

**Minimising our use of
off-site energy
(both electricity & petrol)**

Guy Palmer

What we have

- **2013: solar panels (30 panels)**
- **2013: solar batteries (28KWh)**
- **2020: electric car (Kona, 64KWh))**
- **2021: new solar battery (14KWh)**

**I am going to talk about a) the batteries,
b) how the whole thing works together
and c) the car**

Some overall numbers

- **We use an average of around 13KWh of electricity per day**
 - **During the day: 4KWh**
 - **During the evening & night: 9KWh**
- **We generate an average of around 20KWh per day**
 - **In Summer: 33KWh**
 - **In Winter: 8KWh**

Some energy efficiency measures

We used a lot more electricity before:

- We replaced all of our incandescent light bulbs**
- We got an induction top**
- We switched our air conditioner from standby to off**

Our battery



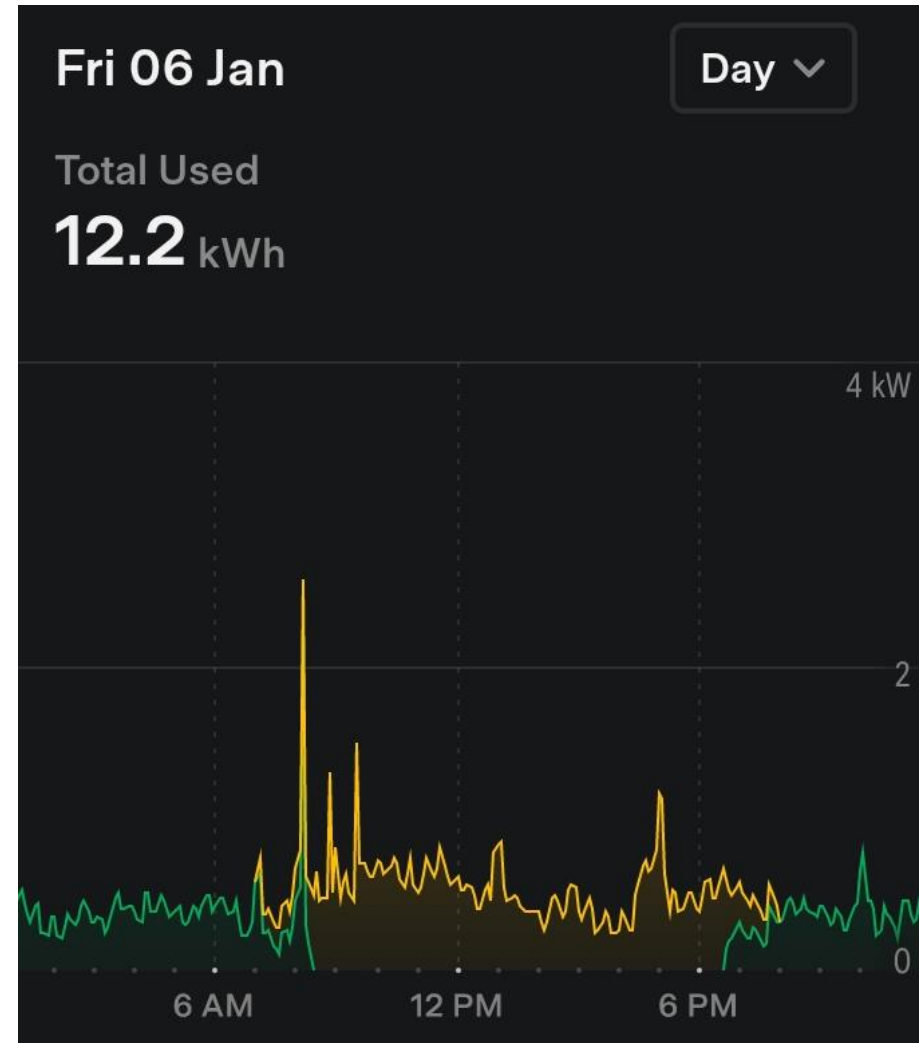
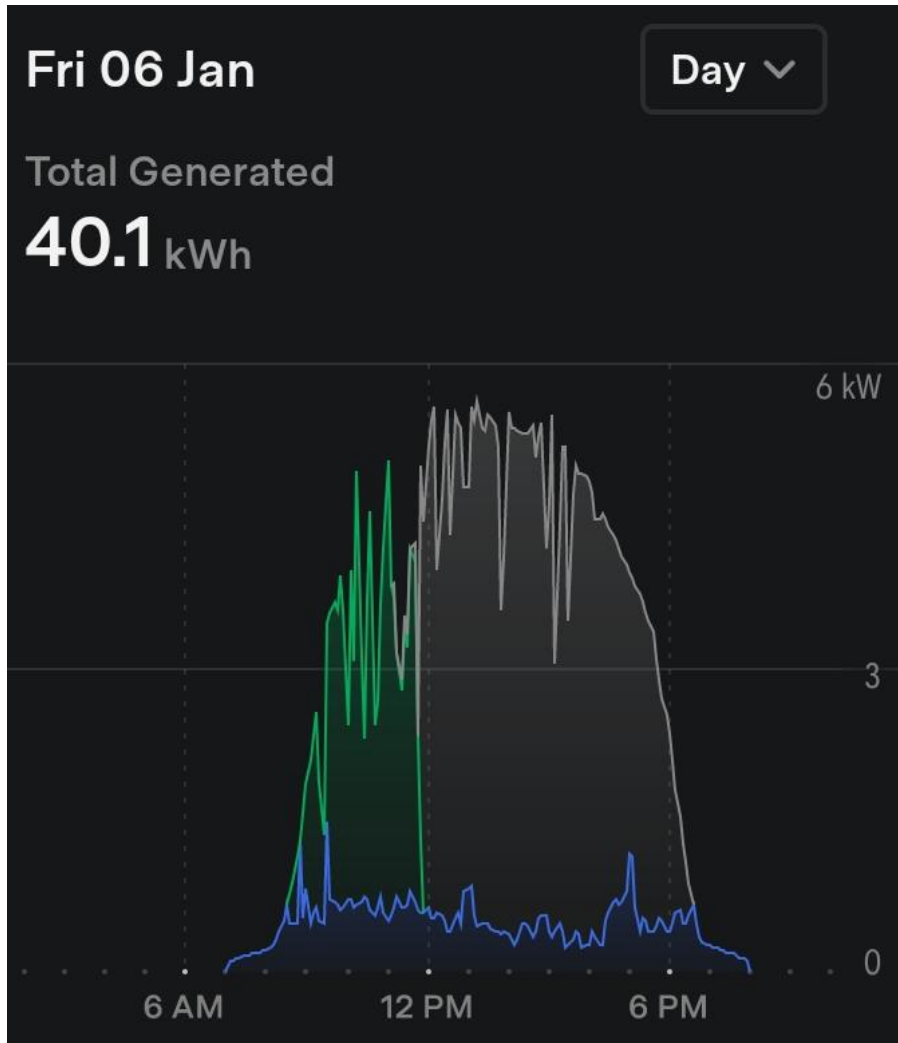
The battery in concept

- **Just about any solar system produces excess electricity during the day during much of the year**
- **This excess is used to charge the battery**
- **The battery then powers the house overnight**
- **So no grid electricity is used**

The battery in concept (cont)

- **Some people with batteries go off grid for self-sustainability reasons**
- **We are on grid so that our excess, even after charging the battery and car, is not lost to the world**
- **And also we don't have to act like hermits during Winter**

Lots of info on your phone



The battery in practice

- **Our 2013 batteries were actually rather problematic in several ways, inc. degradation**
- **Our 2021 replacement battery (singular) works smoothly and without any effort from us**
- **Cost \$10-20K (depending on the inverter and subsidies)**
- **Its only issue is that we had to buy from Tesla**

Doing your laundry

Setup	When laundry?
Early solar adopter	At night (to maximise exports)
Later solar adopter	During the day (to minimise imports)
Battery-based system	Whenever suits (it doesn't matter)

Some choices

- **Placement of panels: link up in parallel; maybe cut a tree down**
- **Number of panels: the maximum allowed on a single phase**
- **Angle of panels: the steeper, the better (cf. Winter); at least 15deg**
- **Size of battery: at least to go from sunset to sunrise**

The overall concept

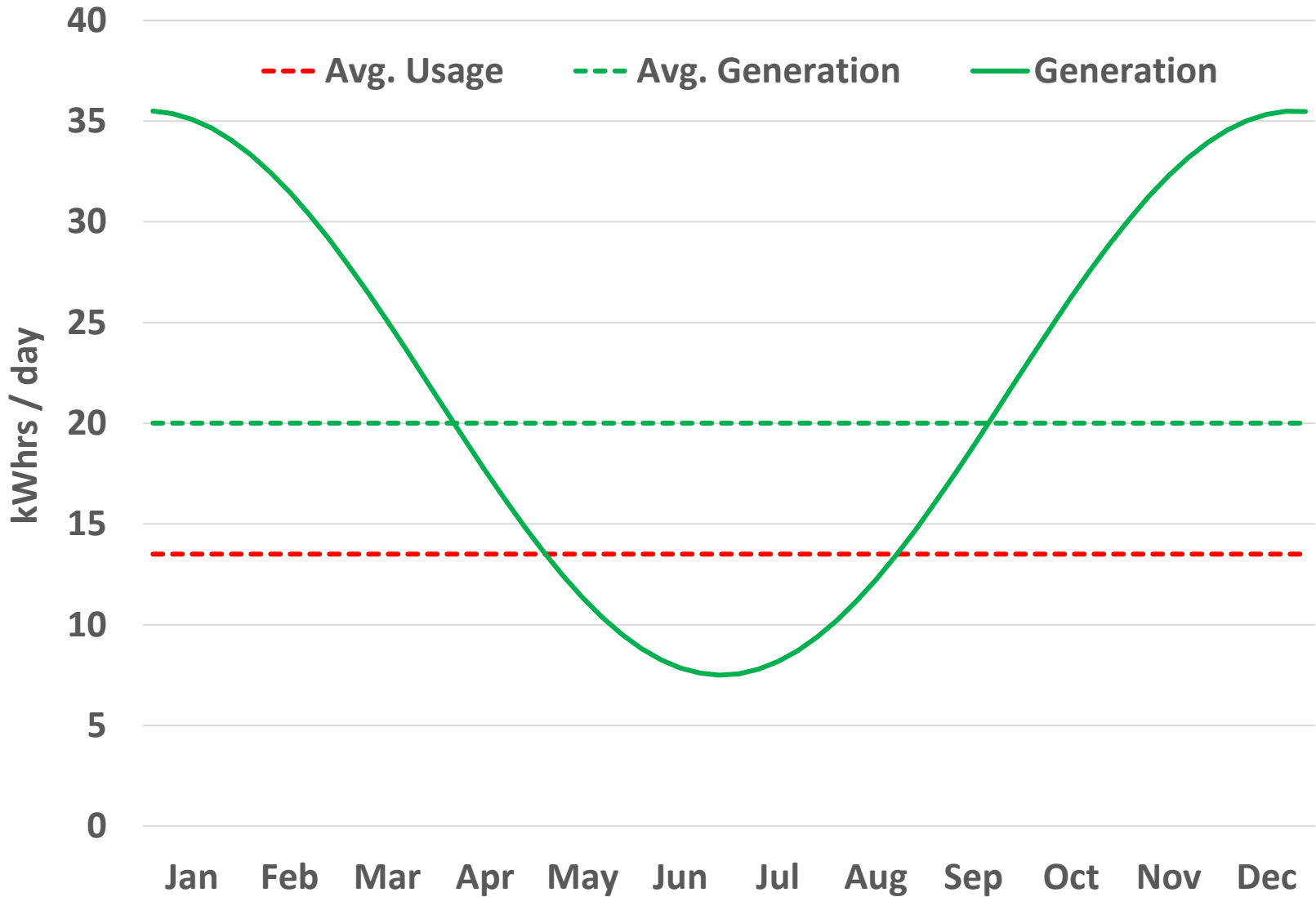
- **We want to ‘tread lightly’ by minimising our use of external energy, both electricity & petrol**
- **The battery minimises use of grid electricity overnight**
- **The car is mostly charged from our excess solar power so it doesn’t use external energy**

If no solar

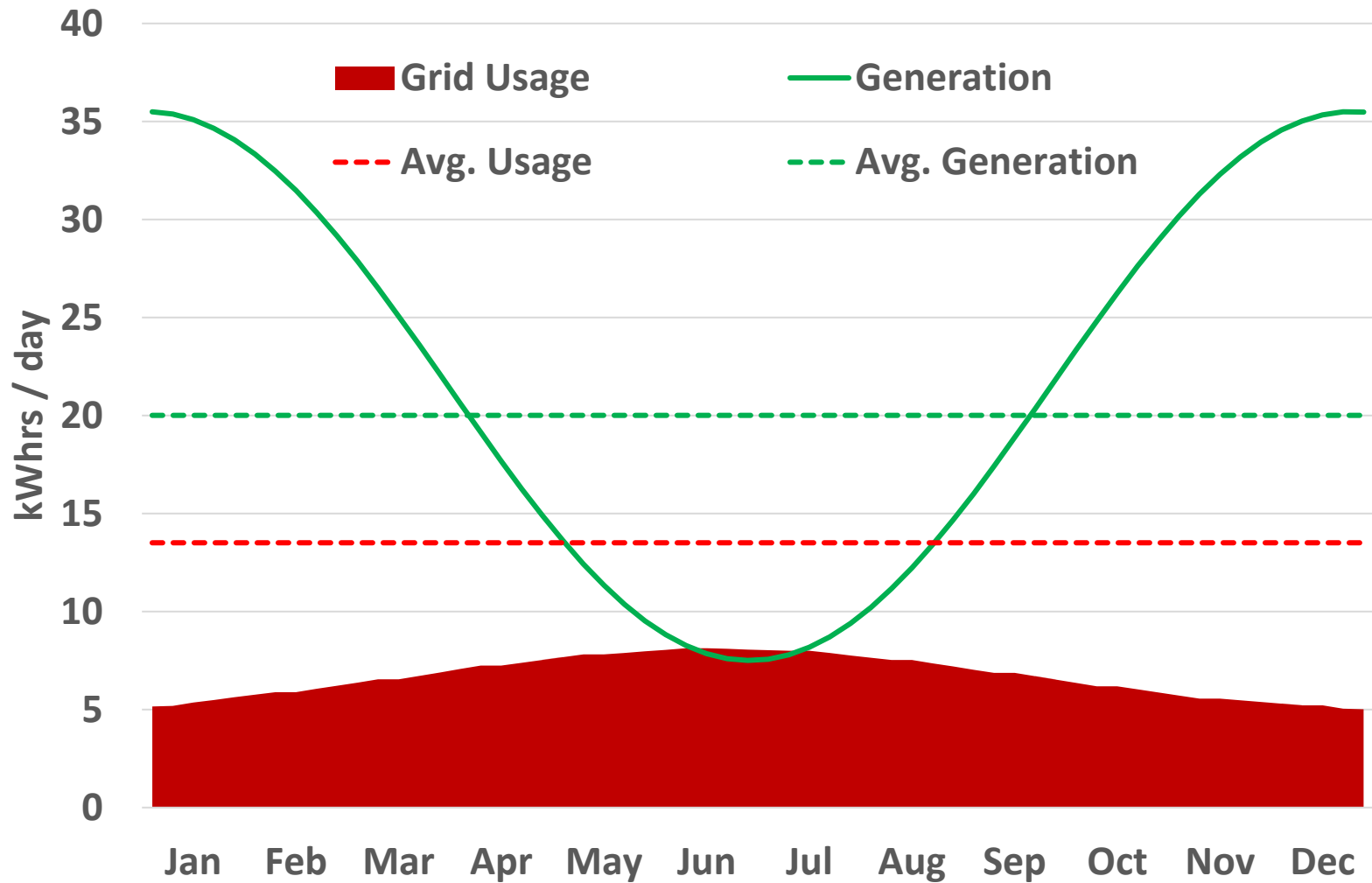


Use 4,900 KWhrs of grid electricity per year

Solar generation

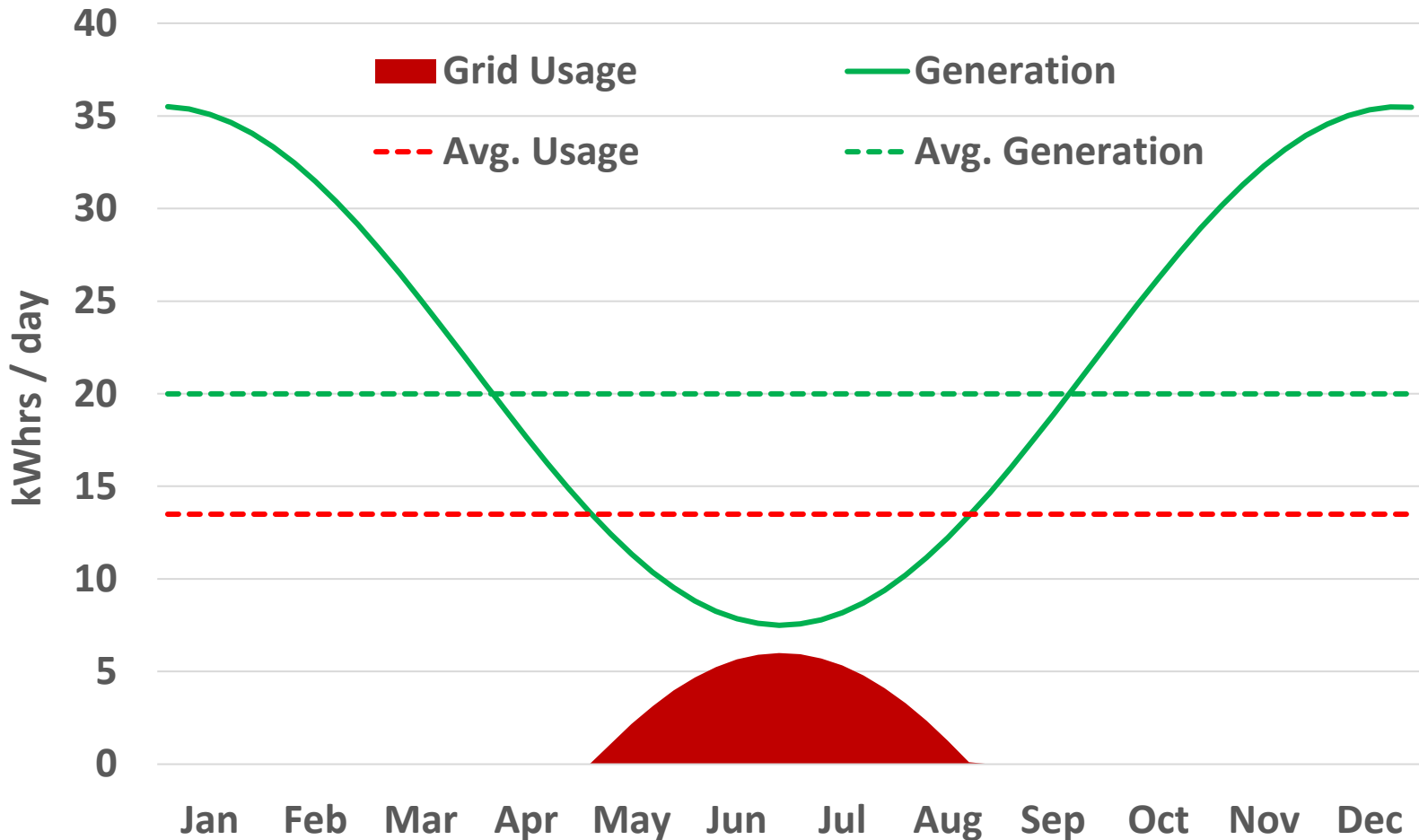


If solar but no battery



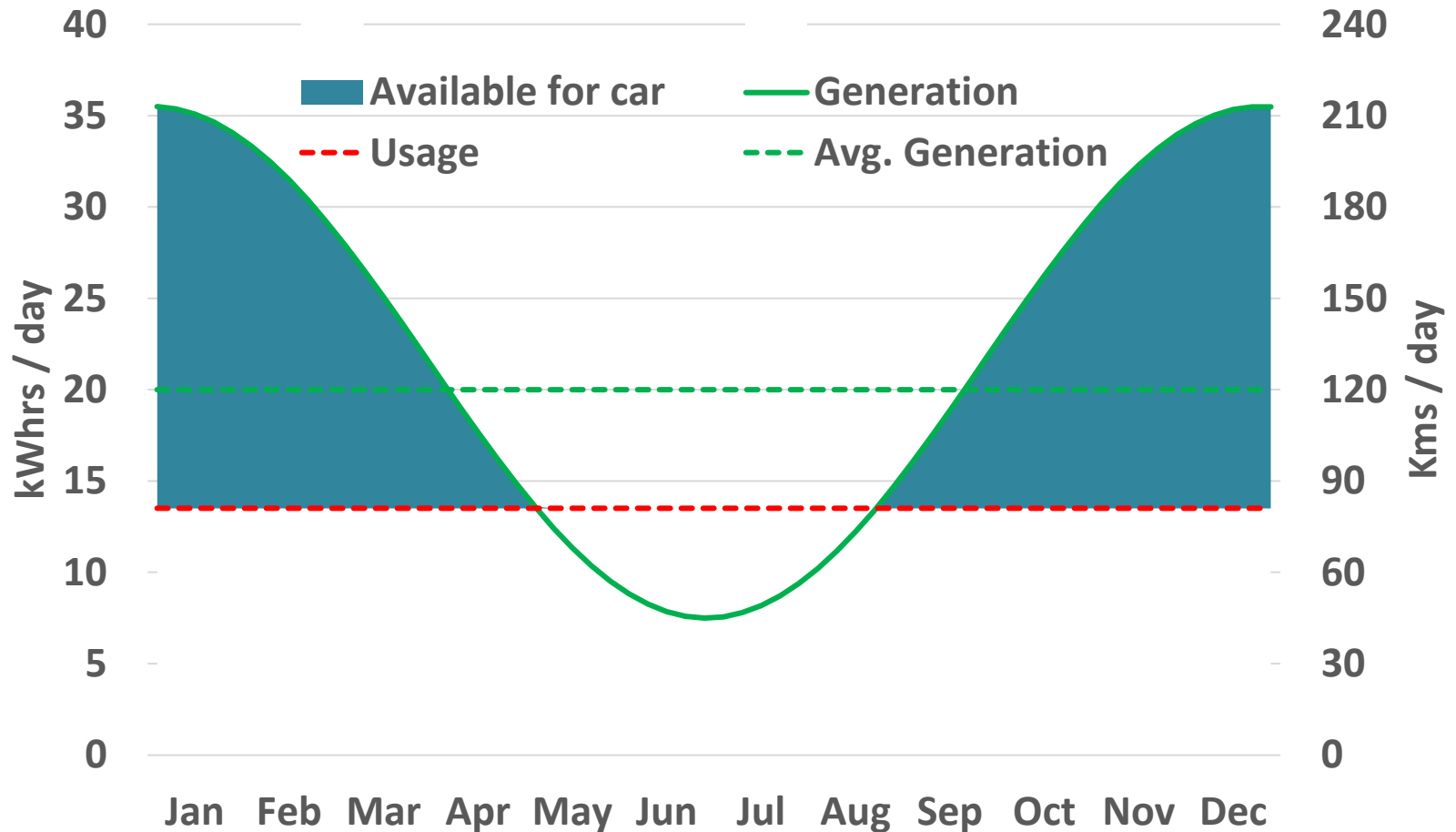
**Use 2,400 KWhrs of grid electricity per year
(i.e. save 2,500 or 50%)**

If solar and battery



**Use 400 KWhrs of grid electricity per year
(i.e. save 4,500 or 90%)**

If solar, battery and electric car



Can drive 20,000 km on the surplus electricity

Some practical issues

- **Our smallish battery means that we use grid electricity if we have a few very cloudy days in a row**
- **Only charging the car during the day on sunny days requires a bit of management plus some good luck**

To repeat: the overall concept

- **We want to ‘tread lightly’ by minimising our use of external energy, both electricity & petrol**
- **The battery minimises use of grid electricity overnight**
- **The car is mostly charged from our excess solar power so it doesn’t use external energy**

Our electric car

- **Hyundai Kona Highlander**
- **Fully electric**
- **Cost around \$60,000 in 2020**
- **Range of around 420km**

When purchased, it was basically 1 of 3 possibilities. Now there are around 40 realistic options from \$40K upwards.

Our electric car



As a driving experience

- **Silent**
- **Goes like a bomb**
- **No gap between you accelerating and it accelerating**
- **If you want, it brakes when you take your foot off the accelerator**

Sustainability issues aside, I could never go back to driving a petrol car

Lots of info on your phone

The car is on the Internet. So:

- **Know where it is**
- **Alerts of someone hits it, etc**
- **Driving records**
- **Remote lock/unlock**
- **Can remotely pre-heat or pre-cool the car**

Charging

- **Electric cars are designed to be mostly charged at home**
- **If plugged into a home charger (cost \$2-3K), will 'fully charge' in around 12 hours**
- **If plugged into a normal plug socket, will charge around 100-150km overnight**

Charging on surplus electricity

- **Want to charge when there is surplus electricity after house use and battery charging**
- **So, charge during the day and on sunny days (rather than overnight)**

Going on holiday

- **There are lots of chargers, inc. lots of fast chargers**
- **Just need a smartphone and your brain in gear**
- **Fast chargers take around 1 hour to 'fully charge' your car**
- **Often located in RSLs or equivalent**
- **Ok for all of Victoria (except, maybe, Mildura)**

Where the chargers are



Here is the man for you

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Some concluding thoughts

- **It's about much more than money**
- **It feels that a) I am doing the right thing and b) it all fits together**
- **The costs are coming down all the time. It is not a question of 'if' but 'when'.**
- **Every house in Australia should, as a minimum, have solar panels**