

EPIC Online Technology Meeting on Photonics for Solar Energy Systems



- Headquarter: Oranienburg (close to Berlin)
- Fresnel Optics: Apolda (close to Jena) part of Reflexite since Dec. 1991; part of ORAFOL since Aug. 2011

We provide innovative solutions for self-adhesive graphic films, reflective materials and adhesive tape systems

ABOUT ORAFOL EUROPE GMBH

Oranienburg



Apolda

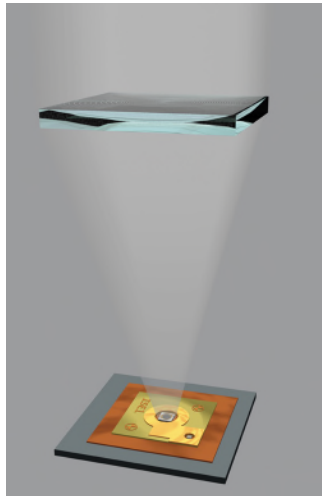
Optic Solutions - **Engineered to Manage Light™**

Juergen Zosel; 06/26/2020



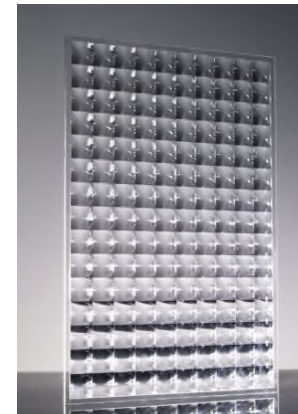
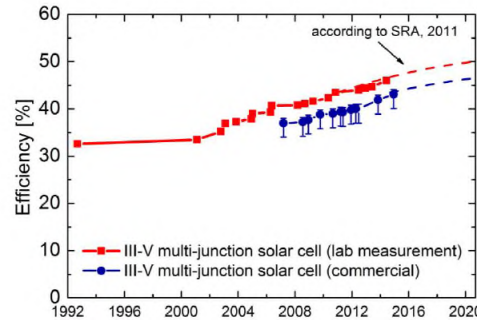
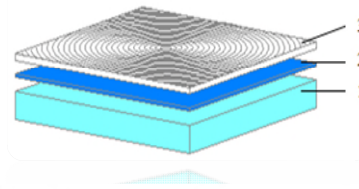
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Solar – CPV System



SOG Lens

Solar Cell



- module performance >30% energy-generating efficiency requires high optical quality, precision and uniformity
- durability under extremely harsh climatic conditions for 25 years
- hybrid optic: optical silicone based Fresnel structure cast on a glass plate
- fabrication of lens arrays up to 1 m² (2m² at former times)
- concentration of sunlight up to 1,000 X
- global market leader for silicone-on-glass (SOG) technology

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Development of Production Technology

Production Capacity

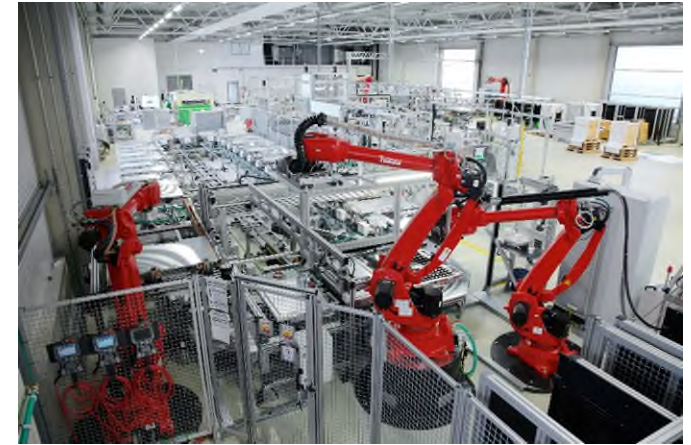
- ❖ Own development of different production lines
- ❖ Own installation of different production lines
- ❖ High automated Line with appr. 40MW yearly capacity is still available ORAFOL Fresnel Optics in Apolda
- ❖ Production is limited to appr. 1m² / lens array or module

Fresnel Lens Structure

- ❖ Development and Production of large lens array master tools
- ❖ High-precision replication from our own tooling tree
- ❖ Tip rounding typically 5 μ or less
- ❖ Facet spacing (pitch) – variable and constant spacing is possible; Depth no more than 0,35mm
- ❖ Draft angle typically reduced to 1°, to increase efficiency

SOG - Silicon On Glass Lens Plate Concept

- ❖ Low iron AR coated extra-white float glass
- ❖ Typically 3.0 - 4.0 mm thick; partially or fully hardened
- ❖ Special Primer to safe the adhesion of the Silicone on the Glass
- ❖ Special developed optical silicone to replace the precise Fresnel structure over the complete surface



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CPV Market Development



Figure 3: Examples of large CPV power plants. From top to bottom: 30 MW plant in Alamosa, Colorado, USA (© Amonix); 44 MW in Touwsrivier, South Africa (© Soitec); 140 MW in Golmud, China (© Suncore); a recent installation from 2016, 12 MW in Delingha City, China (© Redsolar)

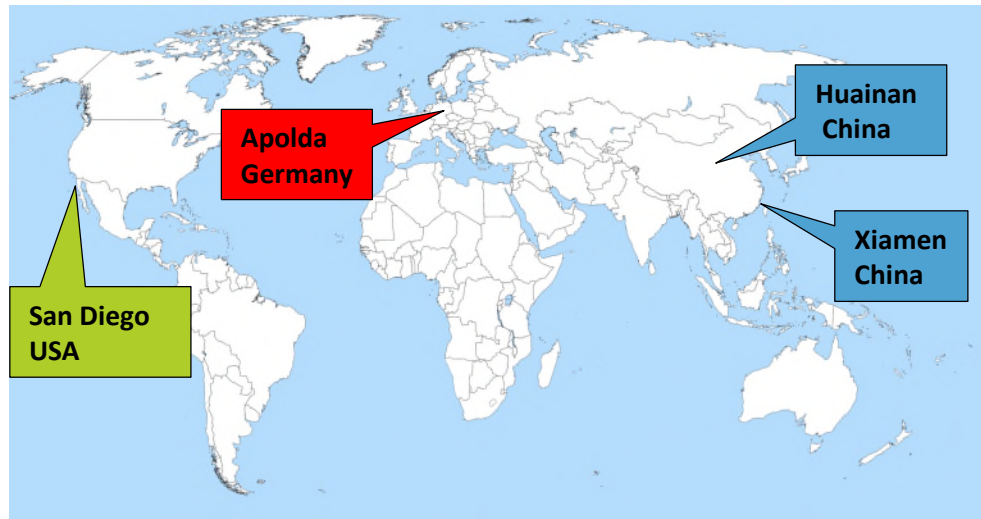


Fraunhofer ISE | NREL

CPV Report 1.3

April 2017

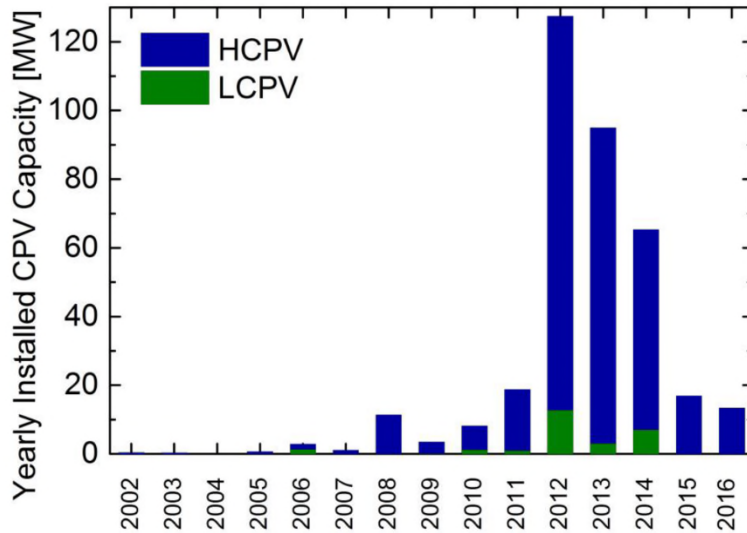
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- Soitec (San Diego, USA)
4 Lines in Total 200 MW capacity
- Suncore (Huainan, China)
2 Lines in total 100 MW capacity
- Reflexite (Xiamen, China)
2 manual Lines in total 50 MW

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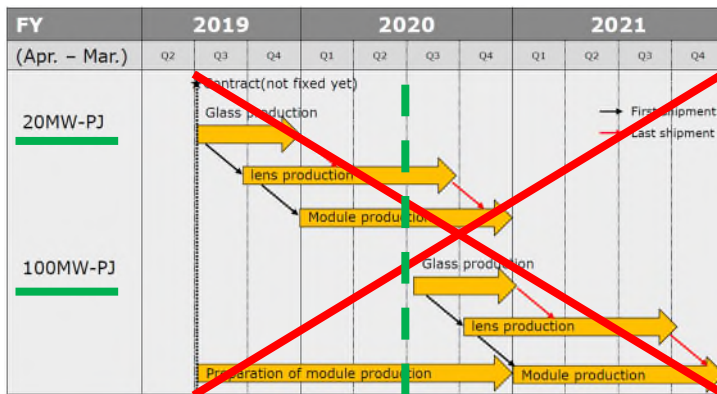
Actual CPV Market Situation



Development Project
CPVMod from March
2017 to February 2020



Last Customer Forecast



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