



Press Declaration

“SunOyster Crystal” helps solar technology reach 30% electric efficiency

The new SunOyster lens paves way for receiver with 75% total energy efficiency in co-generation of power and heat

Hamburg, 5 August 2016. SunOyster Systems GmbH (SOS), the Hamburg-based manufacturer of the concentrating solar technology SunOyster for the co-generation of power and heat, reaches a technical milestone in their R&D project of developing its concentrator cell receiver. “We are very happy that thanks to this new lens – the “SunOyster Crystal” – we are getting much closer to our target of supplying in sunny areas the cheapest form of solar energy wherever heat or cold is needed” says General Manager Dr. Carsten Corino.

The receiver is the heart of the SunOyster. After the parabolic mirrors have concentrated the direct sun light 30 to 40 times onto the receiver, the receiver concentrates it a second time and transforms it into electricity and heat. In order to reach this target, a glass lens in the receiver is concentrating the sun light 16 times onto the highly efficient concentrator cells. The secondary concentration is needed to make full use of the precious concentrator cells which were originally developed for space applications. These multi-junction cells consist of three serially connected layers of semiconductor material, and each of them is converting a different part of the solar spectrum into electricity. At the same time, heat is generated and collected by a fluid circulating through the receiver. The development of the SunOyster receiver, for which patents are pending in Europe, US, India and China, is supported by the German Foundation of the Environment.

The new SunOyster Crystal allows not only an electric efficiency of 30%. A very important property of the lens is also its high tolerance regarding positioning and tracking errors. “Although we are able to track in the millimeter range, it is of course much easier over the life-time of 20 years to reach the receiver position with a tolerance of roughly a centimeter, and also cheaper” explains SOS’ head of workshop Stephan Ulrich.

The new lens reaches a geometrical concentration of 530x. Taking into consideration the optical efficiency of approx. 75%, the optical concentration is a good 400x. The design of the lens was supported by Dr. Ralf Leutz, founder of Leutz Optics and Illumination. The prototype of the lens with a shape of a mountain crystal was cut and polished in the Bavarian Forest – where natural mountain crystals (also named “German diamond” by mineralogists) are found. Bigger numbers of the lens will be pressed from molten glass to reach low unit costs. One SunOyster receiver will contain more than



60 SunOyster Crystals and a corresponding number of cell assemblies. The two receivers of one SunOyster shall have a power output of almost 5 kW electrical plus 7.5 kW thermal.

SOS is presently selecting worldwide demonstration projects for the pre-series of its solar CHP technology, e.g. in the fields of process heat, solar cooling or swimming pools. The company has orders for a dozen machines in particular from Chile, Egypt and India, and further machines are under negotiation. SunOyster Systems is moreover organizing a Series B financing round.

Editor and Press Contact:

SunOyster Systems GmbH
Dr. Carsten Corino
Poststr. 46, D-25469 Halstenbek
T +49 4101 808767
F +49 4101 587853
cc@sunoyster.com
www.sunoyster.com
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Photo of a six SunOyster demo installation in an industry park in Shanxi Province, China



SunOyster with concentrator cell receiver in operation in Halstenbek near Hamburg, Germany