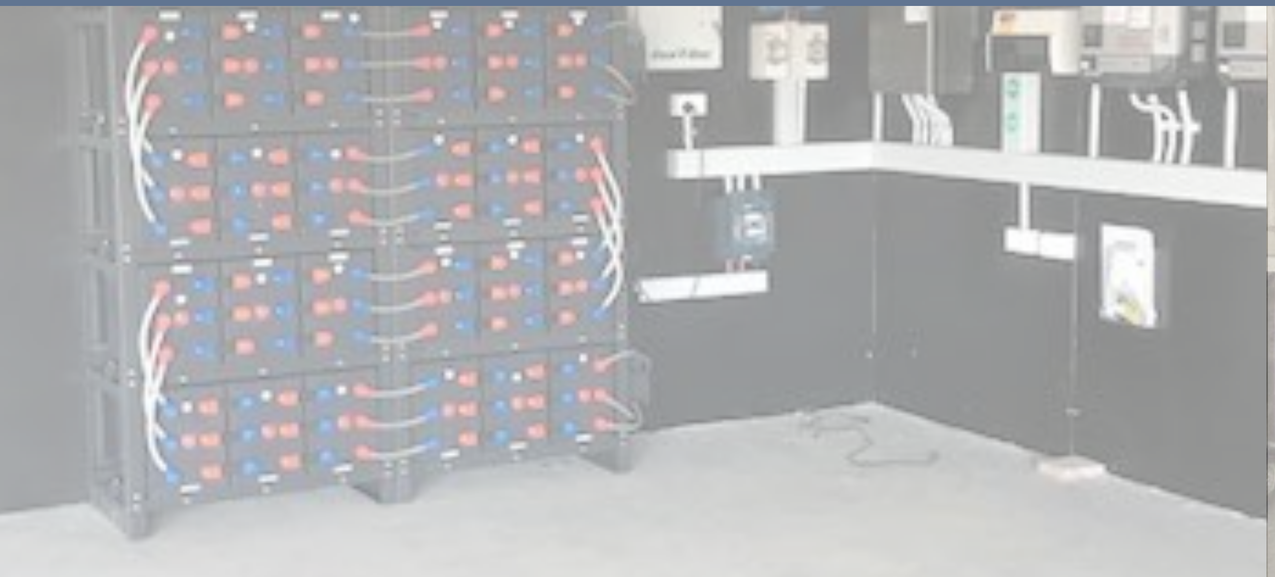
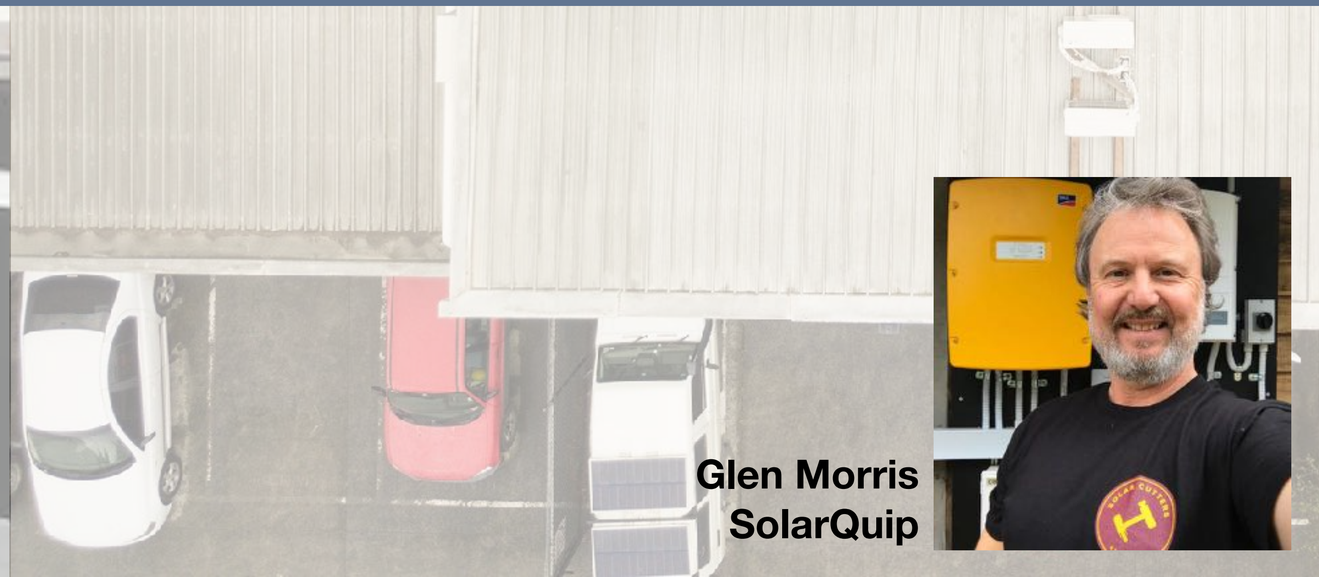
Commercial Storage

Multi-building solar & storage





Glen Morris
SolarQuip

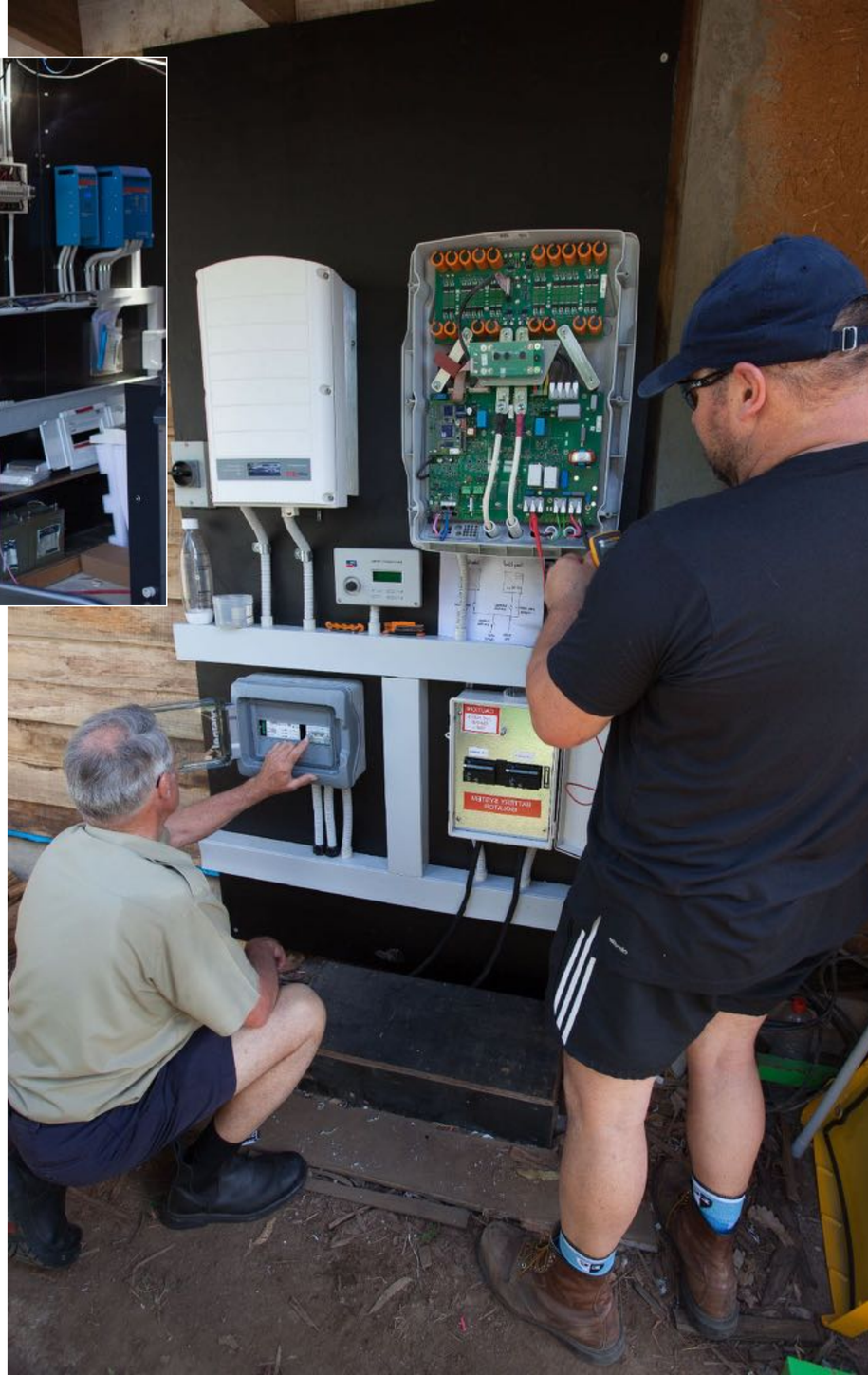
Smart Energy Lab

Solar & Storage Training Centre

@glenmo #askglenmo

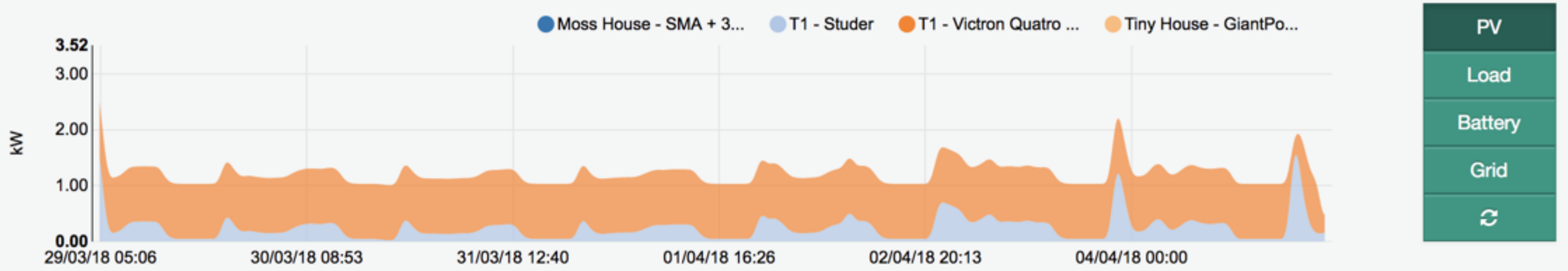
This presentation available from -> http://smartenergylab.com.au/


SOLAX
SOLAX
CONSERVATION
IN ACTION!

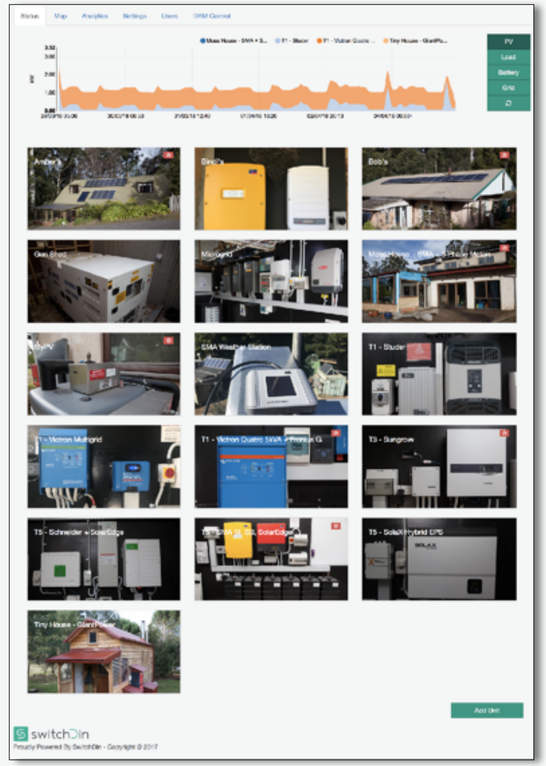


Smart Energy Lab

switchDin

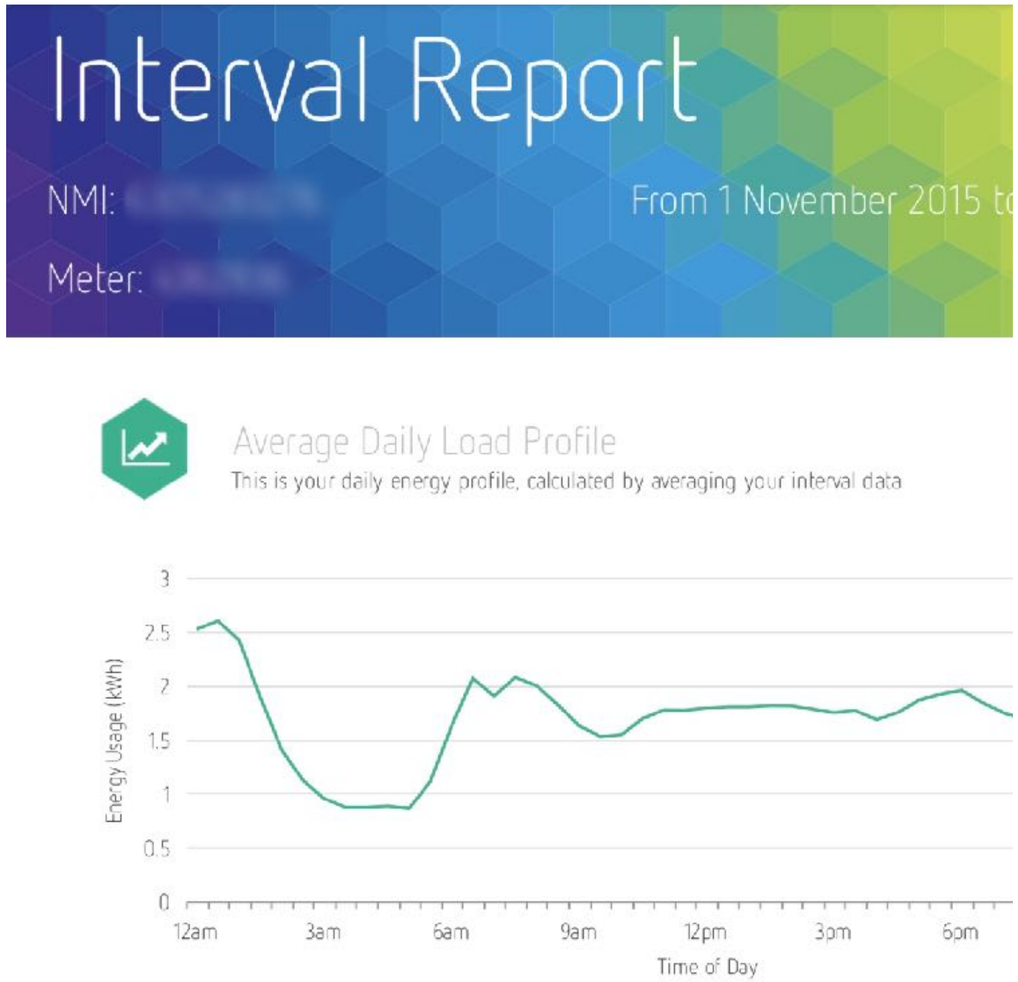


PV
Load
Battery
Grid



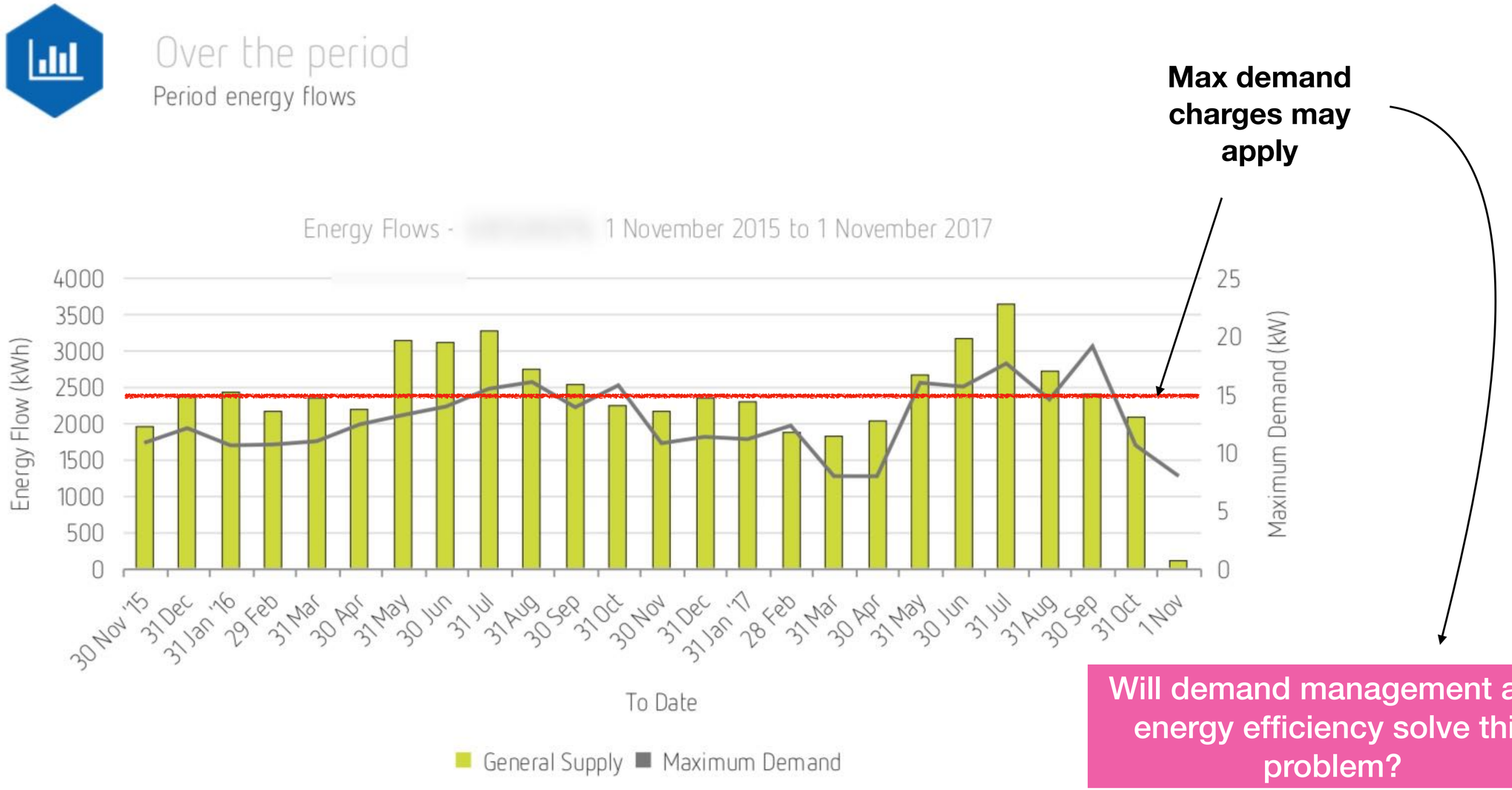
Why add batteries to commercial solar?

- maximum demand charges
- **emergency backup power**
- **self-use of surplus solar**
- power quality
- utility capacity limitations
- early adopter
- leaving the grid
  (more in my next presentation at 3:25pm today)




SMA
suntrix
solar energy solutions

Assess maximum demand

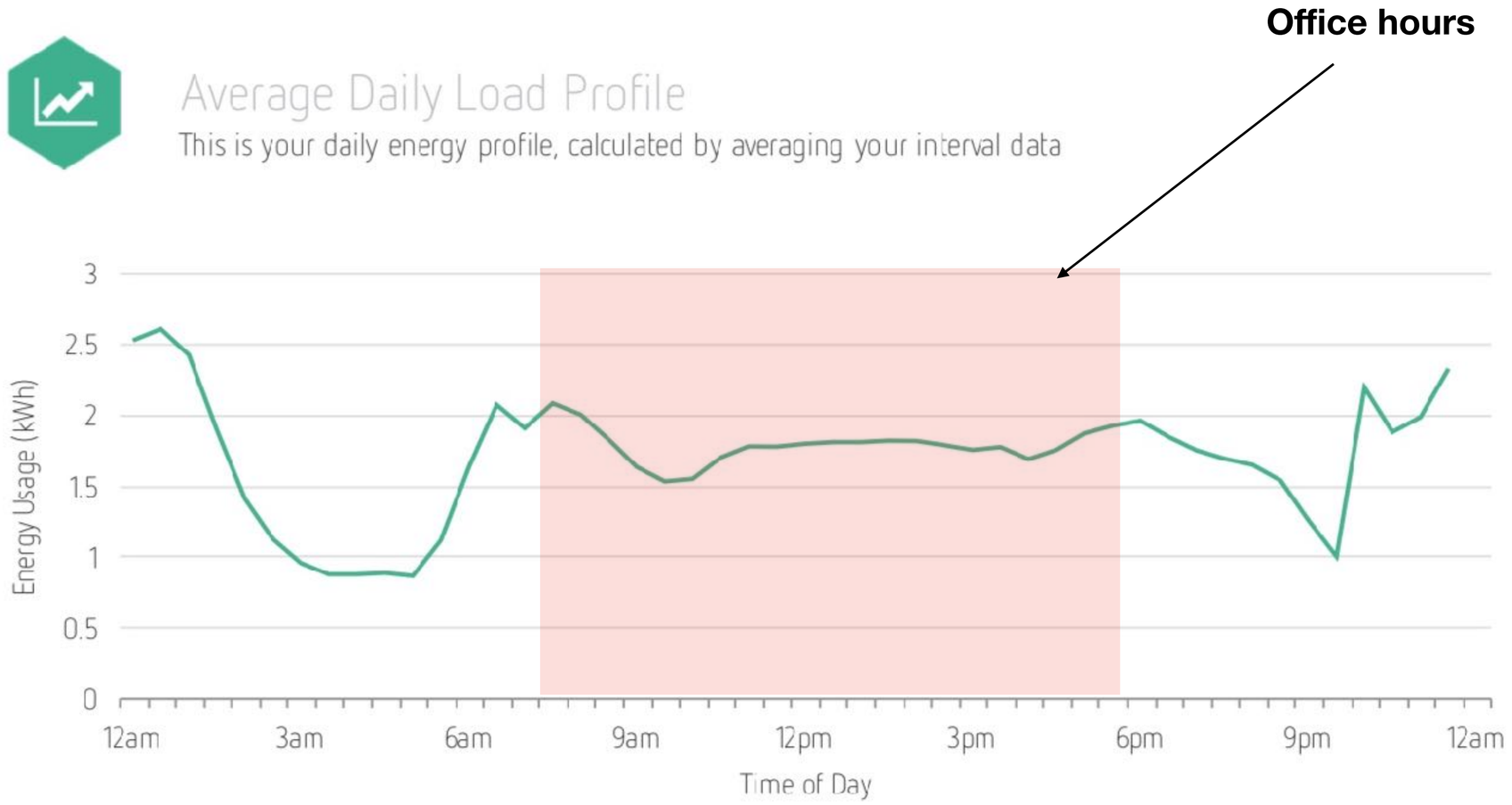


Max demand charges may apply

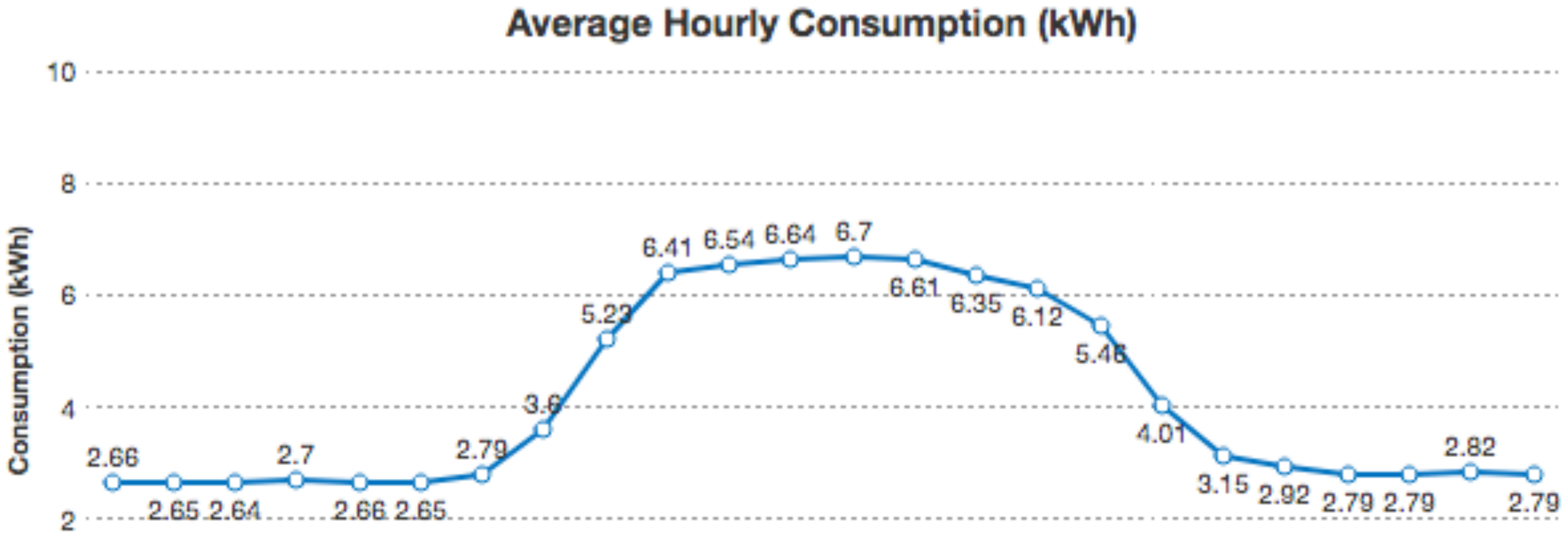
Will demand management and energy efficiency solve this problem?

When is backup needed?

How much (kVA) and for how long (kWh)?



Get the load data



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Analyse the tariff structures

STRUCTURE

PERIOD 1

PERIOD 2

PERIOD 3

Name/Description *

Peak Premium

Tier summing period (max kWh per)

Month

Tier	Max Usage	Tariff c/kWh	Network c/kWh	Feed-in Tariff c/kW
1	1095	28.370	0.000	29.
2	0.0	26.870	0.000	29.

+ Tier

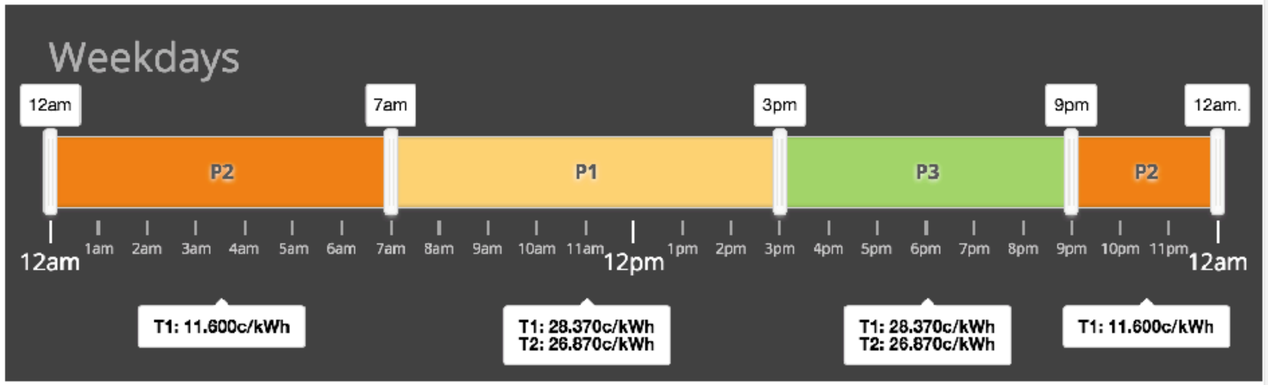
Weekdays
From To

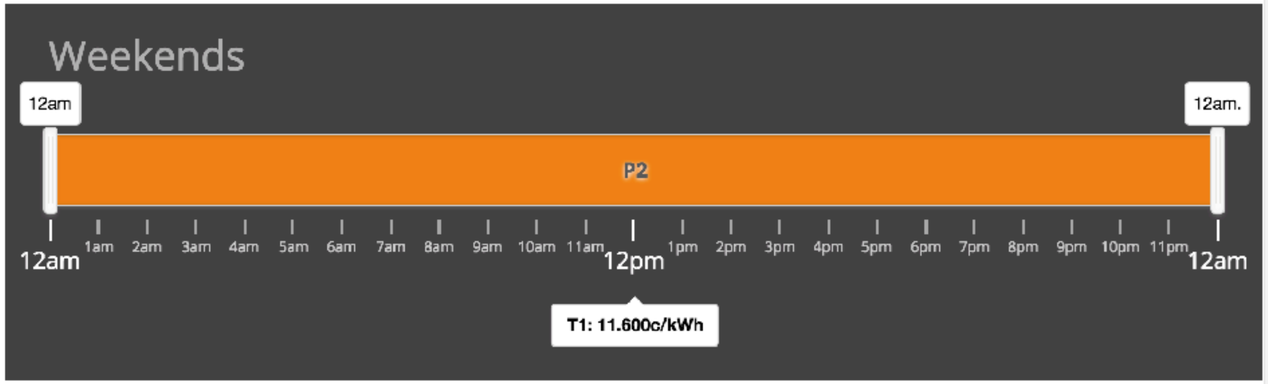
3 PM 9 PM

Weekends
From To

+ Weekday Range

+ Weekend Range





< Back Save Changes

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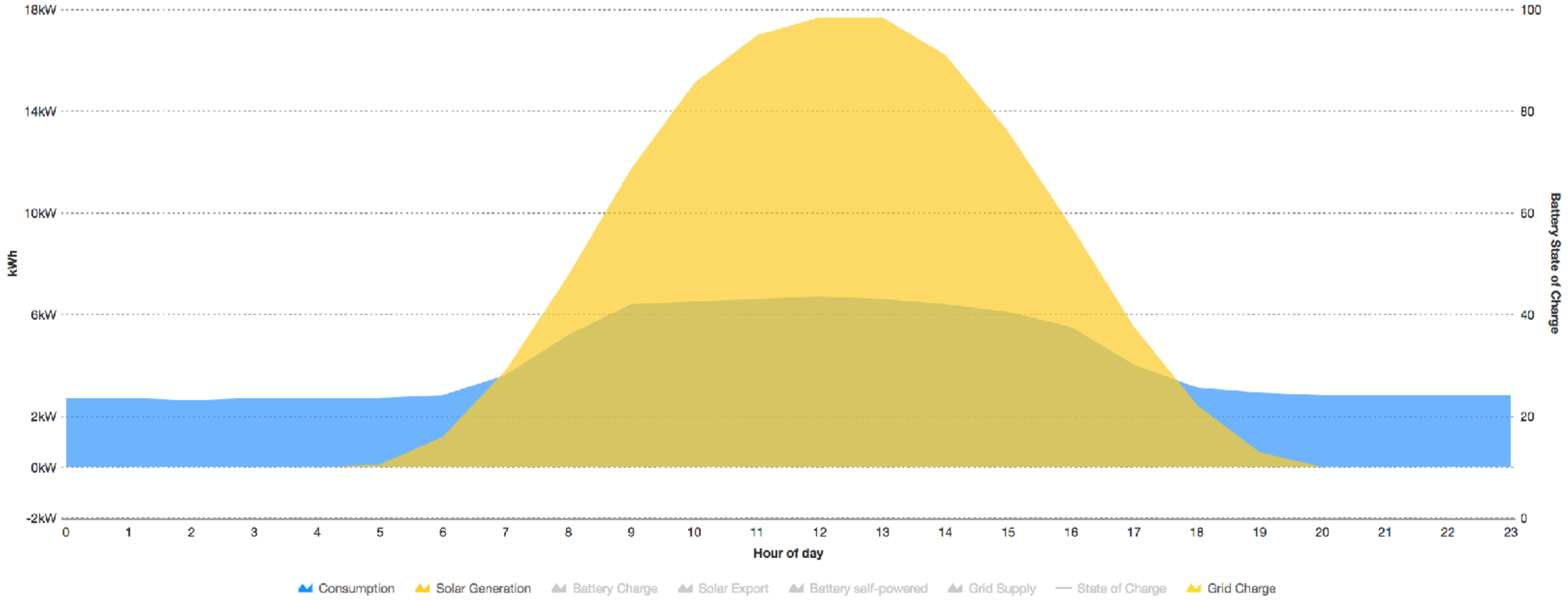
Average Daily Performance

Time range: Yearly | Month: April | Day: | Generate chart



BATTERY CAPACITY

Battery capacity:	300 kWh
Battery DoD:	60 %

BATTERY CYCLING

Year 1 cycles:	38
Battery lifetime cycles:	1410

BATTERY LIFETIME

Battery lifetime:	19 years
Battery lifetime energy:	204 MWh

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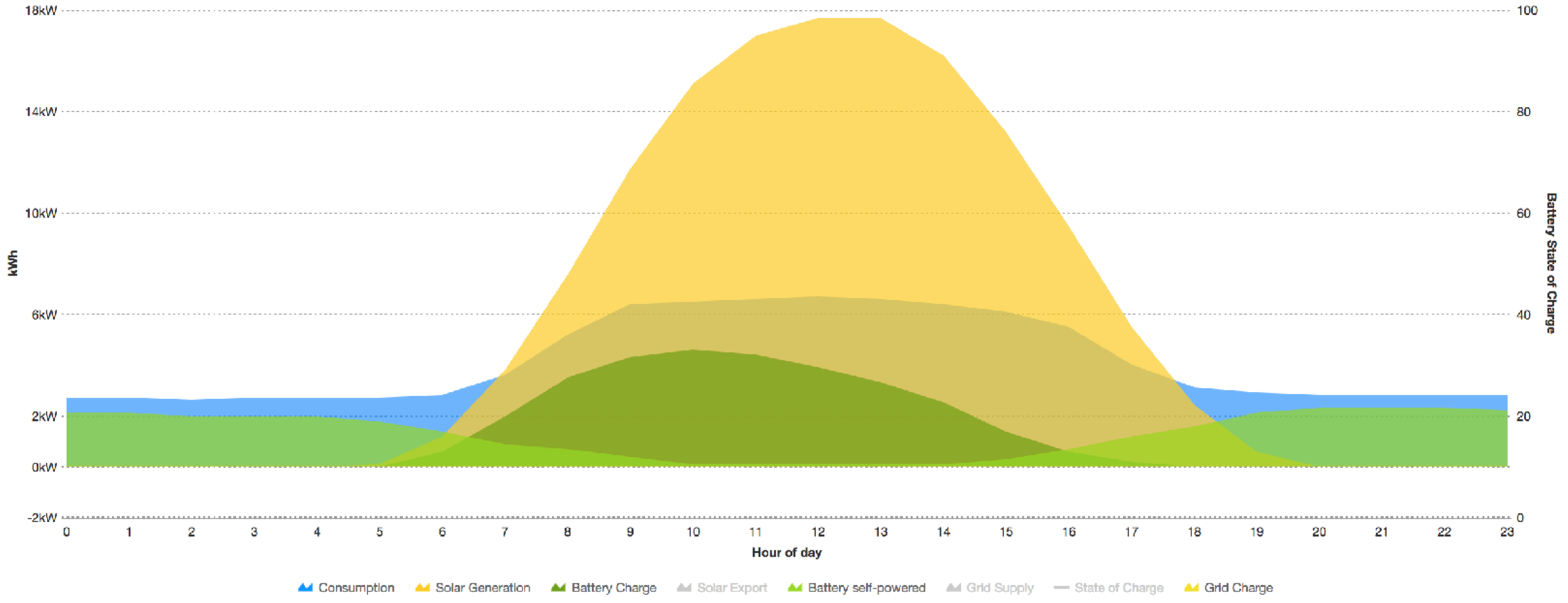
Average Daily Performance

Time range: Yearly | Month: April | Day: | Generate chart



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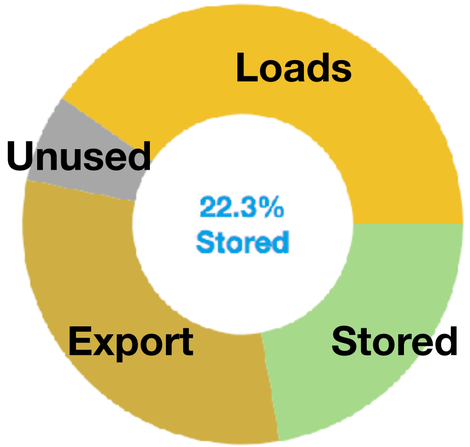
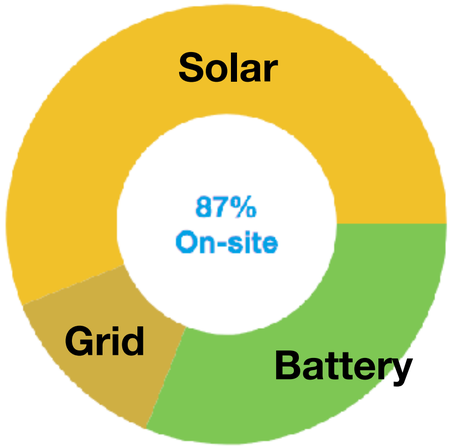
Self-consumption of solar modelled

Solar Produced



Consumption Source



Nominal System Power: 42.24 kW

	DAILY	ANNUAL
Av. Energy Production:	139.3 kWh	50,828 kWh
Specific Yield:	3.3 kWh/kW	1,203 kWh/kW

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Battery Backup Hours

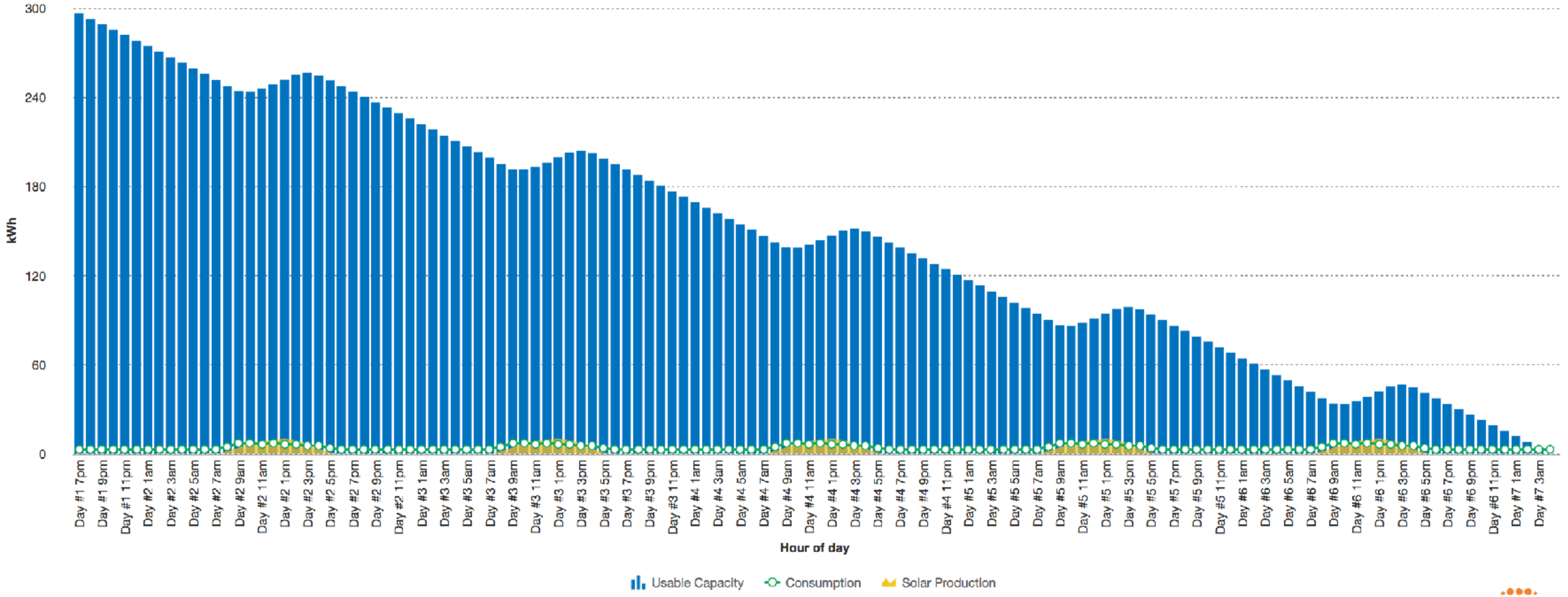
Month

July

Start Time

7pm

Generate chart



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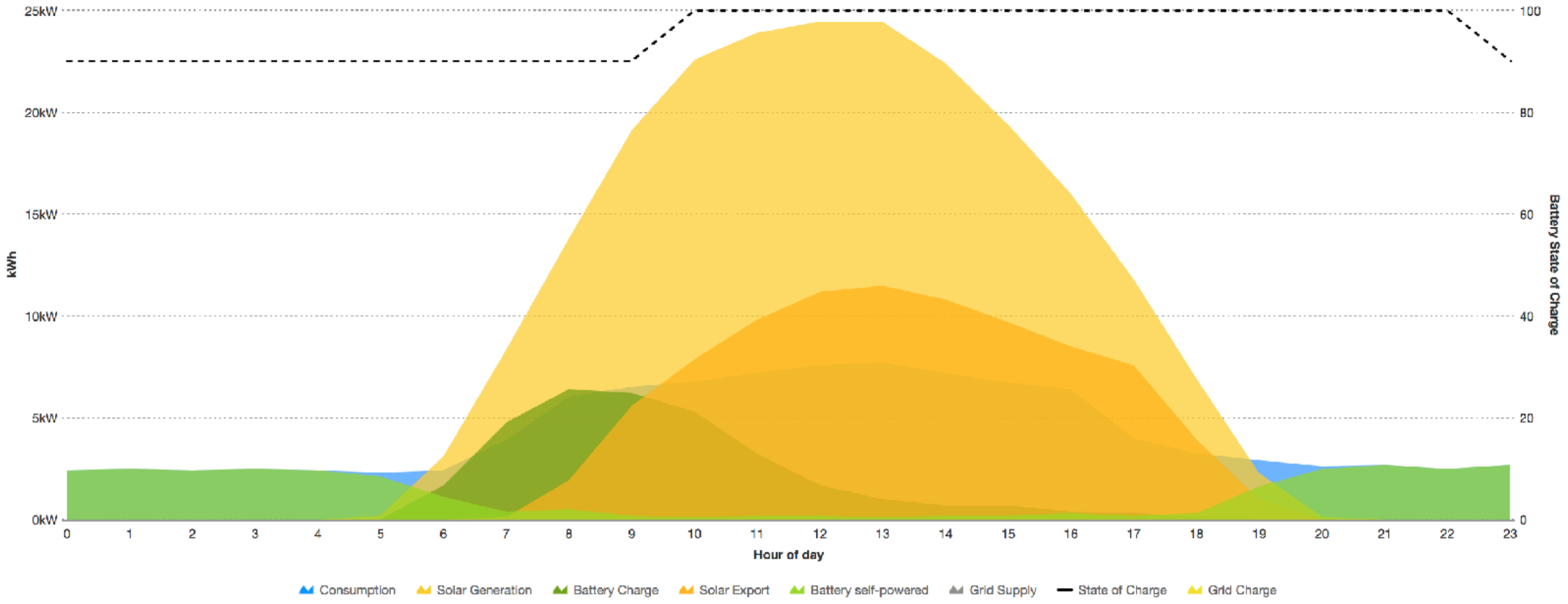
Average Daily Performance

Time range: Monthly | Month: January | Day: | Generate chart



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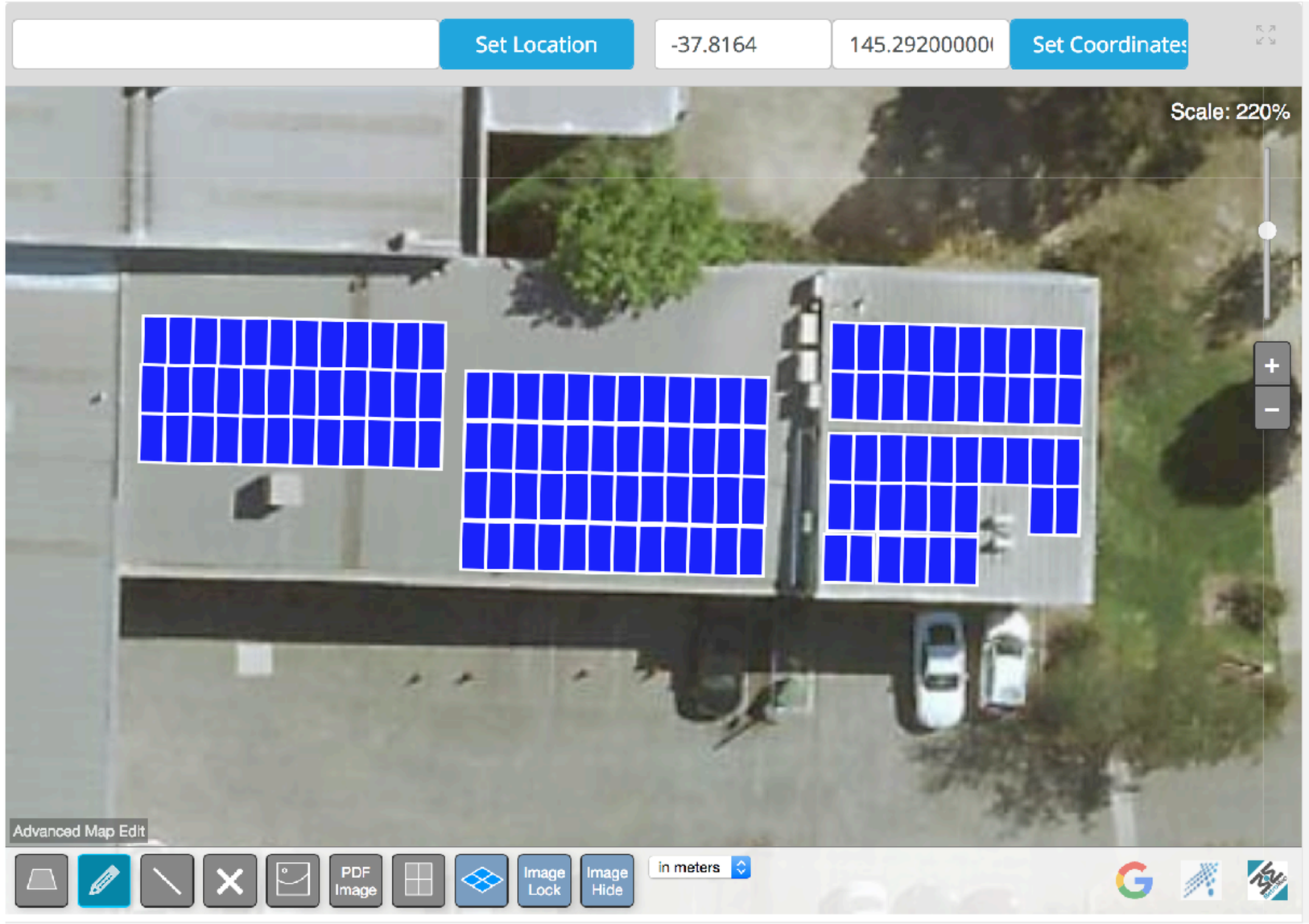
Use roof layout tools



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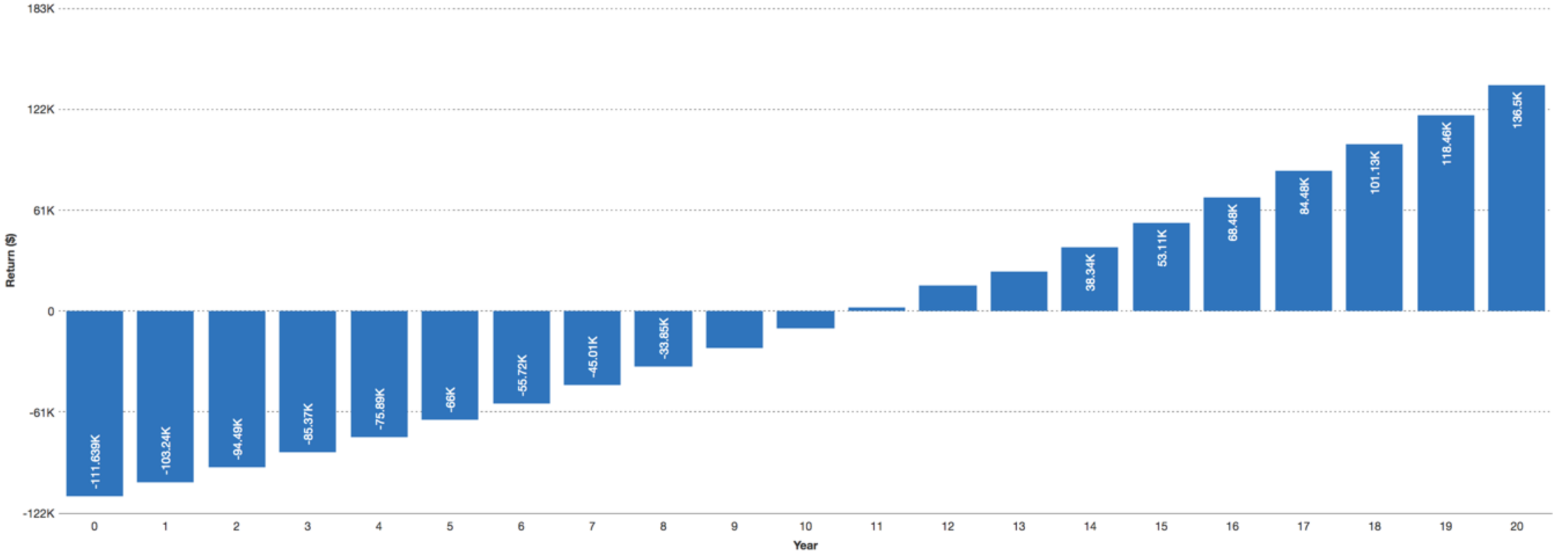
Lifetime cashflow



YEAR ONE CASHFLOW

Investment:	$111,638.98
$/watt:	$2.64
STC credit:	$25,550.00
Est. Yr 1 savings:	$8,702.18 (105%)

RETURN METRICS

Payback time:	10 yrs 10 mths
Internal rate of return:	6.7%
Levelised cost of energy:	12.67 c/kWh

LIFETIME METRICS

Est. lifetime savings:	$136,495.11
Net present value:	$56,013.76
CO^2 savings:	59,178 kg CO^2 p.a.

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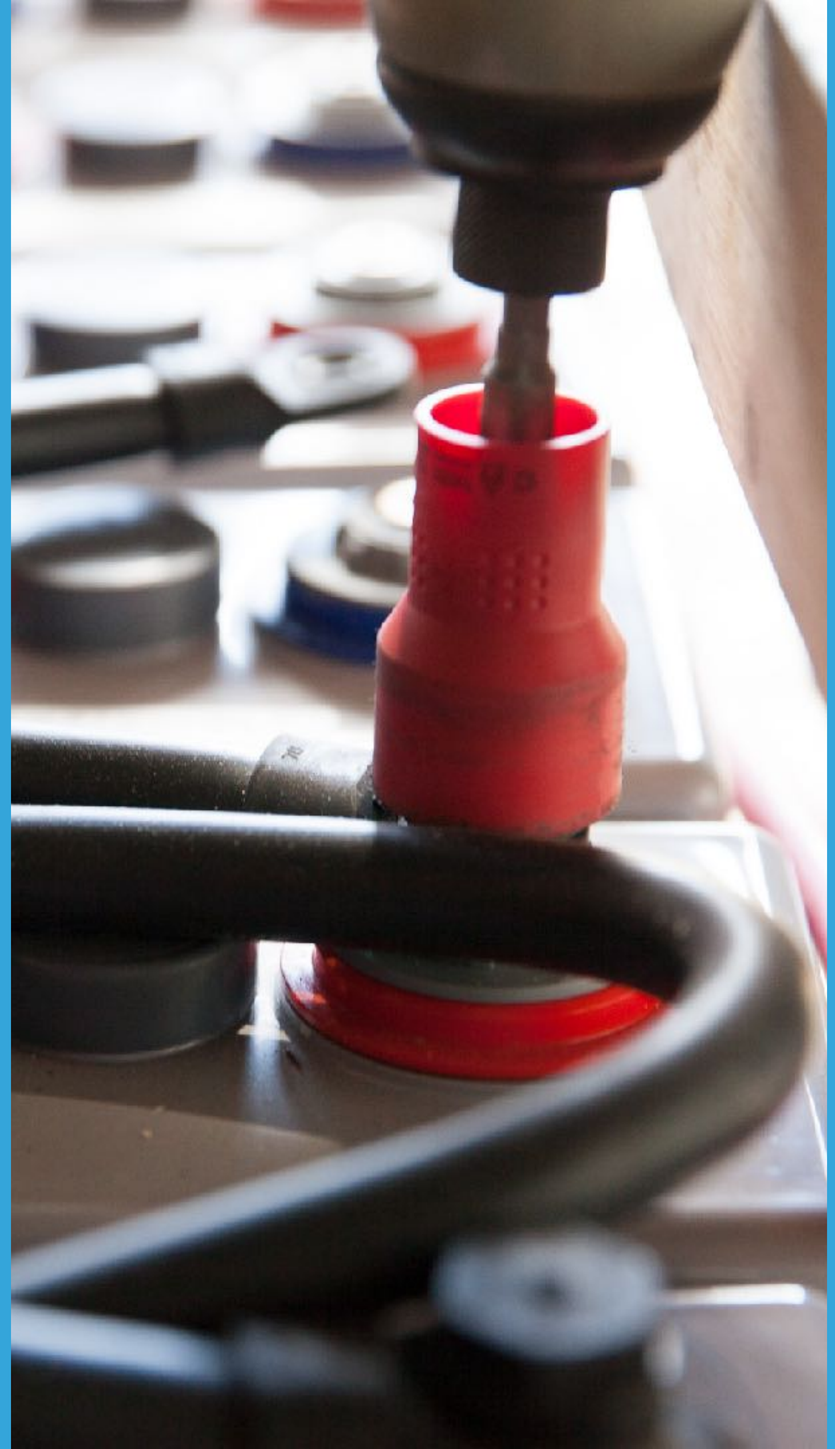


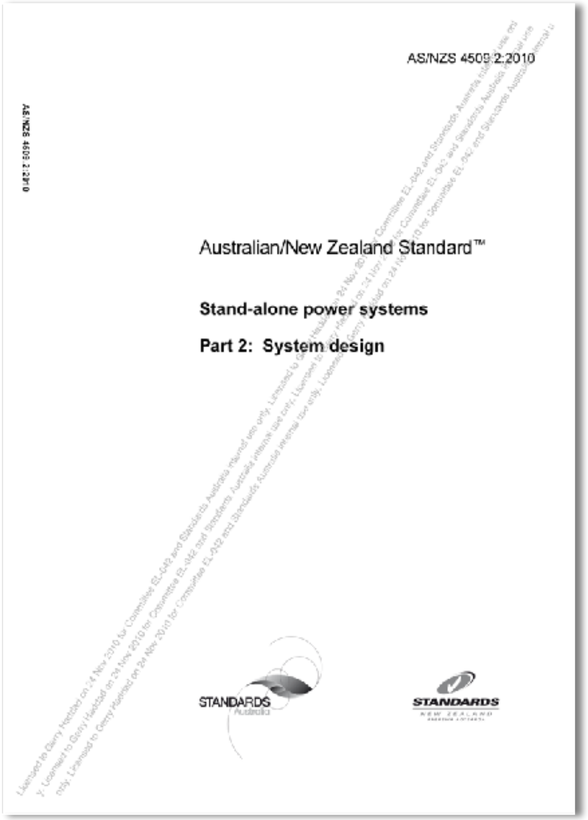
SELECTING & SIZING BATTERY

6. SELECTING & SIZING BATTERY

- Daily load energy required
- Battery system voltage
- Load sub-system efficiency
- Amp-hour demand
  (typically daily except if blackout protection)
- Days of Autonomy (≥2 days if off-grid)
- Amp-hour capacity required @ Cx

BATTERY SIZING EQUATIONS *(SIMPLIFIED)*

- A - daily load energy *(Wh)*
- B - battery system voltage *(V)*
- C - load sub-system efficiency *(0.xx)*
  (wiring, battery round-trip, and inverter efficiency)
- D - Amp-hour demand = A ÷ B ÷ C
- E - Amp-hour capacity = (D x DoA) ÷ DoD max.
  NB. to convert to kWh = (Ah x V) ÷ 1000



AS/NZS 4509.2

BATTERY SIZING WORKED EXAMPLE

- A - daily load energy 10,000Wh
- B - battery system 48V
- C - load sub-system efficiency 0.74
- D - Amp-hour demand = 10,000 ÷ 48 ÷ 0.74
  = 282Ah
- E - Amp-hour capacity = (282 x 1) ÷ 0.9
  = 313Ah @C_{10}
  = 313 x 48 = 15kWh (total capacity)

Photo: Ecotech Energy

SIZING THE PV ARRAY

7. SIZING THE PV ARRAY

- Daily load energy requirement
- Peak Sun Hours (PSH) of site
- Derating for shade
- PV sub-system efficiency
- Load sub-system efficiency

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Easy Way v's Hard Way

SIZING SOLAR PV + BATTERY STORAGE SYSTEM

A Daily load energy (Wh)

B Battery system voltage (V)

C Load sub-system efficiency (eff.)
(wiring, battery, inverter)

D Daily Amphour demand (Ah) = A / B / C

E PV array size = Wh (A) / PSH (actual) / PV system efficiency / Load sub-system eff (C)

F Battery pack capacity = $\frac{\text{Ah demand (D)} \times \text{Days of Autonomy}}{\text{Max. Depth of Discharge}}$

CONTACT ME

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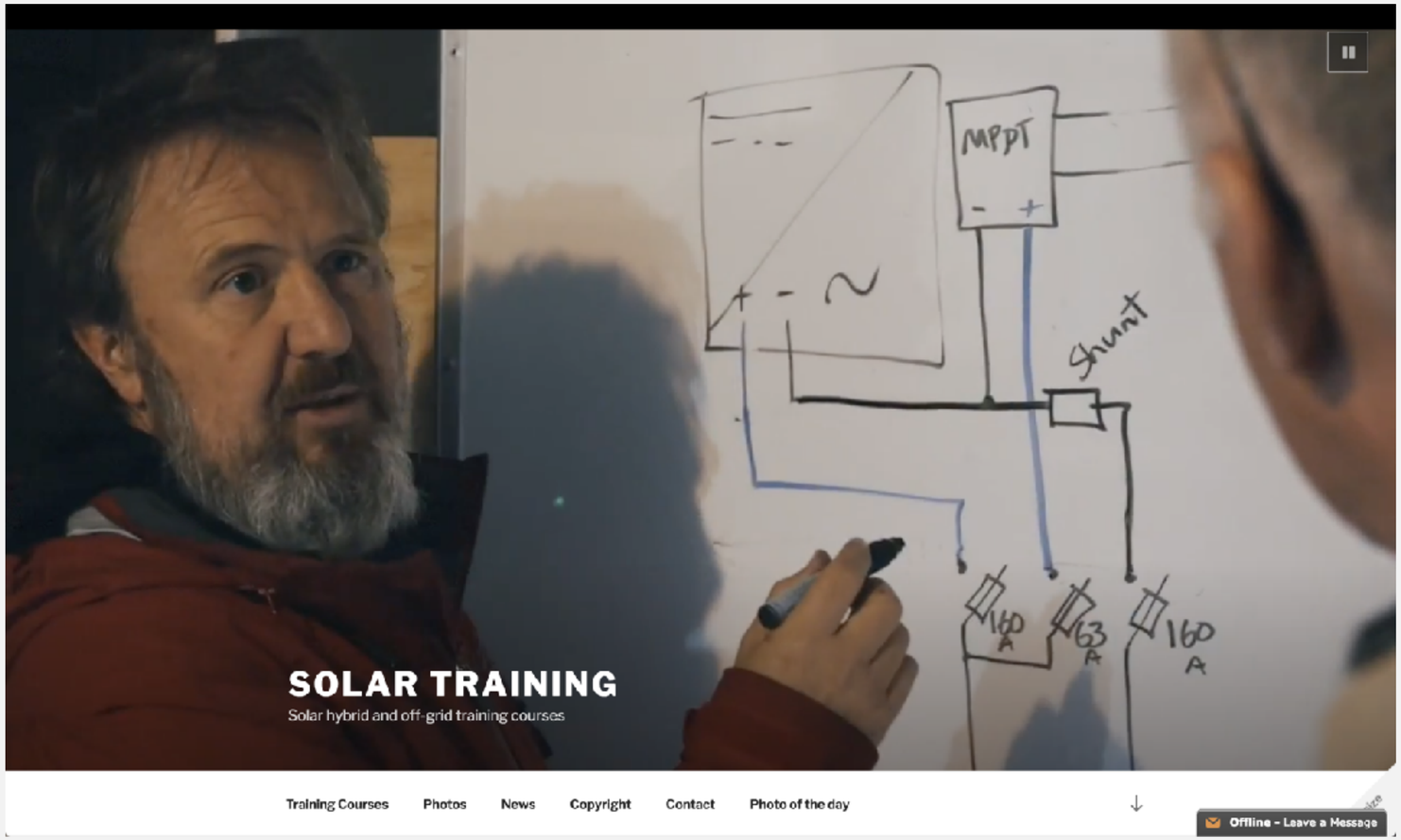
(61) 419 299 140



http://cleanenergy.org.au - blog

http://solarquip.com/ - training courses

http://smartenergylab.com.au - the “Lab”