

# Australian Residential Solar Storage Analysis - Part I - An Enthusiast's Market

(22 Feb 2016) An Independent Expert Analysis of Current Energy Retailer Market Offerings

## Background

Given Australia's large solar resource coupled with historical feed in tariff incentives, it is not surprising that the country has one of the largest residential solar penetration rates globally. However, the staggered withdrawal of these incentive tariffs, combined with overall cost deflation, particularly in battery storage technologies, has helped catalyse the introduction of customised solar storage solutions backed by the significant resources of Origin Energy, AGL Energy and EnergyAustralia. We expect other retailers and technology vendors to join the market over time.

A solar storage system can be effectively used to realise significant electricity bill savings for the average residential household, but given the significant costs involved, what is the Net Present Value (NPV)? What are the bill savings across real households and their diverse consumption patterns, rather than simple, stylised datasets? Energeia performs an in-depth analysis of the solar-storage bundle offerings from the three Tier-1 retailers (above) in order to determine whose offering stacks up.

## Assumptions

Firstly, we assume the solar panel and battery combinations as per Table 1, with the indicative costs of the AGL and Origin offerings sourced directly from the company. Other assumptions include:

- The AGL/Powerlegato offering includes both a retrofit option (i.e.: for customers with existing solar wishing to add a battery to their system) and a standard option. We understand that Origin and EnergyAustralia do not, at this stage, offer a retrofit option.
- As the EnergyAustralia product has not been officially released into the Australian market, the cost of the Enphase system represents our best estimate.
- Tariffs used are the retailer's most competitive current offer as at Feb 2016

Table 1 – Tier One Energy Retailers – Current Residential Solar Storage Bundle Offerings

Retailer	Battery	Solar System	Indicative Cost (\$A)
AGL	7.2kWh Powerlegato Li-ion	Hanwha 3 – 4.5kW System	\$13,000 - \$14,500
EnergyAustralia	4.8kWh Enphase Li-ion	LG Black 3.1kW System	\$11,000
Origin Energy	6.4kWh Tesla Li-ion	Trina 3kW or 4kW System	\$15,500-\$16,500

Source: Energeia, Company Data

## Methodology

Energeia used its proprietary, Distributed Energy Resource (DER) optimiser to assess each of the above offerings against local retail tariffs in Brisbane, Sydney and Melbourne. The DER optimiser takes a tariff, a battery, a solar system and a household electricity load profile and determines the optimal dispatch plan for the battery for each 30-minute interval over a full 365 day period in order to maximise the Return on Investment (ROI). Each household has a unique electricity usage pattern, even between households of similar demographics and construction, which can strongly influence ROI on solar storage systems. For this reason Energeia used a large sample (approximately 10,000 households) of electricity load profiles in order to create a distribution of ROI values for a given system such that a mean representative of the population is assured. The results provide a clear picture of where the current offerings stand and estimate market size for each offering.



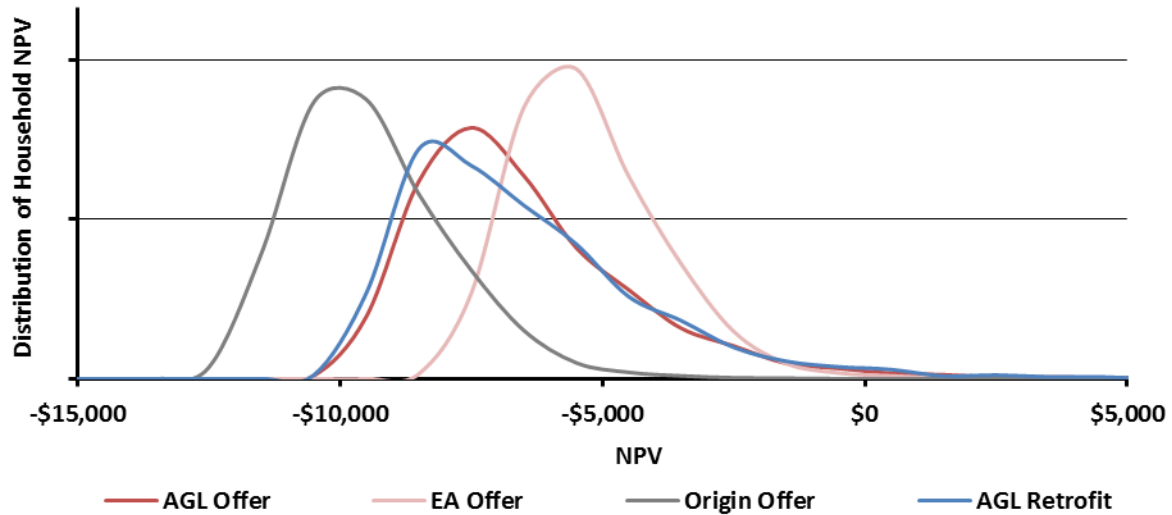
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Figure 1 shows the NPV distribution (at a 10% discount rate) using NSW customers. The majority of NPVs are negative, indicating investments in current products have an infinite payback period (i.e. a non-rational economic investment). It is worth noting that for the few customers that do have a positive NPV, these customers would have an even higher NPV by adopting solar PV only, with no battery.

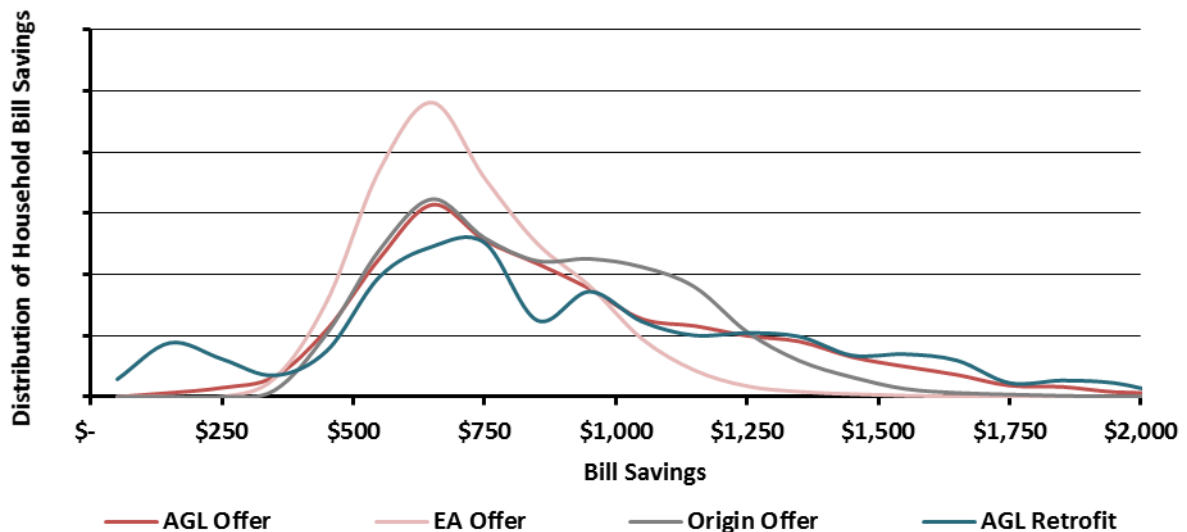
Figure 1 – NPV Outcomes of Solar Storage Bundles (Expressed as Distribution of Households)



Source: Energeia, Company Data

Let's go further with this analysis. The average householder may think in terms of "bill savings", (i.e. what is the reduction in my future power bills?) rather than NPV terms. Figure 2 shows the distribution of bill savings across households with solar storage systems across the four offers, again using NSW as a reference case. The analysis tells us that the EnergyAustralia product (if it were available) gives a median annual bill saving of A\$690, while the AGL and Origin offers would deliver similar annual bill savings with a median of around A\$825.

Figure 2 – Bill Savings (A\$) of Solar Storage Bundles (Expressed as Distribution of Households)



Source: Energeia



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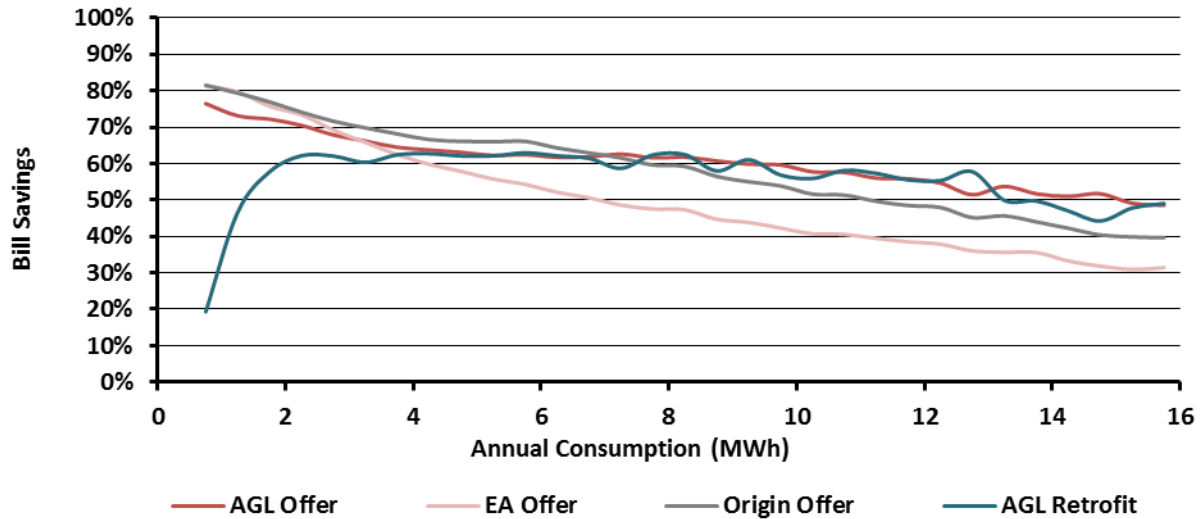
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Finally, we examine the bill savings across a range of energy consumers including the Australian average (~3.8 MWh per annum) up to heavy users 14-16 MWh for each of the offers.

Figure 3 shows the distribution of bill savings expressed as a percentage of the original bill for each of the offerings. For an average household these systems will deliver between 50% to 65% bill savings. Despite these high bill savings, at the current price point, these systems will not pay themselves off within a (typical) 10 year warranty period.

Figure 3 – Bill Savings Against a Range of Household Energy Usage Intensities.



Source: Energeia



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## Conclusion

The results are somewhat stark and indicate that today's offerings are for those who do not require positive economics. These offerings appear to be designed for those households seeking only bill savings. Table 2 highlights the potential market size of each offering assuming households seek a payback period of 8 years or less. We estimate that ~50,000 households (out of an estimated 5.8 million households Australia wide) would be interested in any of the offerings.

Table 2 – Potential Market Size of Examined Solar Storage Bundle

Households	Market Size			TOTAL
	QLD	NSW	VIC	
AGL	7,635	27,802	-	35,437
EnergyAustralia	258	-	-	258
Origin Energy	9,705	5,853	-	15,558

Source: Energeia

Energeia will release further market analysis to our research clients as the market offerings evolve, and particularly payback periods and returns begin to create an attractive thesis for a larger set of households.

## About Energeia

Energeia Ltd is an international energy specialist research provider. Our core competencies span the entire Australian electricity sector including its technical, financial and economic operation from behind-the-meter to the wholesale generation market. Our clients include retailers, networks (both distribution and transmission), generators, governments and industry associations seeking services of regulatory review, forecasting of supply and demand, business case development, financial modelling, government program and policy design, and investment strategy.

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