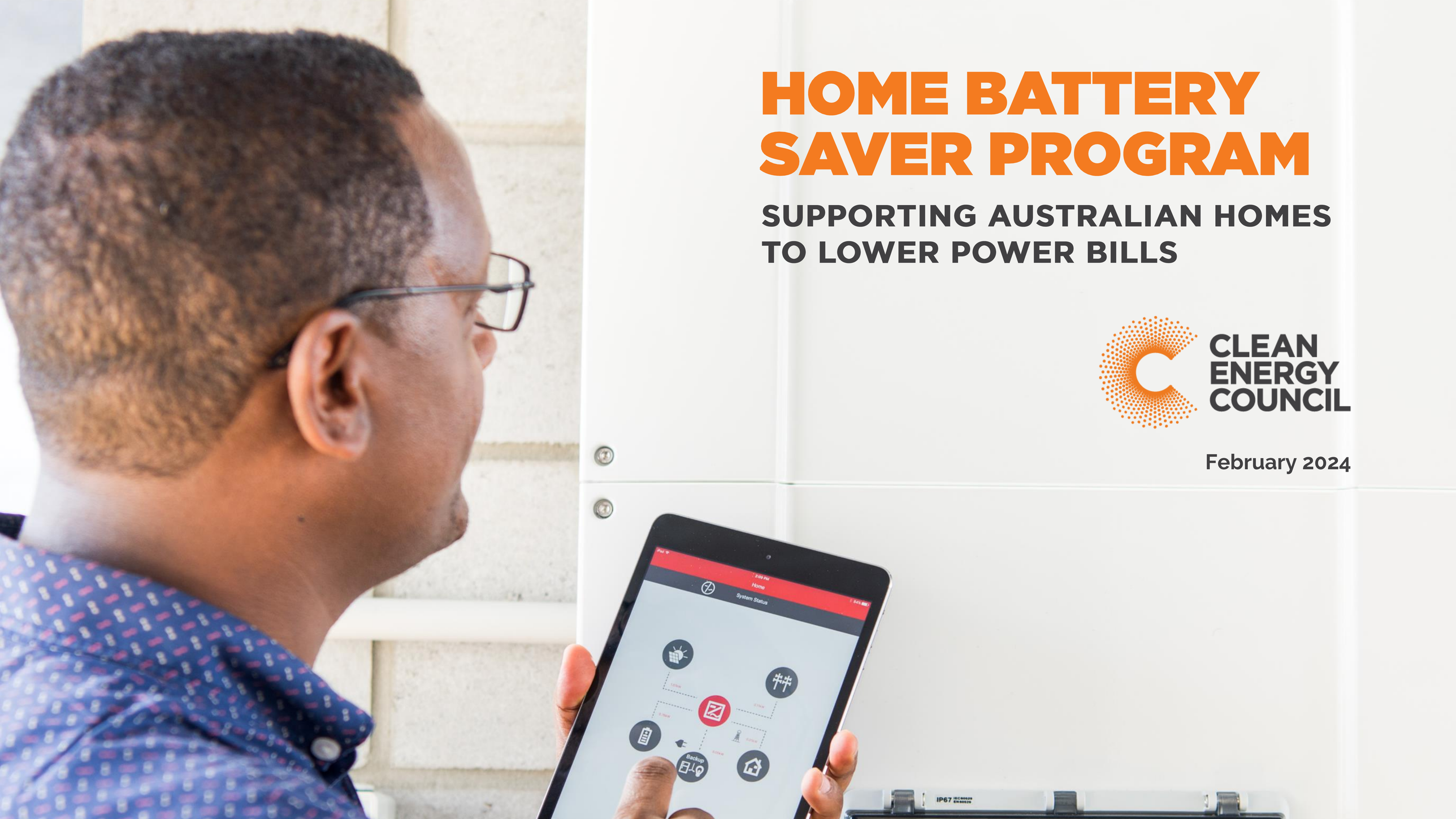
HOME BATTERY SAVER PROGRAM

SUPPORTING AUSTRALIAN HOMES TO LOWER POWER BILLS

CLEAN ENERGY COUNCIL

February 2024



EXECUTIVE SUMMARY

Achieving 82% by 2030 requires ambition across all sectors – large scale renewables and storage, transmission and acceleration of rooftop solar and household batteries

- While the Federal Government has policy measures to accelerate many of these, there is not currently a national policy to accelerate home batteries. Getting to 82% renewable energy by 2030 requires 5GW of orchestrated batteries.

Orchestrated batteries interact with the grid to generate income for consumers and provide services for the grid.

- Batteries deliver huge benefits to energy customers:
    - Those with a non-orchestrated battery save **$900-1,000** per annum on their energy bill
    - Orchestrated batteries also save **$1,150-1,500** per annum due to lower power bills
    - Reduce payback period of **36%** for batteries with an incentive by 2030
- Orchestrated batteries also help the energy system and can deliver billions in savings.

1 in 3 Australian homes already have solar, due in part to the government's Small-scale Renewable Energy Scheme (SRES) but uptake of batteries is far lower.

- Some states have proven rebates for batteries that work, but a national program is needed.
- There are several policy mechanisms that could deliver a national home battery program, including by **expanding the Small-scale Renewable Energy Scheme** to incentivise batteries.
- A Home Battery Program should be designed to deliver better quality and higher standards in battery systems.

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Achieving Australia's target of 82% renewables by 2030 requires big, bold investments across all aspects of clean energy.

TRANSMISSION

$20bn Powering Australia fund

LARGE-SCALE STORAGE

Capacity Investment Scheme delivering 9 GW of large-scale storage

LARGE-SCALE GENERATION

Expanded Capacity Investment Scheme delivering 23GW by 2030

ROOFTOP SOLAR

Small-scale Renewable Energy Scheme helping over 3.7 million Australian homes go solar

It's time to support home batteries.

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ORCHESTRATED BATTERIES CAN SLASH HOUSEHOLD BILLS....

EXPECTED HOUSEHOLD BILL SAVING WITH NON-ORCHESTRATED BATTERY

$900+

PER YEAR

EXPECTED HOUSEHOLD BILL SAVING WITH ORCHESTRATED BATTERY

$1,150+

PER YEAR

EXPECTED PAYBACK PERIOD FOR A NON-ORCHESTRATED BATTERY

36%

BY 2030

with a battery subsidy

Source: Oakley-Greenwood, 2024. A customer with a non-orchestrated battery can expect a return of $900-$1000 per annum, based on a 35c/kWh retail tariff and an 8kW PV system. A customer with an orchestrated battery may expect a return between $1,150/annum and $1,500/annum depending on the arrangement they have made with their Retailer/VPP provider. The returns to battery owners will be influenced by numerous factors, including their consumption profile, size of PV system, size of battery, their location, the retail tariff they are on and the contract for orchestration services. The introduction of a battery subsidy would, when combined with the forecast reduction in battery prices, reduce a battery's payback period – from current levels of around 14 years for an un orchestrated battery, down to around 11 years. This reduces over time, as forecast declines in battery costs as well as the proposed incentive take effect. By 2030, this is forecast to be around 9 years.

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...AND PROVIDE WIDER SYSTEM BENEFITS

A BATTERY PROGRAM COULD SUPPORT INCENTIVES OF UP TO $6,500 PER HOUSEHOLD AND STILL PROVIDE

$190 MILLION

IN NET SAVINGS TO THE ENERGY SYSTEM

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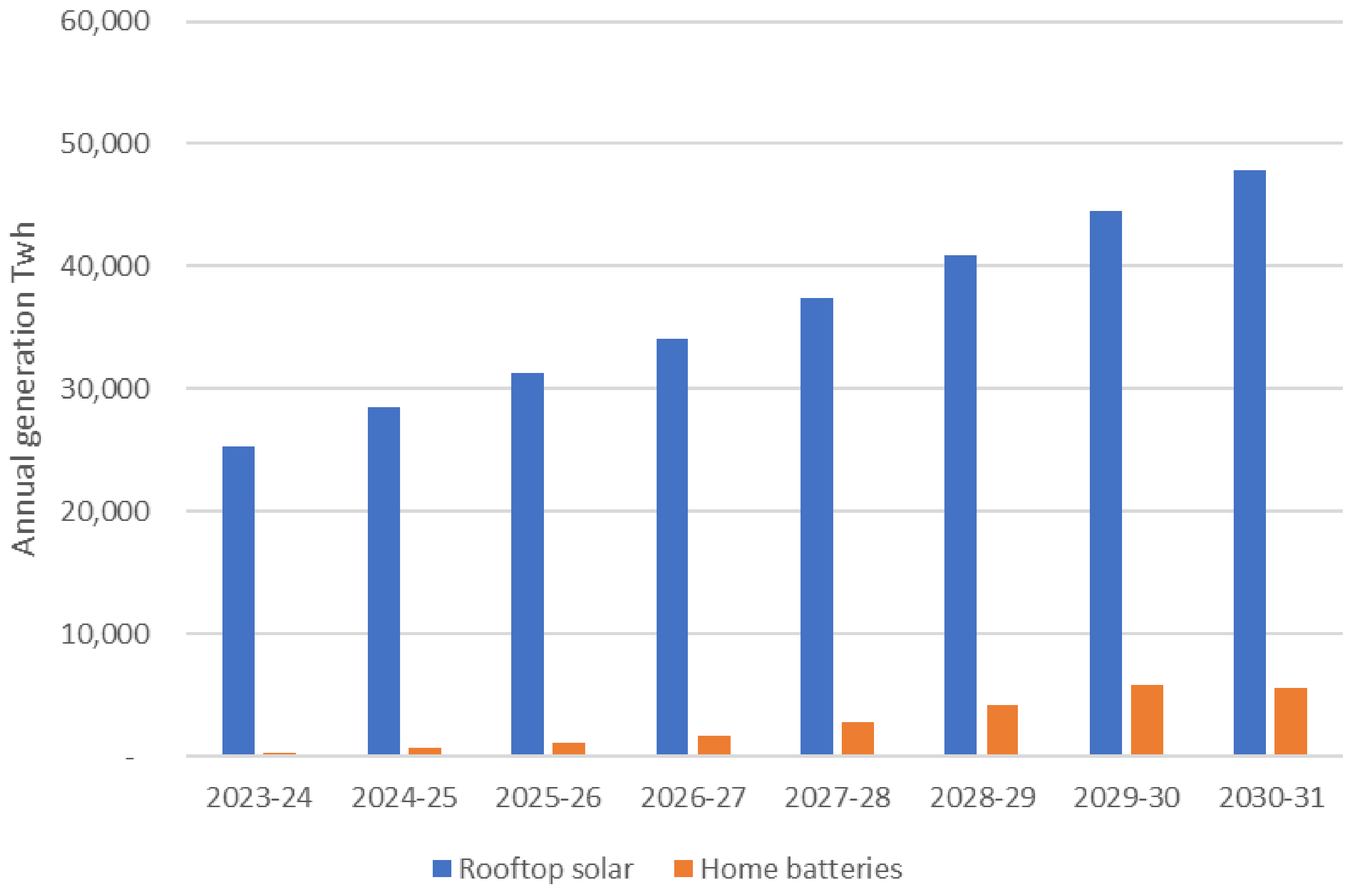
3.7 MILLION HOMES HAVE SOLAR, ONLY 150,000 HAVE HOME BATTERIES



- The SRES has been very effective at creating a world leading Australian solar pv market from a nascent one
- There have been several examples of successful state incentive schemes supporting the uptake of home batteries
- However, to date there has been no federal scheme
- This has created discrepancies between the rate of residential solar PV and home batteries installed
- On a MW basis, solar PV outweighs installed home batteries 20:1

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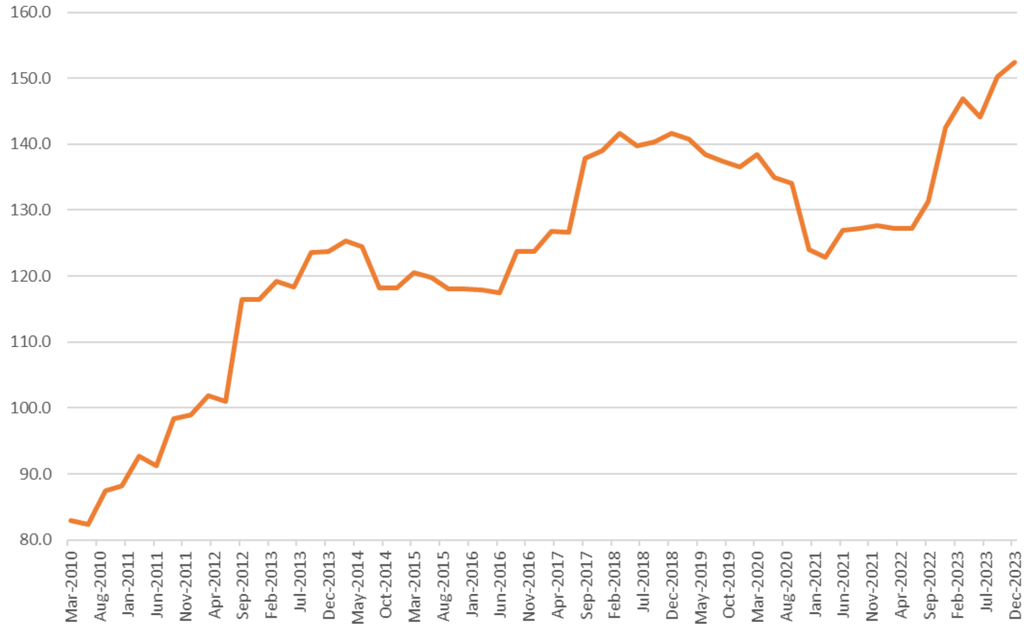
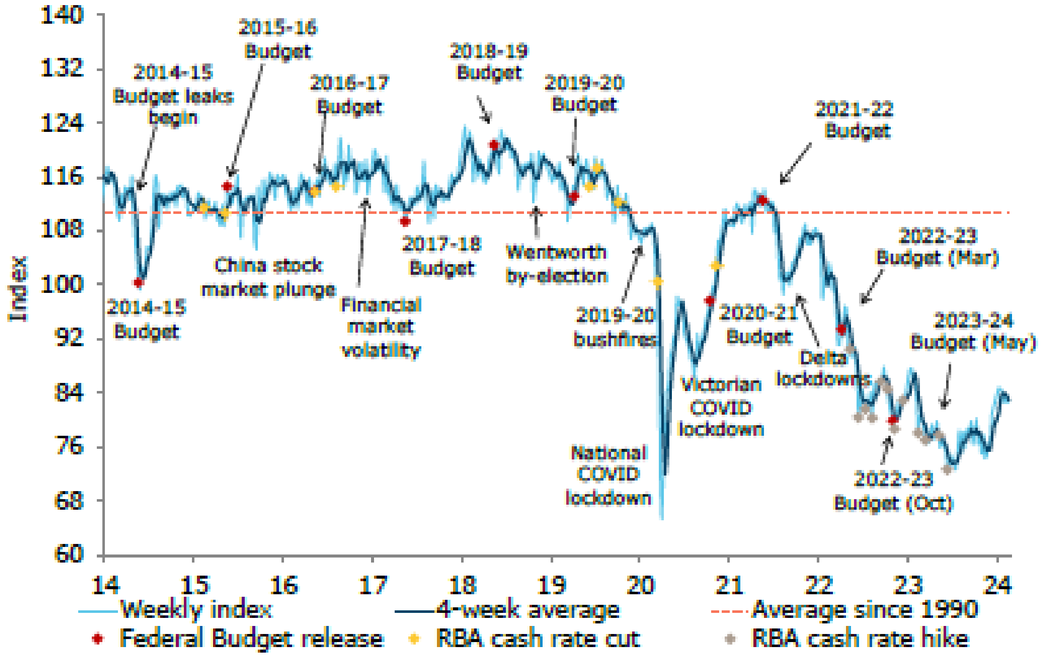
Source:. AEMO 2024 Draft ISP

ENERGY BILLS ARE HIGH AND CONFIDENCE LOW

ELECTRICITY INDEX AUSTRALIA



CONSUMER INDEX AUSTRALIA



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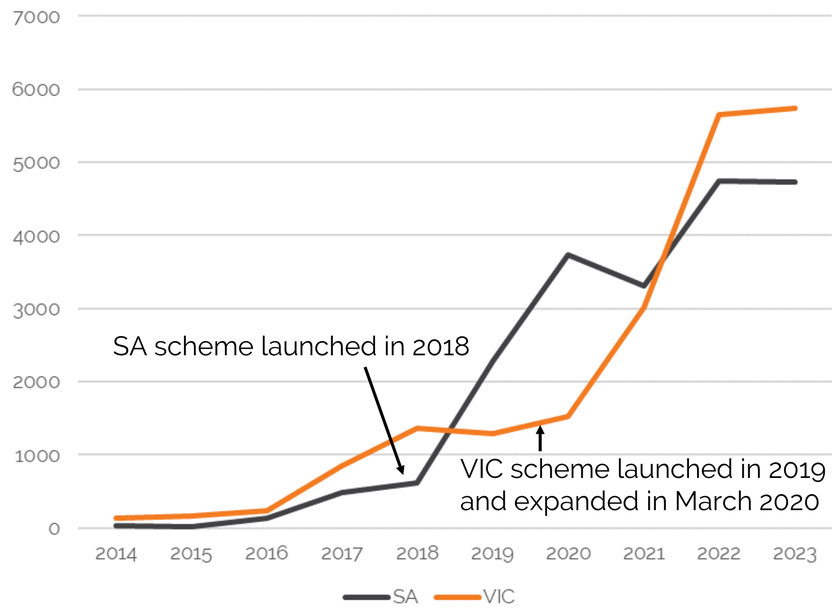
Sources: ABS cat no. 6401.0 and ANZ-Roy Morgan, 2024

STATE PROGRAMS HAVE SHOWN REBATES WORK

During the two years of the SA Home Battery Subsidy Scheme, there was the highest uptake of residential batteries in the world and more than 12,000 batteries enrolled in orchestration. Despite this, greater scale and national leadership is required to coordinate and accelerate battery uptake.

ANNUAL SA & VIC HOME BATTERY INSTALLATIONS



Sources: Clean Energy Regulator, July 2023 State data for battery installations with small-scale systems (cleanenergyregulator.gov.au)

Scheme	Jurisdiction	Targeted take-up/ actual	Scheme overview
SA Home Battery Subsidy Scheme	SA	**Target:** 40,000 subsidies **Overall delivered:** ~39,000	$200 – $400/kWh (incentive started at the higher range and was reduced over the life of the program) Change of Government and scheme repealed before it could be fully exhausted
Solar Victoria – up-front incentives	Vic	**Target:** 17,500 **Overall delivered:** 15,230 subsidies (then transitioned to loan – see below)	• ~$300/kWh – with additional limitations on postcode eligibility (initially, subsequently removed) and income thresholds. • Separate VPP program set up for a portion of systems with a higher rebate attached. • Scheme transitioned to zero interest loan program before fully exhausted
Solar Victoria – zero-interest loans	Vic	**Target:** 4500 **Overall delivered:** ~1000	• Zero-interest loan of $8,800 • Income assessment threshold - initially $180,000pa combined h/h and then raised to $210,000pa
ACT NextGen	ACT	**Target:** 5000 **Delivered:** 5000	• $825 per Kw • No additional eligibility criteria for participation • Data sharing requirements for participating OEMs and suppliers
NSW Empowering Homes	NSW	**Target:** 300,000 zero interest loans **Overall delivered:** ~500	• Zero interest-loan program • Additional limitations on eligibility – income thresholds and postcode limitations that were never removed. • Requirements on industry to provide large amounts of data to participate in program (large uplift for very few systems) • Program repealed

A NATIONAL HOME BATTERY PROGRAM WOULD DELIVER A NET BENEFIT OF $190M

Modelling results indicate that an incentive will be cost-effective and improve the affordability of electricity for all residential customers.

State	Take up incentive ($)	Additional orchestration incentive ($)	Additional batteries (No.)	Additional batteries (MW)	Additional orchestration (MW)	Net present value of net benefit** ($m)
NSW & ACT	2,250	1,000	105,264	526	1,582	58.4
VIC	2,500	1,000	106,599	533	858	58.0
QLD	3,000	1,000	119,986	600	1,353	40.4
SA	5,500	1,000	78,966	395	560	32.9
NEM			**410,815**	**2,054**	**4,353**	**189.7**

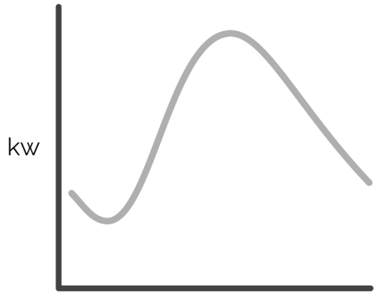
* As compared to the forecast AEMO commissioned from CSIRO as part of the development of the Draft 2024 ISP Step Change scenario

** These are the economic benefits (cost reductions) across the electricity supply chain after accounting for the costs of the incentives paid to all customers that take-up batteries and orchestration.

HOW BATTERIES HELP THE SYSTEM

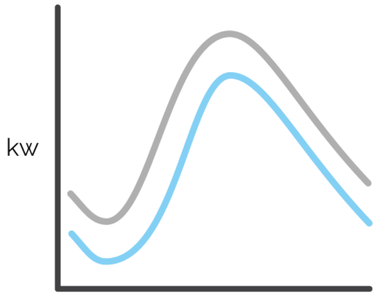
Storage provides owners of a battery with more flexibility as to when to generate, use and store their energy. For example, they can store excess solar PV during day and self-consume during the evening peak. This reduces the owner's overall energy costs and takes pressure off the wider system during peak periods – colloquially referred to as 'flatting the load profile curve'.

NEM GRID PURCHASE



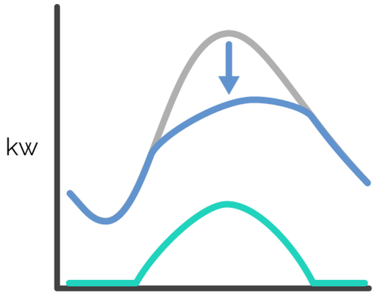
Load profile curve

ENERGY EFFICIENCY



EE Load

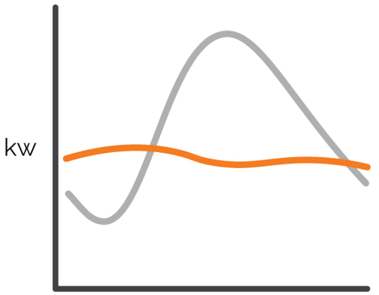
SOLAR PV / DISTRIBUTED GENERATION



PV generation

Net load

STORAGE



Flexible demand

Orchestrated batteries can trade power with the grid at optimal times to maximise savings for the consumer and benefits for the wider energy system.

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ORCHESTRATION PROVIDES HUGE SAVINGS TO THE ENERGY SYSTEM

SUPPORTS LARGE-SCALE ENERGY TRANSITION[1]

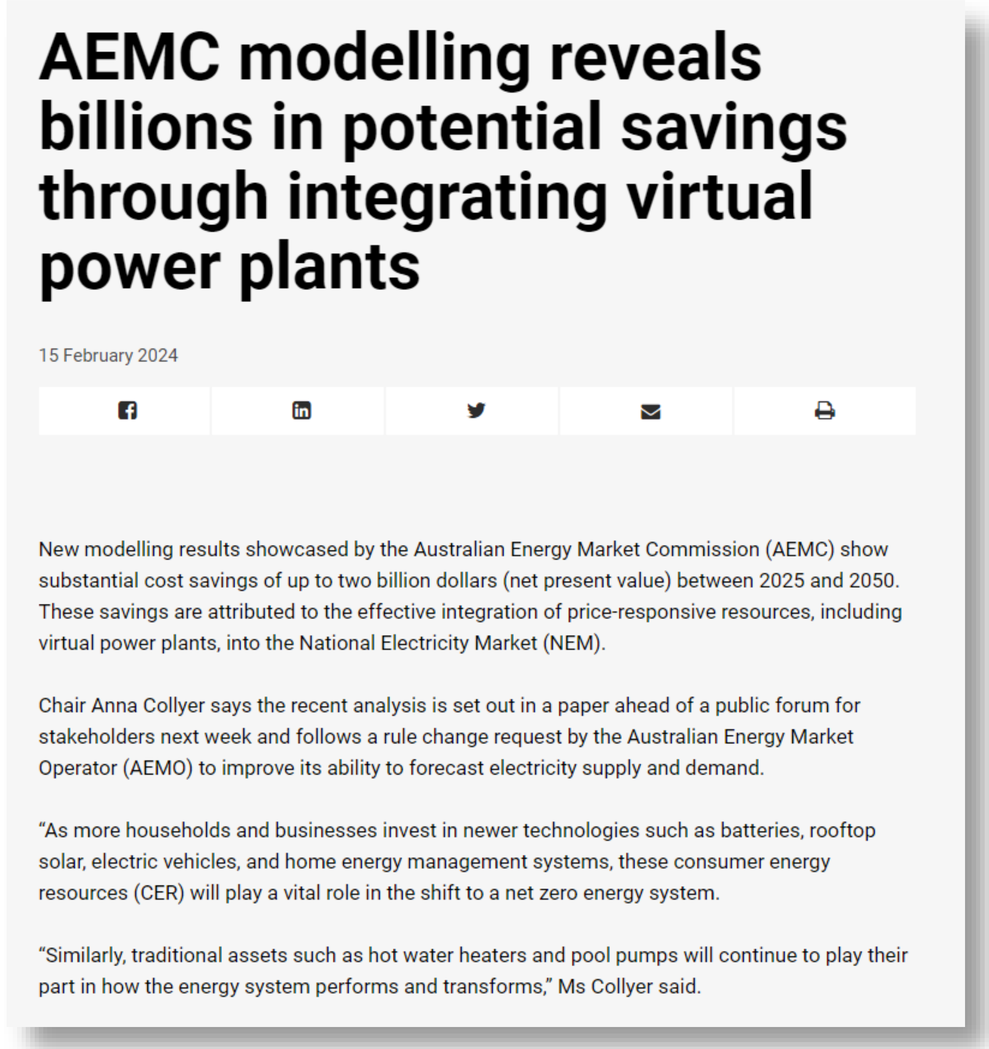
WIDER SYSTEM BENEFITS[2]

Solar storage solutions can dampen wholesale costs and delay the need for network investment.

Storage can also ensure better utilisation of the distribution network by shaving evening peaks and soaking solar generation in the middle of day to avoid minimum demand events.

REDUCE CARBON FOOTPRINT[3]

Reduce reliance on sourcing energy from grid-based high carbon emitting generators, helping combat climate change.



AEMC modelling reveals billions in potential savings through integrating virtual power plants

15 February 2024

New modelling results showcased by the Australian Energy Market Commission (AEMC) show substantial cost savings of up to two billion dollars (net present value) between 2025 and 2050. These savings are attributed to the effective integration of price-responsive resources, including virtual power plants, into the National Electricity Market (NEM).

Chair Anna Collyer says the recent analysis is set out in a paper ahead of a public forum for stakeholders next week and follows a rule change request by the Australian Energy Market Operator (AEMO) to improve its ability to forecast electricity supply and demand.

"As more households and businesses invest in newer technologies such as batteries, rooftop solar, electric vehicles, and home energy management systems, these consumer energy resources (CER) will play a vital role in the shift to a net zero energy system.

"Similarly, traditional assets such as hot water heaters and pool pumps will continue to play their part in how the energy system performs and transforms," Ms Collyer said.

Sources:

1. states that duplicating 20% of the assumed orchestrated fleet by 2040 with utility scale assets will result in an additional capital spend of $1.8bn
2. Oakley Greenwood determined the gross market value of a battery in NSW to be in the order of $2k if un-orchestrated and $6k if orchestrated. NERA Economic Consulting and Energy Synapse modelling for ARENA predicted system savings of $8-18b from energy storage behind the meter. Race2030 estimated $455m value from flexible demand.
3. NERA Economic Consulting and Energy Synapse modelling for ARENA predicted emissions decrease on average by 3Mt from 2035 to 2040.

A NATIONAL HOME BATTERY SAVER PROGRAM SHOULD FOCUS ON THE FOLLOWING

- SIMPLE TO IMPLEMENT WITH A TARGET SET IN AT LEAST 2030, PREFERABLY 2040
- CUSTOMER-FOCUSED AND DESIGNED TO PROVIDE CUSTOMER CHOICE
- ENSURE STRONG STANDARDS FOR SAFETY & QUALITY OF SYSTEMS
- PROVIDE END-USE CUSTOMERS WITH UP-FRONT INCENTIVES TO REDUCE SYSTEM COST
- PROVIDE THESE INCENTIVES ON A $/KWH BASIS INSTALLED TO ENCOURAGE RIGHT SIZING OF SYSTEMS TO MATCH ROOFTOP SOLAR
- SUPPORT THE TAKE-UP OF SMART SYSTEMS CAPABLE OF BEING ORCHESTRATED TO PROVIDE MAXIMUM MARKET BENEFITS TO ALL CONSUMERS, NOT JUST CUSTOMERS WITH SYSTEMS INSTALLED

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MULTIPLE OPTIONS TO DELIVER A NATIONAL PROGRAM

	DESIGN OVERVIEW	BENEFITS

Amend the SRES	• Introduce income threshold assessment for households for solar component and/or reduce deeming rights to fund:
	  • extension to home batteries and orchestration (incl. V2H or V2G)
	  • Increase size of solar system to 150 or 200Kw
		• Revenue neutral
		• Would increase the cost-effectiveness of the rebates

New Incentive Scheme/Amendment to Homes Energy Upgrade Scheme to rebate	• Direct customer incentive • Designed on a $/kW basis	• Subsidies/ incentives have been proven as the most effective way to drive uptake of home batteries. • Introduce new criteria to support orchestration capability in an already existing scheme
Small Scale Capacity Investment Scheme	• Like how the SRES was developed as the supporting scheme for the LRET, we could look at introducing a small-scale capacity investment scheme to complement the utility scale CIS. • Value provided as either a fixed upfront incentive or passed back through to customers on an annual basis – linked to ongoing VPP participation.	• Ties into recent announcement of extension of the CIS. • Opportunity to demonstrate the role that distributed capacity can play in a functioning market and system. • Could be designed as an entirely new incentive-based scheme.
Tax System	• Tax break or accelerated depreciation allowance of the cost of battery systems	• Simple to implement.

EXTENDING THE SRES COULD BE FAST & EFFECTIVE

	DESIGN OVERVIEW	BENEFITS
Extend the SRES	• Extension of SRES as currently exists (out to 2040) • Inclusion of home batteries (incl. V2H or V2G) • Increase solar system size to 150 or 200Kw • Inclusion of additional incentive for participation in orchestration services	• Existing scheme – already legislated and well understood. • Creates a product and installer regulatory framework that could be applied to small scale batteries as well if included within the scheme. • Legislated scheme

SRES IS UNDERPINNED BY A STRONG COMPLIANCE INSTALLER AND PRODUCT ACCREDITATION PROGRAM THAT HAS BUILT CONSUMER TRUST:

- The SRES program has established a legislative framework and processes that ensure the compliance of solar PV retailers and installers with their obligations under the scheme and protect consumers against inappropriate sales and installation practices through:
- A formal accreditation process of installers, including ongoing compliance arrangements, to ensure systems are installed by persons who are appropriately trained, competent and operate with integrity; and
- An approval process for key components (i.e. solar PV panels and inverters), including ongoing compliance arrangements, to ensure components comply with relevant product standards

ENFORCING STRONG STANDARDS WILL BE CRITICAL

Requirements	Minimum specifications	Rationale
Battery and solar system specifications	>10kWh battery storage system with >5kW peak charge/discharge power	System should be sufficiently large to meet the customers' household load and provide support to grid when required
Product standards	All components should be from Tier 1 suppliers (CEC - or future accrediting body) approved product list (BESS and inverter) and compliance with Best Practice Guide on product safety – prepared by ERAC and industry bodies)	Ensure minimum standards of product quality, and that this minimum product quality is not traded off to achieve lower system price
Installation	Compliance with AS3000 & AS5139 (Battery Installation Standard) Noting, batteries are not currently captured by the SRES program, hence there is no regulatory oversight of battery installations through Clean Energy Regulator installer accreditation service provider. CEC currently provides guidance in the form of advice documents (not Guidelines) on battery installations.	Product installation integrity
Customer interface	Provides interactive system usage data to customers via an app or online	To allow customers to understand the operation of their system and the additional steps they can take to reduce energy costs
Service & Warranty	Warranty covering battery energy storage system or battery system; inverter; balance of system and workmanship Aust service centre - manufacturer has office and service team in Australia	Provides whole of system certainty for customers and ensures product integrity.
Supplier integrity	Suppliers compliant with CEC New Energy Tech Consumer Code	Ensures that all suppliers are being assessed against an ACCC approved industry code. Necessary for customer protection

Services	Minimum specifications	Rationale
Back-up services	CEC approved multiple mode inverter	To support system reliability (and consumer resilience) in advent of power outages
Time of Use	Application of applicable time of use tariffs	To drive optimal generation, usage and storage outcomes
Orchestration Capability requirements	Minimum criteria: • Internet connectivity • Ability to support at least one orchestration offer (controlled either by aggregators or retailers) through cloud-based integration. Potential additional criteria: • Registered on AEMO Portfolio Management System (note at this stage it is just used for FCAS devices, so the functionality would need to evolve if it was to be used more broadly)	General orchestration criteria and advertisement of additional orchestration benefits has been shown to drive uptake of home batteries with orchestration service. This was the case in the SA Home Battery Subsidy Scheme (HBS)

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It’s time to back batteries

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SUPPORTING MATERIAL: KEY MODELLING ASSUMPTIONS

KEY ASPECTS OF THE MODELLING

- The modelling was undertaken by Oakley Greenwood focused on home batteries and orchestration. This was done because residential batteries are forecast to constitute the vast majority of CER battery capacity installed, particularly in the near term, and there is significant variation in the size of commercial CER batteries. This necessitated a disaggregation of the CSIRO battery forecast.
- A constant battery size of 5kW/10kWh was assumed over the analysis timeframe.

MAIN ECONOMIC BENEFITS

Wholesale market benefits: We have relied on the AER's CECV's, as representative of the short-run marginal cost of the marginal generator, as a proxy for the economics costs that will be imposed on the system, if AEMO's step change forecast of BTM batteries is not achieved. In simple terms, we overlaid the impact of both an un-orchestrated battery profile and an orchestrated battery profile on the CECVs to determine the impact that their respective charge/discharge profiles would have on wholesale costs at the margin. The impact varies over time, as forecast wholesale costs change with increased penetration of centralised solar and wind.

FCAS: We assumed that orchestrated BTM batteries can be used to provide some (limited) FCAS services (e.g., regulation raise, raise 6 seconds, raise 60 seconds). As future FCAS prices are inherently uncertain, we assumed that FCAS prices (and therefore the revenues generated from the VPP-enabled batteries that provide those services) would remain constant over the forecast time horizon. Our modelling indicates that orchestrated BTM batteries can currently generate around $200/pa in NSW through the provision of FCAS services.

Network support: We assumed that both un-orchestrated and orchestrated BTM batteries can provide network support. The economic value ascribed to that network support was assumed to reflect the published LRMCs of the distribution businesses operating in NSW ($70/KVA/pa), as well as a small allowance for the LRMC of the state's transmission system ($10/KVA/pa).

The amount of network support reflected either: (a) for an un-orchestrated battery, the amount of energy that its charge/discharge profile indicates would be discharged on average over the time of peak demand (assumed to be 6pm in summer); and (b) for an orchestrated battery, the capacity of the battery, discounted by 10% to reflect a 'lack of' perfect foresight and another 10% to reflect the fact that the battery may not be full and that it is unlikely to be fully discharged.