A re-evaluation of the potential for growth in rooftop solar and small-scale batteries

Prepared for the Australian Conservation Foundation and Smart Energy Council

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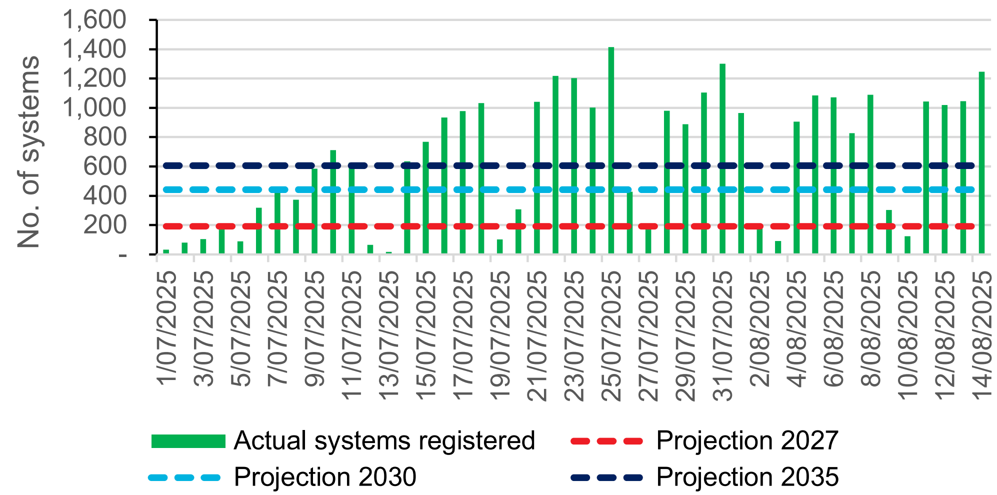
Introduction

- In the lead-up to the April federal election the Albanese Government committed to amending the Small Scale Renewable Energy Scheme (SRES) to make batteries up to 100kWh in capacity eligible for financial support via Small-scale Technology Certificates (STCs). At the time they indicated the level of STCs that would be provided would deliver a rebate initially equal to approximately 30% of the typical purchase price of a fully installed household battery (with STCs awarded in line with the kWh capacity of batteries up to a cap of 50kWh per system).
- Within just a few weeks after the federal election result it became readily apparent to solar industry participants that demand for household battery systems had surged to levels far above the levels seen over 2024. Feedback from our own industry sources, as well as data collected by solar market analysis firm Sunwiz, and information from online solar and battery quotation service SolarQuotes indicated both a surge in customer inquiries and conversion of those inquiries to closed sales of battery systems. In addition, the available information indicated that the average capacity size of battery systems was noticeably larger than historical norms of around 10kWh to 14kWh. This early, indicative information of a surge in battery demand has since been confirmed through battery STC registry data that became available from the Clean Energy Regulator in July.
- This early information suggested that rooftop solar and small-scale battery projections we had prepared for the Australian Energy Market Operator (used in their Integrated System Plan in conjunction with projections from CSIRO) and published in December last year were likely to seriously underestimate the level of battery capacity installed over the medium term.
- The industry representative group, the Smart Energy Council (SEC), had received similar early indications about the surge in battery demand from their solar industry membership base. In conjunction with the Australian Conservation Foundation (ACF), they felt that projections from ourselves and CSIRO informing AEMO and broader government planning and policy were likely to underestimate the potential contribution of small scale solar and batteries to decarbonising Australia’s electricity system. This led them to approach us in June to discuss the potential implications of the surge in battery demand for our modelling.
- In addition to this new information on battery demand, the Victorian Government has announced a series of reforms to improve the energy efficiency of rental properties and phase out of some gas appliances. Furthermore, under the Victorian Energy Upgrades program there has been a major scale-up in the level of gas heater decommissioning and replacement with energy efficient reverse-cycle air conditioners.
- Also, the re-election the Albanese Federal Government means that the National Vehicle Emissions Standard has faced the verdict of voters and over this term of government will progressively encourage an electrification of the vehicle fleet.
- Lastly, delays affecting the roll-out of transmission make it worthwhile considering options for expanding renewable energy that do not require transmission upgrades.
- These developments led us to conclude that an urgent re-evaluation of our model and projections was warranted. This report details the findings from this re-evaluation.

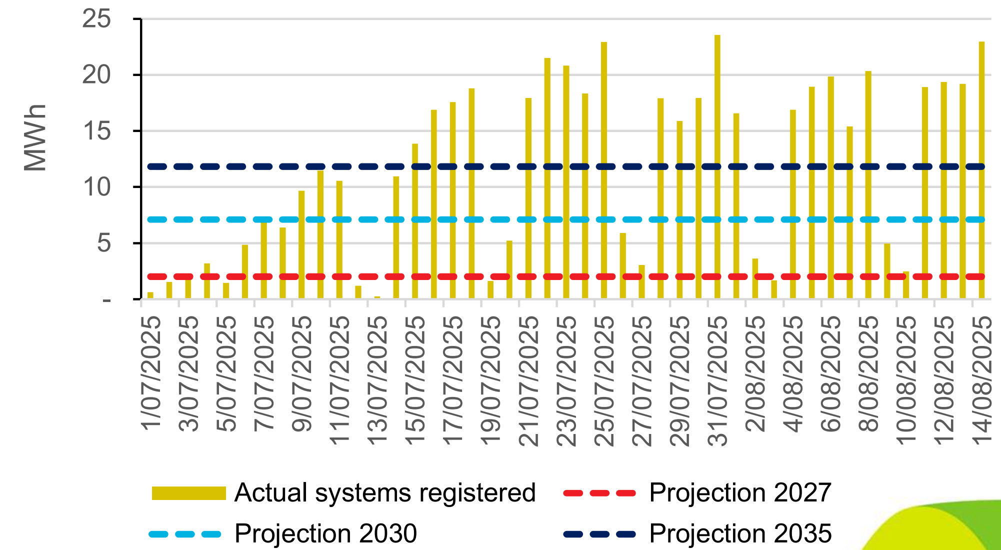
Actual battery demand vs projections

- The challenge with projecting future small scale battery installations is that the market for battery systems has been in an early adopted phase, at least until very recently. Such a market involves small volumes of sales relative to the overall potential size of the market (all electricity consumers) where those purchasing batteries are willing to buy the product in spite of its high costs relative to competing alternatives. This does not provide a particularly good basis for inferring how the broader market might act in response to reductions in battery prices.
- At the time of developing our 2024 projections of solar and battery uptake our baseline for existing market demand for small scale batteries was based on Sunwiz's survey of the battery market in 2023 which estimated 57,000 systems were installed nationally with 656 MWh of capacity in that year. This would equate to around 156 systems being installed per day equal to 1.8MWh of capacity. Data on sales over 2024 were unavailable at the time our projections were developed.
- The chart to the right at top illustrates in the green bars the numbers of systems that have actually been registered for STCs per day since 1 July when it became possible to claim STCs for battery systems. Meanwhile the horizontal dashed lines show the average daily residential and small commercial system installations we had projected under the Step Change Scenario for the financial year 2027 (when the scenario envisaged a battery rebate would be introduced), as well as 2030 and 2035. The bottom right chart illustrates in yellow bars the actual amount of battery capacity (megawatt-hours) registered per day, while horizontal lines show the projected levels.

Battery systems registered per day vs GEM projection



Battery capacity registered per day vs GEM projection



Note: Registrations are concentrated in weekdays, with a drop off during weekends.

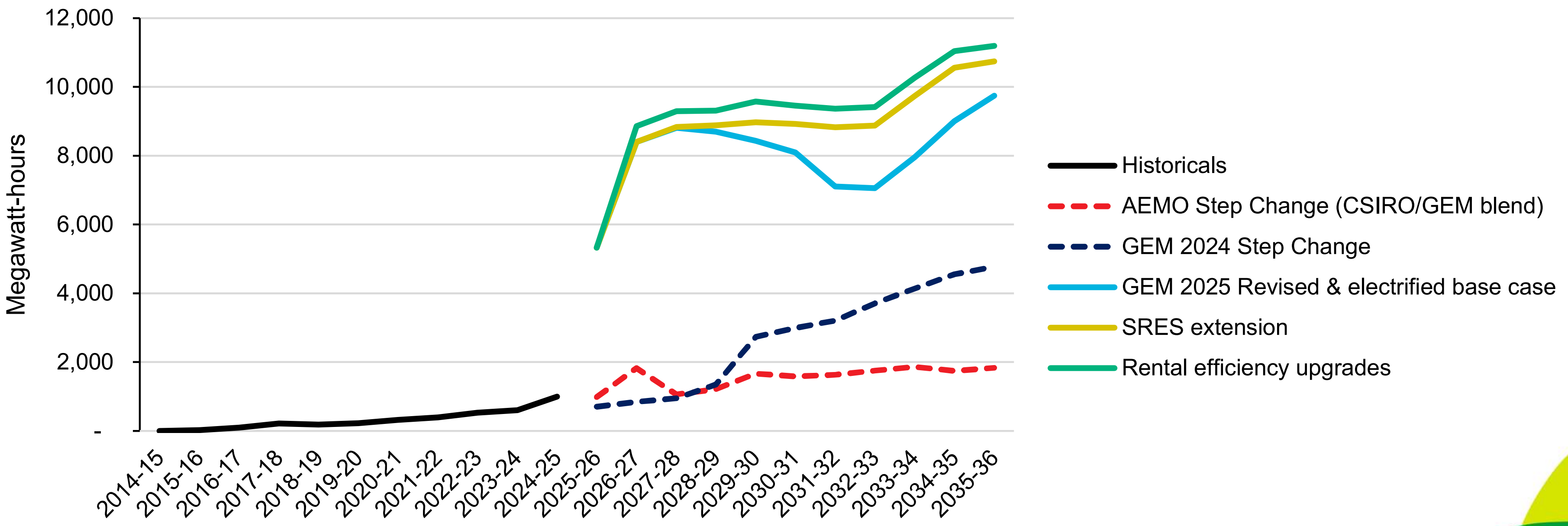
Actual battery demand vs projections

- What is abundantly clear is that actual installations have been running well above what we projected for 2027 and 2030, and even above levels projected for 2035.
- Since mid-July the average daily number of battery systems being registered (including weekends) has been running above 800. This is well ahead of what we expected in 2027 of 191 residential system additions per day and 2030 of 441 per day, and even noticeably above our 2035 projection of 606 system additions.
- In terms of megawatt-hours of storage, since mid-July 14.9MWh have been registered per day on average (including weekends) versus our projections of 2.0MWh in 2027, 7.1MWh for 2030 and 11.8MWh for 2035.
- Admittedly this data covers just a short period of time. So, there is uncertainty about whether demand will hold up at these levels over an extended period of time. The government explicitly allowed for battery systems to be sold and installed over May and June and remain eligible for the STCs, but these could only be commissioned and registered for STCs from July. This will mean July and possibly August numbers are bolstered by a backlog of systems installed over the prior two months, but which could only be registered since July 1.
- Nonetheless interviews with several industry participants suggest that these levels of installations for batteries are robust and are likely to be sustained.
- Discussions with solar market data analytics service provider, Sunwiz, revealed that customer requests for battery quotes surged in May. But these are then subject to several weeks lag, with 6 weeks common, between issuing of a quote and a closed sale and then installation. This suggests that the numbers coming through the registry over July and August are not a one-off inflated blip from a backlog of systems installed over May and June. Instead, the post-election rebate-induced increase in demand that we saw in a surge for quote requests is likely to only begin to come through in STC registrations over August.
- In addition to this information received from Sunwiz, interviews with several solar retailers/installers revealed that they had banked up order books of sales that would require several months to ultimately fulfil due to constraints in available battery-accredited installers. This included some companies with bookings that would keep them busy into January and February next year.
- One potential short-term cloud on the horizon was not so much about a lack of demand but rather supply – with wholesalers encountering shortages of battery system stock from a range of major manufacturers. For a number of the major manufacturers the Australian market for small residential scale systems has suddenly become equivalent in size to their European operations and will necessitate expansions in their residential system production capacity. Nonetheless, the Australian residential market remains extremely small relative to overall global battery production which also serves electric vehicles and utility-scale systems. Consequently, shortages of these residential systems should be relatively short-lived and over the length of the model period will even out.

Revised projection results
Battery capacity

- The chart below illustrates in the dashed lines AEMO's current ISP Step Change estimates (red) and GEM's 2024 projections (dark blue) for annual additions of battery capacity across the NEM and SWIS grids.
- The solid lines illustrate our revised projections for battery capacity which take into account the fact that battery uptake since the STC rebate was introduced has been far higher than we had previously envisaged. While these represent a very large leap up from historical levels, this is exactly what has transpired, as is evident in STC registration data.
- The revised projections also incorporate the potential for further policy and market developments under three alternative scenarios.
- The scenario in the blue line is a product of our updated understanding of battery demand and economics but also the potential for household electrification to improve solar and battery economics if encouraged by governments.
- The yellow line represents a scenario that also involves the Small Scale Renewable Energy Scheme being extended beyond 2030 with deeming for solar STCs held at 5 years and the amount of STCs for batteries maintained at 2030 rates.
- The green line represents a scenario that on top of the SRES extension adds a policy measure that would require rental properties to be progressively upgraded to meet minimum energy efficiency performance standards that allowed for solar and batteries as one of several compliance options.

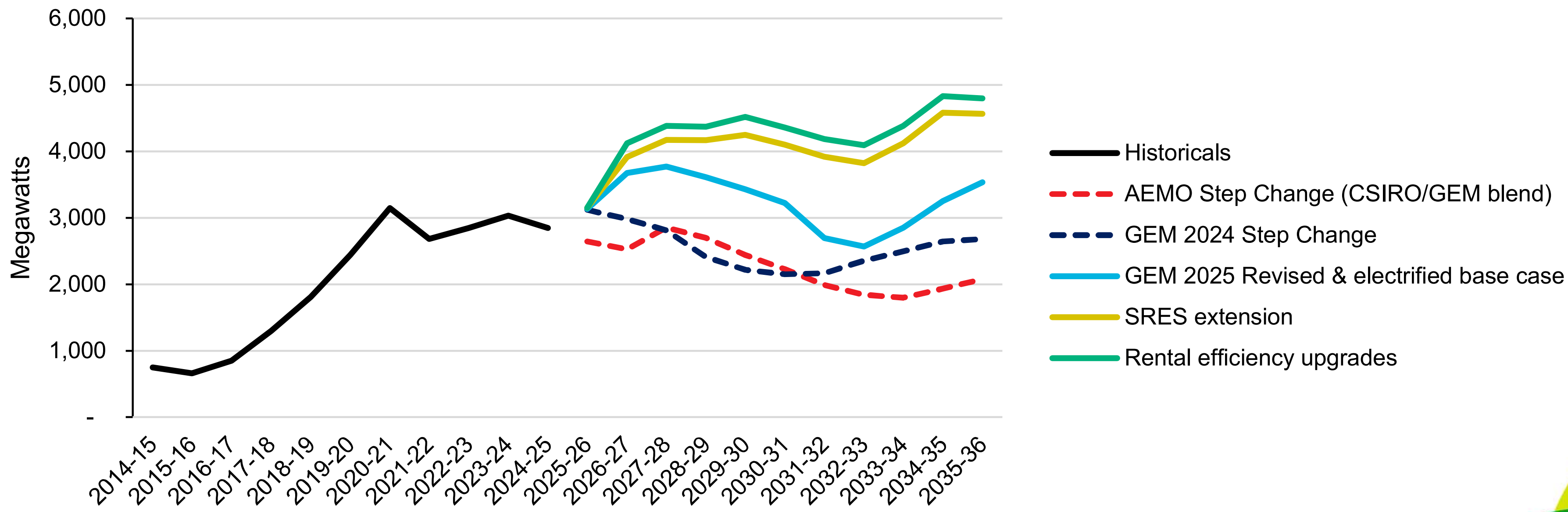
Annual additions of battery capacity –Updated projections relative to prior projections and historicals



Revised projection results
Solar PV capacity

- The chart below covers projections for solar PV capacity (for systems less than 100kW) in the NEM and SWIS grids. Each line colour corresponds to the same scenario as in the chart on the prior page.
- It is important to recognise that the economic attractiveness of a solar PV system is intertwined with batteries. For the past few years installations of solar PV capacity have flatlined due to three factors that reduce solar's economic attractiveness: 1) declining daytime feed-in tariffs; 2) annual reductions in the value of the STC rebate due to reduced deeming rates; and 3) the roll-out of time of use tariffs which deliver lower rates for daytime electricity and higher rates during peak and overnight periods when solar is not generating power.
- Batteries help to restore some of the lost value of solar PV rooftop generation by allowing customers to use generation that would otherwise be exported for low daytime feed-in rates, and take this power to use later to avoid needing to consume the far higher priced electricity they would otherwise need to import from the grid at peak and overnight rates. In our modelling of solar uptake we consider not just the payback on solar in isolation but also the payback once combined with batteries.
- Given battery systems are more popular and are likely to be far more prevalent than previously thought, this will have flow-on implications for greater solar PV adoption as well – which is shown in the light blue line. In addition, the SRES extension (with STC deeming held at 5 years) will make solar capacity more affordable.

Annual additions of small solar PV capacity –Updated projections relative to prior projections and historicals



Revised projection results
Power generation and emissions

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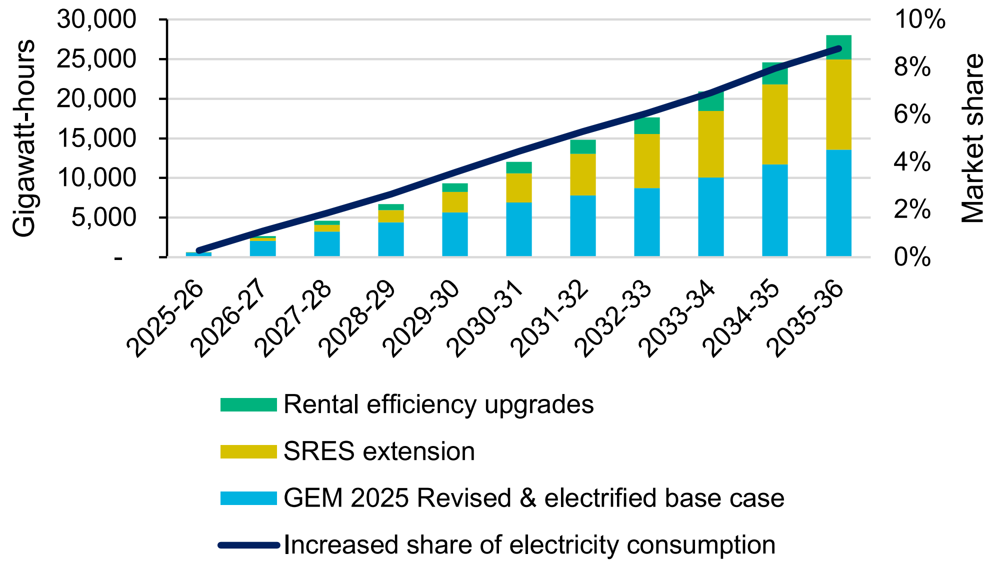
- The chart to the right illustrates in the stacked bars the extra electricity generation that could be expected from the additional rooftop solar capacity projected under the policy measures envisaged across all three scenarios, relative to AEMO's current Step Change assumptions. By 2035-36 the additional 22,200MW of solar capacity delivered across all scenarios could be expected to produce around 28,000GWh of additional renewable electricity.
- As shown in the dark blue line, this extra generation in 2035-36 would be equal to almost 9% of total electricity consumption across the NEM and WA SWIS grids. In 2030-31, we project 12,000GWh of additional rooftop solar generation, equal to just under 4.5% of electricity consumption.
- Note we have not considered the potential for the projected extra battery capacity to also support investment in new utility-scale wind and solar projects.

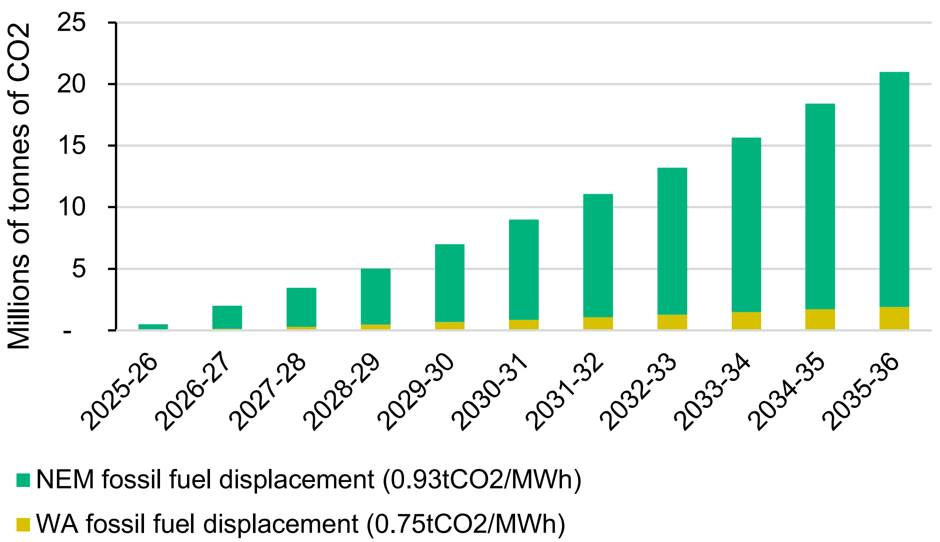
Extra incremental generation from small solar & its increased share of electricity relative to AEMO Step Change



Revised projection results
Power generation and emissions

- The chart to the right illustrates the emissions that could be avoided from this extra solar generation, assuming displacement of the average emissions intensity of the fossil fuel generation mix (as detailed in the CER's most recent Designated Generation Facilities Report).
- In 2035-36, the emissions avoided from the extra rooftop solar is estimated to reach 21 million tonnes of CO2.
- To put this into perspective national emissions from the electricity sector in 2005 were 197 million tonnes of CO2, so this represents a 10.7% reduction in electricity emissions from the levels that prevailed in that benchmark year for Australia's emission target.
- In terms of overall economy-wide emissions, these were 613 million tonnes in 2005. So the extra rooftop solar provides a reduction of 3.4% in emissions relative to this benchmark.

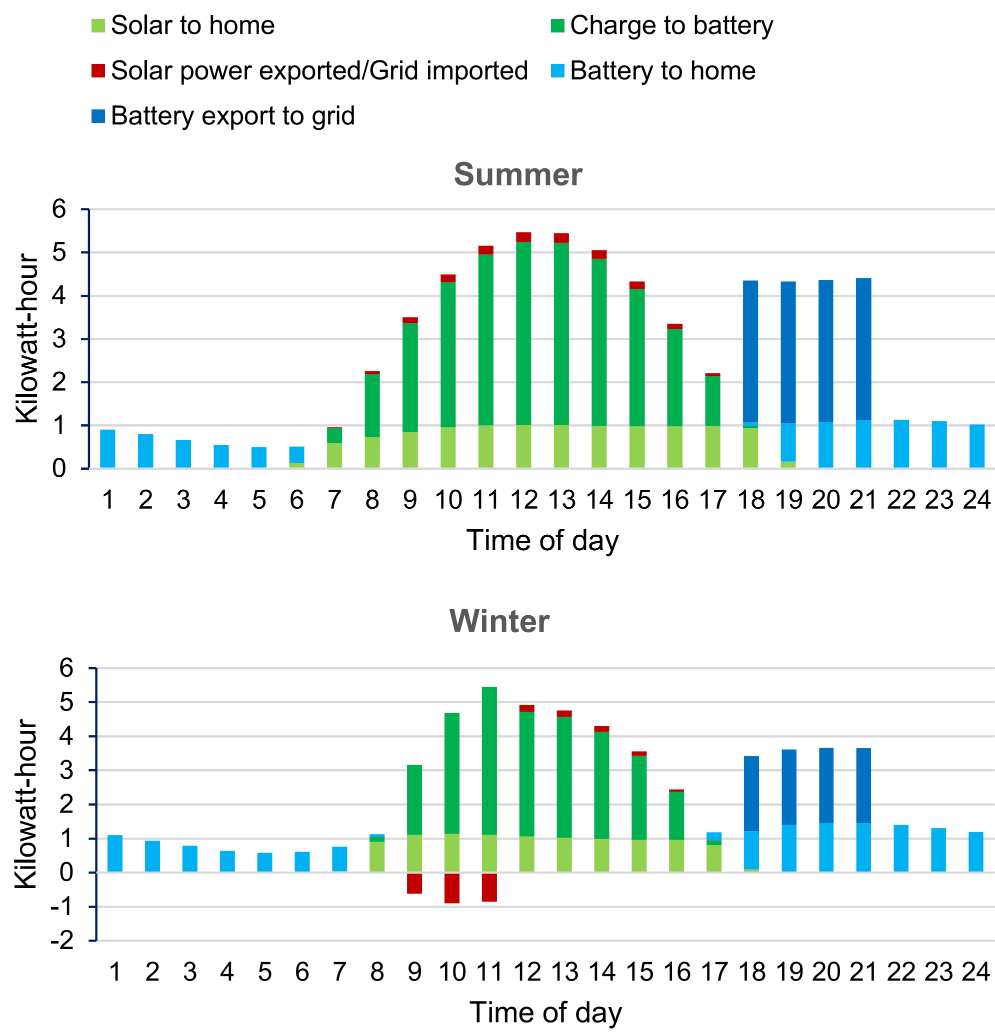
Annual emissions avoided from displaced fossil fuel generation



Revised projection results
Power generation and emissions

- Over recent years it has become common for wholesale electricity market prices to descend to negative values during daytime periods when there is a large amount of supply from rooftop solar. This is usually driven by inflexible fossil fuel generators bidding negative prices in order to maintain output at sufficient levels that units won't become unstable and can remain online for later in the day when power prices rise to profitable levels. The end result can then be that utility-scale solar and wind generators will curtail output to dodge these negative prices.
- However, this should be a short-term phenomenon. This is partly because the negative prices and swings in power output ultimately take their toll on the viability of coal generators which will lead them to progressively exit from the market. This will then free up demand to be satisfied by renewable generators and reduce curtailment.
- However, the other factor is that the large increase in the uptake of household batteries, along with electrification, will mean a large proportion of household solar generation is soaked up in satisfying increased household electricity demand and charging up batteries.
- As we'll explain later, there are substantial labour productivity gains from installing larger household battery systems. These are driving installers to encourage households towards much larger systems than required to satisfy their own consumption. We expect in the near future 25 kWh household battery systems will become common. The charts to the right illustrate the generation and usage profile of such a battery system when combined with 10 kilowatts of solar and electrification of heating and vehicle transport.

Time profile of electrified household generation and usage – NSW, 10kW solar/25kWh battery



Revised projection results
Power generation and emissions

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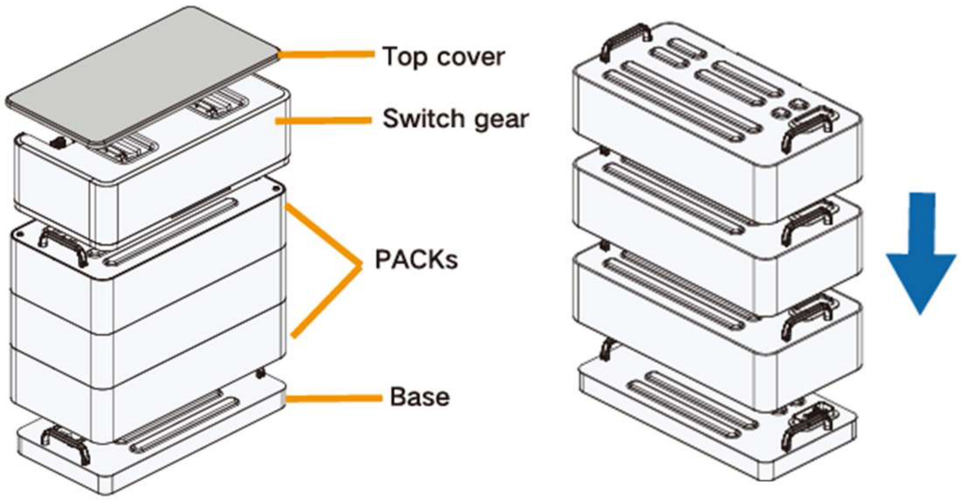
- At present a typical household with a 6.6 kilowatt solar system will export a substantial majority of the solar system's output to the grid – 70% to 80% is common.
- However, as the charts on the prior page illustrate, these solar exports largely disappear for a household with a 25kWh battery system in place along with an electric vehicle and no gas appliances. This is even though the modelled archetype solar system is 10kW rather than 6.6kW.
- Instead, the household's exports to the grid are driven by a desire to make use of substantial spare battery capacity beyond what's needed to satisfy the household's own electricity consumption. This leads to significant exports to the grid illustrated in the dark blue bar section during the evening electricity market peak demand period.
- In winter, we actually model the need for the household to import a small amount of power from the grid (shown by the negative values for the red bar section). This is not to meet their own electricity consumption, but rather to charge the battery to full capacity to then take advantage of high wholesale power prices in the evening peak. Although it should be noted that we don't expect the power imports to occur exactly between 9 to 11am, other times may well make better economic sense.
- This means that ongoing growth in rooftop solar PV capacity is likely to present much less of a challenge in terms of ensuring levels of electricity demand from the transmission system are sufficient to ensure power system stability and also less challenges in terms of the ramping of other power plants.
- It is also less likely to drive curtailment of generation from other renewable generators.
- We would note that this type of usage and generation export profile hinges on sensible reform of network pricing structures and time of use tariffs that will encourage exporting of power during periods of high power demand while also allowing for low cost imports when overall power demand is low. There is also a need for greater uniformity and stability in network tariff structures across the country to allow technology suppliers to develop products that can help households to better utilise battery capacity to benefit the wider electricity system and other consumers.
- We also expect that it will become common practice for electricity retailers to offer feed-in tariffs that vary by time of day such that they better reflect the high wholesale market value that prevails during the evening peak demand period.
- In addition, changing regulations to allow households to join virtual power plant operators that are independent from their choice of electricity retailer (as is the case for large electricity consumers) will assist in providing enhanced choice and competition for consumers that means they will be more likely to enrol their battery in a VPP so it can be better utilised.

Drivers behind revised projections
Battery cost and economies of scale

- One of the stand-out differences in how the battery market has unfolded since the introduction of the STC inducement relative to our projections is the size of systems have been noticeably larger.
- Historically, residential batteries in Australia have tended to average around 10 to 12kWh per system. In our projections we had assumed that this would remain the case, adopting an average system size assumption over the 2020's of 10kWh. Only once batteries began to deliver a comparable payback to solar did we expect they would grow larger – 15kWh in 2030 and progressively increasing to 20kWh by 2040.
- Yet instead of systems being 10kWh, the average battery system size registered for STCs since July has been 17.6kWh. Furthermore, feedback from industry interviews suggests that the average size is likely to grow over the next month or two as the industry has adjusted its marketing and pricing structures from a historical norm of selling systems in the 10kWh to 14 kWh range to now heavily encouraging customers to systems of 20kWh or larger.
- What wasn't adequately appreciated when prior projections were produced, is the scope for substantial labour productivity gains via adding incremental capacity to systems using stackable lego-block like storage modules. This type of modular design has become increasingly popular with several major brands providing such products.
- An example of such a system design is illustrated in the top-right. Switch-gear and controls are contained within one block module, while the battery cells that provide storage capacity are contained within additional modular blocks or packs.

Example of stackable lego-block modular battery system



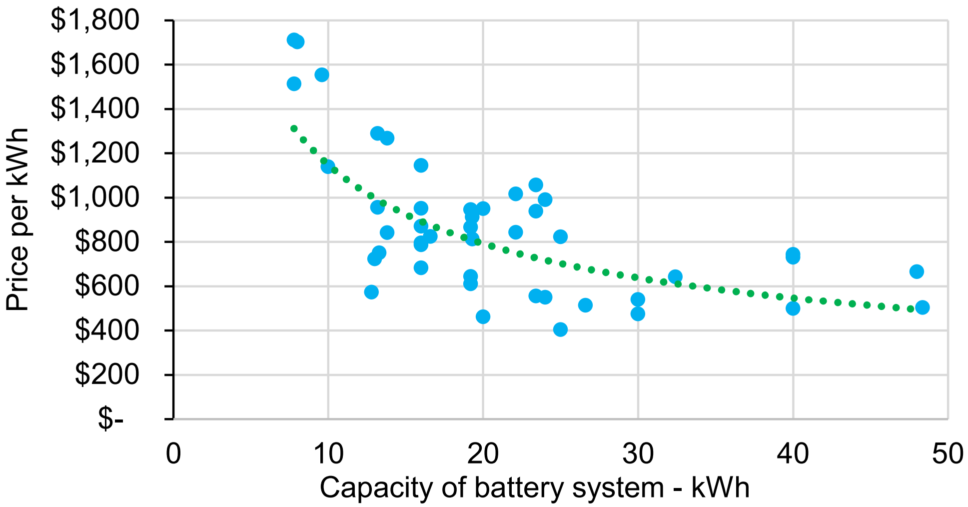
Source: ***Sungrow Quick Installation Guide***

- To increase the storage capacity of the system, one simply has to stack an additional block on top of the others with no wiring work required. These modules typically come in capacity sizes of around 2.5 to 5kWh, with the potential to stack many modules together (for example the Sungrow system allows for 8 blocks providing 40kWh). This provides a high degree of flexibility in capacity that can be offered.
- Where there are significant implications for our modelling is that adding an extra storage block to a system involves very little additional labour time (a few minutes) and therefore cost.

Drivers behind revised projections
Battery cost and economies of scale

- The structure of the STC inducement, quite appropriately, is provided per kWh unit of capacity and covers a significant proportion of the cost of the storage module block hardware. Consequently, given there is little extra labour needed to add extra modules, an extra incremental unit of capacity adds relatively modest additional cost to a system compared to the base level of storage capacity (most systems require at least two modules as a base core to function).
- It is also worth noting that even systems that do not employ the modular lego-block design can also benefit from similar economies of scale – albeit needing to add larger chunks of capacity. For example, Tesla's Powerwall 3 design now provides a 'dumb' storage module that doesn't include an inverter within it (saving on hardware costs) and operates as a connected 'slave' to the master unit holding the inverter. While this does require some extra wiring work, it still saves on site mobilisation and sales administration labour costs when installed at the same time as the master unit.
- The substantial labour productivity gains from going for larger capacity battery systems, alongside the structure of the STC inducement, mean suppliers have a strong incentive to encourage customers to adopt larger systems than we had originally assumed in past modelling.
- The drive towards larger systems has also been supported by the fact that households can only claim STCs for a battery system on one single occasion. If they were to elect to upgrade or replace a battery system that had previously claimed STCs then the upgrade or replacement will be ineligible for STCs.

Quoted price of battery systems relative to size of system (before rebates and incl. GST)



Source: Green Energy Markets analysis based on quotes published on My Efficient Electric Home over May and June

- The chart above illustrates a sample of battery price quotes provided on the My Efficient Electric Home community Facebook group, with each blue dot representing a quoted system The green dashed line is the power trend line applied by Excel to the sample.
- The trend line shows clearly how the average price per unit of capacity declines as the capacity of the system increases.

Drivers behind revised projections
Battery cost and economies of scale

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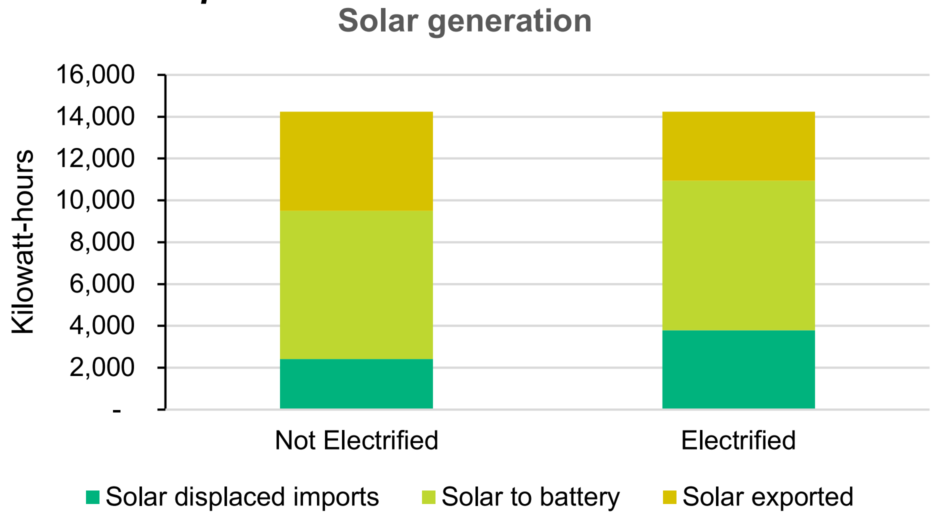
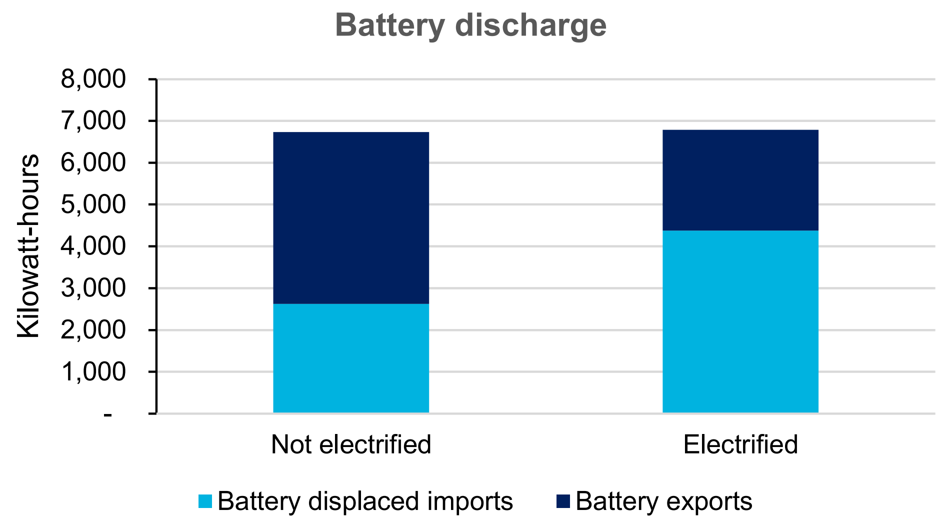
- In light of this new market data we've needed to make several adjustments to our model.
- Firstly, our consumer demand curve (customers' propensity to purchase a battery) was not correctly calibrated due to inadequate data as a result of the battery market being so immature. The price point and paybacks at which a large pool of customers appear willing to buy a battery look to be higher than what we had previously estimated.
- Secondly, battery systems will clearly be larger on average. We anticipate residential systems will reach 25 kWh on average in the residential sector by the 2026-27 financial year. In the small commercial sector we expect battery systems will be around 50kWh in average size.
- Thirdly, the cost per kWh that customers are actually paying (prior to application of rebates) is likely to be slightly lower than we previously assumed. We had estimated that the average cost per kWh of a fully installed system this year to be around $1,000 (including GST, excluding rebates). While this is true for a system around 13kWh in size, the market average size is now closer to 18kWh and we suspect will trend towards 20kWh. Prices for these systems are closer to around $900 per kWh (including GST and excluding rebates).
- Another learning from recent market data is that there are a range of systems on the market today which are hitting a price point we had not expected to be achieved until around 2030. This suggest to us the potential for prices across the market to fall faster over time than we had previously assumed.
- A further factor supporting faster cost reductions is that there currently exists a very large cost difference between very large utility-scale battery systems and residential systems. This can be more easily bridged as the move towards standardised, lego-block modular systems opens up room for mass economies of scale and automation in the production of these storage module blocks as well as a high degree of repeatability that accelerates learning by doing. This should help to narrow the cost difference with utility-scale systems, especially given the very small labour cost associated with upscaling residential systems from 10kWh to 20+kWh.

Drivers behind revised projections
Better accounting for electrification

- In past modelling we have accounted for the potential for electrification to increase household electricity demand. However, this was relatively coarse, and several important developments have prompted us to refine the model to more precisely account for how electrification of residential heating and transport could affect the economics of solar and battery systems:
  - The Victorian Government has announced it will phase out gas water heating across the board while also implementing rental energy efficiency standards which are likely to phase out gas heaters.
  - Under the Victorian Energy Upgrades Program there has been a major step-up in the number of gas central heaters being decommissioned and replaced by reverse cycle air conditioners.
  - The re-election of the Albanese Labor Government will provide several years for vehicle CO2 emission standards to ratchet up in stringency and become embedded. In conjunction with improvements in the value proposition of pure-electric and plug-in hybrid vehicles, there is greater likelihood of electrified vehicles becoming widespread.
- The model now more thoroughly accounts for the degree to which gas is used in each state for water heating and space heating and how switching over to electric appliances would alter electricity consumption profiles. It also allows for adjustments in electrical load from charging an electric vehicle.
- The charts to the right illustrate how the electrified home can make greater use of solar and batteries to displace the need to import electricity from the grid – avoiding not just the wholesale cost of energy but also the cost of transportation via power networks and retailer margins. Meanwhile exports of power, which are only able to capture the wholesale energy value are greatly reduced in the electrified home.

How 10kW solar and 20kWh battery system output is utilised under an electrified vs non-electrified home NSW example

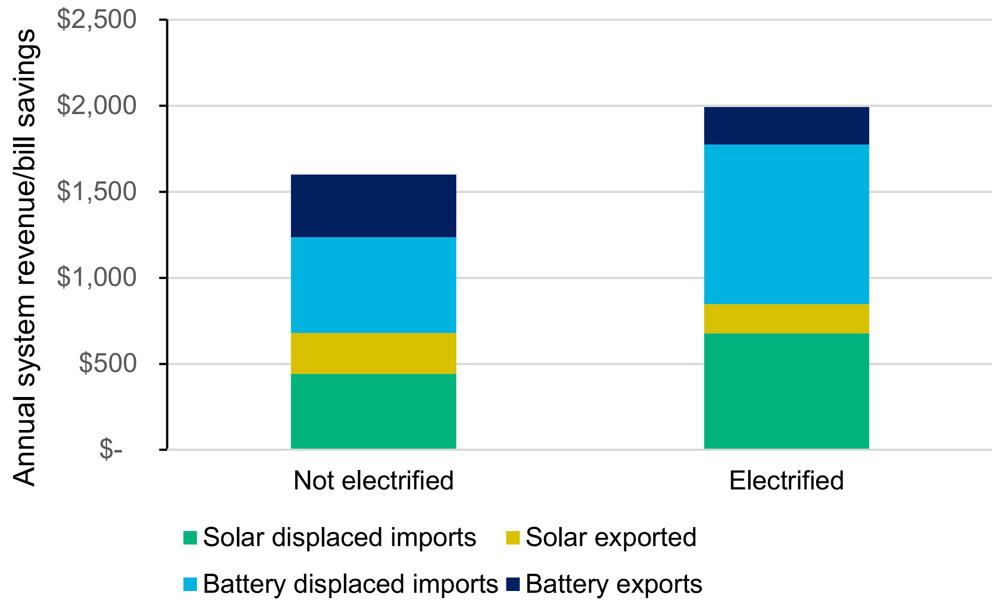




Drivers behind revised projections
Better accounting for electrification

- The chart to the right shows how this greater use of solar and batteries for on-site use rather than export delivers greater cost savings to the electrified household compared to the non-electrified home. In this NSW example illustrated, the solar-battery system delivers almost $400 greater financial benefit to the electrified home compared to the typical NSW household load.
- If governments were to accelerate electrification of residential heating and transport it would likely deliver a two-pronged benefit. Firstly, it would involve replacing gas and petrol with more energy-efficient and consequently less emissions intensive and also less expensive alternatives.
- But secondly, this increased electrical load then makes it financially more attractive for a household to install a solar and battery system, thereby further reducing Australia's carbon emissions.
- If governments follow through on implementing meaningful policies that would lead to the gradual phase out of gas appliances and adoption of electric vehicles, we expect it will lead to a meaningful increase in the uptake of solar PV and battery systems.

The difference in revenue derived from 10kW solar and 20kWh battery system output for an electrified versus non-electrified home. NSW example, year 2030.



Further policy options - Extending the Small-Scale Renewable Energy Scheme

- When the Renewable Energy Target (RET) was originally designed it was recognised that awarding renewable energy certificates upfront at installation, rather than as power was produced, would be administratively easier and better suited to encouraging small household renewable energy systems. Originally systems were provided with certificates deemed upfront based on estimates of their first five years of expected generation. Then a few years later this was extended to 15 years because this was better aligned with the lifetime over which solar systems were likely to operate
- However, when the Renewable Energy Target was reviewed in 2012 by the Climate Change Authority (CCA), they articulated a view that the RET was a transitional policy measure which should ultimately be subsumed by the emissions trading scheme in operation at the time. This ETS was considered a more economically efficient mechanism to reduce emissions than one confined to renewable energy.
- Within this context that the legislated ETS would subsume the RET, the CCA also recommended that the years of certificate deeming provided to solar PV should step down by a single year as each calendar year passed, beginning in 2017. This recommendation was adopted by government and even though the ETS was abolished in 2014, the rate of deeming has continued to decline each year since 2017 as the CCA had recommended. Consequently, by next year solar PV systems will be back to five years of deeming.
- While both state and federal governments have indicated little appetite to re-introduce an emissions trading scheme or any other explicit carbon price in electricity, several have adopted a range of policies that aim to support the financial viability and construction of large utility scale renewable energy projects, such as the Capacity Investment Scheme.
- At the same time, the national energy market laws have been amended to incorporate an objective to reduce carbon emissions in line with governments' targets. This has led to the Australian Energy Regulator developing estimates of the value of emission reductions which are used to guide economic evaluations such as the cost and benefits of new transmission investments.
- The AER's estimated value of emission reductions for 2025 is $75 per tonne of CO2 which subsequently ascends to $105 in 2030 and $157 in 2035. Meanwhile the capped price of an STC representing roughly one megawatt-hour of generation is $40 and the average emissions intensity of the remaining stock of fossil fuel generators is 0.93tCO2/MWh in the NEM and 0.75tCO2/MWh in the WA SWIS. Assuming that over the long run a megawatt-hour of solar PV is most likely to displace generation from fossil fuel generators that carry a fuel cost, the $40 STC equates to $43 per tonne of CO2 avoided in the NEM and $53.33 in the WA SWIS. Yet because a solar PV system is likely to generate far more megawatt-hours over its lifetime than recognised with STCs under current deeming arrangements, the emission reduction value delivered under the SRES is far greater than this.

Further policy options - Extending the Small-Scale Renewable Energy Scheme

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- Given the fact that:
  - Rooftop solar PV represents a cost-effective source of carbon abatement; and
  - There are constraints in the in the roll-out of transmission and utility-scale renewable energy projects;
- We have included a scenario estimating the extra solar and battery capacity that could be realised by extending the SRES beyond 2030 with the deeming rate held constant at 5 years out to 2035.
- In addition, we have assumed that the level of STC support currently specified for batteries in the year 2030 is continued until 2035.
- This acts to avoid the decline in both battery and solar PV annual capacity additions that unfolds after 2027-28 under the revised GEM base case.
- This delivers an additional 9,000MW of solar PV capacity over the updated base case by 2035-36.

Further policy options - Rental energy efficiency upgrades

- An inescapable curse of energy-efficiency is the principle-agent problem that afflicts rental properties. While landlords are responsible for the purchase and maintenance of much of the fixed equipment and building thermal envelope that determines the energy efficiency of homes, they don't pay the energy bill. Consequently, they have little incentive to invest in equipment that will reduce the energy bill of the tenant.
- While theoretically it should be possible to write a contract that shares the costs and benefits of energy saving upgrades between the landlord and the tenant, in practice such arrangements are rare. This is the case the world over, and has been in spite of many attempts by both the private and government sector to facilitate voluntary arrangements to align the interests of landlords and tenants.
- This is highly evident in the case of solar PV systems in Australia where around one in three households have solar, but within rental properties this is estimated to be closer to one in twenty homes.
- At present landlords are free to access STC incentives for the installation of solar and batteries. In addition, a range of other financial incentives have been made available to landlords to encourage them to install solar. To date, uptake of these incentives from landlords has been very low.
- A more effective solution to assist renters would be to supplement these existing mechanisms with requirements for landlords to meet minimum energy performance standards for their properties.
- This can be done through regulatory standards such as what the ACT has done with insulation and Victoria plans to do more comprehensively to upgrade the thermal envelope, space conditioning and hot water. Alternatively, eligibility for tax concessions could be made contingent on meeting energy performance requirements. For example, claims on depreciating assets could be linked to these assets' energy efficiency.
- However, such standards should provide for a wide range of technological options to provide flexibility to cater for varying circumstances. For example, while upgrading insulation is usually an excellent way to improve thermal comfort and reduce energy consumption, in some houses the ceiling cavities might make this difficult.
- While solar PV and batteries haven't been considered in rental standards to date, solar is an option to meet the NSW BASIX new home sustainability standards.
- Implementing rental energy performance standards would open up a large pool of rooftops that would otherwise remain untapped. This is even though for many of these households solar will represent a cost-effective solution for addressing their energy needs and lowering carbon emissions. It would also improve social equity outcomes.
- Under our modelling of this scenario, we have assumed a modest proportion of rental properties comply with the standards via solar, resulting in an additional 2,422 MW of solar PV by 2035-26 beyond that under the SRES extension scenario.

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