



Solar Thermal Energy Research at King Saud University



Quick Facts: King Saud University

2

- Founded in 1957 (oldest university in Saudi Arabia).
- 24 colleges and more than 50,000 students.
- Shanghai ranking: 160 (overall), 114 (engineering).
- Annual budget: US\$ 2.5 billion.
- Endowment: US\$ 2.7 billion.

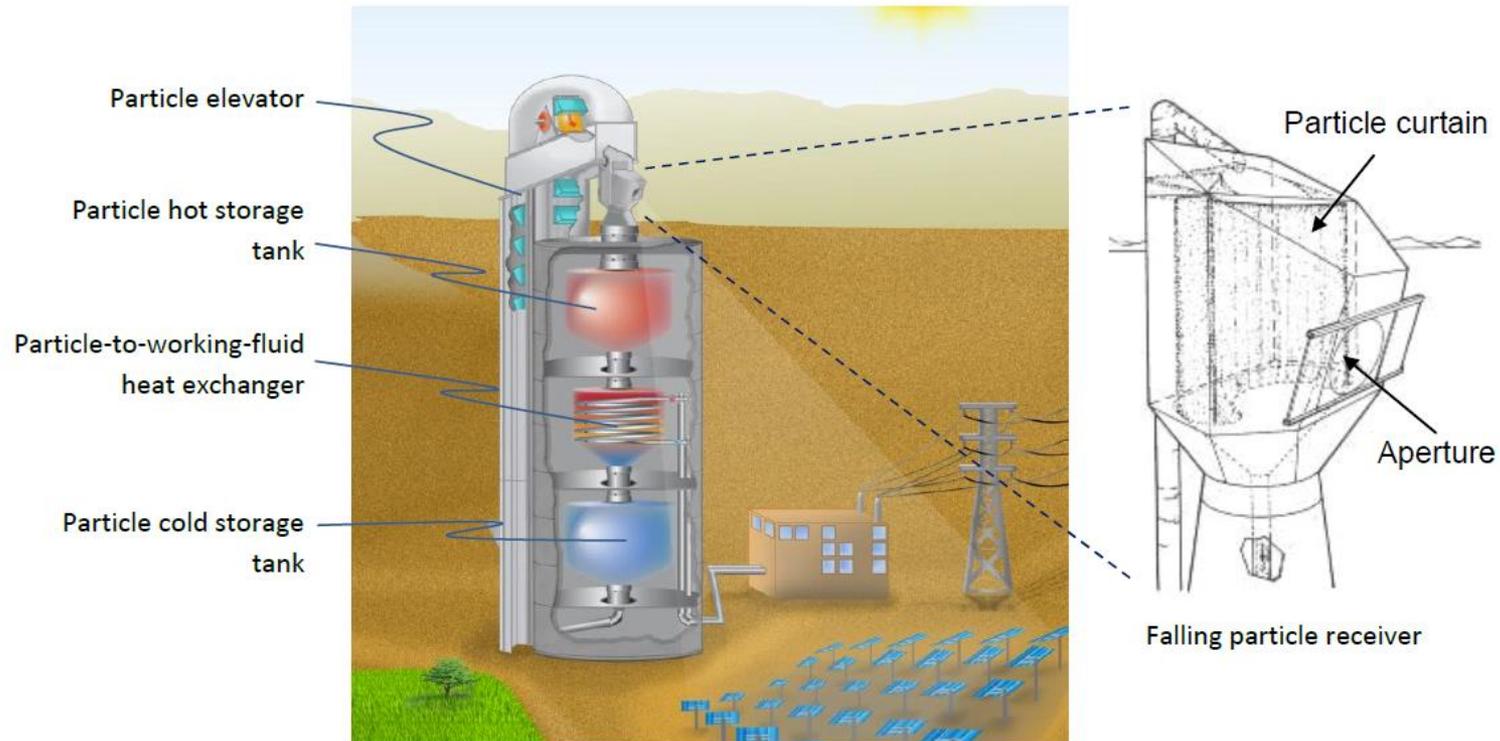


- Very active since 2008.
- More than 15 patents granted or filed since 2009.
- Collaboration with world-class institutions, including:
 - **CIEMAT (Spain)**
 - **Sandia National Laboratories (USA)**
 - **Georgia Institute of Technology (USA)**
 - **DLR (Germany)**
 - **Cranfield University (UK)**

- Research topics include:
 - **High-temperature central receiver systems**
 - **Point-focus Fresnel collectors**
 - **Enhanced parabolic trough receivers**
 - **Solar desalination**

Falling Particle Receiver

- Concentrated sunlight is absorbed directly by falling particles.
- Energy is also stored in the same medium.
- Target temperature: 1000 °C

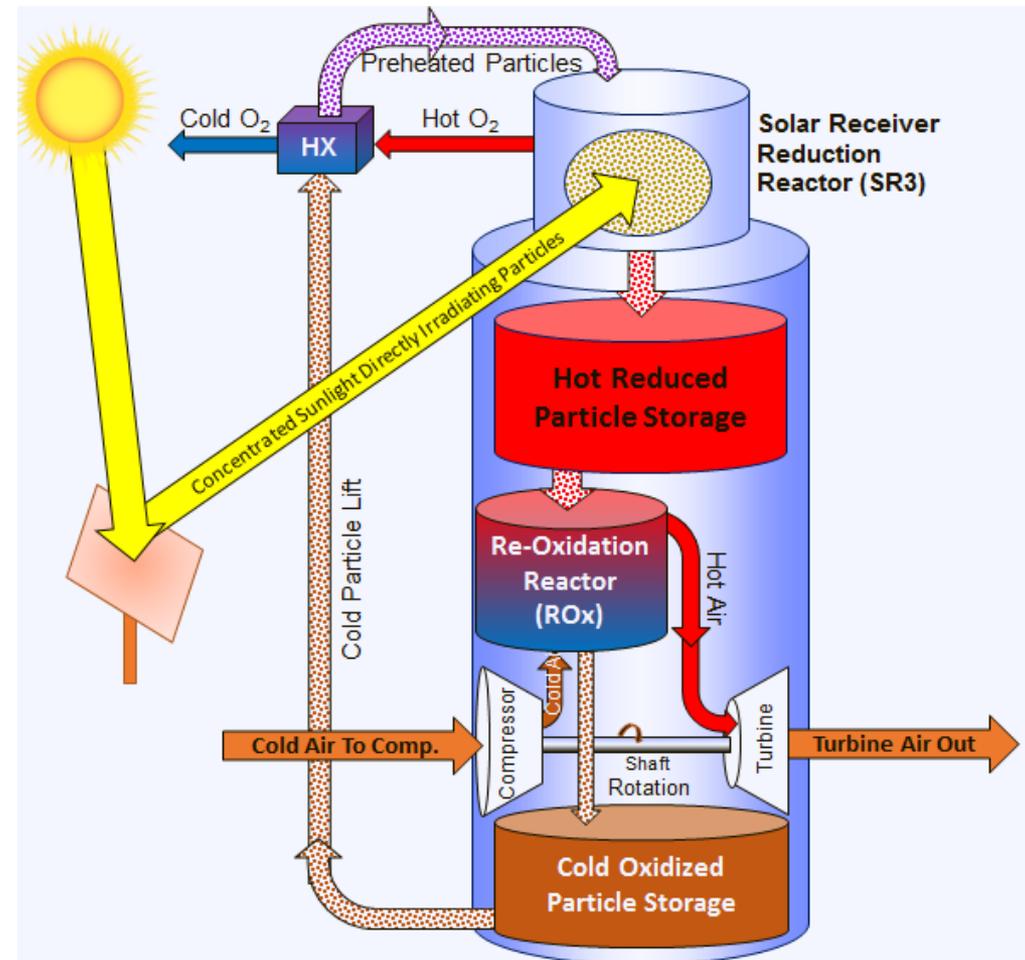


Falling Particle Receiver

- KSU has a 300-kWth test facility on campus.

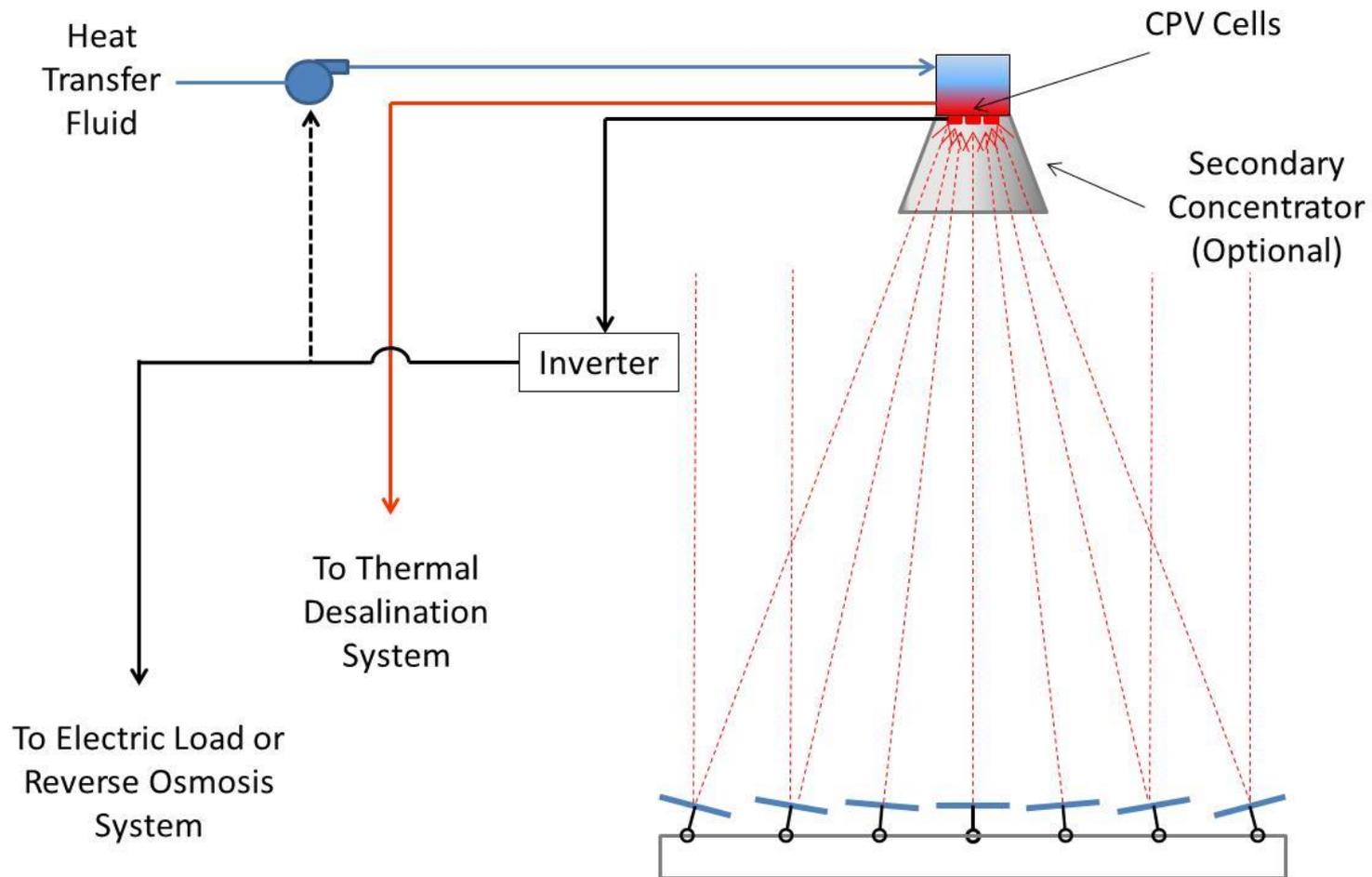


High Performance Reduction/Oxidation Metal Oxides for Thermochemical Energy Storage (PROMOTES)



- 100-kWth prototype testing will be done at KSU's facility.

Point Focus Fresnel Collector for Desalination or Polygeneration

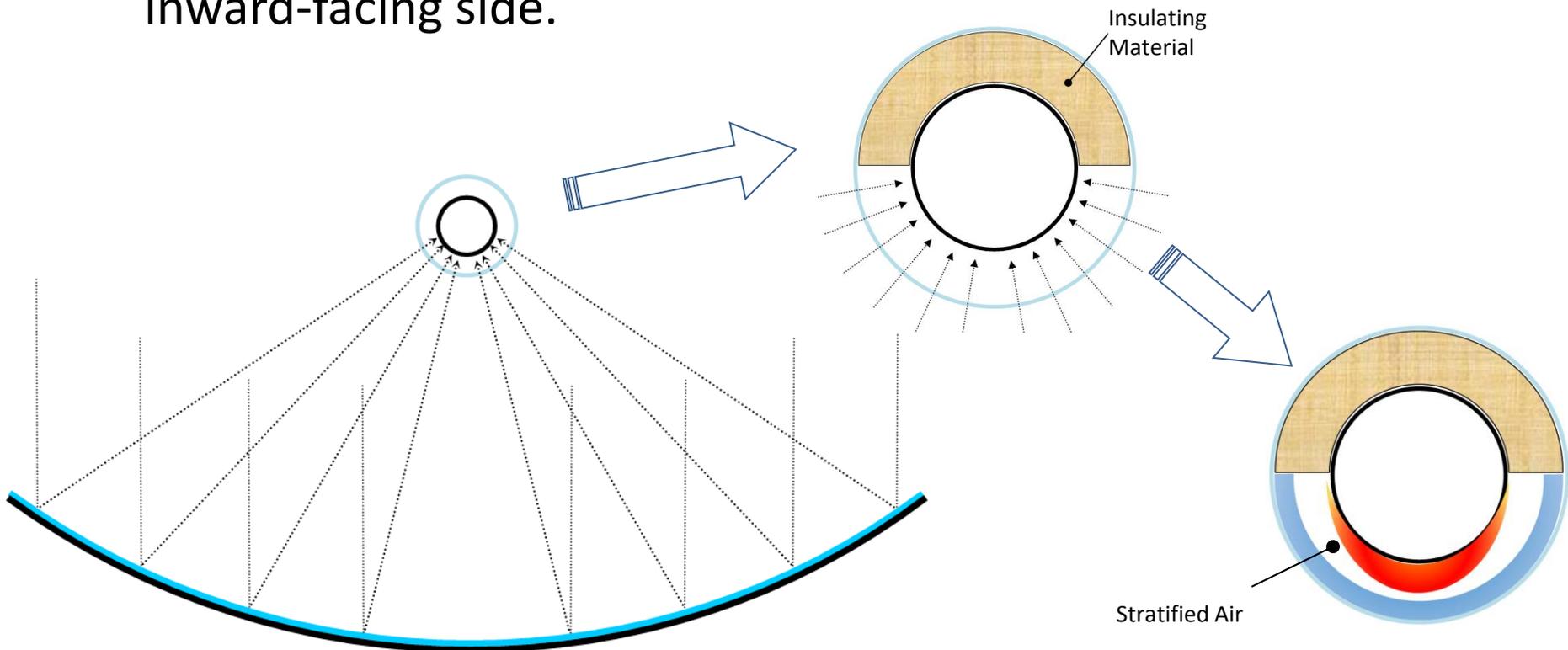


Point Focus Fresnel Collector for Desalination or Polygeneration



Enhanced Parabolic Trough Receivers

- Suitable for receivers with air-filled annuli.
- Insulating the outward-facing side of the receiver annulus reduces radiations loss and subdues natural convection in the inward-facing side.

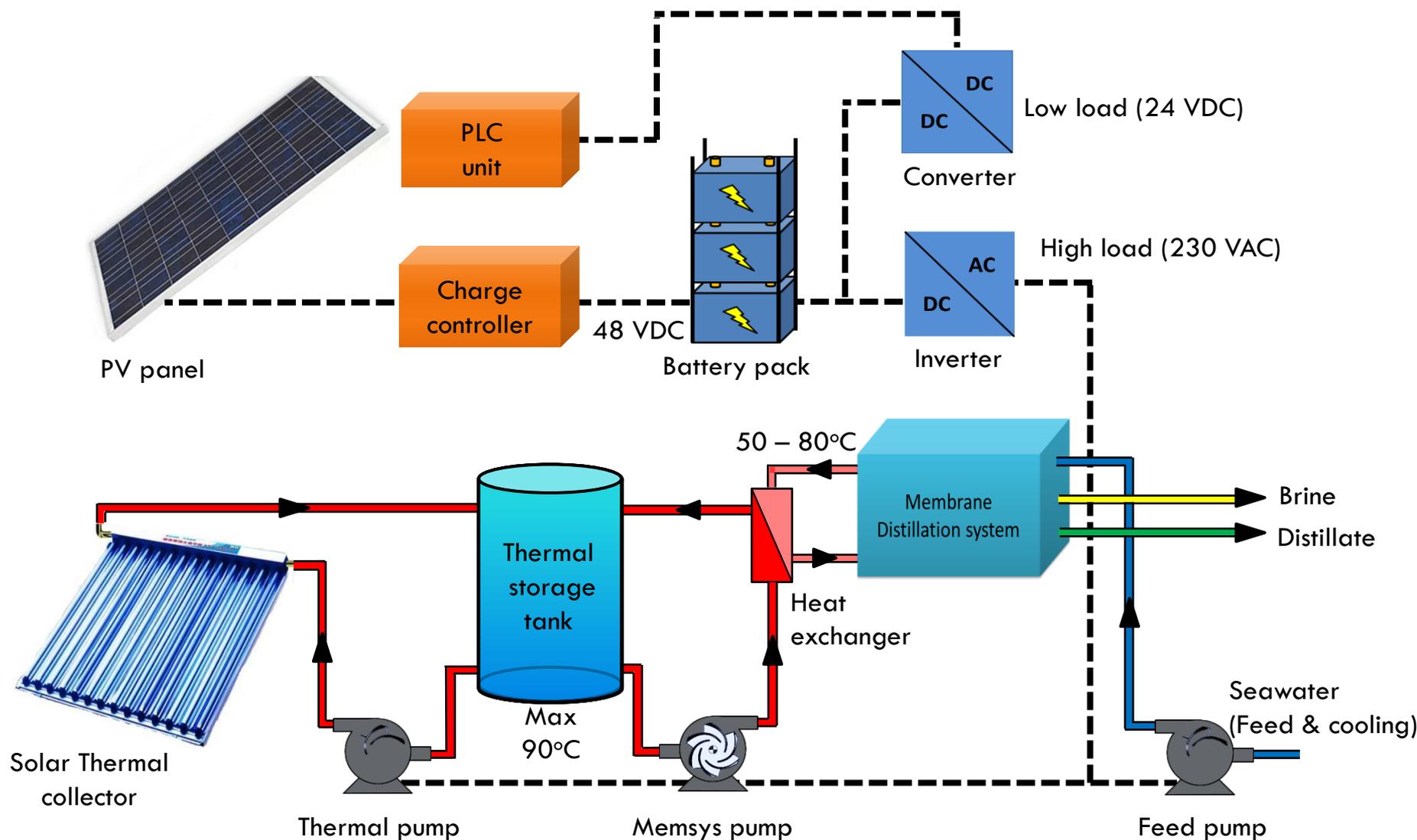


Enhanced Parabolic Trough Receivers

- Testing of new receiver is carried out on the NEP Solar Polytrough array at Plataforma Solar de Almeria.



Autonomous Solar Membrane Distillation System at KSU



Autonomous Solar Membrane Distillation System at KSU

- Comparison with performance of similar membrane distillation system at Plataforma Solar de Almeria is carried out.



Picture of the portable solar-driven desalination system at KSU