

100% electric and no heat pump?

Are you mad?

John Rich

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John Rich

Four big questions:

- 1. Gas is so cheap, 7p per kWh, why do anything else?**

But using gas, our CO2e emissions would have been 1.5Tonnes/year

Four big questions:

2. Electricity is so expensive at 28p per kWh

Mid-2024 to mid-2025

We used 6,800kWh of electricity in total

We bought 2,400kWh of day-time energy @ 26.75p/kWh

We bought 3,500kWh of night-time energy @ 7.05p/kWh

We sold 2,000kWh of solar pv energy @ 15p/kWh

We self-consumed 900kWh of our own solar pv, worth 26.75p/kWh

Overall, we paid £590 for 6,800kWh = 8.7p/kWh,

plus one standing charge of £200.

Four big questions:

3. Renewable electricity isn't really that green

It's the Market -v- Location CO2e question

About half is night-rate, so very green

And one-seventh self-generated, so definitely green

Four big questions:

4. but isn't a heat-pump a no-brainer?

It is not so good if you want play tunes on time and temperature programming in different rooms, so need quick warm-up

Our aim was:

- to be zero carbon, so no gas
- to dramatically cut energy use, so lots of insulation
- to generate our own electricity, so solar pv panels
- to use night-time energy during the day, so batteries
- to be experimental!
- lowest cost *now* was not a driver as this means gas ch

What we did:

- cut heat losses through the fabric



3kW heat loss when -5C outside and 20C inside

- cut heat losses through ventilation



Room extract = 17.8C and 60%rh

Exhaust air to outside = 14.6C

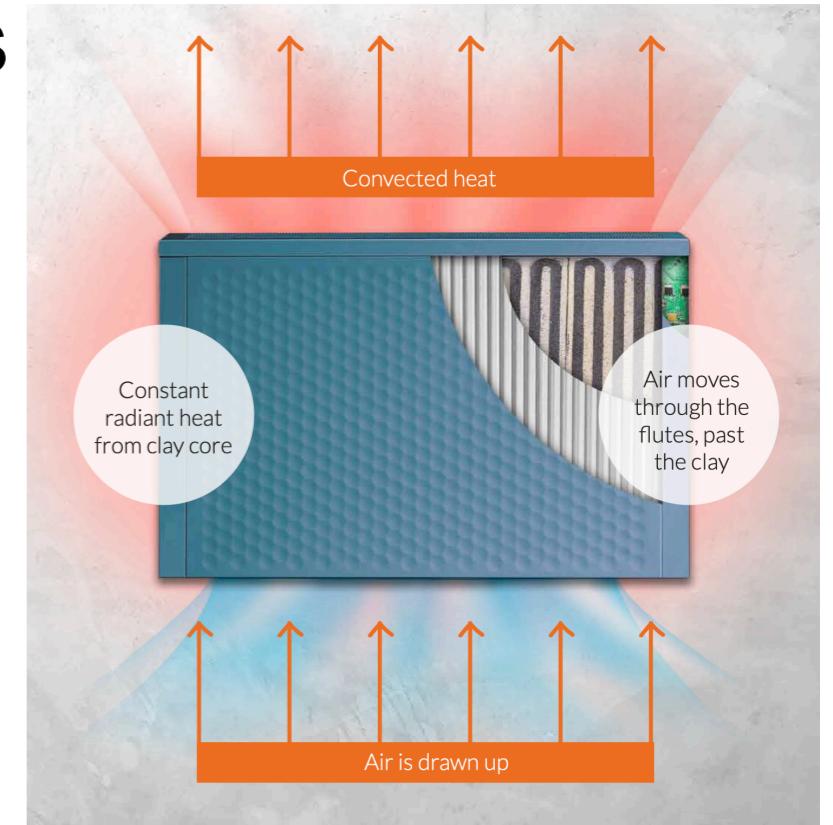
Outside air incoming = 14.3C

Room supply = 17.6C, 100% fresh air

- no hot water storage
- energy efficient kit



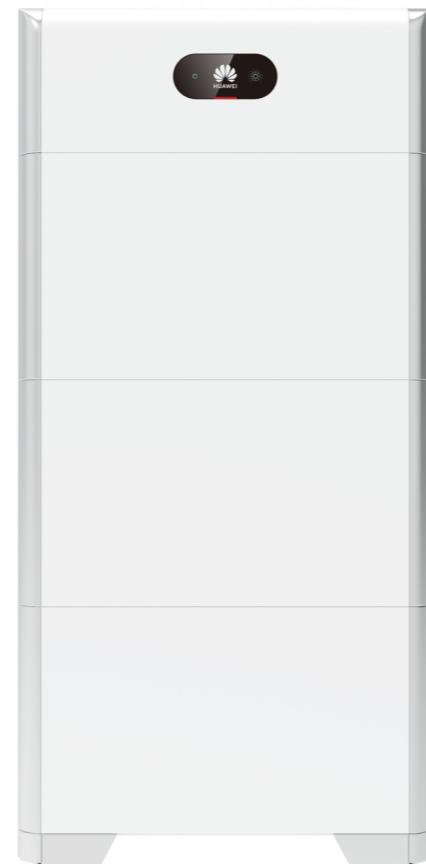
- heating - direct electric panel radiators



- self-generation



- battery storage



Challenges with our set-up:

- it's more complicated

because it is highly controllable

- it's more complicated

lighting a gas boiler or opening windows is so simple!

- it's more complicated

day rate, night rate, export rate, self-consumption, time-of-use all have an impact

- capital cost is high if you already have a nice house

it is easier if the existing systems need replacement

Up-coming game-changer:

- V2X Electric Vehicles and bidirectional chargers



Both have a 75kWh EV battery ready for V2X

This would mean the overall cost of electricity =

3.5p/kWh or £90/year

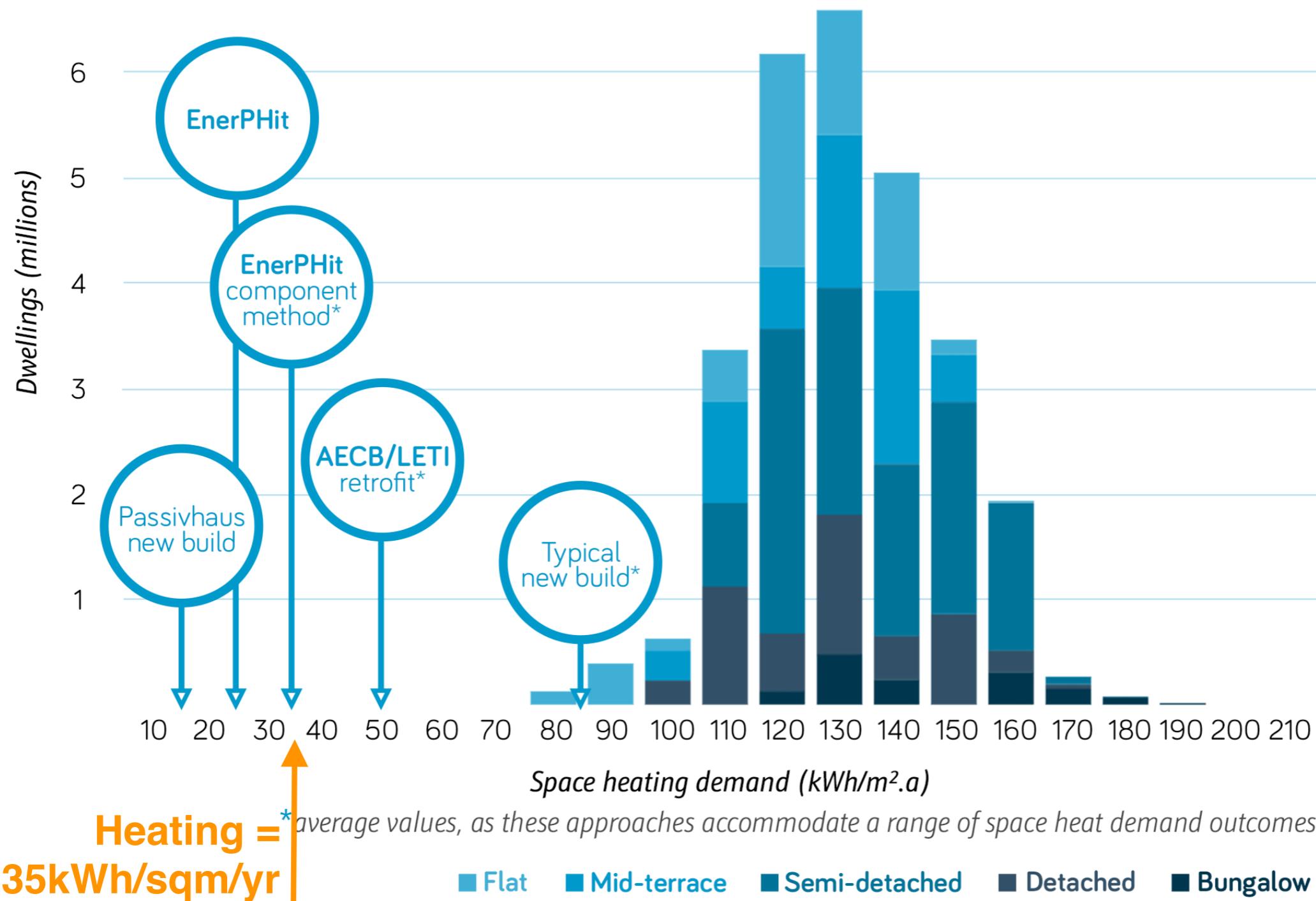
Why no ashp?

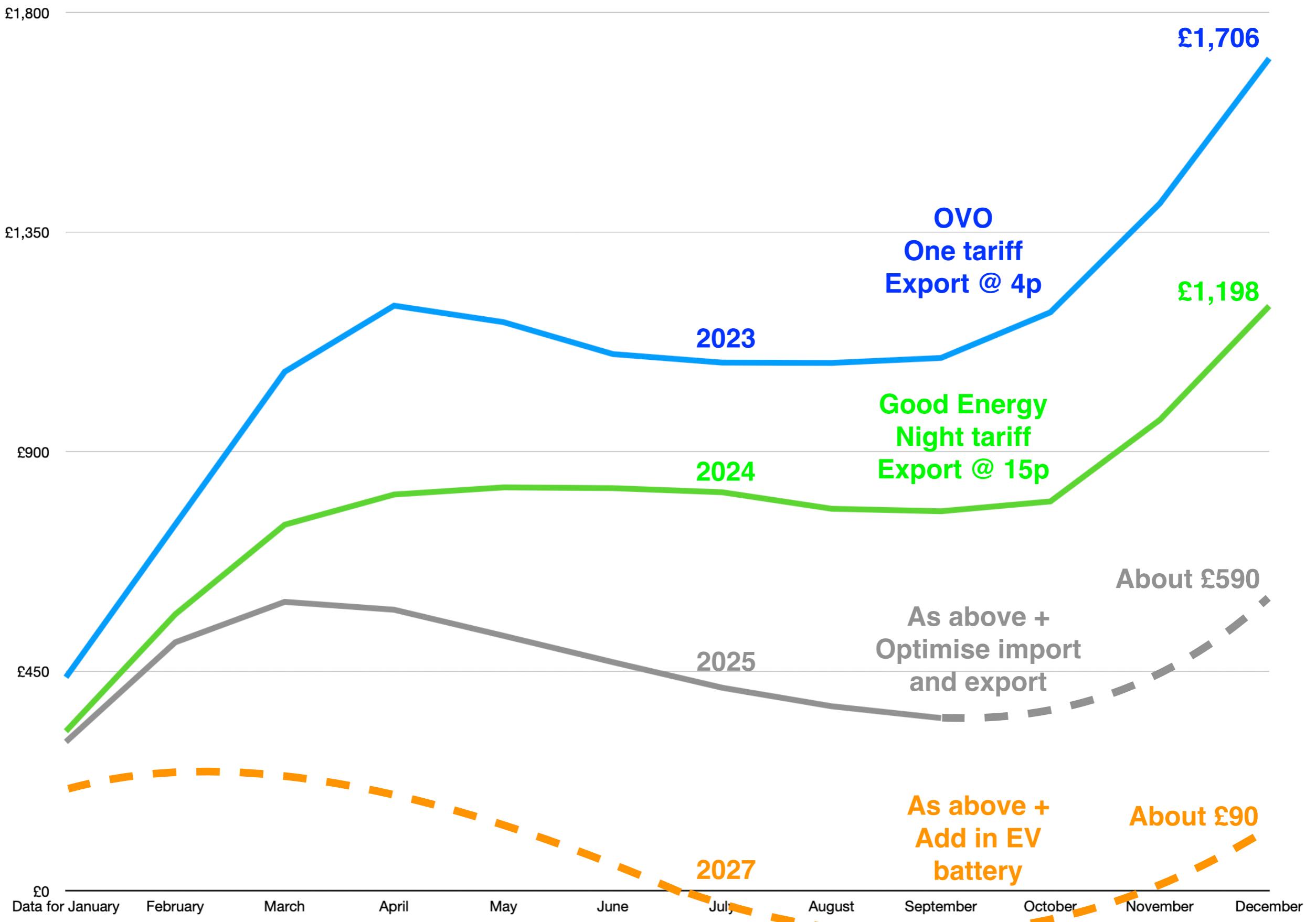
- £590/year for all our energy is already low
- £90/year with an EV battery will be *very* low

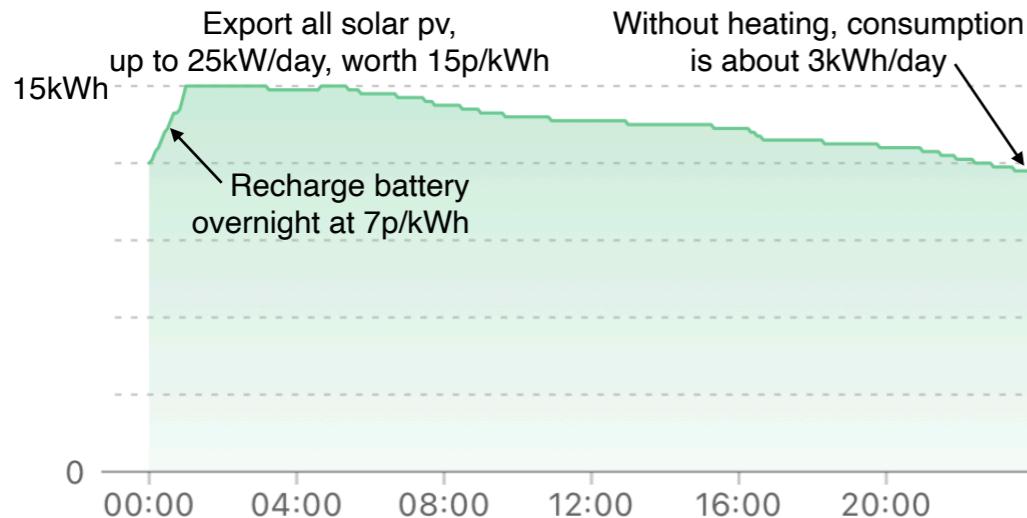
So, any financial saving would be negligible

Also:

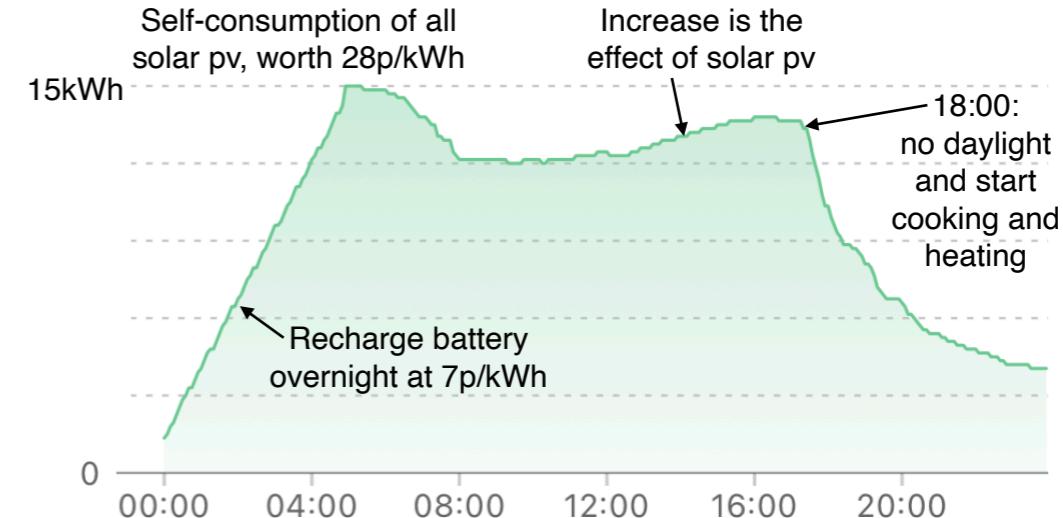
- our heating installation cost was lowish
- there is no need for annual maintenance
- the kit is simple, so less likely to go wrong
- we have dry radiators, so no leakage risk



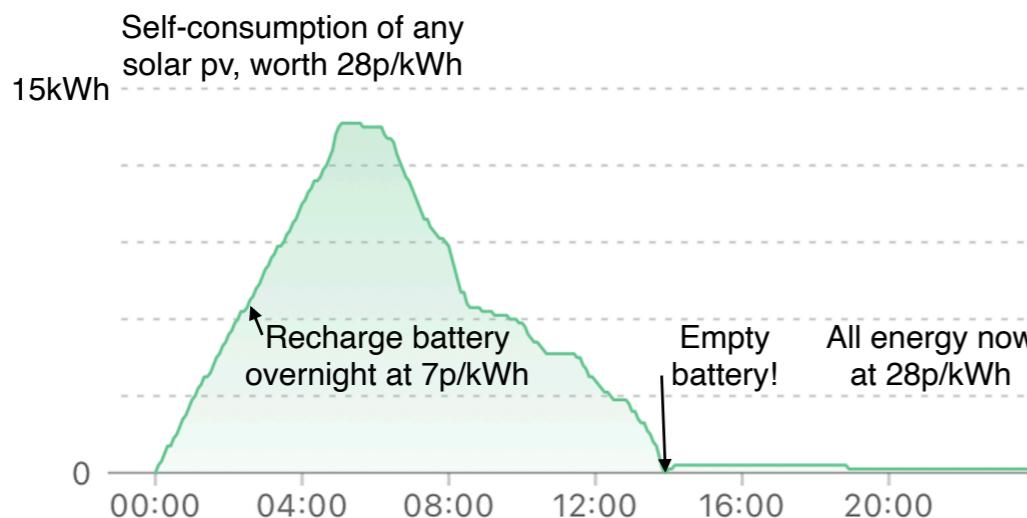




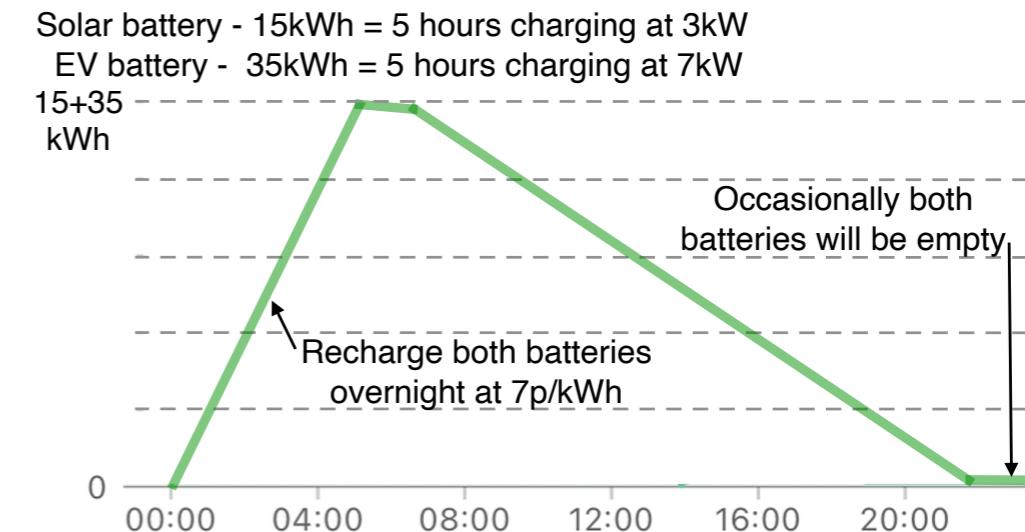
Summer:
April to September
PV > all export
Net export - ££



Spring/Autumn:
March & October
PV > all self-consumption
Net import - £



At present, Winter:
November to February
PV > all self-consumption
Net import - ££££



Winter with an EV battery:
November to February
PV > all self-consumption
Net import - ££