Department of Climate Change, Energy, the Environment and Water

Draft statutory review report

NSW Energy Savings Scheme

21 May 2025

NSW GOVERNMENT

Acknowledgement of Country

Department of Climate Change, Energy, the Environment and Water acknowledges the traditional custodians of the land and pays respect to Elders past, present and future.

We recognise Australian Aboriginal and Torres Strait Islander peoples' unique cultural and spiritual relationships to place and their rich contribution to society.

Artist and designer Nikita Ridgeway from Aboriginal design agency – Boss Lady Creative Designs, created the People and Community symbol.

Draft statutory review report

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Executive summary

This statutory review report assesses the operation of the NSW Energy Savings Scheme (ESS) for the period 2019–2023 to determine whether the:

- ESS is meeting its policy objectives
- policy objectives remain valid
- overall scheme design remains appropriate for securing those objectives.

The Minister for Energy and Climate Change is releasing this draft report for public consultation as part of the requirement under Schedule 4A, section 77 of the *NSW Electricity Supply Act 1995* to review the ESS every five years.

The main findings of the draft statutory review report are as follows.

Objective 1: create a financial incentive to reduce the consumption of energy by encouraging energy saving activities

The ESS is meeting this objective. Accredited certificate providers (ACPs) have created energy savings certificates (ESCs). Surveys of ACPs indicate revenue from the sale of ESCs is greater than the administrative cost of creating them. Scheme participants are purchasing and surrendering ESCs to meet annual energy savings targets. The ESS has encouraged the uptake of energy savings activities that otherwise would not have occurred, particularly in the heat pump hot water market.

This objective remains valid. There are substantial opportunities to improve energy efficiency in NSW through the ESS. However, market barriers to their adoption persist. The ESS provides financial incentives to help overcome these barriers.

Objective 2(a): assist households and businesses to reduce energy consumption and energy costs

The ESS is meeting this objective. Activities implemented between 2019 and 2023 are estimated to deliver almost 29,000 GWh of energy savings and around $8 billion in energy bill savings over their lifetimes. The ESS' contribution to lowering electricity demand in NSW has placed downward pressure on energy bills for all consumers. By comparing scenarios with and without the ESS, market modelling indicates the scheme has saved NSW households an estimated $98 a year and NSW businesses an estimated $277 a year on their electricity bills over the review period.

This objective remains valid. Evidence indicates that electricity and gas bills in NSW have increased over the review period. Energy efficiency continues to play an important role in reducing costs for consumers and pressure on the electricity system. The NSW Consumer Energy Strategy identifies the ESS as a key form of financial support for households and businesses to reduce energy consumption and costs.

Objective 2(b): complement any national scheme for carbon pollution reduction by making the reduction of greenhouse gas emissions achievable at a lower cost

The ESS is meeting this objective. Between 2019 and 2023, the ESS is estimated to have resulted in cumulative emissions reductions of 13.3 $MtCO_2$-e in the national electricity market and 8.6 $MtCO_2$-e in NSW. This helps reduce the cost of meeting Australia's obligations under the Paris Agreement and NSW's legislated emissions reduction targets because the ESS is shown to be a cost-effective means of reducing emissions compared to the cost of abatement of new wind and solar projects.

This objective remains valid. Cost-effective energy savings delivered by the ESS will continue to complement the declining emissions intensity of the electricity grid. However, there is an opportunity to reframe the objective to complement the *Climate Change (Net Zero Future) Act 2023* as well as national action on emissions abatement.

Objective 2(c): reduce the cost of, and the need for, additional energy generation, transmission and distribution infrastructure

The ESS is meeting this objective. By reducing overall energy consumption, the ESS has reduced the amount of generation capacity needed in NSW. Electricity savings delivered by the ESS in 2023 reduced the need for additional energy infrastructure equivalent to an 1,800 MW solar farm at a capital cost of $2 billion. Peak savings have also deferred investment in additional gas peaking plant of about 380 MW at a capital cost of $300 million. Based on peak demand reductions achieved between 2019 and 2023, the ESS has deferred an estimated $168 million of network investment.

This objective remains valid. As coal-fired power stations approach retirement, there is a continued need to help minimise supply disruptions and reduce the cost of new or augmented network infrastructure. The ESS is shown to help manage reliability risks as part of the energy transition.

Broad scheme design remains appropriate

As the statutory review finds the ESS is meeting its objectives and they remain valid, the broad design as a market-based certificate scheme remains appropriate. However, the statutory review identified some challenges with new activities and a growing ESC surplus that may require further government action to address.

1 Introduction

The Energy Savings Scheme (ESS) is one of three schemes under the NSW Energy Security Safeguard. The ESS provides financial incentives for households and businesses to install energy efficient equipment and appliances.

This draft statutory review report assesses the operation of the ESS for the period 2019–2023 to determine whether the:

- ESS is meeting its policy objectives
- policy objectives remain valid
- overall scheme design remains appropriate for securing those objectives.

The ESS was established in 2009 and is legislated to operate until 2050 under the NSW *Electricity Supply Act 1995* (the Act).

Schedule 4A, Part 1 of the Act requires the Minister for Energy and Climate Change to review the operation of the ESS every five years.

The second statutory review was completed in June 2020. The third statutory review report is therefore due to be tabled in NSW Parliament by 30 June 2025.

1.1 Call for submissions

1.1.1 Discussion paper

On 9 August 2024, the NSW Department of Climate Change, Energy, the Environment and Water (the department) released a discussion paper seeking stakeholder views on:

- the proposed approach to the statutory review
- the validity of scheme objectives
- the appropriateness of scheme design for achieving those objectives
- opportunities for reform.

The consultation period closed on 6 September 2024. The department received 30 submissions.

A summary of the feedback received is available on the NSW Climate and Energy Action website.

1.1.2 Draft statutory review report

The department invites submissions on the evidence presented in this draft statutory review report.

To help us consider your submission, please respond to the following questions:

1. Are there any other matters or evidence that should be considered in determining whether ESS objectives are being met and remain valid? Please set out your response against the scheme objectives.
2. Are there any other matters or evidence that should be considered in determining whether scheme design remains appropriate?

Making a submission

This draft statutory review report was released on Wednesday 21 May 2025.

The submission period closes at 5 pm AEST on Wednesday 11 June 2025. Submissions received after this time may not be considered.

To make a submission please:

- submit your response in PDF format
- use your organisation's letterhead
- email your response to energysecurity@environment.nsw.gov.au

Publication of submissions

The department is committed to an open and transparent consultation process. All responses will be published on the NSW Climate and Energy Action website.

If you wish for your written submission to remain confidential, please state this clearly. In such cases, the department will publish your organisation's name only.

Submissions from individuals will be published will all personal details removed.

Please be aware that even if you state that you do not wish certain information to be published, there may be circumstances that require the department to release certain information (for example, under the *Government Information (Public Access) Act 2009*).

2 Objective 1: create a financial incentive to encourage energy savings

The principal object of Schedule 4A, Part 1 of the Act, otherwise referred to as Objective 1 of the ESS, is to create a financial incentive to reduce the consumption of energy by encouraging energy saving activities.

2.1 The ESS is meeting this objective

The ESS has created a financial incentive to encourage energy savings. This is demonstrated by:

- accredited certificate providers creating energy savings certificates
- scheme participants purchasing and surrendering energy savings certificates to meet annual targets
- households and businesses receiving financial incentives
- encouraging energy savings activities that would otherwise not have occurred.

2.1.1 Accredited certificate providers have created energy savings certificates

Between 2019 and 2023, accredited certificate providers (ACPs) created more than 31.1 million energy savings certificates (ESCs) for eligible energy savings activities. This exceeded the cumulative target over the same period by 7.3 million ESCs.[1]

2.1.2 Scheme participants have purchased and surrendered energy savings certificates to meet annual targets

Table 1 shows scheme participants have largely chosen to purchase ESCs rather than pay penalties. Between 2019 and 2022, scheme participants surrendered more than 18.7 million ESCs and paid penalties for the equivalent of about 274,000 ESCs. Penalties paid represent roughly 1.5% of the total scheme obligation over the same period.

[1] As reported for 2019 to 2022 (IPART 2024a). Final numbers in IPART's annual report to the Minister for 2023 will be published in July 2025.

Table 1 Annual scheme participant compliance[2]

Compliance year	Total scheme obligation	Certificates surrendered to meet obligation[3]	No. scheme participants that paid penalties	Total penalties in certificates	% total scheme participant obligation
2019	4,649,936	4,866,779	10	11,426	0.25%
2020	4,546,509	4,458,119	2	17,308	0.38%
2021	4,512,439	4,581,448	13	20,904	0.46%
2022	4,884,583	4,794,787	23	224,369	4.59%[4]
2023	5,170,851	Not available	Not available	Not available	Not available

Scheme participants are not required to report the price they pay for the ESCs they purchase and surrender. As shown in Figure 1, the certificate market indicates that the cost of purchasing ESCs remains below the penalty rate. Between 2019 and 2023 the ESC price fluctuated between $18 and $39 per certificate, remaining below the tax-effective penalty rate of around $45.

[2] As reported for 2019 to 2022 (IPART 2024a). Confirmed scheme participant data for 2023 was not available at the time of drafting this report.

[3] Includes ESCs surrendered to cover shortfalls carried over from previous compliance years.

[4] One-off increase in 2022 due to a single scheme participant's shortfall penalty payment. Preliminary 2023 compliance data from IPART indicates that 2022 was anomalous and penalty payments have returned to levels consistent with 2019-2021.

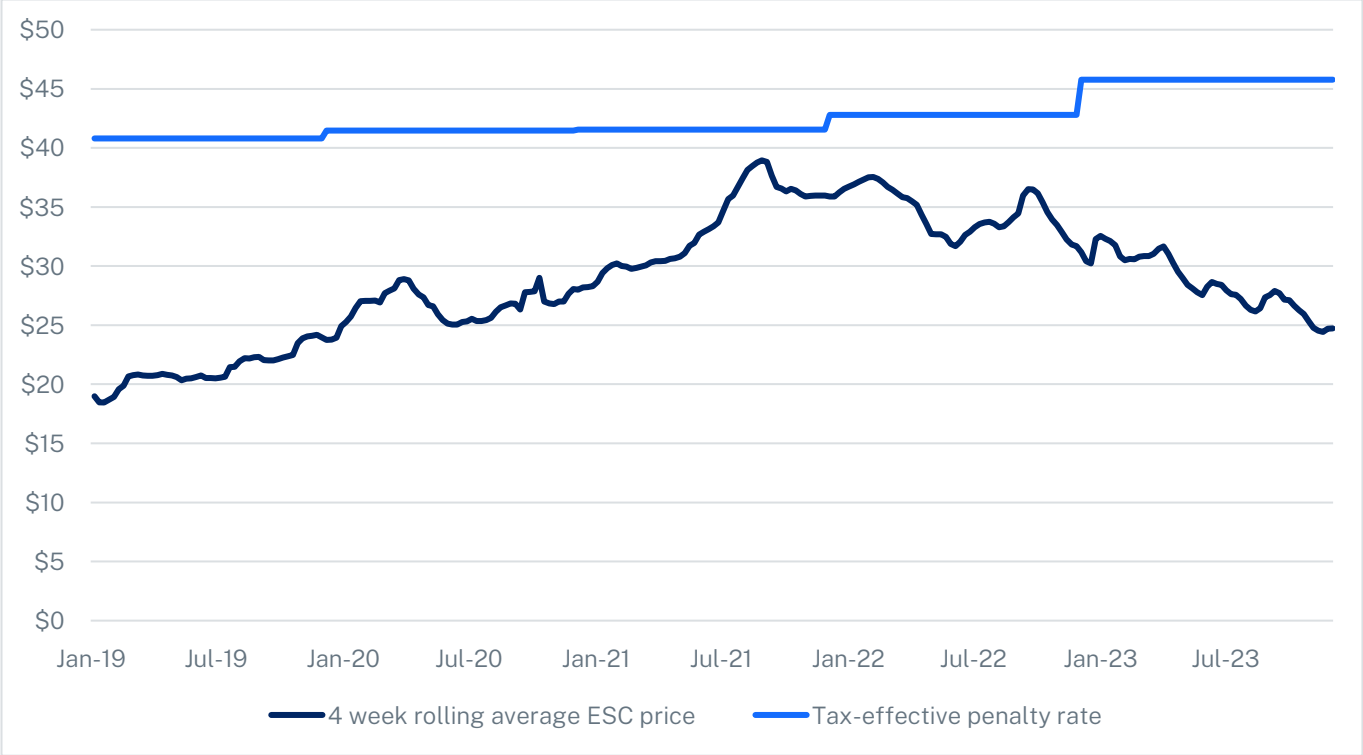

Figure 1 Tax-effective penalty rate and ESC price[5]

The number of scheme participants with negligible liability is growing.

Figure 2 shows that over the review period, around 42% of scheme participants had no liable acquisitions. These are electricity retailers without any customers in NSW that are registered to operate in NSW, which means they must still comply with annual scheme requirements. In these cases, the cost of compliance for IPART and these retailers does not deliver any benefit.

Some scheme participants' liability is so low that they are unable to purchase ESCs in the required quantity, and they instead just pay the scheme penalty. Liability for these participants therefore does not contribute to scheme objectives.

In 2023, 72 of the 111 scheme participants had liable acquisitions less than 10,000 MWh (equivalent to approximately 950 ESCs). The remaining 39 scheme participants accounted for 99.93% of the total liable acquisitions.[6]

[5] Volume-weighted ESC price sourced from CORE Markets and averaged over the preceding four weeks. The tax-effective penalty rate is the base penalty rate adjusted for CPI and grossed up by the corporate tax rate of 30%.

[6] Sourced from IPART.

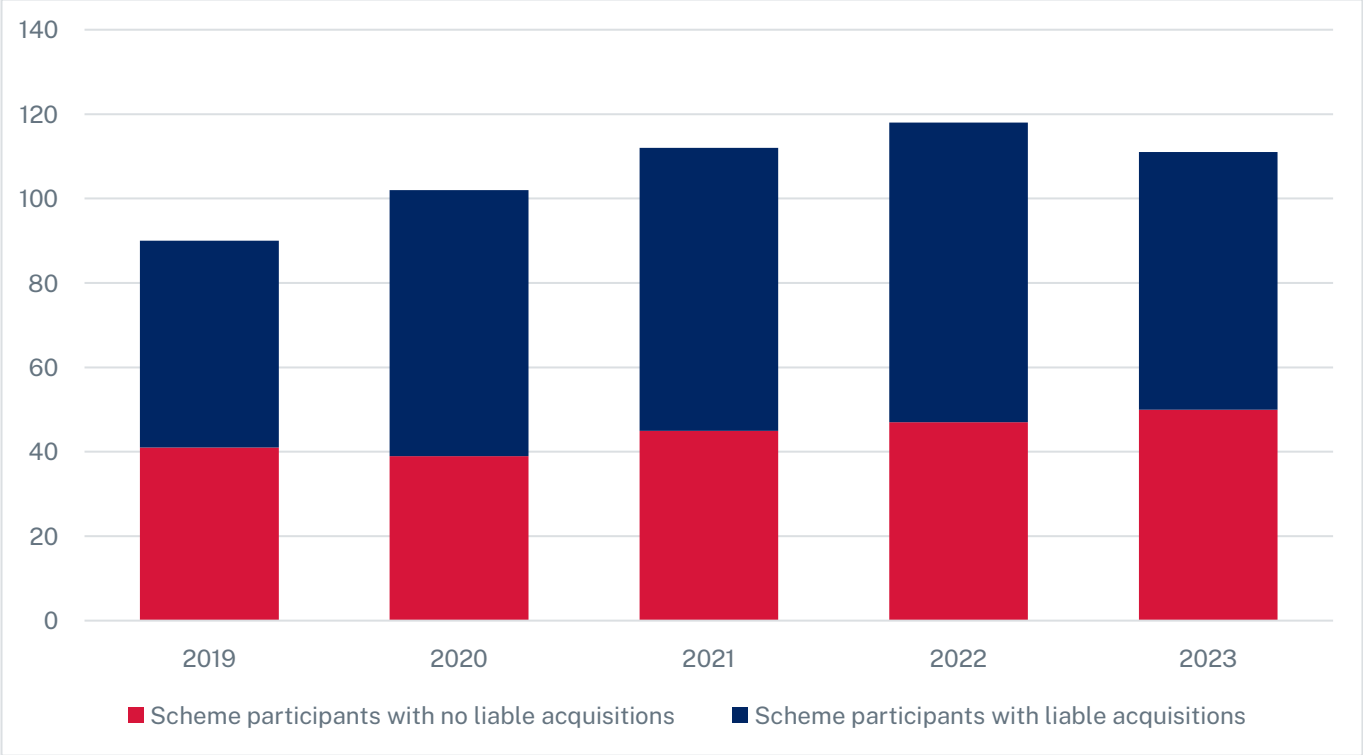

Figure 2 Number of scheme participants with and without liable acquisitions[7]

2.1.3 Households and businesses have received financial incentives

Surveys of scheme participants and ACPs indicate the price paid for ESCs is generally above the administrative cost of creating them. From 2017 to 2022, the average cost for an ACP to create an ESC has risen from $3.63 (Sapere Research Group 2017) to $4.37 (Common Capital 2022), representing a 20% increase.[8] The average ESC price between 2019 and 2023 was $28.91,[9] making about 85% of the remaining ESC price available as an incentive to NSW households and businesses to encourage energy saving activities.

ACPs use the revenue from the sale of ESCs in various ways. Some may provide an upfront discount on the equipment supplied to their customers. Others may offer discounted equipment servicing or delivery fees.

2.1.4 The ESS has encouraged energy savings which would otherwise not have occurred

In 2022, the NSW Government introduced ESS incentives for solar hot water and heat pump hot water systems in addition to incentives available under the Australian Government's Small-scale Renewable Energy Scheme (SRES). This was largely due to low uptake of these technologies in NSW compared to other states where equivalent schemes top up SRES incentives (DPIE 2021).

[7] Sourced from IPART.

[8] These figures (in nominal $) may not be directly comparable but provide a good indication that costs to ACPs have increased.

[9] Average volume-weighted ESC price (in nominal $) sourced from CORE Markets.

Between 2022 and 2023, the number of new and replacement heat pumps installed under the ESS grew from 12,500 to 54,500 (NSW DCCEEW 2025).

The combined state and Australian Government incentives doubled the size of the national heat pump market and encouraged businesses to source new products at a lower cost. Combined incentives reduced the cost of heat pump installations in NSW by up to 33% (CER 2025). However, this impact was not sustained because of subsequent changes made to heat pump activities to address the issues noted in section 6.1.1 and lower ESC prices.

2.2 The objective remains valid

The objective to provide a financial incentive to encourage energy savings activities remains valid because there are unrealised energy efficiency opportunities in NSW and market barriers to their adoption persist.

2.2.1 The energy efficiency opportunity remains significant

Significant electrification and energy efficiency opportunities exist in the built environment and industrial sectors (CCA 2024). There is also a need to accelerate uptake of more energy efficient appliances and equipment to support decarbonisation (OCSE 2023). Energy efficiency measures in buildings alone could deliver $20 billion in bill savings for households and businesses nationwide and avoid 64 $MtCO_2$-e of emissions by 2050 (GBCA and PCA 2023).

Analysis for the department indicates there are opportunities to save over 25,000 GWh a year from energy efficiency and over 11,000 GWh a year from fuel switching[10] activities in NSW under the ESS (Common Capital 2024). As shown in Figure 3, the largest opportunities are in the commercial and industrial sectors.

[10] Includes natural gas or LPG to electricity.

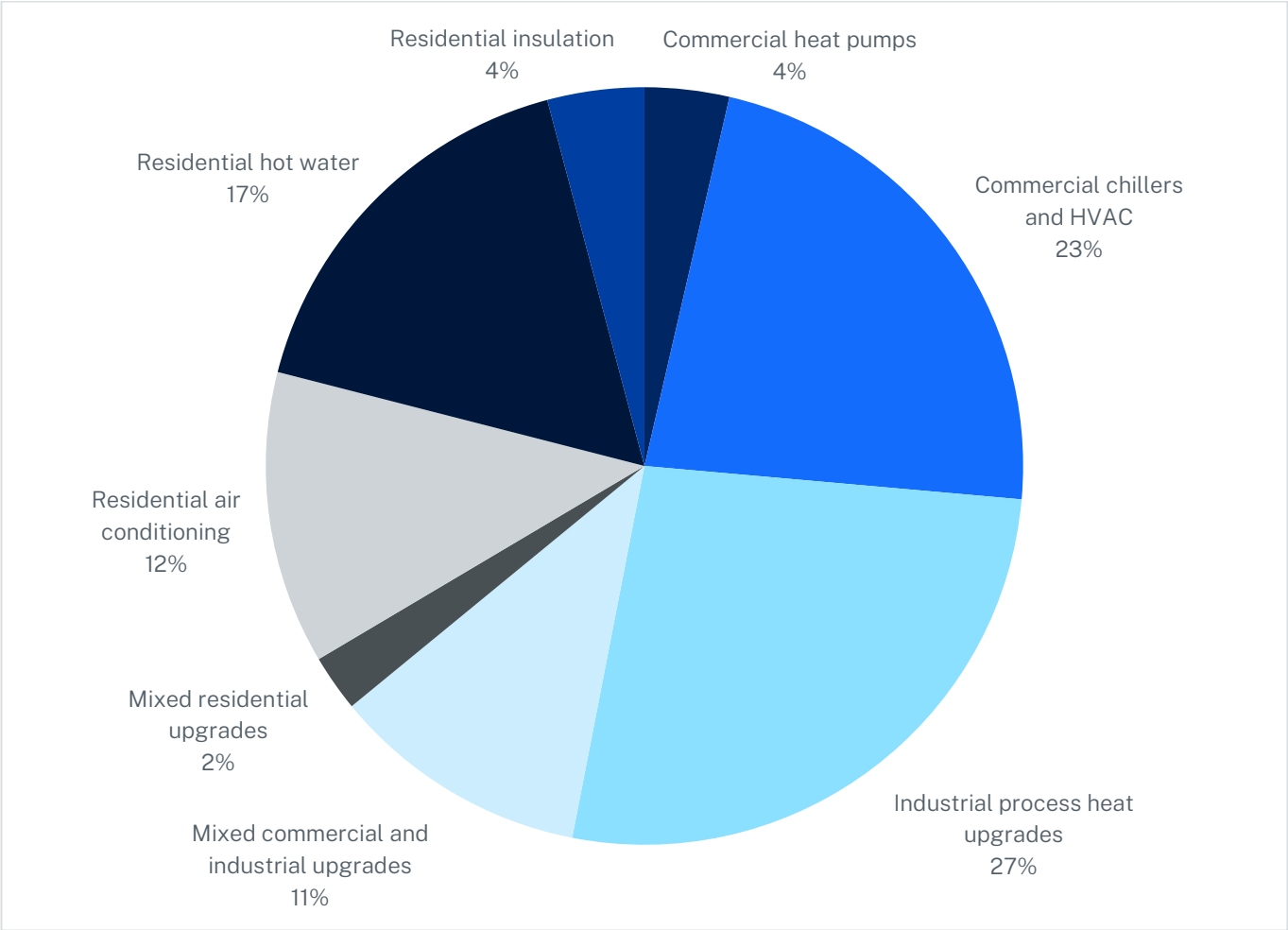

Figure 3 Energy efficiency opportunity in NSW that could be unlocked under the ESS

2.2.2 Market barriers to energy efficiency persist

A range of financial and non-financial barriers prevent the uptake of energy efficiency opportunities. High upfront costs and long payback periods remain a fundamental barrier to the adoption of more energy efficient appliances and equipment (CCA 2024).

The ESS provides financial incentives to help overcome these barriers. The benefit of market-based mechanisms like the ESS is that they lower the cost of energy savings by:

- providing dynamic and efficient subsidy levels
- driving competition through product and business model innovation
- enabling market transformation due to their typical scale and duration (APEC 2021).

The previous statutory review of the ESS highlighted how the scheme has effectively transformed the lighting market in NSW (DPIE 2020a).

2.3 Outcome of consultation

2.3.1 Discussion paper consultation

Most respondents agreed that ESS objectives remain valid and that market-based certificate schemes effectively encourage energy savings activities. However, some stakeholders suggested alternative principal objectives for the ESS, including:

- a greater focus on emissions reduction, electrification and flexible demand
- shifting from providing a financial incentive to energy savings outcomes.

The department will consider these suggestions alongside broader ESS reforms in 2025.

2.4 Finding

The statutory review finds that the ESS is meeting this objective and it remains valid.

3 Objective 2(a): reduce energy consumption and costs for businesses and households

Objective 2(a) of the ESS is to assist households and businesses to reduce energy consumption and energy costs.

3.1 The ESS is meeting this objective

The ESS has been effective in assisting households and businesses to reduce energy consumption and costs by:

- providing direct benefits for households and businesses that received an upgrade
- placing downward pressure on electricity prices for all NSW consumers.

3.1.1 Participating households and businesses have saved energy and money

Activities implemented between 2019 and 2023 are estimated to deliver almost 29,000 GWh of energy savings and around $8 billion in energy bill savings over their lifetimes.[11]

Figure 4 shows the proportion of ESCs created by calculation method over the review period. Lighting upgrades continued to be the dominant activity. Since 2022, there has been a significant increase in ESCs created under the Installation of High Efficiency Appliances for Businesses method driven by new activities for refrigerated display cabinets and heat pump water heaters.

[11] Estimated by the department using annual energy savings from IPART and internal forecasts of electricity and gas prices (in real $2024). These savings are from avoided electricity purchase costs by participants only and do not include the effect that the ESS may have on future wholesale electricity prices.

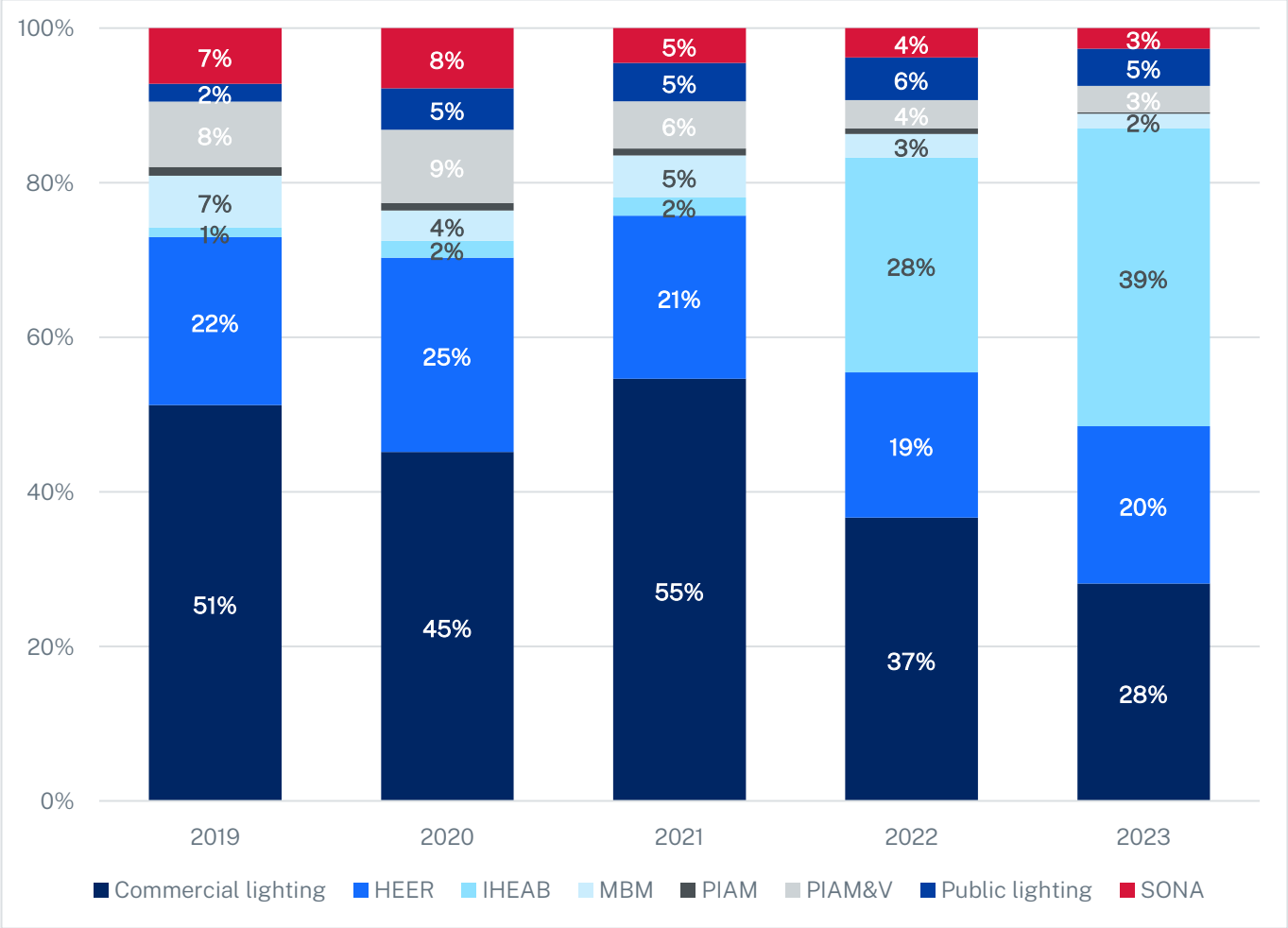

Figure 4 Proportion of ESCs created by calculation method over the review period[12]

Figure 5 shows the proportion of ESCs created by sector over the review period. Upgrades took place in a range of sectors, including manufacturing, retail and other commercial buildings such as offices, hotels and warehouses.

[12] Department analysis of The Energy Security Safeguard Application (TESSA) portal data. HEER – Home Energy Efficiency Retrofits; IHEAB – Installation of High Efficiency Appliances for Businesses; MBM – Metered Baseline Method; PIAM – Project Impact Assessment Method; PIAM&V – Project Impact Assessment with Measurement and Verification; SONA – Sale of New Appliances.

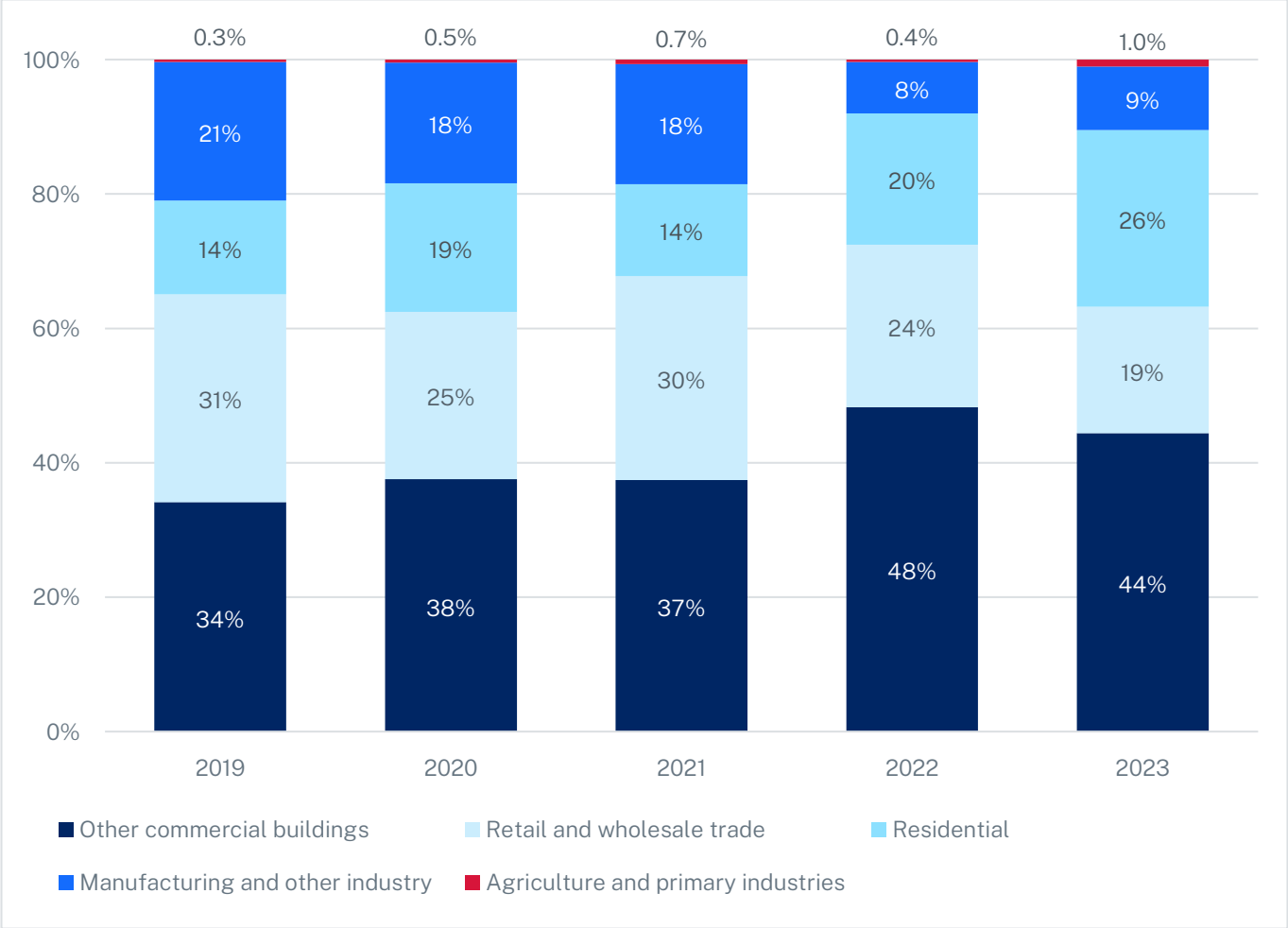

Figure 5 Proportion of ESCs created by sector over the review period[13]

Over the review period, about 20% of ESCs have been created in regional areas.[14] This is comparable to electricity usage in regional areas, which is about 23% of the state's total.[15] The ESS Rule includes a regional network factor to recognise the value of avoided line losses and encourage activities in regional areas. However, stakeholder feedback suggests that regional customers continue to have difficulty accessing ESS incentives.

Over the same period, about 17% of ESCs were created for household upgrades,[16] whereas about 35% of electricity supplied in NSW is to residential customers.[17] The number of ESCs created for household upgrades in 2023 is more than triple the number created in 2019. This indicates that NSW households are increasingly accessing upgrades through the ESS.

[13] Department analysis of TESSA portal data.

[14] Department analysis of TESSA portal data based on postcodes that have a regional network factor greater than 1 applied.

[15] Total energy deliveries for Essential Energy compared to Ausgrid and Endeavour Energy, sourced from Regulatory Impact Notices for 2022-23 (AER 2023).

[16] Department analysis of TESSA portal data.

[17] Proportion of residential energy deliveries of total energy deliveries from Ausgrid, Endeavour Energy and Essential Energy, sourced from Regulatory Impact Notices for 2022-23 (AER 2023).

3.1.2 The ESS has placed downward pressure on electricity prices for all NSW consumers

By helping households and businesses to save energy, the ESS has contributed to lower overall electricity demand in NSW. This has placed downward pressure on both the wholesale electricity market and energy infrastructure costs, which are generally passed through to consumers.

Analysis for the department shows that without the ESS, the wholesale electricity price could have been $21.40 per MWh[18] higher on average between 2019 and 2023. Scheme costs over this period were an average of $2.90 per MWh.[19]

As shown in Figure 6, the ESS has saved NSW households an estimated:

- $44 a year on average on their electricity bills since it commenced in 2009
- $98 a year on average on their electricity bills over the review period (2019–2023).

Savings to households have increased since the last statutory review due to a combination of greater energy savings driven by annual increases in scheme targets, and higher wholesale electricity prices.

[18] The estimate of how much higher the annual average wholesale electricity price could have been ranges from $13.30 to $33.60 per MWh (in real $2024). This is based on analysis undertaken by Endgame Economics using market simulation software PLEXOS for scenarios with and without the ESS. Electricity savings from the ESS are sourced from IPART and reduced by 13% to adjust for the net impact of free-riders and spillovers. Refer to Appendix A for more information about the methodology.

[19] This figure is an estimate of the ESS costs passed through to consumers, averaged over 2019 to 2023 (in real $2024). This was calculated by the department based on the methodology used by the Australian Energy Regulator in the 2024-25 DMO (Acil Allen 2024).

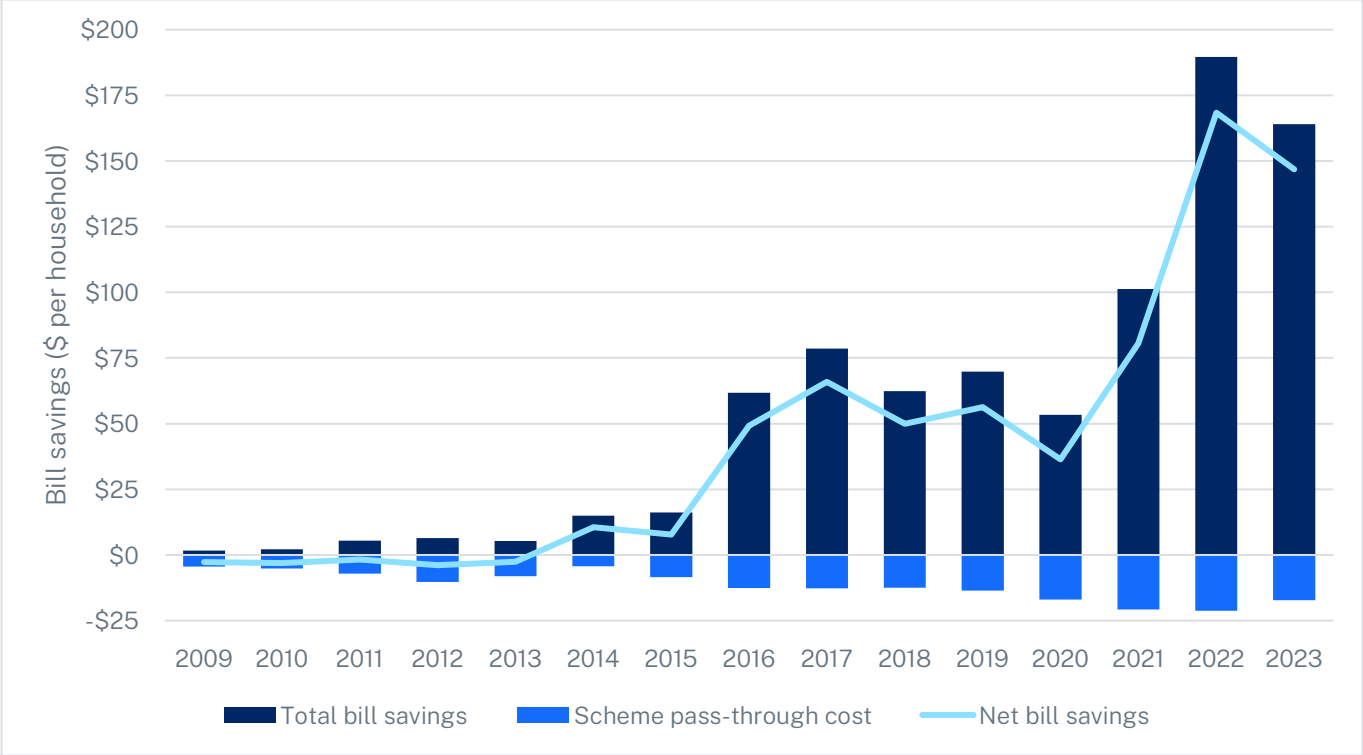

Figure 6 Estimated annual residential bill savings from the ESS (in real $2024)[20]

As shown in Figure 7, the ESS has saved NSW businesses an estimated:

- $141 a year on average on their electricity bills since it commenced in 2009
- $277 a year on average on their electricity bills over the review period (2019–2023).

[20] Residential retail price analysis takes into account the ESS pass-through and assumes an average residential energy consumption of 6,000 kWh per year. Refer to Appendix A for more information about the methodology.

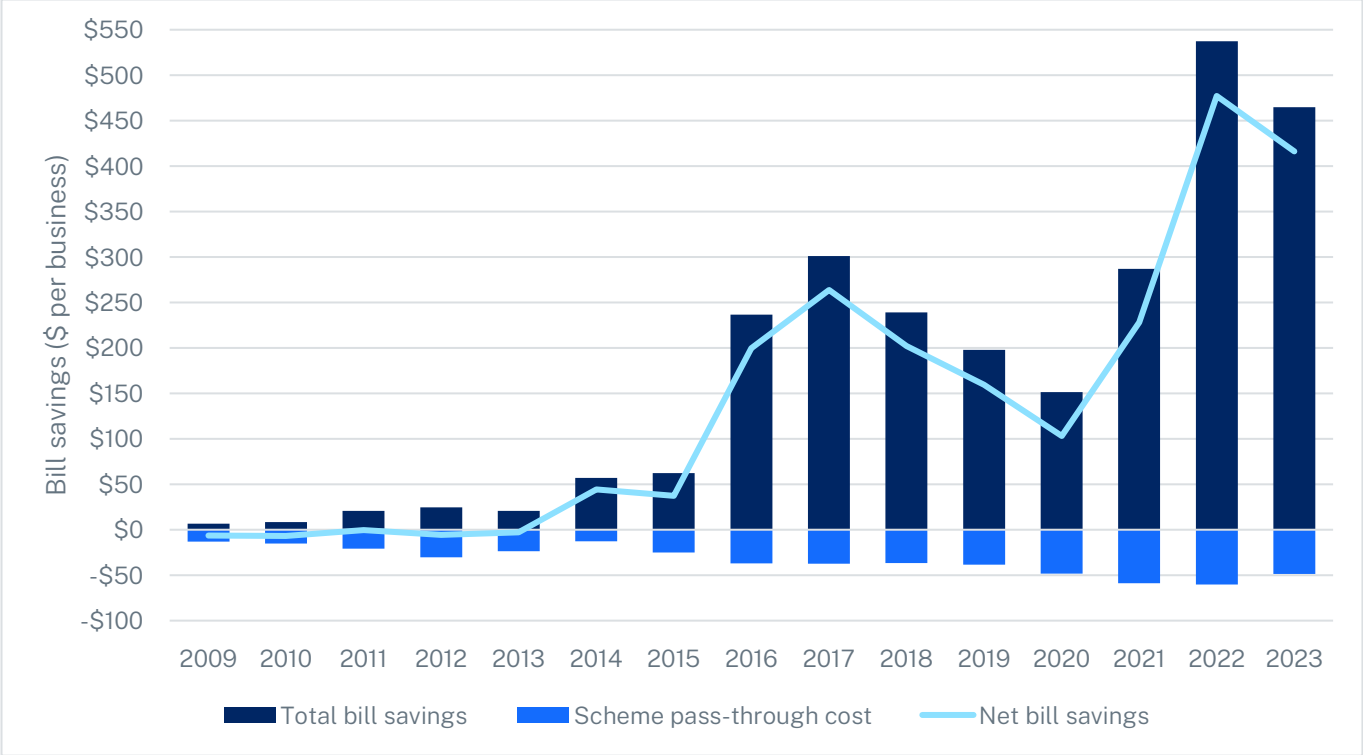

Figure 7 Estimated annual commercial bill savings from the ESS (n real $2024)[21]

3.2 The objective remains valid

The objective to reduce energy consumption and costs for households and businesses remains valid because energy bill pressures continue for many customers and energy efficiency measures help lower energy costs for all consumers.

3.2.1 Energy bill pressures remain

The objective to reduce energy costs remains valid as the following evidence supports the growth of energy bills and customers in hardship over the review period.

In the June 2024 Energy Consumer Sentiment Survey, NSW households reported the expense they are most concerned about paying is their electricity bill (ECA 2024).

According to data collected by the Australian Competition and Consumer Commission, the weighted average electricity bill in NSW increased by 35% for residential customers and 29% for small business customers between 1 August 2022 and 1 August 2023. Typical electricity prices in regional areas are, on average, 23% higher for households and small businesses than in metropolitan areas (IPART 2024b).

[21] Commercial retail price analysis takes into account the ESS pass-through costs and assumes an average business energy consumption of 17,000 kWh per year. Refer to Appendix A for more information about the methodology.

Higher wholesale and distribution costs have driven an increase in retail gas prices of 35% for residential customers and 46% for business customers between 2019-20 and 2023-24 (IPART 2024c).

The proportion of NSW households on hardship programs has steadily grown to over 2% for electricity and almost 1.2% for gas in 2023-24. 4.1% of small business customers in NSW have energy debt (AER 2024).

One of the priorities of the NSW Consumer Energy Strategy, released in 2024, is keeping energy bills as low as possible. The ESS is identified as a key form of financial support to help households and businesses cut their energy use and lower their energy bills (NSW DCCEEW 2024b).

3.2.2 Energy efficiency helps lower energy consumption and costs for consumers

AEMO forecasts that residential and business electricity consumption are expected to grow by approximately 25% and 45% respectively over the next decade, driven by electrification and changes in economic activity (AEMO 2024a). This growth is partially offset by improvements in energy efficiency, driven by state-based schemes such as the ESS.

The Australian Government's National Energy Performance Strategy recognises that state-based schemes have been at the forefront of assisting households and businesses to benefit from energy efficiency improvements (DCCEEW 2024a).

In every sector, energy efficiency has a role to play in reducing costs for consumers and pressure on the electricity system (CCA 2024).

3.3 Outcome of consultation

3.3.1 Discussion paper consultation

Respondents generally agreed that Objective 2(a) remains valid. Stakeholders highlighted the role of the ESS in helping to reduce energy costs and cited cost of living pressures for households.

3.4 Finding

The statutory review finds that the ESS is meeting this objective and it remains valid.

4 Objective 2(b): complement national action to lower the cost of emissions reductions

Objective 2(b) of the ESS is to complement any national scheme for carbon pollution by making the reduction of greenhouse gas emissions achievable at a lower cost.

4.1 The ESS is meeting this objective

The ESS has complemented national action to lower the cost of reducing greenhouse gas emissions by:

- making emissions abatement available at a lower cost
- complementing Australian Government emissions reduction policies.

4.1.1 The ESS has made emissions abatement available at a lower cost

The ESS is a cost-effective means of reducing emissions. As shown in Figure 8, the ESS is estimated to have resulted in cumulative emissions reductions of 13.3 $MtCO_2$-e in the national electricity market (NEM) and 8.6 $MtCO_2$-e in NSW between 2019 and 2023. This translates to an average abatement cost of around \$2/tCO_2-e over the same period, which is seven times lower than the abatement cost that would be achieved by a renewable solar or wind project with equivalent emissions reductions.[22]

[22] Estimated by the department using the cost of wind and solar projects (\$/kW) from GenCost project data for the years 2019-20 to 2023-24 (CSIRO n.d.). Refer to Appendix A for more information about the methodology.

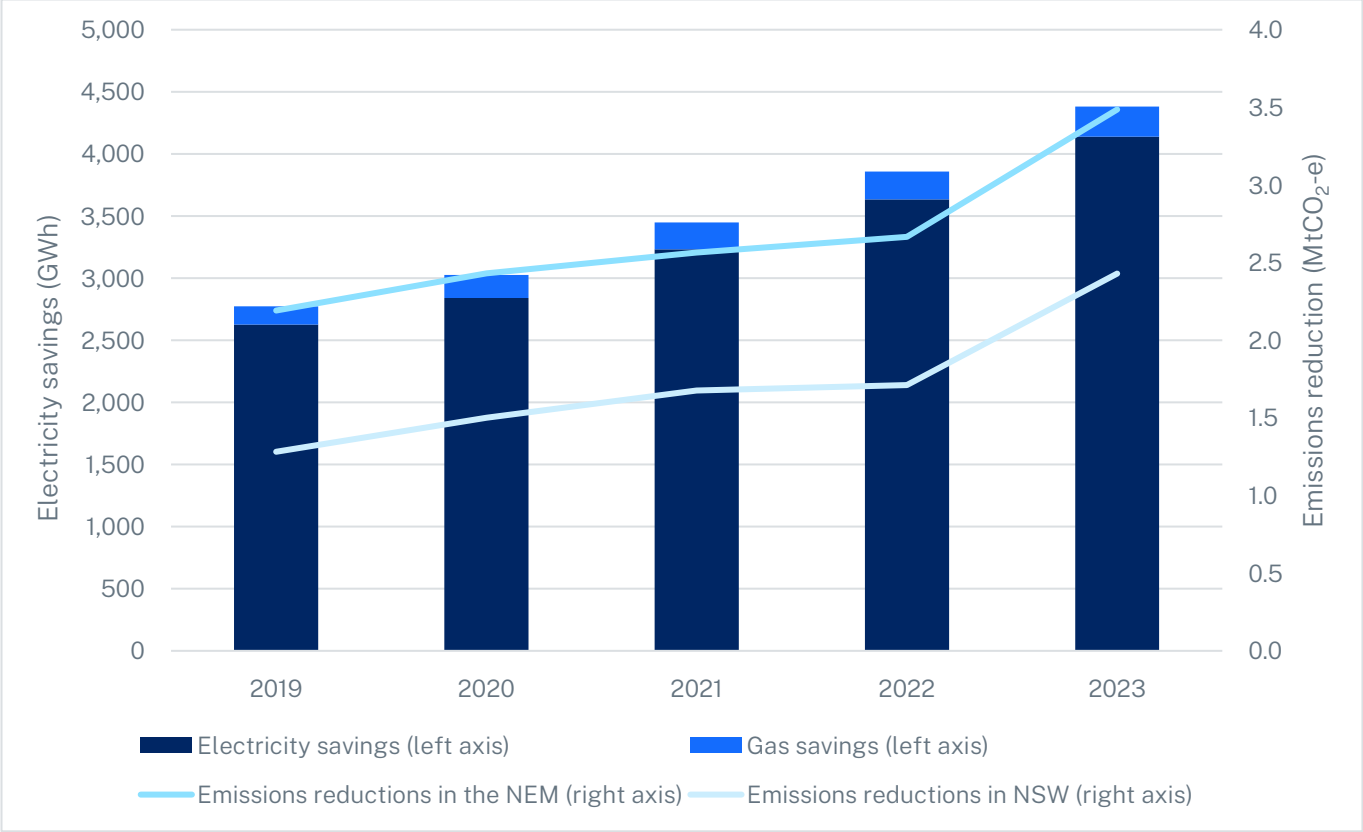

Figure 8 Estimated electricity savings and emissions reductions from the ESS over the review period[23]

4.1.2 The scheme complements national action on emissions abatement

The main way the ESS complements national action on emissions abatement is by making emissions reduction targets more achievable by reducing the cost. This is demonstrated in sections 4.1.1 and 5.1.

The Australian Government has committed under the Paris Agreement to reduce greenhouse gas emissions by 43% below 2005 levels by 2030 and net zero by 2050. The contributions of state-based energy efficiency schemes, including the ESS, are factored into national projections on progress towards this target.

The Australian Government's emissions reduction policies include the Safeguard Mechanism, Renewable Energy Target (RET) and Capacity Investment Scheme (DCCEEW 2025).

Under the RET, the SRES provides incentives to households and businesses to install eligible small-scale renewable energy systems. With the SRES scheduled to end in 2030, the NSW Government decided to provide additional incentives for solar and heat pump water heaters to bridge upfront cost barriers while SRES incentives ramp down (DPIE 2021).

[23] Emissions reductions due to the ESS are based on analysis undertaken by Endgame Economics for the department using market simulation software PLEXOS for scenarios with and without the scheme. Annual energy savings are sourced from IPART and reduced by 13% to adjust for the net impact of free-riders and spillovers. For this purpose, NEM emissions reductions also include emissions reductions associated with gas savings. Refer to Appendix A for more information about the methodology.

The Safeguard Mechanism applies to facilities that emit more than 100,000 tCO_2-e per year. The Australian Government reformed the Safeguard Mechanism in 2023 to apply a baseline decline rate of 4.9% per year to 2030, consistent with achieving Australia's emissions reduction targets. Trade-exposed facilities can apply for a lower rate (DCCEEW 2024b). There are around 35 Safeguard facilities in NSW.[24]

While large industrial facilities based in NSW are permitted to access ESS incentives for eligible energy savings activities, the ESS Rule precludes activities that are undertaken in order to comply with a mandatory legal requirement,[25] such as a declining baseline. This ensures the ESS encourages energy savings activities that are additional to business-as-usual.

4.2 The objective remains valid but should complement NSW climate change policies

While the objective to complement national action to reduce the cost of abatement remains valid, there is an opportunity to reframe the objective to complement NSW climate change policies.

4.2.1 NSW has legislated emissions reduction targets under the *Climate Change (Net Zero Future) Act 2023*

The NSW Government is committed to effective action on climate change. The *Climate Change (Net Zero Future) Act 2023* legislates emissions reduction targets for NSW:

- 50% reduction on 2005 levels by 2030
- 70% reduction on 2005 levels by 2035
- net zero by 2050.

The Net Zero Future Act also mandates the setting of future interim targets to reduce net greenhouse gas emissions in NSW for 2040 and 2045, which must be greater than the previously set target.

Figure 9 shows there is a risk that NSW is not on track to achieve the 2030 and 2035 targets under current policy settings (NSW DCCEEW 2024a).

[24] Based on Safeguard facilities data for 2022-23 (CER n.d.).

[25] Clause 5.4(b) of the Energy Savings Scheme Rule 2009.

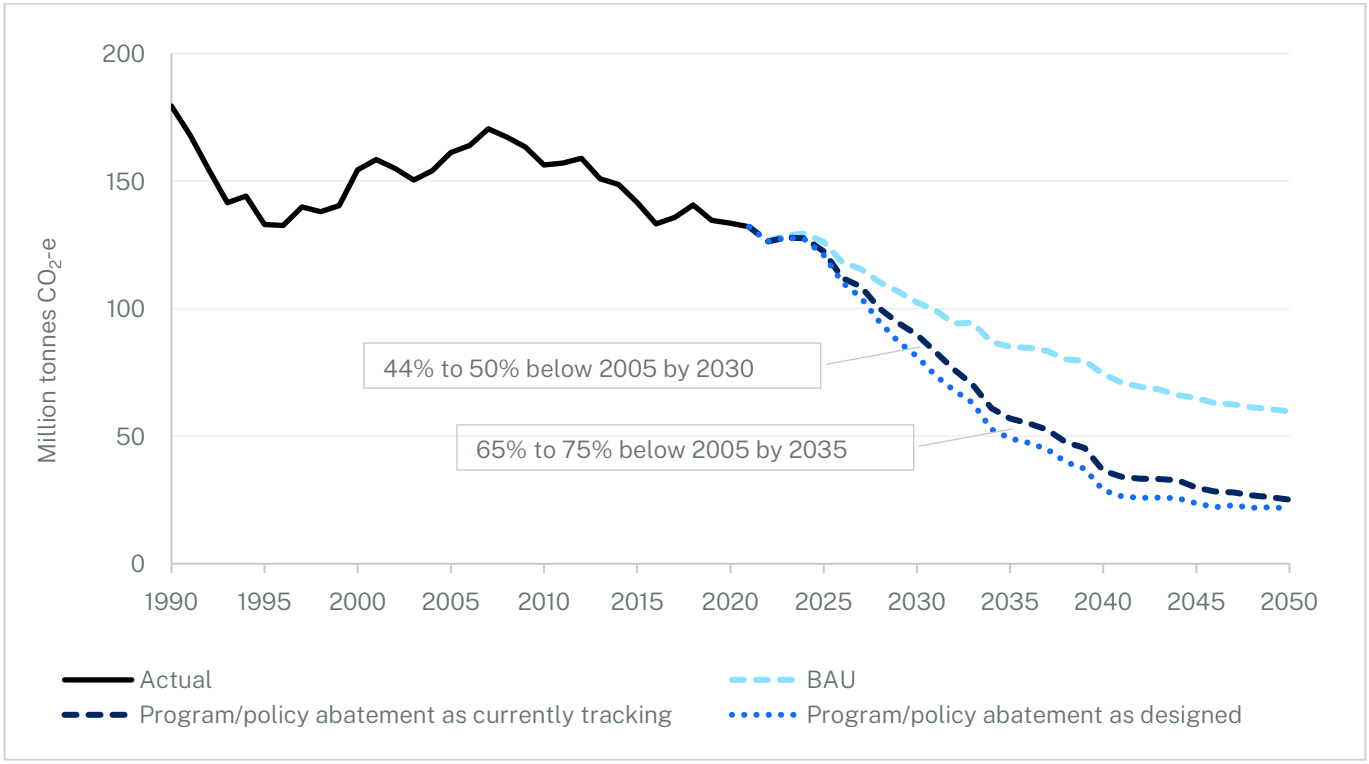

Figure 9 Projected total NSW emissions to 2050 for business as usual and current policy scenarios

4.2.2 Cost effective energy efficiency measures are needed to complement emissions reductions from the electricity sector

The rapid decarbonisation of the electricity sector is critical to NSW achieving its legislated emissions reduction targets (NZC 2024).

The electricity sector transition in NSW is driven by the NSW Electricity Infrastructure Roadmap and the Energy Security Safeguard.[26] Annual NSW electricity generation emissions are projected to reduce by 66% over the period 2021–2030 and by 85% over the period 2021–2035 (NSW DCCEEW 2024a).

Energy savings achieved under the ESS will continue to complement the declining emissions intensity of the electricity grid. Market-based certificate trading schemes like the ESS are highly effective at seeking out the lowest cost energy savings activities (APEC 2021). By design, the market will find the least cost way of meeting ESS targets, and competition and economies of scale further drive down costs.

Energy efficiency measures will also reduce the new generation and transmission infrastructure needed to decarbonise the electricity grid (NZC 2024).

[26] The Energy Security Safeguard comprises the ESS, Peak Demand Reduction Scheme and Renewable Fuel Scheme (not yet commenced).

4.3 Outcome of consultation

4.3.1 Discussion paper consultation

Respondents highlighted how the ESS supports meeting emissions reduction targets and the transition to renewable energy. Key recommendations included:

- redefining objectives to focus explicitly on emissions reductions
- updating certificate conversion factors to better support electrification.

The department will consider these suggestions alongside broader ESS reforms in 2025.

4.4 Finding

The statutory review finds that the ESS is meeting this objective and recommends considering a potential amendment to complement the *Climate Change (Net Zero Future) Act 2023* as well as any national scheme for carbon pollution reduction.

5 Objective 2(c): reduce cost of and need for additional energy system infrastructure

Objective 2(c) of the ESS is to reduce the cost of, and the need for, additional energy generation, transmission and distribution infrastructure.

5.1 The ESS is meeting this objective

The ESS has reduced the cost of and need for additional energy generation, transmission and distribution infrastructure by:

- reducing electricity consumption
- reducing peak demand.

5.1.1 The ESS has reduced electricity consumption and therefore the cost of and need for additional generation infrastructure

In 2023, the ESS reduced electricity consumption by approximately 4,100 GWh, which is equivalent to 7% of grid-supplied electricity.[27]

By lowering electricity consumption, the ESS reduces the need to invest in new additional generation infrastructure.

For example, the energy savings delivered by the ESS in 2023 are equivalent to:

- the generation capacity of one 685 MW unit in Bayswater Power Station, which is scheduled to close between 2030 and 2033[28] or
- the generation of an 1,800 MW solar farm in NSW at a capital cost of $2 billion.[29]

[27] Electricity savings from the ESS are sourced from IPART and reduced by 13% to adjust for the net impact of free-riders and spillovers. Grid-supplied electricity in 2023 is the average of actual operational consumption for 2022–23 and 2023–24 less line losses. Line losses were estimated using a weighted average of LV and HV distribution loss factors from Ausgrid, Endeavour Energy and Essential Energy Regulatory Impact Notices for 2022-23 (AER 2023) and a weighted average of 2024-25 marginal loss factors (AEMO 2024b).

[28] The capacity of Bayswater unit 2 is 685 MW and under a 77% capacity factor generates approximately 4,300 GWh after accounting for an auxiliary load of 5.46% and a network line loss factor of 1.052 (AEMO 2023).

[29] In practice, this corresponds to the generation of four large solar farms recently committed under the NSW Electricity Infrastructure Roadmap and Australian Government Capacity Investment Scheme: New England Solar Farm 1 (400 MW), New England Solar Farm 2 (320 MW), Sandy Creek Solar Farm (700 MW) and Stubbo Solar Farm (400 MW). Combined, these generate approximately 4,298 GWh (AEMO 2023).

5.1.2 The ESS has reduced peak demand and therefore the cost of and need for additional generation, transmission and distribution infrastructure

Figure 10 shows that based on peak demand reductions achieved between 2019 and 2023, the ESS has deferred an estimated $168 million of network investment.

In 2023, the ESS is estimated to have reduced electricity demand at peak times by about 350 MW at the point of consumption. This is equivalent to deferring investment in additional gas peaking plant of about 380 MW, which is 64 MW more than the recently commissioned Tallawarra B, at an estimated capital cost of about $300 million.[30] By lowering peak demand, the ESS has helped reduce peak prices.

It is also likely that the ESS has materially reduced the reliability risk over the review period, especially in the 2022 winter when the electricity system was affected by significant coal outages and low wind output (Endgame Economics 2025).

[30] Estimated by the department using a weighted network line loss factor of 1.052, assuming a 5% reduction in power station output during summer peak due to seasonal de-rating and auxiliary load, and capital cost forecasts for Open Cycle Gas Turbines of $1063 per kW in 2024-25 (AEMO 2023).

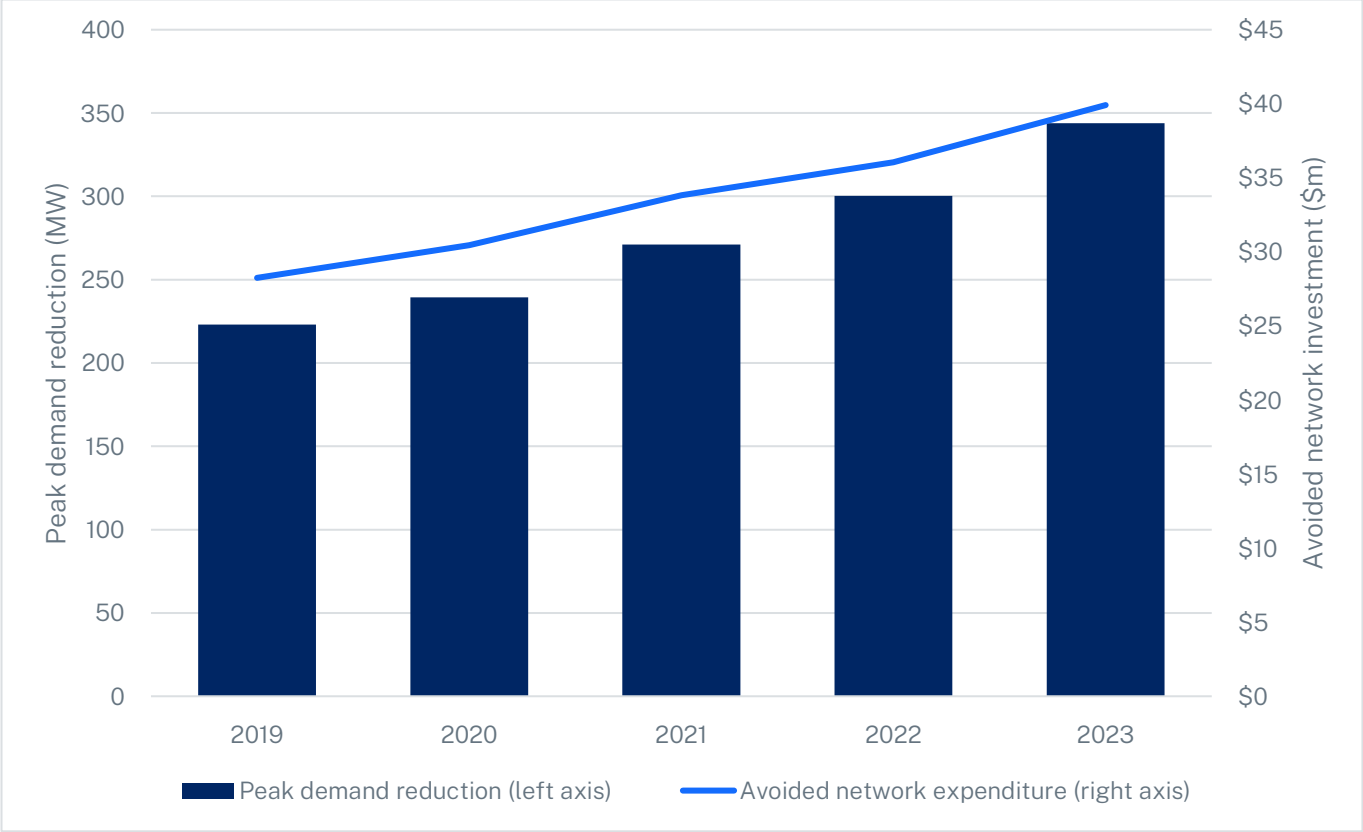

Figure 10 Annual peak demand reduction and avoided network investment over the review period[31]

5.2 The objective remains valid

The objective to reduce the cost of and need for additional energy generation, transmission and distribution infrastructure remains valid because there is a continued need to support the energy transition in NSW and the ESS can help manage reliability risks.

5.2.1 The energy transition in NSW is underway

Over the next decade, three coal-fired power stations are expected to close in NSW: Eraring Power Station (2,880 MW) in 2027, Bayswater Power Station (2,715 MW) in 2033 and Vales Point B Power Station (1,320 MW) in 2033 (AEMO 2024a).

[31] Electricity peak demand reduction at the point of consumption was estimated by the department using conservation load factors for different technologies, matched to electricity savings sourced from IPART. Electricity savings were reduced by 13% to adjust for free-riders and spillover. The weighted average long run marginal cost (LRMC) for the distribution networks was estimated by the department assuming all commercial and residential customers are supplied by the LV network and 30% of industrial customers are connected at sub-transmission voltages with the remainder connected to the HV network. The LRMC represents the avoidable cost of supply in the long term, assuming all costs of production can be varied. The weighted average LRMC was sourced from distributors' (Ausgrid, Endeavour Energy and Essential Energy) published tariff structure statements for 2019–2024 (AER 2019a, 2019b, 2019c). An estimate of the transmission network LRMC was calculated using forecasts of capital expenditure and incremental peak demand (TransGrid 2017). The deferred peaking gas plant, network investment and energy savings (equivalent coal closure) are not fully independent of each other and may have overlap in savings and benefits.

In November 2020, the NSW Government released the Electricity Infrastructure Roadmap to support investment in new transmission, generation, long duration storage and firming infrastructure (DPIE 2020b).

The ESS complements the Electricity Infrastructure Roadmap by:

- helping to minimise disruption as coal-fired power stations approach retirement. Energy savings from the ESS are predictable as targets are legislated to 2050 and factored into demand forecasts by AEMO and network operators.
- helping to reduce the cost of new or augmented network infrastructure by reducing peak demand. Peak demand is a key driver for investment in electricity network infrastructure, including replacement expenditure, as forecast demand affects how much capacity is required.

5.2.2 The ESS can help manage reliability risks

AEMO expects a reliable supply of electricity to homes and businesses to be maintained over most of the next decade if state and federal energy policies and programs are delivered as planned (AEMO 2024a). However, certain conditions such as extreme weather events and generator outages can impact reliability.

Energy savings delivered by the ESS are shown to help mitigate this risk during system demand peaks as discussed in section 5.1.2 and the 2020 statutory review (DPIE 2020a).

AEMO warns that increased investment in energy efficiency is required to mitigate the forecast breach of the Energy Security Target[32] in 2023-24, once Bayswater and Vales Point power stations retire (AEMO 2024c).

5.3 Outcome of consultation

5.3.1 Discussion paper consultation

Respondents noted the role of the ESS in supporting the transition to renewable energy. Stakeholders suggested consumer preferences have shifted towards electric appliances and vehicles and that the ESS helps alleviate pressure on the electricity system by incentivising uptake of energy efficient technologies.

5.4 Finding

The statutory review finds that the ESS is meeting this objective and it remains valid.

[32] The Energy Security Target is established under the NSW *Electricity Infrastructure Investment Act 2020* as the amount of reliable electricity required to meet forecast NSW maximum consumer demand in summer.

6 Broad scheme design remains appropriate

6.1 Finding

The statutory review finds that the ESS is meeting its objectives, and they remain valid. Therefore, the broad design as a market-based certificate scheme remains appropriate.

However, the statutory review has also identified some challenges with new activities introduced to the ESS during the review period and a growing ESC surplus that may require further action to address.

The NSW Government has committed to investigating options to enhance the ESS to help deliver the NSW Consumer Energy Strategy targets and objectives (NSW DCCEEW 2024b). The department will consider these options alongside broader scheme reforms in 2025.

6.1.1 Challenges with new activities

Prior to 2019, there was a long period of stability in ESS activities. Commercial lighting upgrades dominated ESC creation and the spread of ESCs across other activities remained relatively stable.

This statutory review covers a period of diversification of ESS activities, especially in 2021 and 2022 with the introduction of new activities for:

- residential and commercial heat pump hot water systems
- refrigerated cabinets
- air conditioning.

The ESS expanded to new markets, with some activities delivered by ACPs and tradespeople with limited prior engagement with the scheme. Expanding to multiple new markets over a short period presents challenges in predicting, monitoring and responding to issues.

During the review period, high incentives for new activities without a proportionate co-payment led to opportunistic market behaviour that resulted in poor customer outcomes including reports of:

- high pressure sales tactics and misleading advertising for heat pump hot water systems (IPART 2023)
- safety issues from installations of heat pump hot water systems that were non-compliant with relevant standards (IPART 2023)
- reports of loopholes in testing standards being used to evaluate energy efficiency for refrigerated cabinets (NSW DCCEEW 2024c).

These outcomes can undermine scheme integrity and performance against its objectives. These conditions also enabled high volumes of ESCs to be created in a short period of time, which has contributed to the surplus and caused the ESC price to fall.

Since the review period, the department and IPART have commenced implementation of a significant body of work to address such issues, including undertaking comprehensive risk

assessments, reviewing ESS governance arrangements, increasing co-payments for some activities and working with the NSW Building Commission to conduct inspections of installations.

However, the scheme's ability to manage compliance with product quality and performance standards is limited because IPART, the scheme administrator and regulator, is not the regulator for Greenhouse and Energy Minimum Standards (GEMS) or Australian standards. The Australian GEMS Regulator is now actively monitoring products being offered under state-based energy efficiency incentive programs (DCCEEW 2024c).

6.1.2 There is a growing surplus of energy savings certificates

Over the review period, the cumulative surplus of ESCs has steadily grown. In 2023, the surplus reached over 12.6 million ESCs and continues to grow, while ESC prices had fallen to around $14 by February 2025. Some of this surplus is attributable to issues noted in section 6.1.1.

The ESS is legislated to 2050 with scheme targets increasing by 0.5% each year, reaching 13% in 2030. ESCs do not expire, which means the surplus can be used to meet future targets and act as a buffer for any future slowdown in ESC creation. Low ESC prices mean the ESS encourages energy savings at a lower cost to scheme participants, but also potentially reduces the amount of incentive that ACPs can pass through to customers to encourage upgrades.

A sustained period of certificate oversupply and low ESC prices risks market activity stalling. The NSW Government will explore options to address the surplus and ensure the ESS continues to deliver additional energy savings.

6.2 Outcome of consultation

6.2.1 Discussion paper consultation

Most respondents agreed scheme design is appropriate, but some stakeholders identified issues and opportunities for improvement:

- current scheme design presents challenges for some customers in accessing upgrades, particularly in regional areas or for low-income households
- fluctuating ESC prices have impacted the viability of businesses that rely on stability, making long-term planning challenging for ACPs
- the large surplus has affected ESC prices and constrained project development in industrial settings
- the ESS could be expanded to support a wider range of technologies.

The department will consider these suggestions alongside broader ESS reforms in 2025.

7 Glossary

Acronym	Term
ACP	Accredited certificate provider A business who is accredited to create ESCs under the ESS
AEMO	Australian Energy Market Operator
ESC	Energy savings certificate
ESS	Energy Savings Scheme
GEMS	Greenhouse and Energy Minimum Standards
GWh	Gigawatt hours
IPART	Independent Pricing and Regulatory Tribunal
kW	Kilowatts
kWh	Kilowatt hours
$MtCO_2$-e	Megatonnes of carbon dioxide equivalent
MW	Megawatt
MWh	Megawatt hours
NEM	National electricity market
RET	Renewable Energy Target
Scheme participant	Typically an electricity retailer, who is required by legislation to participate in the ESS and meet an individual energy savings target each year
SRES	Small-scale Renewable Energy Scheme
tCO_2-e	Tonnes of carbon dioxide equivalent
TESSA	The Energy Security Safeguard Application

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Appendix A: Modelling methodology

Modelling for the review period was undertaken by Endgame Economics using market simulation software PLEXOS to estimate the impact of the ESS on wholesale electricity prices. After validating the model against historical prices, the impact of the ESS on bill savings was determined by simulating scenarios with and without the scheme.

Energy savings based on IPART data with some adjustments

Annual energy savings (electricity and gas) from the ESS were sourced from IPART's published annual reports to the Minister on scheme performance plus provisional energy savings data for calendar year 2023 provided directly by IPART to the department. Energy savings are derived from the number of ESCs created by activity, where 1 ESC represents a saving of 1 MWh per year for the customer. Energy savings formulas are defined in the ESS Rule.

The department adjusted down energy savings to:

- reflect the impact of changes to heat pump hot water and refrigerated display cabinet activities in 2022 and 2023
- account for the net impact of free-riders and spillovers.

These adjustments were evenly distributed across each half-hour interval.

Modelling period from 2019 to 2023

Modelling for this statutory review covers the calendar years from 2019 to 2023.

Previous periods (i.e. 2009 to 2018) were not remodelled. Wholesale prices and impacts for these periods were taken from the values calculated and published as part of the 2020 statutory review.

Wholesale electricity price volatility excluded from reported numbers

Electricity wholesale prices are conventionally described as the base or sub-$300 component, and the volatility or above-$300 component, of wholesale prices. Traditionally, it is difficult to accurately capture individual volatility events observed in real market dispatch. This is caused by the fundamental mismatch between transient, difficult to predict events that drive volatility in the real-time market and the systematic inputs and methodologies in market modelling. Despite not replicating volatility on an event-by-event basis, Endgame Economics' validation process showed the modelled annual total price levels were closely aligned with historical outcomes in NSW, meaning that modelled prices are suitable for assessing the overall impact of the ESS on NSW consumers.

Endgame Economics outlined that excluding the volatility component of prices means that the department is consciously underestimating a material cost stack of servicing NSW consumers as well as the benefit of the ESS in reducing this. On balance, Endgame Economics recommended that the ESS benefit should include the volatility component, presenting the ESS benefits as a range, with the volatility exclusive estimate as a lower bound and the inclusive estimate as an upper bound.

Within this report, the department presents only the lower bound (excluding volatility) to provide a conservative estimate of the benefits of the ESS. This is in line with NSW Treasury guidelines, where

volatility is treated as a wealth transfer because generators and retailers have off-market hedging agreements to manage the risk of high price events. In addition, the department anticipates that limiting generators' availability to their reported maximum availability within bids may have resulted in inflated volatility at times of maximum demand. Some generators may increase their maximum availability during peak times when generation capacity is tight, thereby reducing the peak price.

June 2022 (including market suspension period) excluded from the analysis

The PLEXOS modelling horizon includes the month of June 2022, where a combination of extreme international fuel prices, low coal availability, and wind lulls induced major supply disruptions and, subsequently, price extremes across the NEM. The cumulative price threshold was activated on 12 June 2022 in all NEM regions (except Tasmania) and AEMO implemented administered pricing. The market function was further impinged by the level of the administrative price cap ($300/MWh), which was below the running cost of many generators due to high fuel prices. This caused many generators to withdraw their availability commercially and led to an unprecedented number of AEMO directions and, eventually, market suspension. As this was a non-repeatable event with abnormal behaviours for many participants, the month of June 2022 was separated out in the modelling outputs.

For reporting purposes, where costs and savings are reported on a customer or state basis, the results for 2022 (excluding June 2022) were scaled up from 11 months to 12 months to account for the missing month.

Scheme costs

ESS costs passed through to residential and commercial customers were calculated by the department based on the methodology used by Acil Allen, prepared for the AER as an input to the 2024/25 Default Market Offer (DMO). This uses annual ESS targets and ESC prices sourced from CORE Markets.

In the 2020 statutory review, pass-through costs were taken from the AEMC's Annual Residential Price Review. Since 2019, the Residential Price Review no longer includes data on ESS pass-through costs as the AER reports similar information for the DMO.

Average household energy use kept constant for residential bill impacts

Residential bill impacts were calculated by the department using an average energy use of 6,000 kWh per household per year. This figure is based on actual consumption as reported in Ausgrid, Endeavour Energy and Essential Energy Regulatory Information Notices for 2017-18 and is consistent with the average household energy use assumed for the 2020 statutory review. As the current review period is 2019 to 2023, the department deemed it appropriate to continue to use the 6,000 kWh per household per year for all years from 2009 to 2023. Future statutory reviews should consider whether this figure continues to be appropriate.

Assumed net rate of free-riders and spillovers

The department reduced the estimated energy savings by 13% to account for the net rate of free-riders (proportion of energy savings that would have happened even without the ESS) and spillovers (proportion of energy savings incurred without direct participation in the ESS but as a result of the

ESS) in line with previous statutory reviews. A sensitivity test was also conducted using a 26% net rate of free-riders and spillovers. The department acknowledges that the 13% is only indicative as it is based on a 2013 review of North American energy efficiency programs.

All prices and bill impacts reported in real $2024

All prices and bill impacts are reported in real $2024 unless otherwise stated.

Emissions reductions in the NEM and NSW

Modelling undertaken for the 2020 statutory review used a methodology that only accounted for emissions reductions associated with a reduction in electricity demand in NSW.

For this review period, the market modelling estimates emissions reductions from two separate effects:

1. reduction in total emissions due to avoided electricity generation
2. reduction in the emissions intensity of grid electricity, both within NSW and across the NEM.

This allows for a more accurate estimate of the emissions reductions compared to the previous methodology.

Abatement cost

The abatement cost was calculated by the department based on an annualised cost for the ESS and utility-scale wind and solar projects over the period 2019 to 2023. The abatement cost does not account for the lifetime abatement of the technologies. For wind and solar abatement cost, using the 2019 to 2023 period results in a significantly lower abatement cost compared to a longer 25-year lifetime cost. This is due to the reduced abatement in the latter years of the project as grid emissions intensity is reduced.