

Advanced Compressors for CO₂-Based Power Cycles and Energy Storage Systems **CFD optimization yields compressor efficiency exceeding 91% and facilitates economical energy storage systems**

1. Impact

High efficiency drives greater project economics and mitigates risk for FOAK sCO₂ axial compressor. LCOS improves by 3.5%. CAPEX reduced by 20%.

2. Project Goal

Demonstrate design methodology. Improve compressor efficiency. Build, demonstrate and validate at 10MW test facility. Derisk first article

3. Method(s)

Optimization of compressor aero design performed using CFD. Method validated by building 10MW scale compressor and quantifying performance.

4. Outcome(s)

Design complete with 5 point improvement over radial compressor. Operation expected mid 2022.

5. Conclusion/Risks

Axial compressors at large scale can significantly improve efficiency, and reduce overall system cost. Operation in the test cell derisks technology for future adaptation

6. Team

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Visuals

Figure 1 illustrates the optimized airfoil geometry for the rotor, the three-stage test compressor, and the test loop.

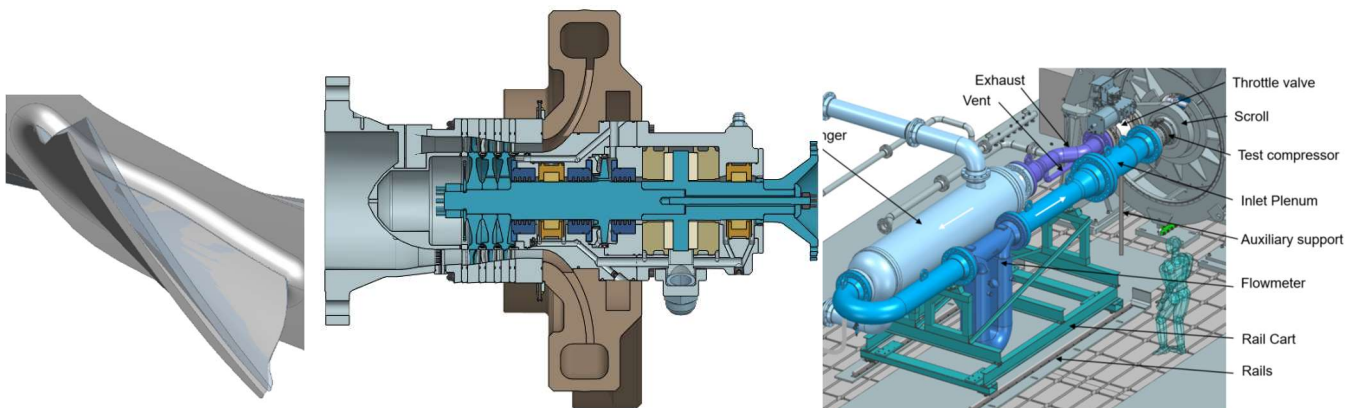


Figure 1. Axial compressor and test loop