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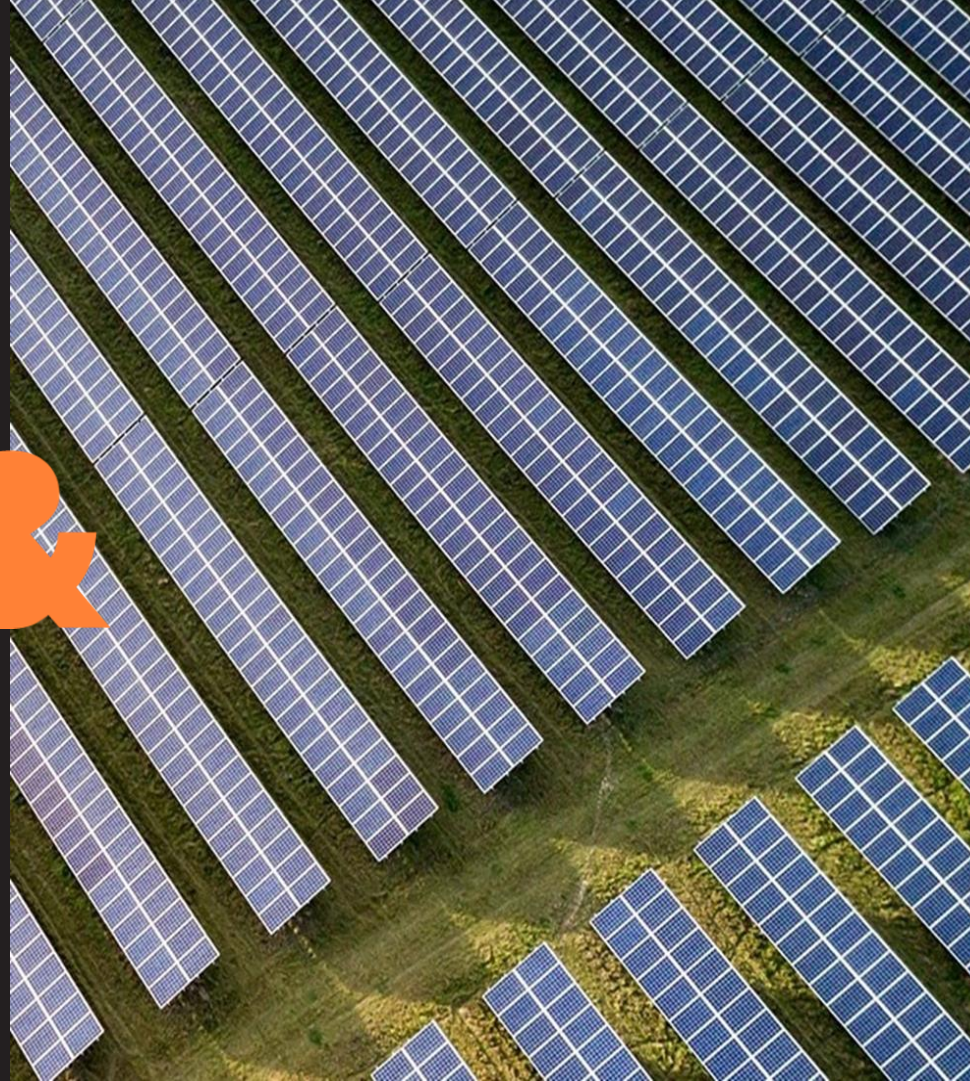
Specialist Knowledge.
Practical Solutions.

Agriculture Applications of Batteries



Prepared by – Charles Luo
Date – 25 August 2019

Australia's l rm opens in Kerang, ir sherry

Faster payback of your investm
in solar power

Our Energy Intelligen
Unique to Evergen, E
make minute-by-minu

These fine calculation
because they adjust f
your tariffs.

VIDEO: Australia's largest solar

Why talk about batteries

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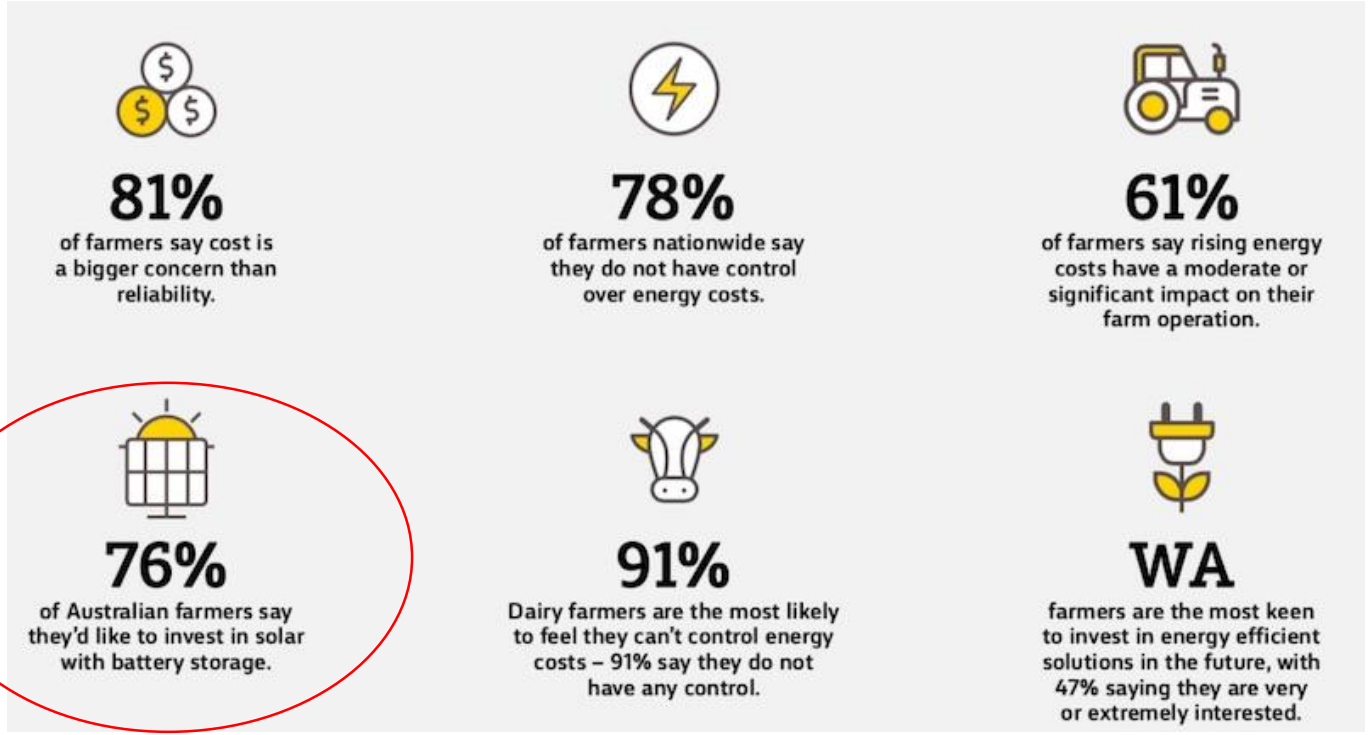

https://onestepoffthegrid.com.au/farmers-flock-solar-battery-storage-power-costs-bite/
From 2018

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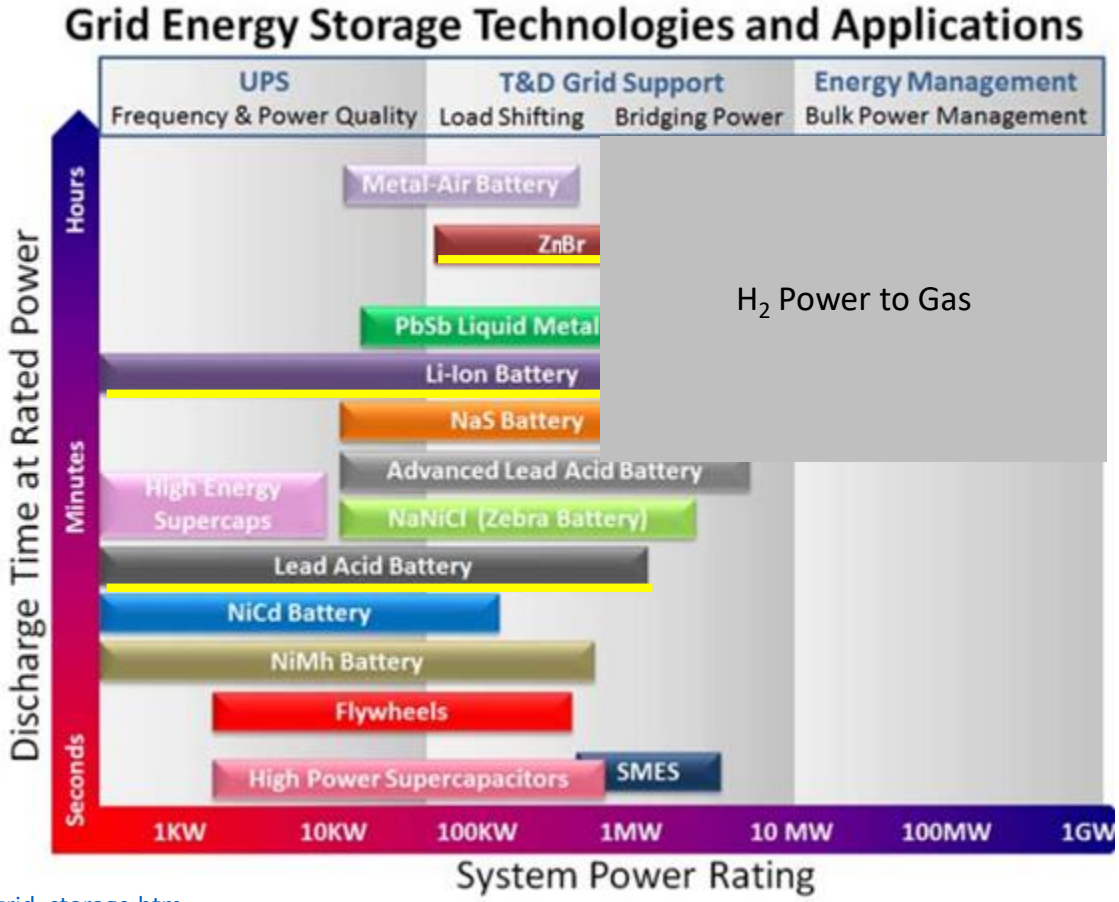
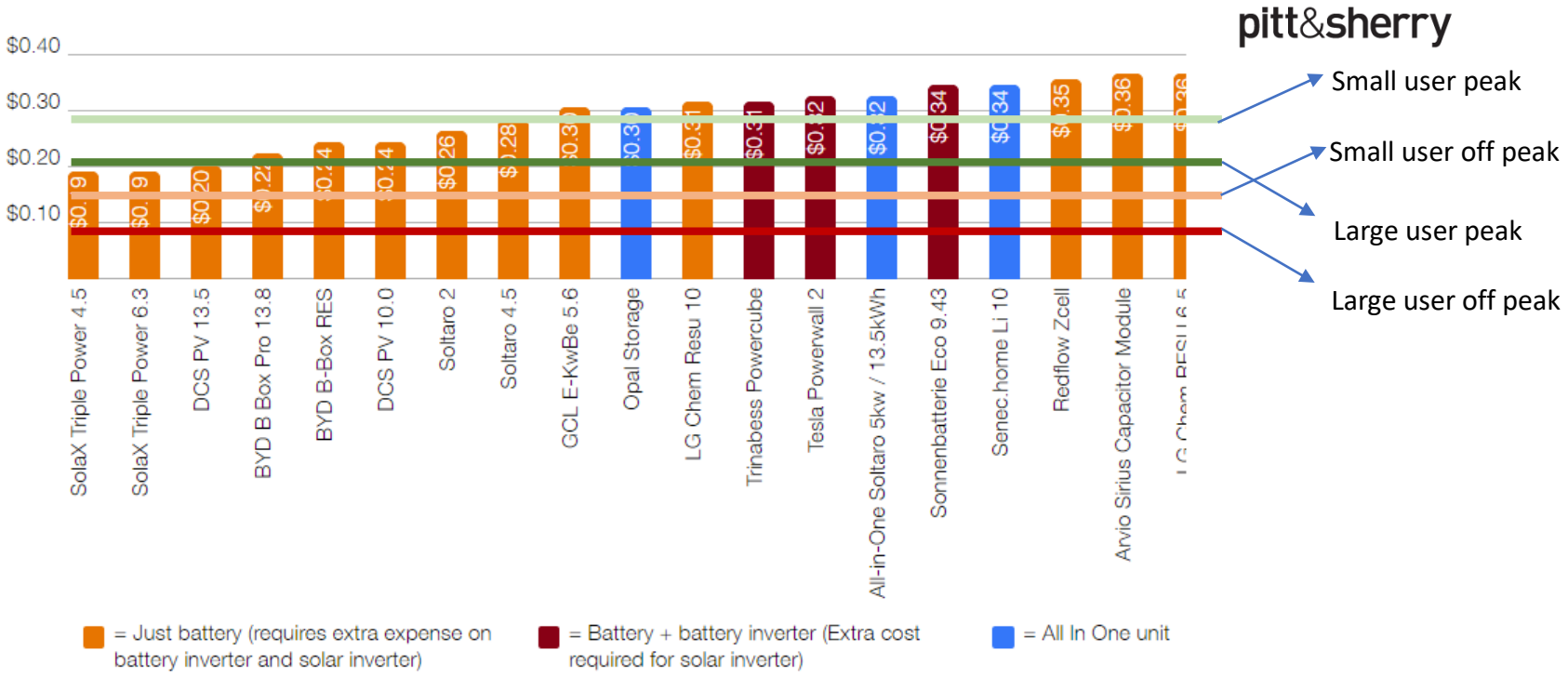


https://www.mpoweruk.com/grid_storage.htm
From 2005



https://www.solarquotes.com.au/battery-storage/comparison-table/

Typical solar PV only is between $0.06 - $0.10 per kWh over the warrantied period

Updated August 19th 2019

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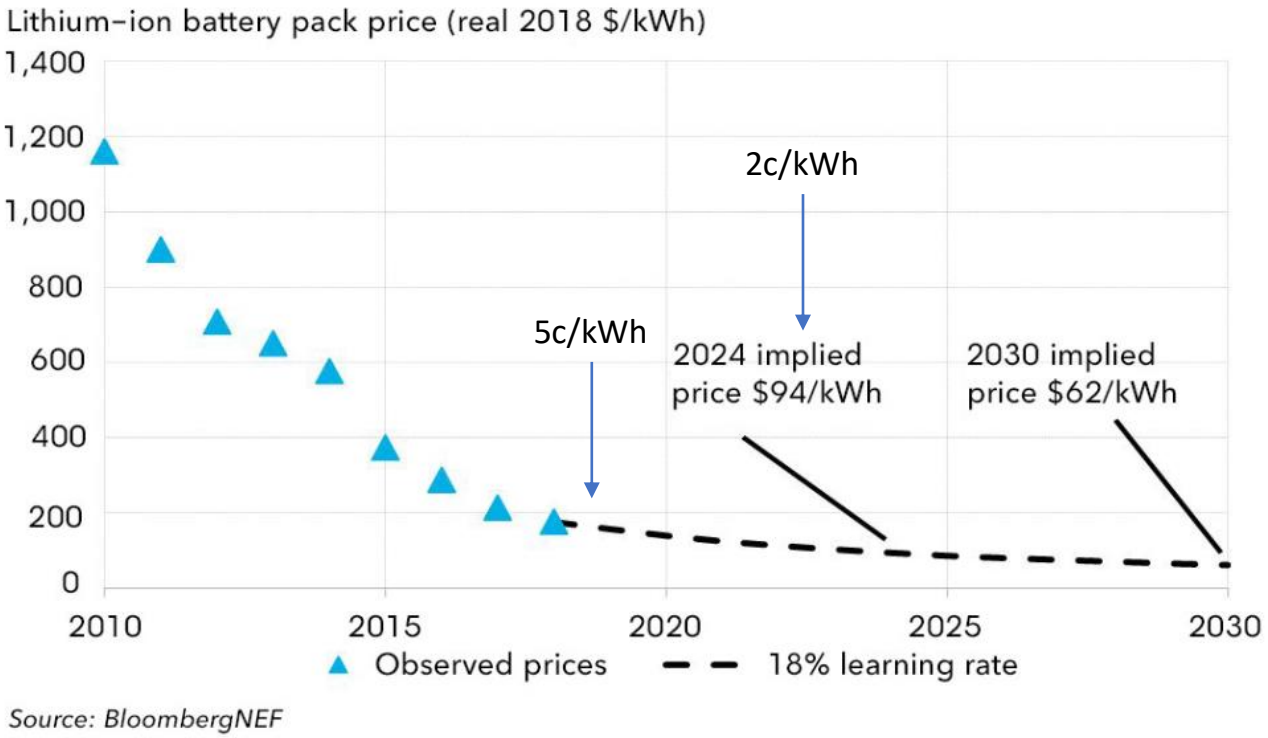
Lithium-ion battery price outlook



Source: BloombergNEF

https://about.bnef.com/blog/behind-scenes-take-lithium-ion-battery-prices/

Recent Effective Battery Applications

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- Standalone systems, particularly in WA due to the size of the grid
- SA – due to the potential $6000 subsidy from the state government
- Moree, NSW – for irrigation and off grid uses mainly
- Better utilisation of renewable energy*

Effective battery applications

- Off grid applications with solar
  - Power to remote sites
  - Higher energy infrastructure costs offset by lower land and compliance costs

Effective battery applications

- Diesel replacement in remote areas
  - Reduction in diesel transport costs
  - Reduction in maintenance costs
  - Mitigate large grid connection costs

Effective battery applications

- Supply stabilisation and UPS (more than a standard battery system)
  - Growing importance for robot dairies
  - Provides power to equipment before generators can start

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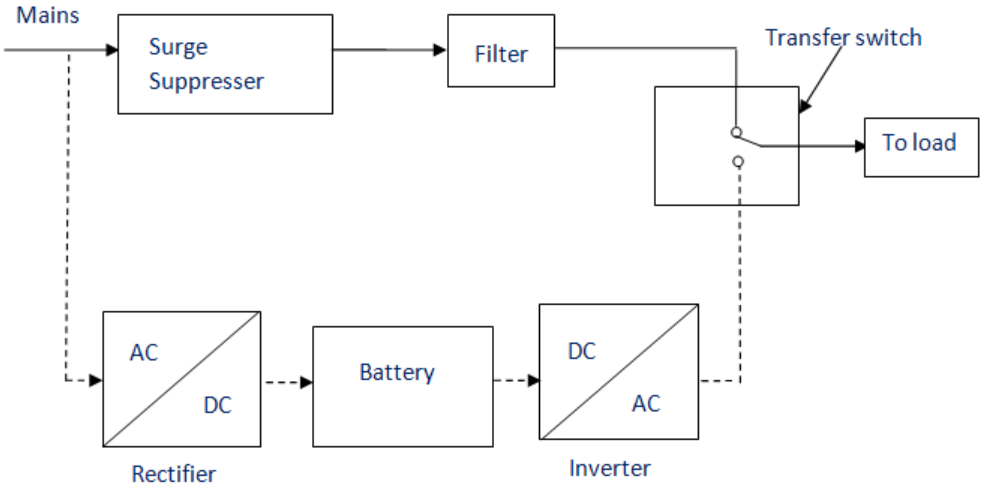

Figure 1

Effective battery applications

- Peak demand management
  - In presence of high demand charges and/or infrequent but high peaks
  - offset main supply upgrades

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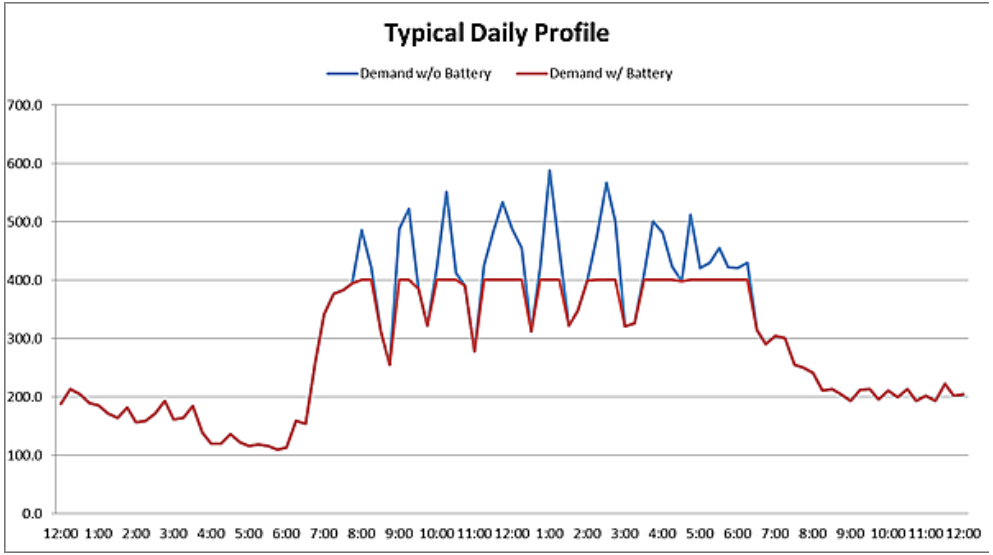

Uneconomical battery applications

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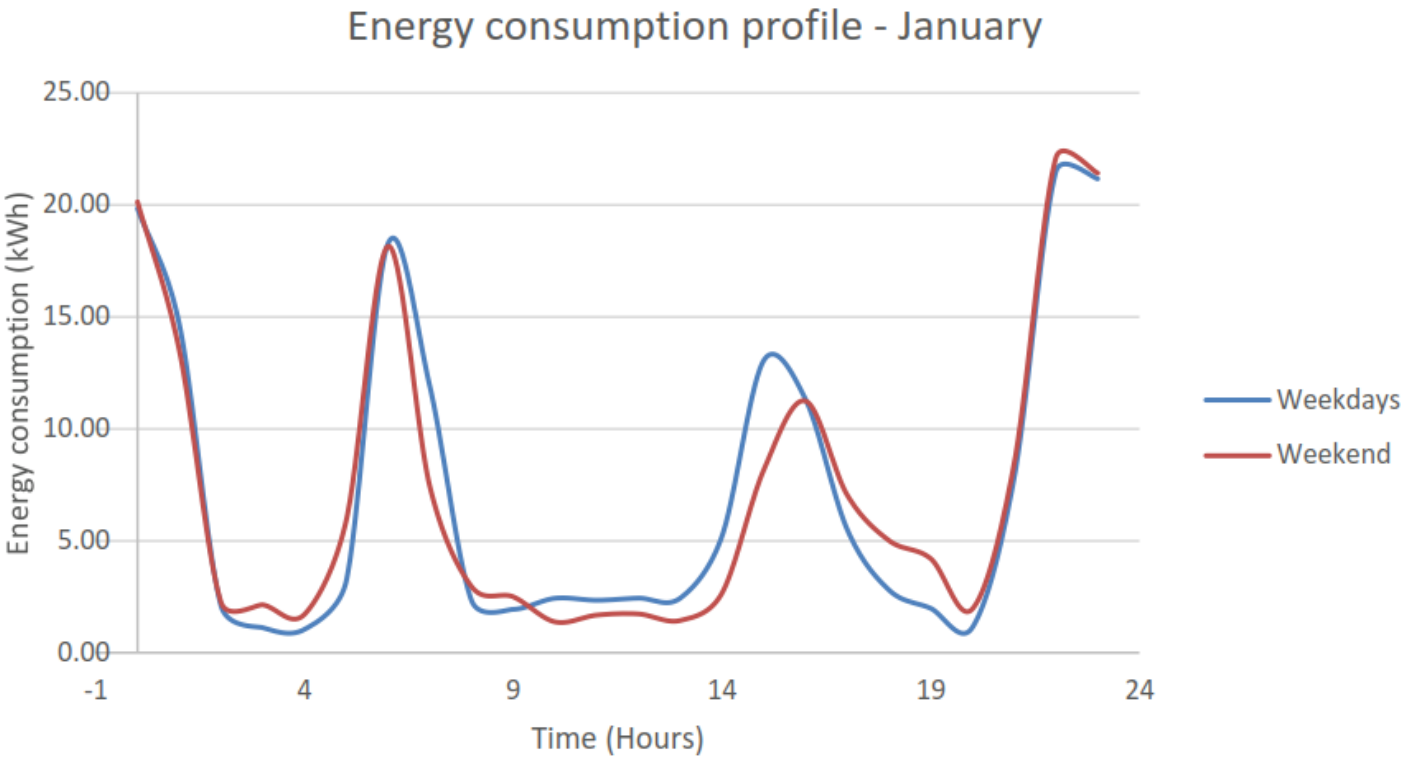

Uneconomical battery applications

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- Grid connected renewable storage in the presence of a feed in tariff
  - Better to export excess solar production instead of spending capex on batteries to store it
  - Packaged solar + battery deals
- Off peak storage for peak use
- Grid independence
- Mitigation of frequent demand peaks
  - A single demand event can be charged across a full year, regardless of frequency
  - Typical cycle life of lead acid is 300, lithium is 4000, flow batteries 30,000+

Key criteria for making a decision

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- Fully quantify other cost savings/deferred expenses in addition to usage rates
  - Diesel transport costs
  - Grid extension costs
  - Transformer upgrade costs
  - On farm benefits
- Availability of solar and current price tariff
  - In most cases, accepting a feed in tariff (even if it is low) is better than using batteries
- <u>The system needs to be designed specifically for your farm!</u>

Why pitt&sherry?

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