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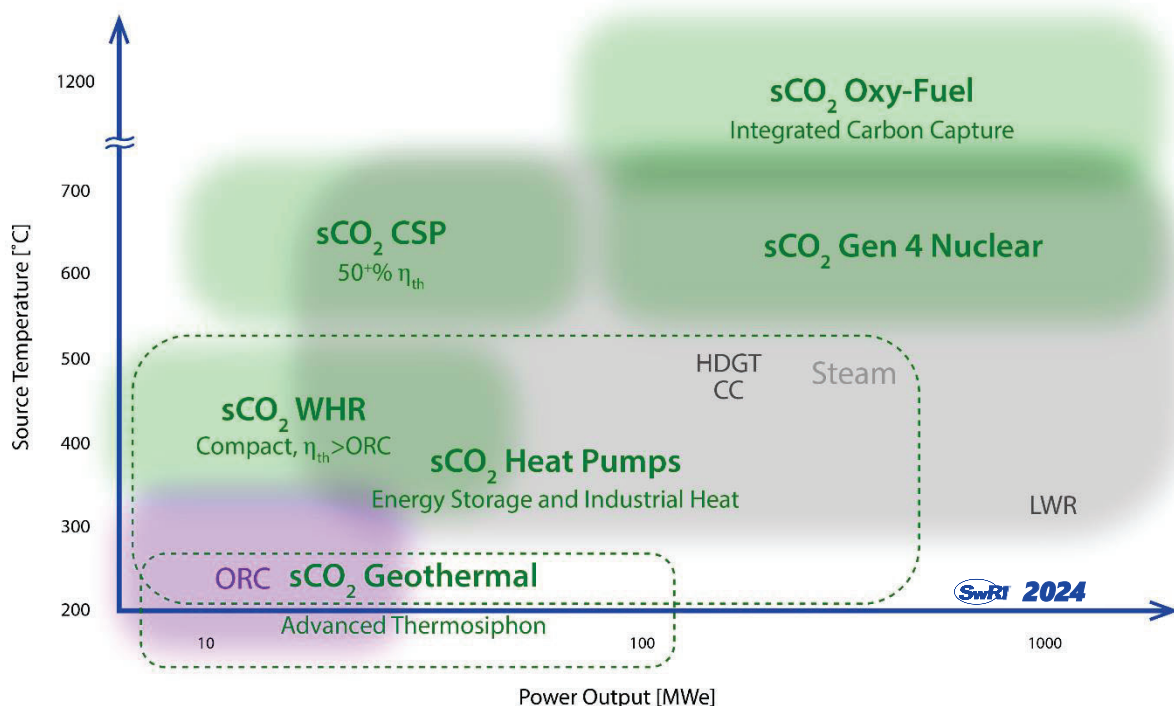
## Application Update and Development Status of Supercritical Carbon Dioxide Power Cycles

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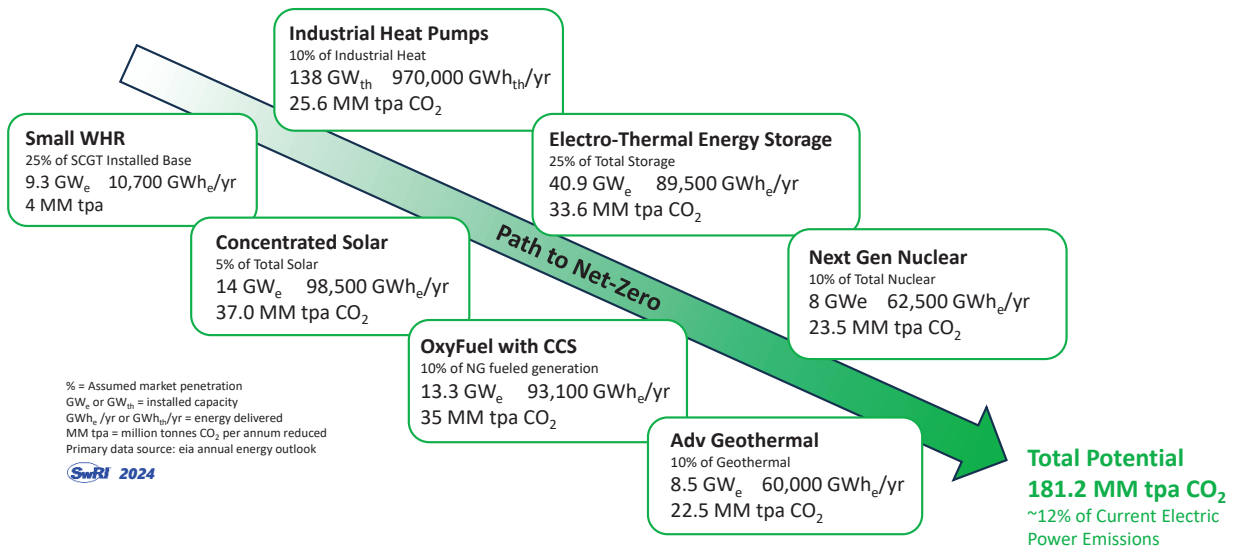
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### Abstract

Supercritical Carbon Dioxide (sCO<sub>2</sub>) power cycles have been the topic of significant recent development efforts internationally and offer the promise of higher efficiency, modularity, and transient capability that steam Rankine cycles for power generation across many applications including advanced nuclear, fossil with carbon capture, concentrating solar, geothermal, waste heat, grid energy storage, and other applications. This oral presentation will provide a perspective of the application space, expected performance, and potential carbon dioxide emission reduction impact of sCO<sub>2</sub> systems in addition to an overview of nearly \$150M of recent technical development activities, including axial and integrally geared turbine development and testing, centrifugal compressor development and testing, utility-scale turbomachinery design and seal development, and pilot-scale demonstration at the 10 MWe scale at the now-operational Supercritical Transformational Electric Power (STEP) pilot plant located at SwRI in San Antonio, TX. The development overview will summarize the development efforts including technical achievements, lessons learned, and future work on these major development efforts.



**Application Space of Supercritical Carbon Dioxide Power Cycles**



## CO<sub>2</sub> Emissions Reduction Impact Potential of Supercritical Carbon Dioxide Power Cycles



**Aerial View of Supercritical Transformational Electric Power (STEP) 10 MWe Pilot Plant**