COMPANY PROFILE

CSPultraLiteSolar Inc.

Air pressure reenforced solar concentrator for utility-scale CSP

Content Programs:
Low Cost CSP

Coverage Areas:
Next Generation Power and Energy

Categories:
CSP systems and components

Last Update:
February 1, 2019

WHAT YOU NEED TO KNOW

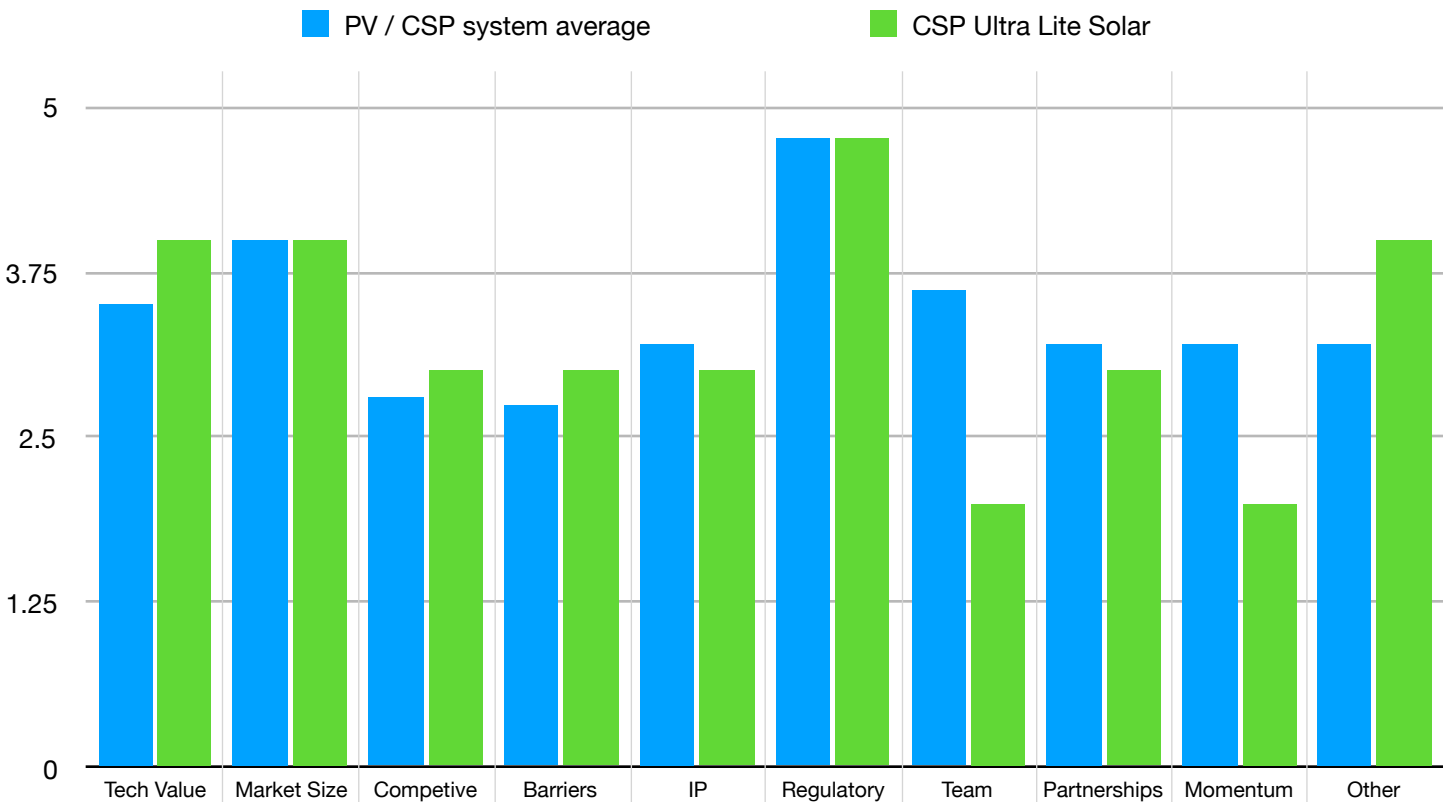
- Developing air pressure reinforced solar concentrator using commercially available industrial materials for utility-scale CSP and Process Heating applications.
- The technology reduces the complexity of the super-structure with air pressure, used as a super-structure component.
- The company has developed three variants of the technology designated UL3, UL2, and UL1. UL3 is ready for production. The UL2 and UL1 variants will provide a near term pathway to cost reductions with the completion of enhancements.
- The company performed extensive testing on system components for all variants.
- We are developing relationships for Process Heating and CSP applications.

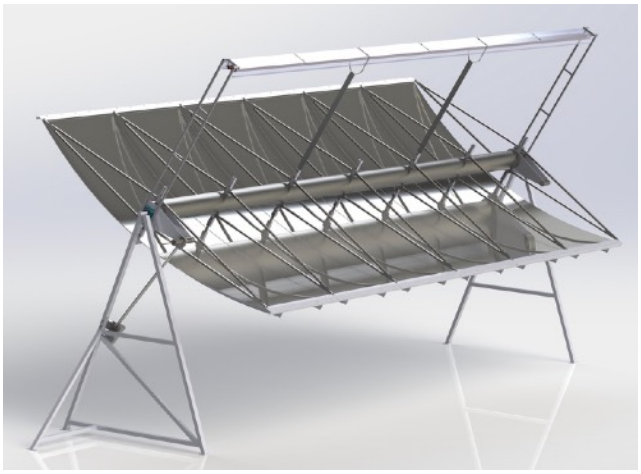
STAGE OF DEVELOPMENT

Pre Commercial

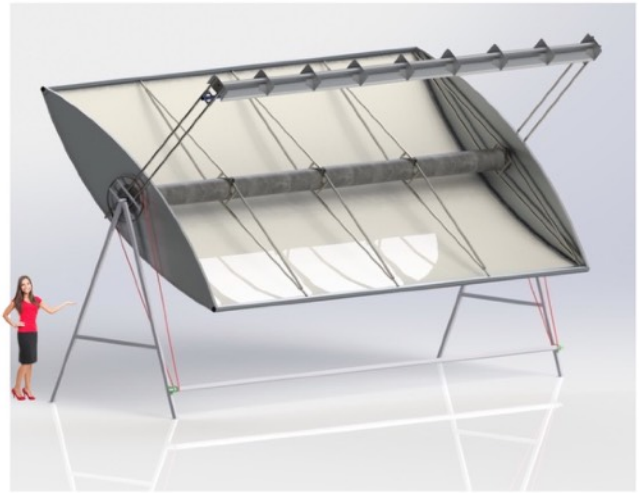
Headquarters:	Saskatchewan, Canada
Founded:	1996
Business Model:	Sells Product
Personnel:	7
Cash:	Nil
Revenue:	$0
Profitable:	No
Website:	cspultralitesolar.com

TECHNOLOGY / SOLUTION VALUE - 4	Reduces capex by over 50% compared to traditional trough concentrators
ADDRESSABLE MARKET SIZE - 4	Global market size for CSP growth for utility scale power in the billions
COMPETITIVE LANDSCAPE - 3	Competes with traditional CSP technologies and high fuel cost process heat
BARRIERS TO GROWTH - 3	UL3 ready with tested materials, UL2 and UL1 still in development
IP POSITION - 3	13 patents issued and pending
REGULATORY FACTORS - 5	Policies will continue to favour adoption of renewable energy
MANAGEMENT TEAM - 2	Management team needs to be further built out
PARTNERSHIPS - 3	Working with partners in Chile, India and China for build and market
MOMENTUM - 2	Capital infusion required to get to production and market
OTHER - 4	Developed progressive variants to continue lowering cost for future growth





UL3 Solar Concentrator with Low-Temperature Receiver



UL1 Solar Concentrator with Retro-Reflector and conventional Evacuated Tube Linear Receiver

History

CSPultraLiteSolar Inc. initially formed in 1996 to develop solar hydrogen production technology and had developed super concentrating point focus technology and novel high-efficiency receiver technology capable of generating temperatures up to 850 C with low emissivity losses of less than 5 %. This low energy loss more than doubled the efficiency over competitive technologies.

Due to the fuel-cell automobile market taking much longer to develop than forecast and other factors, the company re-purposed its technology for Concentrating Solar Power (CSP) generation.

The company has raised about $12 million in funding from private investors, private lenders and grant funding.

Technology

CSPultraLiteSolar is developing a series of solar concentrators using reflective film for CSP and Process Heating applications. These are designated **UL3**, **UL2**, and **UL1**.

UL3 is a conventional design using a simplified super-structure and reflective film adhered to parabolic aluminum sheet instead of glass mirrors. This design makes for a lower cost and more robust concentrator resistant to hail damage.

UL2 uses an air pressurized envelop consisting of a reflective back film and transparent front film. Each film surface forms a symmetrical semicircular arc. These opposing symmetries form a laminar flow surface, resulting in the reduction of lift forces from the wind, allowing the concentrator to operate in higher winds. The air envelope provides for significant reduction of the super-structure materials since air pressure is used to hold the shape of the film mirror surface.

UL3 is similar in design to the UL2 except that its primary core support is sheet metal instead of heavy gauge steel. This sheet metal core itself is pressurized to make a rigid, lightweight structure. The sheet metal core requires specialized manufacturing processes to produce it. The company conducted extensive testing on the pressured core concept and manufacturing techniques to build it. Automated structural testing, not unlike aircraft fuselage testing, was undertaken. Tests exceeded safety margins by 300% to failure and exceeded 500,000 torsion-till-failure tests. These tests proved the super-structure concept for long term deployment of many decades. The company has also developed about 75% of the specialized prototype machinery to produce the UL3 support core.

Two receiver options are available for all design variants. One possibility is a low temperature, low-cost, linear-receiver for lower-temperature process heating applications, and Organic Rankin Cycle industrial scale CSP applications under 200 C. A conventional high temperature evacuated-tube linear receiver for temperatures up to 400 C, necessary for traditional Utility-Scale CSP applications. An auxiliary retro-reflector is required to correct focus for the UL2 and UL3 for higher temperature applications since the primary reflector is semi-circular by nature from the air pressure and not parabolic.

Strategy and Markets

CSPultraLiteSolar aims to supply its technology for Process Heating and industrial-scale CSP plants for electricity generation initially. The company would grow to provide its technology for utility-scale CSP plants in conjunction with EPC companies. Regarding geographic markets, the company is focusing on parts of Chile, India, and China with future market development in the Middle East, the United States, and Australia.

Key Relationships

PARTNER	TYPE	IMPORTANCE (1-5)
CSDC, Inc.	Market / Funding / Developer - Chile	5
Swathi Sunsource Power Pvt. Ltd.	Manufacturer / India Market Developer	3
Shenzhen Super Aurora New Energy Corp	China Market Developer	2

MIRRORED FILM

The mirrored film is a highly-reflective, silvered film intended for decades of use in outdoor applications. It has been laboratory and field tested and has proven it is a premier reflective film for optimal use in solar concentrators. Developed in the 1990s by scientists at the National Renewable Energy Laboratory focused on cost reduction and increasing durability of parabolic trough collectors. Continuous improvements to the film include an abrasion resistant coating.