNZE Canopy internal cistern (bladder) and "Solar Sail" Assembly; US Design Patent and Copyright issued to studio[Ci] 2019.

Director and Co-Inventor Constance Bodurow holds graduate degrees from MIT, brings extensive technical expertise, and years of experience in assembling and leading large, complex teams. She has been leading diverse technical team which designed and engineered the HNZE Canopy and installed the operating prototype. She has run a small business (design firm) since 2013, and looks forward to the opportunity to collaborate with NREL staff, partners, and the national network.