Contrasting different electricity futures by comparing a large number of optimized scenarios

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1 CSP dispatchability

2 UK electricity scenarios

3 Future work
CSP:
Concentrating solar power
A. Mediterranean
Solar and weather data

Plant model (Python)

Optimization (GAMS)

Postprocessing (Python)

Outputs
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Outputs
Spatially explicit technology models and data

Optimization (GAMS)

Postprocessing (Python)

Outputs
Spatially explicit technology models and data

Energy systems modeling framework

Outputs
ETI-ESME
Spatial and temporal detail
Probabilistic scenarios

Temoa
Open-source toolchain
Run on computing cluster

Calliope
Pluggable spatio-temporal “resource streams”

Hybrid planning-operational mode with dynamic timesteps
Desert solar imports
System-wide costs

No imports

Desert solar imports
Emissions

[Graph showing emissions levels with a color scale from 0 to 500 g CO₂/kWh, with axes labeled as Renewable, Nuclear, and Fossil.]
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Next steps for Calliope framework

- Improved **operational constraints** for hybrid planning-operational mode
- Examine **heat – electricity link** with spatial and temporal detail
- **Other methods** than global optimization that better capture complexity
Questions or comments?

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