

**Project ID: Development and Full Load Demonstration of a 1000 °C Solid Particle Receiver for Concentrating Solar Power Applications: 35889**

## High Temperature Centrifugal Particle Receiver Testing for Concentrating Solar Power Applications.

### 1. Impact

This particle receiver technology can contribute to the particle-based concentrating solar power, enabling the high temperature, Generation 3 CSP program. The aim is to reduce the cost of electricity to US\$0.06/kWh.

### 2. Project Goal

Testing of an experimental centrifugal receiver unit at full-load thermal capacity up to 1000 °C at the National Solar Thermal Test Facility (NSTTF).

### 3. Methods

Installation and integration on the NSTTF solar tower of a centrifugal receiver, designed and built by DLR (German Aerospace Center), followed by an on-sun test campaign of at least 15 full days, characterizing the performance of the receiver.

### 4. Outcome

Identify the next steps in the roadmap to commercialization of this technology by executing

the test campaign and using the test data to further develop the technology. Testing up to a particle outlet temperature of 1000 °C, reaching a thermal duty of >2 MW<sub>th</sub>.

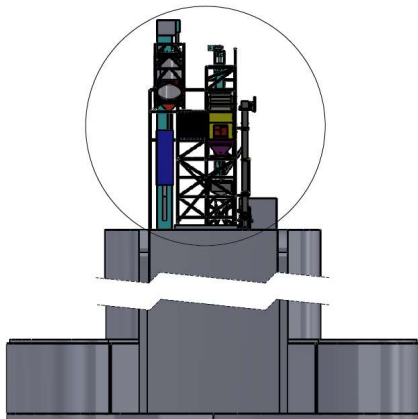
### 5. Conclusion/Risks

Control of a large, high temperature and dynamic particle receiver for concentrating solar power needs more development prior to reaching commercial reliability, identifying and refining the unknown transient characteristics. This technology shows potential in decarbonizing the mineral processing industry, by providing the ability for long duration exposure of raw materials.

### 6. Team

Sandia National Laboratories: Henk Laubscher, PI, Kevin Albrecht, Rip Winckel, Francisco Alvarez, Luis Garcia Maldonado, Cliff Ho, Daniel Ray, German Aerospace Center: Matti Lubkoll, Reiner Buck, Miriam Ebert, Martina Neises,

## CentRec Receiver Graphics



a) Proposed receiver integration at the NSTTF



b) Photo of actual receiver in Germany (DLR)

**Figure 1. Proposed Integration of CentRec Receiver at NSTTF and Photo of Receiver**