

***100% electric and no heat pump?***

***Are you mad?***

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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 CO<sub>2</sub>e 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

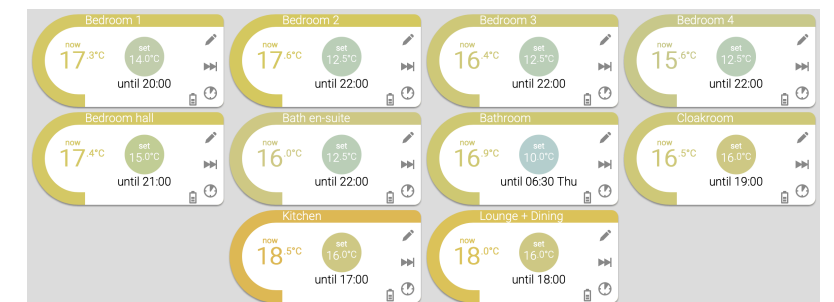
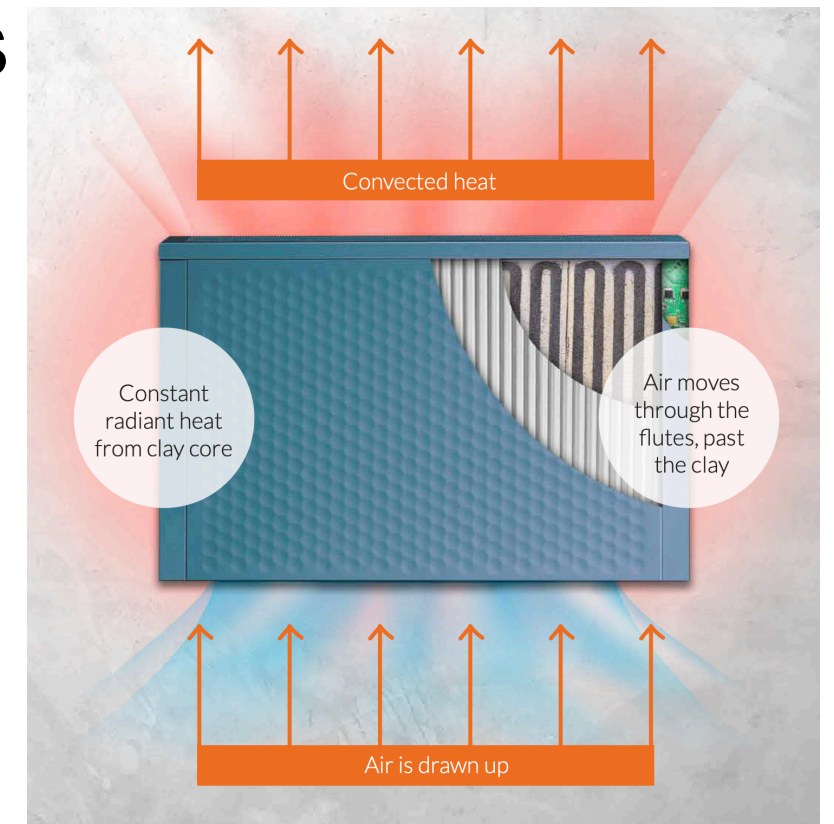
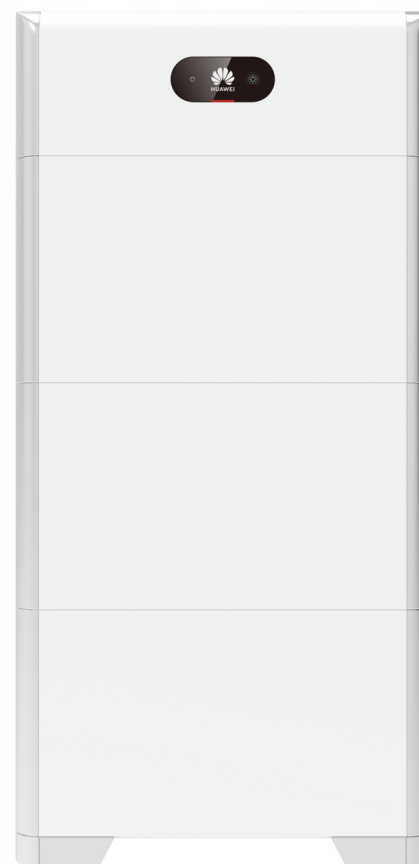


- heating - direct electric panel radiators

- 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*

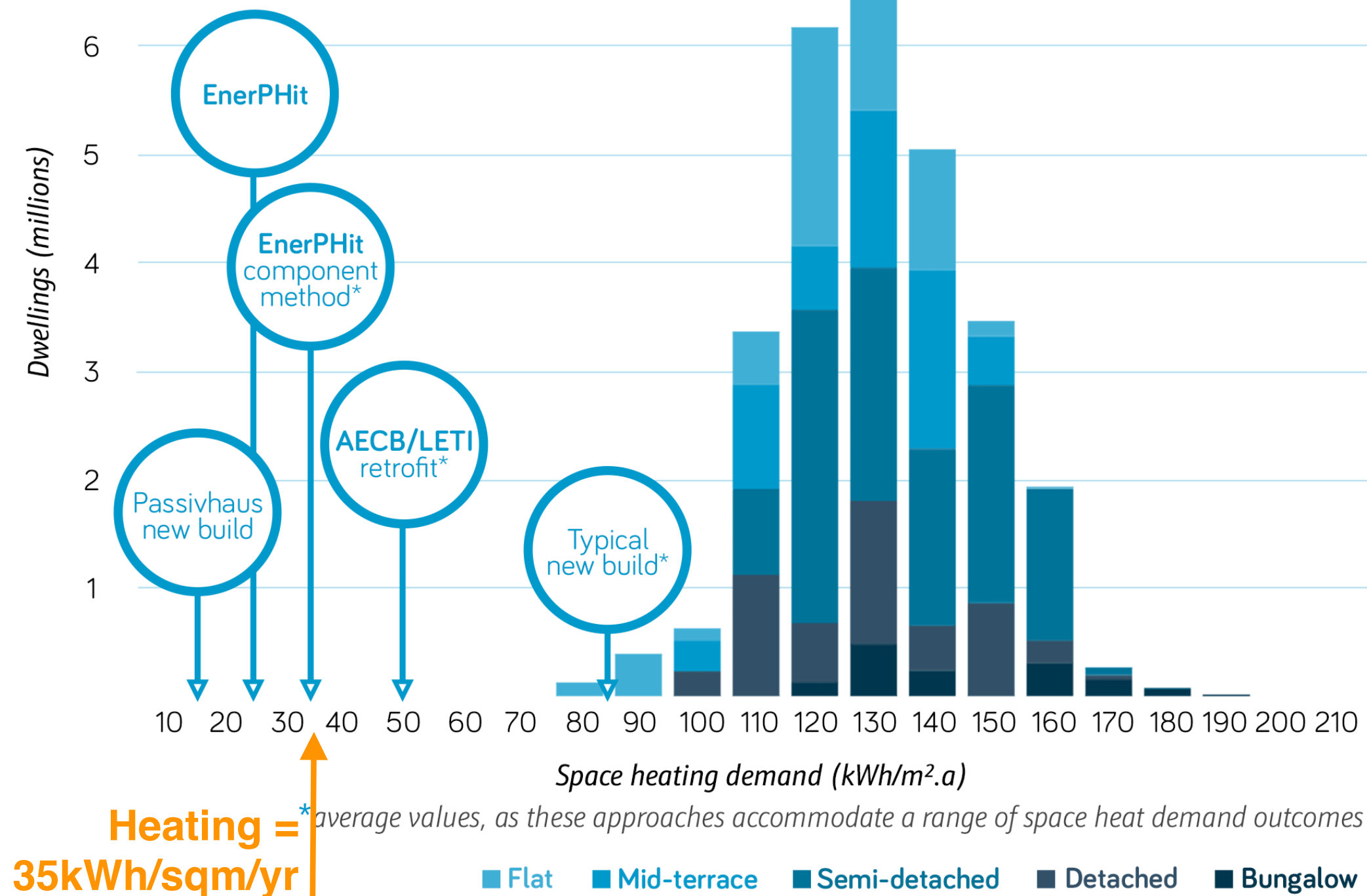
## Why no ashp?

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

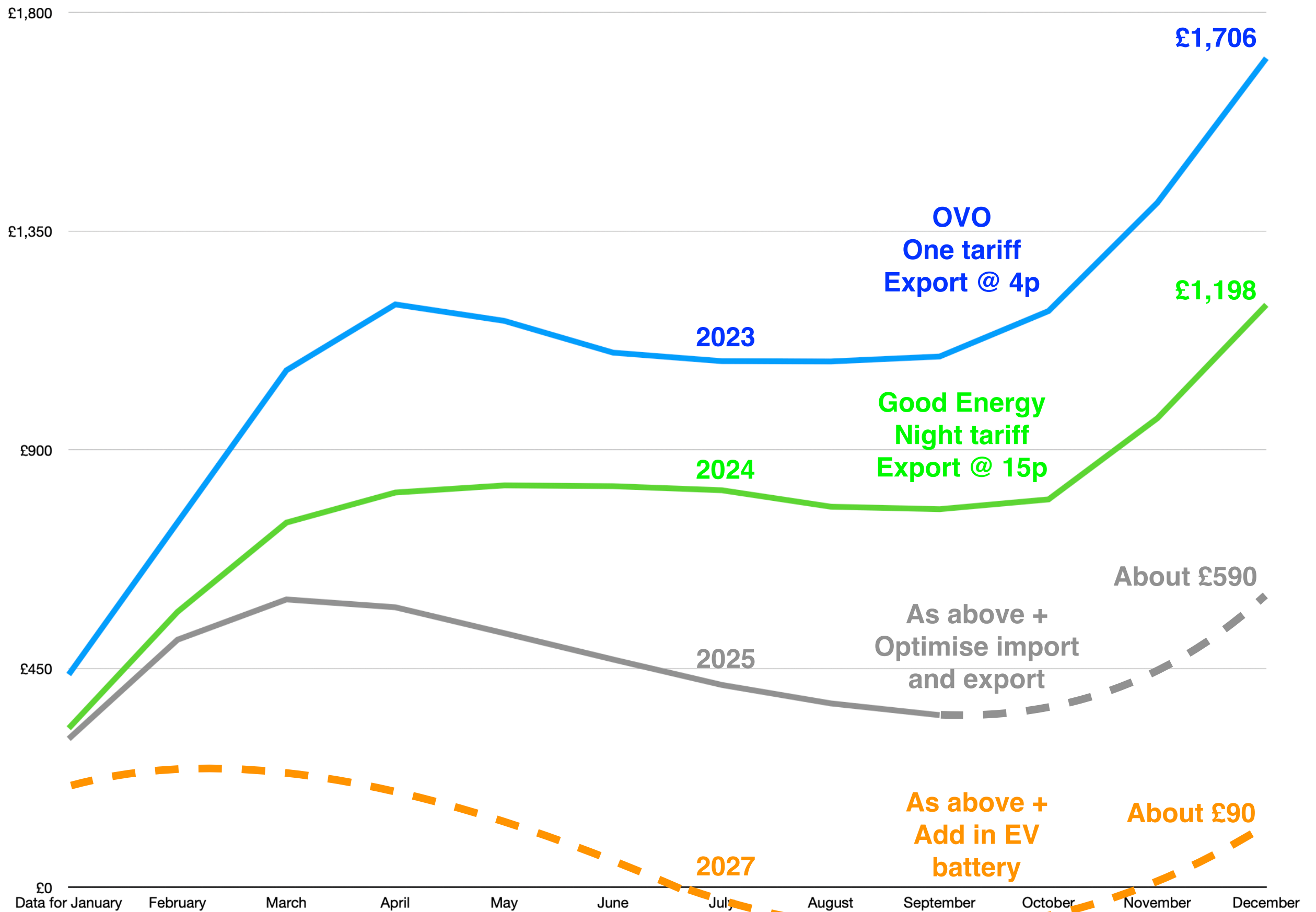
*So, any financial saving would be negligible*

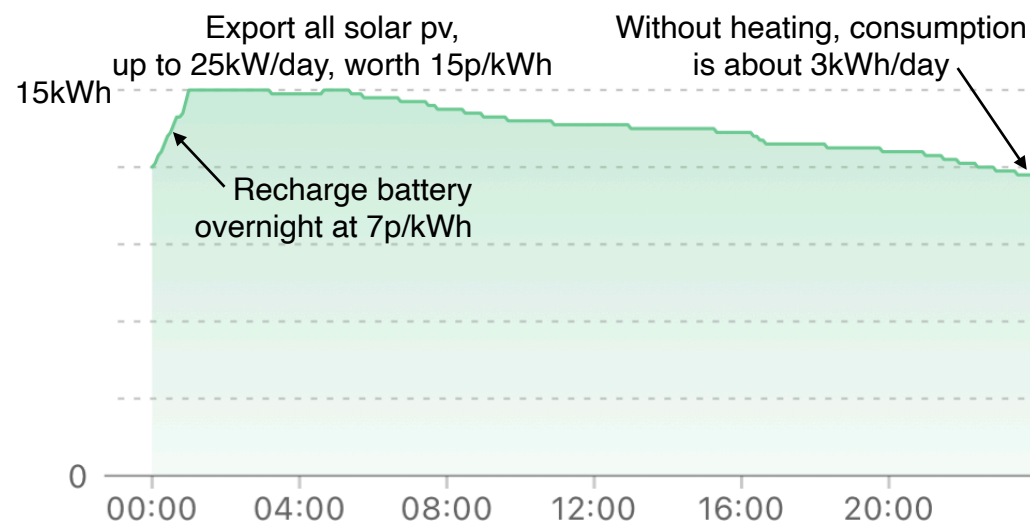
Also:

- 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

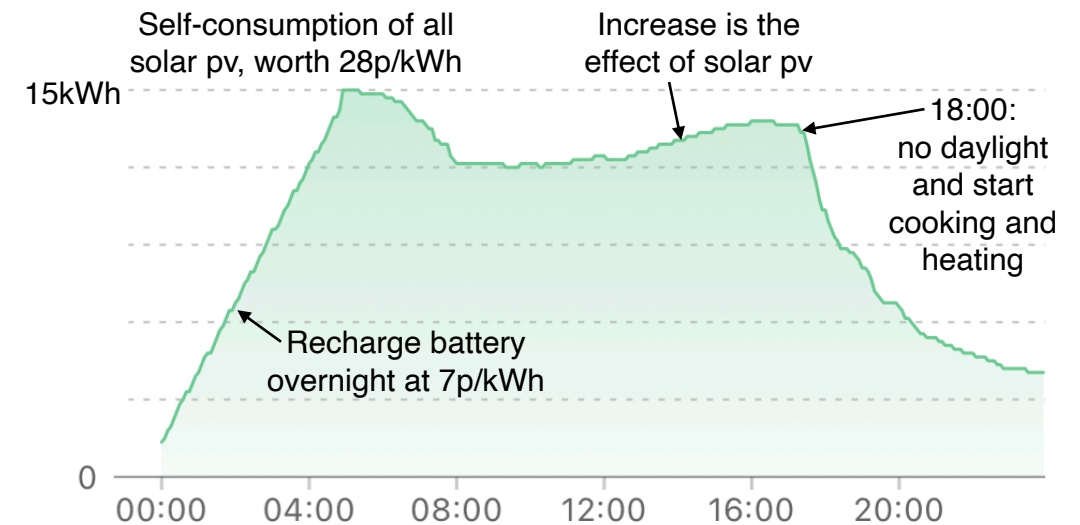




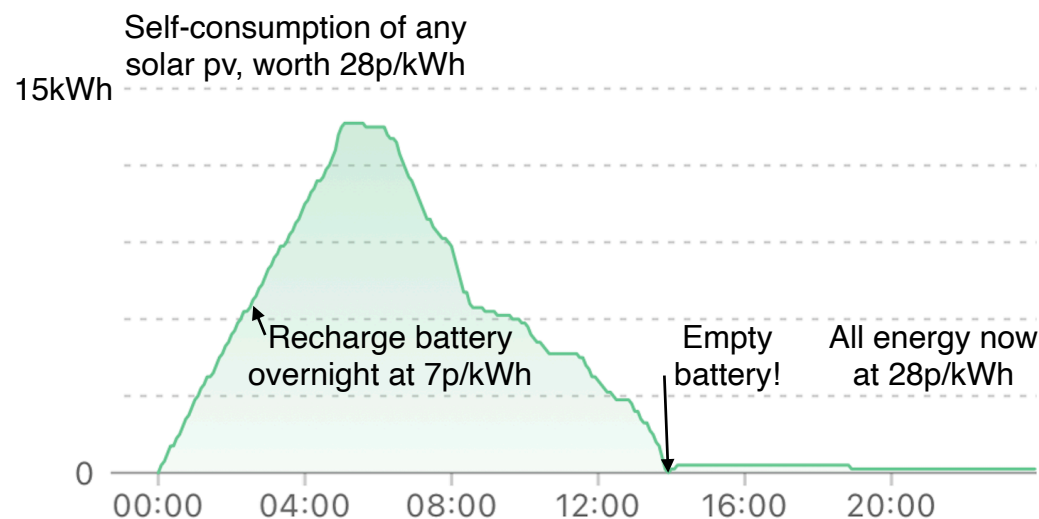




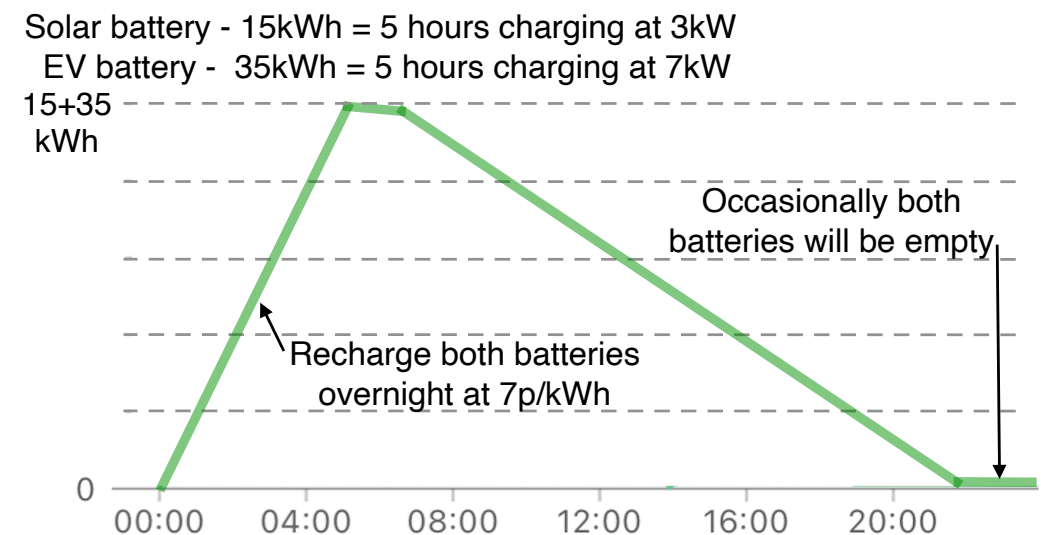
Summer:  
April to September  
PV > all export  
Net export - ££



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 - ££