**High-Temperature Particle Heat Exchanger for sCO₂ Power Cycles**

**PROBLEM STATEMENT**
- Conventional molten-salt central receiver systems are limited to temperatures ≤600 °C
- Advanced power cycles (combined air Brayton, supercritical CO₂ Brayton) require higher temperatures (>700 °C)
- Particle receivers are being investigated to achieve these higher temperatures, but particle heat exchangers operating at necessary temperatures and pressures (>20 MPa) do not exist

**OBJECTIVES & VALUE PROPOSITION**
- Design, develop, and test the world’s first particle/sCO₂ heat exchanger
  - Particle temperature ≥ 720 °C
  - sCO₂ temperature ≥ 700 °C
  - sCO₂ pressure up to 20 MPa
  - Overall heat transfer coefficient ≥ 100 W/m²K
  - Total cost of power-block components ≤ $900/kWₑ
  - Specific cost of prototype heat exchanger ≤ $30/(W/K)

**APPROACH**
- Work with industry leaders to design and develop particle-sCO₂ heat exchanger that meets cost/performance requirements (Year 1)
- Utilize experience and infrastructure at Sandia, NREL, and Georgia Tech to downselect, procure, and test components (Years 1 & 2)
- Integrate heat exchanger with high-temperature falling particle receiver and skid-mounted sCO₂ flow loop (Year 3)

**PATH TO MARKET**
- We are partnering with industry leaders (B&W, Solex, VPE)
- By engaging and working with these companies during the early design, development, and testing phases of this project, we will enable and develop a manufacturable technology and path towards rapid commercialization

**FUNDING & KEY INSTITUTIONS**
- FY16 – FY18: $4.6M (DOE)