

American-Made Solar Prize 4

Project Name: Electrodynamic Self-Cleaning PV Modules: Establishment of Manufacturing Processes

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Project Mission: We seek to establish manufacturing processes for integrating Electrodynamic Screen (EDS) films onto front glass plates of PV modules to enable self-cleaning with water conservation. Our goal is to support TW-scale growth of solar industries without a major environmental impact on water consumption, which is currently required for cleaning PV modules and CSP mirrors. EDS films enable frequent, water-free dust removal on the optical surfaces of PV modules and CSP mirrors without causing surface abrasion.

Technical assistance needed:

1. Texturing the front surface of the Willow Glass film for antireflection coating
2. Flexographic printing of EDS electrodes on thin flexible glass film such as Willow Glass
1. Glass to glass/polymer lamination working with a heated windshield manufacturing company
2. Three-phase interconnection of the electrodes with the EDS power supply unit to be mounted at the back of each PV module (1m x 1.3 m) working with an electronic device manufacturing company
3. Vacuum lamination of electrode-printed side of the glass film with thin (2 – 3 mm) front glass plate of the PV module under pressure and heat with a module manufacturer in the US experienced in PV module production for special application of PV modules (such as defense industry)
4. Electronics packaging company for producing EDS power supply units in large volume
5. Assistance from NREL for the application of antireflection and hydrophobic coatings, transparent conducting electrodes environmental durability with damp/heat testing and UV radiation resistance,
6. Collaboration with (a) Eastman Kodak, (b) Corning Research and Development Corporation, (c) Sandia National Lab, (d) NREL (Dr. Timothy Silverman, Dr. Maikel van Hest, and Dr. David Miller), (e) Arizona State University and (f) University of Texas at Austin, Indian Institute of Technology and the University of Colorado.
7. Technology to Market (T2M) team of the DOE Solar Energy Technology Office