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# Independent Evaluation

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Past performance and future policy  
options for the Retailer Energy  
Efficiency Scheme (REES)

FINAL REPORT, 11 July 2019

# Independent Evaluation – Past performance and future policy options for the Retailer Energy Efficiency Scheme (REES)

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**Date** 11 July 2019

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# Executive Summary

## Evaluation overview

This report sets out the findings and analysis from an independent evaluation of the Retailer Energy Efficiency Scheme (REES). Common Capital undertook this independent evaluation for the Department for Energy and Mining of South Australia, (the Department), to support a Review of the REES, which must be submitted to the Minister by 31 December 2019.<sup>1</sup>

For this evaluation, we were tasked with a policy and economic assessment of the historical performance of the scheme against its objectives, the case for continuation of the REES in some form scheme beyond 2020, and policy options for the REES post 2020. While it was out of scope for this evaluation, consultation is an important next step for the Department to test and improve on the analysis and proposed reforms outlined in this report. The Department has commenced consultation on the 2019 review of the REES in parallel to this evaluation, releasing an Issues Paper for public feedback from April to May 2019.<sup>2</sup> The Department will incorporate both the findings of this evaluation and the consultation into their analysis and advice.

We found that from 2015-2017 the REES has successfully delivered against its overall objectives. The scheme has delivered over 180,000 energy efficiency upgrades and over \$1 billion in energy bill savings to households, businesses and low-income households, with \$156 million in net economic benefits to South Australia.

We also identified a number of areas where the scheme has opportunities to improve, should it continue. These include delivering deeper energy savings for households and businesses, and increased competition in the provision of energy saving activities under the REES.

Our evaluation showed that there is a strong case for the continuation of the scheme in some form after 2020. Energy efficiency remains a key challenge in South Australia and the scheme has demonstrated its ability to overcome barriers that households and business face in saving energy. However, the South Australian energy market has and continues to change dramatically since the REES was first established. These changes bring new issues that need to be addressed. Options for the REES post-2020 should be

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<sup>1</sup> *Electricity (General) Regulations 2012*, Section 36 (1)

<sup>2</sup> Department for Energy and Mining, 2019 review of the Retailer Energy Efficiency Scheme, accessed: [http://www.energymining.sa.gov.au/energy\\_and\\_technical\\_regulation/energy\\_efficiency/retailer\\_energy\\_efficiency\\_scheme/2019\\_review\\_of\\_the\\_retailer\\_energy\\_efficiency\\_scheme](http://www.energymining.sa.gov.au/energy_and_technical_regulation/energy_efficiency/retailer_energy_efficiency_scheme/2019_review_of_the_retailer_energy_efficiency_scheme)



assessed in light of their ability to help address these issues. These include heatwaves driving critical peak demand events, negative demand as renewable energy generation exceeds demand at other times and the need to support households with the likely transition to time-of-use pricing.

The REES can play a key role in addressing these challenges, reducing the costs of decarbonisation in the energy sector, reducing overall energy system costs and improving the reliability and security of the energy system, while delivering energy bill savings to households, including low-income households, and to small and large businesses.

In this context we identified and analysed seven different options for the REES after 2020. We considered the comparative public and private costs and benefits of these options at different energy savings target sizes. We also qualitatively assessed alternative and complementary delivery mechanisms beyond the current market-based energy efficiency credit frameworks.

Our cost-benefit analysis indicates that the range of options we have considered for continuing the REES post-2020 would deliver from \$126 million to \$320 million in net public benefit to the South Australian economy, while delivering between \$1.3 billion and \$3.1 billion in energy bill savings for South Australian households and businesses.<sup>3</sup>

Generally, the options with the highest public benefits are those with increased scheme targets and a focus on activities that either reduce or shift load at times of the day and year where there are energy system challenges. There are strong public benefits for both energy savings activities at peak times and load shifting activities. There also remains a strong policy case for continued general energy efficiency. Demand savings and energy savings at any time also deliver strong private benefits in the form of direct energy bill savings. Depending on tariffs and activities, the direct private benefits of load shifting are generally less immediate.

Each of the options we considered require a degree of regulatory, administrative and, potentially, legislative changes. Their comparative cost and benefits therefore need to be considered in the context of analysis and consultation on broader range of policy and implementation issues that are beyond the scope of this evaluation. Therefore, we have not made recommendations on a preferred option. Rather these findings are an input into further policy work being undertaken by the Department.

The remainder of this Executive Summary provides an overview of these findings, policy options and the cost-benefit analysis. These are detailed in the body of this report.

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<sup>3</sup> Over 30 years to 2050.

## Overview of REES performance 2015 to 2017

The evaluation found that the REES has successfully delivered against its evaluation criteria:

- **effective** – at delivering its objectives
- **efficient** – by delivering a net economic benefit while meeting these objectives
- **equitable** – by delivering benefits to households and low-income households across the state
- **administratively simple** – by keeping costs in line with similar scheme costs.

The cost-benefit analysis of the REES's performance from 2015 to 2020<sup>4</sup> found:

- **180,000 energy efficiency upgrades** to households, businesses and low-income households over 2015 to 2017
- delivered **positive net economic benefits of \$156 million** to South Australia
- supported **8.5 million gigajoules** of energy savings for South Australian households and businesses
- is on track to deliver over **\$1 billion in energy bill savings** to South Australian households and businesses over the life of implemented energy efficiency activities from 2015 to 2020, including:
  - \$328 million in energy bill savings for households, including \$155 million in energy bill savings for priority low-income households
  - \$720 million in energy bill savings for businesses
- reduced greenhouse gas emissions by **450,000 tonnes of CO<sub>2</sub>-e** due to activities from 2015 to 2017, and is on track to reduce emissions by over **1 million tonnes of CO<sub>2</sub>-e** from activities implemented from 2015 to 2020
- **performs well compared to similar Australian schemes** in relation to administrative costs as a proportion of total scheme costs and average energy bill reductions.

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<sup>4</sup> Modelled using actual savings from 2015 to 2017, and projected savings from 2019 to 2020

## Key opportunities for improvement post 2020

However, there are also potential areas for improvement for the next phases of the scheme. These include:

- **delivering deeper energy savings for households** – moving beyond energy audits (for low-income households) and low-cost, low-energy-savings activities, and refocussing efforts on upgrades that can deliver greater bill relief for those in need
- **placing downward pressure on energy system costs** – by targeting energy savings at peak times to reduce wholesale energy market peaks and network peaks
- **preparing households for cost-reflective pricing** – by targeting energy savings at peak times and ensuring that upgrades include smart appliances that service providers can access to help them manage their energy bills
- **expanding support to a wider range of business upgrades** – improving the range of opportunities for small businesses, and extending the REES to larger businesses and deeper savings, can place downward pressure on energy system costs for all South Australian energy customers
- **examining opportunities to increase competition** – lowering the cost of delivering energy savings activities under the REES, driving innovation and improving the range and quality of products and services
- **keeping energy savings activities up to date** – as they approach market saturation or becomes business as usual practices, with 12- to 24-month lead times to assist service providers to adjust their business models
- **growing sustainable business models while delivering deeper energy savings** – by moving away from product giveaways and introducing requirements for customer co-payment<sup>5</sup> (for all customer groups except low-income households).

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<sup>5</sup> Whether in the form of an upfront co-payment, a finance plan, on-bill financing, or a service contract model.

## Post-2020 policy options for REES

Overall, the evaluation found there is a strong case for continuing the REES post-2020.

We identified and assessed a range of options to continue or enhance a future REES in response to a changing policy context and the previously discussed opportunities to improve the scheme.

We modelled the costs and benefits of seven policy options and qualitatively assessed two further options. We also considered the comparative costs and benefits of three different target sizes.

These scheme options we considered are:

1. **Residential only** – return to a household only scheme from 2020
2. **Residential only targeting energy savings at peak times** – refocussing the scheme to support activities that target energy savings at peak times
3. **Business as usual** – a scheme based on current settings focussed on households, low-income households and small businesses
4. **Business as usual targeting energy savings at peak times** – a scheme based on current settings focussed on households, low-income households and small businesses
5. **Residential and all business** – expand the REES to include a wider range of business activities and support larger energy efficiency upgrades
6. **Residential and all business targeting energy savings at peak times** – expand the REES to include a wider range of business activities and support larger energy efficiency upgrades, while refocussing the scheme to drive activities that target energy savings at peak times
7. **Load shifting** – reform the REES to focus on load shifting to address wholesale and network peaks and network issues arising from negative demand
8. **Alternative funding and delivery models** – to better target sectors or technologies

9. **Complementary programs** – including a range of regulations, incentives and information programs, such as minimum equipment, appliance and building standards, the development of a simple, fast and affordable voluntary home ratings tool, programs to support the effective rollout of electric vehicles and smart charging systems, initiatives to address excess solar PV generation.

We modelled and compared the costs and benefits of options 1 to 7 with REES targets the current size, at a 50 per cent increase, and a 100 per cent increase. We have also conducted sensitivity analysis across these scenarios in Section 3.1, assuming the benefits of avoiding electricity distribution network augmentation costs are reduced to \$0.

Option	Analysis					Pros & Cons
<b>Residential only</b>	<b>Target size</b>	<b>Cost</b>	<b>Net public benefits</b>	<b>BCR<sup>6</sup></b>	<b>Bill savings</b>	<ul style="list-style-type: none"> <li>• Dedicated support for households</li> <li>• Removes options to support businesses to save on their energy bills &amp; deliver low cost energy savings</li> <li>• An end to business activities could cause a boom-bust cycle for tradespeople and service providers</li> <li>• Efforts not targeted at maximising energy system benefits</li> </ul>
	<b>Current target</b>	\$102 million	\$126 million	2.3	\$1.3 billion	
	<b>50% increase</b>	\$159 million	\$202 million	2.3	\$1.9 billion	
	<b>100% increase</b>	\$225 million	\$278 million	2.3	\$2.6 billion	
<b>Residential only targeting energy savings at peak times</b>	<b>Target size</b>	<b>Cost</b>	<b>Net public benefits</b>	<b>BCR</b>	<b>Bill savings</b>	<ul style="list-style-type: none"> <li>• Helps households to prepare for cost-reflective pricing (such as time-of-use pricing)</li> <li>• Removes options to</li> </ul>
	<b>Current target</b>	\$109 million	\$151 million	2.5	\$1.3 billion	

<sup>6</sup> BCR is the public benefit divided by public cost, the “program administrator cost test” using terminology developed by the California Public Utilities Commission – see California Public Utilities Commission, 2001. *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects*, available online at: [http://www.cpuc.ca.gov/uploadedFiles/CPUC\\_Public\\_Website/Content/Utilities\\_and\\_Industries/Energy\\_-\\_Electricity\\_and\\_Natural\\_Gas/CPUC\\_STANDARD\\_PRACTICE\\_MANUAL.pdf](http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/CPUC_STANDARD_PRACTICE_MANUAL.pdf)



	<b>50% increase</b>	\$168 million	\$234 million	2.5	\$2.1 billion	support businesses to save on their energy bills
	<b>100% increase</b>	\$243 million	\$320 million	2.4	\$2.7 billion	<ul style="list-style-type: none"> <li>An end to business activities could cause a boom-bust cycle for tradespeople and service providers</li> <li>Targeting energy savings at peak times improves net benefits</li> </ul>
<b>Business as usual</b>	<b>Target size</b>	<b>Cost</b>	<b>Net public benefits</b>	<b>BCR</b>	<b>Bill savings</b>	<ul style="list-style-type: none"> <li>Continuing support for limited small business upgrades</li> </ul>
	<b>Current target</b>	\$82 million	\$129 million	2.6	\$1.3 billion	<ul style="list-style-type: none"> <li>Limited offerings for businesses</li> </ul>
	<b>50% increase</b>	\$129 million	\$206 million	2.7	\$2.1 billion	<ul style="list-style-type: none"> <li>Potential continued focus on low-cost, low savings upgrades</li> </ul>
	<b>100% increase</b>	\$175 million	\$284 million	2.7	\$2.8 billion	<ul style="list-style-type: none"> <li>Efforts not targeted at maximising energy system benefits</li> </ul>
<b>Business as usual – targeting energy savings at peak times</b>	<b>Target size</b>	<b>Cost</b>	<b>Net public benefits</b>	<b>BCR</b>	<b>Bill savings</b>	<ul style="list-style-type: none"> <li>Helps households and small businesses to prepare for time-of-use pricing</li> </ul>
	<b>Current target</b>	\$87 million	\$149 million	2.8	\$1.4 billion	<ul style="list-style-type: none"> <li>Limited options to support businesses to save on their energy bills</li> </ul>
	<b>50% increase</b>	\$136 million	\$231 million	2.8	\$2.1 billion	<ul style="list-style-type: none"> <li>Targeting energy savings at peak times improves net benefits</li> </ul>
	<b>100% increase</b>	\$192 million	\$315 million	2.7	\$2.9 billion	
<b>Residential and all businesses</b>	<b>Target size</b>	<b>Cost</b>	<b>Net public benefits</b>	<b>BCR</b>	<b>Bill savings</b>	<ul style="list-style-type: none"> <li>Support expanded to all businesses and bigger energy savings projects</li> </ul>
	<b>Current target</b>	\$50 million	\$132 million	3.7	\$1.3 billion	<ul style="list-style-type: none"> <li>Delivers high economic benefits</li> </ul>
	<b>50%</b>	\$82	\$191	3.3	\$2.0	<ul style="list-style-type: none"> <li>Should include a household target to ensure</li> </ul>

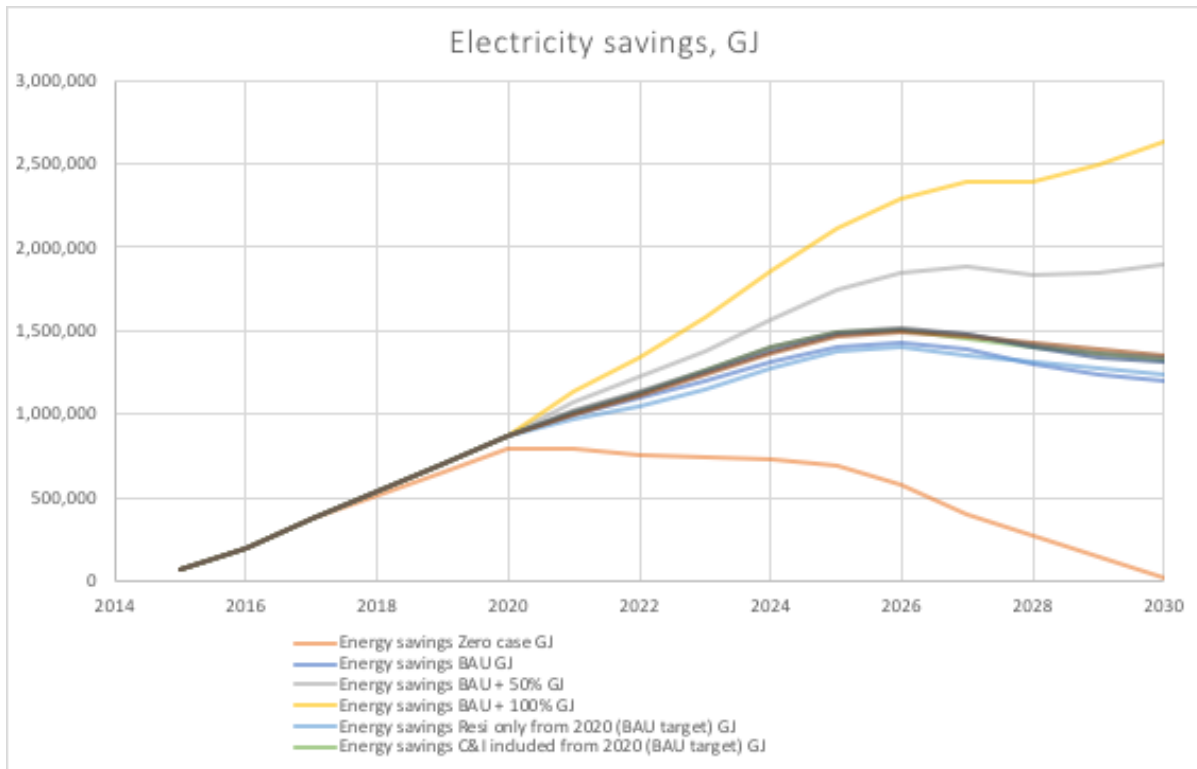
	<b>increase</b>	million	million		billion	<ul style="list-style-type: none"> <li>minimum household participation</li> </ul>
	<b>100% increase</b>	\$114 million	\$250 million	2.7	\$2.8 billion	<ul style="list-style-type: none"> <li>Efforts not targeted at maximising energy system benefits</li> </ul>
<b>Residential and all businesses targeting energy savings at peak times</b>	<b>Target size</b>	<b>Cost</b>	<b>Net public benefits</b>	<b>BCR</b>	<b>Bill savings</b>	<ul style="list-style-type: none"> <li>Unlocks cost-effective savings from larger businesses and larger upgrades</li> <li>Delivers high economic benefits and highest energy bill savings</li> <li>Prepares households and businesses for time-of-use prices. reduces energy system costs and improves reliability</li> <li>Should include a household target if minimum household participation is desired</li> </ul>
	<b>Current target</b>	\$57 million	\$153 million	3.7	\$1.5 billion	
	<b>50% increase</b>	\$94 million	\$231 million	3.5	\$2.3 billion	
	<b>100% increase</b>	\$132 million	\$308 million	3.3	\$3.1 billion	
<b>Load shifting</b>	<b>Target size</b>	<b>Cost</b>	<b>Net public benefits</b>	<b>BCR</b>	<b>Bill savings</b>	<ul style="list-style-type: none"> <li>Focuses on reducing wholesale peaks and network issues (peak and negative demand)</li> <li>Helps to keep a lid on energy system costs</li> <li>No significant direct bill savings as overall energy is not reduced</li> <li>Relies on significant private sector contribution for batteries.</li> </ul>
	<b>Current target</b>	\$467 million	\$138 million	2.6	-	
	<b>50% increase</b>	\$709 million	\$209 million	2.6	-	
	<b>100% increase</b>	\$942 million	\$282million	2.6	-	
<b>Alternative funding and delivery models</b>	Note: we under took a qualitative analysis of this option as it could be applied to any of the above options					<ul style="list-style-type: none"> <li>Picks target sectors to receive upgrades and/or technologies, where the market alone may pick the lowest cost activities</li> </ul>

- More flexible models to trial and/or deliver targeted programs than the current REES

*Table 1 – Economic and policy analysis of options for a post-2020 REES*

Initial analysis suggests that 50% and 100% increases to current targets under the business as usual scenario would deliver commensurate increases in energy savings, bill savings, and net economic benefits.

Figure 1 shows the energy savings potential of the scenarios for a post-2020 REES. Ending the scheme after 2020 will result in a decline in energy and bill savings, as activities implemented run the course of their product lives and the energy savings end as products are replaced. This graph illustrates the sufficient cost-effective technical opportunities to support higher targets, if the market is given time and incentives to develop effective business models. As shown above in Table 1, the REES is projected to be able to deliver increased energy savings and bill savings while at the same time increasing net economic benefits.



**Figure 1 – energy savings estimates for post-2020 options<sup>7</sup>**

These options should be considered further as part of the Department’s investigation, consultation and analysis into the future of the REES.

<sup>7</sup> Note: this graph does not include the load shifting option as load shifting does not result in energy savings.

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# Preface

Department for Energy and Mining of South Australia (the Department) engaged Common Capital to conduct an independent evaluation of the Retailer Energy Efficiency Scheme (REES). This report sets out the key findings of our evaluation.

This section outlines the background and methodology of the evaluation.

## Policy background

The REES has operated in South Australia since 2009, in force through the *Electricity Act 1996*, the *Gas Act 1997*, the *Electricity (General) Regulations 2012* and the *Gas Regulations 2012*. The objectives of the REES are 'to reduce household and business energy use, with a focus on low-income households. This will provide associated energy costs and greenhouse gas emission benefits.'<sup>8</sup>

The REES places an obligation on electricity and gas retailers to deliver energy audits and energy efficiency activities to households and businesses to meet their annual energy efficiency targets, which from 2018 to 2020 is set at 2.3 million normalised gigajoules of energy a year in total across the REES. Of this, 500,000 normalised gigajoules a year of savings must be met through activities delivered to priority low-income households. Further, the REES sets a target on obliged retailers to deliver to a total of 7,367 energy audits a year to low-income households.

The REES has already delivered significant benefits to South Australia, with over 1.8 million tonnes of greenhouse gas reductions delivered through household energy savings activities from 2009 to 2014 (Stages 1 and 2 of the REES), and over 7.3 million gigajoules of energy savings from household and business energy savings activities from 2015 to 2017 (Stage 3). In the process, the REES has delivered energy savings to priority household groups and is responsible for delivering energy savings activities to over 367,000 South Australian households across the state.<sup>9</sup>

The South Australian energy market has continued to evolve since the REES was established in 2009, and further since the last independent evaluation of the REES in 2013. Renewable energy investments in South Australia have continued at pace over the past decade, with the Australian Energy Market Operator (AEMO) projecting renewable

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<sup>8</sup> AEMO, p. 12

<sup>9</sup> ESCOSA, *REES Time Series Data*, accessed: <https://www.escosa.sa.gov.au/ArticleDocuments/214/20180802-REES-TimeSeriesData-2017.xlsm.aspx?Embed=Y>

energy generation will grow from approximately 49 per cent of the State's electricity generation in 2016-17 up to around 73 per cent of electricity generation in 2020-21.<sup>10</sup> Summer heatwaves have driven critical peak demand events in South Australia and across the National Energy Market (NEM), and the South Australian Government is delivering a range of programs alongside the REES to bolster energy affordability, security and reliability and support renewable energy assets through programs such as the Home Battery Scheme, the Grid Scale Storage Fund, a Virtual Power Plant, and backup generation assets. The success in the Government's efforts to drive the proliferation of rooftop solar has significantly changed the daily load profile at the local level, with midday troughs a common occurrence during shoulder seasons. This also presents new demand management challenges.

## Current context

While the policy environment has continued to shift, the REES continues to play an important role in South Australian energy efficiency policy. The scheme also contributes to national energy efficiency policy, through Measure 2 of the Council of Australian Governments (COAG) Energy Council's 2015-2030 National Energy Productivity Plan and the National Energy Productivity Target of a 40 per cent improvement between 2015 and 2030.

The last major legislative review of the REES was delivered in late 2013, with the Minister determining to continue the scheme until 2020 and expand the scheme to include businesses, with a particular focus on small to medium businesses.

The Department is now required to deliver a review of the REES and its governing legislation and report back to the Minister before 31 December 2019. This review must consider whether the scheme should continue when the governing regulations expire on 31 December 2020.

In order to determine whether the REES should continue, the Department has commissioned an independent evaluation of the scheme to assess its performance to date and project its performance should it continue beyond 2020.

The Department engaged Common Capital for this task based on our expertise and experience in evaluation and review, policy, legislative and economic analysis, a strong

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<sup>10</sup> Australian Energy Market Operator, *South Australian Generation Forecasts*, December 2017, p.4, accessed: [http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning\\_and\\_Forecasting/SA\\_Advisory/2017/2017-South-Australian-Generation-Forecast.pdf](http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/SA_Advisory/2017/2017-South-Australian-Generation-Forecast.pdf)

understanding of energy efficiency markets, cost-benefit analysis and program design, and deep knowledge of energy efficiency obligation schemes.

## Our methodology

The evaluation aims to help the Department understand:

- the extent to which the REES has met its objectives
- whether the REES is required beyond 2020
- the appropriate objectives, scheme design and administrative arrangements if the REES continues beyond 2020
- the costs, benefits and risks associated with any recommendations made.

For the evaluation, the Department provided Terms of Reference detailing ten specific issues they wanted addressed, as set out in Table 2 below.

### REES Independent Evaluation Terms of Reference

- 1. Complete a cost-benefit analysis of the REES to date**

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- 2. Assess whether the costs and benefits modelled in the 'Evaluation of the SA REES 2013' have occurred**

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- 3. Assess the scheme objectives against other comparable schemes**

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- 4. Benchmark the cost efficiency of the REES against other comparable schemes, in terms of administrative cost (for all parties) as a proportion of the total cost**

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- 5. Identify any significant REES deficiencies, including saturation constraints and level of REES activities in regional areas, and assess the impact that these have on the efficiency and effectiveness of the REES**

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- 6. Assess the appropriateness of the targets (types and quantum) as measures of success in meeting the REES's objectives**

## REES Independent Evaluation Terms of Reference

### **7. Compare the efficiency and effectiveness of the REES scheme design with alternative scheme design options. These alternative options will include, but need not be limited to, variations in:**

- 7.1. Fuel coverage
- 7.2. Sector and facility coverage
- 7.3. Performance indicators (e.g. energy consumption, peak demand reduction, electricity network minimum demand management, contribution to network reliability and security, greenhouse gas emissions, qualitative measures)
- 7.4. Obligated parties
- 7.5. Performance incentives (e.g. to reflect priority group targets or regional activities)
- 7.6. Eligible energy savings, or contribution to other scheme objectives (including options to introduce the Victorian Energy Scorecard or similar as a metric to determine energy savings credits)
- 7.7. Measurement, verification, reporting and compliance
- 7.8. Trading of energy savings

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### **8. Assess the merits of varying the above alternatives in terms of improving the cost effectiveness of the scheme should it be continued after 2020**

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### **9. Assess whether the allocation of activities to priority group households is an efficient and effective method of targeting greatest need and/or greatest potential for energy efficiency improvement**

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### **10. Assess the merits of the current funding model against alternative funding options. These should include but need not be limited to:**

- 10.1. Alternative funding source(s)
- 10.2. Funding transparency
- 10.3. Ensuring that only efficient costs are passed through to customers

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#### *Table 2 – REES Evaluation Terms of Reference*

In answering these questions, Common Capital has:

- conducted research planning and responded to different aspects of the Terms of Reference with qualitative and/or quantitative analysis
- developed frameworks for the evaluation and for cost-benefit analysis, and established a benchmarking approach
- researched and analysed the policy context including a comparison of other EEO schemes
- developed policy options and conducted qualitative and cost-benefit analysis on these options.

## **The structure of this report**

The rest of the report is structured into 3 Chapters that focus on findings and recommendations grouped around the key themes we identified in our evaluation.

Chapter 1 – How has the REES performed against its objectives?

Chapter 2 – Is there a role for the REES post 2020?

Chapter 3 – What are the merits of policy options for a post-2020 REES?

These findings are supported by technical appendices summarising key aspects of our research and analysis.



CHAPTER 1

# How has the REES performed against its objectives?

## 1.1. The REES has successfully reduced household and business energy use to deliver energy cost and emissions benefits

Following the last REES Review 2013, scheme objectives were updated to be:

to reduce household and business energy use, with a focus on low-income households. This will provide associated energy costs and greenhouse gas emission benefits.<sup>11</sup>

In this section, we examine the performance of the REES since 2015 based on these objectives.

### The REES is performing well

Common Capital has conducted policy, economic and cost-benefit analysis for this independent evaluation of the REES Evaluation. We have found the REES to be:

- **effective** – at delivering its objectives
- **efficient** – by delivering a net economic benefit while meeting these objectives
- **equitable** – by delivering benefits to households and low-income households across the state
- **administratively simple** – by keeping costs in line with similar scheme costs.

Key findings of the cost-benefit analysis demonstrate that from 2015 to 2020<sup>12</sup> the REES:

- delivered a **positive net economic benefits of \$156 million** to South Australia
- supported **8.5 million gigajoules** of energy savings for South Australian households and businesses
- is on track to deliver over **\$1 billion in energy bill savings** to South Australian households and businesses over the life of implemented energy efficiency activities from 2015 to 2020, including:

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<sup>11</sup> AEMO, p. 12

<sup>12</sup> Modelled usual actual savings from 2015 to 2017, and projected savings from 2019 to 2020

- \$328 million in energy bill savings for households, including \$155 million in energy bill savings for priority low-income households
- \$720 million in energy bill savings for businesses
- reduced greenhouse gas emissions by **450,000 tonnes of CO<sub>2</sub>-e** due to activities from 2015 to 2017, and is on track to reduce emissions by over **1 million tonnes of CO<sub>2</sub>-e** from activities implemented from 2015 to 2020
- **performs well compared to similar Australian schemes** in relation to administrative costs as a proportion of total scheme costs, and average energy bill reductions.

## The costs and benefits modelled in the 2013 Evaluation of the REES have occurred

Common Capital has conducted an assessment of whether the projected costs and benefits for Stage 3 of the REES, from 2015 to 2020, modelled in the 2013 REES Evaluation have occurred to date, or are expected to occur. There were challenges in conducting this assessment as the 2013 evaluation included energy savings projections for multiple scenarios that appear to be unconstrained by legislated targets, and with different additionality assumptions. Common Capital did not have access to the 2013 modelling, so there may be a number of variances in approaches to the task.

Noting these differences, we found that:

- **projected energy savings will occur in some scenarios** – the 2013 Evaluation of the REES projected between 5.7 million and 18.1 million gigajoules of energy savings could be delivered between 2015 and 2020. With a combination of actual and forecast data, we project that the REES will deliver 8.5 million gigajoules of energy savings over the same period.
- **REES targets were met at a lower cost than projected** – the projected costs of the scheme are lower over the modelling period than anticipated in the 2013 Evaluation in 3 out of 4 scenarios.

## The REES shares objectives with other schemes

There are four comparable schemes operating in Australia. These are the:

- ACT Energy Efficiency Improvement Scheme (EEIS)
- NSW Energy Savings Scheme (ESS)
- SA Retailer Energy Efficiency Scheme (REES)
- Victorian Energy Upgrades (VEU) program.

Common Capital found these schemes all share similar legislated objectives:

- all four schemes share common objectives relating to **reducing household and business energy use** and **delivering greenhouse gas emissions reductions or associated benefits**
- the REES and the EEIS share explicit objectives to **support low-income households**
- all schemes except the VEU program share objectives to **reduce energy costs**.

There are over 50 energy efficiency obligation schemes around the world. The REES shares similar objectives with many international schemes, however there are a few examples of objectives that do not overlap with those of the REES. These include:

- explicit objectives to support energy savings in buildings, industry, agriculture, transport or public sector buildings (France<sup>13</sup> and Italy<sup>14</sup> include an overlap of these objectives)
- a specific focus on household heating bills (UK ECO<sup>15</sup>) or increasing public health and environmental benefits (California<sup>16</sup>)
- an explicit goal to reduce system peak demand (Texas<sup>17</sup>).

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<sup>13</sup> Odyssee-Mure, *FRA 45 Energy Saving Certificates (ESC)*, 2019, accessed: [http://www.measures-odyssee-mure.eu/public/mure\\_pdf/general/FRA1.PDF](http://www.measures-odyssee-mure.eu/public/mure_pdf/general/FRA1.PDF)

<sup>14</sup> Odyssee-Mure, *ITA2 Market incentives: the white certificates system*, 2017, accessed: [www.measures-odyssee-mure.eu/public/mure\\_pdf/general/ITA2.PDF](http://www.measures-odyssee-mure.eu/public/mure_pdf/general/ITA2.PDF)

<sup>15</sup> Odyssee-Mure, *Supplier Obligations – Energy Company Obligation*, 2018, accessed: [www.measures-odyssee-mure.eu/public/mure\\_pdf/general/UK33.PDF](http://www.measures-odyssee-mure.eu/public/mure_pdf/general/UK33.PDF)

<sup>16</sup> Regulatory Assistance Project (RAP), *Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes*, June 2012, accessed: [www.raponline.org/wp-content/uploads/2016/05/rap-leadsm-bestpracticesindesigningandimplementingenergyefficiencyobligationschemes-2012-may.pdf](http://www.raponline.org/wp-content/uploads/2016/05/rap-leadsm-bestpracticesindesigningandimplementingenergyefficiencyobligationschemes-2012-may.pdf)

<sup>17</sup> RAP.

## 1.2. The REES has successfully delivered energy savings to households and businesses, low-income households and the regional SA

The REES has delivered significant energy efficient upgrades and bill savings to households and businesses

The REES has delivered a significant number of individual energy efficiency items as part of upgrades to households and businesses from 2015 to 2017. A selection of these is shown below in Table 3.

Activity	Households (non-priority group)	Low-income households (priority group)	Businesses
Energy saving lights	479,348	236,600	399,784
Energy saving showerheads	28,203	20,106	30,200
Standby power controllers	59,079	39,227	N/A
Energy efficiency hot water heater upgrades	2,487	395	N/A

**Table 3 – Selection of items delivered 2015 to 2017<sup>18</sup>**

<sup>18</sup> ESCOSA, REES Time Series Data, accessed: <https://www.escosa.sa.gov.au/ArticleDocuments/214/20180802-REES-TimeSeriesData-2017.xlsm.aspx?Embed=Y>



Further, the REES has delivered, and is projected to continue delivering, significant energy bill savings for households and businesses. This can be seen below in Figure 2, which shows comparative energy bill savings averaged out across all electricity customers.

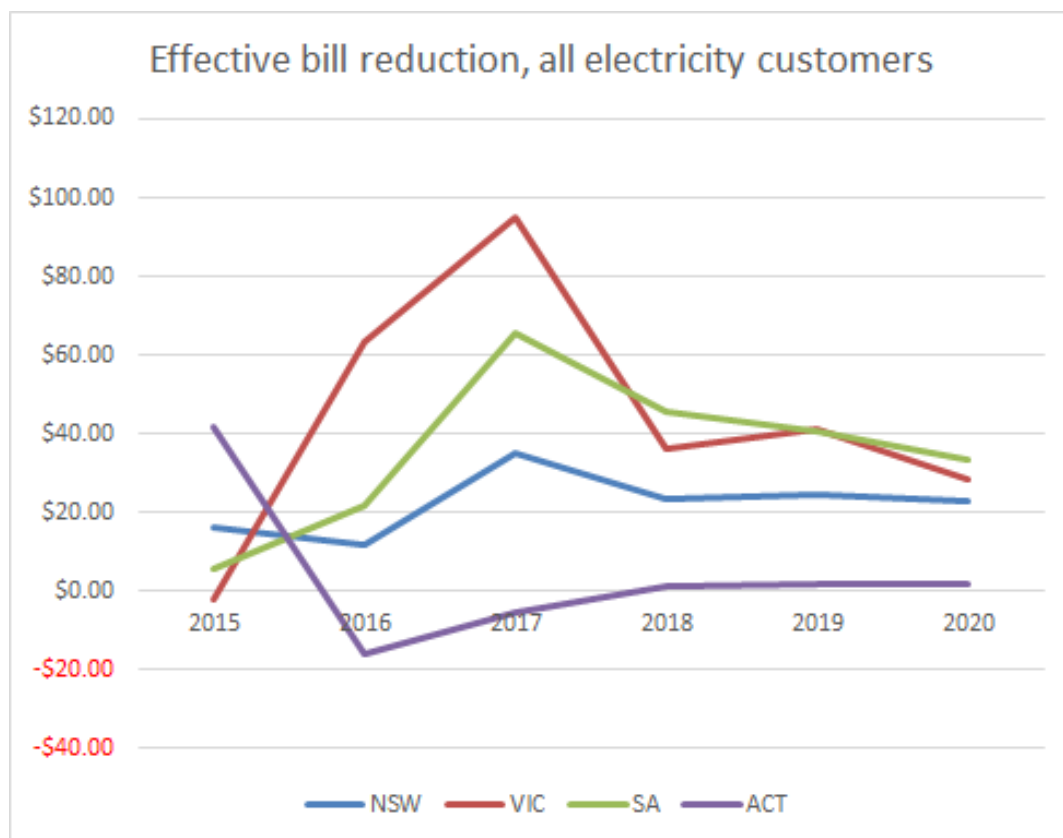


Figure 2 – average energy bill savings from EEOs across Australia<sup>19</sup>

## The REES has supported the regions

The REES has successfully delivered activities to regional and remote South Australia, despite the absence of a regional delivery requirement. 75 per cent of South Australians live in the Greater Adelaide region and 25 per cent of South Australians live in the regions.<sup>20</sup>

From 2009 to 2017, the REES has delivered an average of 14.5% of activities to regional SA (including 2.2% to remote SA). This is a healthy proportion of activities delivered to regional South Australia in the absence of specific delivery targets.

<sup>19</sup> Based on Common Capital's analysis of public scheme costs, activity registries and spot prices, assuming a 10 year deeming period with a 7% discount rate on future savings, and applying a conservative approach to benefits based on a common set of assumptions on wholesale electricity prices and network benefits.

<sup>20</sup> ABS 2016 Census data

The 2015 to 2017 period represents the lowest proportion of regional delivery over the 3 stages of the scheme since it commenced in 2009, with around 9 per cent of activities delivered to the regions. This decline is in part due to a higher proportion of commercial lighting upgrades being delivered to metropolitan areas, while also pointing to a decline in the regional delivery of household upgrades.

However, recently released data shows that the REES increased regional delivery in 2018, with around 28 per cent of activities delivered to the regions.<sup>21</sup>

## The REES has consistently met its low-income household targets

The REES has consistently met its low-income household priority group targets and over-delivered against energy savings targets and audit targets every year since the scheme commenced. From 2015 to 2017, low income energy savings targets represent 19 per cent of the total energy savings targets, however the REES has delivered 79 per cent, 93 per cent, and 29 per cent over the energy savings targets in each respective year.

The REES is estimated to have delivered upgrades that have locked in around \$69 million in energy bill savings for low-income households from 2015 to 2017, and a total of up to \$155 million from 2015 to 2020.

### 1.3. The REES can deliver increased benefits by expanding its focus and phasing out under-performing activities

#### The REES has mainly delivered low-cost, low-savings activities

The majority of REES activity from 2015 to 2017 has focussed on low-cost, low-energy-savings upgrades. Across all household groups, this includes installing over 715,000

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<sup>21</sup> ESCOSA, *REES Time Series Data*, accessed: <https://www.escosa.sa.gov.au/ArticleDocuments/214/20190627-REES-TimeSeriesData-2018.xlsm.aspx?Embed=Y>

Note: This data was released around the time this report was finalised.

energy saving lights, over 48,000 energy and water saving showerheads, and over 98,000 standby power controllers.

Fewer higher-cost upgrades occurred through the REES over this three-year period, with only 50 insulation upgrades, and around 2,500 hot water heater upgrades taking place.

This pattern is consistent with activities delivered to all household groups through the REES from 2009 to 2017, with around 2.7 million energy savings lamps, over 156,000 energy and water saving showerheads, and over 362,000 standby power controllers.

The high number of some activities delivered to households may present saturation constraints, as we begin to approach the point at which every eligible household (within the 638,782 occupied homes in South Australia<sup>22</sup>) has received a particular type of upgrade. These saturation constraints are explored further in Appendix A, and may warrant a review of some of these activities to assess whether they are approaching saturation or business as usual practice.

In contrast to these high-volume activities, over the period 2009-17, there were a total of around 9,700 insulation and hot water system upgrades each.

The future of the REES could involve a shift in focus towards a range of higher-cost, higher-energy savings upgrades, which for households could include hot water system and heating and cooling upgrades, as have been successfully adopted in the ACT Energy Efficiency Incentive Schemes (EEIS) by ActewAGL.<sup>23</sup>

And, by developing partnerships with community groups and no-interest loan schemes, the REES could also support deeper energy savings in low-income priority households through appliance replacement programs like those delivered by the ACT and NSW governments.<sup>24</sup>

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<sup>22</sup> ABS, 2016 QuickStats: South Australia Dwellings, accessed: [https://quickstats.censusdata.abs.gov.au/census\\_services/getproduct/census/2016/quickstat/4](https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/4)

<sup>23</sup> ActewAGL, Energy Saving Solutions: Upgrade appliances webpage, 2019, accessed: [www.actewagl.com.au/save-energy/upgrade-appliances.aspx](http://www.actewagl.com.au/save-energy/upgrade-appliances.aspx)

<sup>24</sup> ACT Smart: Replacing old appliances webpage, <https://www.actsmart.act.gov.au/energy-saving/replacing-old-appliances>  
NSW Department of Planning and Environment, Appliance replacement offer webpage, accessed: <https://energysaver.nsw.gov.au/households/rebates-and-discounts/appliance-replacement-offer>

## Energy audits may not deliver energy savings

From 2009-17, the REES delivered energy audits to around 44 per cent of low-income households in South Australia, which will increase to around 59 per cent if the current 2018-20 energy audit targets are met.<sup>25</sup> Audits may approach saturation in the future.

However, an independent billing data evaluation of over 20,000 participants in a NSW low-income energy efficiency program found it difficult to assign statistically significant energy savings to energy audits, and that they do not deliver energy savings without regular, repeat contact.<sup>26</sup>

This is reflected in the Californian experience, where regular, tailored and constantly varied tips and rankings that leverage behavioural psychology to drive change found that even programs with regular (e.g. monthly) customer intervention these programs only resulted in energy savings of between 1-3 per cent of total household energy use.<sup>27</sup>

Even assuming that REES energy audits delivered the modest energy savings in line with US programs, a survey of 120 community, environment and energy experts suggested that there is a need to support the ongoing funding of energy efficiency programs to deliver deeper savings for low-income households (through higher-cost, higher savings upgrades), and to tackle other problems such as supporting renters to save on their energy bills by overcoming landlord-tenant split incentives.<sup>28</sup>

The Department could look to the range of innovative next generation low-income energy efficiency programs, such as those rolling out across the ACT, NSW and Victoria<sup>29</sup>. These provide examples of how the Department, in consultation with community groups, could reform low-income household audit and priority target offerings to help these

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<sup>25</sup> Based on audits delivered compared to proportion of South Australian households with an average weekly income of less than \$650, using a combination of ABS data and ESCOSA data

<sup>26</sup> Institute for Sustainable Futures: University of Technology Sydney, *Evaluation of the Home Power Savings Program – Phase 1 Final Report*, September 2012, accessed: [www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Research/Our-science-and-research/home-power-savings-program-evaluation-phase-1-final-report-140051.pdf](http://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Research/Our-science-and-research/home-power-savings-program-evaluation-phase-1-final-report-140051.pdf)

<sup>27</sup> Based on across best practice randomised control trial based monitoring and evaluation: DNV GL Energy Insights USA for the Californian Public Utilities Commission, *Impact Evaluation Report, Home Energy Reports – Residential Program Year 2017*, May 2019, accessed: [http://www.calmac.org/publications/CPUC\\_Group\\_A\\_Res\\_2017\\_HER\\_finalCALMAC.pdf](http://www.calmac.org/publications/CPUC_Group_A_Res_2017_HER_finalCALMAC.pdf)

<sup>28</sup> Australian Council of Social Service, Brotherhood of St Laurence, The Climate Institute, *Empowering disadvantaged households to access affordable, clean energy*, 2017, accessed: [https://www.acoss.org.au/wp-content/uploads/2017/07/ACOSS\\_BSL\\_TCI\\_Empowering-households.pdf](https://www.acoss.org.au/wp-content/uploads/2017/07/ACOSS_BSL_TCI_Empowering-households.pdf)

<sup>29</sup> See: ACT Smart: Replacing old appliances webpage, <https://www.actsmart.act.gov.au/energy-saving/replacing-old-appliances>  
NSW Department of Planning and Environment, Appliance replacement offer webpage, accessed: <https://energysaver.nsw.gov.au/households/rebates-and-discounts/appliance-replacement-offer>  
NSW Office of Environment and Heritage, Home Energy Action Program evaluation, 2018, accessed: <https://www.environment.nsw.gov.au/research-and-publications/publications-search/home-energy-action-program-evaluation-final-report>  
VIC Department of Environment, Land, Water and Planning, Home Energy Assist webpage, 2019, accessed: <https://www.energy.vic.gov.au/energy-efficiency/home-energy-assist>

groups to achieve deeper energy savings. Opportunities exist for such programs to be delivered in partnership with community groups, no-interest loan scheme providers, public housing authorities and energy retailers (through hardship programs).

## Business activities have been limited but deliver a large proportion of savings

Since being introduced in 2015, business activities have made a significant contribution towards the total energy savings delivered in the REES. After a slow first year in 2015, commercial lighting upgrades grew to deliver a significant proportion of energy savings year on year, as seen below in Table 4.

Business activity	2015	2016	2017	Average
Lighting	16.8%	68.9%	75.8%	61.5%
Showerheads	20.3%	2.8%	1.4%	5.7%

- **Table 4 – Contribution of business activities towards total energy savings<sup>30</sup>**

These projects have helped businesses to save on their bills, and have likely delivered some very low-cost energy savings that have helped to bring down the overall costs of the scheme.

However, the REES has provided businesses with two main limitations to their participation in the scheme:

- a 900 gigajoule cap on the amount of energy savings that can be claimed for a lighting upgrade<sup>31</sup>
- a limited range of eligible energy efficiency activity methods.

These restrictions have proven effective to date, by limiting participation to smaller projects and smaller businesses, as intended. The cap provides a disincentive for larger

<sup>30</sup> Essential Services Commission of South Australia, *REES Time Series Data*, 2 August 2018, accessed at: [www.escosa.sa.gov.au/ArticleDocuments/214/20180802-REES-TimeSeriesData-2017.xlsm.aspx?Embed=Y](http://www.escosa.sa.gov.au/ArticleDocuments/214/20180802-REES-TimeSeriesData-2017.xlsm.aspx?Embed=Y)

<sup>31</sup> ESCOSA, Energy efficiency activities: CL1 – Commercial Lighting Upgrade, accessed: [www.energymining.sa.gov.au/\\_data/assets/pdf\\_file/0019/315514/REES-specification-CL1.pdf](http://www.energymining.sa.gov.au/_data/assets/pdf_file/0019/315514/REES-specification-CL1.pdf)

businesses to participate in the REES, as a business that has to upgrade a whole office building, factory floor, or shopping centre, will be less interested in participating if the discounts available only apply to a small number of the lights they wish to upgrade. While these restrictions have performed as intended, they should be re-examined as part of the 2019 REES Review.

The limited range of activity methods businesses can use to claim REES incentives for energy efficiency upgrades also places limitations on business participation in the REES. By following the NSW and Victorian schemes' examples and including a wider range of deemed activity schedules for businesses, and introducing measurement and verification-based flexible methods, the REES can facilitate a wide range of energy efficiency upgrades for businesses, which deliver low-cost energy savings that reduce the costs of delivering the REES. However, schemes such as the REES rely on the market to determine which eligible activities will be delivered, so including a wider range of activities does not necessarily result in them being delivered in the short-term.

This expansion should be considered alongside both an increase in the size of REES targets to accommodate new sectors, and the introduction of a household energy efficiency target to ensure a minimum amount of continued household participation in the REES.

## 1.4. Considerations for a post-2020 REES

In this chapter, we have determined that the REES has been successful at delivering significant energy bill savings to South Australian households and businesses to date, providing substantial benefits to regional South Australia and low-income households along the way.

But as described above, we have also found that the REES has mainly delivered low-cost, low-energy savings activities to date, that some activities may be approaching market saturation in the near future and some activities may no longer deliver the energy savings they once did as the market changes. We also found that priority group low-income energy audits may not deliver energy savings, and that while businesses have begun to deliver energy savings through the REES, a further expansion to support businesses should be considered.

Therefore, post-2020, the Department may wish to consider the following changes as part of any ongoing scheme updates:

- **reviewing activities** based on saturation constraints and shifts in the market that impact energy savings, and scheme changes that can facilitate the uptake of higher-cost, higher impact energy savings upgrades
- **replacing energy audits** with alternative higher impact low-income household energy efficiency programs, in consultation with community groups
- **expanding opportunities for businesses to participate in the REES** by removing 900 gigajoule limits on lighting upgrades and expanding the range of activities, while considering an increase in energy savings targets and the introduction of a minimum household target.

The following sections explore further possibilities to reform the REES in the context of an examination of its role after 2020 and options for reforms should the scheme continue.

CHAPTER 2

# Is there a role for the REES post-2020?

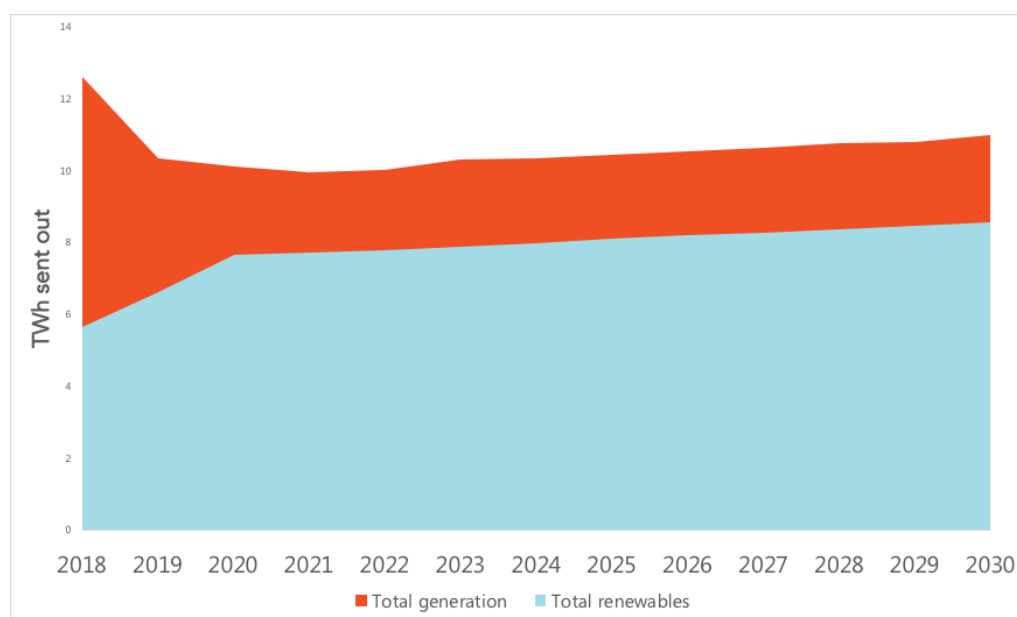


## 2.1. The policy context has changed

### The South Australian energy system continues to evolve

The South Australian energy market has continued to evolve since the REES was established in 2009, and further since the 2013 independent evaluation of the REES.

Renewable energy investments in South Australia have continued at pace over the past decade, with AEMO projecting renewable energy generation will grow from approximately 49 per cent of the State’s electricity generation in 2016-17 up to around 73 per cent of electricity generation in 2020-21,<sup>32</sup> and on track to 78 per cent renewable energy by 2030, in the absence of new renewable energy or emissions reduction policy (see Figure 3).<sup>33</sup>



**Figure 3 – South Australian Renewable Energy Generation Forecast<sup>34</sup>**

Summer heatwaves have driven critical peak demand events in South Australia and across the NEM. The success of the Government’s efforts to encourage uptake of rooftop solar

<sup>32</sup> Australian Energy Market Operator, *South Australian Generation Forecasts*, December 2017, p.4, accessed: [http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning\\_and\\_Forecasting/SA\\_Advisory/2017/2017-South-Australian-Generation-Forecast.pdf](http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/SA_Advisory/2017/2017-South-Australian-Generation-Forecast.pdf)

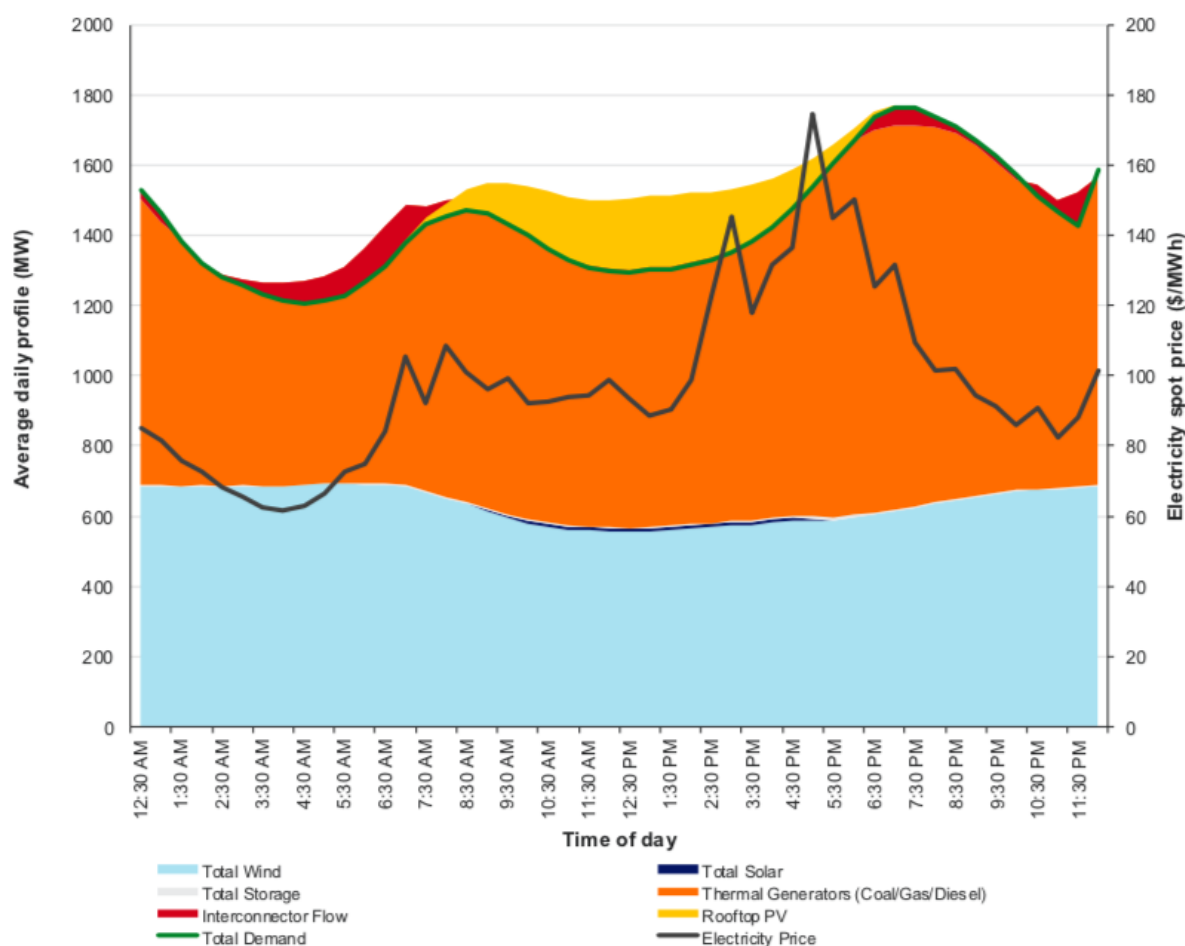
<sup>33</sup> ACIL Allen, *National Energy Guarantee Modelling assumptions and results: ACIL Allen PowerMark NEM summary results - No policy scenario*, 2018, accessed:

[www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/Modelling%20assumptions%20and%20results%20National%20Energy%20Guarantee.xlsx](http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/Modelling%20assumptions%20and%20results%20National%20Energy%20Guarantee.xlsx)

<sup>34</sup> ACIL Allen.

has significantly changed the average daily load profile at the local level, with midday troughs a common occurrence during shoulder seasons.

This transition to a near zero emission energy grid also presents new demand challenges, with misalignment between supply and demand at different times, as illustrated by Figure 4 below.



**Figure 4 – Average daily demand, price and generation by fuel<sup>35</sup>**

The South Australian Government has already begun to respond to these challenges with a range of programs alongside the REES to bolster energy affordability, security and reliability and support renewable energy assets through programs such as the Home Battery Scheme, the Grid Scale Storage Fund, a Virtual Power Plant, the Demand Management Trials Program, and backup generation assets.

This changing energy market and policy landscape has a number of implications for the benefits of energy efficiency. Currently in the REES (and all Australian energy efficiency

<sup>35</sup> AEMO (2018) South Australian Electricity report

schemes), energy savings are valued equally, regardless of when or where they occur. However, the changing nature of the South Australian grid illustrates that all savings are not of equal value. For example, savings delivered in homes with high solar generation and negative energy bills are of less social benefit than those delivered to homes or businesses struggling under high energy costs. Similarly, the savings delivered at times of excess generation will have a much lower impact on reducing wholesale prices than savings at times of supply constraints.

The value of these impacts will continue to change as the South Australian grid evolves with policy. For example, if the new interconnectors that the Government has committed to are delivered, this will help alleviate some of the issues of over- and undersupply. However, if energy retailers decide to pass on SA Power Network's planned time-of-use charges from 2020, households will face new challenges managing peak demand to avoid bill rises.

Energy efficiency upgrades that save energy at peak times can help reduce not only customer bills but also peak demand. These include, for example, measures like upgrading old air conditioners to new high-efficiency and demand response enabled models and smart energy management systems that pre-cool homes. However, current REES policy settings have been less effective at driving these kinds of activities.

Thus, in this new and evolving policy context, it is important to consider the differential costs and benefits of energy savings based on when and where they occur. Energy efficiency obligation schemes in Canada, China and the USA already target peak demand savings, and provide examples of the ways these schemes can target multiple objectives.<sup>36</sup>

## 2.2. How to keep the REES relevant post-2020

There are strong merits to continuing the REES beyond 2020, in order to support households and businesses to contain energy prices, while improving energy reliability, security and lowering the costs of decarbonisation.

However, in order to continue to deliver these benefits post-2020, the REES needs to consider a number of changes. These include:

- **changes to scheme objectives** – to respond to shifting energy market and policy contexts including redefining peak demand and market transformation goals

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<sup>36</sup> Regulatory Assistance Project, Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes, June 2012, accessed: [www.raonline.org/wp-content/uploads/2016/05/rap-ieadsm-bestpracticesindesigningandimplementingenergyefficiencyobligationschemes-2012-may.pdf](http://www.raonline.org/wp-content/uploads/2016/05/rap-ieadsm-bestpracticesindesigningandimplementingenergyefficiencyobligationschemes-2012-may.pdf)

- **rewarding energy savings at peak times** – to maximise the REES’s energy bill benefits by targeting both wholesale and network peaks, and preparing households for cost-reflective pricing (by updating energy savings factors)
- **support smart appliances and energy management services** – by requiring energy savings upgrades to include demand response enabled devices and service contracts (by updating activity schedules), the REES can support the development of demand management and demand response services that can deliver more benefits to households, businesses and the energy system
- **updating household offerings** – to deliver upgrades with deeper energy bill savings for households (including low-income households), in consultation with stakeholders. This may include rethinking how best to deliver these activities
- **changes to the scope of sectoral coverage** – to access business energy savings that can deliver significant benefits for all energy consumers
- **investigating alternative funding and delivery models** – to better target sectors or technologies alongside or within the REES
- **continue to deliver complementary programs** – to work alongside the REES to tackle the multiple market barriers to energy efficiency through other information, regulation and incentive programs.

CHAPTER 3

# What are the merits of policy options for a post-2020 REES?

## 3.1. A summary of options considered and cost-benefit analysis

### Options examined for a post-2020 REES

Common Capital has examined a wide-range of options for a post-2020 REES. This includes four core scenarios:

- continuing the REES in its current form
- reverting the REES to a residential-only scheme
- expanding the REES to include a wider range of business activities and larger project sizes
- reforming the REES to encourage load-shifting activities.

We have also examined each of these core scenarios against:

- options designed to target energy savings at peak times (first three core scenarios only)
- 50 per cent target increases
- 100 per cent target increases.

We have also included optional design considerations, such as the introduction of alternative funding and delivery models to better target sectors or technologies, as part of or alongside the REES.

The REES could also support the market to deliver energy savings at peak times under any of these options. This could be achieved by updating activity schedules for suitable appliances (such as air conditioners and pool pumps) to require the installed appliances to be:

- demand response enabled devices
- and signed up to service provider contracts to control the appliances to reduce customer energy bills and reduce energy system peaks.

However, options targeting peak demand are likely to have a higher impact on the uptake of such appliances.

Lastly, we have considered a range of scheme design options and complementary programs to be considered alongside the REES.

Our analysis found that **increasing REES targets across all scenarios would deliver increases in energy savings and net economic benefits**. Further, our analysis found that **by targeting energy savings at peak times, the REES could deliver up to 20 per cent higher net economic benefits** across all scenarios and target levels than their equivalent scenarios with broad, untargeted energy savings. Scenarios expanding the scheme to include all businesses delivered slightly lower net economic benefits than expected, due to the limited public information available on the peak benefits of industrial energy efficiency projects. However, these benefits would improve with more detailed uptake modelling of an expanded scheme, as industrial projects have the potential to deliver significant peak benefits. Further, the 2015 Review of the NSW ESS found that large commercial and industrial energy efficiency projects are able to deliver low-cost energy savings towards scheme targets. This reduces the total cost of the scheme (and cost pass-through for all participants and non-participants) and increases its efficiency.<sup>37</sup>

## Sensitivity analysis

We have also conducted sensitivity analysis on our cost-benefit analysis of the seven scenarios for a post-2020 REES. This sensitivity analysis involved removing the benefits of avoiding electricity distribution network augmentation costs from the public benefits accrued by REES activities, and reducing the marginal cost of new generation capacity. To do this, we reduced the assumed distribution network benefits from \$239 per kW avoided to \$0, and a lower cost of new generation based on the recently installed Barker Inlet dual fuel peaking plant, rather than an open-cycle gas turbine plant (approximately \$70,000/MW/year compared to \$170,000). Combined, these changes reduce the public benefit for avoided capacity investment from \$480,000/MW/year to \$120,000/MW/year.

This sensitivity analysis can be used to test the assumption that SA Power Networks will not require any expenditure on network augmentation in the near future due to increases in electricity demand, and that future peaking plants will follow the lower cost Barker Inlet template.

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<sup>37</sup> NSW Government, Review of the NSW Energy Savings Scheme – Part 2: Options Paper, April 2015, accessed: [www.resourcandenergy.nsw.gov.au/energy-consumers/sustainable-energy/efficiency/scheme?a=558865](http://www.resourcandenergy.nsw.gov.au/energy-consumers/sustainable-energy/efficiency/scheme?a=558865)

However, SA Power Networks' *Revised Regulatory Proposal 2015-2020* states that growth in energy demand in South Australia over this period will mostly be offset through energy efficiency (through programs such as the REES).<sup>38</sup> Further, SA Power Networks' *2020-2025 Regulatory Proposal* outlines expenditure of \$155 million of network augmentation to grow its distribution network capacity, out of a total \$391 million augmentation budget over the five-year period.<sup>39</sup>

Based on SA Power Networks' own public reporting of expenditure and acknowledgement of the positive contribution of energy efficiency to delivering demand reductions in South Australia, this sensitivity analysis takes an extremely conservative approach in examining the potential benefits of the REES in reducing network expenditure.

Sensitivity analysis for the seven modelled post-2020 options for the REES can be seen below in Table 5, alongside our central cost-benefit analysis.

Option	Central analysis			Sensitivity analysis	
Residential only	Target size	Net benefits	Bill savings	Net benefits	Bill savings
	Current target	\$126 million	\$1.3 billion	\$47 million	\$1.3 billion
	50% increase	\$202 million	\$1.9 billion	\$77 million	\$1.9 billion
	100% increase	\$278 million	\$2.6 billion	\$107 million	\$2.6 billion
Residential only – targeting energy savings at peak times	Target size	Net benefits	Bill savings	Net benefits	Bill savings
	Current target	\$151 million	\$1.3 billion	\$62 million	\$1.3 billion
	50% increase	\$234 million	\$2.1 billion	\$96 million	\$2.1 billion

<sup>38</sup> SA Power Networks, *Revised Regulatory Proposal 2015-2020*, p. 55, accessed at: [www.aer.gov.au/system/files/SA%20Power%20Networks%20-%202015-20%20Revised%20Regulatory%20Proposal%20-%20July%202015.pdf](http://www.aer.gov.au/system/files/SA%20Power%20Networks%20-%202015-20%20Revised%20Regulatory%20Proposal%20-%20July%202015.pdf)

<sup>39</sup> SA Power Networks, *2020-2025 Regulatory Proposal: An overview for South Australian electricity customers*, January 2019, p. 34, accessed: [www.aer.gov.au/system/files/SAPN%20-%20%20Electricity%20Distribution%20Proposal%202020-2025%20-Overview%20-%20January%202019\\_0.pdf](http://www.aer.gov.au/system/files/SAPN%20-%20%20Electricity%20Distribution%20Proposal%202020-2025%20-Overview%20-%20January%202019_0.pdf)



	100% increase	\$320 million	\$2.7 billion	\$126 million	\$2.7 billion
Business as usual	Target size	Net benefits	Bill savings	Net benefits	Bill savings
	Current target	\$129 million	\$1.3 billion	\$56 million	\$1.3 billion
	50% increase	\$206 million	\$2.1 billion	\$91 million	\$2.1 billion
	100% increase	\$284 million	\$2.8 billion	\$126 million	\$2.8 billion
Business as usual – targeting energy savings at peak times	Target size	Net benefits	Bill savings	Net benefits	Bill savings
	Current target	\$149 million	\$1.4 billion	\$70 million	\$1.4 billion
	50% increase	\$231 million	\$2.1 billion	\$109 million	\$2.1 billion
	100% increase	\$315 million	\$2.9 billion	\$145 million	\$2.9 billion
Residential and all businesses	Target size	Net benefits	Bill savings	Net benefits	Bill savings
	Current target	\$132 million	\$1.3 billion	\$74 million	\$1.3 billion
	50% increase	\$191 million	\$2.0 billion	\$106 million	\$2.0 billion
	100% increase	\$250 million	\$2.8 billion	\$138 million	\$2.8 billion
Residential and all businesses – targeting energy savings at peak times	Target size	Net benefits	Bill savings	Net benefits	Bill savings
	Current target	\$153 million	\$1.5 billion	\$84 million	\$1.5 billion
	50% increase	\$231 million	\$2.3 billion	\$123 million	\$2.3 billion

	100% increase	\$308 million	\$3.1 billion	\$163 million	\$3.1 billion
Load shifting	Target size	Net benefits	Bill savings	Net benefits	Bill savings
	Current target	\$138 million	-	\$56 million	-
	50% increase	\$209 million	-	\$91 million	-
	100% increase	\$282million	-	\$126 million	-

*Table 5 – Sensitivity analysis on the seven post-2020 scenarios*

## Our approach to cost-benefit analysis

Common Capital’s approach to analysing the costs and benefits of government programs draws on extensive experience from our time in government and working for clients in both government and business, as well as on best practice for cost-benefit analysis, particularly Boardman et al (2018)<sup>40</sup> and the Australian Office of Best Practice Regulation (2016).<sup>41</sup>

This model considers the costs and benefits of individual REES activities, including both direct activity costs and savings and the overall costs of delivering the scheme. It then multiplies these activities by the market uptake to determine the total scheme costs and benefits.

Activity-level costs and benefits and estimates of market uptake are based on our literature review, qualitative and quantitative research and the best available data and assumptions. This cost-and-benefit model is primarily based on analysis of historic trends in South Australia. To help with recommendations on whether the scheme should be continued beyond 2020, the cost-benefit analysis also uses forecasts that reflect recent market movement and relevant market trends in other jurisdictions.

<sup>40</sup> Boardman, A.E., Greenberg, D.H., Vining, A.R. and Weimer, D.L., 2017. *Cost-benefit analysis: concepts and practice*. Cambridge University Press.

<sup>41</sup> Office of Best Practice Regulation, 2016, *Cost-benefit analysis guidance note*, Australian Government.

Our model has been calibrated by comparing our outputs to those of comparable energy efficiency obligation schemes from other jurisdictions, normalised to REES metrics wherever possible.

## 3.2. A residential-only REES

### Three sub-options for a residential-only REES

This scenario would see the REES return to its pre-2015 sectoral coverage, as a residential-only scheme, with low-income priority targets. In this section, we analyse three option pathways for a residential-only REES, with sub-options focussing on:

- a residential-only scheme based on the current model – but removing activities for small businesses
- a residential-only scheme that targets energy savings at peak times – to increase energy system and energy price benefits
- both of the above options with higher-energy savings targets – modelled at 50 per cent and 100 per cent target increases.

		Residential only <i>Current target</i>	Residential only <i>50% target increase</i>	Residential only <i>100% target increase</i>
Broad-based, untargeted energy savings	Net economic benefit	\$126 million	\$202 million	\$278 million
	Energy bill savings	\$1.3 billion	\$1.9 billion	\$2.6 billion
Targeting energy savings at peak times	Net economic benefit	\$151 million	\$234 million	\$320 million
	Energy bill	\$1.3 billion	\$2.1 billion	\$2.7 billion

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## savings

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These scenarios would see the uptake of energy efficiency activities such as:

- lighting upgrades
- air conditioner upgrades
- hot water system upgrades
- insulation and draught proofing
- refrigerator upgrades.

## Advantages of a residential-only REES

The main advantages of a residential-only REES include:

- dedicated support for households and low-income households to save energy and money while delivering strong net economic benefits
- these options would facilitate deeper energy bill savings for households (moving beyond only delivering low-cost, low-energy-savings activities)
- targeting energy savings at peak times delivers greater benefits than untargeted, broad based energy savings options
- the larger the target size for each option, the greater the bill savings and net economic benefits.

## Disadvantages of residential-only REES

The main disadvantages of a residential-only REES include:

- removes incentives for small businesses to access support to save on their energy bills
- could create a boom-bust cycle where the service providers and tradespeople currently delivering energy savings upgrades to businesses no longer have any discounts available for this sector.

### 3.3. A business as usual REES

#### Three sub-options for a business-as-usual REES

This scenario would see the REES continue with its sectoral coverage as set in 2015, as a residential and business scheme (with a focus on limited activities for small businesses), with low-income priority targets. In this section, we analyse three option pathways for a business-as-usual REES, with sub-options focussing on:

- a business as usual scheme – based on the current scheme settings
- a business as usual scheme that targets energy savings at peak times – to increase energy system and energy price benefits
- both of the above options with higher-energy savings targets – modelled at 50 per cent and 100 per cent target increases.

		Business as usual <i>Current target</i>	Business as usual <i>50% target increase</i>	Business as usual <i>100% target increase</i>
Broad-based, untargeted energy savings	Net economic benefit	\$129 million	\$206 million	\$284 million
	Energy bill savings	\$1.3 billion	\$2.1 billion	\$2.8 billion
Targeting energy savings at peak times	Net economic benefit	\$149 million	\$231 million	\$315 million
	Energy bill savings	\$1.4 billion	\$2.1 billion	\$2.9 billion

*Table 6 – Projected costs and benefits for a business as usual scheme*

These scenarios would see the uptake of energy efficiency activities such as:

- lighting upgrades
- air conditioner upgrades
- hot water system upgrades
- insulation and draught proofing
- refrigerator upgrades.

## Advantages of a business-as-usual REES

The main advantages of a business-as-usual REES include:

- continuing to provide support for households and low-income households to save energy and money
- continuing support for limited small business upgrades delivers bill savings and reduces the cost of doing business
- greater benefits than a household-only scheme (noting the need for further analysis to fully capture the impacts of business upgrades on energy savings at peak times)
- higher target options could facilitate deeper energy bill savings for households (moving beyond only delivering low-cost, low-energy-savings activities)
- targeting energy savings at peak times delivers greater benefits than untargeted, broad based energy savings options
- the larger the target size for each option, the greater the bill savings and net economic benefits.

## Disadvantages of business-as-usual REES

The main disadvantages of a business-as-usual REES include:

- limited support for businesses, with restrictions on the range and size (900 gigajoules for lighting) of projects supported by the REES potentially ruling out a range of low-cost energy savings activities that can benefit the economy and the energy system
- risk of business activities dominating energy savings targets, however this can be easily addressed through minimum household targets.

### 3.4. A REES expanded to include all businesses

#### Three sub-options for expanding the REES to all businesses

This scenario would see the REES expand on its sectoral coverage as set in 2015, expanding the scope of activities within the REES and removing any restrictions on project sizes to encourage all sectors of businesses to participate, using a wider range of activities, and support larger energy savings projects. This option would still maintain household participation and low-income priority targets. In this section, we analyse three option pathways for a REES expanded to include all businesses, with sub-options focussing on:

- a scheme expanded to residential and all businesses – based on the current scheme settings
- a scheme expanded to residential and all businesses that targets energy savings at peak times – to increase energy system and energy price benefits
- both of the above options with higher-energy savings targets – modelled at 50 per cent and 100 per cent target increases.

		Residential and all businesses <i>Current target</i>	Residential and all businesses <i>50% target increase</i>	Residential and all businesses <i>100% target increase</i>
Broad-based, untargeted energy savings	Net economic benefit	\$132 million	\$191 million	\$250 million
	Energy bill savings	\$1.3 billion	\$2 billion	\$2.8 billion
Targeting energy	Net economic benefit	\$153 million	\$231 million	\$308 million

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savings at peak times	Energy bill savings	\$1.5 billion	\$2.3 billion	\$3.1 billion
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*Table 7 – Projected costs and benefits for a scheme expanded to include all businesses*

These scenarios would see the uptake of energy efficiency activities in households and businesses, such as:

- lighting upgrades
- air conditioner upgrades
- hot water system upgrades
- insulation and draught proofing
- refrigeration upgrades
- manufacturing upgrades
- mining equipment upgrades.

## Advantages of a REES expanded to all businesses

The main advantages of an expanded REES include:

- continuing to provide support for households and low-income households to save energy and money
- expanding support beyond smaller businesses for limited project types to include a wider range of larger energy savings upgrades across commercial and industrial businesses
- higher target options could facilitate deeper energy bill savings for households and businesses (moving beyond only delivering low cost, low energy savings activities)
- greater benefits than a household-only scheme (noting the need for further analysis to fully capture the impacts of business upgrades on energy savings at peak times)
- expanding activities to encourage all sizes of businesses to participate without any restrictions allows for access to low-cost commercial and industrial energy savings, that reduce the overall costs of meeting scheme targets, and in turn helps to reduce REES cost pass-throughs for participating and non-participating households and businesses



- targeting energy savings at peak times delivers greater benefits than untargeted, broad based energy savings options
- the larger the target size for each option, the greater the bill savings and net economic benefits.

## Disadvantages of a REES expanded to all businesses

The main disadvantages of a REES expanded to all businesses include:

- risks business activities dominating energy savings towards the target, however this can be addressed through minimum household or small business targets
- may require reconsideration of the current arrangements by which ESCOSA apportions overall targets to each energy retailer covered by the REES,<sup>42</sup> so that energy sales to larger businesses are included in this. One option is to consider the approach used in the NSW Energy Savings Scheme to provide 90 per cent exemptions for emissions-intensive trade exposed industries (based on the Clean Energy Regulator's exemptions list).

### 3.5. Load shifting

## Reforming the REES to move beyond energy efficiency and focus on load shifting

This scenario would see the REES shift away from a focus on energy efficiency to instead focus on load shifting.

Rather than using less energy to deliver the desired services (e.g. lighting, heating or cooling), load shifting is a way of changing the time at which appliances consume energy to reduce either wholesale market or network peaks. Load shifting can also help to address emerging issues of negative demand in energy networks. Negative demand has emerged as an issue in South Australia when there is excess energy generation in the middle of the day when the sun is shining and rooftop solar PV is exporting energy back

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<sup>42</sup> These arrangements currently exclude large energy sales, given that the scheme currently targets small to medium businesses, See: <https://www.escosa.sa.gov.au/industry/rees/targets>

into the grid, seeing electricity generation exceed electricity demand. These issues are discussed in more detail in Appendix B.

These negative demand challenges can be addressed through a number of solutions, mainly involving a form of energy storage to avoid behind the meter, or distributed rooftop, solar PV from exporting electricity to the grid when there’s enough energy generation in the system to meet demand. Solutions include:

- encouraging battery storage for households and businesses that typically export electricity from their solar PV in the middle of the day. This action requires a relatively high contribution from households (around \$6,000 per system) which may limit take-up.
- encouraging households and businesses to store energy by heating their electric hot water tanks directly with their behind the meter solar PV
- pre-cooling/heating homes with reverse cycle air conditioners before people arrive home from school or work.

In this section, we analyse three option pathways for a REES reformed to encourage load shifting at the current target levels, at a 50 per cent increase and at a 100 per cent increase.

		Load shifting <i>Current target</i>	Load shifting <i>50% target increase</i>	Load shifting <i>100% target increase</i>
Load shifting benefits	Net economic benefit	\$138 million	\$209 million	\$282 million

*Table 8 – Projected costs and benefits of a scheme targeting load shifting*

## Advantages of a REES reformed to encourage load shifting

The main advantages of a REES reformed to encourage load shifting include:

- supports households to prepare for the introduction of time-of-use electricity pricing

- helps to reduce energy system costs for all consumers by reducing network and wholesale peaks and avoiding periods of negative demand
- assists in improving grid security by providing smart systems to reduce air conditioners' role in critical system peaks that can result in blackouts
- the net public benefit arising from avoiding energy generation at peak times and reducing associated long term capacity investment ranges from \$138 to \$282 million for this option.

## Disadvantages of a REES reformed to encourage load shifting

The disadvantages of a REES reformed to encourage load shifting include:

- most load shifting activities will result in higher overall energy consumption due to the efficiency losses involved in energy storage (whether through battery storage or thermal storage by pre-heating or cooling a hot water tank or a home)
- shifting away from encouraging energy efficiency activities entirely would leave behind significant opportunities to deliver upgrades to households and businesses that can deliver energy savings and wholesale and network peak benefits
- there are currently regulatory restrictions on installing new electric resistance hot water tanks in South Australia (these restrictions do not apply electric heat pump hot water systems).

## 3.6. Alternative funding and delivery models

### A flexible fund to deliver energy efficiency programs

Energy efficiency obligation schemes in Australia allow obligated parties and service providers to choose what activities they wish to use to meet scheme targets. This tends to see the delivery of low-cost activities at scale, often to the effective exclusion of other activities. However, there are options available within energy efficiency obligation schemes to choose the types of upgrades and the sectors they should be delivered to.

The REES could be reformed to provide the South Australian Government with the increased flexibility to deliver a range of highly targeted programs to overcome the more acute barriers to energy efficiency and focusing on specific sectors or technologies. This could include programs to deliver deeper energy savings for all households, or low-income renters in private housing, public and community housing tenants, energy hardship customers, and owner-occupiers. There are examples of next generation low-income energy efficiency programs being delivered in the ACT, NSW and VIC that could be adopted by the REES in partnership with community groups, no-interest loan scheme providers, SA Housing Authority and energy retailers.

There is a precedent within the REES to establish a targeted program, as energy retailer penalties were used to create the Energy Efficiency Fund Initiative (EEFI) Scheme in 2012 and 2013.<sup>43</sup> A similar fund could be explored to redirect resources currently allocated to low-income households (energy audit, and energy savings targets), and possibly include a top-up with State and Commonwealth Government funding to deliver more effective bill savings outcomes for low-income households.

There are also examples of energy efficiency obligation schemes that target specific technologies for particular sectors. For example, the UK ECO<sup>44</sup> program focusses on household heating bills, and a number of schemes across the US require utilities to deliver programs targeting specific sectors and technologies to meet energy savings and peak demand reduction targets.

These changes could be achieved through relatively administratively simple options such as specifying the type of activities that must be used to meet targets within a given period, or through other approaches that may require more detailed regulatory reforms.

The obligated parties within the REES should be examined as a part of any investigations into significant reforms to the design of the scheme. Considerations are discussed in more detail in the appendices to this report and Table 13.

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<sup>43</sup> ESCOSA, *Energy Efficiency Fund Initiative (EEFI Scheme) 2012* webpage, accessed: <https://www.escosa.sa.gov.au/projects-and-publications/projects/rees/energy-efficiency-fund-initiative-efi-scheme-2012>

ESCOSA, *Energy Efficiency Fund Initiative (EEFI Scheme) 2013* webpage, accessed: <https://www.escosa.sa.gov.au/projects-and-publications/projects/rees/energy-efficiency-fund-initiative-efi-scheme-2013>

<sup>44</sup> Odyssee-Mure, *Supplier Obligations – Energy Company Obligation*, 2018, accessed: [www.measures-odyssee-mure.eu/public/mure\\_pdf/general/UK33.PDF](http://www.measures-odyssee-mure.eu/public/mure_pdf/general/UK33.PDF)

## Advantages of alternative funding and delivery models

The main advantages of alternative funding and delivery models include:

- the ability to run phases or funding rounds of the REES that drive the uptake of specific technologies in specific sectors, which may result in deeper energy savings than a model in which obligated parties and/or service providers can choose which activities they deliver to meet targets
- a model based on the Energy Efficiency Fund Initiative (EEFI) Scheme could provide the government with flexibility to run bulk procurement of high efficiency appliances for low-income households (through a competitive tender or reverse auction), to deliver appliance replacement programs supporting low-income renters to achieve deeper bill savings, deliver social and public housing upgrades and work with energy retailers to support their hardship programs receive significant energy bill saving upgrades.

## Disadvantages of alternative funding and delivery models

The main disadvantages of alternative funding and delivery models include:

- many of these options would require further policy investigation, consultation and consideration of the legislative or regulatory reforms that may be required.

### 3.7. Complementary measures

Alongside all of the above options for the future of the REES, there will remain a strong role for the Government to continue delivering complementary programs. This includes:

- continuing to advocate for reforms to improve minimum energy efficiency appliance standards and ratings through the Equipment Energy Efficiency (E3) program and Greenhouse and Energy Minimum Standards
- advocating for step change improvements to residential and commercial building energy efficiency standards
- introducing a voluntary home ratings system based on a short, simple, low-cost assessment tool – to help households make better informed decisions about the

energy costs of running a prospective home they are looking to rent or buy, drawing on the outcomes of the recent Cooperative Research Centre (CRC) for Low Carbon Living's EnergyFit Home Project<sup>45</sup>

- developing electric vehicle policies and programs – to support the rollout of electric vehicles and smart charging business models that improve the security and reliability of the energy system and reduce costs for all consumers, rather than creating new problems
- addressing network stability issues created where individual households are net exporters of electricity from their rooftop solar PV – by fostering the development of microgrids, energy storage capacity (through batteries, hot water, and home pre-heating/cooling) and smart control service provides and other initiatives to improve system stability and reduce costs
- discussing shifting off-peak hot water periods to include the middle of the day to overlap with times where electricity generation now exceeds demand
- rolling out proven programs of off-peak pool pump tariffs, and demand-response air conditioner tariffs to address electricity network reliability and costs, and lower generation costs for consumers, as these are now tried and tested by electricity networks within Australia and abroad.

And, the REES also has the ability, under all options considered, to shift the market towards saving energy at peak times by including requirements in activity schedules for appliances such as energy-efficient air conditioners or pool pumps installed to be:

- demand response enabled devices (with built in smart controls); and/or
- signed up to service provider contracts, or on off-peak tariffs that will help to reduce electricity prices and system costs.

### 3.8. Next steps

This chapter has identified that there a range of options for continuing the REES beyond 2020 that could deliver significant energy savings, bill savings and economic benefits.

The analysis indicates that the REES can amplify these benefits by increasing targets up to double current levels, shifting towards targeting energy savings at peak times and expanding the scheme to include all businesses. We have also identified alternative

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<sup>45</sup> Common Capital and CSIRO for the CRC for Low Carbon Living EnergyFit Homes Initiative Project, *Enhancing the Market for Energy Efficient Homes: Implementing a national voluntary disclosure system for the energy performance of existing homes*, July 2016, accessed: [www.lowcarbonlivingcrc.com.au/sites/all/files/publications\\_file\\_attachments/rp3016\\_enhancing\\_the\\_market\\_for\\_energy\\_efficient\\_homes\\_final\\_report.pdf](http://www.lowcarbonlivingcrc.com.au/sites/all/files/publications_file_attachments/rp3016_enhancing_the_market_for_energy_efficient_homes_final_report.pdf)

funding and delivery options and the need to continue a range of complementary programs alongside the REES.

However, all of these issues require consultation with stakeholders and community groups to test our analysis and assumptions and to identify support, areas for further research and potential implementation issues.

In particular, we suggest the Department:

- consults with community groups on our findings in relation to low-income household audits, and potential reforms to low-income household programs through the REES
- considers ramping up REES targets towards similar levels of target ambition achieved in comparable schemes across Australia
- investigates and consults on the benefits to businesses, energy bills and the economy of expanding the REES to include all businesses
- consults on the potential shift in focus of the REES towards targeting energy savings at peak times, rather than rewarding all energy savings as equal as South Australia moves beyond a 70 per cent renewable energy grid and towards a net zero emissions energy grid
- considers a transition away from low- or no-cost, low-savings activities towards higher-cost, higher-energy savings upgrades for households and businesses
- commissions further research into the costs and benefits of commercial and industrial energy efficiency projects on peak demand and energy system costs, to gain a better understanding of the full range of benefits of including all businesses within the REES
- procures an independent energy billing data evaluation of elements of the REES, to more accurately assess the impact of REES activities in delivering energy savings to inform future changes, such as the potential phase out of energy audits (based on best practice from US Evaluation, Measurement and Verification (EM&V) approaches)
- examines opportunities to increase competition – lowering the cost of delivering energy savings activities under the REES, driving innovation and improving the range and quality of products and services. This would involve exploring scheme design changes such as tradeable certificate models, or reverse auction/tender rounds to deliver upgrades
- continues to regularly review and reform activities as they approach market saturation or become business-as-usual practices, with 12 to 24-month lead times to assist service providers to adjust their business models with minimal disruption.

# Supporting analysis



# Appendix A – Supporting analysis against the Terms of Reference

This appendix provides more detail on the policy and economic research and analysis that underpins Chapter 1 of this REES Evaluation. This appendix presents our research and analysis against each of the REES Evaluation's Terms of Reference issues addressed in Chapter 1.

The objectives of the REES were last updated in 2013 following the tabling of the October 2013 REES Review Report<sup>46</sup> in the House of Assembly on 28 November 2013. This section responds to the Terms of Reference of this evaluation in relation to the REES objective:

to reduce household and business energy use, with a focus on low-income households. This will provide associated energy costs and greenhouse gas emission benefits.<sup>47</sup>

## 1. Complete a cost-benefit analysis of the REES to date

Common Capital has conducted policy, economic and cost-benefit analysis for this independent evaluation of the REES Evaluation. We have found the REES to be:

- **effective** – at delivering its objectives
- **efficient** – by delivering a net economic benefit while meeting these objectives
- **equitable** – by delivering benefits to households and low-income households across the state
- **administratively simple** – by keeping costs in line with similar scheme costs

Key findings of the cost-benefit analysis demonstrate that from 2015 to 2020 the REES:

- delivered a **positive net economic benefits of \$156 million** to South Australia
- supported **8.5 million gigajoules** of energy savings for South Australian households and businesses
- is on track to deliver over **\$1 billion in energy bill savings** to South Australian households and businesses over the life of implemented energy efficiency activities from 2015 to 2020, including:

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<sup>46</sup> Government of South Australia: Department for Manufacturing, Innovation, Trade, Resources and Energy, *Review Report of the Residential Energy Efficiency Scheme (REES), Part 4 of the Electricity (General) Regulations 2012, under the Electricity Act 1996, and Part 4 of the Gas Regulations 2012, under the Gas Act 1997*. October 2013, accessed: [http://www.energymining.sa.gov.au/\\_data/assets/pdf\\_file/0014/315500/REES-review-report.pdf](http://www.energymining.sa.gov.au/_data/assets/pdf_file/0014/315500/REES-review-report.pdf)

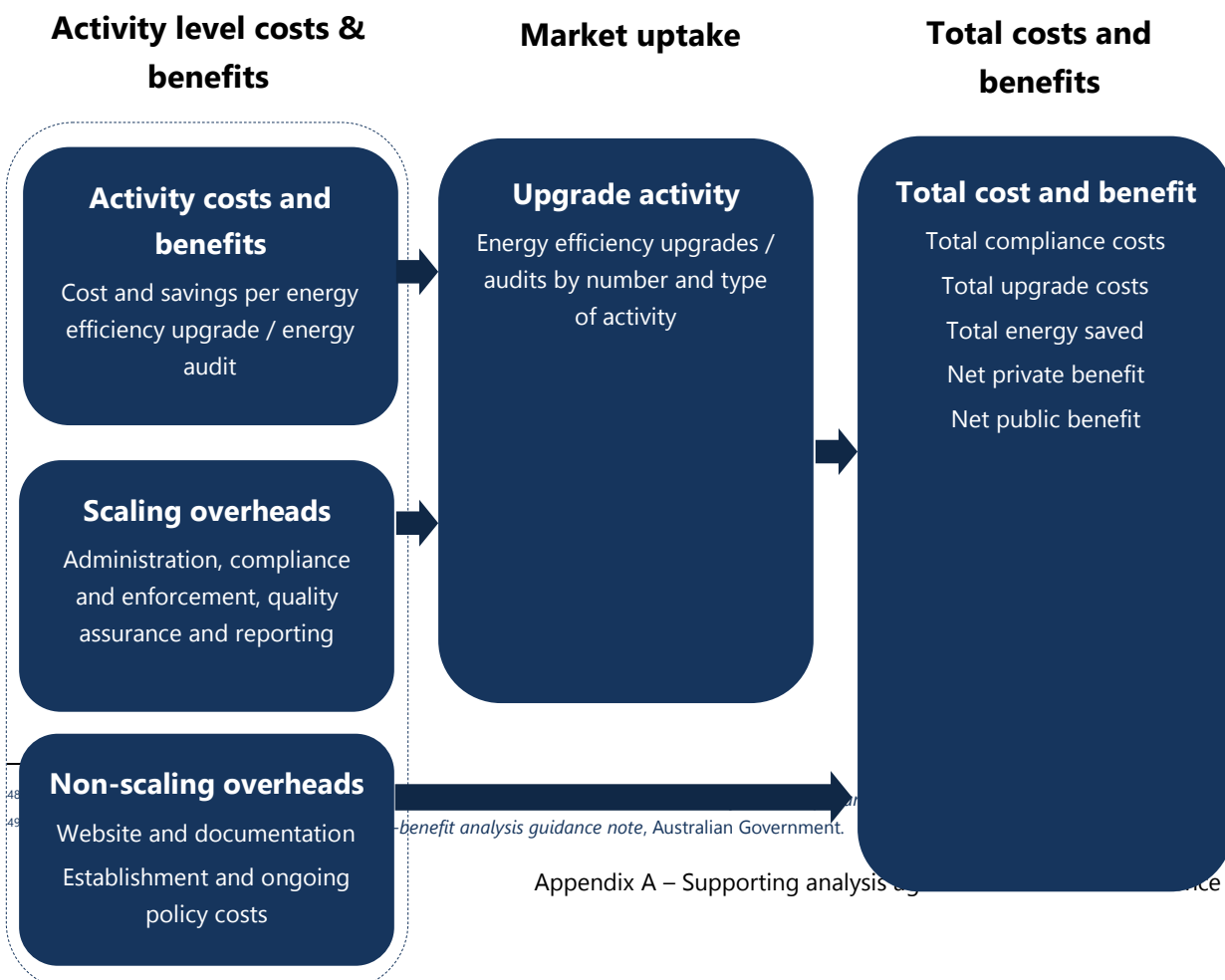
<sup>47</sup> Ibid, p. 12

- \$328 million in energy bill savings for households, including \$155 million in energy bill savings for priority low-income households
- \$720 million in energy bill savings for businesses
- reduced greenhouse gas emissions by **450,000 tonnes of CO<sub>2</sub>-e** due to activities from 2015 to 2017, and is on track to reduce emissions by over **1 million tonnes of CO<sub>2</sub>-e** from activities implemented from 2015 to 2020
- **performs well compared to similar Australian schemes** in relation to administrative costs as a proportion of total scheme costs, and average energy bill reductions.

### Our cost-benefit analysis process

Common Capital’s approach to analysing the costs and benefits of government programs draws on extensive experience from our time in government and working for clients in both government and business, as well as on best practice for cost-benefit analysis, particularly Boardman et al (2018)<sup>48</sup> and the Australian Office of Best Practice Regulation (2016).<sup>49</sup>

The individual components of our analysis model are detailed in Figure 5 below.



*Figure 5 – Common Capital cost and benefit model with draft customisation for the REES Independent Evaluation 2019*

This model considers the costs and benefits of individual REES activities, including both direct activity costs and savings and the overall costs of delivering the scheme. It then multiplies these activities by the market uptake to determine the total scheme costs and benefits.

Activity-level costs and benefits, and estimates of market uptake are based on our literature review, qualitative and quantitative research and the best available data and assumptions. This cost-and-benefit model is primarily based on analysis of historic trends in SA. To help with recommendations on whether the scheme should be continued beyond 2020, the cost-benefit analysis also uses forecasts that reflect recent market movement and relevant market trends in other jurisdictions.

Our model has been calibrated by comparing our outputs to those of comparable energy efficiency obligation schemes from other jurisdictions researched throughout this Evaluation, normalised to REES metrics wherever possible.

## 2. Assess whether the costs and benefits modelled in the ‘Evaluation of the SA REES 2013’ have occurred

Common Capital has conducted an assessment of whether the projected costs and benefits for Stage 3 of the REES – 2015-20 – modelled in the 2013 REES Evaluation have occurred to date, or are expected to occur. There were challenges in conducting this assessment as the 2013 Evaluation included energy savings projections for multiple scenarios that appear to be unconstrained by legislated targets, and with different additionality assumptions. Common Capital did not have access to the 2013 modelling, so there may be a number of variances in approaches to the task. Some of these differences will relate to the different way in which Common Capital treats free-riding and additionality and our approach to energy market benefits, alongside other factors.

Summary	Units	2013 projections for stage 3 REES, including impact of additionality for comparison				Updated actual + projection
		Scenario 1	Scenario 2	Scenario 3	Scenario 4	Update
<b>Comparison with P&amp;S projections</b>						
Energy savings	GJ	5,700,000	9,600,000	11,775,000	18,127,413	8,496,612
Scheme costs	2019\$	\$63 M	\$115 M	\$141 M	\$214 M	\$107 M
Private benefits	2019\$	\$278 M	\$379 M	\$412 M	\$635 M	\$569 M
BCR		4.4	3.3	2.9	3.0	5.3
<i>Note: scenario 4 energy savings is not published in report, this is derived from published costs</i>						
Estimated average target 2015-2020		1,360,685	2,291,680	2,810,889	4,327,316	2,028,283

**Table 9 – Assessment of 2013 evaluation projections**

Noting these differences, we found that:

- **projected energy savings will occur in some scenarios** – the 2013 Evaluation of the REES projected between 5.7 million and 18.1 million gigajoules of energy savings could be delivered between 2015 and 2020. With a combination of actual and forecast data, we project that the REES will deliver 8.5 million gigajoules of energy savings over the same period
- **REES targets were met at a lower cost than projected** – the projected costs of the scheme were lower over the modelling period than anticipated in the 2013 Evaluation in 3 out of 4 scenarios.

### 3. Assess the scheme objectives against other comparable schemes

Common Capital has conducted research to analyse how REES objectives compare to similar energy efficiency obligation schemes within Australia and overseas. The energy efficiency obligation schemes we examined share similar scheme objectives.

The Regulatory Assistance Project’s best practice guide to energy efficiency obligation schemes outlines the importance of clearly setting scheme objectives, and provides a number of example policy objectives they might target, including to:

- ‘acquire cost-effective energy efficiency as an energy resource
- reduce energy bills for all, or a subset of, end-use customers
- assist low-income households with their energy bills
- stimulate the development of an energy services industry

- improve environmental outcomes
- enhance energy security and reliability.<sup>50</sup>

Our assessment of scheme objectives has helped to inform our analysis and recommendations outlined in Chapter 2 and Chapter 3.

The results of our comparison of scheme objectives is shown below in Table 10.

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<sup>50</sup> Regulatory Assistance Project, *Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes*, June 2012, accessed: [www.raponline.org/wp-content/uploads/2016/05/rap-ieadsm-bestpracticesindesigningandimplementingenergyefficiencyobligationschemes-2012-may.pdf](http://www.raponline.org/wp-content/uploads/2016/05/rap-ieadsm-bestpracticesindesigningandimplementingenergyefficiencyobligationschemes-2012-may.pdf)

Scheme	Objective 1	Objective 2	Objective 3	Objective 4
SA Retailer Energy Efficiency Scheme (REES)	to reduce household and business energy use	with a focus on low-income households	provide associated energy cost benefits	provide associated greenhouse gas emission benefits
ACT Energy Efficiency Improvement Scheme (EEIS) <sup>51</sup>	encourage the efficient use of energy	reduce greenhouse gas emissions associated with stationary energy use	reduce household and business energy use and costs	increase opportunities for priority [low-income] households to reduce energy use and costs
NSW Energy Savings Scheme (ESS) <sup>52</sup>	to create a financial incentive to reduce the consumption of energy by encouraging energy saving activities	to assist households and businesses to reduce energy consumption and energy costs	to complement any national scheme for carbon pollution reduction by making the reduction of greenhouse gas emissions achievable at a lower cost	to reduce the cost of, and the need for, additional energy generation, transmission and distribution infrastructure
VIC Energy Upgrades (VEU) program <sup>53</sup>	reduce greenhouse gas emissions	encourage the efficient use of electricity and gas	encourage investment, employment and technology development in industries that supply goods and services which reduce the use of	

<sup>51</sup> *Energy Efficiency (Cost of Living) Improvement Act 2012* (ACT), Section 6: Objects, Effective 16/06/2017, accessed: <https://www.legislation.act.gov.au/View/a/2012-17/current/PDF/2012-17.PDF>

<sup>52</sup> *Electricity Supply Act 1995* (NSW), Section 98: Objects of Part, current version for 1 September 2018, accessed: <https://www.legislation.nsw.gov.au/#/view/act/1995/94/part9>

<sup>53</sup> *Victorian Energy Efficiency Target Act 2007* (VIC), Section 4: Objects, Authorised Version incorporating amendments as at 1 March 2019, accessed: [http://www.legislation.vic.gov.au/domino/Web\\_Notes/LDMS/LTObject\\_Store/ltobjst10.nsf/DDE300B846EED9C7CA257616000A3571/7471D6B6004D4F2CC.A2583B30013C6AE/\\$FILE/07-70aa016%20authorised.pdf](http://www.legislation.vic.gov.au/domino/Web_Notes/LDMS/LTObject_Store/ltobjst10.nsf/DDE300B846EED9C7CA257616000A3571/7471D6B6004D4F2CC.A2583B30013C6AE/$FILE/07-70aa016%20authorised.pdf)

			electricity and gas by consumers	
France Energy Saving Certificates (ESC) <sup>54</sup>	energy savings in various sectors such as building, industry, agriculture and transport	encouraging consumers (households, local authorities or companies) to reduce their energy consumption	targeted support for low-income households in fuel poverty <sup>55</sup>	
Italy <sup>56</sup>	end-use energy savings through energy efficiency improvement in industry, residential and public sector			
United Kingdom Energy Company Obligation (ECO) <sup>57</sup>	to support households to save on their energy and heating bills	support vulnerable households and target energy poverty	deliver carbon emissions savings	
US California <sup>58</sup>	produce cost-effective energy savings and	reduce overall system costs	reduce customer demand increase reliability	and increase public health and environmental benefits
US Texas <sup>59</sup>	reduce system peak demand	reduce energy consumption	reduce energy costs	

**Table 10 – Comparison of scheme objectives**

<sup>54</sup> Odyssee-Mure, *FRA 45 Energy Saving Certificates (ESC)*, 2019, accessed: [http://www.measures-odyssee-mure.eu/public/mure\\_pdf/general/FRA1.PDF](http://www.measures-odyssee-mure.eu/public/mure_pdf/general/FRA1.PDF)

<sup>55</sup> Association Technique Energie Environment (ATEE), *Snapshot of Energy Efficiency Obligations schemes in Europe: 2017 update*, June 2017, accessed: [http://atee.fr/sites/default/files/part\\_6-2017\\_snapshot\\_of\\_eeos\\_in\\_europe.pdf](http://atee.fr/sites/default/files/part_6-2017_snapshot_of_eeos_in_europe.pdf)

<sup>56</sup> Odyssee-Mure, *ITA2 Market incentives: the white certificates system*, 2017, accessed: [www.measures-odyssee-mure.eu/public/mure\\_pdf/general/ITA2.PDF](http://www.measures-odyssee-mure.eu/public/mure_pdf/general/ITA2.PDF)

<sup>57</sup> Odyssee-Mure, *Supplier Obligations - Energy Company Obligation*, 2018, accessed: [www.measures-odyssee-mure.eu/public/mure\\_pdf/general/UK33.PDF](http://www.measures-odyssee-mure.eu/public/mure_pdf/general/UK33.PDF)

<sup>58</sup> Op. cit., RAP

<sup>59</sup> Ibid.



This analysis affirms the perspective that energy efficiency can deliver a range of benefits, however the key criteria in setting these objectives are the government’s priority policy objectives.

#### 4. Benchmark the cost efficiency of the REES against other comparable schemes, in terms of administrative cost (for all parties) as a proportion of the total cost

Common Capital has benchmarked the cost efficiency of the REES against a number of comparable energy efficiency obligation schemes. Our benchmarking analysis draws on available data on costs and cost-effectiveness from publicly available reports on energy efficiency obligation schemes, meta-analysis and research.

Our analysis found that the REES to be relatively cost efficient for schemes of comparable size and sectoral coverage. Our benchmarking analysis is shown below in Table 11.

Energy efficiency obligation schemes have a range of differing features, such as:

- target sizes (the amount of energy savings required to be delivered each year)
- a certificate trading model or a direct utility obligation model
- how energy savings are calculated (greenhouse gas emissions, gigajoules, megawatt hours, barrels of oil equivalent, etc.) and size.

We have sought to create equivalent metrics for benchmarking.

Scheme	Time period	Annual cost of the scheme (AUD)	Administrative costs (as % of total annual cost)
SA REES	2015–17	\$10 m	3.9%
ACT EEIS	2013–17	\$12 m	4.1%

NSW ESS	2015–18	\$80 m	3.7%
VIC EEU	2015–18	\$112 m	3.6%
United Kingdom	2008–12	\$1662 m	0.2%
Denmark	2014	\$292 m	0.3%
France ESC	2011–13	\$616 m	0.4%
Italy	2014	\$1106 m	1.4%
Austria	2015	\$150 m	N/A
US Vermont	2012–14	\$62 m	4.9%
US California	2010–12	\$1172 m	N/A

*Table 11 – Benchmarking the REES and other scheme costs<sup>60</sup>*

<sup>60</sup> International scheme benchmarking is adapted from: RAP, Rosenow and Bayer, *Costs and Benefits of Energy Efficiency Obligation Schemes*, April 2016, accessed: <http://www.raonline.org/wp-content/uploads/2016/11/rap-rosenow-bayer-costs-benefits-energy-efficiency-obligation-schemes-2016.pdf>

## 5. Identify any significant REES deficiencies, including saturation constraints and level of REES activities in regional areas, and assess the impact that these have on the efficiency and effectiveness of the REES

Common Capital has identified a number of areas where the REES could perform better against its objectives. A list of potential issues and areas for improvement, and their likely impact on the efficiency and effectiveness of the REES are shown below in Table 12.

Further information on some of these issues and potential solutions for them are outlined in Appendix B.

Issue	Impact on efficiency & effectiveness
Regional delivery	<ul style="list-style-type: none"> <li>Regional delivery is an important equity issue, but regional delivery often comes at a higher cost of delivery (due to a smaller market and more expensive customer acquisition, and further distances to travel), which can impact the efficiency of schemes</li> <li>From 2009 to 2017, the REES has delivered an average of 14.5% of activities to regional SA (including 2.2% to remote SA), which contains around 25% of the total population. This appears to be a healthy proportion of activities delivered to regional SA in the absence of specific delivery targets</li> <li>The NSW and VIC schemes both include regional factors based on electricity network distribution loss factors, however previous analysis indicated that this approach is not applicable in SA.<sup>61</sup></li> <li>Should the Department wish to increase regional participation, or existing participation drops, a priority target for regional SA would be the preferred approach within the REES (as arbitrary multipliers to drive activity can drastically diminish cost-effectiveness and</li> </ul>

<sup>61</sup> Energy Efficient Strategies and Beletich Associates, *Review of Energy Efficiency Activities under the SA REES Scheme for 2018-2020*, March 2017, accessed: [www.energymining.sa.gov.au/data/assets/pdf\\_file/0017/315404/Energy-Efficient-Strategies-REES-review-report-2017.pdf](http://www.energymining.sa.gov.au/data/assets/pdf_file/0017/315404/Energy-Efficient-Strategies-REES-review-report-2017.pdf)

Issue	Impact on efficiency & effectiveness
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create boom-bust business models).

- An alternative approach would be for the Department to consider cross-promotion of REES upgrades to regional SA alongside other government energy programs.
- However, any decline in regional participation should also be considered alongside an investigation into whether activities have reached market saturation in regional SA.

- A sub-target can improve effectiveness of meeting scheme objectives to focus on reducing low-income household energy bills
- Sub-targets lower the overall REES efficiency as sub-targets create higher costs by segmenting the targets and therefore the scale of markets

Low-income sub-targets

- Determining eligibility requirements for determining who qualifies as a low-income household requires a balance between being tightly targeted and administratively simple
- The ACT EEIS and the NSW Home Energy Action program both allow referrals from community service organisations – an important addition to eligibility requirements to assist vulnerable households who may not otherwise hold concession cards.<sup>62</sup> ESCOSA recognises participants in energy retailer hardship programs or in an energy retailer’s payment plan, and referrals from community service organisations registered as financial

<sup>62</sup> ACT Environment, Planning and Sustainable Development Directorate, *EEIS: Priority Household Target webpage*, accessed: [www.environment.act.gov.au/energy/smarter-use-of-energy/energy\\_efficiency\\_improvement\\_scheme\\_eeis/how-the-scheme-works/priority-household-target](http://www.environment.act.gov.au/energy/smarter-use-of-energy/energy_efficiency_improvement_scheme_eeis/how-the-scheme-works/priority-household-target)  
 NSW Government, *Appliance replacement offer: Who's eligible*, accessed: <https://energysaver.nsw.gov.au/households/rebates-and-discounts/appliance-replacement-offer>

Issue	Impact on efficiency & effectiveness
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counsellors.

- Low-income households represent 23.8% of South Australian households,<sup>63</sup> and the REES set low-income priority group targets that average 30% of REES activities towards low-income households from 2009 to 2017.
- Over the same period, the REES has exceeded priority low-income targets in all but one year (2017), delivering an average of 36% of REES activities to low-income households.
- In comparison, low-income households in the ACT represent 11.7%<sup>64</sup> of households, and the ACT EEIS has a 20% low-income priority target.<sup>65</sup>
- The ACT EEIS also allows Tier 2 suppliers to meet their obligation through an Energy Savings Contribution fee, which the government uses (alongside other penalties) to deliver other low-income household energy programs.<sup>66</sup>

<p>Energy audits approaching saturation and uncertainty surrounds their energy savings</p>	<ul style="list-style-type: none"> <li>• From 2009-17, the REES delivered energy audits to around 44% of low-income households in South Australia, which will increase to around 59% if the current 2018–20 energy audit targets are met.</li> <li>• From 2010 to 2014, the NSW Home Power Savings Program (HPSP) delivered energy audits (and energy savings kits) to around 44% of NSW low-income households.</li> <li>• Independent evaluation of the HPSP program found it difficult to assign statistically significant energy savings to energy audits, and</li> </ul>
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<sup>63</sup> Based on households with an average gross weekly income of less than \$650, from: Australian Bureau of Statistics, *2016 Census QuickStats: Dwellings – household composition, Dwellings – mortgage & rent*, accessed: [https://quickstats.censusdata.abs.gov.au/census\\_services/getproduct/census/2016/quickstat/4](https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/4)

<sup>64</sup> As above, ACT data, accessed: [https://quickstats.censusdata.abs.gov.au/census\\_services/getproduct/census/2016/quickstat/8ACTE?opendocument](https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/8ACTE?opendocument)

<sup>65</sup> Op. cit., ACT Environment, Planning and Sustainable Development Directorate, *EEIS: Priority Household Target webpage*

<sup>66</sup> ACT Environment, Planning and Sustainable Development Directorate, *EEIS: How the scheme works webpage*, [www.environment.act.gov.au/energy/smarter-use-of-energy/energy-efficiency-improvement-scheme/how-the-scheme-works](http://www.environment.act.gov.au/energy/smarter-use-of-energy/energy-efficiency-improvement-scheme/how-the-scheme-works)

Issue	Impact on efficiency & effectiveness
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concluded that they don't deliver energy savings without regular, repeat contact.<sup>67</sup>

- California's energy efficiency obligation scheme for utilities to deliver Home Energy Reports provides households with regular (i.e. at least monthly) contact on their energy usage compared to their neighbours and similar households, helping them to track their usage and providing them with tailored bill saving tips based on their household consumption and the season. Such programs, with regular behaviour change intervention, have been found to deliver 1–3% savings across best-practice randomised control trial-based monitoring and evaluation.<sup>68</sup>
- Paying for activities that don't deliver energy and bill savings reduce the efficiency and effectiveness of the REES.

Sectoral coverage	<ul style="list-style-type: none"> <li>• The 2015 Review of the NSW ESS found that large commercial and industrial energy efficiency projects are able to deliver low-cost energy savings towards scheme targets that reduces the total cost of the scheme and increases scheme efficiency.<sup>69</sup></li> <li>• The REES currently includes a limited range of energy activities suitable for larger commercial and industrial projects, and commercial lighting upgrades can only claim a maximum of 900</li> </ul>
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<sup>67</sup> A billing data analysis evaluation involving over 20,000 of the 225,000 households that participated in the NSW Home Power Savings Program, a low-income energy efficiency program from 2010 to 2014, found that the energy assessment and energy savings tips component of the program could not be shown to make a statistically significant impact on energy savings.. The report notes that "Issuing people just with advice rarely results in significant savings. It is essential that advice is followed up by subsequent interventions to engage households and keep them engaged."

Institute for Sustainable Futures: University of Technology Sydney, *Evaluation of the Home Power Savings Program – Phase 1 Final Report*, September 2012, accessed: [www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Research/Our-science-and-research/home-power-savings-program-evaluation-phase-1-final-report-140051.pdf](http://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Research/Our-science-and-research/home-power-savings-program-evaluation-phase-1-final-report-140051.pdf)

<sup>68</sup> DNV GL Energy Insights USA for the Californian Public Utilities Commission, *Impact Evaluation Report, Home Energy Reports – Residential Program Year 2017, May 2019*, accessed: [http://www.calmac.org/publications/CPUC\\_Group\\_A\\_Res\\_2017\\_HER\\_finalCALMAC.pdf](http://www.calmac.org/publications/CPUC_Group_A_Res_2017_HER_finalCALMAC.pdf)

<sup>69</sup> NSW Government, *Review of the NSW Energy Savings Scheme – Part 2: Options Paper*, April 2015, accessed: [www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/efficiency/scheme?a=558865](http://www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/efficiency/scheme?a=558865)

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gigajoules of energy savings at each eligible address, effectively limiting participation to smaller businesses.<sup>70</sup>

- Expanding sectoral coverage to encourage more businesses, large and small, to save energy through the REES would improve the scheme’s effectiveness (by meeting the objective to deliver energy savings to businesses) but the trade-off may be reducing the number of households that can directly participate and benefit.
- A minimum household target (alongside the priority low-income household target) could be set to address the risk of large business upgrades crowding household activities out of the REES.
- Expanding sectoral coverage to encourage larger businesses to participate and deliver larger projects may require a reconsideration of current liable energy sales, which currently excludes designated purchases (over 1000MWh electricity and 3600 GJ of gas) and recommend expanding coverage to a wider proportion of energy sales and providing 90% exemptions for Emissions Intensive Trade Exposed businesses listed as exempt parties by the Clean Energy Regulator.

Lighting market is transforming	<ul style="list-style-type: none"> <li>• The REES and similar schemes across Australia have delivered large numbers of lighting upgrades against the backdrop of a global transformation of the lighting market through the shift to LEDs as the dominant technology.</li> <li>• These schemes brought forward energy saving technologies and upgrades much earlier than would have occurred without them.</li> <li>• Energy efficiency obligation schemes have also changed the structure and dynamics of the lighting market, in a way that has the potential to drive savings beyond the individual projects they</li> </ul>
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<sup>70</sup> ESCOSA, Energy efficiency activities: CL1 – Commercial Lighting Upgrade, accessed: [www.energymining.sa.gov.au/data/assets/pdf\\_file/0019/315514/REES-specification-CL1.pdf](http://www.energymining.sa.gov.au/data/assets/pdf_file/0019/315514/REES-specification-CL1.pdf)

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have funded, encouraging innovation in lighting product design and business models that break down split incentives by putting customers first.

- However, for these impacts to persist, the policy settings need to be managed carefully to transition these business models and structures to sustain without incentives.

- Having a number of obligated parties can drive competition and keep the cost of delivering the scheme down (in 2018 there were 12 obligated retailers<sup>71</sup>), however the more competition within a relatively small market, the less an individual obligated retailer may be compelled to establish their own in-house program of service offerings.

- A goal of making energy retailers obligated parties can be to drive their business models towards energy services (including energy efficiency), rather than increasing profits by selling more energy.

**Obligated parties**

- ActewAGL are an example of an energy retailer that appears to have actively changed their business model in response to the ACT EEIS, delivering a range of energy services (including energy efficiency upgrades) into their product offerings.
- AGL has also advertised REES household and business offerings over a number of years.
- Alternative funding and delivery models could be investigated in the absence of retailers shifting from models aiming to sell more units of energy towards selling energy services. There are precedents here in the ACT EEIS (where Tier 2 Retailers can make contributions towards an energy efficiency fund), and previously in the REES (through the Energy Efficiency Fund Initiative Scheme) in

<sup>71</sup> ESCOSA, *Obligated Parties* webpage, accessed: <https://www.escosa.sa.gov.au/industry/rees/obliged-retailers>



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2012 and 2013, as well as through international schemes.

- An alternative model to placing the obligation on a larger number of energy retailers is to place the obligation instead on electricity distribution network business(es). This option could reduce administration costs, and can tie in well with program objectives that target energy system peaks.
- A single obligation on electricity retailers (and removing an obligation of gas retailers) could reduce administrative costs, and be more appropriate for a scheme focussed on targeting electricity savings at peak times.

Targeting energy savings at peak times can deliver more benefits

- Some schemes across Canada, China and the USA include separate peak demand targets.
- Lighting and air conditioner upgrades are among the types of upgrades that help to address summer peaks.
- Activity requirements can help to support further energy system benefits, such as mandating that efficient appliances installed are demand response enabled devices, and/or are signed onto off-peak tariffs or service provider contracts to deliver wholesale price or network benefits.
- Targeting energy savings at peak times through standalone targets or adjusting savings factors weighted to reward activities based on peak benefits can improve the efficiency and effectiveness of a scheme.

Mix of activities

- Activities should be regularly reviewed to determine saturation constraints and evaluate whether they deliver energy savings.
- Activities, such as standby power controllers (examined in Chapter 1), should be reviewed and have their savings factors

Issue	Impact on efficiency & effectiveness
	<p>adjusted and/or phased out when determined that they no longer deliver their anticipated energy savings.</p> <ul style="list-style-type: none"> <li>• Schemes should seek to move on from low-cost, low-savings activities as they approach saturation to make way for higher-cost, higher-energy savings activities that require out of pocket costs for customers but deliver greater benefits.</li> <li>• The ACT EEIS has successfully begun to roll out higher-cost upgrades for households involving customer co-contributions, and the NSW ESS also has significant amounts of household and business upgrades being delivered that require minimum customer co-payments.</li> <li>• Co-contributions help to establish sustainable markets for energy efficient products and services, and avoid some of the problems that occur when businesses enter markets to give away products, and exit again once incentives are removed. Co-contributions are an important ingredient to drive market transformation, rather than a one off impact. Common Capital’s NSW Lighting Market Impact Evaluation Study (2017) found that if giveaway models are allowed, they are highly likely to crowd out co-contribution offerings.</li> <li>• Low-income household programs require no-interest loans and higher rates of subsidies for higher-cost upgrades, as this cohort is less able to afford co-contributions.</li> </ul>
Trading of energy savings	<ul style="list-style-type: none"> <li>• Trading of energy savings can occur through open markets with public registries, or through bilateral trading.</li> <li>• The REES already includes bilateral trading between retailers to meet their obligations, which can increase efficiency, but can decrease effectiveness if the goal is to get retailers to offer their customer base energy efficiency upgrades.</li> </ul>

Issue	Impact on efficiency & effectiveness
	<ul style="list-style-type: none"> <li>Trading through public registries allows service providers, retailers and third parties to trade in energy savings. This can add to liquidity and transparency in the market, increasing efficiency. Public registries have higher administrative costs, however these can be recovered through registry fee structures.</li> </ul>
Fuel coverage	<ul style="list-style-type: none"> <li>Fuel coverage should consider scheme objectives, administrative simplicity and obligated parties.</li> <li>The number of fuels covered does not independently impact on efficiency and effectiveness, but may in relation to the above factors.</li> </ul>
Sector and facility coverage	<ul style="list-style-type: none"> <li>Sector and facility coverage should match the scheme objectives in order to deliver an effective scheme.</li> <li>More sectors covered generally results in the ability to support higher scheme targets and deliver larger amounts of benefits to the energy system, bill payers and the economy.</li> <li>Larger businesses have the ability to deliver low-cost energy savings that can help to keep the costs of meeting targets down for all energy customers.</li> <li>To ensure effectiveness, you may wish to consider sub-targets, for example, introducing minimum household targets to avoid large commercial and industrial projects from delivering all of the energy savings towards targets.</li> </ul>
Performance indicators	<ul style="list-style-type: none"> <li>Performance indicators should reflect the scheme objectives, to facilitate clear incentives to meet targets and clear reporting against targets.</li> </ul>
Performance	<ul style="list-style-type: none"> <li>The REES has demonstrated to date that performance incentives</li> </ul>

Issue	Impact on efficiency & effectiveness
incentives	<p>have not been required in order to deliver energy savings to regional South Australia.</p> <ul style="list-style-type: none"> <li>• Introducing arbitrary performance incentives and multipliers to drive activity should be avoided as they can distort the market and create boom-bust cycles for service providers.</li> <li>• However, incorporating quantifiable benefits into savings factors (such as for line losses, or peak demand benefits) can improve scheme efficiency and effectiveness by shifting market delivery to activities by more fairly rewarding the value of savings.</li> </ul>
Eligible energy savings, or contribution to other scheme objectives (including options to introduce the Victorian Energy Scorecard or similar as a metric to determine energy savings credits)	<ul style="list-style-type: none"> <li>• Eligible energy savings activities can have a significant impact of scheme efficiency and effectiveness.</li> <li>• Activities that heavily rely on user behaviour to deliver energy savings should only be rewarded through measurement and verification-type approaches. Deeming such activities, such as in-home displays, energy saving tips, scorecards or perhaps even standby power controllers, are at a high risk of lowering the efficiency and effectiveness of the scheme if the energy savings rewarded do not occur in practice.</li> <li>• Incentives should be rewarded in energy efficiency obligation schemes for activities that deliver outcomes, not those that simply take steps to overcome barriers to delivering outcomes (i.e. outputs).</li> <li>• A voluntary home rating tool for point of sale or lease can deliver benefits in overcoming market barriers to energy efficiency by helping owners and landlords to identify and recoup the value of their investment in energy efficiency, while independently verifying the energy bill savings features to future tenants and owners.</li> <li>• However, voluntary home rating tools must be quick (e.g. 1 hour or less), simple and affordable to carry out. See the collaborative</li> </ul>

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industry, government and academic EnergyFit Home Project’s final report for advice on the key elements of designing a voluntary ratings system.<sup>72</sup>

<p>Measurement, verification, reporting and compliance</p>	<ul style="list-style-type: none"> <li>• Measurement and verification is crucial to understanding scheme impacts, and many of the schemes in the USA invest heavily in measurement and verification.</li> <li>• Without conducting measurement and verification of energy savings within the REES, we cannot be sure whether the energy savings assumed to have occurred did occur in real life, or if they would have occurred in the absence of the scheme.</li> <li>• As well as investing in evaluation, monitoring and verification, many international schemes have also moved away from calculation methods that deem energy savings towards those that are fundamentally based on measurement and verification. Examples of these exist in the REES (the Aggregated Metered Baseline method) and in NSW and Victoria’s Project Assessment with Measurement and Verification (PIAM&amp;V) and Project Based Assessment (PBA) methods respectively.</li> <li>• Measurement and verification studies help to hone activity savings factors and the range of activities that can be delivered in a scheme, and provide investment grade analysis and reporting on macro-level energy savings results to energy market regulators on the impacts of energy efficiency.</li> <li>• Compliance is important to ensure customer protection, that claimed energy savings projects were delivered and to provide a ‘stick’ where there are clear cases of poor performance – the trend in US energy efficiency obligation schemes towards measurement and verification based schemes (and away from deemed energy</li> </ul>
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<sup>72</sup> Common Capital and CSIRO for the CRC for Low Carbon Living EnergyFit Homes Initiative Project, *Enhancing the Market for Energy Efficient Homes: Implementing a national voluntary disclosure system for the energy performance of existing homes*, July 2016, accessed: [www.lowcarbonlivingcrc.com.au/sites/all/files/publications\\_file\\_attachments/rp3016\\_enhancing\\_the\\_market\\_for\\_energy\\_efficient\\_homes\\_final\\_report.pdf](http://www.lowcarbonlivingcrc.com.au/sites/all/files/publications_file_attachments/rp3016_enhancing_the_market_for_energy_efficient_homes_final_report.pdf)

Issue	Impact on efficiency & effectiveness
	<p>savings methods) is one way to improve compliance and outcomes.</p> <ul style="list-style-type: none"> <li>• Scheme reporting should aim to provide transparency on the full range of scheme costs and benefits, including results of measurement and verification studies and the costs of administration.</li> </ul>

*Table 12 – Issues relating to REES and their impacts*

## 6. Assess the appropriateness of the targets (types and quantum) as measures of success in meeting the REES’s objectives

Common Capital’s cost-benefit analysis, presented in the first section of this appendix, demonstrates that the REES has successfully met its objectives.

In assessing the appropriateness of the targets as measures of success in meeting the REES’s objectives, Common Capital has made a number of observations:

- **the low-income household priority group target is appropriate** to successfully meet the objective to deliver energy bill savings to households for whom energy bills represent the highest proportion of income, compared to all other household income quintiles
- **the low-income energy audit target could be reconsidered**, as evaluations of energy audit programs have not shown that energy audits result in household energy and bill savings
- **the REES targets could be ramped up to deliver more energy savings** while still delivering significant net economic benefits and a positive cost-benefit ratio. This is based on our cost-benefit analysis and comparison with other schemes, as our analysis of post-2020 options shows that doubling targets would result in a significant increase in energy bill savings and net economic benefits, while still delivering a cost-benefit ratio of greater than 2.

## 7. Compare the efficiency and effectiveness of the REES scheme design with alternative scheme design options

These alternative options will include, but need not be limited to, variations in:

- 7.1. Fuel coverage
- 7.2. Sector and facility coverage
- 7.3. Performance indicators (e.g. energy consumption, peak demand reduction, electricity network minimum demand management, contribution to network reliability and security, greenhouse gas emissions, qualitative measures)
- 7.4. Obligated parties
- 7.5. Performance incentives (e.g. to reflect priority group targets or regional activities)
- 7.6. Eligible energy savings or contribution to other scheme objectives (including options to introduce the Victorian Energy Scorecard or similar as a metric to determine energy savings credits)
- 7.7. Measurement, verification, reporting and compliance
- 7.8. Trading of energy savings

Common Capital has conducted research and analysis of scheme design options from comparable schemes across Australia and overseas, examining scheme design features for the purpose of benchmarking the REES. We have synthesised our qualitative analysis of the efficiency and effectiveness of different energy efficiency obligation scheme design features below in Table 13.

Our key findings are that the REES:

- shares a range of scheme design features with energy efficiency obligation schemes in Australia, the USA and Europe that have been found to be efficient and effective in evaluations and reviews, and through cost-benefit analysis
- shares a utility obligation scheme design model common across small and large schemes, such as the ACT's EEIS and a number of schemes in the USA and Europe

- could expand fuel or sectoral coverage to go beyond small business to include a wider range of larger commercial and industrial businesses, or expand to include transport efficiency, while remaining efficient and effective
- shares a focus on low-income priority with the ACT EEIS and UK schemes
- fairs well on reporting and compliance compared to other schemes, however our research showed that all Australian schemes could benefit from improved measurement and verification of energy savings activities (including for deemed energy savings calculations) to more tightly target incentives towards activities that deliver most effectively against scheme objectives and more benefit to the South Australian economy
- could further investigate the implications of competition among third-party service providers compared to similar schemes and examine options to improve competition, if merited
- like many energy efficiency obligations schemes, may benefit from improving evaluation, measurement and verification practices. The US Government recommends that 3–6% of energy efficiency program budgets is allocated to EM&V to manage risk and drive continuous improvement while ensuring programs remain efficient and effective.<sup>73</sup>

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<sup>73</sup> US Department of Energy and Energy Efficiency: State and Local Energy Efficiency Action Network, *Energy Efficiency Program Impact Evaluation Guide: Evaluation, Measurement, and Verification Working Group*, December 2012, p.7-14, accessed: [https://www4.eere.energy.gov/seeaction/system/files/documents/emv\\_ee\\_program\\_impact\\_guide\\_0.pdf](https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf)



REES	Alternative scheme design options	How design features impact efficiency and effectiveness
<b>Fuel coverage</b> <ul style="list-style-type: none"> <li>• Electricity</li> <li>• Natural gas</li> </ul>	<ul style="list-style-type: none"> <li>• Electricity</li> <li>• Natural gas</li> <li>• LPG gas</li> <li>• Firewood</li> <li>• Liquid fuels (stationary energy)</li> <li>• Liquid fuels (transport)</li> </ul>	<ul style="list-style-type: none"> <li>• Fuel coverage impacts the size of the energy efficiency opportunity that can be targeted by the scheme.</li> <li>• The more limited the opportunity, theoretically the higher the cost of energy savings.</li> <li>• Fuel coverage is closely linked to sector coverage, obligated parties and eligible activities.</li> </ul>
<b>Sector coverage</b> <ul style="list-style-type: none"> <li>• Residential</li> <li>• Commercial</li> </ul>	<ul style="list-style-type: none"> <li>• Residential</li> <li>• Commercial</li> <li>• Industrial</li> <li>• Emissions-intensive trade exposed industries</li> <li>• Transport</li> </ul>	<ul style="list-style-type: none"> <li>• Sector coverage should deliver on the scheme objectives.</li> <li>• Sector coverage should also consider the obligated parties and cost pass-through mechanisms.</li> <li>• Sector coverage is also linked to the distributional equity of the scheme – sectors that contribute to the cost of the scheme should have the opportunity to participate. Some sectors have larger and cheaper energy efficiency opportunities, however the private benefits are concentrated among fewer participants. In some circumstances, the public benefits from these large opportunities (through downward pressure on wholesale electricity prices and deferred network investment) can offset the impacts of distribution of scheme incentives to fewer participants.</li> </ul>
<b>Performance indicators</b> <ul style="list-style-type: none"> <li>• Normalised gigajoules (GJ)</li> </ul>	<ul style="list-style-type: none"> <li>• Megawatt hours (MWh)</li> <li>• Greenhouse gas reductions (tCO<sub>2</sub>-e)</li> <li>• Tonnes of oil equivalent (toe)</li> <li>• Primary energy</li> <li>• Final energy</li> </ul>	<ul style="list-style-type: none"> <li>• Performance indicators should be determined in relation to the fuel coverage and scheme objectives.</li> <li>• The choice of performance indicator will impact which types of energy savings activity receive the most incentives.</li> <li>• Primary energy metrics should be used when multiple fuel sources are involved to fairly compare energy savings and losses.</li> <li>• Schemes with a primary focus on greenhouse gas reductions could be set in tCO<sub>2</sub>-e.</li> </ul>
<b>Obligated parties</b> <ul style="list-style-type: none"> <li>• Electricity retailers</li> <li>• Gas retailers</li> </ul>	<ul style="list-style-type: none"> <li>• Electricity retailers</li> <li>• Gas retailers</li> <li>• Electricity distributors</li> <li>• Gas distributors</li> <li>• Large energy generators</li> <li>• Liquid fuel suppliers</li> </ul>	<ul style="list-style-type: none"> <li>• Consider fuel coverage when determining obligated parties. The main cost drivers are administrative costs – the more obligated parties, the higher the private and public administrative costs of compliance. The equity of obligated parties and cost pass-throughs also need to be considered.</li> <li>• Energy retailers in Australia have closer customer relationships than energy distribution networks, but competition means retailers come and go and customers change retailers.</li> <li>• Energy distributors (natural monopolies) do not have the same competition (and therefore changes) as retailers, but often have less consumer contact.</li> <li>• A scheme focussed on delivering peak demand or load shifting activities should consider placing an obligation on energy distribution networks, rather than energy retailers.</li> </ul>
<b>Performance incentives</b> <ul style="list-style-type: none"> <li>• No performance incentives</li> </ul>	<ul style="list-style-type: none"> <li>• Regional delivery incentives</li> <li>• Low-income household delivery incentives</li> <li>• Whole of building retrofit incentives</li> <li>• Activities that target peak demand</li> <li>• Exceeding energy saving targets</li> </ul>	<ul style="list-style-type: none"> <li>• Performance incentives can help to improve the effectiveness of meeting particular objectives (such as regional delivery or supporting low income households). However, these incentives or sub-targets can come at a premium by rewarding more credits than energy is saved, reducing the efficiency and effectiveness of a scheme.</li> <li>• Performance incentives are one technique of driving the market towards particular activities or target groups, which can come at the expense of the lowest cost activities or deepest savings.</li> <li>• Performance incentives can result in targets being met, but actual savings from activities being lower than the target.</li> </ul>
<b>Eligible activities</b> <ul style="list-style-type: none"> <li>• Deemed residential</li> <li>• Deemed small business</li> <li>• AMB</li> </ul>	<ul style="list-style-type: none"> <li>• Deemed residential</li> <li>• Deemed commercial</li> <li>• Deemed small business</li> </ul>	<ul style="list-style-type: none"> <li>• Eligible activities have strong links to both the effectiveness and efficiency of a scheme.</li> <li>• Activities determine which sector can/will participate.</li> </ul>

	<ul style="list-style-type: none"> <li>• Deemed industrial</li> <li>• Aggregated Metered Baseline (AMB)</li> <li>• Project-based assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Activities have different product and installation costs.</li> <li>• Including a range of activities allows service providers to innovate and develop the lowest cost solutions.</li> <li>• Allowing deemed activities and crediting the whole of life energy savings up front is essential for household and small business activities.</li> <li>• Allowing project-based methods allows third parties to invest in calculation methods for their own products and services, or for businesses for whom off the shelf deeming methods are unsuitable to reward savings.</li> </ul>	
<p>Measurement, verification, reporting and compliance</p>	<ul style="list-style-type: none"> <li>• Annual reporting</li> <li>• No M&amp;V studies</li> <li>• Compliance framework outlining audits and penalties</li> </ul>	<ul style="list-style-type: none"> <li>• Annual reporting</li> <li>• Quarterly reporting</li> <li>• Regular independent program impact evaluation including measurement and verification of energy efficiency outcomes</li> <li>• Move towards measurement and verification based methods to reduce risk and focus activities</li> <li>• Auditing regimes can be carried out in-house by administrators or externally by independent parties, and funded through scheme fees or at service provider/obligated parties expense</li> <li>• Penalties and enforcement tools range from warnings, penalty notices, legal action, and can be for failing to meet targets, invalid/fraudulent energy savings claims or misleading the scheme regulator</li> </ul>	<ul style="list-style-type: none"> <li>• Reporting and compliance is essential for ensuring that obligated parties meet their targets, to confirm that the claimed energy activities were installed/delivered as required and to improve price transparency to keep costs down.</li> <li>• Measurement and verification is important to calibrate deemed savings activities and maintain the additionality of activities under the scheme. M&amp;V also improves method development, and can support the inclusion of multipliers, such as for activities that deliver demand management benefits.</li> <li>• Some scheme regulators conduct compliance audits of delivered activities in-house. Other scheme regulators require participants to engage their own independent audits to verify their activities. This impacts whether costs are borne in-house, or by voluntary or obligated parties.</li> <li>• It is important to maintain a budget for audits within a regulator in order to be able to conduct spot audits, as there is little to no element of surprise if you are asking the audited party to commission/fund a spot audit.</li> <li>• IT systems can be used to support compliance and identify areas of significant activity, service providers who have delivered significant activities and any red flags that compliance officers may wish to monitor or investigate.</li> </ul>
<p>Trading of energy savings</p>	<ul style="list-style-type: none"> <li>• Only between obligated parties that have exceeded their targets</li> </ul>	<ul style="list-style-type: none"> <li>• No trading of obligation</li> <li>• Trading allowed between obligated parties only</li> <li>• Trading allowed between obligated parties and third parties active within a scheme</li> <li>• Public certificate trading – where any party can trade certificates openly on a public register</li> </ul>	<ul style="list-style-type: none"> <li>• Trading of energy savings can promote competition, market transparency and reduced costs.</li> <li>• Trading of energy savings also provides obligated parties with options to deliver activities themselves or purchase savings from the market to meet their obligation.</li> <li>• Schemes without trading can still operate efficiently and subcontract installers through competitive processes, however this is more likely through schemes where trading is actively facilitated.</li> <li>• Certificate trading schemes that allow third-party service providers to create tradeable certificates which can facilitate competition and more market players, and lower costs of meeting targets. The REES currently has 8 third-party service providers, while the VEU program has 50 accredited providers alone for commercial and industrial lighting in Metro Melbourne, and the NSW Energy Savings Scheme has 44 accredited providers who have nominated themselves as aggregators under the scheme.<sup>74</sup></li> <li>• Depending on the culture of the retailer/utility/obligated party, allowing trading may see obligated parties reduce their involvement in directly delivering activities, instead meeting their obligations solely through third-party providers.</li> </ul>

Table 13 – A review of alternative scheme design features and their impacts<sup>75</sup>

<sup>74</sup> Statistics drawn from [www.escosa.sa.gov.au/industry/rees/obliged-retailers](http://www.escosa.sa.gov.au/industry/rees/obliged-retailers), [www.victorianenergysaver.vic.gov.au/save-energy-and-money/discount-energy-saving-products/save-with-these-energy-efficient-products/commercial-lighting-and-upgrades](http://www.victorianenergysaver.vic.gov.au/save-energy-and-money/discount-energy-saving-products/save-with-these-energy-efficient-products/commercial-lighting-and-upgrades), and [www.ess.nsw.gov.au/Accredited-Certificate-Providers/Working-with-others/List-of-ACPs](http://www.ess.nsw.gov.au/Accredited-Certificate-Providers/Working-with-others/List-of-ACPs), all accessed 02 July 2019.

<sup>75</sup> Drawing on Common Capital's experience and analysis and the Regulatory Assistance Project, Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes, June 2012, accessed: [www.raponline.org/wp-content/uploads/2016/05/rap-leads-bestpracticesindesigningandimplementingenergyefficiencyobligationschemes-2012-may.pdf](http://www.raponline.org/wp-content/uploads/2016/05/rap-leads-bestpracticesindesigningandimplementingenergyefficiencyobligationschemes-2012-may.pdf)

## 9. Assess whether the allocation of activities to priority group households is an efficient and effective method of targeting greatest need and/or greatest potential for energy efficiency improvement

Common Capital has conducted an assessment of the REES's low-income household priority group targets, and whether they are an efficient and effective way to support those in need. Our key findings are:

- that the low-income priority group target is an efficient and effective method of delivering energy savings and bill relief to low-income households based on current low-cost, low-savings activities, and is expected to deliver \$155 million of energy bill savings to priority households through activities from 2015 to 2020
- however, the REES may be less suited to delivering higher-cost, higher-savings upgrades, and alternative funding and delivery models should be investigated to explore a more agile approach to delivering next generation targeted low-income programs
- that the low-income priority group target is relatively efficient, allowing for the trade-off that sub-targets shrink the eligible market size thereby increasing costs of delivery
- that low-income energy audits are likely to be ineffective and thereby inefficient measures for delivering energy bill savings to low-income households, based on previous evaluations
- eligibility should continue to be monitored over time, in consultation with community groups and sharing learnings with other government programs across Australia, such as the NSW Government's Home Energy Action low-income household energy efficiency program. While these eligibility requirements can result in the program capturing more households than those most in need (such as retirees who own a home with no mortgage and receive regular superannuation payments, but qualify for the pension and concession card), the administrative complexity and associated costs of tightening requirements further would outweigh the benefits.

## Moving towards deeper energy savings

The majority of REES activity from 2015 to 2017 has focussed on low-cost, low-energy savings upgrades. Across all household groups, this includes installing over 715,000 energy saving lights, over 48,000 energy and water-saving showerheads, and over 98,000 standby power controllers.

Fewer higher-cost upgrades occurred through the REES over this three-year period, with only 50 insulation upgrades, and around 2,500 hot water heater upgrades taking place.

This pattern is consistent with activities delivered to all household groups through the REES from 2009 to 2017, with around 2.7 million energy savings lamps, over 156,000 energy and water saving showerheads, and over 362,000 standby power controllers.

Over the same period, there were a total of around 9,700 insulation and hot water system upgrades each.

While these activities have delivered energy savings to households across South Australia, they may present issues in the future, as the 638,782<sup>76</sup> households across the state that are eligible and interested in upgrades have received them. For example, between 2009 and 2017 up to 50 per cent of South Australian houses received energy saving lighting upgrades (at an average of 8.3 lights per home), up to 31 per cent of households received standby power controllers (at an average of 1.8 per home), and up to 18 per cent of households received energy and water saving showerheads (at an average of 1.3 per home).<sup>77</sup> Further research would be required using more recent REES data to determine the proportion of households that still have lights or showerheads that could be upgraded and the likely proportion of households willing to accept more efficient models.

Common Capital and Beletich Associates' 2017 NSW Lighting Market Impact Evaluation study found that due to the success of the NSW Energy Savings Scheme (ESS) 'efficient lighting is becoming the norm for new product sales and the incremental benefits of retiring legacy technology early will gradually decline over the next decade', and that 'the

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<sup>76</sup> ABS, Census QuickStats South Australia: Occupied private dwellings, accessed:

[https://quickstats.censusdata.abs.gov.au/census\\_services/getproduct/census/2016/quickstat/4](https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/4)

<sup>77</sup> Note: Common Capital's analysis uses the caveats of 'up to' as the data does not clearly indicate whether upgrades (compared to the quantity of items installed) were unique visits or may have received upgrades on different occasions:

ESCOSA, REES Time Series Data, accessed: <https://www.escosa.sa.gov.au/ArticleDocuments/214/20180802-REES-TimeSeriesData-2017.xlsm.aspx?Embed=Y>

ESS Rule [also] needs to be updated to reflect the eventual but inevitable upgrade of almost all NSW lighting to LEDs.<sup>78</sup>

As well as potential market saturation constraints, the role of standby power controllers within the REES should also be reconsidered in the future. A 2012 independent evaluation of a NSW low-income energy efficiency program found that the passive standby power controllers delivered through the program delivered no detectable energy savings. The Institute for Sustainable Futures also noted that ‘most of the large standby users in a home are things that people are unable or unwilling to turn off’, while also noting that the standby power of devices has continued to drop over the years.<sup>79</sup>

The International Energy Agency released a One-Watt Plan in 1999 for the global appliance market to aim for a maximum of 1 watt power consumption in standby modes. This shift has already started to occur, and in 2013 minimum energy performance standards already included maximum standby power specifications for refrigerators and freezers, air conditioners, televisions, set top boxes, computers and monitors. Further, a consultation paper delivered by the COAG Energy Council and New Zealand Government-led Equipment Energy Efficiency (E3) committee showed the steep decline in standby power since 2001 (Figure 6 below).

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<sup>78</sup> Common Capital and Beletich and Associates, NSW Lighting Market Impact Evaluation: Impacts of NSW Government energy efficiency programs, 1 November 2017, accessed: [https://energy.nsw.gov.au/sites/default/files/2018-09/ESS-2017-18-Rule-change-consultation-paper-Appendix-B\\_0.pdf](https://energy.nsw.gov.au/sites/default/files/2018-09/ESS-2017-18-Rule-change-consultation-paper-Appendix-B_0.pdf)

<sup>79</sup> This evaluation involved billing data analysis of 23,000 participating households and 200,000 household control group:

Institute for Sustainable Futures: University of Technology Sydney, *Evaluation of the Home Power Savings Program – Phase 1 Final Report*, September 2012, accessed: [www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Research/Our-science-and-research/home-power-savings-program-evaluation-phase-1-final-report-140051.pdf](http://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Research/Our-science-and-research/home-power-savings-program-evaluation-phase-1-final-report-140051.pdf)

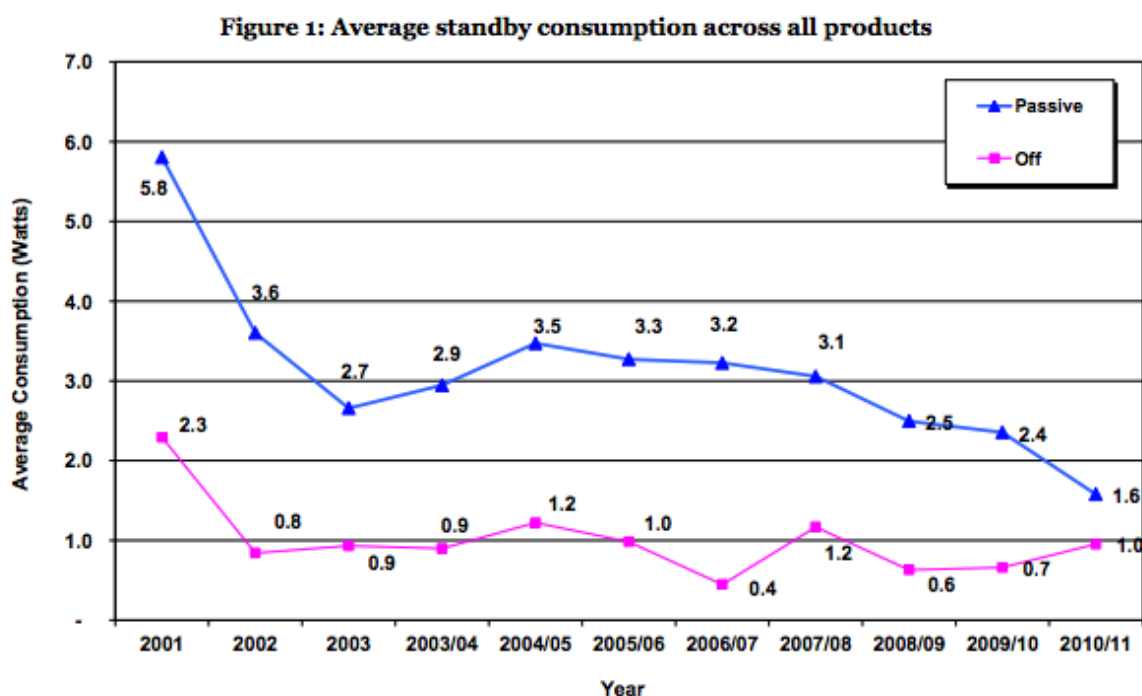


Figure 6 – Average standby power 2001–11<sup>80</sup>

As households replace their old home appliances with new ones, the energy savings that can be delivered through standby power controllers will continue to diminish over time, as standby power is addressed at the individual appliance level.

However, it should be noted that while E3 Program made a commitment to this plan in 2000, the extent to which minimum standby power standards have been implemented 20 years on from the International Energy Agency’s call to action is unclear.<sup>81</sup> Therefore, it is possible that the majority of change was driven by overseas standards and trends from Europe and the USA.

The future of the REES could involve a shift in focus towards a range of higher-cost, higher-energy savings upgrades, which for households could include hot water system upgrades and heating and cooling upgrades, as have been successfully adopted in the ACT’s EEIS by ActewAGL.<sup>82</sup>

And, by developing partnerships with community groups and no interest loan schemes, the REES could also support deeper energy savings in low-income priority households

<sup>80</sup> Equipment Energy Efficiency E3 Committee (A joint initiative of Australian, State and Territory and New Zealand Governments), *Consultation Regulatory Impact Statement: Standby Power*, August 2013, accessed: [http://www.energyrating.gov.au/sites/new.energyrating/files/documents/Consultation\\_Regulation\\_Impact\\_Statement\\_-\\_Standby\\_Power.pdf](http://www.energyrating.gov.au/sites/new.energyrating/files/documents/Consultation_Regulation_Impact_Statement_-_Standby_Power.pdf)

<sup>81</sup> E3 Program, *Standby Power in Australia and New Zealand* webpage, accessed: [www.energyrating.gov.au/news/standby-power-australia-and-new-zealand](http://www.energyrating.gov.au/news/standby-power-australia-and-new-zealand)

<sup>82</sup> ActewAGL, *Energy Saving Solutions: Upgrade appliances* webpage, 2019, accessed: [www.actewagl.com.au/save-energy/upgrade-appliances.aspx](http://www.actewagl.com.au/save-energy/upgrade-appliances.aspx)



through appliance replacement programs similar to those delivered by the ACT and NSW governments.<sup>83</sup>

## Low-income energy audits

From 2009-17, the REES delivered energy audits to around 44 per cent of low-income households in South Australia, which will increase to around 59 per cent if the current 2018-20 energy audit targets are met.<sup>84</sup> Audits may approach saturation in the future.

However, an independent billing data evaluation by the Institute for Sustainable Future of over 20,000 participants in a NSW low-income energy efficiency program found it difficult to assign statistically significant energy savings to energy audits, and that they do not deliver energy savings without regular, repeat contact.<sup>85</sup>

This analysis is reflected in the Californian experience, where utility obligation Home Energy Reports provided households with regular (i.e. at least monthly) contact on their energy performance compared to their neighbours and similar households, helping them to track their usage and providing them with consistently tailored, highly detailed and continuously varied bill saving tips based on their household consumption and the season. Independent billing data evaluations of these programs across California (and other US states) found that even with regular behaviour change intervention these programs resulted in only 1 to 3 per cent household energy savings.<sup>86</sup>

Even assuming that REES energy audits delivered these modest energy savings, in line with US programs, a survey of 120 community, environment and energy experts suggested that there is a need to support the ongoing funding of energy efficiency programs to deliver deeper savings for low-income households (higher-cost, higher-savings upgrades), and to tackle other problems such as supporting renters to save on their energy bills by overcoming landlord-tenant split incentives.<sup>87</sup>

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<sup>83</sup> ACT Smart: Replacing old appliances webpage, <https://www.actsmart.act.gov.au/energy-saving/replacing-old-appliances>  
NSW Department of Planning and Environment, Appliance replacement offer webpage, accessed: <https://energysaver.nsw.gov.au/households/rebates-and-discounts/appliance-replacement-offer>

<sup>84</sup> Based on audits delivered compared to proportion of South Australian households with an average weekly income of less than \$650, using a combination of ABS data and ESCOSA data

<sup>85</sup> Institute for Sustainable Futures: University of Technology Sydney, *Evaluation of the Home Power Savings Program – Phase 1 Final Report*, September 2012, accessed: [www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Research/Our-science-and-research/home-power-savings-program-evaluation-phase-1-final-report-140051.pdf](http://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Research/Our-science-and-research/home-power-savings-program-evaluation-phase-1-final-report-140051.pdf)

<sup>86</sup> Based on across best practice randomised control trial based monitoring and evaluation:  
DNV GL Energy Insights USA for the Californian Public Utilities Commission, *Impact Evaluation Report, Home Energy Reports – Residential Program Year 2017*, May 2019, accessed: [http://www.calmac.org/publications/CPUC\\_Group\\_A\\_Res\\_2017\\_HER\\_finalCALMAC.pdf](http://www.calmac.org/publications/CPUC_Group_A_Res_2017_HER_finalCALMAC.pdf)

<sup>87</sup> Australian Council of Social Service, Brotherhood of St Laurence, The Climate Institute, *Empowering disadvantaged households to access affordable, clean energy*, 2017, accessed: [https://www.acoss.org.au/wp-content/uploads/2017/07/ACOSS\\_BSL\\_TCI\\_Empowering-households.pdf](https://www.acoss.org.au/wp-content/uploads/2017/07/ACOSS_BSL_TCI_Empowering-households.pdf)

In 2012, energy audit costs were estimated to be \$1.8 million for stage one of the REES (2009 to 2011).<sup>88</sup> As energy audit targets have increased in future stages of the REES, up from an annual average target of 4,333 a year from 2009-11, to 5,667 from 2012-17, and increasing to 7,367 a year from 2018-20. Assuming there were no cost reductions over time (which there may have been with scale and process improvements), costs of energy audits would have increased to \$2.4 million for the period from 2012-14 and 2015-17, and increase to \$3.1 million from 2018-20 as audit targets increase.

The Department could look to the range of innovative next generation low-income energy efficiency programs rolling out across the Australian Capital Territory, New South Wales and Victoria<sup>89</sup>, that provide examples for how the REES, in consultation with community groups, could reform low-income household audit and priority target offerings to help low-income households to achieve deeper energy savings, in partnership with community groups, no interest loan schemes, public housing authorities, and energy retailer hardship programs.

## 10. Assess the merits of the current funding model against alternative funding options

These should include but need not be limited to:

- 10.1. Alternative funding source(s)
- 10.2. Funding transparency
- 10.3. Ensuring that only efficient costs are passed through to customers.

Common Capital's evaluation has considered the merits of the current REES funding model compared to other options. Our analysis found that the REES uses a similar model to other energy efficiency obligation schemes such as in the ACT and multiple schemes across the USA.

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<sup>88</sup> Pitt & Sherry, *Evaluation of the South Australian Residential Energy Efficiency Scheme (REES): Final Report*, 31 July 2013, accessed: [http://www.energymining.sa.gov.au/\\_data/assets/pdf\\_file/0008/315485/REES-review-independent-evaluation-report.pdf](http://www.energymining.sa.gov.au/_data/assets/pdf_file/0008/315485/REES-review-independent-evaluation-report.pdf)

<sup>89</sup> See: ACT Smart: Replacing old appliances webpage, <https://www.actsmart.act.gov.au/energy-saving/replacing-old-appliances>  
NSW Department of Planning and Environment, Appliance replacement offer webpage, accessed: <https://energysaver.nsw.gov.au/households/rebates-and-discounts/appliance-replacement-offer>  
NSW Office of Environment and Heritage, Home Energy Action Program evaluation, 2018, accessed: <https://www.environment.nsw.gov.au/research-and-publications/publications-search/home-energy-action-program-evaluation-final-report>  
VIC Department of Environment, Land, Water and Planning, Home Energy Assist webpage, 2019, accessed: <https://www.energy.vic.gov.au/energy-efficiency/home-energy-assist>



The current REES funding model operates by placing an obligation on energy retailers to meet regulated energy savings targets based on a proportion of their liable energy sales, or pay a penalty for any shortfalls (beyond allowable carry-forwards for any given year).

The key findings of our analysis are that:

- the scheme obligation can be placed on energy retailers or energy distribution networks – the cost structures will be similar, but placing the obligation on electricity distribution networks can involve fewer parties and be better paired with schemes that target demand management or load shifting objectives
- funding sources typically depend on the obligated party – there is no material difference whether cost pass-through is collected through retailer or network charges
- alternative funding sources could include funding energy efficiency programs through government budgets, however, if it is not a legislated fund, then this provides less certainty for product and service providers to establish business models to deliver energy bill savings upgrades to households and businesses
- other alternative funding models include using a similar funding collection model to the REES but establish a government run program to use these funds to target activities and sectors – this option provides less long-term certainty for the market but provides the government with more agility to shift focus based on needs than a legislated energy efficiency obligation scheme
- price transparency and reporting, competition and penalty rates are essential to ensure obligated parties do not price gouge, and that obligated parties pass through fair costs to consumers (and costs that are outweighed by the benefits and bill savings delivered by an energy efficiency obligation scheme).

# Appendix B – Supporting analysis for a post-2020 REES

This final appendix provides supporting analysis to Chapter 3, which details a range of policy options for the reform and improvement of the REES post-2020.

In this section we provide analysis of the areas identified for REES reforms that should be considered alongside the options discussed in Chapter 3. As consultation and stakeholder engagement was out of scope for this project, we suggest that the South Australian Government considers these options and consults with stakeholders on their merits as part of the REES Review in 2019.

The South Australian energy market has continued to evolve since the REES was established in 2009, and further since the last independent evaluation of the REES in 2013. Renewable energy investments in South Australia have continued at pace over the past decade, with AEMO projecting renewable energy generation will grow from approximately 49 per cent of the State's electricity generation in 2016-17 up to around 73 per cent of electricity generation in 2020-21.<sup>90</sup> Summer heatwaves have driven critical peak demand events in South Australia and across the NEM.

In response to the rapidly changing energy market, the South Australian Government is delivering a range of programs alongside the REES to bolster energy affordability, security and reliability and to support renewable energy assets through government programs, alongside recent investment in large scale energy storage and backup generation assets. These programs include the:

- **\$11 million Demand Management Trials Program** – providing grants for trials of demand response, demand aggregation and integrating distributed generation assets<sup>91</sup>
- **\$50 million Grid Scale Storage Fund** – to accelerate the rollout of grid-scale storage infrastructure to improve energy reliability, security and affordability in South Australia, through centralised or distributed technologies such as pumped hydro, hydrogen, natural gas, solar thermal or battery storage<sup>92</sup>
- **\$100 million Home Battery Scheme** – providing up to 40,000 South Australian households with up to \$6000 in subsidies per battery installed, with up to \$100

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<sup>90</sup> Australian Energy Market Operator, *South Australian Generation Forecasts*, December 2017, p.4, accessed: [http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning\\_and\\_Forecasting/SA\\_Advisory/2017/2017-South-Australian-Generation-Forecast.pdf](http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/SA_Advisory/2017/2017-South-Australian-Generation-Forecast.pdf)

<sup>91</sup> Government of South Australia, Department for Energy and Mining, *South Australia Demand Management Trials Program* webpage, accessed at: [www.energymining.sa.gov.au/energy\\_and\\_technical\\_regulation/energy\\_resources\\_and\\_supply/south\\_australian\\_demand\\_management\\_trials\\_program](http://www.energymining.sa.gov.au/energy_and_technical_regulation/energy_resources_and_supply/south_australian_demand_management_trials_program)

<sup>92</sup> Government of South Australia, Department for Energy and Mining, *Grid Scale Storage Fund* webpage, accessed at: [www.energymining.sa.gov.au/energy\\_implementation/grid\\_scale\\_storage\\_fund](http://www.energymining.sa.gov.au/energy_implementation/grid_scale_storage_fund)

million in finance from the Clean Energy Finance Corporation available to households to help cover the remaining costs of batteries and solar installations<sup>93</sup>

- **Virtual Power Plant** – set to roll out a network of up to 50,000 homes with solar PV and battery storage across South Australia, pending the success of trials, delivering a virtual power plant of up to 250MW capacity to improve energy security, reliability and affordability.<sup>94</sup>

The success in the Government's efforts to drive the proliferation of rooftop solar has significantly changed the daily load profile at the local level, with midday troughs now a common occurrence during shoulder seasons. This also presents new challenges

There are typically three types of energy efficiency programs:

- **incentive programs** like the REES, which help to improve market energy efficiency through voluntary action, and provide a 'pull' factor to encourage households and businesses to improve the energy efficiency of the products they purchase
- minimum standards **regulations**, which provide a 'push' raise the bar and remove the worst performing products and design features from the market
- and **information programs**, which help consumers to understand how their purchasing decisions will impact their energy bills, how they can save energy in their home or workplace and how they can access discounts and finance on energy saving upgrades.

As well as the above programs that the South Australian Government is already delivering alongside the REES, there is still a strong role for the government to continue delivering complementary programs. This includes:

- continuing to advocate for progress on reforms to improve minimum energy efficiency appliance standards and ratings through the Equipment Energy Efficiency (E3) program and Greenhouse and Energy Minimum Standards
- advocating for step change improvements to residential and commercial building energy efficiency standards
- introducing a voluntary home ratings system based on a short, simple, low-cost assessment tool – to help households make better informed decisions about the

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<sup>93</sup> Government of South Australia, *South Australia's Home Battery Scheme* website, accessed at: <https://homebatteryscheme.sa.gov.au/about-the-scheme>

<sup>94</sup> Government of South Australia, *South Australia's Virtual Power Plant* website, accessed at: <https://virtualpowerplant.sa.gov.au/>

energy costs of running a prospective home they are looking to rent or buy, drawing on the outcomes of the recent CRC for Low Carbon Living's EnergyFit Home Project<sup>95</sup>

- developing electric vehicle policies and programs – to support the rollout of electric vehicles and smart charging business models that improve the security and reliability of the energy system and reduces costs for all consumers
- addressing network stability issues created where individual households are net exporters of electricity from their rooftop solar PV – by fostering the development of microgrids, energy storage capacity (through batteries, hot water and home pre-heating/cooling) and smart control service providers and other initiatives to improve system stability and reduce costs
- discussing shifting off-peak hot water periods to include the middle of the day to overlap with times where electricity generation now exceeds demand
- rolling out proven programs of off-peak pool pump tariffs, and demand-response air conditioner tariffs to address electricity network reliability and costs, and lower generation costs for consumers.

This appendix examines options for updating and improving the REES to ensure that it can continue to deliver energy bill relief and other benefits to South Australia.

### 3.1 An opportunity to update REES objectives

The scheme design options explored in this appendix consider the opportunity the South Australian Government has to update the scheme objectives as part of its review of the REES in 2019.

As seen in Chapter 1 and Appendix 1, the REES shares a number of objectives in common with other energy efficiency obligation schemes. However, the changing energy market in South Australia may justify a change in the REES objectives. An objective 'to reduce household and business energy use, with a focus on low-income households',<sup>96</sup> which does not take into account the time at which the energy savings occur, does not necessarily provide the same energy bill and greenhouse gas reductions as it used to.

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<sup>95</sup> Common Capital and CSIRO for the CRC for Low Carbon Living EnergyFit Homes Initiative Project, *Enhancing the Market for Energy Efficient Homes: Implementing a national voluntary disclosure system for the energy performance of existing homes*, July 2016, accessed: [www.lowcarbonlivingcrc.com.au/sites/all/files/publications\\_file\\_attachments/rp3016\\_enhancing\\_the\\_market\\_for\\_energy\\_efficient\\_homes\\_final\\_report.pdf](http://www.lowcarbonlivingcrc.com.au/sites/all/files/publications_file_attachments/rp3016_enhancing_the_market_for_energy_efficient_homes_final_report.pdf)

<sup>96</sup> Ibid, p. 12

That's why we have considered options that align with a shift in the focus of the REES towards energy bill savings to:

- support households and businesses to save on their energy bills
- maintain a focus on supporting low-income households
- place downward pressure on energy system costs for all consumers by targeting energy savings at peak times, reducing wholesale energy prices and network prices
- reduce the cost of decarbonisation.

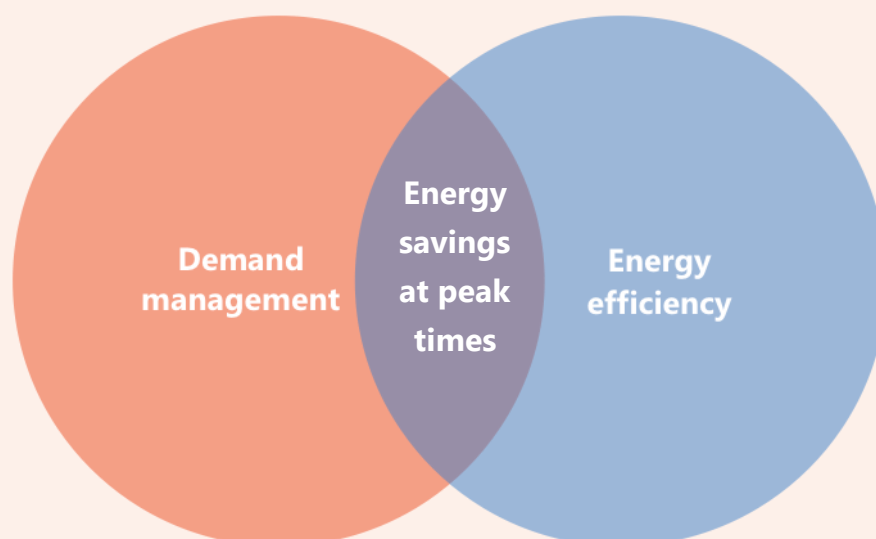
Assistance for vulnerable low-income households should continue to be a priority for the South Australian Government, however as the REES evolves, it is worth considering how best to offer energy bill relief to this priority group.

While the REES currently supports small businesses to save on their energy bills through a limited set of energy savings activities, the REES could also support larger businesses in the commercial and industrial sectors through incentives for a wider variety of business energy efficiency activities. This would support the REES's objectives by providing more direct energy savings to businesses, while also providing bill relief to all households and businesses through downward pressure on wholesale energy prices and deferred network infrastructure costs.

The changing energy market dynamics in South Australia may also require a shift in how the REES delivers against its objectives. This may include a shift of incentives away from rewarding energy savings regardless of the time of day. Instead, it may require a shift towards rewarding energy savings at peak times (to target wholesale market and network peaks), in order to maximise energy bill savings and reduce the cost of decarbonisation.

## What are energy savings at peak times?

**Energy savings at peak times** are a subset of **demand management** and **energy efficiency**.



*Figure 7 – relationship between energy savings at peak times, demand management, and energy efficiency*

**Demand management** (sometimes known as demand-side management) refers to utility, regulated or government-driven activities designed to modify patterns of consumer energy usage (most often electricity). Demand response, load shifting, load shaping and energy efficiency activities are all types of demand management.<sup>97</sup> Demand management activities are primarily led by electricity network businesses to improve the reliability and security of their network. These activities can include:

- off peak hot water or pool pump tariffs (an example of load shifting)
- paying customers (often large industrial businesses) to turn off their facilities to reduce electricity loads during a peak event (an example of demand response)
- paying customers to use behind the meter backup diesel generators, battery storage, or to connect electric hot water systems to solar PV as a form of energy storage to reduce the load on the grid during a peak event (an example of demand response)

<sup>97</sup> American Council for an Energy-Efficient Economy, *Glossary* webpage, accessed at: [https://aceee.org/glossary\\_data](https://aceee.org/glossary_data)  
U.S. Energy Information Administration, *Glossary* webpage, accessed at: <https://www.eia.gov/tools/glossary/index.php>

- subsidising energy efficient appliances to reduce baseload energy demand on the network (an example of energy efficiency, or baseload demand management).

**Energy efficiency** refers to customers reducing their energy usage without reducing service levels. This means that a customer gets the same (or more) service for less energy use or cost. Energy efficiency activities can include:

- upgrading to more efficient appliances
- upgrading building fabrics to save energy through reduced heating and cooling demand
- smart homes or programs that drive ongoing changes to consumer behaviours that influence energy use
- upgrading commercial buildings or industrial facilities and production lines.

**Energy savings at peak times** refers to a subset of energy efficiency activities that deliver demand management benefits. This excludes demand management activities that are purely load shifting, load shaping/curtailing, or energy storage/generation, such as the above examples of using diesel generators or shutting down a facility during a peak event. While it may not result in the exclusion of energy efficiency activities, it would result in a weighting that rewards those energy efficiency activities that contribute the greatest demand management benefits.

Energy savings at peak times are a subset of energy efficiency that are able to maximise the public benefits of energy efficiency by more closely targeting energy system peaks that can place downward pressure on wholesale energy generation prices and defer costly network investment. This can help to improve energy affordability, reliability and security, while reducing the costs of decarbonising our electricity system.

To deliver energy savings at peak times, we need to consider the energy savings activity and also the patterns of energy usage in the sector of the recipient of the upgrade (i.e. household, commercial, or industrial). For example, the energy consumption profile of energy efficient lighting and air conditioning upgrades can target summer peaks as households return home from school and work, and lights and air conditioners are switched on, but the sun has begun to set and solar PV generation ends for the day. These upgrades may deliver similar benefits to



commercial buildings, however a hot water upgrade to an office building is unlikely to deliver benefits to an office building, where the demand for hot water is only during business hours.

Activities that deliver energy savings at peak times can include energy efficient:

- air conditioning upgrades
- lighting upgrades
- building fabric upgrades
- pool pump upgrades
- upgrades to commercial buildings and industrial sites.

## 3.2 Potential areas for REES reform

In this section we elaborate a number of issues and sub-objectives the REES could target post-2020, and discuss potential options to address each option and their considerations.

The issues discussed here should be considered alongside any future options for continuing the REES, as many are cross-cutting issues.

### Households

#### Issues

All households continue to face a number of market barriers to making energy efficiency upgrades and saving on their energy bills. These barriers include:

- **split incentives** – such as where neither a landlord or tenant invest in energy efficiency, as the landlord is responsible for the maintenance and upgrade of the building and fixed appliances, but the tenant pays the energy bills
- **high upfront costs** – where the initial cost of the energy efficiency activity prevents a household from purchasing products or services, even when they would be better off financially within years of purchasing the products or services

- **information asymmetry** – where consumers do not have the same knowledge as service providers, or do not have the skills required to compare the value of different product or service offerings.

Changing energy market dynamics in South Australia since 2009 may mean that the current model of evenly rewarding energy efficiency activities for a unit of energy they will save, regardless of whether these upgrades in households typically save energy during peak times (and deliver network and system benefits that drive down energy costs), may no longer be the best way to meet REES objectives.

The REES has been successful to date at delivering low-cost, or no-cost energy efficiency upgrades to households. This includes rollout of over 360,000 standby power controllers, around 155,000 energy and water saving showerheads, and around 2.7 million energy saving lights to households across South Australia from 2009 to 2017.<sup>98</sup> Common Capital expects that after taking into account the ongoing activities taking place between now and 2020, some of these items are approaching saturation in the South Australian market, and those that are still eligible activities under the REES may need to be phased out in coming years.

While LED lighting upgrades may be approaching saturation in coming years, as LED lighting becomes business as usual, efficient household lighting, alongside efficient heating and cooling, is widely accepted as one of the best energy efficiency activities at targeting energy savings during times of summer and winter evening peak demand.

Energy efficient air conditioner upgrades are also one of the most effective technologies at delivering energy savings at peak times, to reduce energy system costs for all consumers. Demand response enabled device (DRED) air conditioners have smart controls that allow electricity networks or service providers to reduce their demand on the energy system during peak times with negligible impacts on service levels. DRED air conditioners could deliver significant reductions in energy system costs for all consumers, and usually come with a reward for participating households, that allow their electricity network or a third-party service provider to control their air conditioner to pre-cool, or temporarily reduce their cooling during peak times. Major brands already offer over 800 DRED air conditioners on the market today.<sup>99</sup> While Queensland electricity distribution networks, Ergon Energy and Energex, have been actively promoting households to

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<sup>98</sup> Common Capital's analysis of data of individual activity items delivered to all households (priority/low-income and non-priority groups): Essential Services Commission of South Australia, *REES Time Series Data*, 2 August 2018, accessed at: [www.escosa.sa.gov.au/ArticleDocuments/214/20180802-REES-TimeSeriesData-2017.xlsm.aspx?Embed=Y](http://www.escosa.sa.gov.au/ArticleDocuments/214/20180802-REES-TimeSeriesData-2017.xlsm.aspx?Embed=Y)

<sup>99</sup> Ergon Energy, Eligible PeakSmart air conditioners, 2019, accessed: <https://www.ergon.com.au/network/manage-your-energy/incentives/peaksmart-air-conditioning/eligible-peaksmart-air-conditioners>

upgrade to DRED air conditioners, it is unclear how many of these products are available or purchased in jurisdictions such as South Australia. Product suppliers, installers and electricity networks or third-party service providers may require time to establish the business models required to deliver the most public benefits out of DRED air conditioners through a government program such as the REES. However, this could deliver significant benefits for South Australia through downward pressure on wholesale electricity prices and deferred or avoided electricity network infrastructure investment (both leading to downward pressure on energy bills for households and businesses), while improving energy security and reliability by helping to avoid blackouts during critical summer peaks.

ActewAGL have successfully demonstrated that higher-cost, higher-energy savings upgrades with customer out of pockets can be delivered through a similar scheme (the ACT EEIS).

Another issue to consider if the South Australian Government was to expand the REES to include all businesses, including larger energy users in the commercial and industrial sectors, is the risk that an increase in the uptake of business energy savings activities could result in the delivery of less energy savings activities to households.

## **Solutions**

A number of solutions could be employed to reform household energy savings through the REES. These could include combinations of:

- a focus on activities that deliver deeper energy savings, such as bigger energy-consuming appliances or upgrades, or upgrading multiple items in each house
- rewarding upgrades based on their ability to deliver energy savings at peak times, such as lighting, DRED air conditioners, efficient hot water upgrades with load control, efficient pool pumps with load control and smart homes
- consider introducing a minimum household (and possibly small business) quota to ensure that the REES continues to deliver energy savings by directly supporting households and bill savings to all households and businesses by putting downward pressure on energy system costs for all of South Australia.

## Low-income households

### Issues

23.8 per cent of South Australian households have a gross weekly income of less than \$650, and 10 per cent of South Australian households spend 30 per cent or more of their income on meeting their rent alone. Both figures are above the Australian average.<sup>100</sup> And this is before households factor in their energy bills and other cost-of-living expenses. That's why it's important that the state Government continues to support vulnerable households to keep a lid on their energy bills.

The section above discusses the barriers all households face to make energy efficiency upgrades. Compared to the general household cohort, low-income households face even higher barriers to energy efficiency upgrades. These include a limited ability to make out-of-pocket contributions or to take on finance to fund more expensive energy saving upgrades that deliver bigger bill savings.

The South Australian Government offers various forms of financial support to help households to pay their energy bills, including the energy bill concession, the cost of living concession, the residential park concession, as well as medical-related energy bill concessions.<sup>101</sup> These payments support households to pay their energy bills, but they do not provide ongoing reductions to the root cause of energy bill stress.

### Case study: the evolution of the low-income energy efficiency programs

The NSW Government's low-income energy efficiency programs have evolved over time. The Home Power Savings Program delivered energy audits and energy saving kits (with energy saving tips, CFL light bulbs, shower heads, draught-proofing and door snakes) to over 225,000 low-income households,<sup>102</sup> or around 44 per cent of low-income households in NSW.<sup>103</sup> An evaluation of this program suggested that the

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<sup>100</sup> Australian Bureau of Statistics, *2016 Census QuickStats: Dwellings – household composition, Dwellings – mortgage & rent*, accessed: [https://quickstats.censusdata.abs.gov.au/census\\_services/getproduct/census/2016/quickstat/4](https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/4)

<sup>101</sup> South Australian Government, *Help paying energy bills*, accessed: <https://www.sa.gov.au/topics/energy-and-environment/energy-bills/financial-assistance>

<sup>102</sup> NSW Office of Environment and Heritage, *Home Power Savings Program evaluation webpage*, accessed: <https://www.environment.nsw.gov.au/research-and-publications/our-science-and-research/our-research/social-and-economic/sustainability/energy-efficiency-programs-evaluation/home-power-savings-program-evaluation>

<sup>103</sup> Based on the proportion of households in NSW that earn average gross weekly incomes of <\$650, and the proportion of occupied dwellings in the state, from Australian Bureau of Statistics, *2016 Census QuickStats: Dwellings – household composition, Dwellings – mortgage & rent*, accessed: [https://quickstats.censusdata.abs.gov.au/census\\_services/getproduct/census/2016/quickstat/1](https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/1)

light bulb and showerheads upgrades were the only activities that delivered noticeable savings over time. That's why the next evolution of NSW Government low-income energy efficiency programs focussed on activities that would deliver deeper savings. The current Home Energy Action Program delivers three program streams to target deeper savings:<sup>104</sup>

- **the Appliance Replacement program** – to remove and replace old energy guzzling appliances (such as fridges) with new efficient models, through a bulk-buying contract and partnerships with community groups and their no-interest loan schemes (NILS), to help those most in need to access upgrades and bill savings at no upfront cost. This program is able to overcome barriers that exist in supporting low-income tenants to achieve deeper energy savings, as it focusses on plug-in appliances tenants own and can upgrade without their landlord's permission
- **social and public housing upgrades** – to work with the owners and operators of social housing to deliver deeper upgrades to their properties that will saving their tenants on their energy bills, including the installation of solar panels, efficient hot water systems, insulation and air conditioning upgrades
- **energy hardship assist** – to work with energy retailers to support their hardship customers to install co-funded solar panels to deliver deep energy bill savings and reduce energy hardship.

The ACT's ACT Smart program also partners with community groups and no-interest loan schemes to provide a similar service offering to ACT customers as the NSW Appliance Replacement Offer.<sup>105</sup>

The Victorian Government's Home Energy Assist program is a \$17 million program to support low-income households to save on their energy bills and to have more comfortable homes.

The program includes the:

- **EnergySmart Public Housing program** – to upgrade old electric hot water

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<sup>104</sup> Urbis – prepared for the NSW Office of Environment and Heritage, Home Energy action Program Final Report, September 2018, accessed: <https://www.environment.nsw.gov.au/research-and-publications/publications-search/home-energy-action-program-evaluation-final-report>

<sup>105</sup> ACT Smart: Replacing old appliances webpage, <https://www.actsmart.act.gov.au/energy-saving/replacing-old-appliances>

and space heaters with energy saving models

- **Victorian Healthy Home program** – providing free home energy upgrades to low-income households with complex healthcare needs
- **Energy Savvy Upgrades** – which supports low income households to replace appliances, upgrade their homes and access advice.<sup>106</sup>

The 2015 Review of the NSW Energy Savings Scheme (ESS), the equivalent of the REES, found that a dedicated low-income energy efficiency program (the Home Energy Action program) could target market barriers that the ESS could not overcome on its own, such as landlord-tenant split incentives.<sup>107</sup>

Based on the NSW experience, it may also be worth re-evaluating the approach to assisting low-income households energy bill savings under the REES.

All of the issues raised here, and potential solutions discussed below, should undergo thorough consultation with community groups representing the interests of low-income households in South Australia, to ensure that any changes meet the needs of this group, and the community groups and their programs that already provide vulnerable low-income households with much needed support. Consultation was out of scope for this evaluation.

## **Solutions**

There are a number of possible solutions for how the REES can continue to deliver meaningful energy bill support to low-income households in South Australia.

These solutions could include a range of options that would see the end of energy audit targets, and the phase-out of the low-cost energy efficiency opportunities that deliver low savings per household, such as lighting upgrades. The focus could instead shift to higher-cost items that deliver deeper energy bill savings, with creative solutions for ensuring that these can be delivered to low-income households at little to no out-of-pocket costs for those who are already struggling to pay their bills. Some of these options

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<sup>106</sup> VIC Department of Environment, Land, Water and Planning, Home Energy Assist webpage, 2019, accessed: <https://www.energy.vic.gov.au/energy-efficiency/home-energy-assist>

<sup>107</sup> NSW Government, *Review of the Energy Savings Scheme: Position Paper*, October 2015, p.51, accessed at: [https://www.productivity.nsw.gov.au/sites/default/files/2018-07/review\\_energy\\_savings\\_scheme\\_position\\_paper\\_2015\\_0.pdf](https://www.productivity.nsw.gov.au/sites/default/files/2018-07/review_energy_savings_scheme_position_paper_2015_0.pdf)

could be delivered within the REES, however many would be best suited for a standalone program, which leverages REES incentives where possible.

One component of targeting deeper savings may require greater flexibility of program design and implementation than traditionally supported through amending the REES to deliver low-income household energy efficiency programs that build on the NSW Government's experience, such as:

- developing a program to replace high energy consuming appliances (such as fridges) for low-income households whether they rent or own their home, and building relationships with community groups and no interest loan schemes (NILS) to support households to achieve deep savings with little to no upfront cost
- working with social, public and community housing providers and private home owners to deliver deeper energy savings for low-income households, aligned with technologies that target peak demand and reduce energy bills for all South Australian consumers through upgrades such as high efficiency air conditioners with smart controls and contracts to deliver peak demand benefits or linking electric hot water systems directly to solar PV to store energy, reduce peak demand and save on energy bills
- working with community groups, government and energy retailer hardship programs to consider how energy bill concessions could be harnessed to provide deeper and ongoing energy bill relief by investing them in energy efficiency upgrades, solar PV and battery storage.

These types of initiatives have proven to be successful so far in NSW, and are being rolled out across the ACT and Victoria, and could be applied successfully in South Australia to complement pilot programs already underway (such as the Virtual Power Plant<sup>108</sup>) to deliver energy bill relief to more households while delivering benefits to the whole South Australian energy system.

All of these options, and any reforms to low-income support through the REES, require close consultation with community groups representing low-income households on the suitability, design considerations and timing of any reforms.

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<sup>108</sup> <https://virtualpowerplant.sa.gov.au/>

## Deeper energy savings

### Issues

As discussed above, the REES has successfully delivered large numbers of smaller energy savings upgrades to households across South Australia. The successful mass rollout of low-cost but small energy savings upgrades within the REES has been mirrored in other energy efficiency obligation schemes across Australia. As these opportunities reach saturation, a challenge for energy efficiency schemes is to shift their focus towards higher-cost activities that deliver more substantial energy savings for households and businesses.

These low-cost energy efficiency activities have been delivered at no cost, or very low cost to customers under the REES and other Australian energy efficiency obligation schemes to date. To deliver higher-cost activities requires a shift in business models, marketing practices and customer perceptions, and potentially higher levels of incentives.

While this experience within the REES largely applies to household energy efficiency activities, other schemes, and more recently the REES have also seen the proliferation of low-cost or no-cost lighting upgrades for businesses.

### Solutions

There are a number of possible solutions to drive deeper energy savings through the REES for each participating household or business. These include:

- updating REES activity specifications to require bundling (a minimum quantity of activities to be carried out at every household or business)
- updating REES activity specifications to require minimum energy savings thresholds (an outcomes-based alternative to move away from single item upgrades or giveaways)
- conducting billing data analysis studies (measurement and verification) and market impact evaluations to determine when lower-cost activities are reaching saturation or approaching business as usual activity in the broader market
- require customer co-payments, which have been successful in NSW and the ACT, to support more sustainable business models, customer engagement, and facilitate market transformation.



## Businesses

### Issues

Businesses, including small businesses and those in the commercial and industrial sectors, form important parts of the South Australian economy. Combined, business is forecast to consume around 8000 GWh of electricity in 2018-19, or around two-thirds of electricity consumption in South Australia.<sup>109</sup> All businesses face energy bill pressures, and small, medium and large businesses can benefit from energy efficiency upgrades to reduce their own bills, while reducing energy system costs and providing benefits for all South Australian households and businesses.

The REES was expanded to include businesses as part of the 2013 REES Review. But the REES only provides incentives for limited opportunities for businesses to improve their energy efficiency. At present, these include lighting upgrades, purchasing high efficiency whitegoods and installing refrigerated display cabinets. Of these activities, around 11,500 commercial lighting upgrades have delivered around 400,000 energy saving lights and 30,000 water and energy saving showerheads to South Australian businesses to date.<sup>110</sup>

While the commercial and industrial sectors can present large and low-cost energy efficiency opportunities (per gigajoule of savings), the private benefits are concentrated in fewer participants. In the context of energy efficiency obligation schemes like the REES, larger commercial and industrial energy efficiency upgrades can help meet energy savings targets at a lower cost, improving the net economic benefits of the scheme while placing downward pressure on energy bills for all South Australian households and businesses, but this could result in lower household participation in the scheme.

Some energy efficiency obligation schemes only allow participation from sectors that contribute to scheme costs. For example, the Victorian Energy Upgrades program only lets large energy users participate and receive incentives for energy efficiency upgrades if they also opt-in to include a liability for their energy retailer under the scheme.<sup>111</sup>

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<sup>109</sup> Australian Energy Market Operator, *South Australian Electricity Report*, November 2018, accessed: [www.aemo.com.au/-/media/Files/Electricity/NEM/Planning\\_and\\_Forecasting/SA\\_Advisory/2018/2018-South-Australian-Electricity-Report.pdf](http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/SA_Advisory/2018/2018-South-Australian-Electricity-Report.pdf)

<sup>110</sup> Common Capital's analysis of data of individual activity items delivered to all households (priority/low-income and non-priority groups): Essential Services Commission of South Australia, *REES Time Series Data*, 2 August 2018, accessed at: [www.escosa.sa.gov.au/ArticleDocuments/214/20180802-REES-TimeSeriesData-2017.xlsm.aspx?Embed=Y](http://www.escosa.sa.gov.au/ArticleDocuments/214/20180802-REES-TimeSeriesData-2017.xlsm.aspx?Embed=Y)

<sup>111</sup> Department of Environment, Land, Water and Planning Victoria, *Large energy user opt-in*, accessed: <https://www.energy.vic.gov.au/energy-efficiency/victorian-energy-upgrades/large-energy-user-opt-in>

In comparison, as part of the 2015 Review of the NSW Energy Savings Scheme, the NSW Government found that large energy users should continue to receive exemptions from liabilities and still receive incentives for energy efficiency upgrades, as these businesses would deliver low-cost energy efficiency projects that drive down the costs of meeting scheme targets, while placing downward pressure on energy system costs for all consumers.<sup>112</sup>

## Solutions

There are a number of options that should be considered to expand the REES to access opportunities for commercial and industrial energy efficiency upgrades. These include:

- expanding the range of activities included in the REES to facilitate a wider range of commercial and industrial energy efficiency upgrades
- increasing REES targets to facilitate the increased energy efficiency opportunities brought by expanding the REES to commercial and industrial projects
- considering a household sub-target to ensure that the introduction of commercial and industrial businesses to the REES does not crowd out household participation
- allow large energy users (emissions intensive trade exposed industries, or EITES) to participate with up to 90% exemptions from scheme liabilities, so that they have an incentive to participate in the REES and deliver benefits to the South Australian economy.

## Energy savings and energy demand challenges

### Issues

As discussed in Chapter 1, Common Capital has found the REES to be overall efficient and effective. This is consistent with the experience of other energy efficiency obligation schemes across Australia. However, as mentioned above, the energy market dynamics in South Australia are changing.

Broad-based energy efficiency schemes that reward every gigajoule of energy saved equally may continue to deliver economic benefits and energy bill savings into the future.

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<sup>112</sup> NSW Government, *Review of the NSW Energy Savings - Scheme Part 2 Options Paper*, April 2015, pp. 84-90 accessed: <http://www.resourcesandenergy.nsw.gov.au/energy-consumers/sustainable-energy/efficiency/scheme?a=558865>

However, with changing energy generation and demand profiles, and more regular critical summer peak events, the REES has the potential to more tightly target energy efficiency activities that will save energy at peak times, contributing more to placing downward pressure on energy bills and system costs than broad-based energy efficiency schemes. It can do this by placing downward pressure on wholesale electricity prices and network prices.

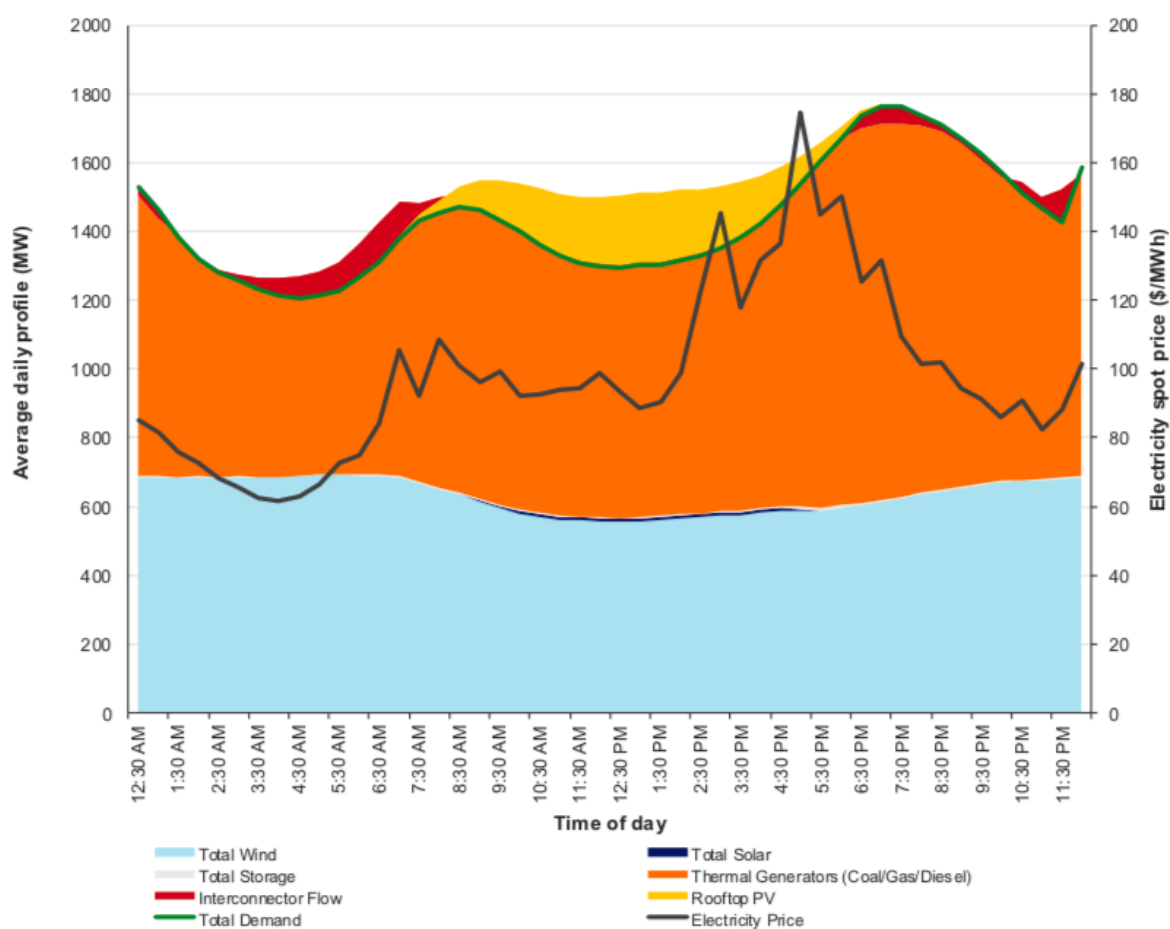
Targeting energy efficiency more tightly to deliver energy savings at peak times can also support households and businesses to be prepared for any future shift towards time-of-use energy tariffs and cost-reflective pricing.

Targeting energy savings at peak times and requiring efficient appliances to be demand response enabled devices also support the development of a services market to tackle wholesale electricity generation price peaks, and to support distributed demand response and demand management capabilities which could be aggregated to avoid blackouts and costly investment in poles and wires. AEMO and ARENA are already operating a demand management trial program in conjunction with South Australia to offer financial incentives for customers to participate, and electricity distribution networks can access the Demand Management Incentive Scheme.<sup>113</sup>

### The 'duck curve' & negative demand

South Australia's energy market is changing, and one of these changes has seen the development of a mismatch between electricity supply and demand. The uptake of rooftop solar PV, and how the market has or hasn't responded to date, has begun to create scenarios during the daytime where there is excess electricity supply on the grid. Negative demand can result in system stability. This negative demand can be seen below in yellow, which some refer to as the 'duck curve':

<sup>113</sup> Australian Energy Regulator, *Demand Management Incentive Scheme webpage*, accessed: [www.aer.gov.au/news-release/aer-incentive-scheme-to-drive-potential-1bn-in-demand-management-action](http://www.aer.gov.au/news-release/aer-incentive-scheme-to-drive-potential-1bn-in-demand-management-action)



**Figure 8 – the duck curve: average daily supply profile 2017-18<sup>114</sup>**

These negative demand challenges can be addressed through a number of solutions, mainly involving a form of energy storage to avoid behind the meter, or distributed rooftop, solar PV from exporting electricity to the grid when there's enough energy generation in the system to meet demand. One solution could be to encourage battery storage for households and businesses that typically export electricity during the time of the yellow 'duck curve'. Another form of energy storage could be to encourage households and businesses to store energy during these times by heating their electric hot water tanks directly with their behind the meter solar PV. The pre-cooling of homes with reverse cycle air conditioners before people arrive home from school or work is

<sup>114</sup> Australian Energy Market Operator, *South Australian Electricity Report*, November 2018, accessed: [www.aemo.com.au/-/media/Files/Electricity/NEM/Planning\\_and\\_Forecasting/SA\\_Advisory/2018/2018-South-Australian-Electricity-Report.pdf](http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/SA_Advisory/2018/2018-South-Australian-Electricity-Report.pdf)

another form of energy storage that could help address negative demand. Likewise, encouraging electric vehicle charging during this time of day (which largely overlaps with when people are typically at work, and could leave their electric car connected to charge) is another form of battery storage.

However, these solutions are more load shifting, or demand management activities, and many would likely result in an increase in overall energy consumption, and represent demand management activities rather than energy efficiency activities, or energy savings at peak times. Because the REES is primarily an energy efficiency program, driving load shifting activities would require broader reforms to the REES regulatory architecture. These would need to include activity changes to either allow load shifting activities side by side or instead of energy savings activities.

## **Solutions**

There are a number of options for updating the REES to more closely target energy efficiency to deliver demand management benefits. These could include combinations of:

- limiting the range of activities to include only those that deliver the most demand management benefits
- expanding the range of activities to reward upgrades such as high efficiency, load controlled pool pumps, high efficiency DRED air conditioning upgrades and smart home controls, and supporting the development of business models where service providers aggregate customers to lower wholesale electricity prices and target peak demand, passing on benefit to both participating and non-participating households

updating energy savings factors in eligible activity specifications to reward based on energy savings at peak times (through a peak multiplier or integrating this into updated savings factors).

