Independent Pricing and Regulatory Tribunal (IPART) Energy Savings Scheme

Cost Effectiveness Analysis Report 2011

DATABUILD
Research & Solutions

DATABUILD
Research & Solutions

IPART
Energy Savings Scheme Cost Effectiveness Analysis Report
October 2011

Project Director: David Kenington

Report Author: David Kenington

Reviewed by: Charles Michaelis

Date: 11th October 2011

Contents

1 Executive Summary

Databuild Research and Solutions were commissioned by IPART to undertake a cost effectiveness analysis of the Energy Savings Scheme, covering the first 18 months operation of the scheme, starting July 2009 – December 2010. The scheme places an obligation on electricity retailers to save energy through the creation, trade and retirement of Energy Savings Certificates (ESCs).

This research project aimed to:

- Quantify costs associated with delivery of the program while it is still relatively early in its lifecycle
- Undertake a cost benefit analysis based on the delivery costs, in order to help IPART report performance
- Investigate how scheme participants, Accredited Certificate Providers (ACPs) and electricity retailers, were delivering the scheme, including
    - Scheme experience, current and future
    - ACP and retailer delivery models
    - Drivers and barriers, and suggestions for improvement

33 in-depth interviews were conducted with electricity retailers and ACPs participating in the scheme in 2009 and 2010.

1.1 Key findings

ESS activities delivered under the scheme have been split into the following groups:

- Showerhead activities[1]
- Lighting and aggregator activities
- Equipment upgrade activities

In 2009, 278,157 ESCs were created with 83% generated by equipment upgrade projects[2], 13% showerheads and 4% lighting. In 2010 759,866 ESCs were created, with showerhead activities accounting for (61%), with equipment upgrades generating 31% and lighting and aggregator activities 8%.

1.1.1 ACP Business Costs

For showerheads[3], lighting and aggregator activities, project delivery costs (gross) are included in the costs. For equipment upgrades, projects had been undertaken prior to the start of ESS (transfer from GGAS), which meant we were unable to include project delivery costs. It was not possible within the timeframe allowed for this study to investigate the difference between business as usual cost and the project costs including the energy efficiency activity. Therefore, the study only considers gross costs where available. This

[1] For explanations of these activities, refer to section 2

[2] Transferred from the GGAS scheme

[3] Respondents from 2010 only were included in the sample.

should be considered when comparing the cost/benefit performance of equipment upgrades to other groups.

Figure 1: ACP and End User Business Costs per ESC generated

ACP type	Business costs	
	2009	2010
Equipment upgrade	$4.14	$3.06

ACP type[4]	Business costs	
	2009	2010
Showerheads	-	$12.25
Lighting and aggregator	$23.15 (3.88)	$26.72 ($7.45)

Figure 1 shows the business costs of ACPs and end users[5] for 2009 and 2010 for organisations included in the research sample. For lighting and aggregator activities, costs are incurred both by the ACP and the end user of the equipment, therefore the total ESC delivery cost is shown, with the ACP business cost shown in brackets. As noted above, equipment upgrade activities are shown separately as they do not include project delivery costs.

The results show that ACP costs are significantly lower than the selling price of ESCs for 2009 and 2010. However for lighting and aggregator activities, when project delivery costs are included (borne by end using customers) they are very similar to ESC selling prices.

1.1.2 Electricity retailer costs

Figure 2: Electricity retailer delivery costs per ESC retired

Electricity Retailer Cost Estimates	2009	2010
ESC purchase costs	$20.18	$22.96
Internal additional Costs	$5.14	$1.25
Total Costs Per ESC	$25.32	$24.20

Electricity retailers estimated ESC purchase costs to be $20.18/ESC in 2009, increasing to $22.96 in 2010. Internal additional costs were $5.14 in 2009, decreasing to $1.25 in 2010.

[4] Includes project delivery costs (gross)

[5] End users are recipients of the energy efficiency equipment. In some cases (e.g. lighting activities) the customers pay other parties for the equipment and installation, separately from the activity of the ACP.

1.1.3 Cost Benefit Analysis

Cost benefit analysis (CBA) is used in the assessment of whether a proposed project, program or policy is worth doing, or to choose between several alternative ones. It involves comparing the total expected costs against total expected benefits, to see whether the benefits outweigh the costs, and by how much.

We have calculated the CBA using the quantitative information provided by scheme participants, and applied to an ESC creation forecast model (2009-2020) provided by IPART. The methodology employed for this project builds on best practice developed by the UK Government's approach to economic analysis of greenhouse gas mitigation programs through the Intergovernmental Analysts Group (IAG).

Figure 3: Total net costs and benefits/ESC 2009-2020

Year	TOTAL 2009-2020
Net ESC generation cost/ESC ($/ESC)	-$15.07
Net lifetime benefit per MWh saved ($)	$39.63[6]
Total net cost or benefit/ESC	$24.56

Figure 3 shows that the total ESS net benefit is $24.56 per ESC created under the scheme. Using the ESS 2009-2020 ESC creation forecast, energy savings are predicted to be 7.5 TWh over the life of the ESS, and provide CO_2e savings of 7.6Mt CO_2e.

Figure 4: Total ESC, Energy and CO_2e savings 2009-2020

Year	TOTAL 2009-2020
No. ESCs generated - lifetime CO_2e savings (Mt CO_2e)	7.6[7]
Total lifetime estimated energy savings (TWh)	7.5

1.2 Key Conclusions

The main finding of this project is that the Energy Savings Scheme is an overall benefit ($24.56/ESC). Based on this, the scheme makes both financial and environmental sense with an overall net resource benefit across all types of activity including showerheads, lighting/aggregators and equipment upgrades.

ACPs are operating programs which deliver ESCs profitably, so the scheme should grow should conditions remain similar in future. ACPs have different profiles and delivery models to generate ESCs across the three groups. These can be summarised as

- Showerhead activities – small businesses, set up exclusively in response to ESS delivering high volumes of showerheads to residential areas in NSW
- Lighting and aggregator activities – small and large organisations, with some retailers acting as ACPs in this area. Projects are sourced by marketing to large

[6] This analysis uses the LRMC of generation to estimate costs. This differs to the approach taken by the NSW Government when estimating the LRMC of energy supply applied to other government programs in the NSW Energy Efficiency Strategy, where these costs included generation, transmission, distribution and carbon costs, with an estimated value of around $80/MWh. Consequently, if the full long run marginal cost of energy inclusive of transmission and distribution costs had been used, the net benefit of the ESS would be considerably higher.

[7] This figure is based on existing projects accredited at the time this study was undertaken and assumes they will continue until 2020.

electricity end users undertaking projects, offering their ESS accreditation to provide end users with access to ESS revenue and charging a fee. Marketing is a key strategy in the business model, as the costs for end users of projects are high within only a marginal benefit for them

- Equipment upgrade ACPs – large, usually industrial organisations with very high energy use, claiming ESS as part of the benefits gained from improving energy efficiency

Electricity retailers who are obliged to participate, are taking a variety of approaches to comply, which can be summarised as:

- Reactive – sourcing ESCs where possible by working with ACPs and brokers
- Proactive – getting involved in ACP activity, and looking to improve relationships with their customers by undertaking paid for energy efficiency projects, and claiming ESS credits as part of activity
- Paying penalties – in a few cases, retailers avoided complying through ESC purchase, and simply paid penalties. However, most retailers made efforts to avoid paying penalties, due to the negative connotations associated with them.

Electricity retailers have reduced their internal delivery costs for running the scheme between 2009 (20%) and 2010 (5%) this is likely to be due to a combination of efficiency improvements, and the increase in scale of ESCs between 2009 and 2010.

The ESS market is embryonic and has potential to work more efficiently, with participants not communicating as well as they could. All respondents noted that ESCs were in short supply. Retailers paid $7M in penalties in 2010 due to not retiring enough ESCs under these, although in reality enough ESCs were generated to meet demand.

Some participants, particularly showerheads ACPs are concerned about how long the scheme is likely to last, which is affecting behaviour in the market. For example, this appeared to be having a negative impact on the desire and ability to form contractual arrangements between ACPs and retailers.

A key barrier to ACP participation is the rigorous audit requirements of the scheme, and is likely to be negatively impacting on new market entrants. However, some also see the rigorous requirements as a benefit once they are accredited, as it inhibits new entrants to the scheme, thus decreasing competition. Despite the audit requirements, experience of working with IPART was generally good, with respondents commenting positively on the service, such as when applying for accreditation.

1.3 Key Recommendations

Improve communication between participants: Several of the market issues found are caused by a lack of communication between participants, particularly between ACPs and retailers. Potential activities which could help improve communications include facilitated events to encourage networking between participants. In the UK, similar schemes such as the Carbon Emissions Reduction Target (CERT) have held networking events, or set up facilitated partnership working groups to help improve communications. Activities like this could be an opportunity to discuss views on topical elements of the scheme such as market liquidity, penalties and auditing.

Greater market certainty: Providing greater certainty over the future continuation of the scheme would give participants, particularly ACPs (e.g. showerhead activities), greater confidence to grow activities and invest more in developing longer term relationships with retailers.

Encourage new entrants to the market The market will need facilitation in order to grow, so it would be worthwhile seeking opportunities to help facilitate more participants to join the ESS. For example, UK experience has shown that businesses in other sectors can develop their delivery models to support energy efficiency activities and have transformational effects on the market. For example, for residential activities, working with home improvement stores, boiler servicing businesses and bathroom/kitchen installers has worked successfully.

Demonstrating additionality: It may be worthwhile investigating whether there is potential to include some evidence of additionality, for example within the application process for new projects, to help mitigate for non-additional activities occurring through the scheme.

Audit requirements: Special guidance for smaller businesses applying for accreditation may be beneficial, as currently there is a risk that smaller ACPs will stop participating and the market will stagnate with only a few large ACPs developing ESCs.

2 Introduction

2.1 Background and Context

The Independent Pricing and Regulatory Tribunal (IPART) of New South Wales engaged Databuild Research and Solutions Ltd to research the cost effectiveness of the New South Wales Energy Savings Scheme (ESS).

In July 2009 the New South Wales Government initiated ESS, which creates financial incentives to reduce consumption of electricity in NSW by encouraging energy savings activities. The scheme is designed to increase opportunities to improve energy efficiency by rewarding companies who undertake eligible projects that either reduce electricity consumption, or improve the efficiency of its use. The objectives of the ESS include:

- to assist households and businesses to reduce electricity consumption and electricity costs;
- to complement the Greenhouse Gas Reduction Scheme (GGAS) and 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.

The ESS places a mandatory obligation on scheme participants (electricity retailers and other parties licensed to buy or directly supply electricity in NSW) to obtain and surrender Energy Savings Certificates, which represent eligible savings under the Energy Savings Scheme.

Scheme participants purchase Energy Savings Certificates from Accredited Certificate Providers (ACPs), created following the implementation of energy saving activities. Companies that are mandatory scheme participants may also apply to become Accredited Certificate Providers.

2.2 Research Objectives

Databuild Research and Solutions Ltd has been commissioned by IPART to undertake an analysis of the cost-effectiveness of the ESS, in terms of both the cost per MWh of energy saved and cost per tonne of CO_2e reduced. In particular to:

- Understand costs associated with the program while it is still relatively early in delivery
- Undertake a cost benefit analysis based on the delivery costs
- Help IPART report cost benefit performance back to the NSW Government

Key additional qualitative research areas included:

- How scheme participants were delivering energy savings, and the rationale for involvement
- Drivers and barriers to participation in the scheme

Project Scope: In order to deliver this, we were tasked with interviewing ACPS, electricity retailers, and working with IPART to determine costs involved with delivery of the scheme. As the scheme is largely delivered by a market that operates separately from IPART, there has been little data on the approaches taken and costs of delivery available, so a research approach was deemed an appropriate methodology for the project.

3 Methodology

The cost effectiveness evaluation of the ESS comprises four key elements:

- Establishing a methodology for assessing the cost effectiveness of the ESS (Chapter 5)
- Conducting qualitative interviews with electricity retailers and Accredited Certificate Providers (ACPs) to identify and quantify their costs associated with participating in the ESS scheme (Chapter 6)
- Developing a cost effectiveness spreadsheet calculation tool designed to assist IPART in undertaking future cost effectiveness analysis on ESS.

3.1 Approach to the research

IPART provided Databuild with a database of 29 electricity retailers and 76 ACPs involved in the ESS scheme. To recruit the respondents the following approach was taken:

1. IPART sent an introductory letter to each respondent explaining the purpose of the work and notifying them that Databuild would be in contact with them shortly to arrange an appointment to speak with them
2. Databuild made contact with the respondent to arrange a time and date to undertake interviews either face to face or over the telephone.

Pilot interviews were conducted initially (see Appendix 1). Subsequently, in-depth interviews were conducted with a total of 33 organisations (see Appendix 2). Please refer to Appendix 3 for a full list of the interview questions.

3.1.1 Mandatory Participants interviews – electricity retailers

15 in-depth interviews were carried out with electricity retailer participants in the ESS scheme. Five interviews with the largest retailers were undertaken face to face, and a further ten interviews were undertaken by telephone. The interviewed sample represents over 70% of the total ESCs retired through the scheme for both 2009 and 2010, the years of operation of the scheme covered by this review.

Each interview was recorded, and lasted between 30 minutes and an hour and a half, with an overall average of just under an hour.

The following questions were explored with respondents:

1. Overall experience of the ESS, including extent of involvement with the scheme, obstacles to involvement
2. The proportion of resources spent on the main elements involved in scheme compliance, including:
    i. Purchasing ESCs
    ii. Scheme strategy and compliance
    iii. Annual audits
    iv. Relationships/ negotiations with ACPS
    v. Relationships with retailer customers and ESCs
3. Suggested areas for improvements to the scheme and other areas of interest.

3.1.2 Voluntary Participant interviews – Accredited Certificate Providers (ACPs)

18 in-depth interviews were carried out with Accredited Certificate Providers (ACPs). Interviews with five of the largest ACPs were undertaken face to face, and the rest were undertaken by telephone. Each interview was recorded, and lasted between 30 minutes and an hour and a half, with an overall average of just under an hour.

As with retailers, the majority of these interviews explore creation of ESCs which were sold and subsequently retired during 2009 and 2010. However, there were two respondents which hadn't sold any ESCs[8] as one had only just received accreditation in 2011, and another which had generated ESCs, but had not sought to sell them to a retailer.

The sample interviewed covered a significant proportion of ESCs retired (55% of total in 2010, and 30% of total in 2009), which means the results provide a good indication of what the total market is doing. However, there are limitations associated with the small sample size here, which is addressed in section 3.1.3.

These interviews were used to explore costs associated with the generation of ESCs through energy saving project delivery, and other costs associated with ESS participation. The following question areas were explored with respondents:

1. Background to the ACP's involvement in the ESS scheme, including motivations and barriers to involvement
2. The proportion of resources spent on delivering different key elements of the scheme, covering:

    i. Marketing and how they recruit projects
    ii. Project feasibility studies
    iii. Delivering projects – different projects/ technologies etc
    iv. Negotiations with electricity retailers
    v. Auditing activities
    vi. Systems, administration and other internal activities
    vii. Financing.

[8] We did not have information on their active status prior to interview.

The types of participants varied widely, in terms of the type of organisation, size and activity. For example, some of the showerhead activities ACPs were very small with only a few employees, whereas some of those undertaking equipment upgrade works were very large industrial businesses with very high energy use in NSW. As a result, the interviews were carried out using high level interview questions and were exploratory in nature to investigate in depth individual approaches taken and to record as much information as possible.

At IPART's request, since the draft report stage we have interviewed two further ACPs who are 'aggregators' (as they aggregate energy efficiency activities undertaken by other organisations who are unable or unwilling to become accredited under the scheme directly). The aggregator's customers gain some financial benefit from the inclusion of their projects in the scheme, while outsourcing the administrative and financial requirements of participating in the scheme to the aggregator (for a fee). As aggregators usually work with several organisations undertaking similar projects, they can develop standardised processes and achieve economies of scale.

3.1.3 Research Limitations

There are a number of research limitations, noted in the methodology report and discussed with IPART during project meetings to date.

Research sample: A key limitation in the research is sample size, as the project has a limited number of participants. Added to this, there is a large variety of ways to generate ESCs (e.g. showerheads projects are very different in terms of delivery and costs to large scale equipment upgrades). We have only researched a sample of the population, and found variation in approach and costs amongst similar projects. As a result, we have reported quantitative results based only on the sample we have researched at this stage.

Quality of information provided: The quality of the data provided in this report is limited by the quality of the information provided by respondents by estimating costs within the interviews. Although we requested supporting data for cost estimates provided by ACPs and retailers to help support this, we only received limited information via this route. Furthermore, there are commercial sensitivities involved with some aspects of the interviews (e.g. asking about prices of ESCs bought and sold under contractual arrangements), so in some cases respondents were unwilling to provide information.

Some respondents found it difficult to estimate costs within the interviews, as some of the activities had taken place some time ago (2009), so there is some uncertainty in response accuracy worth highlighting due to this. We have mitigated this uncertainty in responses by going back to re-check assumptions with some respondents, and by using experienced staff in order to appropriately interpret cost estimates provided to us. Although this applies some limitations in terms of the way the quantitative information can be interpreted, as noted above, the project covered a significant proportion of retailers(>70%) and ACPs (30%-55%[9]) participating in the scheme, so does provide a good guide as to the overall cost effectiveness of the program.

[9] For 2009 and 2010 respectively.

4 Quantitative Results

This section explores quantitative results in terms of costs incurred by ACPs, electricity retailers and IPART.

4.1 ACP Approaches and Costs

The projects undertaken by ACPs are split into those which had undertaken showerheads or lighting projects both using the deemed energy savings methodology, and those which had done equipment upgrade projects using the project impact assessment or measured baseline methodology.

Showerhead activities: We interviewed four ACPs delivering showerhead activities. These activities were delivered by businesses which were either largely or wholly set up as a result of ESS. They were state based companies, some also worked on other similar schemes such as the Victorian Energy Efficiency Target (VEET). The companies are small, with few (5-10) permanent staff and a larger pool of (20-70) contractors who they employed on a call off basis to actually deliver the activities in targeted residential and commercial areas in New South Wales.

These organisations form an important part of the research as, particularly in 2010, they make up a large proportion of the ESCs within the scheme (61%).

Lighting and Aggregator Activities: Of the lighting activities ACPs we interviewed, five organisations were undertaking these types of project, although one had only just been accredited and so hadn't started operational activity yet.

These organisations varied from small companies, set up to undertake energy audits for commercial and industrial energy users (sometimes supported by the Energy Savers Program), and two large retailers which had become ACPs, working through their customer base or with others.

Overall, these organisations were undertaking work which was similar to that of aggregators, and in two cases were actually acting as aggregators on a small scale. This meant they searched for energy saving projects undertaken by others, used their own ESS accreditation to claim ESCs for these projects (taking away the burden from the project deliverer), and sharing the proceeds.

We also interviewed two organisations acting as project aggregators by design, and due to their similar set up, for the purposes of the report we have combined the two types of activities.

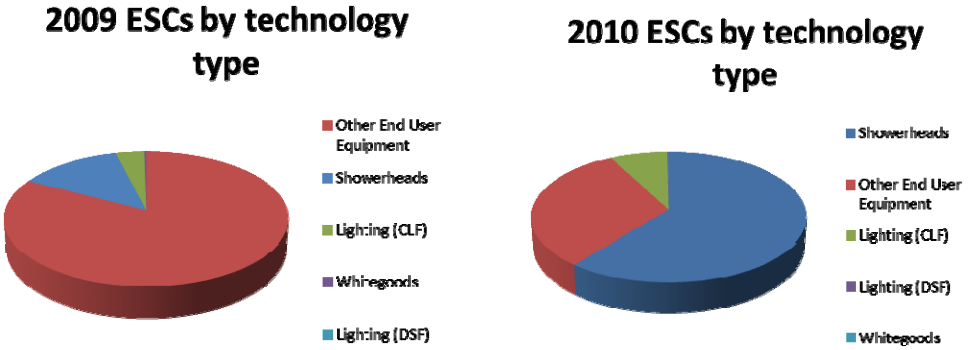
Equipment Upgrades: We interviewed a further seven organisations who had generated ESCs as part of undertaking equipment upgrade or replacement projects, and used the project impact assessment method or metered baseline method. There was significant variability in the type of organisation involved, which ranged from aluminium smelter companies to public health authorities. However, they were characterised by being typically very large organisations, with very high energy use and so employing energy managers to manage energy use and improve efficiency.

The ESS generally represented a small fraction of their overall turnover, and usually only one individual or small team managed ACP activities.

Some of the organisations were exempted from the ESS as part of the high energy users' exemption Ministerial Order, but still participated as an ACP in order to generate revenue from energy efficiency projects they undertook.

Figure 5 shows the percentage split of ESCs delivered by technology type for 2009 and 2010.

Figure 5: Total ESCs delivered split by technology type 2009, 2010



This section of the report focuses on the main costs associated with the different approaches taken to generate ESCs by ACPs. The different approaches have been classified as separately as showerhead activities, lighting upgrades and equipment upgrades.

As these are private sector businesses[10], we assume that these costs are passed on to the electricity retailer purchasing ESCs. It also covers estimates of the prices ESCs were sold at so estimates the profitability of the activities.

As described above, a few respondents were not comfortable providing estimates of prices for ESCs sold. Where prices were not provided, estimates have been made using an average of the OTC price on the spot market for 2009 and 2010 respectively. As the OTC price is not significantly different from estimated prices, we feel that this is a reasonable assumption to make in absence of respondent information.

1. Showerhead activities

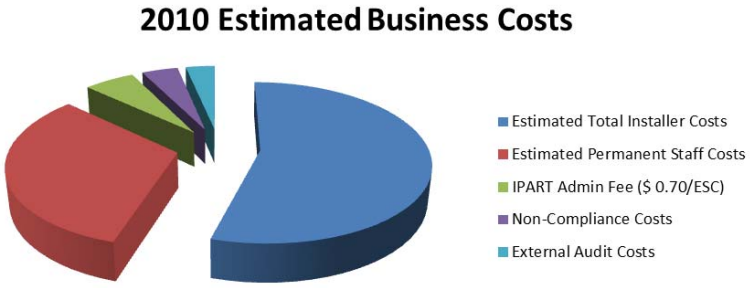
Respondents from the sample for showerhead activities had only generated ESCs in the 2010 year, none were generated in 2009.

Figure 6 shows the costs of delivery, as a weighted average of the sample we interviewed. The costs have been represented in terms of a 'cost per ESC', and the relative proportion of each major business cost shown as a percentage of the total.

[10] Aside from two state run ACPs

Figure 6: Showerheads Activity Estimated Costs[11][12] (Project Administration and Delivery)

Showerheads Activity Cost Area	$/ESC	Percentage (%)
Estimated sales price/ ESC	**$25.17**	100%
Estimated Profit/ESC	$12.93	51%
Estimated Total Business Costs	$12.25	49%
Estimated Total Business Costs	**$12.25**	**100%**
Estimated Total Installer Costs	$6.68	55%
Estimated Permanent Staff Costs	$3.94	32%
IPART Admin Fee ($ 0.70/ESC)	$0.70	6%
Non-Compliance Costs	$0.50	4%
External Audit Costs	$0.40	3%



The results show that these activities are operating profitably. Looking at individual responses, this was higher for larger projects, which were achieving economies of scale.

Differences in size of operation ranged from 10,000 ESCs for the smallest ACP, to over 250,000 for the largest. The difference in size meant that fixed costs (e.g. audits) were higher and affected profitability of smaller ACPs. There is a degree of uncertainty with the data here, as one large ACP respondent did not provide cost estimates for sold ESC prices and we have estimated prices using OTC data for this respondent.

Since 24th December 2010 the factors for creating showerheads ESCs have changed so that 2.014 ESCs (1.9 x 1.06) may be created for each showerhead installation, as opposed to 3.498 (3.3 x 1.06), which has been used to calculate these figures. The Rule change would reduce the estimated profits to about 28% (although some of this reduction may be mitigated by charging higher prices for ESCs).

Despite size differences, the business model of showerheads activity ACPs is consistent across all organisations interviewed, and has a relatively simple structure. As described in the sections above, the companies only had few permanent members of staff (3-10),

[11] Costs for showerheads activities are based on 3.3 ESCs created per showerhead. The rule changed reducing this to 1.9 on December 24th 2010.
[12] For the cost benefit analysis we include a cost of capital assumption, which is not included here

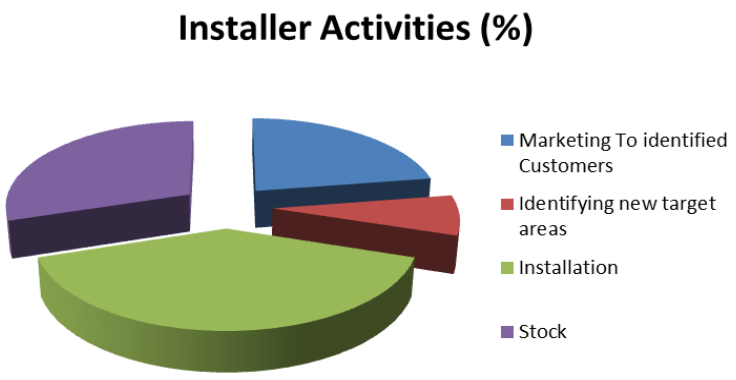
which usually included business owners who had set up the company as a result of the ESS and other similar schemes in Australia.

Installer Activities: The businesses also employ teams of sub-contractors who do the marketing (leaflet dropping, door knocking), engage customers, install the showerheads at the property and remove old showerheads. These teams of subcontractors are managed closely by permanent staff acting as team leaders, directing the activities of the contractors and the areas in which they work. The individual sub-contractors also move between companies, depending on who is in audit (when delivery work ceases).

Included in these costs are costs for the showerheads stock. It is not possible to accurately separate installation from stock costs from the research, as respondents were inconsistent in their responses when questioned about splitting these costs out. However, from the responses received, we estimate that the split of resources for installation activities shown in Figure 7.

Figure 7: Estimated Installer activities

Installer Activities	Percentage (%)
Marketing	20-25%
Identifying new target areas	5-10%
Showerhead installation	40%
Showerhead stock	30%

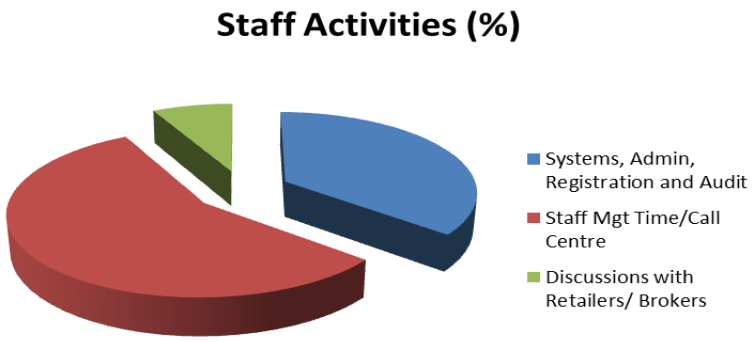


Staff Activities: Main activities of permanent staff included scheme registration and gaining accreditation working with IPART, management of installers, auditing and developing systems and doing administration. A large proportion of staff time was ensuring paperwork and internal audits were undertaken in order to comply with the scheme.

As with installer activities, it is difficult to provide accurate, evidenced splits of resources between activities, however based on the responses received we estimate the following split of activities shown in Figure 8.

Figure 8: Estimated Staff Activities

Staff Activities	Percentage (%)
Systems, admin, registration and audit	30-40%
Staff mgt time/call centre	50-60%
Negotiations with retailers/ brokers	10%



A significant amount of the registration and audit activities were deemed to be relevant only to year one and it was generally felt that these costs would decrease over time as after passing the first 10,000 ESC audit, they can operate for a further 40,000 before the next audit.

In terms of negotiations with retailers or brokers of ESCs, time spent on this activity was low; mainly as it has been easy to sell certificates.

Non-compliance costs: Non-compliance costs; particularly for showerhead activities are material as they do have a high non-compliance rate compared to other ESC generation projects and have forfeited many ESCs. Separating out non-compliance costs is difficult, as respondents tend to think in terms of overall operating costs, of which non-compliance plays a role to varying degrees in a number of different areas. We also believe that some respondents may have provided conservative estimates of non-compliance costs, perhaps because they are nervous about discussing these within an IPART project, as IPART is the scheme regulator. One respondent did describe non-compliance costs in depth and provided an estimate of approximately $20 per ESC forfeited.

Other minor costs noted by respondents included costs for brokers, which they estimated were a few cents per ESC and therefore, in their view, not worth exploring in detail.

2. Lighting and Aggregator Activities

Five respondents delivering lighting projects, and two ACPs identifying themselves as aggregators were interviewed. However two lighting respondents did not provide sufficient costs data to be included in the analysis so were excluded.

Lighting and aggregator activity ACPs have been combined for quantitative analysis purposes because their delivery model was similar across both. In addition, aggregator activities were largely involved with lighting activities. There was limited action taken to actively seek out additional energy saving projects, and where this was happening the ESS was not the main incentive to take action (which was realising energy savings across a raft of projects[13]).

Almost all projects claiming ESCs had already taken place, and ESC creation was sought retrospectively. This involved ACPs seeking out and working with commercial or industrial energy users who had undertaken lighting or other energy efficiency projects and in effect licensing their ESS accreditation to claim ESCs. This was done for a fee negotiated as a commercial arrangement between the two organisations.

Because the projects initially accredited were largely undertaken prior to the ESS commencing, there may be limited additionality in the early savings. However, over time it can be expected that, as end-users become more aware of the financial gains and aggregators expand their business, the ESS will promote earlier and more-extensive roll-out of energy efficient lighting.

Two of the lighting ACPs actually got involved with delivering projects, offering a whole package to the energy user, by undertaking the following:

- Undertaking an energy audit, sometimes subsidised by the OEH Energy Saver Sustainability Advantage Program (ESSAP) to identify energy saving opportunities across a range of measures, some of which were eligible for ESC creation
- Arranging sub-contractors to undertake works, (paid for by the end user)
- Using their ESS accreditation for measures eligible for ESC creation to create ESCs.

In one case this also included data logging before and after project delivery to fulfil metered baseline methodology projects.

ESC Creation fees: The ACPs charged varying fees for ESC creation, ranging from 15-35% of the value of the ESCs created, with average fees estimated at $4.8/ESC for 2009 and $7.50/ESC for 2010. The rest of the ESC revenue was passed to the end user. There is some uncertainty with this data as two respondents did not provide estimates, so for these we used average estimates which we believe to be appropriate as their model of delivery was very similar to others.

ACP Business costs: Business costs increase from 2009 ($3.88) to 2010 ($7.45) due to a large increase in scale of delivery in 2010 by some participants. As ACPs settled into a more constant rate of delivery in 2011, it was thought this would improve.

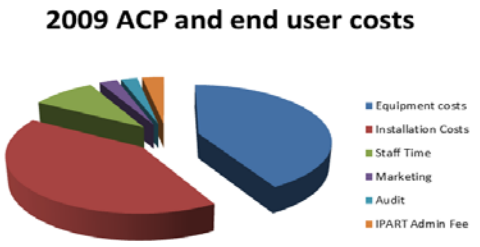
[13] Of which a portion may have been eligible for ESC creation

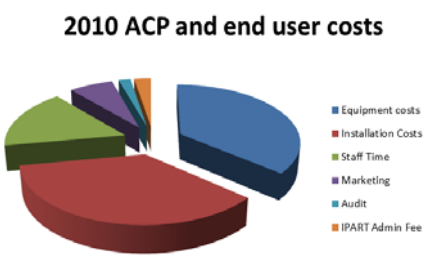
Project Delivery (End User) Costs: Despite a focus of effort to elicit project delivery costs for lighting and aggregator activities through interviewing ACPs this proved fruitless due to lack of knowledge or commercial confidentiality concerns. In most cases, the ACPs had not been involved with installation of the equipment, as the end using customer had undertaken (and paid for) these activities separately. Even in the cases where an ACP had undertaken the project directly, it had been paid for under contract so figures were confidential.

As a result, project delivery costs have been estimated based on a separate assessment of equipment and installation costs through desktop research and interviews with lighting manufacturers and experts. Figure 9 shows total project delivery (end user) costs as $19.28/ESC, of which half is due to the costs of the lighting equipment and half for installation[14].

Figure 9: Lighting and aggregator ACP and end user cost estimates (project administration and delivery)

Lighting/ Aggregator Scheme Cost Area	2009	%	2010	%
Sales price/ ESC	$21.79	100%	$25.05	100%
End User split / ESC	$16.95	78%	$17.42	70%
ACP/Aggregator revenue	$4.83	22%	$7.64	30%
ACP/Aggregator revenue	**$4.83**	**100%**	**$7.64**	**100%**
Profit	$0.95	20%	$0.19	2%
Total business costs	$3.88	80%	$7.45	98%
Total business costs	**$3.88**	**100%**	**$7.45**	**100%**
Staff Time	$2.08	53%	$4.43	60%
Marketing	$0.58	15%	$1.82	24%
Audit	$0.53	14%	$0.49	7%
IPART Admin Fee	$0.70	18%	$0.70	9%
End user costs	**$19.28**	**100%**	**$19.28**	**100%**
Equipment costs	$9.69	50%	$9.69	50%
Installation Costs	$9.59	50%	$9.59	50%
Total ACP and end user costs	**$23.16**	**100%**	**$26.73**	**100%**





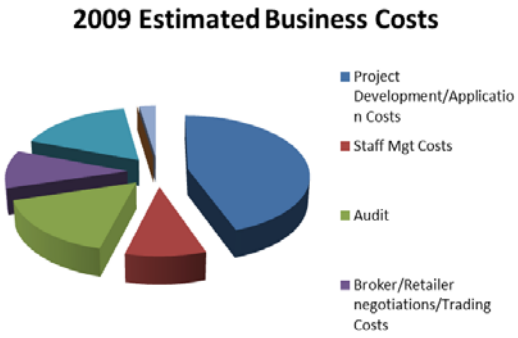
[14] Based on an analysis of the following types of equipment: T8-T5 replacements, T8 delamping, T5 adaptors, Compact Fluorescent Lamps (CFLs), LED downlights and low energy halogen replacements.

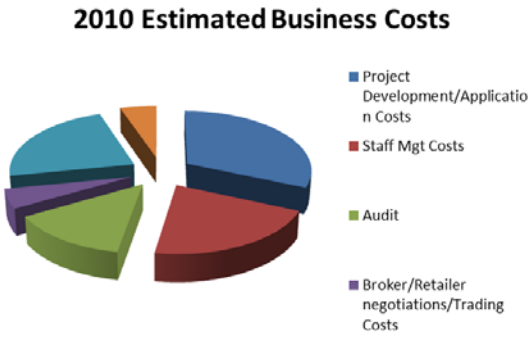
3. Equipment Upgrades

Respondents, who undertook equipment upgrade activities, had undertaken projects in 2009 and 2010, and were all transferred over from the GGAS scheme. This is markedly different to other activities such as showerheads installation, as set up costs play less of a role.

Figure 10: Equipment Upgrade Project Cost Estimates (Project Administration)

Equipment Upgrade Cost Area	2009	%	2010	%
Sales price/ ESC	**$22.86**	**100%**	**$26.44**	**100%**
Profit	$18.72	82%	$23.38	88%
Total business costs	$4.14	18%	$3.06	12%
Total business costs	**$4.14**	**100%**	**$3.06**	**100%**
Project development/application costs	$1.84	45%	$0.97	32%
Staff mgt costs	$0.40	10%	$0.64	21%
Audit	$0.68	16%	$0.43	14%
Broker/retailer negotiations	$0.42	10%	$0.16	5%
IPART Admin Fee ($0.70/ESC)	$0.70	17%	$0.70	23%
Marketing	$0.00	0%	$0.16	5%
Consultancy	$0.10	2%	$0.00	0%





Contrary to showerheads, lighting and aggregator activities, the table above shows the administration costs of the projects, without the costs of the equipment upgrades themselves. Key reasons for this are:

- These tend to be large upgrade projects (e.g. aluminium smelter upgrades), which occurred several years ago, accredited through the GGAS scheme and then transferred to ESS. On this basis respondents did not feel it appropriate to include project delivery costs for ESS[15].
- Enquiring about the costs of the projects was difficult for respondents to answer. This is because usually:

[15] On the basis that these projects were done under the DSA component of the GGAS scheme, which became the basis for ESS

    - the respondent hadn't been involved in the project and in several cases had been undertaken before they became involved with ESS or worked at the organisation.
    - the project may have been undertaken as part of a larger upgrade and/or pursued for reasons in addition to the energy savings.
- As discussed later in this report, the question of additionality applies here as respondents when asked did not say that they did the project directly as a result of the GGAS or ESS scheme (although it may have helped), so some felt it would not be appropriate to include these costs within the analysis.

Hence it was difficult to estimate and allocate the costs for the equipment upgrades. It is important to note that this means it is not appropriate to directly compare the costs of equipment upgrade projects with other projects in the scheme.

Estimated Project Costs: As described above, the cost analysis for equipment upgrades excludes project delivery costs. However, we did ask for estimates of these project costs, and received five estimates which are shown in Figure 11. These are shown here just to provide an overview of the scale and types of projects undertaken, which may help further discussions within IPART on the subject of additionality.

Figure 11: Equipment Upgrade Project Cost Examples

Project type	Estimated Cost ($M)
Aluminium Smelter Upgrade	125
Lighting, Chillers and Power Factor Correction Units	2.4
Lighting, Chillers and Power Factor Correction Units	15.0
Aluminium Smelter Upgrade	1.8
Lighting	0.2

Should IPART wish to investigate this area further, we would recommend a review of the GGAS scheme and further work to investigate these costs with other staff members within the ACP organisations.

The exclusion of project costs does make the analysis look highly profitable for respondents; however it is worth noting that many pay the ESS charge through their energy bill, particularly where they are not exempted from liability so feel that ESS is a way of recouping that liability rather than a profit making exercise. In contrast to other ACP types, these organisations tended to be very large, so the impact of ESS on their turnover was very small.

4.2 Electricity Retailer Approach and Costs

As shown in section 3.1.1, we interviewed 15 electricity retailers, ranging from the largest organisations, to smaller retailers with relatively small liabilities under the scheme. The sample interviewed covers 76% of all ESCs retired under the scheme in 2009, and 69% in 2010.

Retailers have significantly improved their internal additional costs, which reduced from 20% over the ESC purchase price in 2009, to 5% in 2010. Most respondents attributed higher costs in 2009 to set up activities, which required more staff time in the first year.

Figure 12: Electricity Retailer Costs

Electricity Retailer Costs	2009	%	2010	%
Total costs per ESC	$25.32	100%	$24.20	100%
Cost of purchasing ESCs	$20.18	80%	$22.96	95%
Internal additional costs	$5.14	20%	$1.25	5%
Internal additional Costs	**$5.14**	**100%**	**$1.25**	**100%**
Staff mgt and admin	$3.24	63%	$0.59	48%
Auditing	$0.71	14%	$0.23	18%
Annual energy statement	$0.26	5%	$0.10	8%
ESC purchase negotiations	$0.27	5%	$0.08	6%
Other costs	$0.66	13%	$0.25	20%

In general we found that only one or two people within the organisation knew about the ESS in detail (usually the energy/ facilities manager), and once the system has been set up, they spent only a few days on it each year to fulfil the audit and paperwork requirements to source and purchase the ESCs, accounting for the low estimated costs of administration of the scheme.

Reviewing the sample in more detail, shows that due to fixed and set up costs, some of the smallest respondents had much higher administration costs (almost equal to ESC purchase costs in some cases), whereas the largest retailers typically had on-costs of 3-5%.

Figure 12 provides a breakdown of other main areas of activity and cost in ESS participation. Staff costs are mainly due to undertaking internal audits and administering

the scheme, particularly when the annual energy statement is due. The main external cost for them is for the required external audit required by IPART.

These costs exclude the costs of paying penalties for ESCs not surrendered, which is explored separately in section 4.2.1.

ESC purchase prices estimates: In interviews with ACPs and retailers we asked respondents to provide us with an average cost of ESC sold or purchased. The weighted[16] average purchase price estimated by electricity retailers ($20.18 in 2009, $24.20 in 2010) is slightly lower than some of the ACP estimates shown in section 4.1. This results from sample variability, particularly within the ACP sample and do not see this as a significant problem. Overall, these estimates do not significantly vary from OTC price information provided by IPART for 2009 and 2010.

ACPs and retailers were generally happy to estimate sales prices when talking in general, and referred to the open market as one of the main ways in which ESCs were bought and sold, particularly in the early stages of the market. However, both sets of respondents were less happy to give details of prices agreed through ESCs delivered under performance contracts due to commercial confidentiality. We know these prices are usually lower than OTC prices, and as retailers will have a better overview of both open market and contract sources prices, this may also have a bearing on the slightly lower average ESC price estimate.

4.2.1 Penalty Payments

Penalty payments totalled over $7.3M, with the majority paid in 2010. We have not included penalty payments as part of the overall costs for delivering ESCs, mainly because these costs are directly associated with retailers not delivering ESCs.

We have also not included these payments within the cost effectiveness analysis as although they are considered a loss for electricity retailers, they are a benefit for Government (transfer cost) which means at a resource cost level they should cancel each other out.

[16] Weighted by the sum of respondent estimations multiplied by the number of ESCs they generated and then divided by the total number of ESCs included in the sample.

4.3 IPART Costs

Figure 13 shows IPART's estimated budget spend on the ESS in 2009 and 2010. The detailed 2009 IPART budget was not available, so the budget is based on 2010 figures, and divided in two for 2009 to estimate the 6 months the scheme ran for in that year. A further assumption is that these are financial year budgets, whereas the scheme operates on a calendar year basis; however it was agreed with IPART that this wouldn't have a material impact on the costs, which are relatively minor in terms of the overall scheme size.

Figure 13: IPART Estimate budget 2009 and 2010

Year	2009 ($k)	2010 ($k)
IPART ESS Budget	764	1,529

Figure 14 transforms these overall costs into a cost 'per ESC' for the scheme, which is based on the number of ESCs retired in 2009 and 2010.

Figure 14: IPART ESS Costs per ESC

IPART $/ESC	
2009	2010
$5.13	$2.35

5 Cost Benefit Analysis

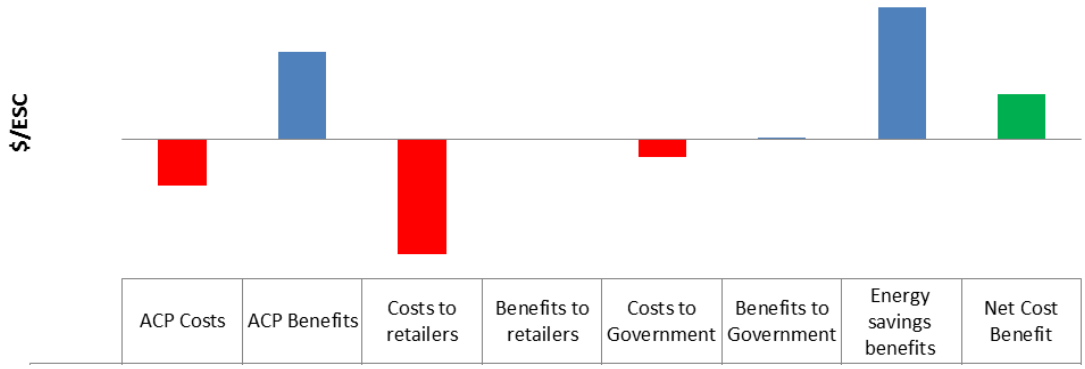
The cost benefit analysis undertaken for this project is based on methodologies for assessing the cost effectiveness of similar programs in the UK such as the Carbon Emissions Reduction Target (CERT). The methodology adopted to undertake these types of assessments are peer reviewed in the UK by the Intergovernmental Analysts Group and considered best practice to follow.

Cost Benefit Analysis (CBA) is used in the assessment of whether a proposed project, program or policy is worth doing, or to choose between several alternative ones. It involves comparing the total expected costs against total expected benefits, to see whether the benefits outweigh the costs, and by how much.

In this section we use the quantitative results to calculate the cost benefit analysis for the ESS. This provides a measure of the cost effectiveness of the program on a 'total resource costs[17]' basis, taking into account benefits such as reduced energy bills. The results are shown on a 'per ESC' basis.

By 'total resource costs' we mean the total net cost or benefit to society as a whole, taking into account the activities of all players, and eliminating transfer costs which occur where there is a cost incurred by one party (e.g. to retailers), but is a benefit elsewhere (e.g. to ACPs). **Figure 15** provides a schematic representation of the approach.

Figure 15: Cost Benefit Analysis Schematic



CBA Assumptions and Limitations: Cost benefit analysis involves the use of a number of calculated assumptions, which require consideration when interpreting the results. An example of this would be the calculation of energy savings benefits (**Figure 15**), which are calculated over the lifetime of the measures put in place, which relies on a forecast of the future energy prices. An overview of these assumptions is provided in Appendix 4.

In the sub-sections below, the costs and benefits of each major scheme type (showerheads, lighting, equipment upgrades) is calculated, based on the sample of respondents. These focus on scheme delivery for 2009 and 2010.

In section 5.4, the cost benefits analysis is calculated on all activities delivered. For the total ESS cost benefit analysis, the calculations are based on forecast ESS activity over the life of the scheme from 2009 to 2020. This is based on an ESC forecast model developed by IPART. Further details on this forecast model is provided in Appendix 4 (Figure 34). Note that in the sections below, b**enefits** are shown as **positive** numbers, and **costs** as **negative**.

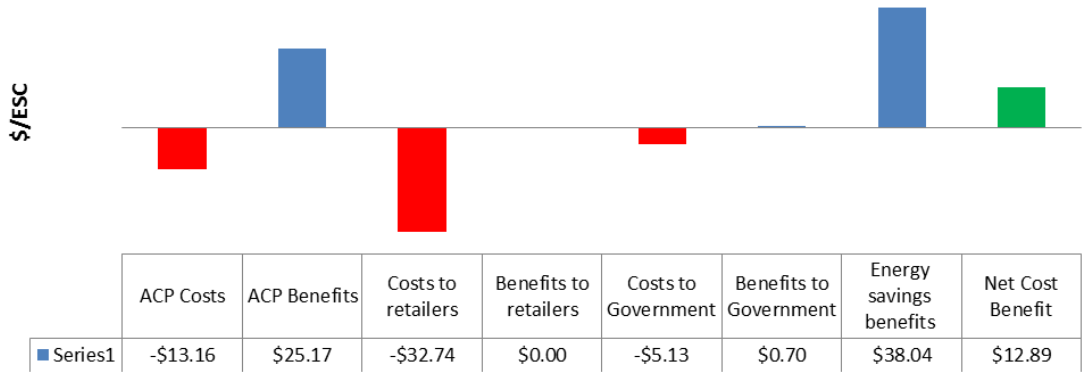
5.1 Showerheads Activity CBA Results

Figure 16 and Figure 17 show the net costs and benefits for delivery of showerhead activities distributed across ACPs, electricity retailers and Government. These are based on sample responses from activities delivered in 2010.

2009 CBA: We do not have respondent results for showerheads activity ACPs in 2009, so we have applied 2010 cost delivery figures to 2009 for the purposes of the CBA. This uses the same figures as those for 2010, except:

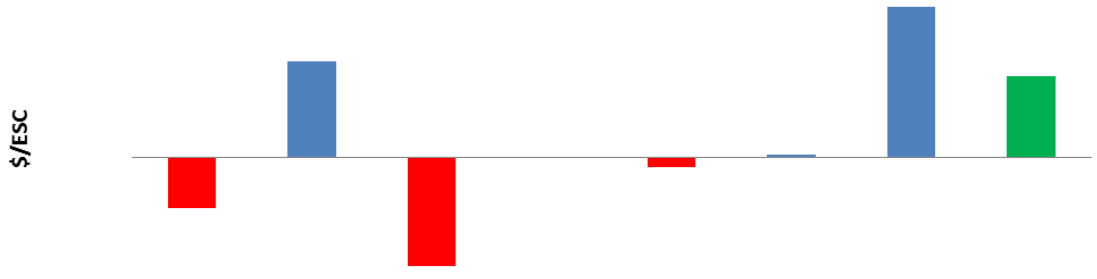
- Retailer ESC delivery costs are higher at $32.74 per ESC
- IPART delivery costs are also higher at $5.13 per ESC

Figure 16: 2009 Showerheads Activity Cost Benefit Analysis



	ACP Costs	ACP Benefits	Costs to retailers	Benefits to retailers	Costs to Government	Benefits to Government	Energy savings benefits	Net Cost Benefit
Series1	-$13.16	$25.17	-$32.74	$0.00	-$5.13	$0.70	$38.04	$12.89

Figure 17: 2010 Showerheads Activity Cost Benefit Analysis



	ACP Costs	ACP Benefits	Costs to retailers	Benefits to retailers	Costs to Government	Benefits to Government	Energy savings benefits	Net Cost Benefit
Series1	-$13.16	$25.17	-$28.53	$0.00	-$2.35	$0.70	$39.60	$21.44

More detailed tables of calculations for Figure 16 and Figure 17 are provided in Appendix 5.

Figure 18: Showerheads activity net costs and benefits / ESC

Year	2009	2010
Net ESC generation cost/ESC ($/ESC)	-$25.16	-$18.16
Lifetime benefit per MWh saved ($)*	$38.04	$39.60
Total net cost or benefit/ESC	$12.89	$21.44

* = to 2020, 2021 respectively adjusted for LRMC energy prices, discounting and inflation

Figure 18 shows that showerhead activities showed an overall benefit of **$12.89** in 2009, and **$21.44** in 2010. The reason for the improvement shown in 2010 is due to lower costs (on a per ESC basis) for both retailers and IPART in scheme delivery.

Figure 19: Showerheads activity ESC, Energy and CO_2e savings[18]

Year	2009	2010
No. ESCs generated - lifetime CO_2e savings (Mt CO_2e)	37,032	462,169
Total lifetime estimated energy savings (MWh) [19]	34,936	436,008

Figure 19 applies the per-ESC results to the numbers of ESCs delivered by showerhead activities in 2009 and 2010, to provide energy and CO_2e savings for those projects.

Figure 20: Showerheads activity total costs and benefits ($M)

Year	2009	2010
Total net ESC generation cost ($M)	-0.93	-8.39
Total lifetime energy bills savings ($M)	1.41	18.30
Total net present value ($M)	0.48	9.91

Figure 20 shows the total costs, and benefits of delivering showerhead activities in 2009 and 2010. This shows these activities to have a net present value[20] of $0.48M in 2009 and $9.91M in 2010. The reason for the increase in 2010 is mainly due to large increase in ESCs delivered through showerhead activities that year.

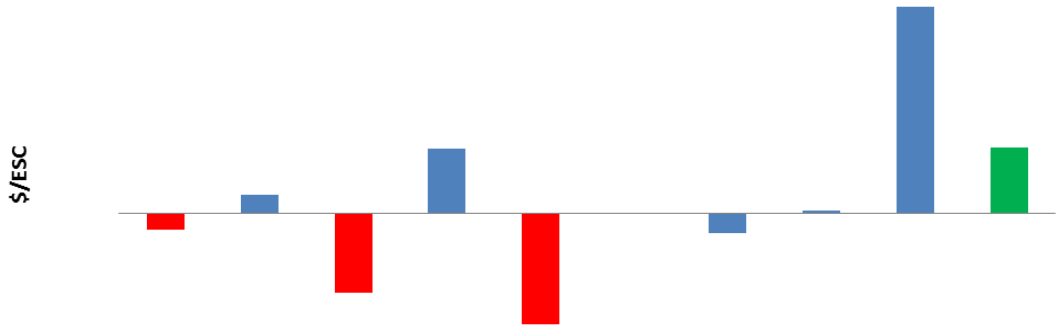
As described above, refer to Appendix 4 for details on calculation assumptions for the figures. These assumptions include discount rates, inflation and forecast energy prices to 2020.

[18] See appendix 2 for details of ESC, energy and CO_2e conversion calculations.
[19] The energy savings represent the full (undiscounted) energy savings associated with ESC creation (i.e. discount factors have not been applied to the energy savings associated with 'forward creation' of ESCs using the Project Impact Assessment Method).
[20] Net present value is the total value of the scheme today, given the number of ESCs generated and their energy savings.

5.2 Lighting Project / Aggregator CBA Results

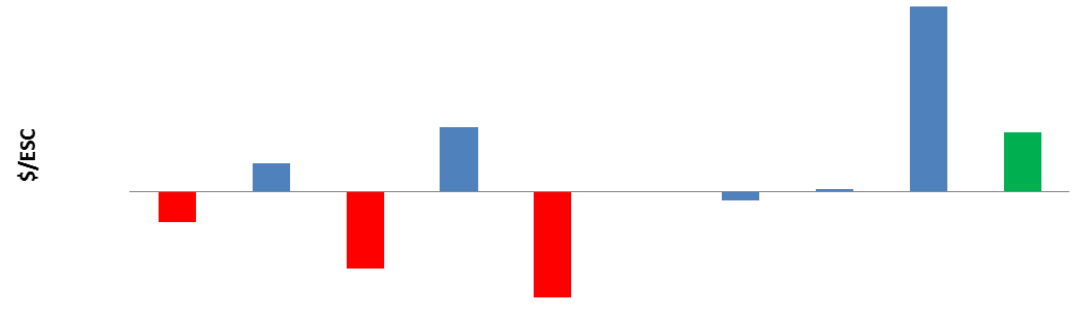
Figure 21 and Figure 22 show the net costs and benefits for delivery of lighting and aggregator activities distributed across ACPs, energy end users, electricity retailers and Government. For these activities, an additional party – the energy end-user (i.e. the recipient of the energy saving project) - is included. This is because they receive a large proportion of the ESC payment for undertaking the project. The ACP in these cases is a separate entity, who takes on the responsibility and risk of generating ESCs using their RESA accreditation.

Figure 21: 2009 Lighting and Aggregator Activity Cost Benefit Analysis



	ACP Costs	ACP Benefits	End user costs	End user benefits	Costs to retailers	Benefits to retailers	Costs to Government	Benefits to Government	Energy savings benefits	Net Cost Benefit
Series1	-$4.20	$4.83	-$20.81	$16.95	-$29.08	$0.00	-$5.13	$0.70	$53.95	$17.21

Figure 22: 2010 Lighting and Aggregator Activity Cost Benefit Analysis



	ACP Costs	ACP Benefits	End user costs	End user benefits	Costs to retailers	Benefits to retailers	Costs to Government	Benefits to Government	Energy savings benefits	Net Cost Benefit
Series1	-$8.04	$7.64	-$20.81	$17.42	-$28.40	$0.00	-$2.35	$0.70	$49.84	$15.99

Figure 23: Lighting and Aggregator activity net costs and benefits/ESC

Year	2009	2010
Net ESC generation cost/ESC ($/ESC)	-$36.74	-$33.85
Net lifetime benefit per MWh saved ($)*	$53.95	$49.84
Total net cost or benefit/ESC	$17.21	$15.99

* = to 2020, 2021 respectively adjusted for LRMC energy prices, discounting and inflation

Year	2009	2010
Net ESC generation cost/ESC ($/ESC)	-$36.74	-$33.85
Net lifetime benefit per MWh saved ($)*	$53.95	$49.84
Total net cost or benefit/ESC	$17.21	$15.99

* = to 2020, 2021 respectively adjusted for LRMC energy prices, discounting and inflation

Figure 23 shows that lighting and aggregator activity showed an overall benefit of **$17.21/ESC** in 2009 and **$15.99/ESC** in 2010.

The figures also show that the lifetime energy saving benefits are higher than for other projects ($53.95/ESC in 2009 and $49.84/ESC in 2010). The reason for this is due to a higher proportion of project impact assessment method ESCs generated via these methods, which have higher estimated energy savings. The reason why the 2010 benefit is slightly lower (despite a decreased ESC generation cost) is due to a lower proportion of project impact assessment ESCs created in the overall mix of measures creating certificates.

Figure 24: Lighting and Aggregator activity ESCs, Energy and CO_2e savings[21]

Year	2009	2010
No. ESCs generated	92,540	107,519
Total lifetime energy savings (MWh)[22]	139,136	132,061

Figure 24 applies the per-ESC results to the numbers of ESCs delivered in 2009 and 2010, to provide energy and CO_2e savings for those projects.

Figure 25: Lighting and Aggregator activity total costs and benefits ($M)

Year	2009	2010
Total net ESC generation cost ($M)	-3.40	-3.64
Total lifetime energy bills savings ($M)	4.99	5.36
Total net present value ($M)	1.59	1.72
Year	**2009**	**2010**
Total net ESC generation cost ($M)	-3.40	-3.64
Total lifetime energy bills savings ($M)	4.99	5.36
Total net present value ($M)	1.59	1.72

[21] See appendix 2 for details of ESC, energy and CO_2e conversion calculations.

[22] The energy savings represent the full (undiscounted) energy savings associated with ESC creation (i.e. discount factors have not been applied to the energy savings associated with 'forward creation' of ESCs using the Project Impact Assessment Method).

Figure 25 shows the total costs and benefits of delivering lighting and aggregator activity in 2009 and 2010. This shows a net present value of $1.59M in 2009 and $1.72M in 2010.

5.3 Equipment Upgrade CBA Results

Figure 26 and Figure 27 show the net costs and benefits for delivery of equipment upgrade activities in 2009 and 2010.

Figure 26: 2009 equipment upgrade activity cost benefit analysis

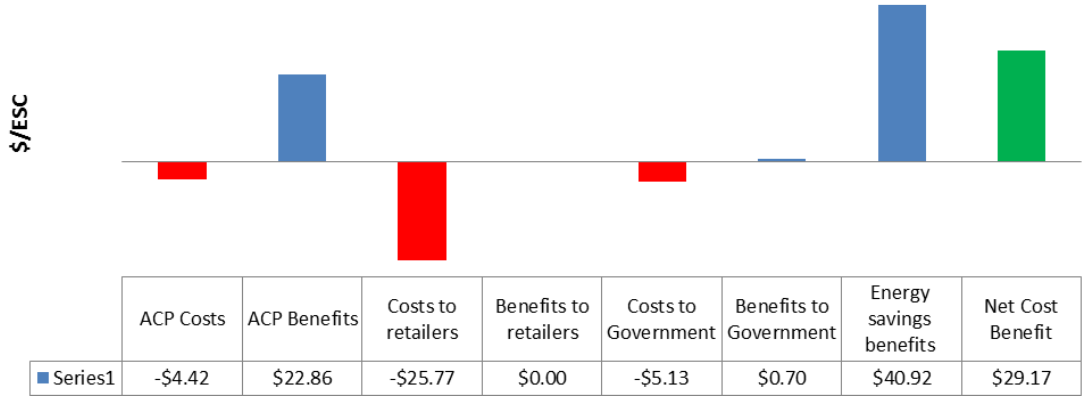


Figure 27: 2010 equipment upgrade activity cost benefit analysis

More detailed tables of calculations for Figure 26 and Figure 27 are provided in Appendix 5.

Figure 28: Equipment upgrade activity net costs and benefits / ESC

Year	2009	2010
Net ESC generation cost/ESC ($/ESC)	-$11.75	-$8.36
Net lifetime benefit per MWh saved ($)*	$40.92	$36.88
Total net cost or benefit/ESC	$29.17	$28.52

* = to 2020, 2021 respectively adjusted for LRMC energy prices, discounting and inflation

Figure 28 shows that equipment upgrade activities showed an overall benefit of **$29.17/ESC** in 2009, and **$28.52/ESC** in 2010. The reason for the slight decrease in benefit shown in 2010 is due to

- Increase in retailer costs from 2009 to 2010
- Differences in the mix of technologies and therefore calculation methods used for projects delivered in 2009 and 2010.

Figure 29: Equipment upgrade activity ESC, Energy and CO_2e savings[23]

Year	2009	2010
No. ESCs generated	147,884	189,920
Total lifetime estimated energy savings (MWh)	160,004	182,639

Figure 29 applies the per-ESC results to the numbers of ESCs delivered in 2009 and 2010, to provide energy and CO_2e savings for those projects.

Figure 30: Equipment upgrade activity total costs and benefits ($M)

Year	2009	2010
Total net ESC generation cost ($M)	-1.74	-1.59
Total lifetime energy bills savings ($M)	6.05	7.00
Total net present value ($M)	4.31	5.42

Figure 30 shows the total costs, and benefits of delivering equipment upgrade activities in 2009 and 2010. This shows these activities to have a net present value of $4.31M in 2009 and $5.42M in 2010.

[23] See appendix 2 for details of ESC, energy and CO_2e conversion calculations.

5.4 ESS Total Scheme Cost Benefit Analysis Results

To calculate the total net generation cost, a weighted average of the costs of delivery of each scheme type has been calculated, based on the numbers of ESCs each contributes to the total scheme.

In addition, the CBA calculates the costs and benefits of the scheme across the predicted life of the scheme, 2009-2020. This uses IPARTs' ESC generation forecast, detailed in Appendix 4. The forecast predicts total generation across this timeframe of over 7M ESCs.

Figure 31: Total ESS net costs and benefits/ESC 2009-2020

Year	TOTAL 2009-2020
Net ESC generation cost/ESC ($/ESC)	-$15.07
Net lifetime benefit per MWh saved ($)*	$39.63
Total net cost or benefit/ESC	$24.56

Figure 31 shows that the total ESS net benefit is $24.56 per ESC created under the scheme.

Sensitivity Analysis: This benefit is significantly dependent on the forecast long run marginal cost of energy generation, described in the assumptions in Appendix 4. We undertook a sensitivity analysis, and reduced the LRMC of generation cost by 10%, which reduced the overall benefit to $21/ESC.

Figure 32: Total ESS ESC, Energy and CO_2e savings 2009-2020

Year	TOTAL 2009-2020
No. ESCs generated - lifetime CO_2e savings (Mt CO_2e)	7.60
Total lifetime estimated energy savings (TWh)	7.47

Using the ESS 2009-2020 ESC creation forecast, energy savings are predicted to be 7.47 TWh over the life of the ESS, and provide CO_2e savings of 7.3MtCO2e.

Figure 33: Total ESS total costs and benefits ($M)

Year	TOTAL 2009-2020
Total net ESC generation cost ($M)	-115
Total lifetime energy bills savings ($M)	301
Total net present value ($M)	187

The results show that the ESS has a total net present value of $187M over the predicted lifetime of the scheme.

6 Qualitative Results

As noted in the objectives, in addition to exploring costs with ACP and energy retailer respondents, we qualitatively explored respondents' experience of ESS, to provide an understanding of the process by which they were delivering energy savings under ESS, their experience of the program and drivers and barriers to participation.

6.1 Awareness, Views on ESS and Motivations for Involvement

1. ACPS

Awareness: Showerheads and some of the aggregator/lighting project ACPs were clearly aware of the scheme, particularly as it was one of the main reasons for their existence and they would not be operating as they were without it.

By contrast, whereas equipment upgrade ACP respondents were clearly aware of the scheme, several respondents stated that only a few people within the organisation were aware of it and its purpose. These respondents had generally engaged with the scheme, driven by operational efficiency as undertaking a project meant that they could gain some revenue by providing their retailer with ESCs. In contrast, there were other equipment upgrade ACPS that were actively pursuing new opportunities to take advantage of the scheme, and promoted it internally.

"Being a high energy user with a desire to reduce costs mixed with our strong desire to be engaged in sustainable activities and an opportunity to reduce costs"

Support for the ESS: Most respondents were generally supportive of the existence of the scheme. In particular, showerheads respondents felt that it was adding value as it was providing a stimulus to the market to take up energy efficiency, which wasn't happening previously as the market would not pay for the measures otherwise. Some of the larger, national ACPs saw the benefits, but were also were keen to see a national scheme put in place to help make the process more consistent with schemes operating in other States. A number of respondents also stated that the existence of the scheme helped add weight to the business case for undertaking energy efficiency projects internally. This additional weight seemed to be driven by the incentives available, but also because the scheme had Government backing and therefore was good to be seen to be involved.

Uncertainty about the future: Showerheads ACPs were most worried about the future of the scheme, quoting recent occasions when rumours had gone round that the scheme was going to be stopped. There appeared to be confusion surrounding the relationship between state-based programs and the federal carbon tax, which appeared to fuel uncertainty in the market. Furthermore, there appeared to be low awareness of the future targets of the ESS, which seemed a missed opportunity as the target increases to 2014 should instil confidence. Some were almost resigned that closure was inevitable, and said that should it happen, they wanted IPART to provide them with 3-4 months' notice of closure so they could use up stock and give staff and subcontractors fair notice. However, this uncertainty was limited to showerheads ACPs only.

Use of available information: These uncertainties about the future also indicated that some ACPs are not utilising the tools available to them as effectively as they could be, as all the relevant documentation on the program is available on the ESS website.

2. Electricity Retailers

Awareness of the scheme was high amongst retailers, which was to be expected given they are mandatory participants. There were varied views on the scheme, with some highly supportive, and others who saw it as just another obligation they needed to comply with.

Larger retailers were more likely to have taken a positive approach towards ESS, actively looking for opportunities to use the scheme to their advantage, whereas in contrast smaller retailers were not particularly happy about their obligation.

"No barriers - had experience with GGAS - but it is yet another annual statement and another audit. At the start the kick off was a bit rusty - it was a little bit fly by the seat of your pants - IPART and us all learning. IPART guys are good - will send reminders if we forget something - very helpful - work well together."

6.2 Satisfaction with IPART

Whereas some respondents grumbled about having to comply with the scheme, they were generally supportive of IPART and the role they played. Many respondents had clearly been directly helped by the staff at IPART and were very positive about the support they received. Some even named and complimented individual members of staff who had provided support for them.

However, the scheme is also viewed as onerous in terms of audit requirements and respondents would have liked more hand holding and guidance in general to help them 'jump through the hoops'. Some suggested more meetings earlier in the process or workshops on process. Others suggested an overall guide to applications would help.

"We felt information was not very specific in terms of what we had to do […] sometimes it would be nice to say these are the steps you have to follow from A to Z and you have to do them, check, check, check, check and then you can go out and create […] I guess that's a better way the IPART can work to be more prescriptive from the beginning in terms of what they want."

"Getting accredited took us a long time, I think it was five months in total." "I feel sometimes IPART is under resourced"

"Found IPART to be extremely helpful - have a common sense approach to things and are helpful and efficient, but feel that at the end of the day if it wasn't there it would make life easier."

6.3 Market Issues

A number of issues were raised on the embryonic state of the ESS market, mainly noting liquidity in the market as a particular problem for retailers.

1. ACPS

Lack of awareness of value of ESCs: In a few cases, it was found that although ACPs had been generating ESCs for a long time (e.g. transferred over from GGAS) they had never looked to sell them to retailers, either directly or through brokers. This was surprising given the high demand for ESCs particularly in 2010.

"We have never sold the ESCs - there isn't really a mechanism within the organisation to sell ESCs and not sure how to go about it."

However, most ACPs were aware of liquidity issues in the market, and sought to suggest potential ways to help promote ESC creation.

"How can IPART resolve the shortage of ESCs? I guess that they can adjust the abatement factor, bring new activities in, or spend time promoting new companies into the market place. We have seen ACPs exit the business saying it's getting to difficult for us' [...] because of the cost of compliance."

Retailer / ACP contracts vs. open market trading: Many ACPs, particularly the smaller ones sold most of their ESCs through brokers on the open market. This is because they are easy to find, they are happy with the deals struck in general, and took the pressure off them having to find the market.

However, showerheads and lighting ACPs in particular were seeking to work much more closely with retailers, actively engaging them with innovative projects such as branded energy audit schemes (part funded by Energy Savers Sustainability Advantage Scheme) to engage large energy users as potential customers. Although working under contract also involved pressures, it helped provide business continuity which is seen as important particularly to smaller ACPs, where they had few or no other revenue streams.

"[We] want to secure long term contacts with energy retailers. This provides good long term cash flow. Selling on the spot market assists with short term cash flow."

Equipment upgrade ACPs also sold many ESCs to brokers, although some had a direct relationship with energy retailers, having either had an existing relationship with them or having been directly approached (e.g. by their own retailer). Some also had relationships with aggregators in order to help alleviate some of the administrative burden and costs associated with auditing.

It is the larger ACPs (across all types of ACP) that tend to be able to operate through contracts, or at least have direct relationships with retailers to sell ESCs to; however uncertainty in the market is holding both parties back from entering long term service contracts.

"We always sell ESCs through a forward contract with an energy retailer to ensure the price. Started with short contracts - 4 months and have slowly made those longer and managed to include clauses for renegotiation if there is a huge change in the market. We always find them easy to sell."

Despite recent high demand for ESCs, in 2010 in particular, ACPs noted that the market was very stop start, depending on the time of year. ESCs were difficult to sell when the scheme started in 2009, and then demand increased significantly towards the end of year as the deadline approaches. Demand seemed to have been high for most of 2010, although again with a peak towards the end of the year.

Range of measures available for ESC creation: Finally, some respondents mentioned other schemes such as the Victoria Energy Efficiency Target (VEET) which has more measures available under the deemed savings methodology type, with viable incentives to enable cost effective projects, so widening the scope of potential work.

2. Electricity Retailers

Market Liquidity: One of the key issues for all retailers was the overall lack of ESCs to purchase in the market, or at least the lack of ability to find them, as there were enough ESCs generated in 2010 to meet demand, but not all of them were sold that year.

"There was no actual market as such, you had to sort of suss it out, go through the registry and find someone who had actually created them and ring them up and say please, please would you sell us some, sort of thing [...] a lot of people had created them but probably didn't know what to do with them"

"We found certificates very hard to find - supply less than demand in both 2009 and 2010. In 2010 we started ringing around all ACPs on the register and found some in the end. But the lack of supply put pressure on the price. The supply / demand dynamics were not thought out all that well. ESCs are not trading freely."

All respondents noted at least some issues with sourcing ESCs.

Penalties: Avoiding penalties was one of the key drivers for retailers to purchase ESCs due to perceived reputation risks with penalties. Some retailers had, on occasion, paid above the penalty price for ESCs in order to avoid or reduce their liability to penalties. This was particularly notable with Government owned retailers, who felt duty bound to comply. This resulted in some frustration as respondents felt it wasn't through lack of effort that they paid penalties, it was because they couldn't find ESCs to purchase.

"As a SOC[24] we have to comply - we can't be on a black list. If we couldn't buy the ESCs we would have got fined and that would have created a nightmare of a situation that's reportable to all sorts of entities. A government organisation breaching a law about energy saving? That would have been front page news"

Registering as ACPs: Others had worked to deal with supply issues through other means, such as registering as an ACP themselves. They could see the business benefits of getting involved in creating ESCs as part of providing added value services to their customer base, which helps improve customer retention.

Some retailers had set up separate energy services divisions to help customers reduce their energy costs. In these cases, they represented only a small part of the overall

[24] State Owned Company

activities of the business (<5%), and then just part of the service was dedicated towards generating ESCs.

"You could see that certificates were going to be hard to come by. The obligations were quite high and they rise very, very steeply so one of the things is you want to comply with the scheme rather than comply by paying a penalty. For that reason it was looking at what sort of things can we put in place that will yield certificates and at the same time you can help some of your retail customers to find certificates that might not be available in the market. So that was the reason to become an accredited party."

Small Retailers: Some of the small retailers found purchasing small numbers of ESCs through brokers was difficult as they were not interested in selling small numbers of certificates. Perhaps as these retailers are less visible in the market, some elected to pay penalties in order to comply with the scheme.

"paid penalty - tried brokers - but with a small parcel like their requirement no one is interested in finding such a small amount - there's nothing in it for the broker."

6.4 Audit Requirements

1. ACPs

Another issue raised by a number of respondents was the audit requirements required by the scheme. A few ACPs had failed audits and forfeited significant numbers of ESCs as a result.

However, several said that they appreciated the rigour and took some pride in being part of the scheme once they had made the effort to gain accreditation. It also meant that it was not easy for others to enter the market and increase competition for them. Several also noted the home insulation scheme and expressed the view that the rigour helped them distance themselves from the bad press received from that scheme.

Audit requirements seemed to be a particular issue for ACPs doing equipment upgrades projects. The time, hassle and cost taken up by audit requirements meant that many smaller projects were not included in the scheme as it was only worth it if a large number of ESCs could be generated (e.g. a few hundred at least). Some also noted practical issues such as getting director level sign off was difficult in a 3000 employee company, when the scheme itself was relatively small.

However, the market has responded to this, and some ACPs are employing an external service to undertake the audit and other admin requirements (e.g. Demand Manager), who take a fee for each ESC sold.

"It is cost effective to use Demand Manager to create the certificates for smaller jobs about 50% [of their total ESC portfolio] - we give them the information and they create the certificates and charge 20% - 35% [of the ESC price] for their fee - we don't then have the audit costs. For big jobs we create our own. Audit costs wipe out any gain for small projects."

2. Electricity Retailers

Large electricity retailers voiced issues with consistency between State lead schemes, which meant repetition of work and additional compliance for particular State lead schemes.

"Would prefer a national framework - currently have a compliance scheme in each state. It's a big issue for us - make compliance costs very high."

Several also noted the requirement to hire an external auditor was an issue for them, due to the costs involved.

"Less paperwork / less cost associated with auditing."

Finally, smaller retailers also seemed to suffer compared to larger ones, as they lacked economies of scale to make processes more efficient and lower costs.

"Our compliance cost to employ the auditor is more than our cost for complying with the scheme"

"Why bother with the certificate when we could just pay the penalty [...] just like a tax and it would cost us less to comply with that [...] it would take much less of our time."

6.5 Additionality

Additionality did not form a specific part of the scope of this project. However, it is worth addressing it briefly, as it is pertinent to the project.

The dominant ESC delivery mechanism for ESS, particularly in 2010 has been through showerhead activities. It is likely that low flow showerheads would be being introduced in very low numbers in NSW without ESS.

To a lesser extent, the scheme has also played a role in helping the business case for lighting projects too.

This is less clear with equipment upgrade projects, where many were a simple continuation of GGAS, and respondents made it clear that although ESS may have helped in some way, in their view the main rationale for undertaking the project laid elsewhere.

"Energy efficiency and savings has always been a fundamental to our process - we don't need a Government program to do this, but needed to be in there playing the game."

"We tend to look at this scheme in terms of, say if we knew we were having to upgrade equipment anyway, which would save energy, then we would look to see if we can use it to generate certificates. However, it does not bring to bear any additional investigation or change in behaviour compared to what we would do in our plants anyway. "

Notwithstanding the above, all the showerheads activity ESCs can be claimed as being additional to the scheme.

6.6 Lighting and Aggregator Activities

Aggregators and lighting ACPS were playing a significant role in the market, by encouraging participation in the scheme from projects, which would not have otherwise got involved, through

- Marketing to improve awareness of the scheme and its benefits to electricity end users, in the commercial and industrial sectors
- Identification of opportunities to take up the scheme, and helping prove the business case

The main area where they added value to the market was by taking away many of the barriers facing individual organisations to participate through creating certificates from portfolios of organisations and charging a fee.

"We see ourselves as a go between[…] to make sustainable energy and water projects happen."

Aggregators, acting as middle-men and trading high volumes of certificates had got good at complying with audit requirements and following scheme rules. However, as with other respondents, issues were still raised with regards to audit requirements. One respondent highlighted a perceived disconnect between different parts of Government over the scheme

"There is a mismatch between government departments, and I feel like piggy in the middle as I have DECCW on the one hand saying it's easy, and IPART highly regulated"

When discussing the business case for projects, all respondents said that the incentive was not enough to make the business case for projects on their own.

"There is the extreme of someone that would not complete the lighting upgrade were it not for the Energy Saving Certificates, and they're pretty clear about that, and then you have the other extreme where people who do a lighting upgrade and only later realise there is benefit, and seek to claim the certificates for that. But more typically it's somewhere in between; they know there's Government grants they're not sure exactly what they are but they go ahead with a lighting upgrade and we come in afterward to help then sort out the grant position for the project."

"[ESS revenue] results in about 40% of one year's worth of electricity savings for a lighting project."

"Australia has the cheapest electricity prices in the world, which means that there is little incentive to undertake energy savings projects."

Respondents did say that lighting activities provided a better incentive than industrial projects, as for some cheaper projects the incentive could reduce the overall project costs by up to 30%.

Quite a lot of effort went into marketing to sign up clients who were usually unaware, and showed initial reticence or suspicion over what it was all about. However, once signed up

and the client saw a new revenue stream coming through it could lead to them looking for more projects to include.

"The ESS activity is valuable to provide an additional incentive – it gives some additional cash to look at further energy efficiency projects to do."

Respondents stated that they were learning through the experience of delivering the scheme, and exploring new more cost effective models of delivery.

"We now work through equipment contractors, such as lighting contractors in order to help reduce our marketing costs. We found this out through working with large organisations, and found out that many of them use one particular contractor. So we then approached the contractor instead of the end using company, work out their processes with them and then work with both parties."

When discussing the future of the scheme, one aggregator suggested that IPART consider setting up a panel of approved aggregators, as this would further help delivery by endorsing a particular route, which involved not having to get individual accreditation.

6.7 Other Useful Findings

1. Other Government Subsidies

A few respondents had used the Energy Savers Sustainability Advantage Program to help identify worthwhile projects. Those who had a close relationship with Government departments seemed to have engaged with both schemes, and reaped benefits by using both ESSAP and ESS together to help get high electricity users to claim ESCs.

Some respondents called for IPART and other Government departments to do more promotion of the schemes available in order to help take up of the scheme. The perception was that most high energy users were not aware of the scheme, which meant that it takes more engagement and persuasion to get them to participate in the scheme.

2. Scheme Finance

In most cases ACPs were self-financed, although showerheads ACPs used various loans and overdrafts to help fund the business. In the case of retailers working as ACPs, they get their commercial and industrial customers to pay for the projects, on the basis that they will make savings from the energy they save.

One of the large state owned ACPs had used the Treasury loan fund and public facility fund to finance projects.

7 Overall Conclusions and Recommendations

7.1 Conclusions

The main finding of this project is that the Energy Savings Scheme is an overall benefit ($25/ESC). Based on this, the scheme makes both financial and environmental sense with an overall net resource benefit across all types of project, including showerheads, lighting/aggregators and equipment upgrades.

Despite the scheme's overall benefits, this does not mean that the energy savings projects would have happened without ESS. In the particular case of showerhead activities, these projects are additional, and very likely would not have happened without existence of ESS. In the case of project equipment upgrade and lighting schemes, many of these considered ESS to be a side benefit of activity that would have taken place anyway. Although it is not possible to quantify, we found that ESS helped encourage schemes to be put in place and helped focus end users on energy efficiency more so than they would have done otherwise.

ACPs are operating programs which deliver ESCs profitably, so the scheme should grow should conditions remain similar in future. ACPs have different profiles and delivery models to generate ESCs across the three groups. These can be summarised as

- Showerhead activities – small businesses, set up exclusively in response to ESS delivering high volumes of showerheads to residential areas in NSW
- Lighting and aggregator activities – small and large organisations, with some retailers acting as ACPs in this area. Projects are sourced by marketing to large electricity end users undertaking projects, offering their ESS accreditation to provide end users with access to ESS revenue and charging a fee
- Equipment upgrade ACPs – large, usually industrial organisations with very high energy use, claiming ESS as part of the benefits gained from improving energy efficiency

Electricity retailers who are obliged to participate, are taking a variety of approaches to comply, which can be summarised as:

- Reactive – sourcing ESCs where possible by working with ACPs and brokers
- Proactive – getting involved in ACP activity, and looking to improve relationships with their customers by undertaking paid for energy efficiency projects, and claiming ESS credits as part of activity
- Paying penalties – in a few cases, retailers avoided complying through ESC purchase, and simply paid penalties. However, most retailers made efforts to avoid paying penalties, due to the negative connotations associated with them.

Electricity retailers have reduced their internal delivery costs for running the scheme between 2009 (20%) and 2010 (5%) this is likely to be due to a combination of efficiency improvements, and the increase in scale of ESCs between 2009 and 2010.

The ESS market is embryonic and has potential to work more efficiently. In particular, there are supply and demand issues, and different parties not communicating as well as

they could. This is evidenced by the fact that in 2010, $7M in penalties was paid by retailers (but in most cases they claimed paying penalties was a last resort). However, in 2010 there were actually enough ESCs generated to meet overall demand.

Retailers expressed some frustration with the scheme due to the liquidity issues in the market, although the extent to which retailers had explored different ways to generate ESCs (e.g. acting as aggregators, registering as an ACP) varied across the sample.

Some participants, particularly showerheads ACPs are concerned about how long the scheme is likely to last, which is affecting behaviour in the market. For example, this appeared to be having a negative impact on the desire and ability to form contractual arrangements between ACPs and retailers.

A key barrier to ACP participation is the rigorous audit requirements of the scheme, and is likely to be negatively impacting on new market entrants. However, some also see the rigorous requirements as a benefit.

7.2 Recommendations

1. Improve communication between participants

Many of the market issues appear to be caused by a lack of communication between participants, particularly between ACPs and retailers. Furthermore, it appears that increased communication from IPART and other parts of Government would help mitigate negative speculation, such as about the future of the scheme which is a particular concern for some participants.

Potential activities which could help improve communications include facilitated events to encourage networking between participants. In the UK, similar schemes have held scheme 'bazaars' or breakfast events which were perceived to be very successful in stimulating these markets. These could also be an opportunity to discuss views on particular elements of the scheme such as penalties and auditing.

The ESS website is a very useful resource, which seems not to be utilised as much as it could be by some participants, so further promotion of the website as a means of keeping up to date would also help.

2. Providing greater market certainty, where possible

Providing greater certainty over the future continuation of the scheme would give participants, particularly ACPs (e.g. showerhead activities), greater confidence to grow schemes and invest more in developing longer term relationships with retailers.

3. Encourage new entrants to the market

ESS has rigorous requirements, which means it takes significant effort for new market entrants to achieve accreditation and comply with the scheme. It would be worthwhile seeking opportunities to help facilitate more participants to join the scheme. For example, some UK experience has shown that businesses in other sectors can develop their delivery

models to support energy efficiency schemes and have transformational effects on the market. For example, for residential schemes, working with home improvement stores, boiler servicing businesses and bathroom/kitchen installers has worked successfully.

4. Deepening links between complementary programs

Some ACPs are already using both the Energy Savers Program and ESS as part of their approach to the market. This has helped them, as some felt that each program in isolation was not enough to convince end users to invest in energy efficiency, but working with both together helped. The programs work well together with Energy Savers Program helping identify the opportunity, and ESS incentivising action taken.

IPART should explore ways to support this linkage more to take further advantage of the potential benefits. However, as both schemes work with the same participants it would be important to identify ways to evaluate each scheme without double counting impact in future.

5. Demonstrating additionality and retrospective action

It may be worthwhile investigating whether there is potential to require some evidence of additionality, for example within the application process for new projects, to help mitigate for non-additional activities occurring through the scheme.

In the EU, state aid legislation places constraints on the nature of public subsidies Government can provide businesses. One of these is the use of a rule that subsidies cannot be provided retrospectively, in order to help ensure additionality. IPART may wish to consider further how these rules work, and whether it is worth considering a similar feature within ESS.

6. Audit requirements

We would not recommend reducing the level of audit requirements for the scheme, but there may be opportunities to explore how to make the process more efficient for the market. Special guidance for smaller businesses applying for accreditation may be beneficial, as currently there is a risk that smaller ACPs will stop participating and the market will stagnate with only a few large ACPs developing ESCs.

7. Increasing the number of measures available and types

A number of respondents suggested IPART review the measures currently available to see what scope there may be to include more measures. There are also some measures and methodological approaches included in the scheme, which currently have little take up so it might be worthwhile investigating other schemes to see whether others get better uptake and how that works. These measures include white goods replacement, power down devices, and air conditioning upgrade equipment.

IPART may also look to consider the inclusion of gas fuelled measures, such as boilers and other heating systems, which is included in other schemes in Australia, and the EU.

Appendix 1: Interview Pilots and Confidentiality

Interview Pilots

The interviews were piloted with a small number of ACPs and Electricity retailers to check the content and structure of the interview, and initial results were discussed with IPART before proceeding to undertake the rest of the interviews.

Confidentiality

Databuild is a member of the Market Research Society, which means we comply with the market research code of conduct, which sets appropriate standards for conducting research, and the use of personal data.

In order to comply with the rules, we made clear to respondents that IPART wished for them to share their views in attributable form, which they could refuse if they wanted their responses to remain confidential. Importantly, we asserted that their views would remain confidential to IPART and would not be put out into the public domain.

In no cases did respondents refuse to allow us to attribute interview responses to IPART, although there were a few specific responses within interviews which they did not want to pass on in attributable form. We have followed their wishes in this respect.

The approach taken to reporting is to list the organisations we spoke to overall within the report, but where verbatim comments have been made, we have not directly attributed these back to the organisation making them. If IPART wish to know the source of particular comments or views, we will be happy to share those on request.

Appendix 2: List of Companies Interviewed

Mandatory Participant Interviews

The electricity retailers interviewed were:

Interviewed Electricity Retailer
AcetewAGL
AGL Sales Pty Ltd
Aurora Energy Pty Ltd
Delta Electricity
Endeavour Energy (was Integral Energy)
EnergyAustralia
ERM Power Retail Pty Ltd
Essential Energy (was Country Energy)
Lumo Energy (NSW) Pty Ltd
Macquarie Generation
Momentum Energy
Red Energy Pty Ltd
Tarong Energy Corporation Ltd
Tomago Aluminium Company Pty Ltd
TRU Energy & TRU Energy Yallourn Pty Ltd

Voluntary Participant Interviews

ACPs interviewed included:

Interviewed ACP
AGL Energy Services Pty Ltd
Boral Ltd
Carter Holt Harvey Australia Pty Ltd
Combined Force Pty Ltd
Demand Manager Ltd
Enact Energy Pty Limited
EnergyAustralia
Essential Energy
Hydro Aluminium Kurri Kurri Pty Ltd
Low Energy Supplies and Services Pty Ltd
Lowa Investments Pty Ltd
Outperformers Ltd
Sales Solutions Australia Pty Ltd
Sydney Markets Limited
Sydney West Area Health Service
Tomago Aluminium Company Pty Ltd
University of Technology Sydney
Watts Green Pty Ltd

Appendix 3: Interview Questions

Mandatory participants / electricity retailers

Introduction to the respondent

Hello my name is X. I'm calling from Databuild, we are an independent research consultancy and we have been commissioned by IPART (an independent economic regulator for NSW) to undertake an analysis of the cost effectiveness of the NSW Energy Savings Scheme.

The work involves identifying and quantifying current costs associated with participating in the ESS for Scheme Participants (electricity retailer), Accredited Certificate Providers, and the Scheme administrator. We are aware that there is little cost-related data collected on the ESS, so the purpose of this study is to undertake a review to better understand this while the program is in its second year of operation.

I would like to have a discussion with you today about your role within the Energy Saving Scheme, where you and your organisation fits into the scheme and specifically explore how you generate Energy Savings Certificates, and the cost associated with these operations. The information will be used by the IPART to make improvements to the scheme in the future.

Is that ok to do now?

If required

- The discussion will last approximately a 30-45 minutes (allow an hour for face to face interviews)
- The objectives of the work are to understand costs associated with the program while it is still relatively early in delivery; to review performance relative to other programs and report back to Government

Confidentiality

We would like to be able to share your views with IPART. Just to assure you none of the information you provide will be put in the public domain (IPART is intending to publish a summary report, without individual company information), however if you feel uncomfortable with this we can keep your responses confidential. Which would you prefer? [You can of course change your mind during the conversation.]

Just to let you know the call will be recorded just so I can type up the notes after the interview. The recording will not be listened to anyone outside of Databuild.

Organisation profile

- I'd like to start the conversation by finding out a bit about you and the organisation.
    - What is your job title/ role with the organisation?
    - What are your key responsibilities?

- How many employees does the organisation have?
- What is the reach of the organisation? E.g. local, national, international
- What is the markets share of the organisation?
- Have there been any recent changes to the structure of the organisation? (e.g. company sale/merger)

Involvement in the ESS

- What is your overall experience of the ESS scheme and ESCs to date?
  Suggested prompts:
  - How well does the organisation understand the rationale for the ESS scheme?
  - How involved is the organisation with the scheme?
  - What are the organisations principal motivations for becoming involved in the scheme?
  - Have the organisation encountered any barriers to involvement from a retailer perspective?

Purchasing ESCs

- Are you aware of how many ESCs the organisation has purchased? [Check to see if they hold data on this.]
  Suggested prompts:
  - What is the organisation's strategy for purchasing certificates? How do you source them?
  - Does the organisation generate it own certificates?
  - [If yes] Explore activities included in the ACP topic guide
  - [If not] Why not? Why do you outsource to an ACP?

ESC scheme strategy and compliance

- I'd now like to move on to discuss the areas of ESS activity which the organisation gets involved in to get a better understanding of the activities and resource requirements that the organisation undertakes to meet ESS obligations. These include:
  - ESC Prices
  - Annual Audit Statement
  - Negotiations and relationships with ACPs
  - Relationships with retailer customers and ESCs:

I'd like to explore each one of these areas to understand how much resource is spent on each in terms of cost and staff time, and also the type of activities that are involved at each stage: **[Note to interviewer – for each area check % of costs and staff time spent]**

- **ESC prices:** How does the organisation feel about the cost of the certificate?
  Suggested prompts:
  - Does the price of the certificate matter? Or is it just a matter of complying?
  - Has the company ever paid penalties for non-compliance?
  - [If yes] Why was this? Was it a one off? [probe to see if this was a deliberate decision]
  - How much did you have to pay?

- **Annual audits of Energy Savings:** I understand that each retailer lodges an annual audit statement. How do you feel about doing this?
  - What do you need to prepare for this?
  - How much time is spent doing this?
  - Is there anything else you need to do in terms of compliance? [If yes] What is this?
  - Does compliance vary across the year as an activity? (e.g. are there peaks in demand)
  - [If respondent is not compliance person] Does the organisation employ a full time compliance member of staff?
  - What proportion of costs is spent on this activity?
  - What proportion of staff time is spent on this activity?

- **Relationships / Negotiations with ACPS:** Do Accredited Certificate providers tend to approach you or have you sought them out?
  Suggested prompts:
  - In the last two years when you purchased ESCs what % was under contractual arrangements and % was done in the open market?
  - What are the benefits/ obstacles to you as a retailer for each approach?
  - Did you use brokers to help you do this?
  - Are there any internal limitations/ rules within your organisations that make it harder to relationships with ACPS? [If yes] What are these? What do they stop you from doing?
  - In terms of the relationships with ACPs are there any other resources requirements that your organisation need to provide? (E.g. hidden administrative costs)? [If yes] What are these?
  - What proportion of costs is spent on this activity?
  - What proportion of staff time is spent on this activity?

- **Relationships with retailer customers and ESCs:** How does the retailer view ESC projects delivered on their own customer base?
  Suggested prompts
  - Is this viewed as an opportunity? [If yes] In what ways?

- **ESC portfolio:** Are you aware what projects/ technologies have generated their ESCs?
  Suggested prompts:
  - Is it important to the organisation to understand where the ESCs are generated from?
  - [If yes] Why is this? Why is it important?
  - [If no] Why not? Why doesn't it matter?
  - How well do you feel understand how the ESCs are generated? (e.g. approaches for different technologies)

- **Future of ESCs:** How will your approach to the ESS change as the targets increase?
  Suggest prompts:
  - Are there any areas where the ESS scheme can be improved?

Thank you for taking the time to speak to me. Do you have any other comments you would like to make?

Voluntary participants / ACPs

Introduction to the respondent

Hello my name is X. I'm calling from Databuild, we are an independent research consultancy and we have been commissioned by IPART (the independent economic regulator for NSW) to undertake an analysis of the cost effectiveness of the NSW Energy Savings Scheme.

The work involves identifying and quantifying current costs associated with participating in the ESS for Scheme Participants (electricity retailer), Accredited Certificate Providers, and the Scheme administrator. We are aware that there is little cost-related data collected on the ESS, so the purpose of this study is to undertake a review to better understand this while the program is in its second year of operation.

I would like to have a discussion with you today about your role within the Energy Saving Scheme, where you and your organisation fits into the scheme and specifically explore how you generate Energy Savings Certificates, and the cost associated with these operations. IPART want to understand your views on the program, and particularly what has worked/ not worked well for you and the rationale behind approaches taken. The information will be used by the IPART to make improvements to the scheme in the future.

Is that ok to do now?

If required

- The discussion will last approximately 30-45 minutes (allow an hour for face to face interviews)
- The objectives of the work are to understand costs associated with the program while it is still relatively early in delivery; to review performance relative to other programs and report back to Government

Confidentiality

We would like to be able to share your views with IPART. Just to assure you none of the information you provide will be put in the public domain (IPART is intending to publish a summary report, without individual company information), however if you feel uncomfortable with this we can keep your responses confidential. Which would you prefer? [You can of course change your mind during the conversation.]

Just to let you know the call will be recorded just so I can type up the notes after the interview. The recording will not be listened to anyone outside of Databuild.

Organisation profile

- I'd like to start the conversation by finding out a bit about you and the organisation.
    - What is your job title/ role with the organisation?
    - What are your key responsibilities?

- What does the organisation do?
- How many employees does the organisation have?
- What is the reach of the organisation? E.g. local, national, international.

Involvement in the ESS

- What is the level of your involvement in the ESS scheme and generating ESC projects?
  Suggested prompts:
  - How does the organisation approach ESS?
  - How much of the business is related to ESS work? E.g. is the organisation exclusively dedicated to ESS work or does it have a separate arm for ESS work?
  - Roughly how much of the company's profit comes from generates ESCs? (may be sensitive, only ask if appropriate)
- What was the rationale for the organisation becoming involved in the ESS and ESCs?
  Suggested prompts:
  - What are the key motivations for becoming involved? [probe to see if size dependent e.g. small ACPs might be more cash flow driven]
  - Are there any barriers to being involved in the ESS scheme and generating ESCs? [If yes] What are these? How do you overcome them?
- Are subcontractors used in the delivery of projects to generate ESCs?
  Suggested prompts:
  - What elements of generating ESCs are they used for? What proportion of ESC work do they do for the organisation?
  - What are the benefits of using subcontractors for the work?
  - What costs are incurred from using subcontractors? (including any hidden costs like administration, staff time).
  - If appropriate, ask to speak separately to a representative of a key subcontractor

Scope of ESCs generated

- How many ESCs did the organisation generate during: [if data is known prior to the interview sense check that this is correct]
  - The first year of the program
  - The last year
- **[If 0 to above]** Why haven't you sold any certificates since registering with the ESS?
  Suggested prompts:
  - Why haven't you pursued it further?
  - What type of obstacles have you encountered?
  - What do you think the certificates are worth? [Probe to see if the current value of the certificate matches with their expectations/ awareness of the value of the projects].

ESC prices/costs for delivery

- I'd like to move on to discuss ESC prices and how they are marketed to electricity retailers.
- How method do you use for selling the ESCs to electricity retailers?
  Suggested prompts:

- Do you enter into contractual arrangements with electricity retailers? Or sell on the certificates on an 'on the spot' basis?
- [If both] What is the general split between the two?
- What are benefits/ obstacles for each method?

- [If contractual] What are the requirements of the contract? Is there built in penalties for under performance? E.g. not creating certificates by a certain date
- **[Asked to all]** Do you have any data that supports these figures? [If yes] Enquire about willingness to send it to us.

ESC project delivery costs

- I'd now like to move on to have a discussion about the different elements of the scheme and the proportion of resources spent on generating ESCs. There are a number of different areas we have identified where resources can be spent, such as:
  i. Lodging applications
  ii. Marketing and project recruitment
  iii. Project feasibility studies
  iv. Delivering projects
  v. Negotiations with electricity retailers
  vi. Auditing activities
  vii. Systems and administration
  viii. Financing projects

I'd like to explore each one of these areas to understand how much resource is spent on each in terms of cost and staff time, and also the type of activities that are involved at each stage: **[Note to interviewer – for each area check % of costs and staff time spent]**

- **Lodging applications:** What activities are involved with this? E.g. what does the organisation need to do at the start of the process?
  Suggested prompts:
  - What costs are involved in this? I am aware there is a one fee of $500 for participation in the scheme – are there any other hidden costs?
  - What proportion of staff time is used for this?

- **Marketing and project recruitment:** What is the organisations strategy for recruiting projects?
  Suggested prompts:
  - Does the organisation actively seek new projects or do electricity retailers approach you?
  - Does the organisation work with electricity retailers to recruit projects?
  - What marketing methods do you use? (e.g. you can X on your energy bill from doing this)
  - How successful is the organisations involvement in the ESS for marketing?
  - What costs are involved in this?
  - What proportion of staff time is used for this?

- **Project feasibility studies:** Does the organisation carry these out before entering into agreements with electricity retailers (e.g. for really big projects)?
  Suggested prompts:

- **[If yes]** What does the organisation do? How much leg work is done beforehand? What are the benefits of doing this?
- What costs are involved in doing this?
- What proportion of staff time is used for this?
- **[If no]** Are there any reasons why the organisation doesn't carry out feasibility studies?

- **Delivering projects:** How does the organisation select projects? (E.g. cost, expertise of the business etc.)
  Suggested prompts:
  - What type of projects/ technologies does the organisation generate ESC for? (e.g. do they select less exhaustive projects like commercial lighting programs, refrigeration projects etc)
  - [If cost is a factor] If the organisation did lots of the same projects would the costs change and how? (i.e. economies of scale)
  - In approaching ESC generation, which of the IPART recognised methods does the organisation use:
    i. Project impact assessment methodology
    ii. Deemed savings method
    iii. Metered savings
  - What % of activity is undertaken by the different approaches (if more than one is used)
  - What is the rationale for using that approach/ not using the others?

- **Relationships/Negotiations with electricity retailers:** Does the organisation actively approach electricity retailers or do the retailers come to you?
  Suggested prompts:
  - What marketing methods does the organisation use?
  - What is demand like currently?

- **Auditing activities:** thinking about the types of ESC generation methods used, what auditing activities does the company have to do?
  Suggested prompts:
  - What are your views on the level of auditing required? (try to be specific to the different ESC generation approach used)
  - We know that some projects that are considered as 'high risk' require more documentation. Do these requirements have an impact on the approach you take?
  - Has the organisation experienced any instances of non compliance?
  - [If yes] What was the reason for this? E.g. lack of documentation or poor energy performance?

- **Financing projects:** Does the organisation use finance to undertake the activities mentioned in generating ESCs?
  Suggested prompts:
  - Who provides this?
  - How much do they provide? Or what proportion of the activities do they provide finance for?
  - What activities do they provide finance for and why?
  - What impact (if any) does this have on the business and approach taken?

- **Systems and administration:** Are there any other internal activities in relation to system or administration that we haven't covered?
  Suggested prompts:
  - [If yes] What activities are these?
  - What costs are involved in this?
  - What % of staff time is spent on this?

- **Delivering projects in the future:**
  - Will the organisations strategy for generating ESCs change at all in the future? (probe to find out what impact the increase in targets will have)
  - Are there any areas where the ESS scheme can be improved?

Do you have any other comments you would like to make?
Interviewer to:

- Repeat request for supporting data
- Obtain contact details of sub contractors where appropriate

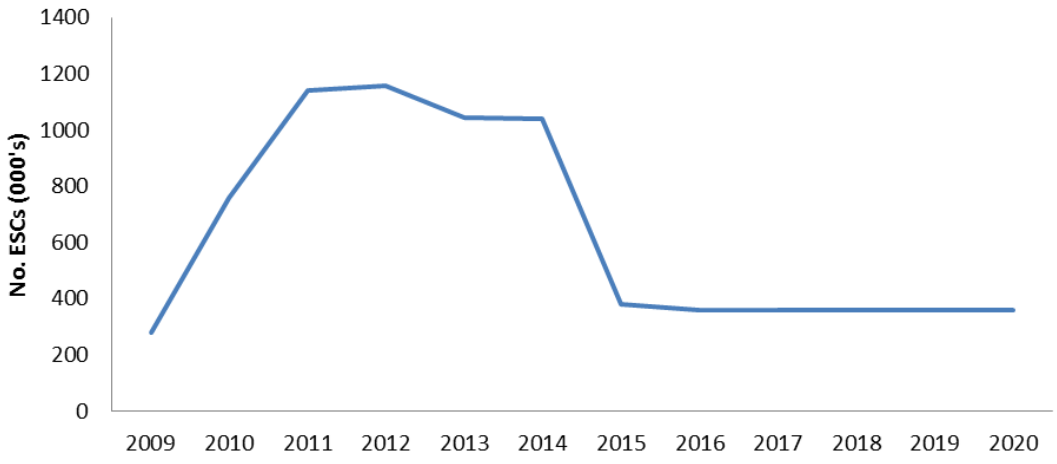
Appendix 4: Cost Benefit Analysis assumptions and limitations

Energy Savings Scheme future ESC creation forecast Model

ESC creation forecasts are based either on the forecast provided by each ACP in its Annual Report Statement (ARS), Notice of Accreditation (NoA) or on analyst estimates based on past creation rates.

The model is used to estimate the creation of ESCs over the lifetime of the scheme, however there are uncertainties associated with the forecast, as the scheme is still only two years into its lifecycle.

Figure 34: Energy Savings Scheme future ESC creation forecast to 2020



Estimated energy savings associated with ESCs

Estimated energy savings from ESC creation differ from the numbers of ESCs created. This section explains the methodologies used to generate ESCs, and the reasons behind from of these differences.

In general, certificates are created after energy savings occur. Under the Metered Baseline Method certificate creation reflects energy savings which occurred during the calendar year. For the most part, RESA[25]s using this method are large scale, industrial projects with significant annual savings.

However, for some projects where the annual energy savings are small, the ESS Rule allows certificate creation in advance of actual energy savings:

[25] Recognised Energy Savings Activity (RESA)

- Under the Project Impact Assessment Method, it is possible to make an up-front assessment of estimated future savings and certificates can be forward created in advance of energy savings. Up to 5 years of energy savings can be brought to account at the commencement of the RESA (see section A.8.1 for further information).
- The Deemed Energy Savings Method is a generic approach for measuring the lifetime or 'deemed' energy savings up front before the actual savings occur. The deeming period depends on the type of activity and usually ranges from 1.5 years to 10 years.

As certificates can be created in advance of energy savings, an estimate of the actual energy savings occurring in future years is calculated by pro-rating the certificates created each year across the forward creation or deeming period, where applicable.

Further details are provided in IPART's 2010 Compliance and operation of the NSW Energy Savings Scheme report[26].

Forecast Energy Costs per MWh 2009 - 2020

The creation of ESCs (with the exception of non-forward created project impact assessment ESCs) includes an assumption of the lifetime of energy savings over up to 10 years. Therefore, to calculate energy savings benefits over this time period, a forecast of energy prices is included using best available information.

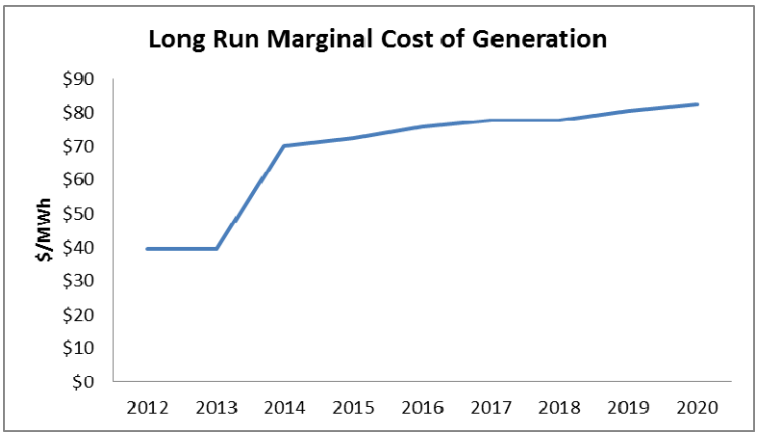
IPART has agreed for this project to use the long run marginal cost of electricity generation (LRMC) as determined by the Energy Costs Annual Review for 2012/13 undertaken for IPART[27], shown in Figure 35.

We are only using the LRMC of generation for this project, which means we are excluding other cost components such as the change in capital costs associated with the transmission and distribution of electricity. While the extent of reduction in transmission and distribution costs will depend on the location and timing of the energy savings, we acknowledge that this is a conservative position which has the result of understating the benefits of the ESS. This differs to the approach taken by the NSW Government when estimating the LRMC of energy supply applied to other government programs in the NSW Energy Efficiency Strategy, where these costs included generation, transmission, distribution and carbon costs, with an estimated value of around $80/MWh. We also note that the objectives of the scheme are to reduce transmission and distribution costs in addition to generation. Consequently, if the full long run marginal cost of energy inclusive of transmission and distribution costs had been used, the net benefit of the ESS would be considerably higher.

[26] IPART (2010) Report to Minister: Compliance and operations of the NSW Energy Savings Scheme during 2010

[27] Frontier Economics June 2011 Energy Costs Annual Review for 2012/13 Final report undertaken for IPART

Figure 35: Forecast LRMC of generation ($/MWh)



The forecast includes a significant price increase from 2013 ($39.60/MWh) to 2014 ($70.29/MWh), due to an assumption that a carbon price will be introduced in that year. This has a consequential impact on the benefits calculated for ESCs with energy savings deemed beyond this period. This assumption on carbon prices is now slightly out of date due to the Prime Minister's announcement on 10 July 2011, but is the best available information at this time.

Treatment of set up costs and on-going scheme costs: At this early stage in the lifecycle of the scheme, it is difficult to estimate the on-going scheme running costs separate from set up costs (e.g. for accreditation) incurred at the outset as we only have information on costs for the first 18 months of the scheme. Although some costs were split out by respondents (e.g. scheme registration) as set up costs, there were other areas (such as staff time), which respondents were unable to provide a consistent split between the two types of activities, which means we are unable to clearly split this out in the data.

The cost benefit analysis takes into account a forecast of ESC creation over the life of the scheme (2009-2020), so requires an approach to account for splitting out set up costs vs on-going running costs in order to appropriately reflect scheme costs in future years.

We have provided costs for delivery split by 2009 and 2010[28] wherever possible, of which the 2009 costs are higher as they include more set up costs. So in order to estimate set up costs vs. on-going scheme costs we have taken the following approach:

- 2009 – based on 2009 costs data
- 2010 – based on 2010 data
- 2011-2020 – based on 2010 data accounting for inflation and discounting.

This approach has some limitations, including:

- 2010 costs also include some project set up costs as long term projects could still have set up costs included in 2010.
- Eight respondent ACPs only started activities in 2010 so there are project set up costs included here too, which means future costs estimations will likely be an overestimate.

[28] 6 months of the year in the case of 2009.

Treatment of Profits

We have taken the approach to remove ACP profits from the cost benefit analysis on the basis that they are a transfer cost between ACPs and retailers. However, this should not exclude the cost of capital for running businesses. For example, the research shows that lighting and showerhead ACPs in particular used finance to fund their businesses. In order to consistently account for this, we have included the following an assumption of 8% additional costs of capital for ACP projects.

Discount and Inflation Rates

The discount rate is assumed at 7% for the purposes of the analysis. Inflation is assumed at 3%.

CO_2e conversion factor

The CO2e conversion factor is used to convert the MWh savings into tonnes of CO_2e and is calculated by multiplying MWh by the certificate conversion factor listed in Schedule 5B of the Electricity Supply Act 1995. The certificate conversion factor is 1.06. At this stage we have assumed no change in carbon intensity, although we recognise that should be updated, as the grid mix will change over time.

Other potential costs and benefits of the ESS not included

There are other potential costs and benefits of the ESS, which have not been included within the study at this stage. These include:

- Costs passed to consumers: Retailers pass-through the costs of complying with the ESS to consumers and this has the effect of increasing electricity prices. It may be assumed that the costs to retailers of delivering the scheme are transferred to consumers, but this is not explored within the study.
- Rebound effects: Policies that save energy and reduce energy bills increase disposable income, which might lead to greater consumption of electricity. Rebound effects have also not been taken into account.
- Load profile: Each activity affects the load profile in a different way, so ideally the LRMC of generation could be adjusted for each activity depending on their effect on the load profile.

Appendix 5: Cost Benefit Analysis Tables

Cells highlighted purple are those which are considered 'net' costs or benefits. Other costs and benefits are all considered transfer costs (i.e. a cost to one party, but a benefit to another) and therefore cancel each other out.

Showerhead activities

Figure 36: 2009 Showerheads activity costs and benefits / ESC

ACP benefits	2009	End user benefits	2009	Retailer benefits	2009	Government benefits	2009	NET
ESC sale cost	$25.17	Energy saving benefit	$38.04		$0.00	ESC admin fee	$0.70	
TOTAL	$25.17	TOTAL	$38.04	TOTAL	$0.00	TOTAL	$0.70	$63.92
ACP costs	**2009**	**End user costs**	**2009**	**Retailer costs**	**2009**	**Government costs**	**2009**	
ESC admin fee	-$0.70			ESC purchase cost	-$25.17	**IPART delivery costs**	**-$5.13**	
ACP delivery costs	**-$11.53**			**Retailer delivery costs**	**-$5.14**			
Cost of capital	**-$0.92**			**Retailer cost of capital**	**-$2.43**			
TOTAL	-$13.16	TOTAL	$0.00	TOTAL	-$32.74	TOTAL	-$5.13	-$51.03
NET cost/benefit	**$12.02**	**NET cost/benefit**	**$38.04**	**NET cost/benefit**	**-$32.74**	**NET cost/benefit**	**-$4.43**	**$12.89**

Figure 37: 2010 Showerheads Activity activity costs and benefits / ESC

ACP benefits	2010	End user benefits	2010	Retailer benefits	2010	Government benefits	2010	NET
ESC sale cost	$25.17	Energy saving benefit	$39.60		$0.00	ESC admin fee	$0.70	
TOTAL	$25.17	TOTAL	$39.60	TOTAL	$0.00	TOTAL	$0.70	$65.47
ACP costs	**2010**	**End user costs**	**2010**	**Retailer costs**	**2010**	**Government costs**	**2010**	
ESC admin fee	-$0.70			ESC purchase cost	-$25.17	**IPART delivery costs**	**-$2.35**	
ACP delivery costs	**-$11.53**			**Retailer delivery costs**	**-$1.25**			
Cost of capital	**-$0.92**			**Retailer cost of capital**	**-$2.11**			
TOTAL	-$13.16	TOTAL	$0.00	TOTAL	-$28.53	TOTAL	-$2.35	-$44.04
NET Cost/Benefit	**$12.02**	**NET Cost/Benefit**	**$39.60**	**NET Cost/Benefit**	**-$28.53**	**NET Cost/Benefit**	**-$1.65**	**$21.44**

Lighting and Aggregator Activities

Figure 38: 2009 lighting and aggregator activity costs and benefits / ESC

ACP/Aggregator benefits	2009	End user benefits	2009	Retailer benefits	2009	Government benefits	2009	NET
ESC revenue	$4.83	ESC revenue	$16.95			ESC admin fee	$0.70	
		Energy savings benefit	$53.95					
TOTAL	$4.83	TOTAL	$70.90	TOTAL	$0.00	TOTAL	$0.70	$76.44
ACP/Aggregator costs	**2009**	**End user costs**	**2009**	**Retailer costs**	**2009**	**Government costs**	**2009**	
ESC admin fee	-$0.70			ESC purchase cost	-$21.79	**IPART delivery costs**	**-$5.13**	
ACP delivery costs	**-$3.18**	**Project Delivery Costs**	**-19.27**	**Retailer delivery costs**	**-$5.14**			
Cost of capital	**-$0.31**	**Cost of Capital**	**-$1.54**	**Retailer cost of capital**	**-$2.15**			
TOTAL	-$4.20	TOTAL	-$20.81	TOTAL	-$29.08	TOTAL	-$5.13	-$59.22
NET cost/benefit	**$0.64**	**NET cost/benefit**	**$50.09**	**NET cost/benefit**	**-$29.08**	**NET cost/benefit**	**-$4.43**	**$17.21**

Figure 39: 2010 lighting and aggregator activity costs and benefits / ESC

ACP/Aggregator benefits	2010	End User benefits	2010	Retailer benefits	2010	Government benefits	2010	NET
ESC revenue	$7.64	ESC revenue	$17.42			ESC admin fee	$0.70	
		Energy savings benefit	$49.84					
TOTAL	$7.64	TOTAL	$67.26	TOTAL	$0.00	TOTAL	$0.70	$75.60
ACP/Aggregator costs	**2010**	**End user costs**	**2010**	**Retailer costs**	**2010**	**Government costs**	**2010**	
ESC admin fee	-$0.70			ESC purchase cost	-$25.05	**IPART delivery costs**	**-$2.35**	
ACP delivery costs	**-$6.75**	**Project Delivery Costs**	**-19.27**	**Retailer delivery costs**	**-$1.25**			
Cost of capital	**-$0.60**	**Cost of Capital**	**-$1.54**	**Retailer cost of capital**	**-$2.10**			
TOTAL	-$8.04	TOTAL	-$20.81	TOTAL	-$28.40	TOTAL	-$2.35	-$59.61
NET Cost/Benefit	**-$0.41**	**NET Cost/Benefit**	**$46.45**	**NET Cost/Benefit**	**-$28.40**	**NET Cost/Benefit**	**-$1.65**	**$15.99**

Equipment Upgrade Activities

Figure 40: 2009 equipment upgrade activity costs and benefits/ESC

ACP benefits	2009	End user benefits	2009	Retailer benefits	2009	Government benefits	2009	NET
ESC sale cost	$22.86	Energy saving benefit	$40.92			ESC admin fee	$0.70	
TOTAL	$22.86	TOTAL	$40.92		$0.00	TOTAL	$0.70	$64.49
ACP costs	**2009**	**End user costs**	**2009**	**Retailer costs**	**2009**	**Government costs**	**2009**	
ESC admin fee	-$0.70			ESC purchase cost	-$22.86	**IPART delivery costs**	**-$5.13**	
ACP delivery costs	**-$3.44**			**Retailer delivery costs**	**-$5.14**			
Cost of capital	**-$0.28**			**Retailer cost of capital**	**$2.24**			
TOTAL	-$4.42	TOTAL	$0.00	TOTAL	-$25.77	TOTAL	-$5.13	-$35.32
NET Cost/Benefit	$18.45	NET Cost/Benefit	$40.92	NET Cost/Benefit	-$25.77	NET Cost/Benefit	-$4.43	**$29.17**

Figure 41: 2010 equipment upgrade activity costs and benefits/ESC

ACP benefits	2010	End user benefits	2010	Retailer benefits	2010	Government benefits	2010	NET
ESC sale cost	$26.44	Energy saving benefit	$36.88			ESC admin fee	$0.70	
TOTAL	$26.44	TOTAL	$36.88		$0.00	TOTAL	$0.70	$64.01
ACP costs	**2010**	**End user costs**	**2010**	**Retailer costs**	**2010**	**Government costs**	**2010**	
ESC admin fee	-$0.70			ESC purchase cost	-$26.44	**IPART delivery costs**	**-$2.35**	
ACP delivery costs	**-$2.36**			**Retailer delivery costs**	**-$1.25**			
Cost of capital	**-$0.19**			**Retailer cost of capital**	**-$2.21**			
TOTAL	-$3.25	TOTAL	$0.00	TOTAL	-$29.90	TOTAL	-$2.35	-$35.49
NET Cost/Benefit	$23.19	NET Cost/Benefit	$36.88	NET Cost/Benefit	-$29.90	NET Cost/Benefit	-$1.65	**$28.52**

Overall ESS Cost Benefit Analysis Tables

Figure 42: ESS Forecast ESC Creation, estimated energy savings (MWh) and CO_2e savings 2009-2020

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
No. ESCs generated	278,157	759,866	1,139,661	1,157,937	1,042,437	1,040,437	379,995	359,995	359,995	359,995	359,995	359,995
Total lifetime estimated energy savings (MWh)	334,738	750,952	1,139,488	1,136,419	1,027,456	1,025,569	358,486	339,618	339,618	339,618	339,618	339,618

Figure 43: ESC Generation cost/ESC, lifetime benefit per MWh saved and net cost/benefit 2009-2020

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Net ESC generation cost/ESC ($/ESC)	-$19.56	-$17.35	-$17.35	-$16.62	-$15.83	-$14.98	-$14.06	-$13.08	-$12.02	-$10.89	-$9.67	-$8.38
Net lifetime benefit per MWh saved ($)*	$40.43	$38.69	$40.31	$40.29	$39.40	$44.85	$46.23	$43.70	$39.51	$34.51	$30.43	$25.79
Total net cost or benefit/ESC	$20.87	$21.33	$22.95	$23.67	$23.56	$29.87	$32.16	$30.62	$27.49	$23.62	$20.76	$17.42

* = to 2020, 2021 respectively adjusted for LRMC energy prices, discounting and inflation

Figure 44: ESS Total Program Costs, Benefits and Net Present Value (NPV) 2009-2020

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total net ESC generation cost ($M)	-5.44	-13.19	-19.78	-19.25	-16.51	-15.59	-5.34	-4.71	-4.33	-3.92	-3.48	-3.02
Total lifetime energy bills savings ($M)	11.25	29.40	45.93	46.66	41.07	46.67	17.57	15.73	14.22	12.42	10.95	9.29
Total net present value ($M)	5.81	16.21	26.16	27.41	24.56	31.08	12.22	11.02	9.90	8.50	7.47	6.27

* = to 2020, 2021 respectively adjusted for LRMC energy prices, discounting and inflation