

Case study house load + PV + heat pump

Workspace

Site location

UK-Gloucester (51.89, -2.19) · UTC

Battery

5kWh (5 kWh)

Inverter

Fox ESS H1-5.0-E (5 kW)

setpoints: cosy charge (6 periods)

Solar Arrays

west (Jinko Tiger Neo 54HL4R 445W, 7 panels, 3.1 kW)

east (Jinko Tiger Neo 54HL4R 445W, 7 panels, 3.1 kW)

Load profile

house (2,500 kWh/yr)

Heat pump

Valiant (rated 5,000 W · design house 20.5 °C · design flow 43 °C)

Tariff

cosy
import: 0.15, 0.28, 0.45 · export: 0.12 · daily standing: 0.60

Summary

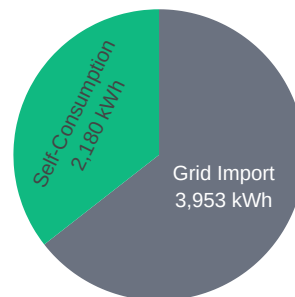
☀️ Solar Generated	5,559 kWh	(5,559 (utilised) + 0 (clipped))
📉 Load Consumed	6,133 kWh	1,629 GBP (cost without solar)
🔧 Space heating electric (heat pump)	2,862 kWh	(thermal generated 12,468)
🔧 Hot water electric (heat pump)	772 kWh	(thermal generated 2,179)
🔌 Grid Import	3,953 kWh	775 GBP
🔌 Grid Export	2,715 kWh	326 GBP
\$ Total benefit from solar & battery		1,179 GBP
\$ New electricity bill		669 GBP (775 (import) - 326 (export) + 219 (standing))

Self-Consumption

Share of load met from PV and batteries vs grid import.

35.5%

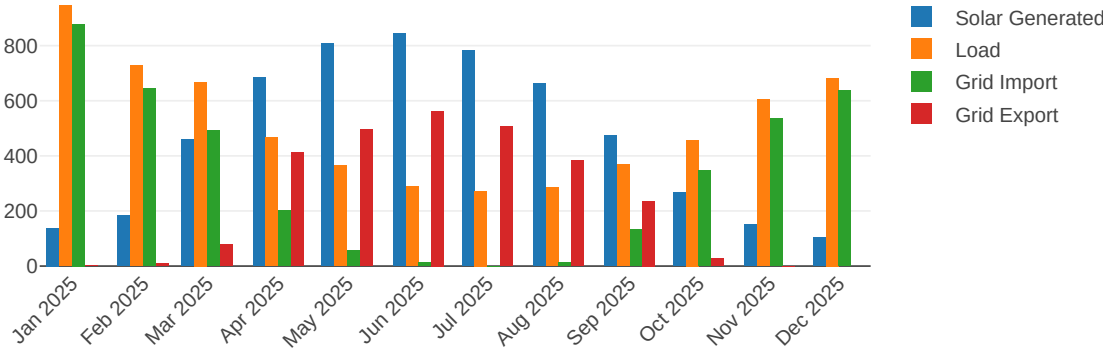
Spring: 49.9% Summer: 97.1%
Autumn: 29.1% Winter: 8.3%



Yearly Summary

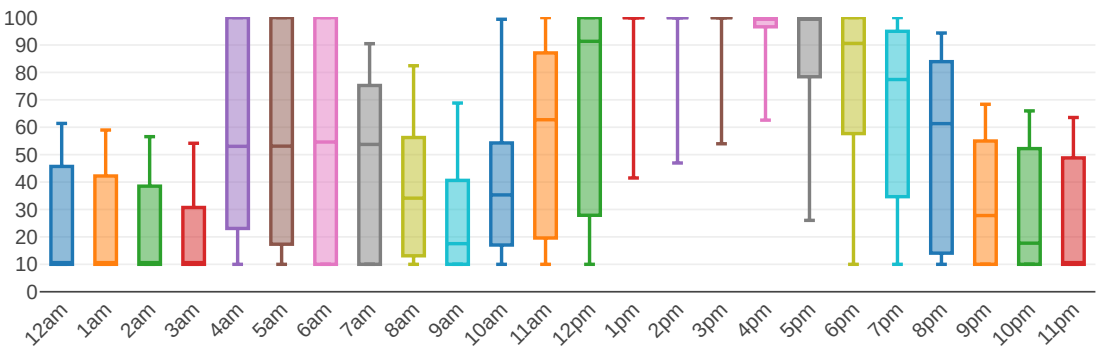
Monthly Energy Totals

Energy flows by month: solar, load, grid import, grid export.



SOC Distribution by Hour

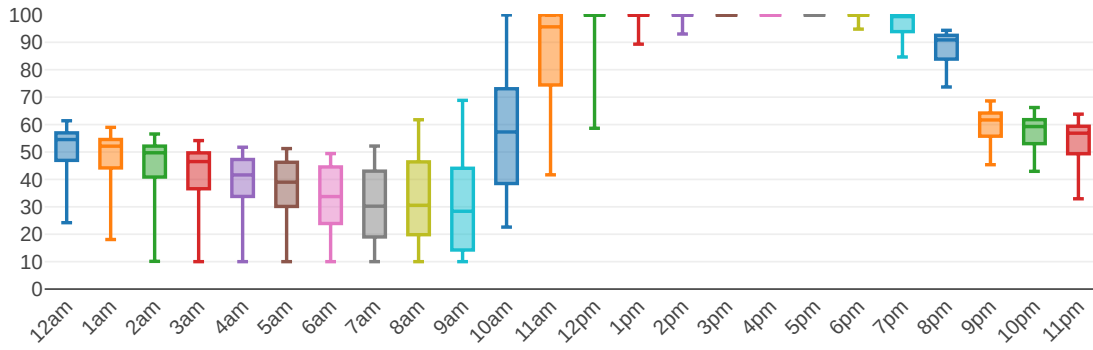
Spread of battery charge levels by hour (box plot).



Summer Monthly Summary

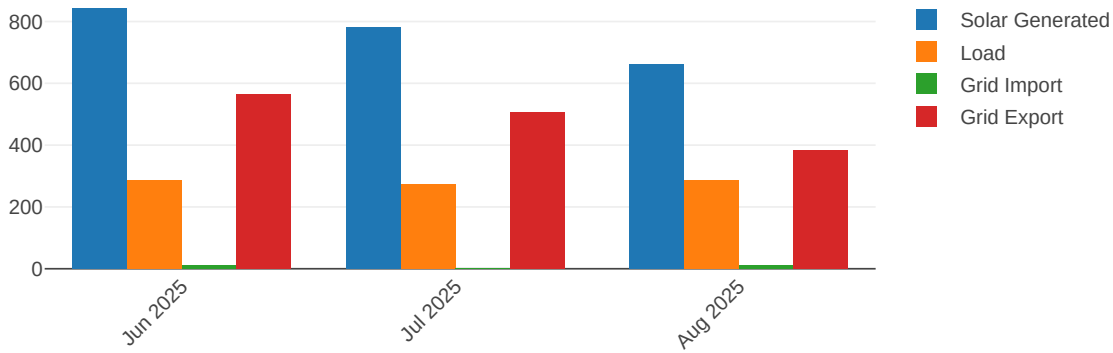
Summer SOC Distribution by Hour

Spread of battery charge levels by hour for June, July, August.



Summer Energy Totals by Month

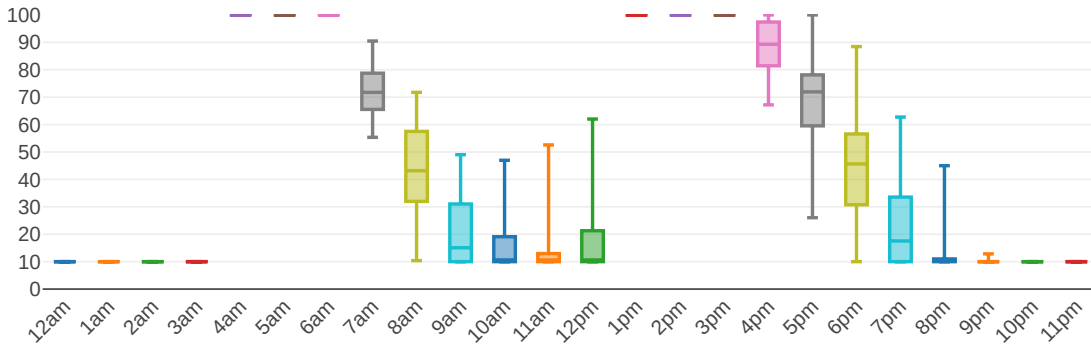
Energy flows for June, July, August: solar, load, grid import, grid export.



Winter Monthly Summary

Winter SOC Distribution by Hour

Spread of battery charge levels by hour for December, January, February.



Winter Energy Totals by Month

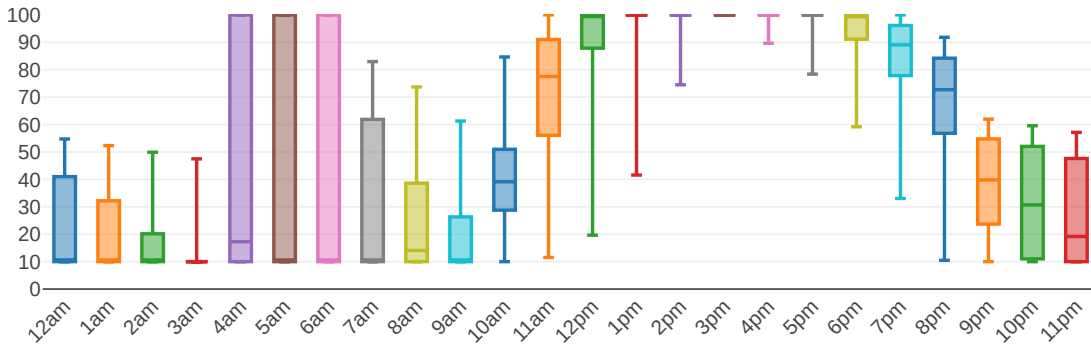
Energy flows for December, January, February: solar, load, grid import, grid export.



Spring Monthly Summary

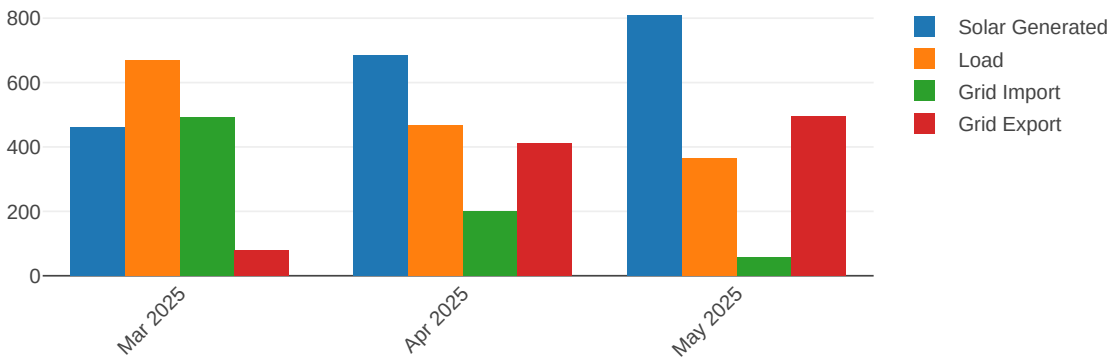
Spring SOC Distribution by Hour

Spread of battery charge levels by hour for March, April, May.



Spring Energy Totals by Month

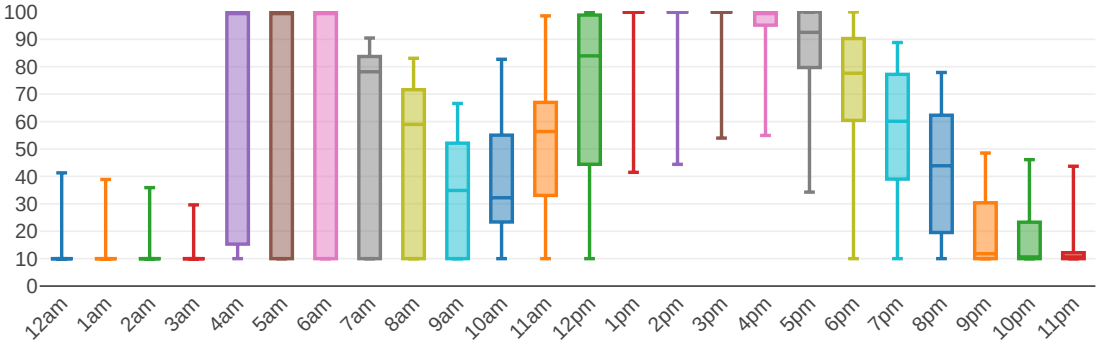
Energy flows for March, April, May: solar, load, grid import, grid export.



Autumn Monthly Summary

Autumn SOC Distribution by Hour

Spread of battery charge levels by hour for September, October, November.



Autumn Energy Totals by Month

Energy flows for September, October, November: solar, load, grid import, grid export.

