

## peaks\_trial

### Flow, Parameters and Guidance

*This script takes information about multiple device and returns ON and OFF times that minimise the 'cost' whilst ensuring a set overall power limit is not exceeded.*

*The code is currently in a working state, therefore it only uses template data and plots are intended to demonstrate action of the optimisation.*

### INPUTS

- Device Information in following format shown in Table 1. For the code in its current working state, only **power** and **on\_period** are relevant.
- Power Limit (given as an integer)
- 24 hr Cost Variable forecast for each device (generated using random numbers)

Table 1

Parameter	Value	comments
device_name	String eg. 'EV charger'	
power	Integer eg. 4	<i>In multiples of 0.25MW</i>
on_period	Integer eg. 6	<i>In multiples of 30 minutes</i>
use_OFF	Boolean T/F eg 'true'	
s_OFF	String HH:MM eg. '14:30'	<i>Start of 'must be OFF' period, minutes must be 00 or 30</i>
e_OFF	String HH:MM eg. '14:30'	<i>End of 'must be OFF' period, minutes must be 00 or 30</i>
use_deadline	Boolean T/F eg 'true'	
deadline	String HH:MM eg. '14:30'	<i>Minutes must be 00 or 30</i>

### OUTPUTS

- Time to turn devices ON
- Time to turn devices OFF

### OPTIMISATION

In general, the optimisation to find the 'best' time to turn the devices ON/OFF works as follows:

1. A master power vector is created to monitor the power value at each half hour period
2. The devices are ordered according to the size of the largest cost variable in their forecasts
3. Starting with the device with the largest cost variable, each device is placed at the available start time that has the lowest associated cost in the following manner:
  - a. The device is placed at the time that has the lowest cost.
  - b. The power of the device is added to the master power vector to see if the power limit has been exceeded.
  - c. If the power limited has been exceeded, the next best cost is tested.
  - d. This continues until the power limit has not been exceeded, and the optimisation moves onto placing the next device.

- e. If at any point a device cannot be placed without exceeding the power limit, the optimisation is halted.

#### EXAMPLE

Using the following device data as shown in Table 2.

Table 2

Device Number	On period	Power
1	4	8
2	6	4
3	9	12

The following plots in Figure 1, Figure 2 and Figure 3 show the sequential placement of the three devices with a power limit of 20. The blue line shows the power limit and the orange line shows the cumulative power after each device has been placed.

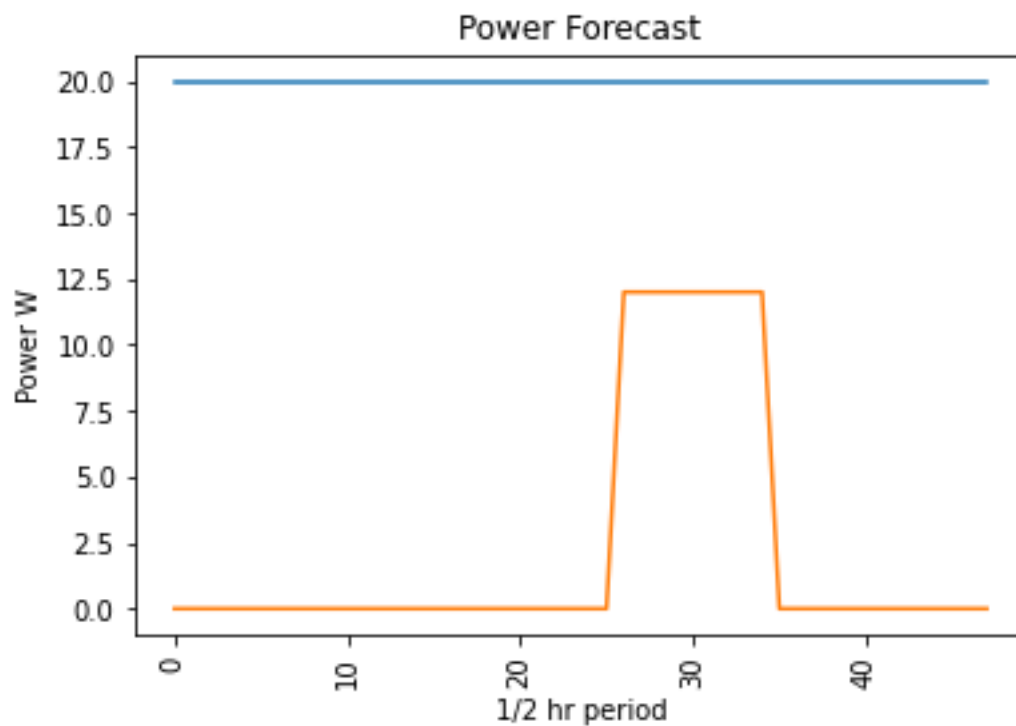


Figure 1

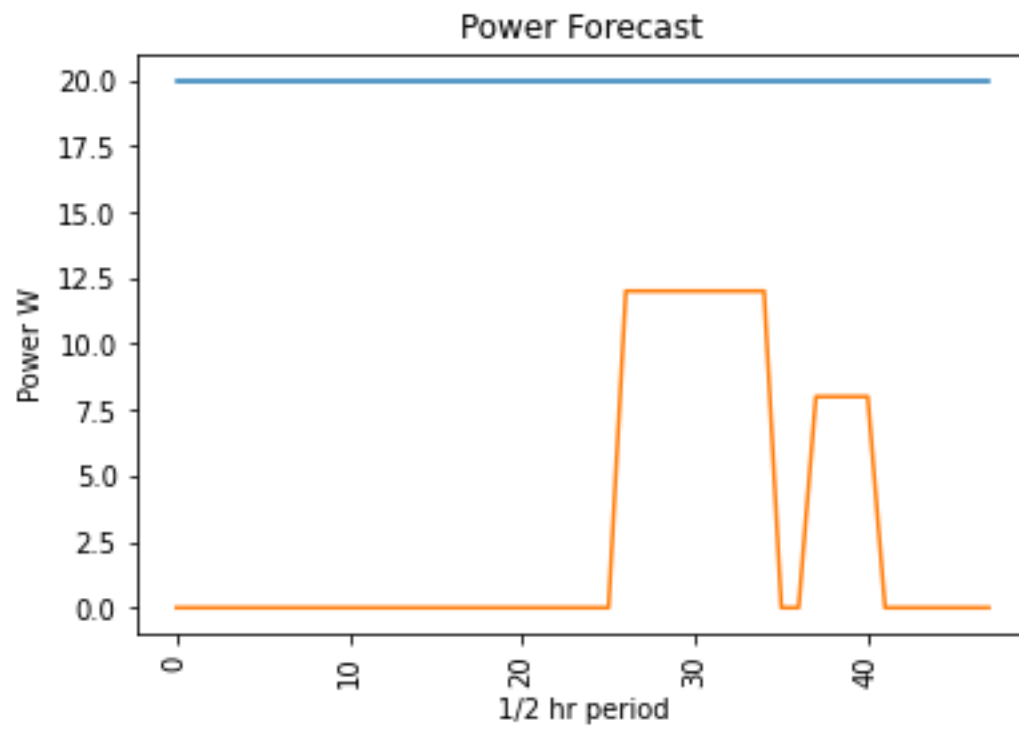


Figure 2

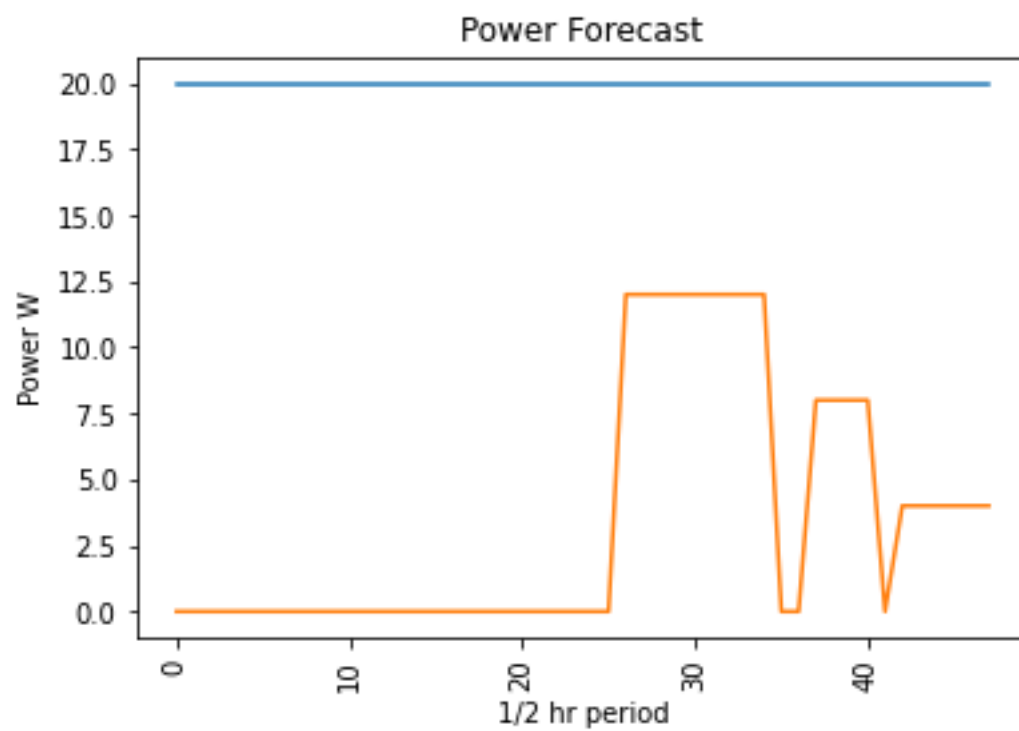


Figure 3