



## Reliability of Luminescent Solar Concentrators for Greenhouse Application

**Soliculture**

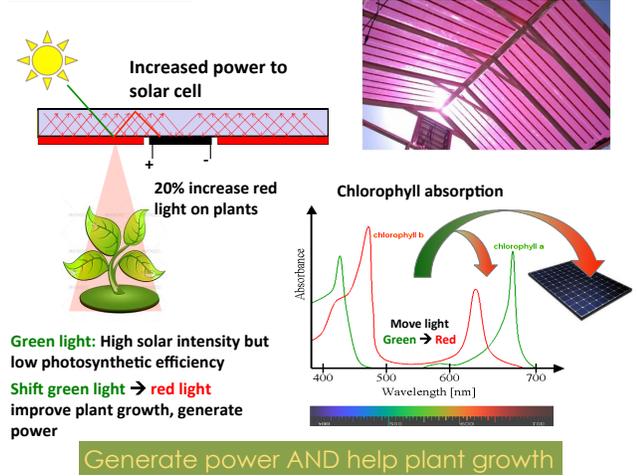
Grow  Generate

Ingrid Anderson\*, Melissa Osborn, Glenn Alers

\*Director of Research, Soliculture

ingrid.anderson@soliculture.com

### How it works:



### The market:



**Greenhouses are big**

Example: 300 acre glass greenhouse  
 >500 million ft<sup>2</sup> in North America

**Greenhouses use a lot of electricity**

Cooling, pumping, lighting, refrigeration  
 \$150,000/year bill typical



**Greenhouses are just the beginning**

Open-field agricultural crops have same results as greenhouse crops  
 Potential is large for co-location

Electricity revenue **DOUBLES** net profit for farmer

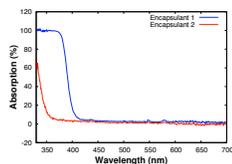
### Clear backsheet reliability:

Current clear backsheets are not made for full sun exposure

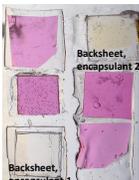
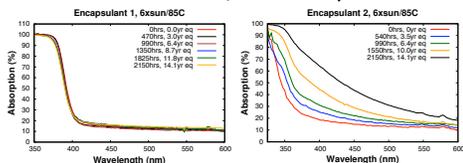
Backsheet must be protected by UV-absorbing encapsulants

Soliculture is exploring appropriate UV cutoff of EVA

Absorption of encapsulants



Clear backsheet, different encapsulants



UV-absorbing encapsulants improve reliability

### LSC backsheet reliability:

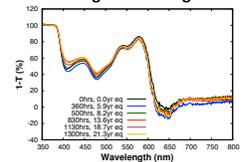
Dye-impregnated plastic is protected by UV absorbers in film and encapsulant

Dye lasts for over 20 years with 36x sun at 60C

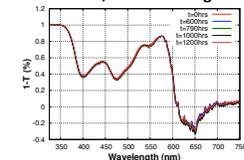
Slight yellowing after 15 years

Spectrum does not change after over 1000 hrs in 85C/85%RH testing

High-UV testing



85C,85%RH testing



Dye is stable in plastic for 20 years equivalent