Terry Niemeier, Director - Program and Market Development - Safeguard

NSW Office of Energy and Climate Change

NCBA and Green Energy Trading Submission to the PDRS Rule Change 2 Consultation Paper

Consultation Questions

1. **Do you agree with the update to the equation, adjustment factors and lifetime for SYS2?**

We agree to the proposed amendments to the equation and adjustment factors, leveraging the publicly available GEMS data (PAEC and DRT) to build a more robust calculation metric that eliminates the necessity to measure the total pool volume. We disagree with the proposed lifetime value for SYS2, however, as this greatly undervalues the lifespan of energy efficiency variable speed pool pumps currently available. From what NCBA understands, the proposed lifetime is based on the findings of the Woolcott consumer survey, averaging out to a lifetime of 7.25 years;

> *"Based on the Woolcott survey, among respondents in Australia who were replacing their pool pumps, 20 per cent were replacing pumps 0 5 years old, 42 per cent were replacing pool pumps 5 10 years old, 23 per cent were replacing pool pumps that were more than 10 years old. The remaining 15 per cent did not know the age of the pump they were replacing".* E3 Decision Regulation Impact Statement: Swimming pool pumps (p. 60).

We believe there are a number of flaws with this approach, given;

- It was based on a customer survey of replacement rates, rather than any equipment test reports,
- Only a very small sample size of 131 Australian respondents were used, and
- The survey was conducted in 2016, in which there was a high prevalence of single speed pumps (which have a lower lifespan due to continuous high-speed operation). Sales data for the 5 years previous to the survey showed an average 80% sale rate of single speed pool pumps.

Currently, no GEMS Registered single speed pool pump exceeds a star rating of 2, falling far below the minimum ESS and PDRS benchmark of 4.0. As a result, we support a minimum lifetime of 10 years, which represents the current effective life as per the 2023 Australian Taxation Office (ATO) Depreciation Rates table.

2. **Is the pool pump industry able to meet a requirement that pool pumps have demand response capability and what would the cost impact of this be?**

Based on conversations with key Pool Pump stakeholders, the industry can meet the requirement of demand response capability, however, this would greatly increase the supply and install costs for the consumer in the order of $1,000. As such, we support the exclusion of demand response capability criteria for SYS2 at this stage to ensure the uptake of multi and variable speed pumps.

3. **Do you agree with adding a capacity factor to WH1?**

We support the inclusion of a capacity factor to WH1 to appropriately apportion peak demand reduction capacity and prevent instances of improper or oversized units being installed in order to take advantage of a higher incentive. However, we believe the capacity factor should be aligned between the ESS and PDRS to avoid unnecessary complexity in the marketplace, included below for reference;

Capacity Factor is:

- *1, if HPCap <= WHCap; or*
- *WHCap / HPCap, if HPCap > WHCap*

Where HPCap is the total rated capacity (kW) of the heat pump water heater(s) being installed, as defined in in a manner determined by the Scheme Administrator, and WHCap is the total rated capacity (kW) of the End-User Equipment being replaced.

This requirement is already well understood by the industry, having been in effect for the duration of F16 activities, thus will be simple to implement and communicate with the wider marketplace with minimal disruption.

Without further information regarding the specific calculation method for a WH1 Capacity Factor (using the baseline input power, which is determined by the *ComPkLoad* (peak daily (winter) load in megajoules)), we cannot comment as to the effectiveness of a differing approach. However, as the *ComPkLoad* is recorded in the accepted product list for each HP Zone, and does not account for the specific electric hot water system currently installed at the premises, an approach using this value may not adequately meet the specified goal of limiting savings to new equipment with a rated capacity less than the original equipment.

4. **What evidence should be required under WH1 to ensure that customers aren't being taken off controlled load?**

We do not share the concerns regarding customers being taken off controlled load tariffs for WH1, as this activity is restricted to commercial premises where the prevalence of these tariffs are significantly lower than residential customers. Imposing additional evidence requirements to address what may be a small minority of sites would not be our preference. However, should the risk of increased consumption during peak times be high, it is essential that flexibility in demonstrating compliance with this requirement is communicated in guidance material and to IPART as the Scheme Administrator to avoid prescriptive and

onerous requirements. We suggest the below two documents as appropriate evidence to comply with any controlled load requirements;

- Copy of the Electricity Bill, demonstrating the customer is not on a controlled load tariff.
- Date-stamped and Geo-tagged photograph of the switchboard, meter box, NMI etc. demonstrating no controlled load meter at the premises.

5. **Is the new air conditioner requirement (equipment requirement 3), as written in the rule, going to be effective to enable consumers to participate in demand response programs using their new air conditioner?**

We support in principle the inclusion of requirements to ensure standardised inclusion of demand response capabilities within air conditioning units, especially the proposed wording to circumvent the current restrictions associated with AS4755. However, we seek further information regarding the acceptable evidence to comply with equipment requirement 3 for air conditioners, specifically surrounding internet connectivity, as this is not detailed in the GEMS Register. However, we do not support the implementation of any product approval mechanism to this method, as this would increase the administrative burden on both the Scheme Administrator and manufacturers, leading to delays in implementations.

To streamline the evidentiary requirements and compliance burden, we propose that the NSW Government leverages the existing SA Government Air Conditioner Regulation Change in the administration of this requirement, with any air conditioning unit listed on the Technical Regulator Compliance List as Category 1 or 2 be deemed as compliant as they exceed the proposed equipment requirement 3. Units within this category comply with any of the below standards as well as three Demand Response Modes (DRM1, DRM2 and DRM3);

- AS/NZS 4755.3.1:2014, or
- AS/NZS 4755.2 (when published), or
- the equivalent of the superseded AS/NZS 4755.3.1.2012 (for a limited period until 1 July 2025 or 12 months after the publication of AS/NZS 4755.2, whichever is the later date).

Should a unit be listed as Category 3 (*products that are demand response capable (as defined in AS4755.3.1.2012) or potentially demand response capable (as defined in AS3823.2.2011), only if a separate part or component is added to them at installation or in the future*), evidence that the additional component has been installed should be collected at the time of installation.

6. **Do you need a transitional period to prepare for the new demand response requirements?**

It is essential that an appropriate transitional period is set for these new requirements, as ensuring compliance with the technical requirements and ensuring stock is available in NSW will be a lengthy exercise. We propose that a six-month transitional period will be sufficient to ensure compliance, aligning with the timeframe from announcement to implementation for the SA Government Air Conditioner Regulation Change.

7. **Do you agree with the requirement to verify demand response capacity through dispatch data?**
8. **Do you agree with the proposal to leverage data from the Wholesale Demand Response Mechanism to validate PDRS capacity?**
9. **Do you agree with the exclusion of RERT and LTESA loads from the PDRS?**

We require further practical implementation data from the Wholesale Demand Response Mechanism to understand it's viability under the PDRS.

10. **Are the implementation requirements sufficient to drive best practice installation of batteries?**
11. **What additional steps can we take to mitigate fire and other safety risks from batteries supported through the scheme?**
12. **Will there be any challenges meeting the requirement for batteries to be registered on AEMO's DER register?**
13. **Are there additional requirements you recommend we add to ensure consumers get the best outcomes?**
14. **Do you support the dataset used, data assumptions and proposed calculation method for certificates for activity BESS 1?**
15. **Do you agree with the way we've considered round trip losses in the factor of 10%?**

We supply the below response addressing all questions associated with BESS1.

We believe that the approach that the Government has undertaken with regard to BESS1 is significantly disadvantaging the technology, and further does not recognize the real demand reduction benefits delivered by BESS. We note that application of conservatism as a principle is fine, however, this must be applied to all activities and not just selective ones, otherwise it is punitive.

There are three areas where we believe the Government's calculation approach should be reviewed:

1. **Deemed lifetime** of BESS1 is stated as being 8 years, with a requirement that the equipment is warranted for at least 7 years and the site must have a PV system. The rationale for choosing 8 years appears to be based on the expectation that the performance of the battery reduces considerably after this period. In addition, the component of the Batteries capacity that would be eligible for PRCs would be limited to 51% of the capacity of the battery.

a. Whilst we accept that residential batteries (with solar PV) are a relatively new technology they have now been in operation for a reasonable amount of time and manufacturers are becoming more confident in the lifetime of the equipment – so much so that they are prepared to warrant if for 7 years (or number of cycle equivalent). As a point of reference, no suppliers of other eligible equipment (e.g. Air Conditioning and Commercial HPWP) are required to warrant the performance of their product (let alone for anywhere near 7 years).

b. Many manufactures claim lifetime of their batteries for considerably greater than 10 years. We refer the Government to Solar Choice website: https://www.solarquotes.com.au/blog/solar-batteries-lifespan/

> *Expect a home battery in a temperate climate with typical use to last 15 – 17 years. Solar batteries exposed to higher temperatures, and worked hard every day, could have an effective life of 12 – 14 years.*

In addition, Solar Choice include an example of a typical Manufacturer warranty (GOODWE, refer extract below. Importantly GOODWE warrant their product for 10 years for the system to retain 70% of usable energy. Apparently for most popular batteries manufacturers will warrant batteries for 10 years at 70% (refer to https://www.solar.com/learn/how-long-does-a-solar-battery-last/ extract of which is included in Attachment 1). As the VDNV article argues manufacturers are quite happy to provide 10 years – 70% warranties as the performance of the equipment are expected to considerably exceed this. Refer to Attachment 2

GOODWE Limited Warranty for Lynx Series LX F Battery System

(For Australia and New Zealand Markets)

OVERVIEW

GoodWe Technologies Co.,Ltd.(hereinafter referred to as GOODWE) warrants that, subject to the exclusions and limitations set out below, the GOODWE Lynx Series battery system LX F 6.6-H, LX F 9.8-H, LX F 13.1-H, LX F 16.4-H come with a *Manufacturer's warranty which includes

1. 10 years of product warranty: GOODWE warrants that the hardware of electronics and enclosure (including battery cover, micro circuit breaker, BMS PCBA) will be free of defects caused by improper workmanship or defective materials and it will be starting from the earlier one of the original End User purchase date or 6 months after the product was manufactured.
2. 10 years of performance warranty: GOODWE warrants that the battery system retains either seventy percent (70%) of Usable Energy for ten (10) years, or for a Minimum Through Output Energy which is calculated from the earlier one of installation date or 6 months after battery system production date, whichever comes first.

Model No.	*Usable Energy (kWh)	Minimum Through Output Energy (MWh)
LX F 6.6-H	6.55	16.77
LX F 9.8-H	9.83	25.16
LX F 13.1-H	13.10	33.54
LX F 16.4-H	16.38	41.93

GOODWE Limited Warranty for Lynx Series LX F Battery System shows a 10-year product and performance warranty of 70% useable energy and a minimum throughput based on battery size. Image: GoodWe

c. As the BESS1 component of 51% capacity requires 61% available energy (including losses of 10%), therefore peak demand benefits can be achieved even if the battery energy retention falls to 61%. In the GOODWE example a warranty period of 10 years at 70%, this is considerably more than is given credit for in the Governments calculation parameters. And is certainly a lot more significant than the 12 years deemed lifetime without warranty for HWHP, which currently represents 85% (or over 11 million) of the PRCs created to date. We believe the minimum 61% required for BESS1 would easily be available for more than 15 years, and thus that the deemed lifetime should be 15 years where a 70%-10 year warranty is provided and 12 years when only a 7 year warranty is provided.

Ensuring technology neutrality - A snapshot

Current Government Proposal

	Comm HPWH	Res A/C	Pool Pumps	Res BESS1
Deemed lifetime	12 years	10 years	7 years	8 years
Warranty Req	nil	nil	3 years	7 years
Typical warranty	2-5 years	5 years	3 years	10yrs/70%
ATO Depreciation	10 to 15 years	10 years (<20kW) 15 years (>20kW)	10 years	15 years

Technology neutral approach

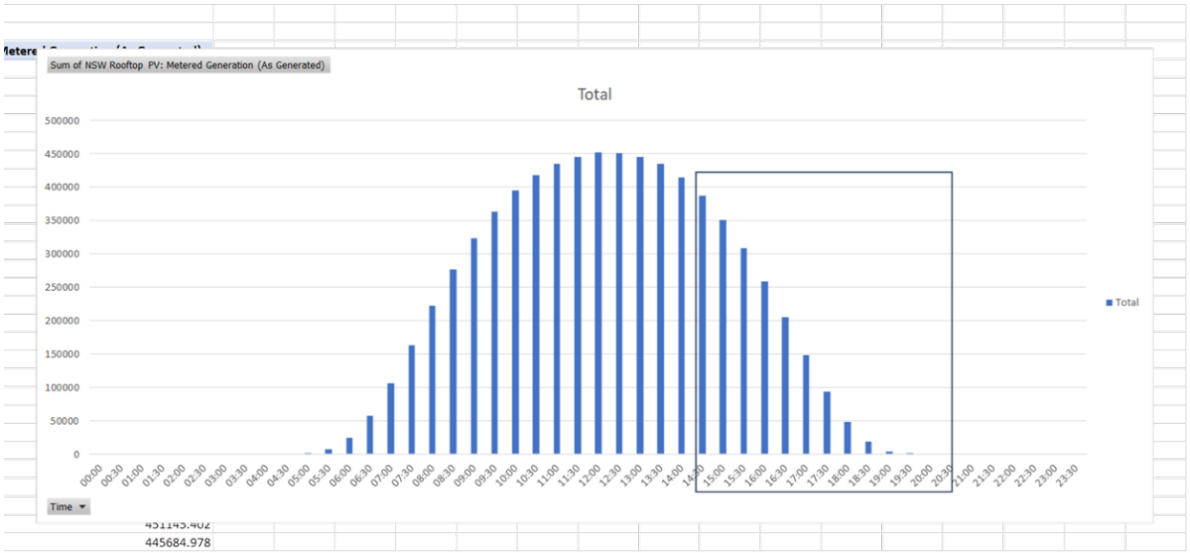
	Comm HPWH	Res A/C	Res Pool Pump	Res BESS1
Deemed lifetime	12 years	12 years	10 years	15 yrs (10 yr Warr) 12 yrs (7 yr Warr)

The following changes to years of deemed savings are required to maintain technology and competitive neutrality, as well as to provide a consistent basis that market participants can have confidence in in order to develop new technologies and business model offerings:

- Increased deemed lifetime for BESS1 from 8 to 15 years when a 10 year / 70% capacity warranty is provided; or from 7 to 12 years where only a 7-year warranty is provided;
- Increase deemed lifetime for Residential and Commercial A/C from 10 years to 12 years;
- Increase deemed lifetime for Residential pool pumps from the proposed 7 years to 10 years.

2. **Eligible capacity available under** BESS1 is stated as being 51% of the rated capacity allocated over the six-hour peak period from 2.30 to 8.30 PM. The proposed calculation for the Annual peak shifting capacity is significantly understating the contribution that a BESS with PV is making to reducing demand over the 2.30 to 8.30 pm peak period. Figure 1 below shows the daily average output of rooftop PV in NSW from 1 Nov 22 to 31 Mar 2023. This is also a representative profile of the average output of a customer's PV system in NSW over the same period. What is clear from the chart is that Solar PV is making a customer with PV is making a significant contribution to demand reduction over the 2.30 to 8.30 period.

Figure 1 - Average daily output (by half hour) of rooftop PV in NSW from 1 Nov 22 to 31 Mar 2023 (from AEMO, NEM Review).



In a non-orchestrated approach (as BESS1 is), it would be illogical for a customer with Solar PV and a battery to discharge the battery when their PV system was still meeting their power needs, occurring up until around 4.30 to 5.00 pm. The peak shifting capacity calculation effectively requires the customer to have the battery capacity available to reduce its load over the 2.30 to 5.00 pm period when it has no load and is instead exporting to the grid. To properly reflect Batteries contribution to reducing demand, the peak shifting capacity available should be reflected over the 5.00 pm to 8.30 pm period. The demand reduction is guaranteed by the PV

generation over the 2.30 to 4.30 period. The incremental impact that a battery is therefore over 3.5 hours, until 8.30 pm. To give effect to this approach the Demand Shifting Component should be determined as follows:

Demand Shifting Component = Usable capacity of battery (kWh) x 51% divided by 3.5 (hours between 5pm and 8.30pm)

In the example using 13.5 kWh usable battery capacity the calculation would be:

13.5 x 51% divided by 3.5 giving = 1.96 kW (compared to 1.15 kW in the example)

3. **Other matters** relating to BESS1, including the potential for BESS activities without Solar PV. Whilst we understand that most battery systems are installed with or alongside solar PV – we do not want to exclude the potential for batteries only to be eligible as they provide demand reduction. As a result, we recommend that there be two conditions for the installation of a battery under BESS1;
    a. Where the customer already has solar PV the calculation is as per item 3 above i.e.. Annual peak shifting capacity is scaled up 40%;
    b. Where a battery is installed without solar PV then the calculation should reflect that proposed by the government i.e.. Annual peak shifting capacity is not scaled up

16. **Do you support the data assumptions and proposed calculation method for certificates for activity BESS2?**
17. **Are there additional requirements you recommend we add to BESS2 to ensure consumers get the best outcomes?**
18. **Can you provide evidence of what proportion of a battery's capacity is available for demand response under orchestration contracts?**
19. **Can you see any potential issues with the 12-month cadence of certificate creation for each NMI?**

We supply the below response addressing all questions associated with BESS2.

As very few PRCs are created from the current BESS2 methodology, the high transaction costs will mean that there will be limited incentive for parties to enter into VPPs. We propose that instead of an annual creation mechanism, forward creation is instead used, tied to the lifetime of the VPP contract – i.e.. for a three year contract – then the next three years of expected demand response could be created – and then verified after three years – with further deemed creation when the VPP is renewed

20. **Do you support the data assumptions and proposed calculation method for certificates for activity HVAC3, especially those relating to duration and temperature limits?**

We believe the current data assumptions and proposed calculation method for HVAC3 do not adequately capture the potential peak demand reduction capacity available from residential customers signing up to a contract. We propose the following amendments to better align with the true capacity available;

- Demand Response Duration: We believe the maximum 2-hour period per event to be appropriate, acknowledging the health and safety risks associated with controlling an AC unit for longer than this period. However, there is a high likelihood of more than one demand response event to occur per annum, which is not accounted for in the current proposed calculation method. We believe that the maximum 6-hour period should be used as the representative Summer Peak Demand Reduction Duration, as there is a strong likelihood of at least three 2-hour demand response events occurring. This is supported by the publicly available data from the QLD Energex PeakSmart program, as over the past ten years, there was an average total event duration of 5.8 hours occurring between 2:30 – 8:30pm 1 November to 31 March.
- Energy Savings Percentage: We note that the energy savings percentage of 7.5% per degree of set-point temperature change was chosen by OECC, based on Sunardi et al. (17 July 2020) research article on the '*Effect of room temperature set points on energy consumption in a residential air conditioning*'. We bring to the Government's attention Figure 6 within this report, detailing the percentage decrease in energy consumption at each degree of increased room set point, from 20 to 21 °C to 23 to 24 °C. Sunardi et al. found an average energy savings percentage of 11.78% within this set point range, which is indicative of the climate and set point change expected to occur within NSW. Therefore, we propose that the calculation methodology for Input Power (kW) be amended to be; *Baseline Input Power × 0.53 (assuming 47% reduction based on relationship between 11.78% per degree of temperature set point increase and a 4°C set point increase)*.

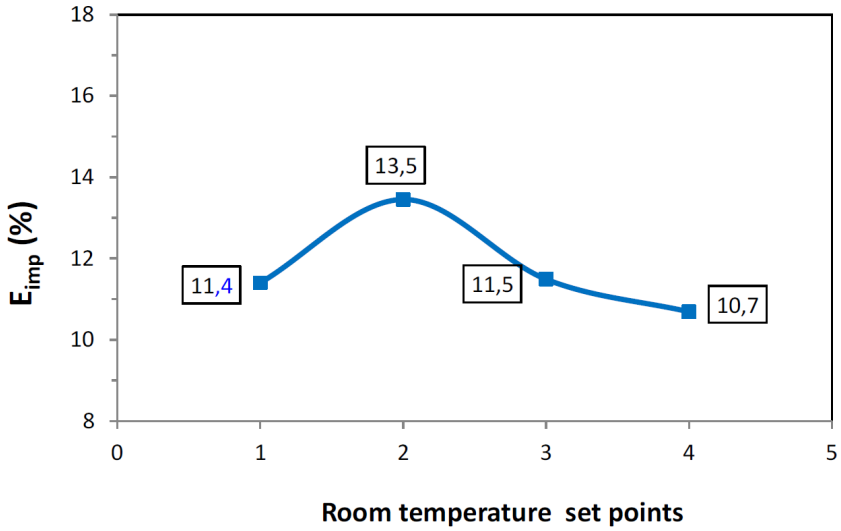


FIGURE 6. The energy consumption improvement of A/C system due to increment in room temperature set points.

- Firmness Factor: We request further clarity on the dataset used to determine a 20% opt out rate for peak demand response events (0.80 Firmness Factor), as this is significantly higher than expected. For example, the Ausgrid Demand Management initiative 'CoolSaver' gave participants the option of overriding a dispatch event, however, only 4.3% of selected this option. During Phase 3 of this trial program (the latest publicly available dataset covering summer peak events), there was only one recorded override across a total of 74 participants during six demand response events in Maitland, representing an opt-out percentage of 1.35% (see table below). Therefore, we support a firmness factor of at least 0.97.

Date	Day of week	Start Time	Finish Time	Mode	Max. Daily Temp (°C)	Participants	No of Overrides
14/01/2016	Thursday	2:00pm	6:00pm	DRM2	38.5	3	0
15/02/2016	Monday	2:00pm	6:00pm	DRM2	33.2	12	0
25/02/2016	Thursday	3:00pm	7:00pm	DRM2	39.5	13	0
3/03/2016	Thursday	3:00pm	7:00pm	DRM2	33.4	16	0
9/03/2016	Wednesday	3:00pm	7:00pm	DRM2	34.8	18	1
10/03/2016	Thursday	3:00pm	7:00pm	DRM2	34.8	12	0

Ausgrid Demand Management CoolSaver Interim Report (February 2017) p. 21

21. **Are there additional requirements you recommend we add to HVAC3 to ensure consumers get the best outcomes?**

No

22. **Can you provide evidence on the approximate duration of events where an air conditioner is controlled by a third party? In addition, can you provide evidence that customer comfort is not noticeably impacted?**

Please refer to the information provided above in our response to Q20, specifically Demand Response Duration.

23. **Can you provide evidence of opt out rates for third party control of air conditioners?**

We refer to the Ausgrid Demand Management CoolSaver Interim Report (February 2017) for figures on opt out rates year on year. Phase Two of this initiative saw 109 households selecting to participate in the program in the Central Coast and Lake Macquarie area, with Ausgrid receiving consistently positive survey feedback from participating households. From this initial population, '*a total of 90 participating households (84%) extended their participation in the trial to a third summer period in 2015/16; and in 2016, 79 households (88%) extended their participation through to the end of summer 2016/17. Of the 10 customers who have declined to continue with the trial, 70% were due to residents having moved out of their property and 30% did not wish to continue*'.

24. **Can you see any potential issues with the 12-month cadence of certificate creation for each NMI?**

We do not foresee any issues with the 12-month cadence.

Please do not hesitate to contact either NCBA or GET should you have any further questions regarding the evidence or information presented in our response.

Kind Regards,

Ric Brazzale
Green Energy Group Chairman

Adam Bertino
NCBA General Manager – Commercial

About us

National Carbon Bank of Australia and Green Energy Trading are part of the Green Energy Group. This submission represents the views of both companies.

Green Energy Trading is one of Australia's largest environmental certificate agents. We are committed to making incentives for renewable energy and energy efficiency activities more accessible to Australians.

Established in 2007, Green Energy Trading supports its clients in accessing incentives available through market mechanisms, including the Victorian Energy Upgrades scheme (Victorian Energy Efficiency Target), NSW Energy Saving Scheme (ESS) and the federal Renewable Energy Target.

As an Accredited Provider (AP), we create and trade environmental certificates for solar PV, hot water, commercial lighting and other energy efficiency upgrades under Federal and State-based renewable energy and energy efficiency incentive schemes.

As a member of the Energy Savings Industry Association (ESIA), we work embrace opportunities to strengthen the schemes we work in to ensure integrity and longevity of those schemes.

National Carbon Bank of Australia is an independent and transparent facilitator of carbon abatement certificates, helping businesses claim financial incentives available from the NSW ESS, PDRS and ERF.

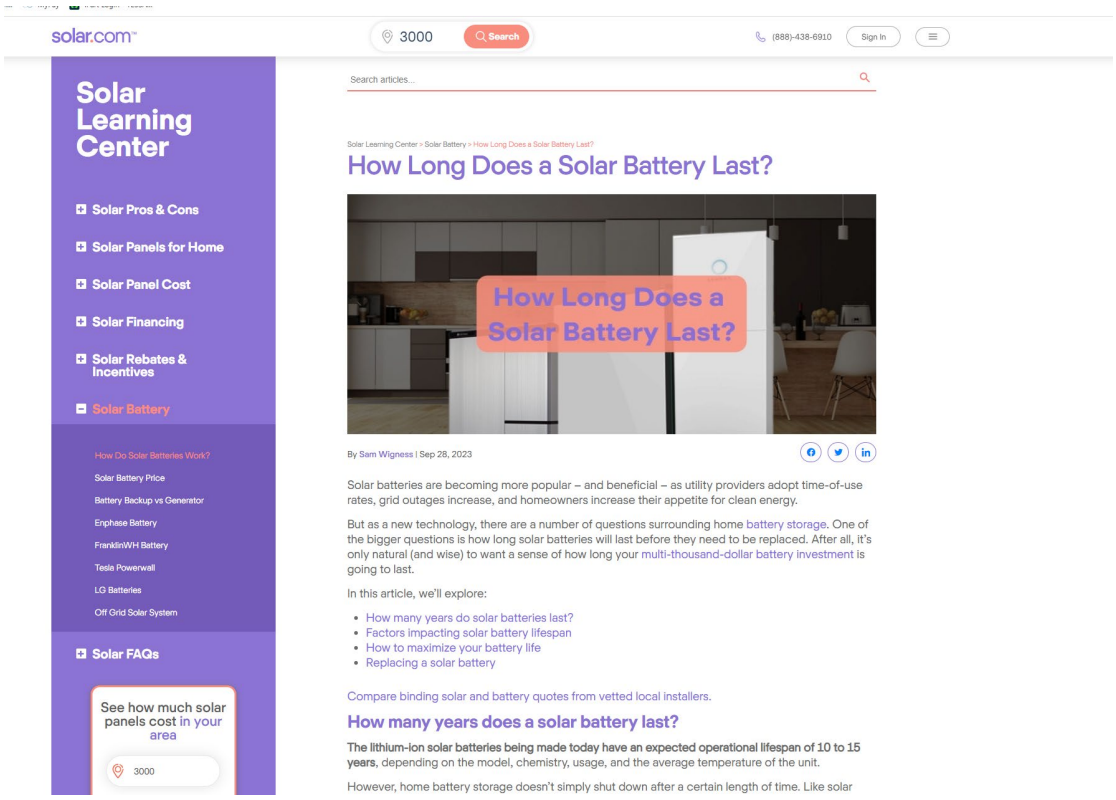
Founded in 2012, National Carbon Bank of Australia is committed to accelerating the uptake of energy efficient technologies, powering Australia to Net Zero and beyond.

As an Accredited Certificate Provider (ACP), we create certificates for air conditioning, hot water, lighting and other energy efficiency projects under the Energy Savings Scheme and Peak Demand Reduction Scheme.

We are committed to building strong partnerships with installers and product suppliers and engaging strong with them and their customers to educate them on the benefits of participating in NSW government scheme driving energy savings and emissions reductions.

We also work with the Emissions Reduction Fund (ERF) creating carbon credit units for commercial lighting and public lighting upgrades all over Australia.

Attachment 1



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How Long Does a Solar Battery Last?

By Sam Wigness | Sep 28, 2023

Solar batteries are becoming more popular – and beneficial – as utility providers adopt time-of-use rates, grid outages increase, and homeowners increase their appetite for clean energy.

But as a new technology, there are a number of questions surrounding home battery storage. One of the bigger questions is how long solar batteries will last before they need to be replaced. After all, it's only natural (and wise) to want a sense of how long your multi-thousand-dollar battery investment is going to last.

In this article, we'll explore:

- How many years do solar batteries last?
- Factors impacting solar battery lifespan
- How to maximize your battery life
- Replacing a solar battery

Compare binding solar and battery quotes from vetted local installers.

How many years does a solar battery last?

The lithium-ion solar batteries being made today have an expected operational lifespan of 10 to 15 years, depending on the model, chemistry, usage, and the average temperature of the unit.

However, home battery storage doesn't simply shut down after a certain length of time. Like solar

Warranty terms for popular solar batteries

MAKE/MODEL	INITIAL USABLE CAPACITY	WARRANTY
Franklin Home Power	13.6 kWh	70% capacity after 12 years or 43MWh throughput
LG ESS Home 8	14.4 kWh	70% capacity after 10 years or 59.8 MWh throughput
sonnenCore+	8.6 kWh	70% capacity after 10 years or 10,000 cycles
LG RESU 10H PRIME	9.6 kWh	70% capacity after 10 years or 32MWh throughput
Enphase IQ Battery 3/10	3.36kWh / 10.08 kWh	70% capacity after 10 years or 4,000 cycles
Enphase IQ 5P	5 kWh	60% capacity after 15 years or 6,000 cycles
Tesla Powerwall 2	13.5 kWh	70% capacity after 10 years (unlimited cycles)
SunPower SunVault	13 kWh / 19.5 kWh	70% capacity after 10 years (unlimited cycles)

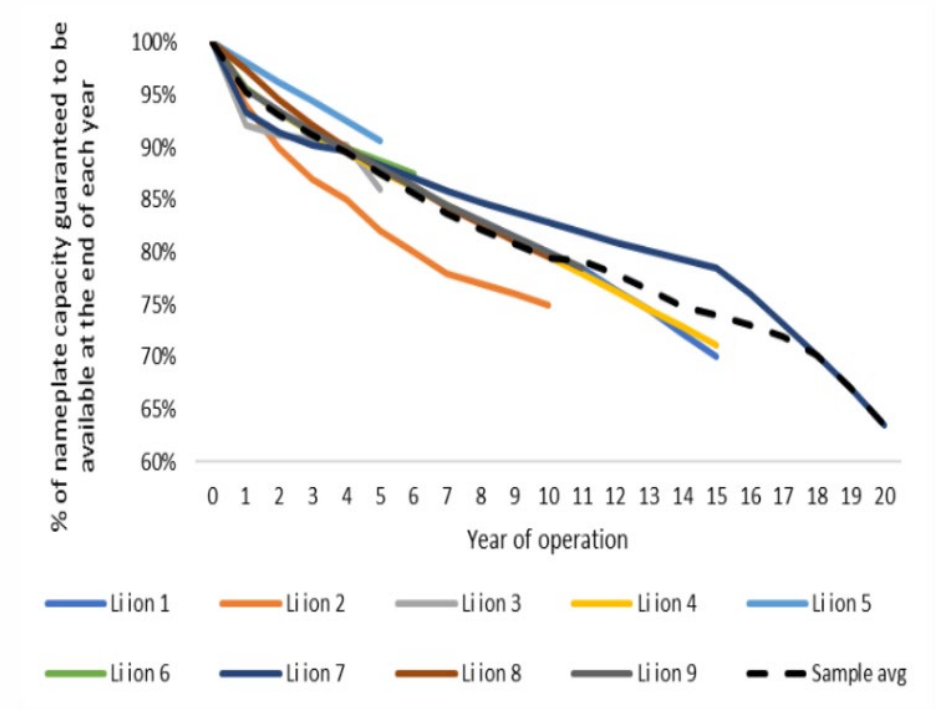
Of course, it's always a good idea to *read the entire warranty agreement* so you know exactly what is covered. For example, Tesla offers an unlimited cycle warranty on its Powerwall 2, however, the warranty states:

> *"If you **only use** your Powerwall for self-consumption of **solar energy generated by an onsite array and for storing that solar energy** for use as backup power, there is no limit on the number of times that you can cycle your battery in this ten year period."*

Attachment 2 - Warranties and degradation curves (DNV report)

https://www.dnv.com/article/energy-storage-capacity-warranties-beyond-the-fine-print-200339

Figure 1: Illustrative warrantied energy capacity degradation curves[2]



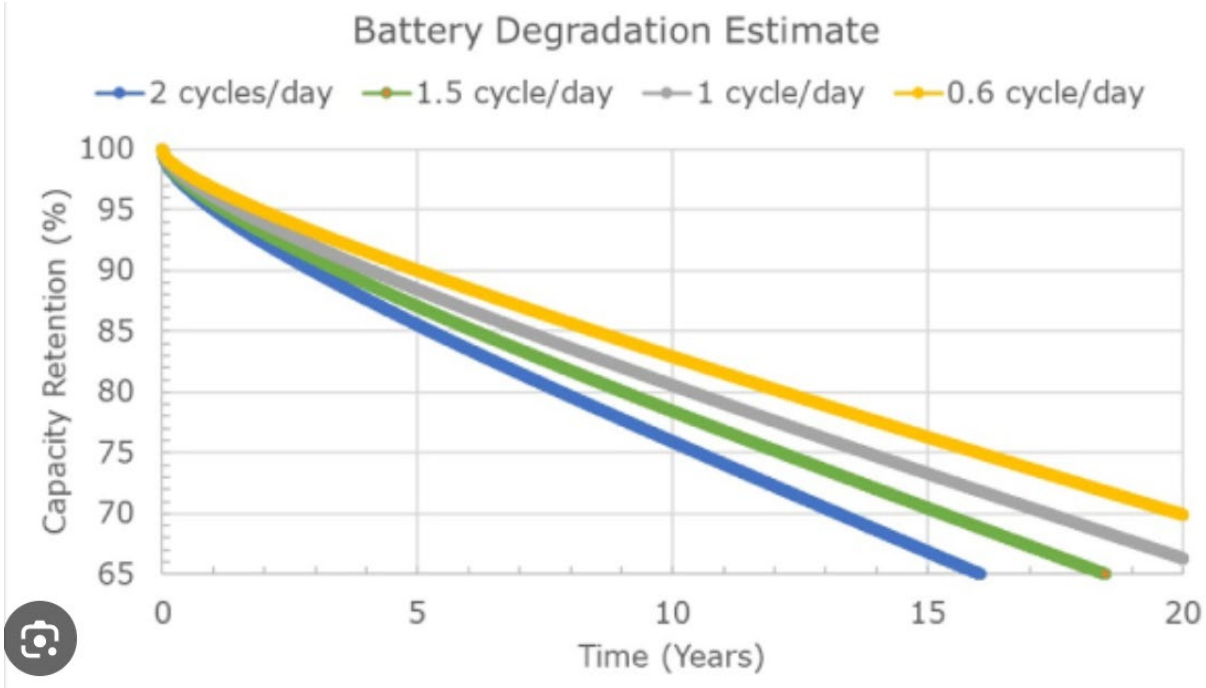


Table B

Name	Effective Life	Diminishing Value Rate	Prime Cost Rate	Date of Application
Power supply assets:				
Storage **batteries**	15 years	13.33%	6.67%	1 Jul 2013
Warehouse and distribution centre equipment and machines:				
Battery assets for warehouse vehicles (including pallet trucks and forklifts):				
Batteries (detachable for recharging)	5 years	40.00%	20.00%	1 Jul 2011