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Project: Layout and Optimization of a Two-Stage Heliostat Field Advisor(s): Mike Wagner & Greg Nellis Sponsor: Department of Energy





Background

Two-Stage Heliostat

- 1st stage: Tracking Stage
 - Multiple small-area mirrors are mounted on a common drive that moves to track the sun
- 2nd stage: Concentrating Stage
 - Stationary mirrors, each with a unique angle direct rays towards the receiver
- Combines benefits of small-area and larger area heliostats
 - Small-area: less expensive support structure, reduced wind loads
 - Larger-area: larger mirror area per drive, lower drive and cabling costs
- Second stage introduces new loss mechanisms
- Requires more land area, mirrors, and structured compared to a conventional heliostat
- Designed for fields with small thermal rating





Overall Project Goal:

• Can the additional structural costs and optical losses be outweighed by a reduced drive cost?

Field-Level Model Goals:

- Simulate a field layout, given field parameters and a design-day power
 - Using Annual Energy Fit and Golden Section Search
- Optimize field parameters based on minimizing the \$/W of the field
 - Using Genetic Algorithm

