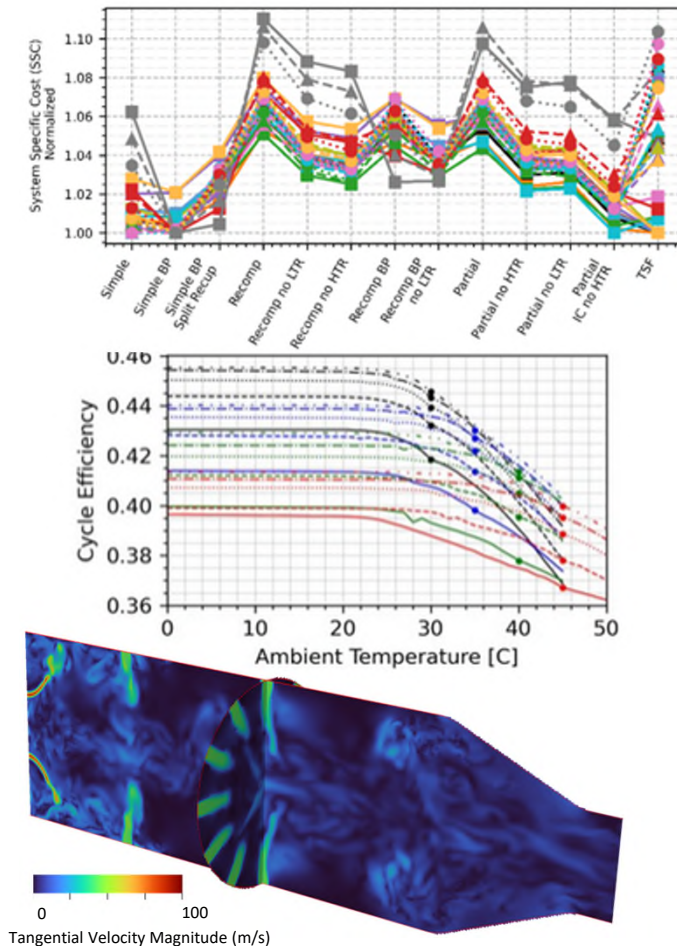


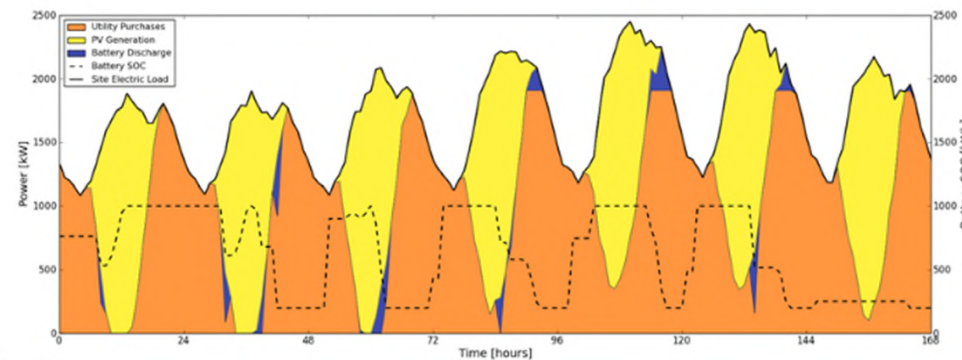
# sCO<sub>2</sub> Research at NLR

- [Open-source design-point models](#) for integration with TES and solar thermal
  - Gen3 particle systems (paper #55 and [prior work](#))
  - [Liquid HTF systems](#)
  - [CHP for thermal desalination](#)
- Steady-state off-design model for annual simulations
  - [Off-design control strategies](#)
  - [Cycle optimization](#) to maximize plant rate of return
- Simulation of oxycombustion in sCO<sub>2</sub>
  - Partnership w/ 8 Rivers through High Performance Computing for Energy Innovation (HPC4EI) program
  - Uses large-scale simulations to develop reduced order models for efficient design



# NLR Capabilities for sCO<sub>2</sub>

- Thermal system integration and optimization
  - Pending projects in System Advisor Model ([SAM](#)) to improve power cycle representation in geothermal and add high temperature heat pumps
- Compare technologies and find lowest cost size/mix/operation to meet electric/thermal loads ([REopt](#))
- Model grid capacity expansion for new loads (e.g. data centers) and generator retirements ([ReEDS](#))
- [ARIES](#) platform to evaluate technology integrated with physical hardware in replicated grid scenarios
- Simulation of oxycombustion in sCO<sub>2</sub> ([Pele](#))



# Research Areas for Labs and Universities

- Third-party evaluation to inform stakeholders and identify researcher opportunities
- Characterize emerging applicants and markets
- Component and material modeling, analysis, and testing
- Systems integration
- Open-source code development
- Institutional knowledge

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