

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

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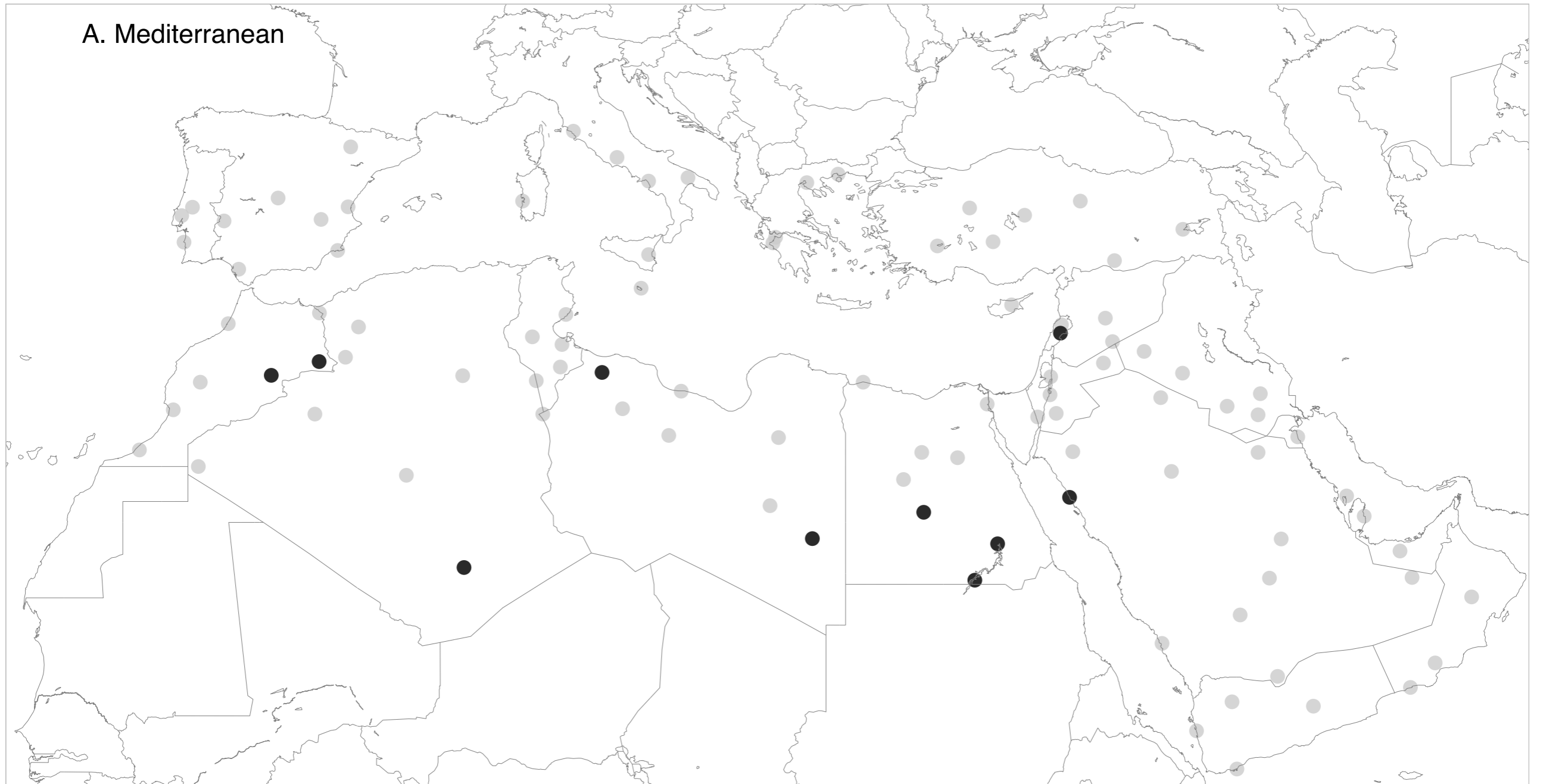
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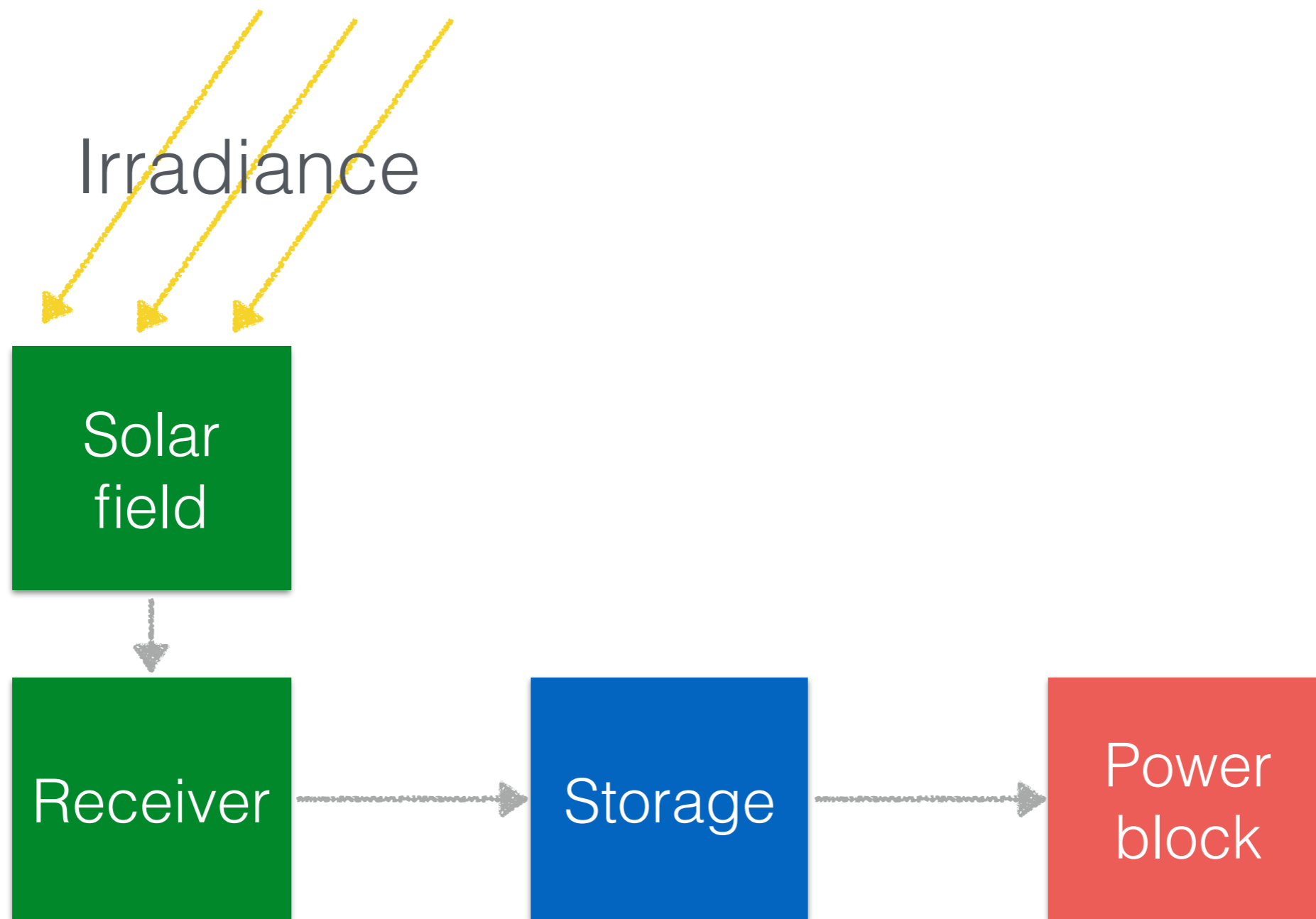
- 1 CSP dispatchability
- 2 UK electricity scenarios
- 3 Future work

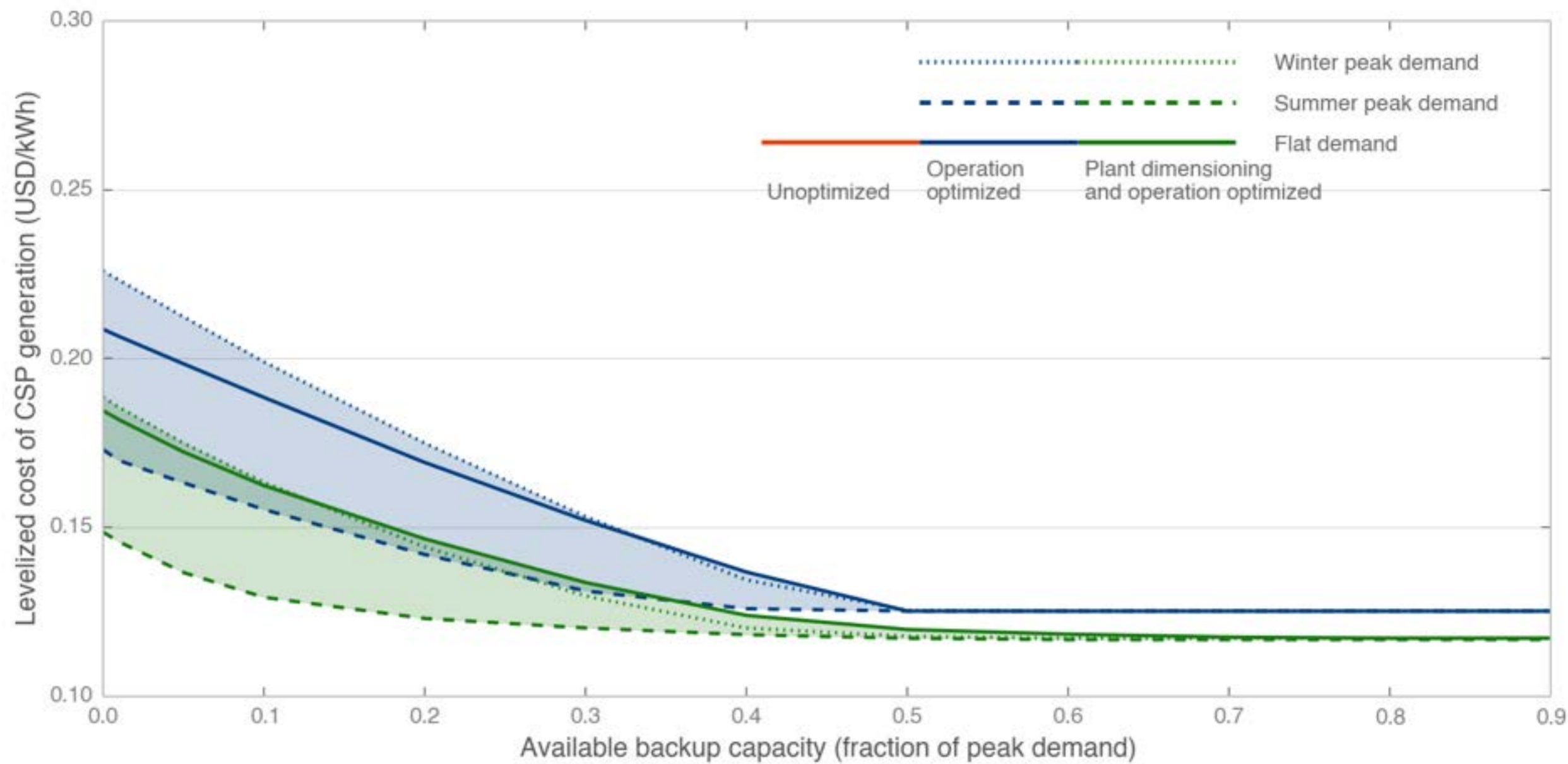


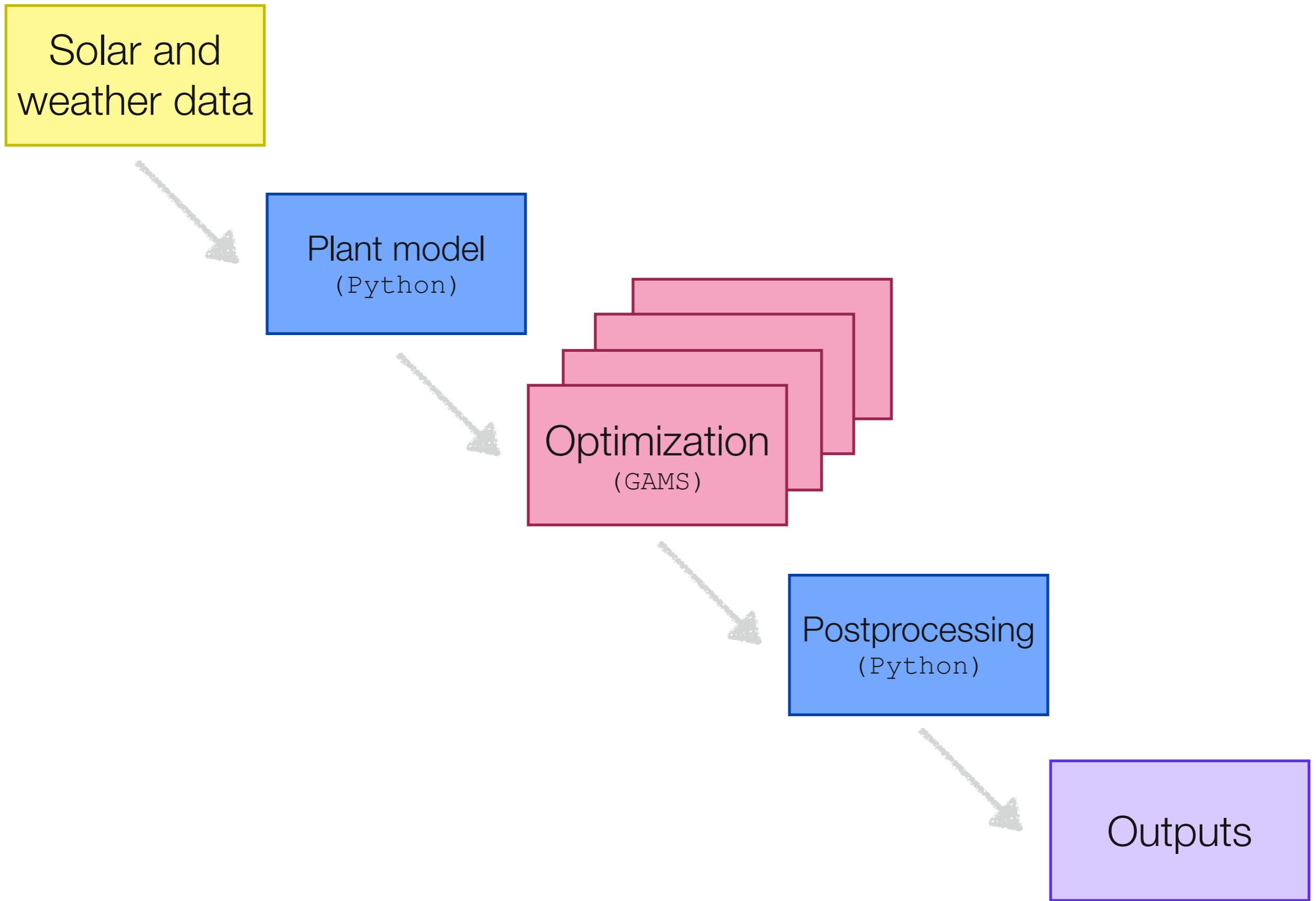
CSP: Concentrating solar power

A. Mediterranean





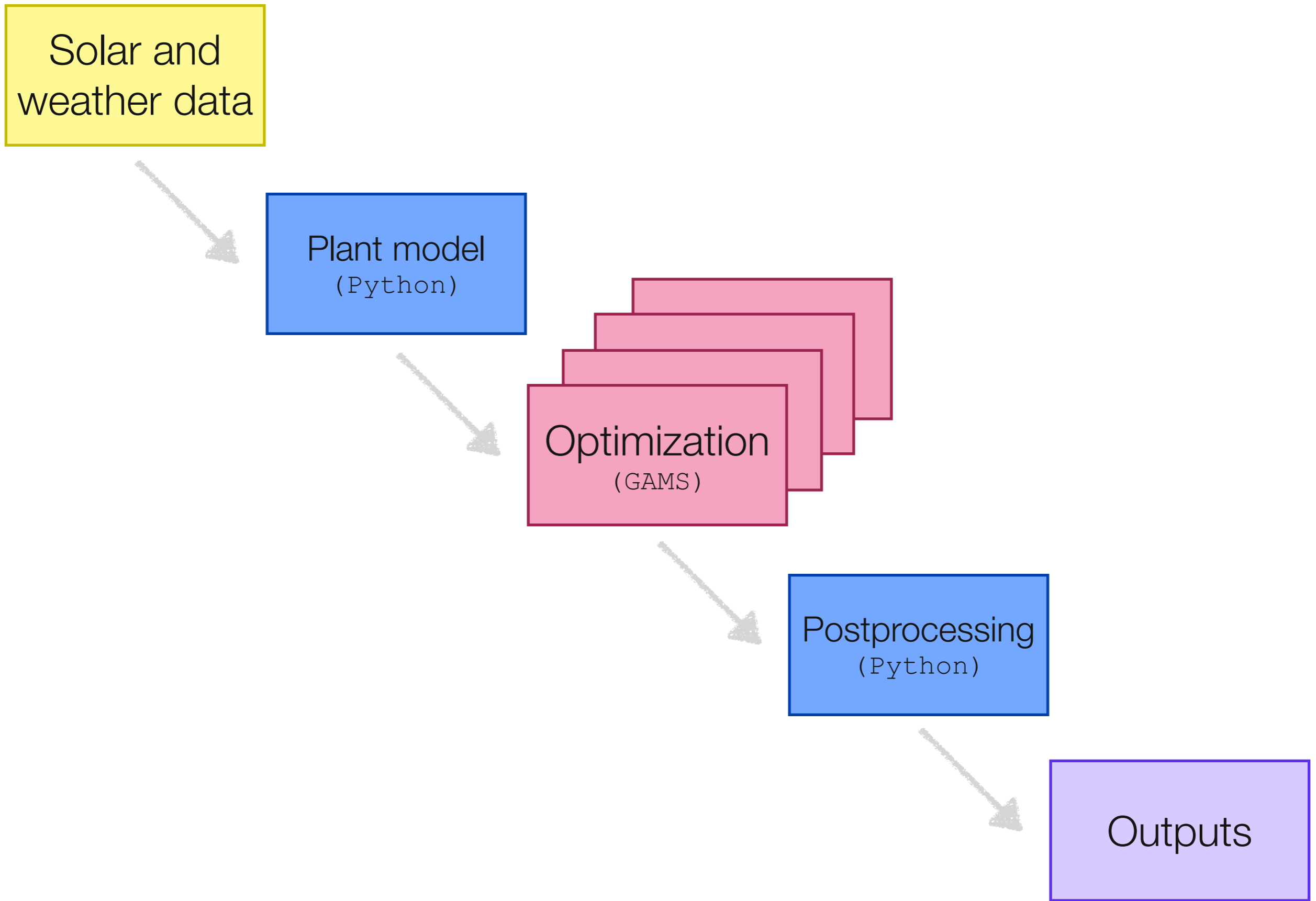




1 CSP dispatchability

2 UK electricity scenarios

3 Future work



Solar and weather data

Plant model
(Python)

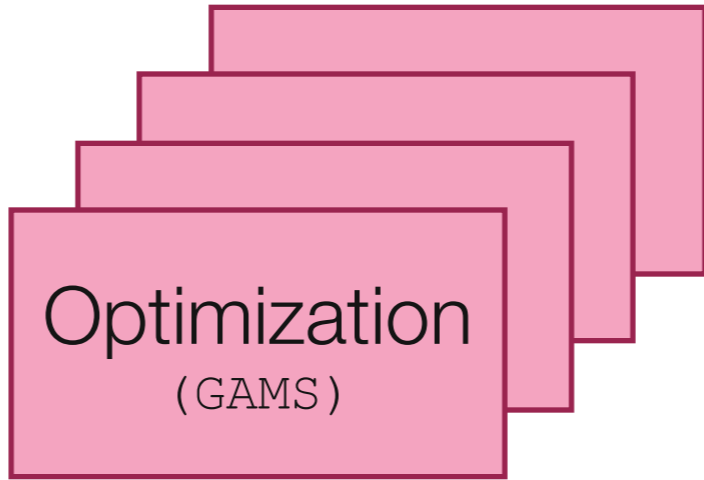
Optimization
(GAMS)

Postprocessing
(Python)

Outputs



Spatially explicit
technology models
and data



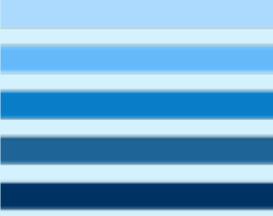
Optimization
(GAMS)

Postprocessing
(Python)

Outputs



Spatially explicit
technology models
and data



Calliope
Energy systems
modeling framework



Outputs

ETI-ESME

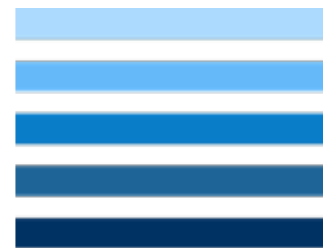
Spatial and temporal detail

Probabilistic scenarios

Temoa

Open-source toolchain

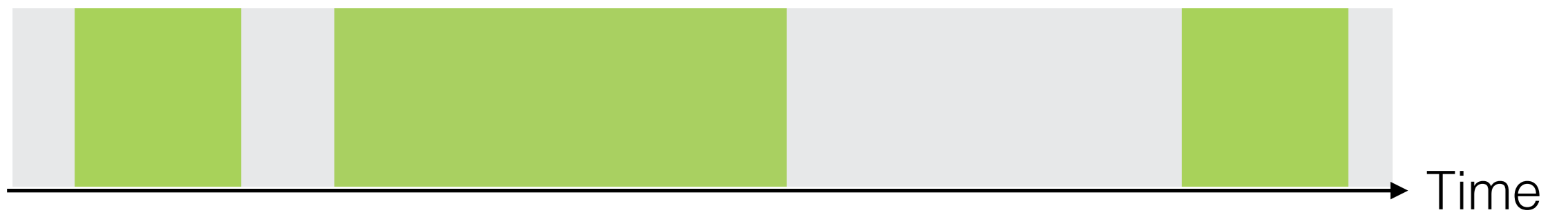
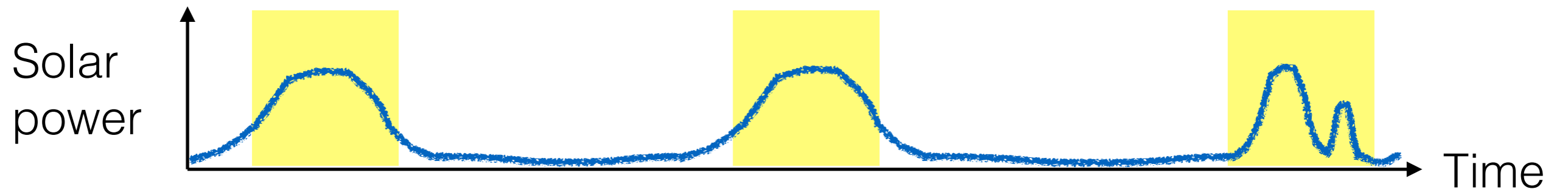
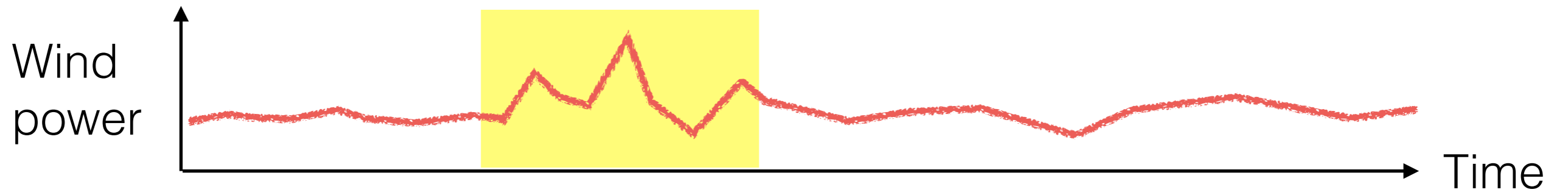
Run on computing cluster

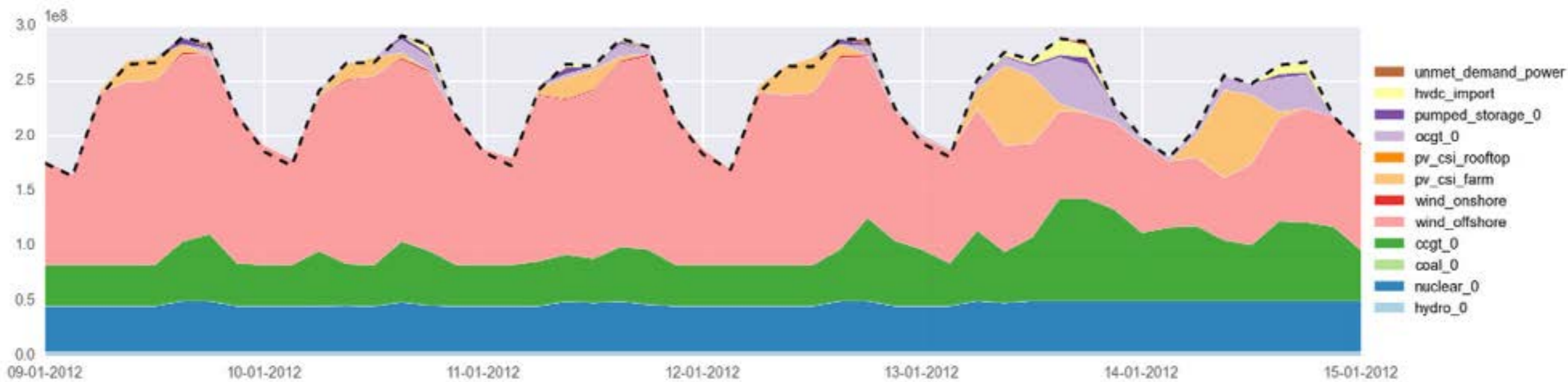


Calliope

Pluggable spatio-temporal
“resource streams”

Hybrid planning-operational mode
with dynamic timesteps





Fossil

Nuclear

Renewable



100% Renewable

Renewable



50% Renewable
50% Nuclear

Fossil



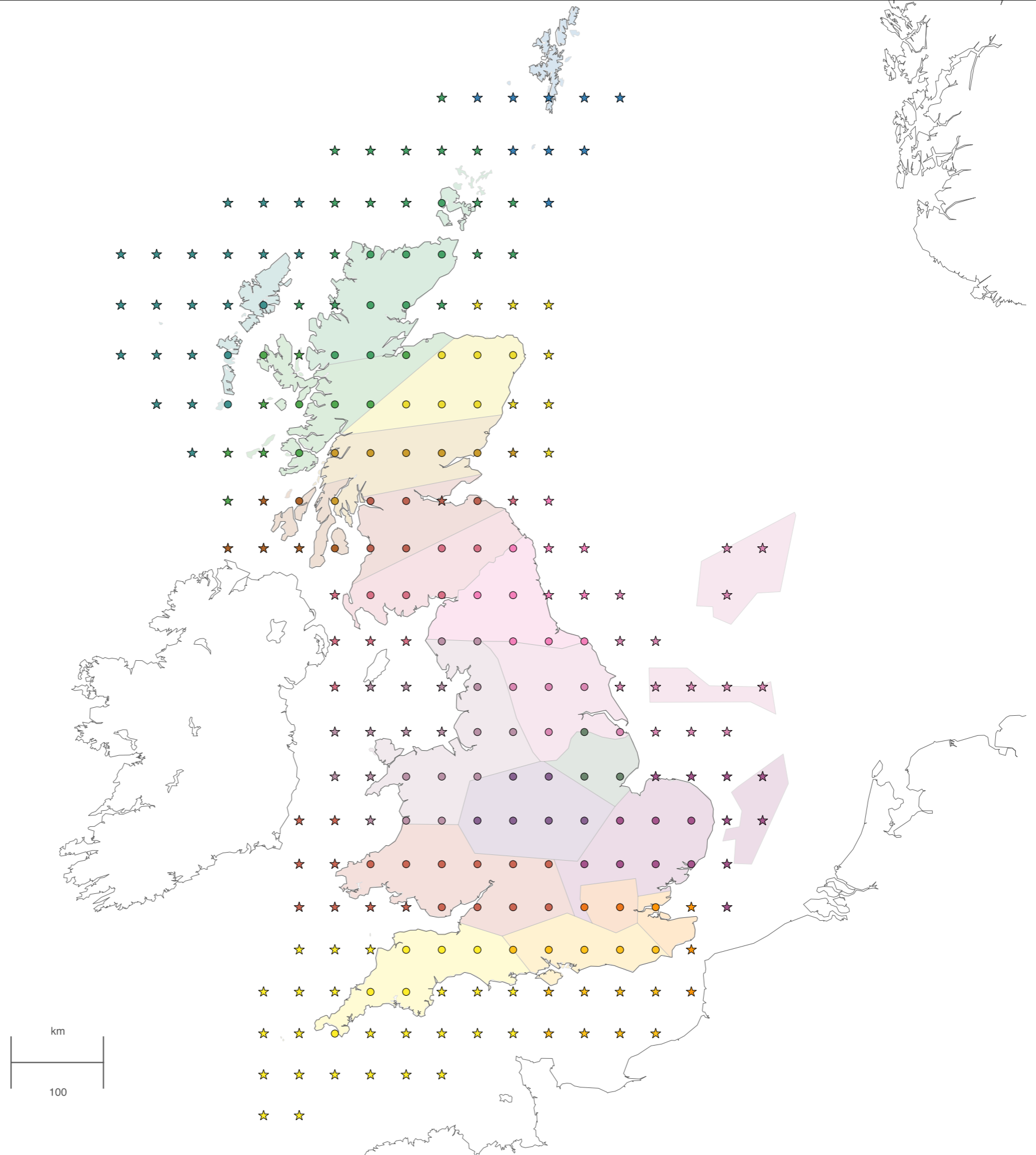
50% Renewable
50% Fossil



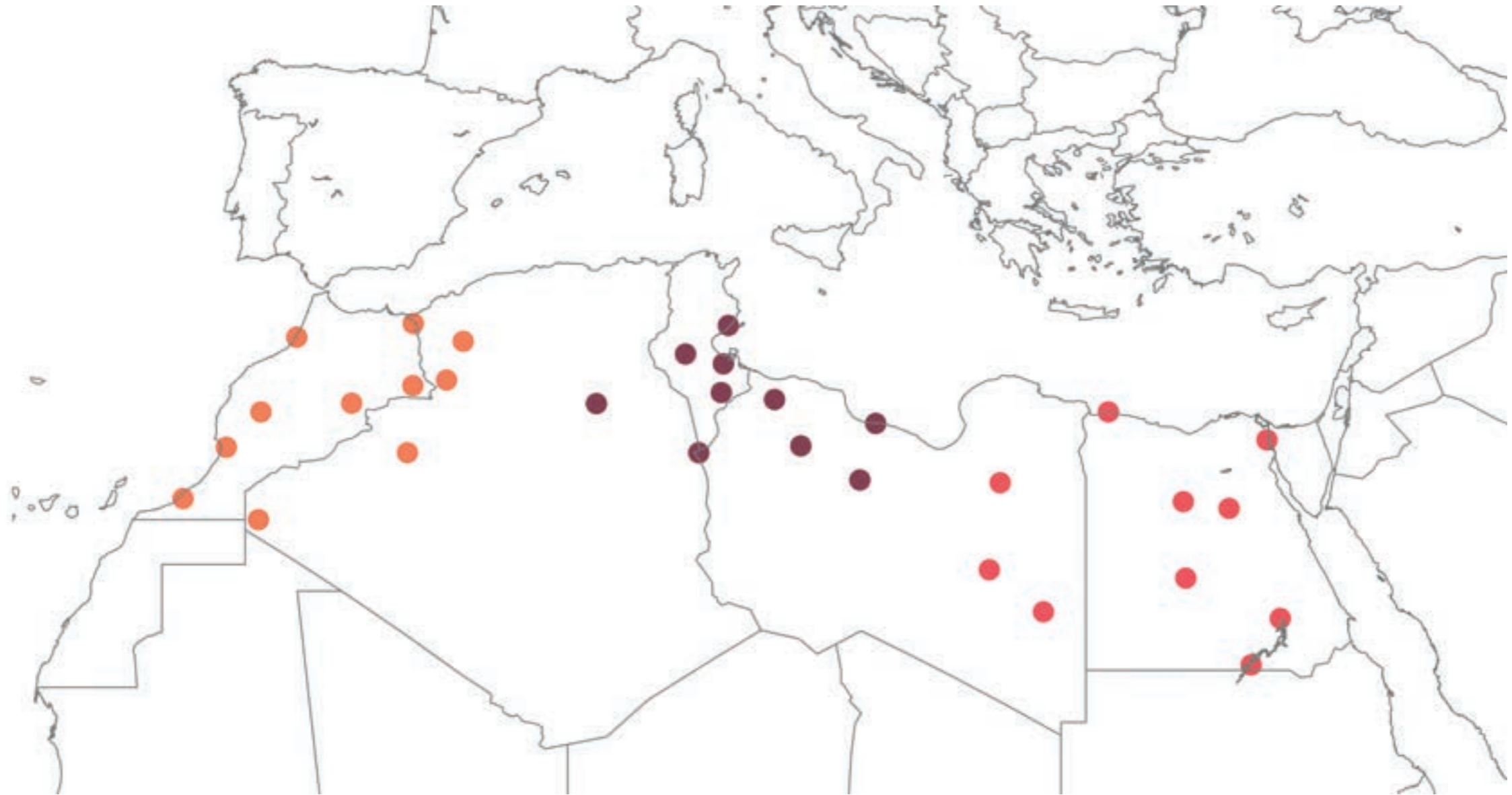
60% Fossil
25% Nuclear
15% Renewable



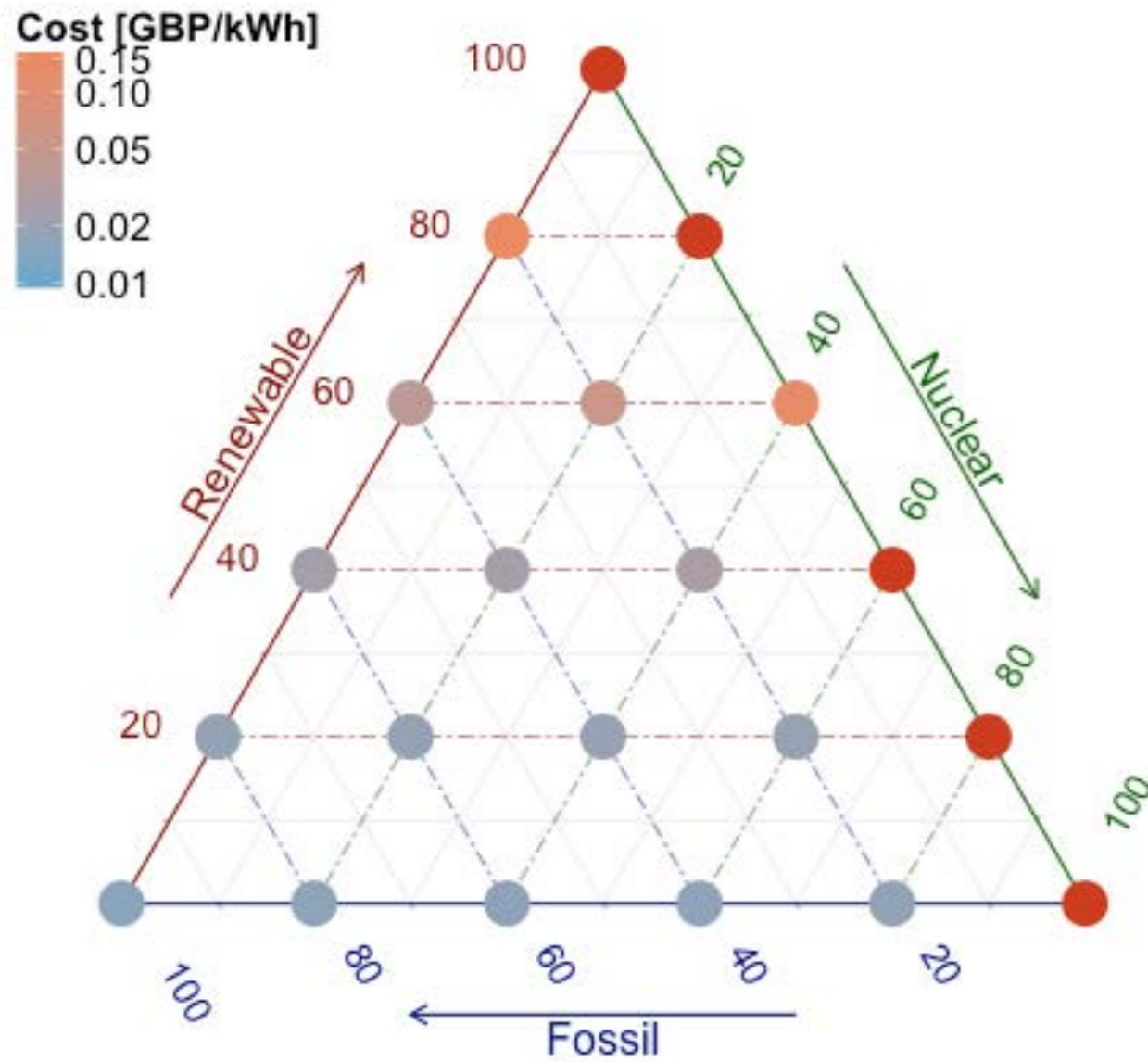
UK zones



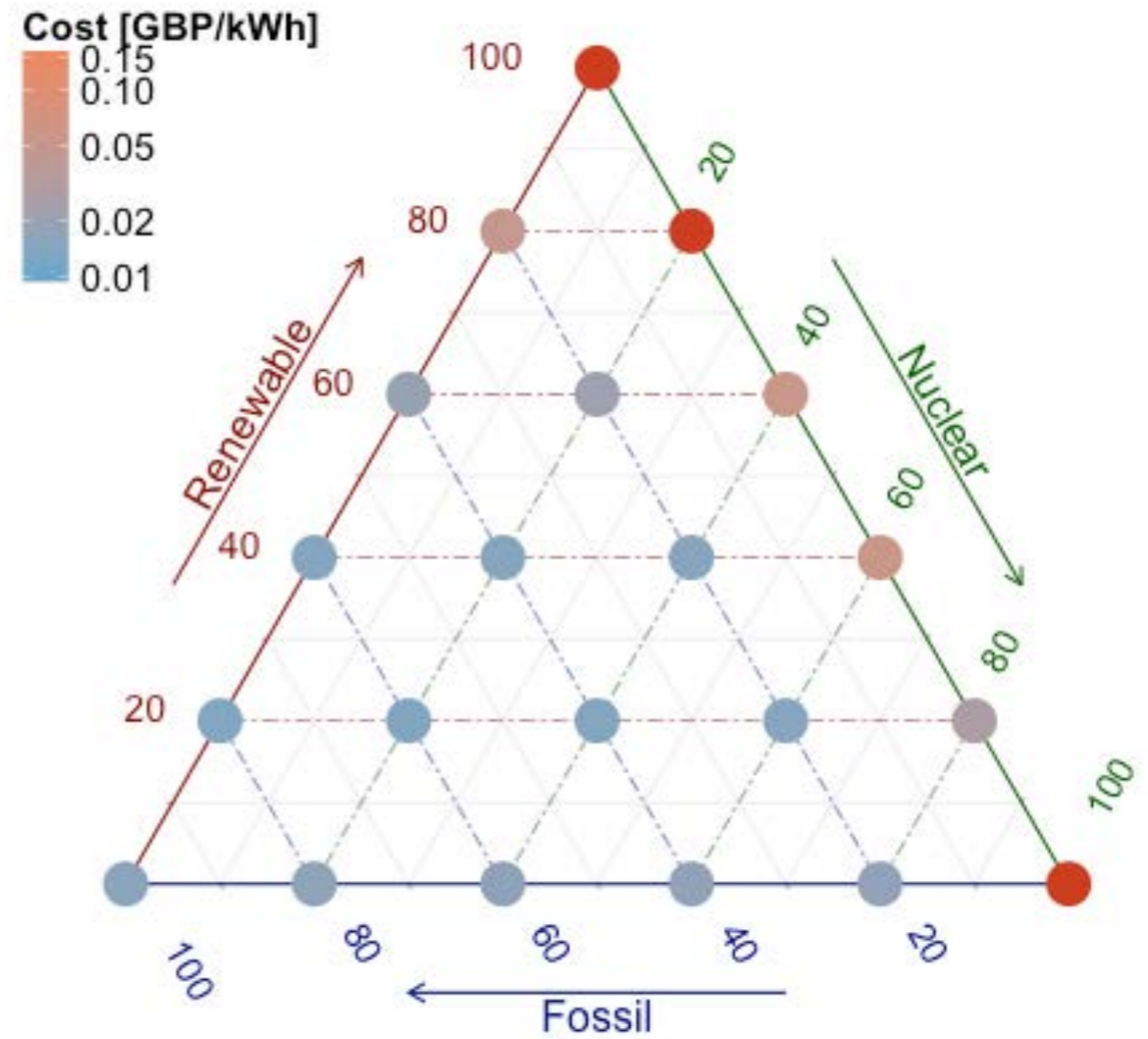
Desert solar imports



System-wide costs

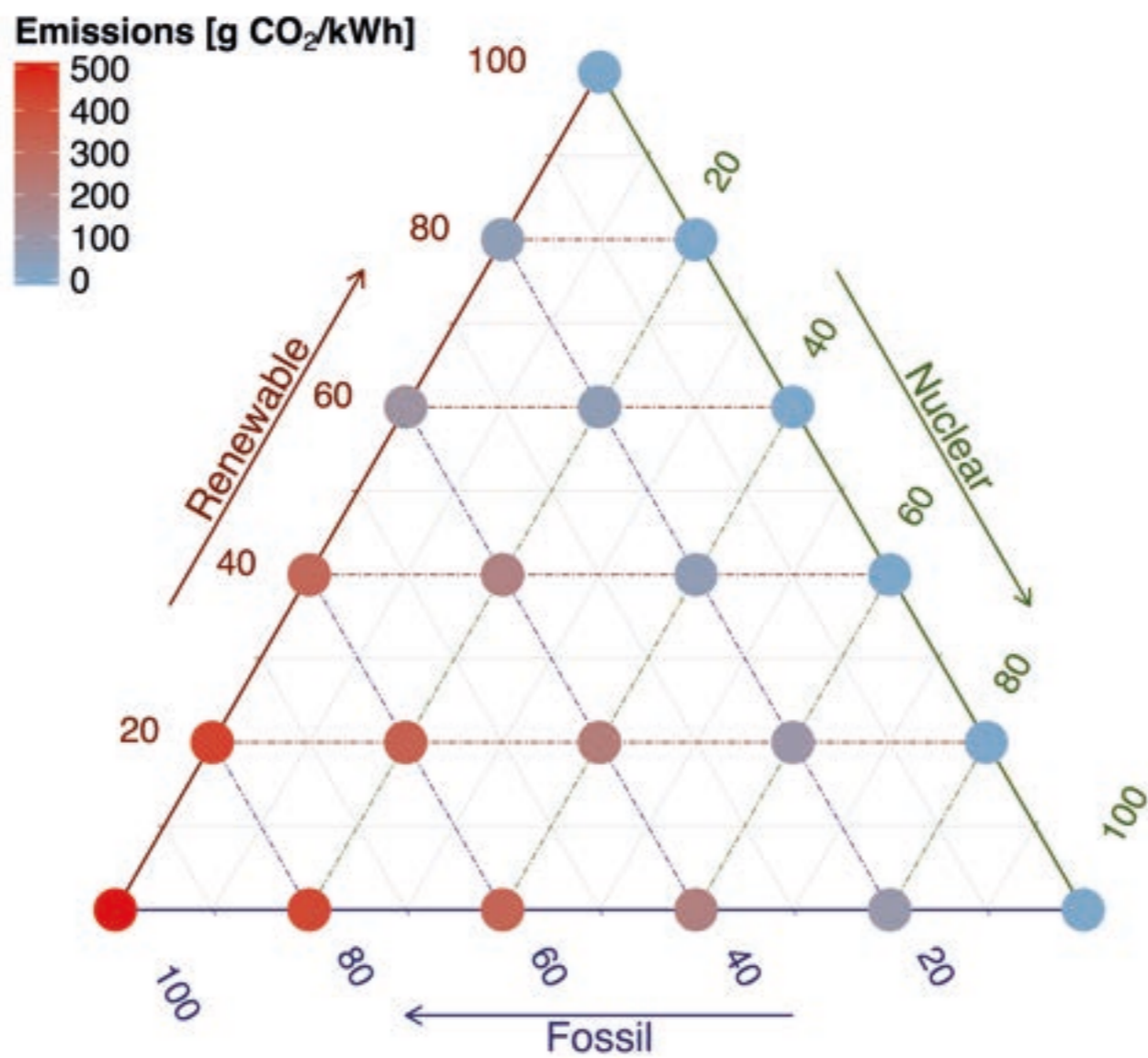


No imports



Desert solar imports

Emissions



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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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