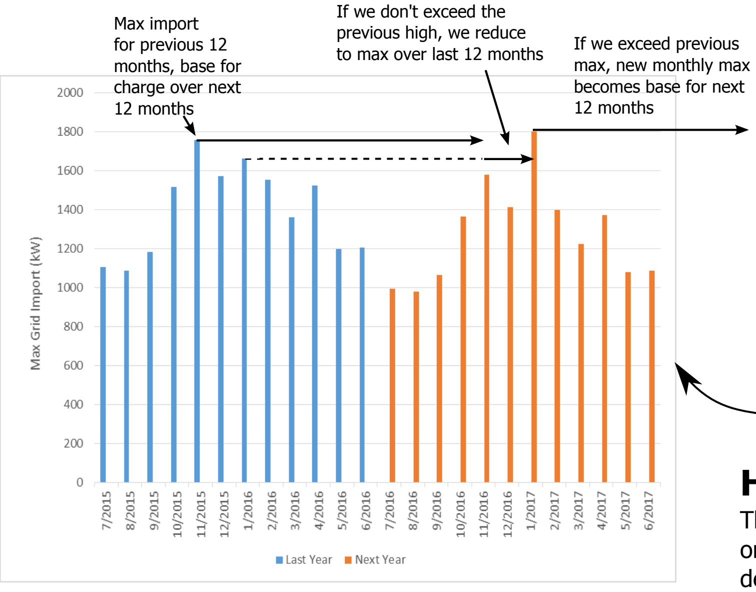
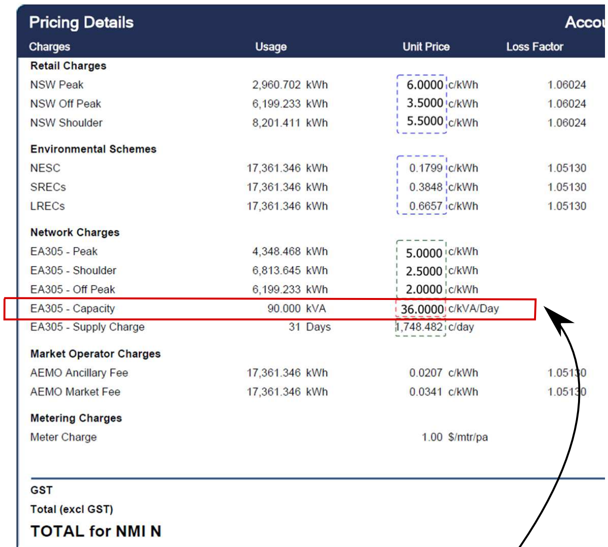
Green Trading Systems

Commercial Capacity Charges

Commercial and industrial customers are generally obliged to pay a 'capacity charge', which compensates the networks for investing in the distribution grid to support the aggregate peak capacity required. Properly scheduled onsite storage offers the ability to decrease the capacity charge, resulting in significant monthly savings.





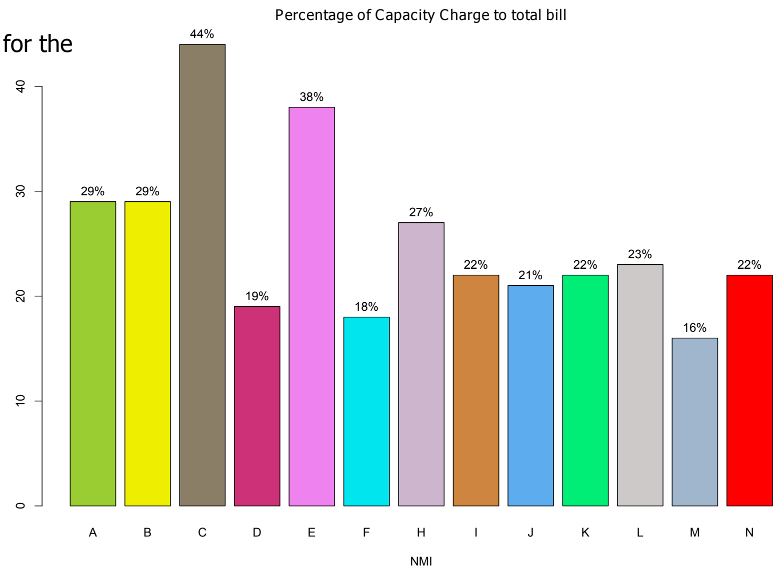
Pricing Details				Accou
Charges	Usage	Unit Price		Loss Factor
Retail Charges				
NSW Peak	2,960.702 kWh	6.0000	c/kWh	1.06024
NSW Off Peak	6,199.233 kWh	3.5000	c/kWh	1.06024
NSW Shoulder	8,201.411 kWh	5.5000	c/kWh	1.06024
Environmental Schemes				
NESC	17,361.346 kWh	0.1799	c/kWh	1.05130
SRECs	17,361.346 kWh	0.3848	c/kWh	1.05130
LRECs	17,361.346 kWh	0.6657	c/kWh	1.05130
Network Charges				
EA305 - Peak	4,348.468 kWh	5.0000	c/kWh	
EA305 - Shoulder	6,813.645 kWh	2.5000	c/kWh	
EA305 - Off Peak	6,199.233 kWh	2.0000	c/kWh	
EA305 - Capacity	90.000 kVA	36.0000	c/kVA/Day	
EA305 - Supply Charge	31 Days	1,748.482	c/day	
Market Operator Charges				
AEMO Ancillary Fee	17,361.346 kWh	0.0207	c/kWh	1.05130
AEMO Market Fee	17,361.346 kWh	0.0341	c/kWh	1.05130
Metering Charges				
Meter Charge		1.00	$/mtr/pa	
GST				
Total (excl GST)				
TOTAL for NMI N				

How Capacity Charges are billed

The capacity charge is billed as the network charge listed on the retail bill, multiplied by the rolling 12 month peak demand for that site (metered as the maximum half hourly average demand). The capacity charge encourages consumers to monitor and manage their peak demand over the year

Capacity Charges are significant

Energy flow through each node of the electricity grid is measured by a separate meter identified by National Meter Identifier (NMI). The graph below shows the capacity charge as a percentage of the total retail bill for the 14 NMIs (see overleaf) analysed in this study.



Case Study

The 14 NMIs analysed in this study are associated with a university's campus buildings, each connected to the Ausgrid network. A NMI may refer to a small building or single floor of a larger building. We have conducted a case study analysis on this metered load data to minimise total costs by optimising battery dynamics.

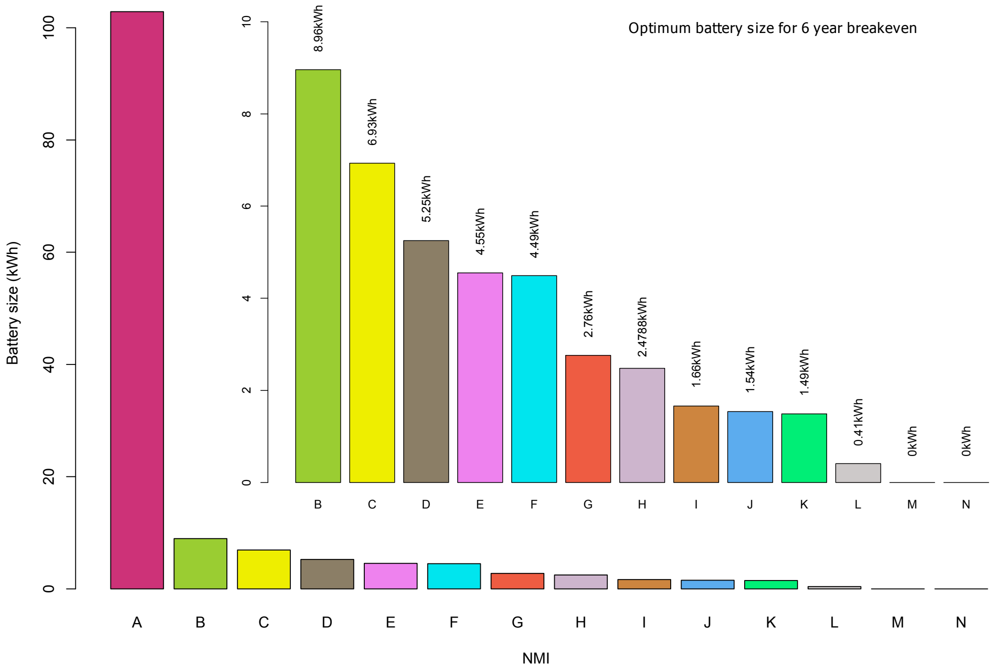
The battery technology used was Lithium Ion and cost per kWh was sampled in late 2016 (before Tesla's Powerwall II announcement). The goal was to determine whether installing battery storage in any of these buildings was financially viable today, without external funding or subsidies.

Using Onsite Batteries to Reduce Power Costs

The university provided load profiles and bills for the 14 NMIs. We used the load profiles and tariffs to run the cost minimisation for each NMI over a range of payback periods. We have assumed:

- A target payback period of 6 years;
- Cost of battery and inverter: $1,100 / kWh;
- Cost of intelligent forecasting and control system: $600 / kWh (assuming development costs, falls with scale);
- Funding rate: 5% annual;
- Asset depreciated using ATO diminishing value method;
- Maximum battery discharge: 80% of capacity;
- Losses: Internal battery 5%, Inverter 10%, Cabling 1%;

Based on these assumptions, we solved for the optimal battery size.



Key Findings

The figure above is a composite graph showing two different resolutions of the results (the inset graph is effectively 'zoomed in' to show the smaller bars). The most obvious result is that a relatively large battery (102kWh) would be economically feasible for NMI 'A'. In the inset chart, a 9kWh battery would be optimal for NMI 'B', which would perhaps be more practical for a pilot project.

In this case study we demonstrated that storage for commercial and industrial buildings can be feasible at today's prices, depending on the demand profile. The main benefit is through the reduction of the capacity charge. Even though we have chosen an extremely conservative 6-year payback period, it is still significantly less than 15 years warranty given for some modern batteries. In such a case the battery would yield pure savings on the energy bill for the nex 9 years.

In the near future there may also be demand management opportunities to consider as well. For a client such as this university who has multiple sites, the analysis allows battery storage to be incrementally rolled out in the optimal sizes as the costs fall to the required threshold for each NMI profile.

__Green Trading Systems (GTS)__ provides value-added data for renewable-centric energy approaches including trading, generation, storage and retail. The directors of GTS have over 60 years of combined experience in energy markets, solar generation, financial modelling and risk management. We have spent more than a decade developing our current suite of models and tools and from this base are building a leading data analytics platform. GTS also uses its data analytics platform for consulting engagements, such as assessing whether certain sites would benefit from installing storage (even without solar).

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