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sCO_2 Cycle Modeling for Integrated Nuclear and CSP

Motivation

- Utilizing complementary technologies, specifically solar concentrating power and lead-cooled fast reactors, in an interconnected cycle allows for consistent generation independent of weather or time of day.
- Recompression supercritical CO_2 Brayton cycles are promising cycle configurations offering higher efficiencies than Rankine, compact design, and reduced turbomachinery cost while operating with non-toxic working fluid.
- Thermal energy storage within the solar concentrating power cycle can be charged by a lead-cooled fast reactor and dispatched during high grid demand periods.

Objectives

- Develop models that accurately represent cycle configurations while being flexible enough to test system parameters' effects on cycle efficiency and power.
- Test the feasibility of using lead-cooled fast reactor to charge thermal energy storage and optimize dispatchability.
- Use the cycle models to run off-design studies.