SkyTrough Vacuum Membrane
A Low Cost Solar Thermal Collector for Desalination

Project led by SkyFuel, Inc. with support from NREL and cooperative research funding from DOE (DE-EE0008393)

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Project Overview

- October 2017 - October 2019
- $2M total project cost, $1.6M federal contribution
- Develop an extremely low cost parabolic trough for desalination and industrial process heat
- Levelized cost of heat (LCOH) < $0.01/kW$_{ht}$
• Eliminate entire cost category and minimize others
  • Torque structure, reflectors, receivers, balance, assembly
• Reduce components and optimize for manufacturing
• Plan for smaller, flexible installations
• Take advantage of reflective film’s inherent benefits
  • Flexibility, conformance
• Use other industries’ scale
Major Milestones

- Down select from conceptual designs
- Load report and detailed design of collector
- Develop lower cost, more durable reflective film
- Complete techno-economic analysis
- Prototype and test a full-scale module
- Establish commercial partner for pilot-scale demo
Current Status

• Conceptual designs complete, detailed design underway
• Reflective film development has begun
Conceptual Design - Collector

- Polymer panels used as mirror and module structure
- Modules do not carry torque, multiple drives along string

Typical Construction
Conceptual Design – Receiver & Balance

- Rapid installation, driven piles double as pylons
- Carbon steel receivers, ambient glass envelope
NREL Partnership

- Design-phase optical modeling
- Validation during reflective film development
- Third-party validation of prototype performance results
- Validation of cost model & techno-economic analysis
Contact

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