Demand Management Incentive Scheme Report – 2018

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1. Introduction

During the 2018 calendar year, United Energy (UE) undertook the following initiatives funded from the Demand Management Innovation Allowance (DMIA):

a) concluding the Virtual Power Plant (VPP) project and commencing the Grid-side Battery Energy Storage Systems trial; and

b) a series of enhancements to the UE Summer Saver (voluntary residential demand response) program.

This report and its attachments deliver the annual reporting requirements for work undertaken on these initiatives during 2018 and documents the outcomes and learnings. Further details are presented below.

1.1 Virtual Power Plant & Grid-side Battery Energy Storage Systems

In September 2013, UE submitted a request to the Australian Energy Regulator (AER) to seek indicative upfront approval to use part of the 2011-2015 allocation of Demand Management Incentive Scheme (DMIS) funding (part A) to support the development of UE's Virtual Power Plant (VPP) 50kW Residential Pilot Project. With the subsequent success of this pilot during this period, UE planned to transition the pilot to business-as-usual for management of peak demand and economic deferral of traditional network augmentation as well as management of supply quality. UE has been using part of the 2016-2020 allowance to fund this transition.

The aim of the original pilot project was to validate or otherwise, the use of solar photovoltaic (PV) and storage to manage embedded generation and storage in a residential setting for the provision of efficient and prudent non-network augmentation.

In 2014, there was significant work completed as part of the pilot. UE successfully installed a total of 13 VPP units, distributed across our network. The installations were completed in July 2014, and significant testing, refinement and learnings have been established through the operations of these units in 2015, 2016 and 2017. The innovation involved in establishing the pilot project was recognised nationally with the project announced as winner of the 2016 Clean Energy Council Award in the Innovation category.

In 2018, UE wound down the pilot project to complete the transition of the pilot to business-as-usual, decommission the remaining VPP units, and re-deploy them as part of a new grid-side storage trial at UE's constrained distribution substations. UE has received indicative upfront approval from the AER in 2018 to undertake the Grid-side Battery Energy Storage Systems trial.

1.2 Summer Saver (Demand Response) Program Enhancements

The Summer Saver Trial was an investigation of how effective and efficient customer demand response is as a non-network alternative at addressing demand at peak times. The Trial investigated various demand management options. The outcomes of this Trial have enabled UE to develop a demand management model that describes the best combination of mechanisms that would result in the biggest peak demand reduction at specific locations based on customer demographics and load profiles.

UE launched the Summer Saver Trial in February 2014 targeting 6,500 customers on four Bulleen zone substation feeders. Customers were offered $25 if they reduced their load during the UE nominated three-hour event period. UE anticipated calling on average four events per summer with the customer having the opportunity to earn $100 for the summer if they participated in all events.

UE expanded the Trial for summer 2014/15 to target 4,000 more customers in areas of the network that were likely to experience an interruption from electrical asset overload. The Trial also introduced new demand management options to the existing Trial members including direct load control of pool pumps and supply capacity limiting.

The Trial was expanded again for summer 2015/16 to target a total of 13,000 customers in areas of the network that were likely to experience an interruption from electrical asset overload. On top of the pool pump load control and supply capacity limiting options, the new option of load control of air-conditioners was added to the service offerings. A Bidgely customer smart phone application was also introduced. The Summer Saver Program

currently utilises the capabilities of the Advanced Metering Infrastructure (AMI) to encourage customer participation and engagement whilst lowering implementation costs.

The Trial in 2015/16 was so successful it was recognised as a Technology Pioneer and Best Customer Focused Technology Project by the US Peak Load Management Alliance (PLMA) and Australian Utility Innovators Awards respectively. The success of the Trial provided UE the confidence to proceed with the Summer Saver Program as a business-as-usual activity in summers 2016/17 and 2017/18 to defer traditional network augmentation using demand response. The Summer Saver Program was targeted to 9,800 and 10,200 customers in areas of identified network constraint in summer 2016/17 and 2017/18, respectively.

In 2018, the Summer Saver Program was partially funded through DMIA as it is still trialling several new elements for demand management to assist with increasing the program uptake, improving customer engagement and performance, and developing an in-house digital technology solution. As such the majority of the costs incurred in 2018 from DMIA were from the following improvement research projects for which UE sought and received indicative upfront approval from the AER in 2018:

- Monash Demand Management Study with ClimateWorks Australia to expand the Program to high-density and short-term rental environments;
- Summer Saver Digital Solution Improvement Study with Deakin University; and
- Summer Saver Study with CitySmart to Increase Customer Uptake.

Some residual costs for summer 2017-18 were also incurred in 2018 which includes technology development and transition to business-as usual.

Refer to Appendix 1 for further details on this Project.

1.2.1. Monash Demand Management Study – ClimateWorks Australia

In February 2018, UE submitted a request to the AER to seek indicative upfront approval to use part of the 2016-2020 allocation of DMIS funding (part A) to support the Monash Demand Management Study, valued at $170k. The project was a joint initiative between UE and ClimateWorks Australia (Monash University).

When ClimateWorks Australia approached UE in early 2018 to discuss their proposed demand management study at Monash University's Clayton campus, there was a clear opportunity for UE to learn how Summer Saver Program could be expanded into the high-density residential apartment and also short-term rental segments of the market, to provide greater coverage of the Program.

Monash University was undergoing an energy transformation as it aimed for net zero greenhouse gas emissions, and planned to use this transformation as a 'living laboratory', providing a space to trial new initiatives and technologies that were relevant to the broader electricity grid. Therefore, Monash University provided an ideal environment to test demand management initiatives, as it was an embedded network with a large pool of potential study participants across a range of customer types, including residential, commercial and industrial.

This demand management study focused on high-density residential demand on two halls of residence at the Monash Clayton campus, which together housed 600 students in multi-unit, single occupant accommodation. Students in the residential halls were charged a flat rate for accommodation that does not identify or directly charge the students for their individual energy usage. These students were analogous to residents in short-term rental properties. The demand management study included separate trials in Semester One and Semester Two, enabling the investigation of different demand management interventions. Prior to each trial, students were surveyed about their environmental values and demographics.

Semester One Trial

For Semester One, the Trial investigated the effectiveness of information provision for demand management. In this Trial, students in one residential building were selected as the control group, while the residents of the second building were allocated to the treatment group.

The control group received a single email at the beginning of the trial explaining that reducing energy use has benefits for the grid and the environment and providing some general tips for energy saving. While the treatment group received weekly emails consisting of six components.

The Semester One Trial commenced on 13 April 2018 and finished on 31 May 2018. Throughout this time, students' individual energy use and demand was monitored for both the treatment and the control group. An initial period of data collection from 13 April 2018 to 25 April 2018 provided an energy use baseline against which subsequent energy use could be compared. From 25 April 2018 through to 31 May 2018, students in the treatment group received weekly emails, as mentioned above.

It was identified that the treatment and control groups showed different patterns of energy use over time, the data analysis then focused on studying the differences between the pre-treatment period and each post-treatment period.

The control group showed no significant change over the study. For the control group, the five differences (between the pre-trial period and each week of the study) were identified as not significant. Therefore, the analysis confirmed the mean energy use for this group did not change significantly over the trial period.

In contrast, the treatment group reduced their energy use after the first email, and maintained this behaviour, with only one exception, during the whole study period. Significant reductions were identified in the energy use of the treatment group in all post treatment periods except for the period between 3 May 2018 and 7 May 2018. Averaged across the entire study, it was found that for the treatment group, energy use was 12.4 per cent lower than the baseline.

Semester Two Trial

The Semester Two Trial took place in the same residential halls as the Semester One Trial. The single-occupant apartments were all almost identical in size and are individually metered. Students had control over their operation of lighting, cooking equipment, electric heaters and fans, entertainment equipment, computers and other appliances. Fridges, hotplates and ceiling lights were provided by Monash Residential Services, while other appliances were student-owned. Gas heating was provided centrally and there were no air conditioners installed in students' rooms.

The Trial aimed to test different notification periods for peak demand events:

- An 8-hour notification; and
- A 24-hour notification with a 2-hour reminder.

8 simulated peak demand events on weeknights were allocated over the semester. Based on the first semester analysis, these events were scheduled for the peak time for the student rooms from 8:00pm to 10:00pm.

Students were divided into 6 groups. Across the 8 events of the semester, each group sometimes received an 8-hour notification, sometimes received a 24-hour notification with a 2-hour reminder, and sometimes acted as the control. A fully counterbalanced design was developed, to account for potential changes in students' energy use depending on the order in which they received the different treatment levels.

Groups receiving a notification by email or SMS were given the following information:

- A request that the students reduce their energy use during peak time on the evening of the event; and
- A reminder that reducing energy use during peak times has important benefits for the environment and the grid.

For each simulated peak demand event, all students (including those in the control group for that event) received feedback on their energy use.

The Semester Two Trial commenced on 29 August 2018 and finished on 17 October 2018. Throughout this time, participating students' individual energy use and demand was monitored. An initial period of data collection from 30 July 2018 to 29 August 2018 provided a baseline against which subsequent energy use could be compared.

Participants were asked about their preferences for different notification periods about upcoming peak demand events. While 45% of respondents had no preference for a particular notification period, 39% preferred the 24-hour notification with a 2-hour reminder and only 16% preferred an 8-hour notification. Respondents who preferred the 24-hour notification with a 2-hour reminder said that it provided a better ability to plan, and that they found multiple reminders helpful. Respondents who preferred the 8-hour notification said that they preferred not to receive multiple emails.

Refer to Appendix 2 for further details on this Project.

1.2.2. Summer Saver Digital Solution Improvement Study – Deakin University

In April 2018, UE submitted a request to the AER to seek indicative upfront approval to use part of the 2016-2020 allocation of DMIS funding (part A) to support the Summer Saver Program Digital Solution Improvement Study, valued at $35k. The project is a joint initiative between UE and Deakin Business School.

The current program had proven effective in managing residential demand management at peak network conditions, however due to existing technology constraints with the current vendor, it was the right time to re-assess the current digital engagement tool for customers with a view to improving customer experience and engagement, and expand the pool of customers participating in demand management.

The digital technology for the Summer Saver Program from Bidgely in previous years did not allow for residential customers with rooftop solar PV systems or other distributed energy resources (DERs) to have access to performance or consumption data. This prevented a large number of highly-engaged participants from utilising the real-time monitoring facility to potentially maximising their demand response performance in real time.

UE aimed to seek customer feedback on uptake of the current digital solution and test the development of additional digital platforms in supporting the following:

- Improve the demand response event performance by customers in both increasing the amount curtailed (kW) as well as the duration of curtailment (kWh); and
- Investigate localised hosting considerations.

Deakin Business School had extensive experience in customer behaviour and data analytics and was ideally placed to review the functionality and customer experience provided by the present digital solution, and recommend improvement opportunities. All investigators had a track record in the area of technology requirements, use and adoption practices, mobile applications evaluation and advanced data analysis.

The objective of this project was to identify improvements to the design and features of the current Summer Saver digital technology solutions to improve customer participation and experience, and optimise their demand response performance for the Summer Saver demand management program.

Based on the findings from the focus groups conducted under this Study, the Project team from Deakin Business School proposed to take the following principals into consideration in the technology solution development for the Summer Saver Program:

- Simple mobile application (perceived ease of use);
- Immediacy of feedback (perceived usefulness);
- Communication with customer (users as partners);
- Incentivises – balance with purpose (perceived benefits); and
- Personalisation (Autonomy and competence).

Refer to Appendix 3 for further details on this Project.

1.2.3. Summer Saver Study to Increase Customer Uptake – CitySmart

In April 2018, UE submitted another request to the AER to seek indicative upfront approval to use a portion of the 2018 allocation of DMIS funding (Part A), valued at $72k to support a study that should lead to increases in the customer uptake rate for participation in the Summer Saver Program. The project was a joint initiative between UE and CitySmart.

The current Program had proven to be effective in attracting sufficient customers to deliver demand management for typical hot weather days by offering the right level of customer financial incentives, with the program achieving customer uptake rates of 6% up until 2016/17. Recognising the lack of awareness of the UE brand with customers, in 2017, UE partnered with local councils to participate in the marketing of the Summer Saver Program. With customer recognition of council branding, this increased customer participation in the Program to more than 10% for summer 2017/18.

UE believed there was further opportunity to increase customer uptake rates without increasing financial incentives to customers (and hence keep the program competitive against traditional network investments), by undertaking the proposed initiative with CitySmart. Increasing customer uptake rates would provide UE with

greater flexibility in the dispatch of this demand management capability, particularly in managing abnormal hot weather days as was observed on 28th January 2018 when temperatures remained high well into the late evening. A higher customer uptake would also allow UE to rotate blocks of customers in sequential 3 to 4 hour windows to sustain the demand response for longer periods of time, while maintaining customer engagement.

As a result of this Study, CitySmart developed 8 customer segments for residential households in Australia based on behaviour. This research proposes to take those segments and understand how to effectively engage each household across 5 different load profile architypes. CitySmart surveyed customers and engaged the existing and potential customers across several channels to test and refine the value proposition and key messaging for each. This included identifying the optimal value for compensation of energy reduction by segment and load curve. The outcomes of study was then tailored towards the Summer Saver Program. The applications of this study for UE were as follows:

- Improving uptake and participation in the Summer Saver Program by using defined messaging through segmentation; and
- Increasing participation in other residential peak load management programs.

By understanding real consumer household decision making motivators and barriers (persona segmentation model) with how they use their electricity (load profiles), UE would be able to create rich insights for sub-segments of consumers. Then, with these insights, consumers with potential messaging, solutions, tactics would be engaged for the Summer Saver Program to maximise participation.

This project served to create value propositions by customer segment and load type which would increase participation and event performance for the Summer Saver Program in 2018/19.

Refer to Appendix 4 for further details on this Project.

2. Regulatory Requirement and Compliance

The AER, in its Demand Management Incentive Scheme applied to UE for the 2016-2020 regulatory period, sets certain criteria and reporting requirements for expenditure from the DMIA. These are detailed below along with a description of how UE complies with each of these requirements for each project.

2.1 Virtual Power Plant & Grid-side Battery Energy Storage Systems

1. Demand management projects or programs are measures undertaken by a DNSP to meet customer demand by shifting or reducing demand for standard control services through non-network alternatives, or the management of demand in some other way, rather than increasing supply through network augmentation."

The VPP project attempts to combine the capabilities of solar PV generation and battery storage to flatten out the demand profile by charging the battery overnight from the network or from PV during the middle of the day when solar PV generation is at its maximum and discharging the battery during the early evening when energy demand requirements on the UE network are at their maximum. Aggregating VPP units will provide a system that can be dispatched to manage network capacity constraints. The Grid-side Battery Energy Storage Systems aim to achieve the same outcomes, but implemented on the network side of the meter.

"2. Demand management projects or programs may be:

(a) broad-based demand management projects or programs—which aim to reduce demand for standard control services across a DNSP's network, rather than at a specific point on the network. These may be projects targeted at particular network users, such as residential or commercial customers, and may include energy efficiency programs and/or

(b) peak demand management projects or programs—which aim to address specific network constraints by reducing demand on the network at the location and time of the constraint."

The VPP sought to address specific network constraints by reducing demand on the network at the location and time of the constraint. With the VPP concept now proven by the pilot, it is intended to locate such units in areas where there are identified network constraints. In the first instance, this is likely to be in areas where there are significant distribution transformer constraints. Ultimately, the goal is to alleviate constraints higher up in the network such as at the distribution feeder or zone substation level.

"3. Demand management projects or programs may be innovative, designed to build demand management capability and capacity and explore potentially efficient demand management mechanisms, including but not limited to new or original concepts."

The VPP offers a new solution for a constrained network area, particularly where load growth is low, uncertain or is expected to plateau in future. The ability to provide incremental amounts of capacity through combining renewable generation and storage to meet the demand as it materialises could be economic against a more traditional network solution that provides significant step increases in capacity at higher cost. The innovation involved in establishing the pilot project has been recognised nationally with the project announced as winner of the 2016 Clean Energy Council Award in the Innovation category. We intend to demonstrate the application using Grid-side Battery Energy Storage Systems.

"4. Recoverable projects and programs may be tariff or non-tariff based."

The VPP and Grid-side Battery Energy Storage Systems projects are non-tariff based.

"5. Costs recovered under the DMIS:

(a) must not be recoverable under any other jurisdictional incentive scheme

(b) must not be recoverable under any other Commonwealth or State/Territory Government scheme and

(c) must not be included in forecast capital or operating expenditure approved in the distribution determination for the regulatory control period under which the DMIS applies, or under any other incentive scheme in that determination."

Costs recovered under the DMIS for the VPP project are costs incurred by UE in procuring expert consulting services, equipment and installation services for the trial. In 2018, costs were predominantly related to operational and decommissioning costs associated with running the pilot. These costs have not been recovered from any other scheme. The costs do not include labour for UE employees' time toward this project. This cost is absorbed by the organisation and is regarded as in-kind contribution towards the project.

"6. Expenditure under the DMIA can be in the nature of capital or operating expenditure. The AER considers that capex payments made under the DMIA could be treated as capital contributions under clause 6.21.1 of the NER and therefore not rolled into the regulatory asset base (RAB) at the start of the next regulatory control period. However the AER's decision in that regard will only be made as part of the next distribution determination."

All costs incurred by UE under the DMIS for the VPP project are classified as operating expenditure.

2.2 Summer Saver (Demand Response) Program Enhancements

"1. Demand management projects or programs are measures undertaken by a DNSP to meet customer demand by shifting or reducing demand for standard control services through non-network alternatives, or the management of demand in some other way, rather than increasing supply through network augmentation."

The Summer Saver Program sought to incentivise customers to reduce their load during peak times. Voluntary customers were rewarded $5 per kWh for reducing their load when compared to their baseline during the UE nominated three hour event period. An additional 50% bonus was rewarded to customers who successfully reduced their consumption for all 3 hours.

During the period of December 2017 to March 2018, four events were called on the following dates and times:

- 13th December 2017 (5:00pm – 8:00pm);
- 6th January 2018 (5:00pm – 8:00pm);
- 18th January 2018 (5:00pm – 8:00pm); and
- 19th January 2018 (4:00pm – 7:00pm).

Event results are summarised in Appendix 1.

"2. Demand management projects or programs may be:

(a) broad-based demand management projects or programs—which aim to reduce demand for standard control services across a DNSP's network, rather than at a specific point on the network. These may be projects targeted at particular network users, such as residential or commercial customers, and may include energy efficiency programs and/or

(b) peak demand management projects or programs—which aim to address specific network constraints by reducing demand on the network at the location and time of the constraint."

The Summer Saver Program sought to address specific network constraints and is therefore targeted at customers directly impacted by those constraints. The Program targeted approximately 10,000 customers in areas of the network which were likely to suffer an interruption during summer or had suffered an interruption in previous summers due to electrical plant overload. Throughout the trial, UE sought to understand if sufficient numbers of customers participate in the trial with the right level of behaviour to reduce sufficient load to prevent an interruption.

"3. Demand management projects or programs may be innovative, designed to build demand management capability and capacity and explore potentially efficient demand management mechanisms, including but not limited to new or original concepts."

Residential demand management as a concept is not new however trialling it in metropolitan Melbourne certainly was. Other DNSPs in Australia and internationally have found success with demand management in regional areas where communities display more social capital. Since UE's network is predominantly metropolitan, demand management such as demonstrated by this Program is a crucial option to be explored. The innovation of

Summer Saver Program has been recognised locally and internationally, winning Australian Innovator Utility Awards 2016's Best Customer Engagement Project, and the US Peak Load Management Alliance's Technology Pioneer Award.

"4. Recoverable projects and programs may be tariff or non-tariff based."

The Summer Saver Program is non-tariff based.

"5. Costs recovered under the DMIS:

(a) must not be recoverable under any other jurisdictional incentive scheme

(b) must not be recoverable under any other Commonwealth or State/Territory Government scheme and

(c) must not be included in forecast capital or operating expenditure approved in the distribution determination for the regulatory control period under which the DMIS applies, or under any other incentive scheme in that determination."

Costs recovered under the DMIS for the Summer Saver Program are costs incurred by UE in conducting customer research and feedback initiatives. In 2018, customer incentive payments were funded through Capex-Opex trade-offs through the deferral of network augmentation. These DMIA-funded costs have not been recovered from any other scheme. The costs do not include labour for UE employees' time toward this Program. This cost is absorbed by the organisation and is regarded as in-kind contribution towards the Program.

"6. Expenditure under the DMIA can be in the nature of capital or operating expenditure. The AER considers that capex payments made under the DMIA could be treated as capital contributions under clause 6.21.1 of the NER and therefore not rolled into the regulatory asset base (RAB) at the start of the next regulatory control period. However the AER's decision in that regard will only be made as part of the next distribution determination."

All costs incurred by UE under the DMIS for the Summer Saver Program are classified as operating expenditure.

3. DMIS Reporting

The information contained in this report and its attachment appendices is suitable for public publication.

The AER requires that a DNSP's annual report must include the following for each project.

3.1 Virtual Power Plant & Grid-side Battery Energy Storage Systems

1. The total amount of the DMIA spent in the previous regulatory year, and how this amount has been calculated.

UE had $17,456 excl. GST of expenses during the 2018 calendar year on activities associated with the DMIA for VPP Project. The costs were associated with mainly the ongoing operational and decommissioning expenses associated with the pilot (such as sim cards to enable remote control and continuous live monitoring of the systems by UE and software maintenance). Cost associated with the follow-on Grid-side Battery Energy Storage Systems trial will begin to be incurred in 2019.

2. An explanation of each demand management project or program for which approval is sought, demonstrating compliance against the DMIA criteria in section 3.1.3 with reference to:

(a) the nature and scope of each demand management project or program

A VPP can be defined as a cluster of grid-connected distributed generation and storage plants that are monitored and controlled by an operator for energy trading and grid benefits. When combined, the cluster can then be treated as a single power plant. For UE's VPP Project UE has used solar PV and battery storage technologies which when combined can act to reduce peak electricity demand. Following completion of this project this year, this concept is now intended to be demonstrated on low voltage grid-side Battery Energy Storage Systems.

(b) the aims and expectations of each demand management project or program

The aim of the Project was to test the VPP concept and its ability to control peak demand through the dispatch of battery storage optimised against solar PV generation.

Traditional network solutions usually result in sunk capital; the resulting augmented asset cannot be easily recovered and used elsewhere if future demand falls. This Project's aim is to validate or otherwise, the use of a VPP to manage embedded generation and storage in a residential setting for the provision of efficient and prudent network augmentation. The solution will be validated if it:

- Effectively avoids/defers Capex/Opex requirements in a prudent and efficient manner.
- Is the most economic outcome when actual costs and benefits are known.
- Is a technically appropriate solution with appropriate mitigation of any risks.

The objectives of this Project were to validate VPP as a suitable approach for managing augmentation on the UE distribution network with no adverse impacts to network reliability and safety. The VPP Project aims were:

- To test the current state of the technology and its ability to scale.
- To identify the risks.
- To test and assess the level of control that can be achieved with commercially available devices currently on the market.
- To develop an understanding of the economics of the solution and validate the solution is a viable load management tool by exploring and then testing the business model(s), taking the generation, retail and distribution aspects into consideration.
- To explore and test the contractual and commercial agreements with 3rd parties and Residential Hosts (customers).

(c) the process by which each project or program was selected, including the business case for the project and consideration of any alternatives

This Project proposed VPP as a solution to address peak demand issues in low-voltage feeders when augmentation costs using traditional solutions are high. It is anticipated that in the future, distributed generation and storage would have application for the entire network as costs continue to fall.

(d) how each project or program was/is to be implemented

The overall VPP Project was broken into key stages to ensure that appropriate governance over costs, risks and benefits and associated gating and review are applied at each stage, with each stage being subject to independent approval. Stage 1 which is essentially complete consisted of a VPP system comprising 13 installations at residential sites totalling 50kW. The installation sites were limited to UE employees and VPP project team members' premises within the UE distribution area to manage identified risks. Stage 1 was operated over an extended period to test the economics and commercial models and understand the technology's capabilities, limitations and suitability for larger scale deployment. Stage 2 which involves deployment to capacity constrained sites to defer traditional augmentation is now underway, but will be implemented as a grid-side storage solution.

(e) the implementation costs of the project or program

In September 2013 UE submitted a request to the AER to seek indicative upfront approval to use part of the 2011-2014 allocation of DMIS funding (part A) to support the development of UE's Virtual Power Plant (VPP) Project. This was endorsed by the AER on the 2nd October 2013. The overall VPP project Stage 1 was estimated to cost $1.75M. The VPP project is now complete.

(f) any identifiable benefits that have arisen from the project or program, including any off peak or peak demand reductions.

UE has identified a number of constrained locations around the UE network where deployment of VPP is able to achieve peak demand reductions economically.

3. The costs of each demand management project or program:

(a) are not recoverable under any other jurisdictional incentive scheme,

(b) are not recoverable under any other state or Commonwealth government scheme, and

(c) are not included in the forecast capital or operating expenditure approved in the AER's distribution determination for the regulatory control period under which the DMIS applies, or under any other incentive scheme in that determination.

- Expenditure under DMIS is not eligible for recovery under any other jurisdictional incentive scheme.
- Expenditure under DMIS is not eligible for recovery under any other state or Commonwealth government scheme.
- Expenditure under DMIS has not been approved in the AER's distribution determination for the regulatory control period under which the scheme applies, or under any other incentive scheme in that determination.

4. An overview of developments in relation to projects or programs completed in previous years of the regulatory control period, and of any results to date.

Not applicable.

3.2 Summer Saver (Demand Response) Program Enhancements

1. The total amount of the DMIA spent in the previous regulatory year, and how this amount has been calculated.

UE had $193,118 excl. GST of expenses during the 2018 calendar year on activities associated with the DMIA for the Summer Saver Program comprising of the following:

- Bidgely Digital Platform License Fees;
- Summer Saver Digital Solution Improvement Study with Deakin University;

- Summer Saver Study to Increase Customer Uptake with CitySmart; and
- Monash Demand Management Study with ClimateWorks Australia.

2. An explanation of each demand management project or program for which approval is sought, demonstrating compliance against the DMIA criteria in section 3.1.3 with reference to:

(a) the nature and scope of each demand management project or program

This Summer Saver Program 2017/18 was an investigation of how effective and efficient customer demand response is as a non-network alternative at addressing demand at peak times.

Different mechanisms of demand response can be utilised to motivate and/or incentivise customers to change their energy usage behaviour and reduce load during peak times. These include:

- Voluntary Demand Side Participation (DSP): incentivises customers to reduce/shift their load during peak times with a single-rate reward paid to those who reduce usage by any amount.
- Direct Load Control: gives the utility more certainty in managing load by allowing the utility to manage appliances (RCAC and/or pool pump) during peak times to a known and predictable maximum.
- Critical Peak Pricing: electricity is priced significantly more during peak times to induce customers to reduce load and save money on their bill.
- Supply Capacity Limiting: sets a limit on the customers supply during peak times. This mechanism targets high users by enforcing a reasonable limit on their supply during peak times. Signing up to this option is voluntary and it is envisioned that such customers are genuinely keen to save energy and be more comparable to their neighbours.

Summer Saver Program 2017/18 was the transitional phase for the Summer Saver Project from a trial basis to a business-as-usual program as a non-network alternative at addressing demand at peak times. The Program utilises a variation of Voluntary Demand Side Participation (DSP) similar to that of Summer Saver Trial 2016 and 2017.

(b) the aims and expectations of each demand management project or program

The key objectives of the Summer Saver Program 2017/18 were to investigate and assess the benefit provided to the network through:

- Demand management tools:
    - investigate the take-up and impact of the DSP mechanism on customer load at peak times.
    - incentivise customers to reduce their load during peak times via one or more demand management tool.
- Informing and empowering the consumer:
    - provide consumers with the tools and information they need to take an active role in managing their consumption and to reduce energy costs and environmental impact.

To this end, the Program intended to:

- Investigate the take up of the DSP mechanism and its
    - attractiveness/value to the customers managing/reducing their load.
    - attractiveness/value to UE in managing peak load.
- Investigate the value of the DSP mechanism compared with network solutions.
- Identify risks with the technology in installation and operation.
- Develop UE knowledge and capability in leveraging Advanced Metering Infrastructure benefits.
- Develop relationships with UE customers.
- Explore and test contractual and commercial agreements with 3rd parties (retailers, contractors, suppliers).

The outcomes of this Program has enabled UE to develop a demand management model that describes the best combination of mechanisms that would result in the biggest peak demand reduction at specific locations based on customer demographics and load profiles.

This model has been incorporated into business-as-usual activities to manage peak demand.

(c) the process by which each project or program was selected, including the business case for the project and consideration of any alternatives

Approximately 85% of UE's network services residential customers. This Program investigated various demand management options that can be employed by residential customers. The results have helped UE define which demand management mechanisms have the biggest customer take-up and participation and yield the biggest load reductions at a given incentive value.

(d) how each project or program was/is to be implemented

UE undertook analysis to identify areas that are likely to experience an interruption and could benefit from load reduction through demand management. Customers in these areas were sent addressed letters informing them of the project and inviting them to register via the UE registration website.

UE accepted registrations from customers within the area who have either a mobile phone or email account to receive UE event alerts.

UE sent application notifications, SMS and/or email alerts to customers:

- 24 hour notice of the event period;
- A reminder on the morning of the event day;
- Event start notification;
- Event end notification; and
- Event performance notification.

Following the event, UE analysed customer smart meter data to verify load reduction during the three-hour event period. Rewards were processed and sent at the end of the project.

UE undertook further analysis of customer data to evaluate individual customer and total load reduction achieved for the event.

(e) the implementation costs of the project or program and

In 2018, the DMIA costs were incurred on market research of customers within the UE servicing area to understand the best channels to inform customers of the Summer Saver Program and motivations for signing up (or not) to the Program.

Research was conducted on different types of customers to learn about their experience on the Program and find ways of improving and expanding the Program.

(f) any identifiable benefits that have arisen from the project or program, including any off peak or peak demand reductions.

UE called three demand response event days last summer.

A total of 901 customers registered for the Summer Saver Program 2017/18 which is a take-up of approximately 9.1% from a customer base of 9,852. This increased from 5.4% in 2016/17. Customers were successfully recruited for all 87 targeted distribution sites. 37 sites achieved a take up rate of more than 10% and of which 10 achieved take up rates higher than 15%.

Event data showed that:

- An average of 75.1% of registered customers participated at any single event. This is confirmed by post summer customer research that shows that a significant portion of customers tried to participate but data shows that they did not manage an energy reduction during the event.

- An average demand reduction of 1.11kW was achieved across all three events compared to 1.03kW and 0.86kW in the Summer Saver Program 2016 and 2017, respectively.
- No rebound peak/shifted peaks were observed during the event days.

3. The costs of each demand management project or program:

(a) are not recoverable under any other jurisdictional incentive scheme,

(b) are not recoverable under any other state or Commonwealth government scheme, and

(c) are not included in the forecast capital or operating expenditure approved in the AER's distribution determination for the regulatory control period under which the DMIS applies, or under any other incentive scheme in that determination.

- Expenditure under DMIS is not eligible for recovery under any other jurisdictional incentive scheme.
- Expenditure DMIS is not eligible for recovery under any other state or Commonwealth government scheme.
- Expenditure under DMIS has not been approved in the AER's distribution determination for the regulatory control period under which the scheme applies, or under any other incentive scheme in that determination.

4. An overview of developments in relation to projects or programs completed in previous years of the regulatory control period, and of any results to date.

Not applicable.

4. Attachments

4.1 Appendix 1 – Summer Saver Program 2017/18

- Customer Letter
- Promotional Flyer
- Terms and Conditions – Voluntary Program
- Solar Incentive Terms and Conditions
- Registration Webpage
- Demand Response Event Results
- Frequently Asked Questions

4.2 Appendix 2 – Monash Demand Management Study Report

4.3 Appendix 3 – Summer Saver Digital Solution Improvement Study Report

4.4 Appendix 4 – Summer Saver Study to Increase Customer Uptake Final Presentation

Customer Letter

Appendix 1 – 2018 DMIS Report

United Energy Distribution Pty Limited
ABN 70 064 651 029

November 2016

UNITED ENERGY

UESS-NEW-GA.001/E 0000001/P 0000001

[redacted]
ELSTERNWICK VIC 3185

PO Box 449
Mt Waverley VIC 3149

We'll pay you to save energy.

Hello [redacted]t

As the electricity distributor for your region, it's our job to supply electricity to your neighbourhood and home.

Every summer, we experience a few days over 35 °C where many people turn on their air-conditioners (eg between 4pm and 7pm), placing enormous strain on the electricity network. A review of electricity demand has shown that your particular area could possibly benefit from smart demand management on those hot summer days.

We want you to be able to stay cool this summer, so we've come up with an initiative where successful participants can still use their air-conditioners, save on energy bills and even earn a financial reward!

It's easy to participate and earn a reward

Where we invite you to participate and you do so successfully, we will pay you $5 per hour for every 1 kWh of electricity reduced during a 3 hour period on nominated event days, plus an additional 50% bonus if your energy reduction is maintained for the whole 3 hour period. Here is an example of the estimated reward you can potentially earn:

Consumption: 2 kWh
Potential reduction: - 1 kWh

3 hrs x 1 kWh x $5	50% bonus
$15.00	$7.50

Potential Total: $22.50^

Consumption: 3 kWh
Potential reduction: - 2 kWh

3 hrs x 2 kWh x $5	50% bonus
$30.00	$15.00

Potential Total: $45.00^

Consumption: 5 kWh
Potential reduction: - 3 kWh

3 hrs x 3 kWh x $5	50% bonus
$45.00	$22.50

Potential Total: $67.50^

^ Please note this is an estimate only.

The first 250 successful participants* will receive a $20 bonus! So sign up now!

Please visit unitedenergy.com.au/summersaver/ for details and register now using your unique **Access Code:** [redacted]

As part of Summer Saver, your account profile will identify the Energy Easy service that helps you understand your consumption profile. You can register and log into this self-service portal by using your unique **NMI code** [redacted] and **meter serial number** [redacted]

Please email us on summersaver@ue.com.au if you do not wish to receive further information about this.

Regards

James Wong
Marketing and Stakeholder Engagement Manager

*Note: Terms & Conditions apply. Visit unitedenergy.com.au/summersaver/ for details.

Promotional Flyer

quick tips for reducing your demand

It's an event day, what can I do?

- Pre-cool your home before the event starts
- Set your air-conditioner to 25°C during the event
- Only use your air conditioner for short periods or turn up the temperature by a few degrees
- Turn off or reduce use of appliances that you consider discretionary for your household
- Make sure that appliances that are typically on standby, such as computers and the TV, are off at the source
- Schedule the washing machine, dishwasher or dryer to outside of the event period
- Minimise the number of times you open the refrigerator door to keep your energy use down
- Turn off the chlorinator, heat pump and cleaning equipment for your pool
- Make sure any non-essential lighting is off

We'll pay you to save energy

Average Single Person Usage

Consumption: 2 kWh
Potential Reduction: - 1 kWh

3 hrs x 1 kWh x $5	50% bonus
$15.00	$7.50

Potential Total: $22.50*

Average Couple Usage

Consumption: 3 kWh
Potential Reduction: - 2 kWh

3 hrs x 2 kWh x $5	50% bonus
$30.00	$15.00

Potential Total: $45.00*

Average Family Usage

Consumption: 5 kWh
Potential Reduction: - 3 kWh

3 hrs x 3 kWh x $5	50% bonus
$45.00	$22.50

Potential Total: $67.50*

* Please note that this is an estimate only.

Terms and Conditions – Voluntary Program

Appendix 1 – 2018 DMIS Report

Summer Saver Program - Terms and Conditions – Voluntary Program

Participation in United Energy Distribution Pty Ltd's (**UE**) Summer Saver Program (**Program**) is conditional on you agreeing to the terms and conditions set out below and completing our registration form.

By checking the box "I agree to the terms and conditions", you will be deemed to be legally bound by these terms and conditions.

1. Eligibility

1.1 In registering to participate, you represent to us that:

(a) you are the lawful occupant of the premises identified in your registration form (**Premises**);
(b) you have discussed this program and your intended participation with all other lawful occupants of the Premises (if any);
(c) the Premises is within one of our selected program areas within United Energy's network;
(d) there is a functioning smart-meter installed at the Premises; and
(e) you do not need electricity at the Premises to use any appliances which are important for the health or wellbeing of anyone at the Premises.

1.2 You must promptly notify us if you no longer meet the criteria set out above, or if there are any changes to your contact details.

2. Term

2.1 This agreement will commence from the time you complete your online registration and, unless terminated in accordance with this clause, will continue until 31 March 2018.

2.2 This agreement will automatically terminate if you cease to occupy the Premises or otherwise cease to satisfy any of the relevant eligibility criteria for the Program.

2.3 We may terminate this agreement at any time by notifying you in writing. You may also terminate this agreement at any time by notifying us in writing.

3. Event days and Incentives

3.1 From time to time we will notify you in advance, by email and/or SMS and/or mobile app push notifications, that an 'event', being a period of up to 3 hours on a day chosen by us as a day on which demand for electricity is likely to be high (**Event**), will take place. We will notify you of:

(a) the day on which the Event will take place, at least 24 hours before the Event;
(b) the hours during which the Event will take place, at least 24 hours before the Event, with a subsequent reminder on the morning of the Event;
(c) your previous electricity consumption (**Previous Consumption Rate**) at the Premises during a comparable day and time (determined by us). Your electricity consumption during the Event will need to stay below your Previous Consumption Rate to qualify for the following incentives (each an **Incentive**):

(i) you will qualify for a $5 incentive for each kilowatt hour (kWh) during the Event that you reduce your electricity consumption, calculated at every hour during the Event, when compared to your Previous Consumption Rate;
(ii) you will qualify for an extra $2.50 for each kWh reduced calculated every hour if your consumption during the Event continuously remains below your Previous Consumption Rate for the entire duration of the Event;
(iii) you will qualify for the Incentive for any additional generation you provide during the Event (when compared to your Previous Consumption Rate) which will be capped at a maximum of additional generation of 5kWh per hour;
(iv) the incentive will be paid to the nearest 0.1kWh reduced, and

(d) your electricity consumption during the Event and whether you qualified for an Incentive or not.

3.2 If you have qualified for an Incentive, we will notify you by email and/or SMS within seven (7) days of the relevant Event. Incentive payments will be processed and paid in April 2018 at the end of the Program.

3.3 If you register, and subsequently qualify for and are paid an Incentive, you will be entered into a draw to receive an additional $5000.00 inclusive of GST towards a rooftop solar installation. Terms and conditions for this incentive will be published separately.

3.4 Through the registration process, you may elect to receive the Incentive as a direct payment to the bank account you nominated on your registration form.

3.5 We reserve the right to cancel an Event at any stage prior to the Event and will notify you, by email, and/or mobile app push notification, of the cancellation.

3.6 We may choose not to involve you in an Event at our discretion. In the event we choose not to involve you, you will not be notified.

4. Scope of this agreement

4.1 You acknowledge that you are not obliged to participate in the Program.

4.2 This is not a retail electricity agreement and does not cover the supply of electricity to the Premises.

4.3 This is not a distribution agreement and does not cover distribution services, or any work carried out by us to connect the Premises to our distribution network or to increase the capacity of a supply point. If there is any inconsistency between a provision of this agreement and your distribution agreement, this agreement will prevail to the extent of the inconsistency.

4.4 You will not be required to pay us anything for participating in the Program. However, under your electricity retail agreement, you will be required to pay charges and fees to your retailer for the electricity it supplies to you.

4.5 To the maximum extent permitted by law, we expressly disclaim any representations or warranties in relation to the Program. You participate in the Program at your own risk and we will not be liable to you for any loss or damage arising under or in connection with this agreement or the Program (including in relation to any steps you take to minimise your use of electricity during an Event). *Please take care to not switch off critical appliances or do anything else during an Event that may cause you to suffer any loss, damage or injury.*

5. Notifications and privacy

5.1 You consent to receiving Event notifications and other communications from us or from our contractors about the Program by email, and/or mobile app push notification. You must ensure that you are able to receive such notifications and communications from us.

5.2 You agree to allow us to collect and use information about you and your household, including your electricity usage prior to and during the Program for the purposes of conducting the Program, including to assess whether you are eligible for an Incentive, to pay the Incentive, for research and analysis purposes and for other purposes associated with the operation and management of our electricity distribution network. You also agree to allow us to provide information relating to your electricity usage to third parties for the purpose of analysing your electricity usage during the Program for the Program. Our Privacy Policy includes more details about how we manage personal information, including how you can access and correct information we hold about you and our complaint management procedures. You can access our Privacy Policy at https://www.unitedenergy.com.au/privacy/**.**

6. UE Smart Energy App

6.1 The UE Smart Energy App may be supplied to you in order to provide near-real time electricity usage information via use of our online portal.

6.2 We do not guarantee and make no representation that the UE Smart Energy App will operate effectively at all times. Use of the UE Smart Energy App is intended to assist with your participation in the Program but its use is not compulsory and if the UE Smart Energy App is not used or does not operate effectively, you may still participate in the Program. Use of the UE Smart Energy App requires a working internet connection at your device and will use a small amount of internet data. Use of the UE Smart Energy App is wholly at the participant's risk and to the maximum extent permitted by law we disclaim all responsibility for any consequences of use of the UE Smart Energy App.

6.3 Consumption information, cost reduction information and other types of information provided by the UE Smart Energy App are estimates, and are indicative only. We cannot guarantee that actual electricity consumption and associated bill reductions will at all times match information provided by the UE Smart Energy App.

7. General

7.1 These terms and conditions are governed by the law of Victoria, Australia.

7.2 We reserve the right to change these terms and conditions at any time on reasonable notice and will notify you of any material changes via the email address that you provide.

7.3 Except as expressly set out in this agreement, all terms, conditions, warranties and statements (whether express, implied, written, oral, collateral, statutory or otherwise) relating to this agreement, the Program or the UE Smart Energy App are excluded to the maximum extent permitted by law. You have statutory guarantees and other rights that cannot be excluded under the Australian Consumer Law.

7.4 For any liability that falls outside of the Australian Consumer Law, the total liability of either party to the other party under or in connection with this agreement, the Program or the UE Smart Energy App will not exceed $100.00.

7.5 To the extent permitted by law, neither party will be liable to the other for any special, indirect or consequential loss or damages arising under or in connection with this agreement, the Program or the UE Smart Energy App.

Solar Incentive Terms and Conditions

United Energy Distribution Pty Ltd. (UE) Summer Saver - Solar Incentive Terms and Conditions

General

1. The Promoter is United Energy Distribution Pty Ltd (United Energy) ABN 70 064 651 029 of 43-45 Centreway, Mount Waverley Vic 3149
2. Registration for the United Energy Summer Saver Program (Program) is deemed acceptance of these Terms and Conditions.
3. If there is any inconsistency between these Terms and Conditions and anything else that refers to this incentive, these Terms and Conditions will prevail.

Eligibility

4. The Directors, management and employees (and their immediate families) of United Energy, its related entities, printers, suppliers, providers and agencies whom are directly associated with the conduct of this promotion are ineligible to enter the promotion. Immediate family means any of the following: spouse, ex-spouse, de-factor spouse, child or step-child (whether natural or by adoption), parent, step-parent, grandparent, step-grandparent, uncle, aunt, niece, nephew, brother, sister, step-brother, step-sister or first cousin.
5. Other than clause 4 above, if you register and subsequently qualify for and are paid an incentive under the Program, you will automatically go into a draw for this incentive (Promotion).
6. Entrants under 18 years of age are not eligible for participation.
7. United Energy reserves the right to request winners to provide proof of identity, proof of residency at the nominated prize delivery address and/or proof of entry validity or proof of registration ownership in order to claim a prize. Proof of identification, residency and entry considered suitable for verification is at the discretion of United Energy. In the event that a winner cannot provide suitable proof, the winner will forfeit the prize in whole and no substitute will be offered.

Promotional Period

1. The Promotion commences at 12:00am AEST on December 1st 2017 and ends at 11:59pm AEST on March 31st 2018 (Promotion Period).

Number of Entries Permitted

2. Entries are limited to one per household.

Draw and Notification of Winner

3. The winner will be drawn in accordance with these Terms and Conditions and drawn by United Energy on Monday 2nd April 2018 at 2:00pm AEDT at 40 Market Street, Melbourne, VIC.
4. United Energy's decision is final and United Energy will not enter into correspondence regarding the competition result or any other decisions United Energy makes in connection with the Promotion.
5. The winner will be notified via email within two days of the draw. The identity of winner will also be published on United Energy's website.
6. The prize will be awarded to the person named in the entry.
7. Promoter.
8. Subject to State Regulation, an unclaimed prize draw (if needed) will take place at United Energy on Wednesday 2nd May 2018 at 2:00pm AEDT at 40 Market Street, Melbourne, VIC. The winner of the unclaimed prize draw will be notified by email within two days of that draw.

Prize On Offer

9. There will be one (1) winner.
10. Total prize pool value is $5000.00 (including GST).
11. The winner is responsible for soliciting a solar quote from a least two solar installation vendors and submitting those quotes to United Energy for direct payment to the installation vendor. If the winner already has a solar installation and/or does not wish to have a solar installation, United Energy will in its absolute discretion offer the winner an alternative prize of equal value.
12.
13. It is a condition of accepting the prize that the winner may be required to sign a legal release in a form determined by the Promoter in its absolute discretion. If an entrant under 18 years of age wins a prize then their parent or guardian must sign the legal release referred to in this clause on the minor's behalf.
14.

Copyright, Statutory Guarantees, Waiver and Liability

15. In consideration of United Energy awarding the prize to the winner, the winner hereby agrees to appear in any promotion associated with the Promotion and/or the United Energy brand or the advertising or marketing thereof, in any media whatsoever throughout the world and the winner will not be entitled to any fee for such use.

Opt-In

16. By participating in United Energy Summer Saver Program and agreeing to the Terms and Conditions, you consent and agree to receive marketing information, offers and special discounts ("United Energy Information") from United Energy by email. A Member will not receive any further United Energy Information from United Energy if that member:

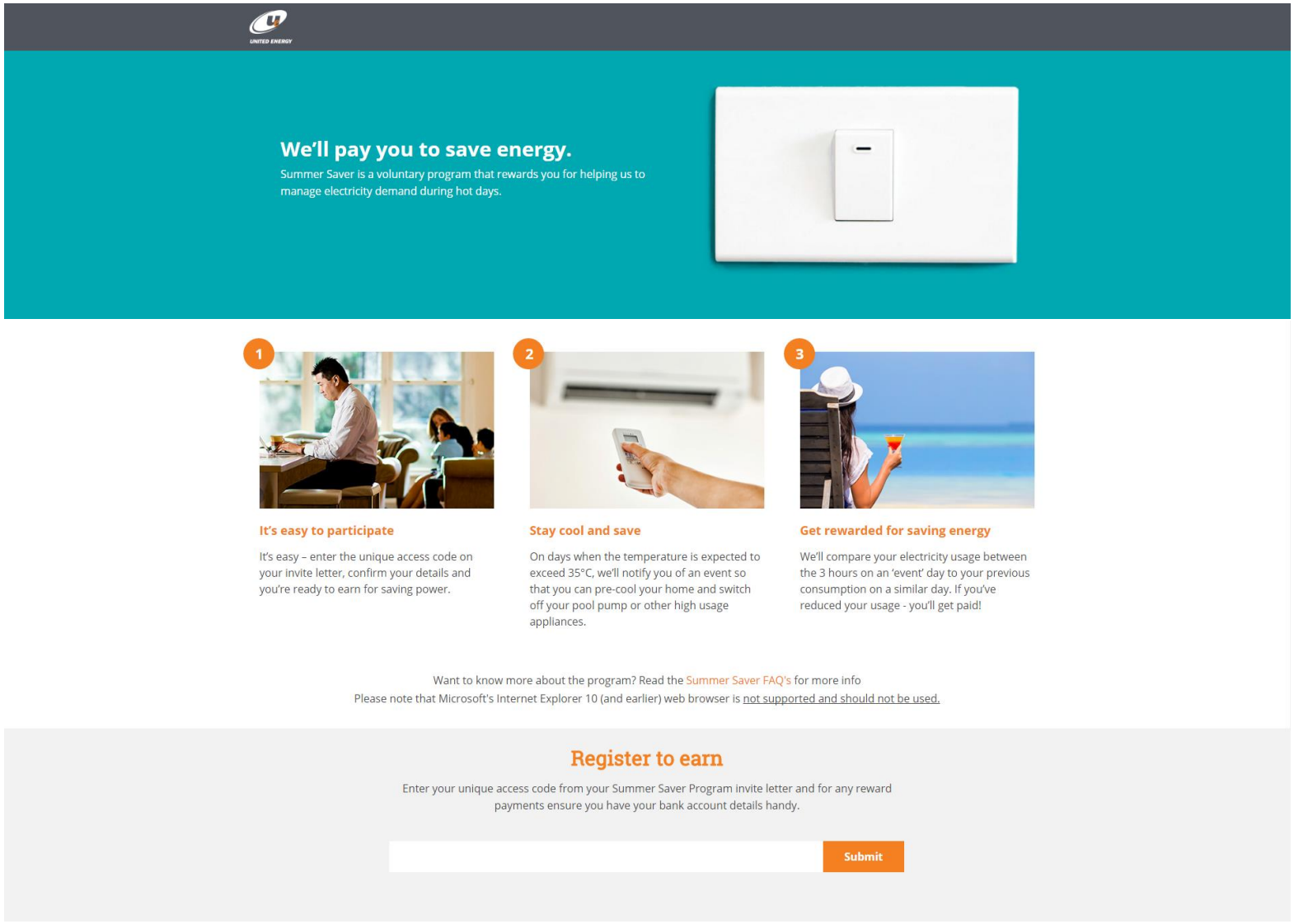
(a) selects the "OPT OUT" link at the base of any email received by that member from United Energy;

(b) follows the links on the Website; or

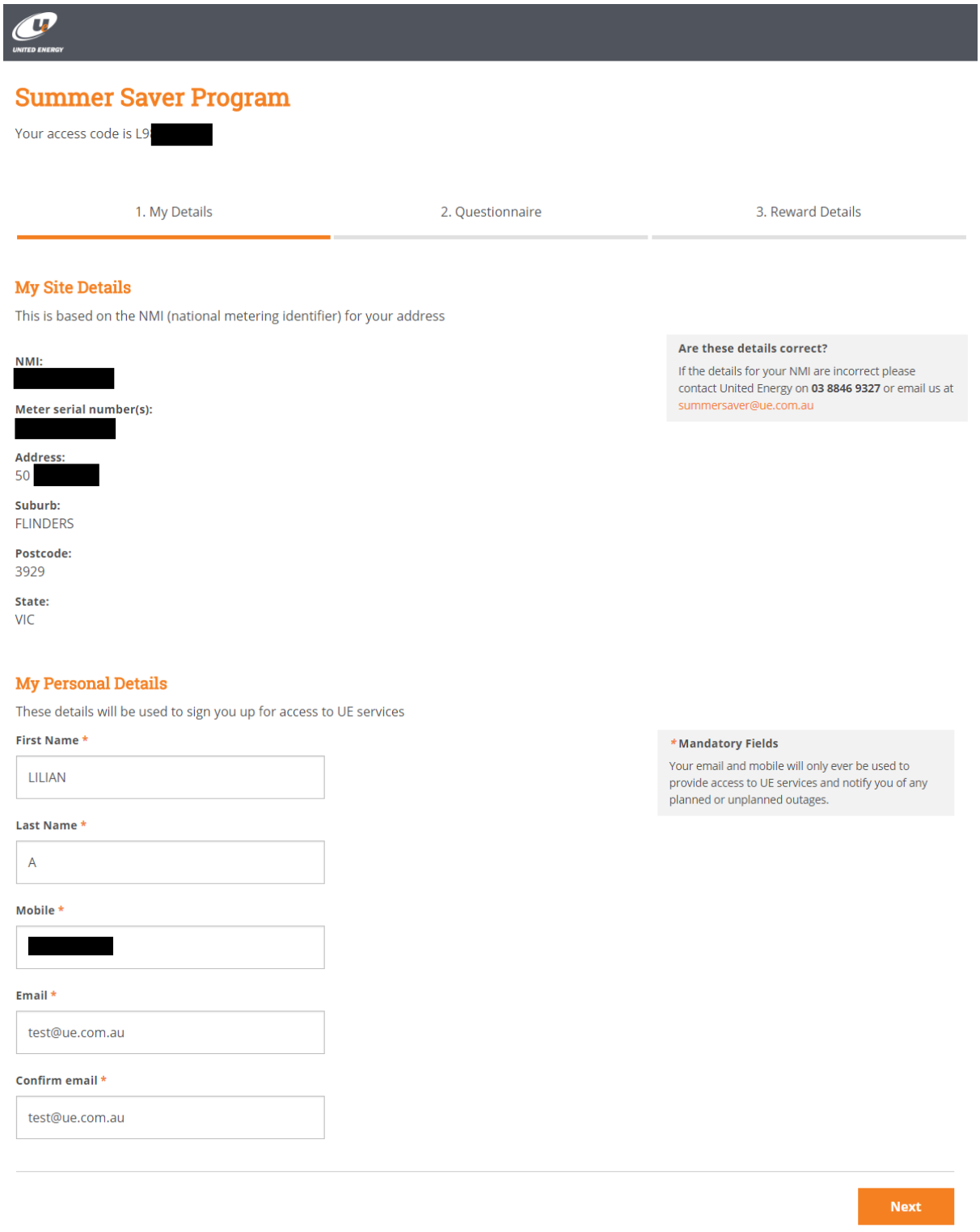
(c) calls the Customer Service Centre on 1300 131 689 and requests to receive no further United Energy Information.

Registration Webpage

1. Registration Webpage Homepage



2. Registration Page Details Page



UNITED ENERGY

Summer Saver Program

Your access code is L9[redacted]

1. My Details | 2. Questionnaire | 3. Reward Details

My Site Details

This is based on the NMI (national metering identifier) for your address

NMI: [redacted]

Meter serial number(s): [redacted]

Address:
50 [redacted]

Suburb:
FLINDERS

Postcode:
3929

State:
VIC

Are these details correct?

If the details for your NMI are incorrect please contact United Energy on **03 8846 9327** or email us at summersaver@ue.com.au

My Personal Details

These details will be used to sign you up for access to UE services

First Name *
LILIAN

Last Name *
A

Mobile *
[redacted]

Email *
test@ue.com.au

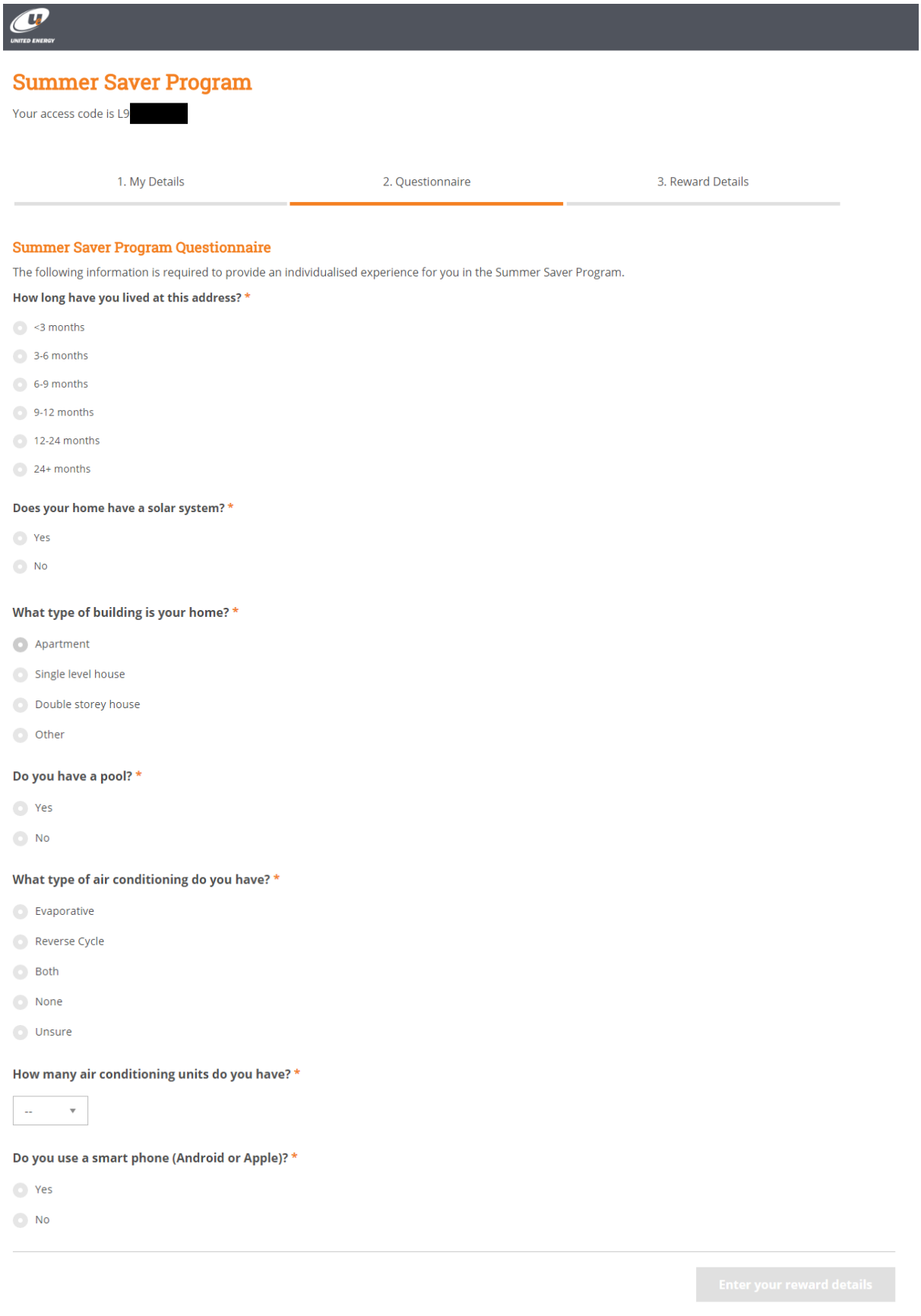
Confirm email *
test@ue.com.au

***Mandatory Fields**

Your email and mobile will only ever be used to provide access to UE services and notify you of any planned or unplanned outages.

Next

3. Registration Questionaire Page



Summer Saver Program

Your access code is L9[redacted]

1. My Details | 2. Questionnaire | 3. Reward Details

Summer Saver Program Questionnaire

The following information is required to provide an individualised experience for you in the Summer Saver Program.

How long have you lived at this address? *

- <3 months
- 3-6 months
- 6-9 months
- 9-12 months
- 12-24 months
- 24+ months

Does your home have a solar system? *

- Yes
- No

What type of building is your home? *

- Apartment
- Single level house
- Double storey house
- Other

Do you have a pool? *

- Yes
- No

What type of air conditioning do you have? *

- Evaporative
- Reverse Cycle
- Both
- None
- Unsure

How many air conditioning units do you have? *

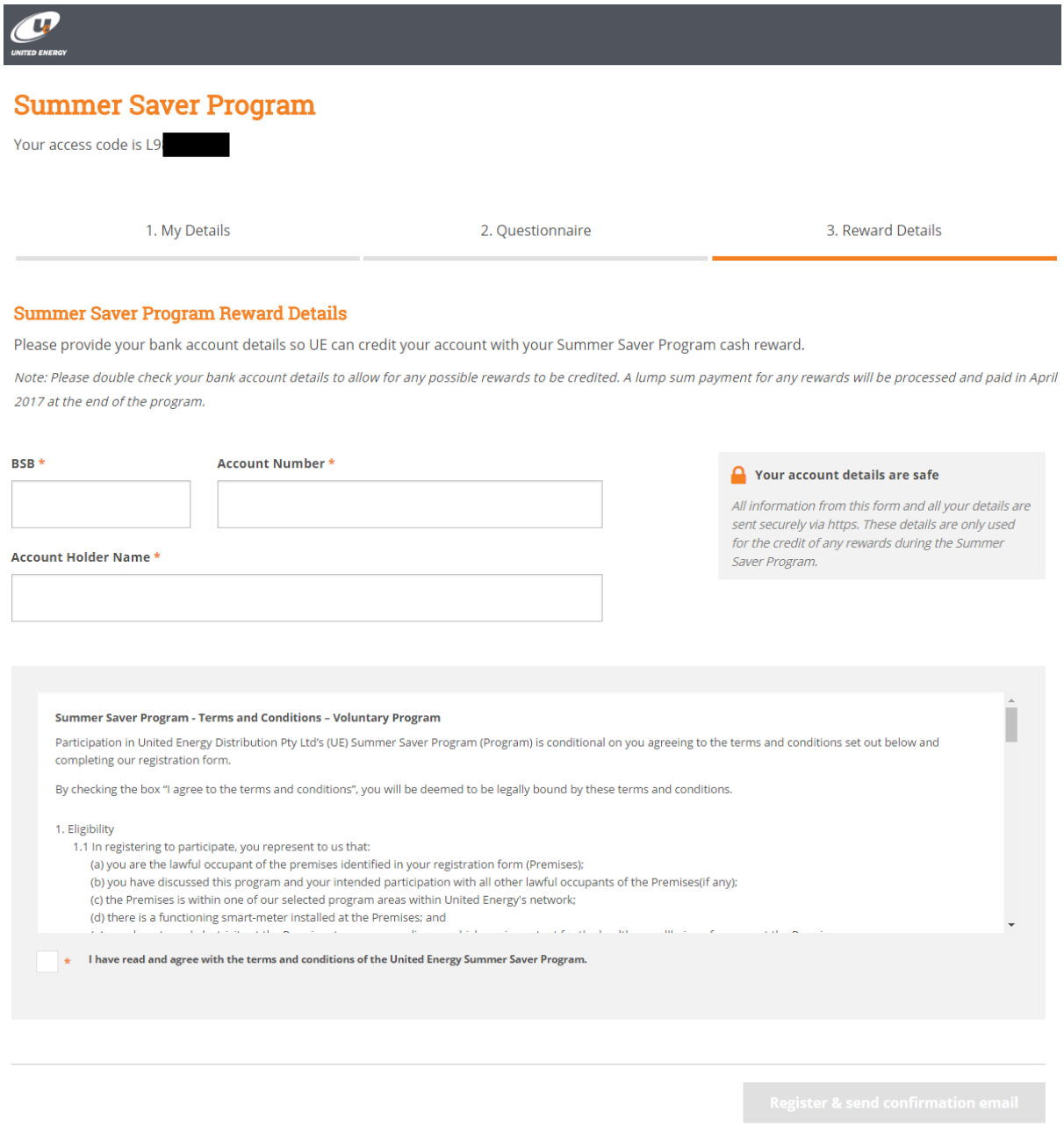
--

Do you use a smart phone (Android or Apple)? *

- Yes
- No

Enter your reward details

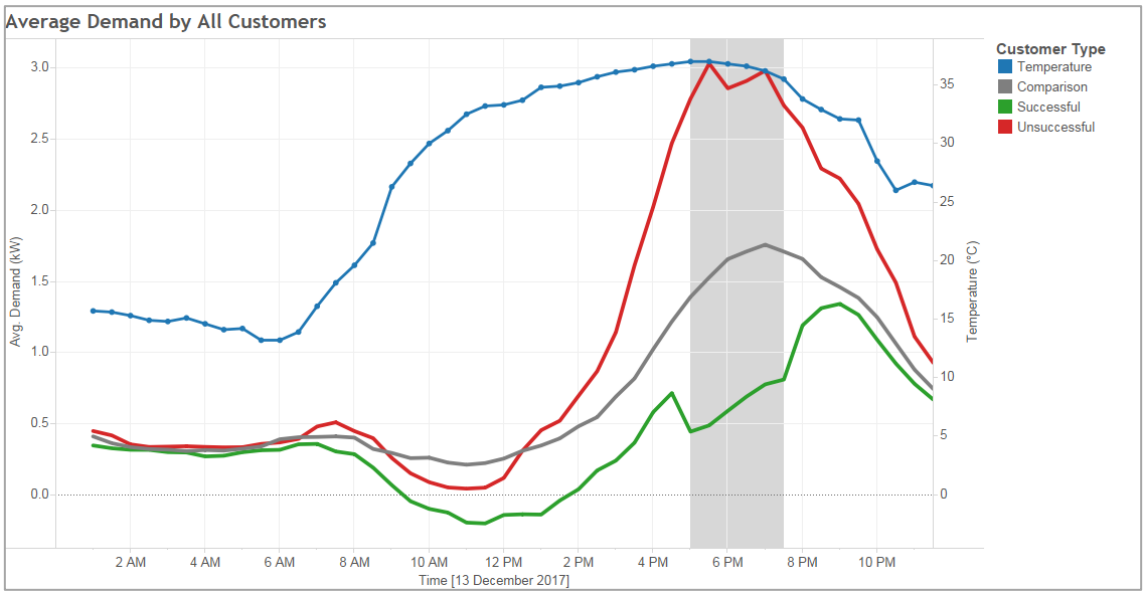
4. Registration Rewards Page



Demand Response Event Results

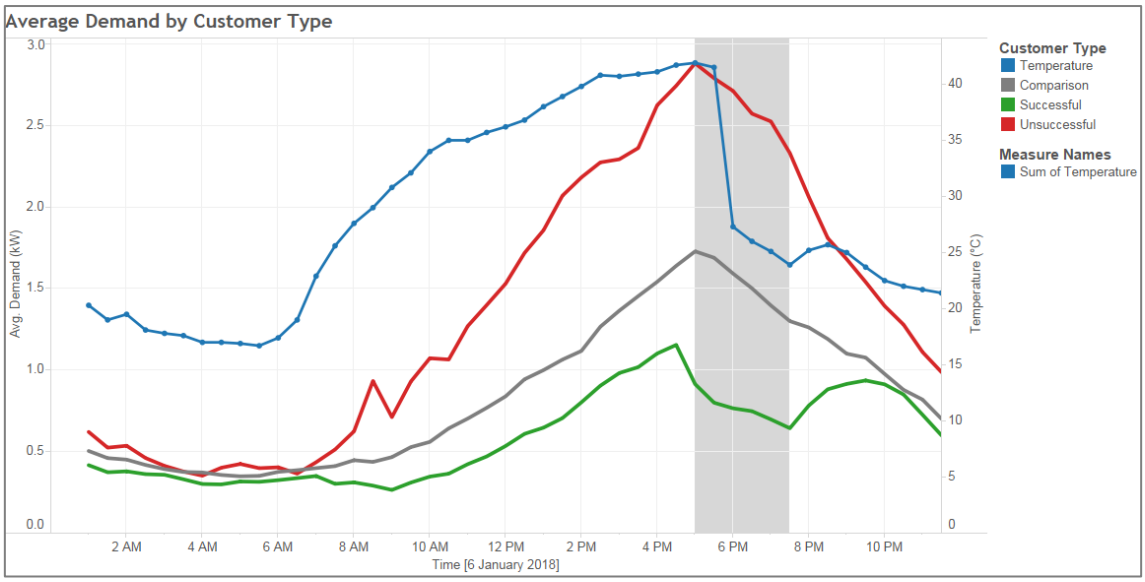
Appendix 1 – 2018 DMIS Report

1.1. Event 1: Wednesday, 13 December 2017 (5:00 – 8:00pm)



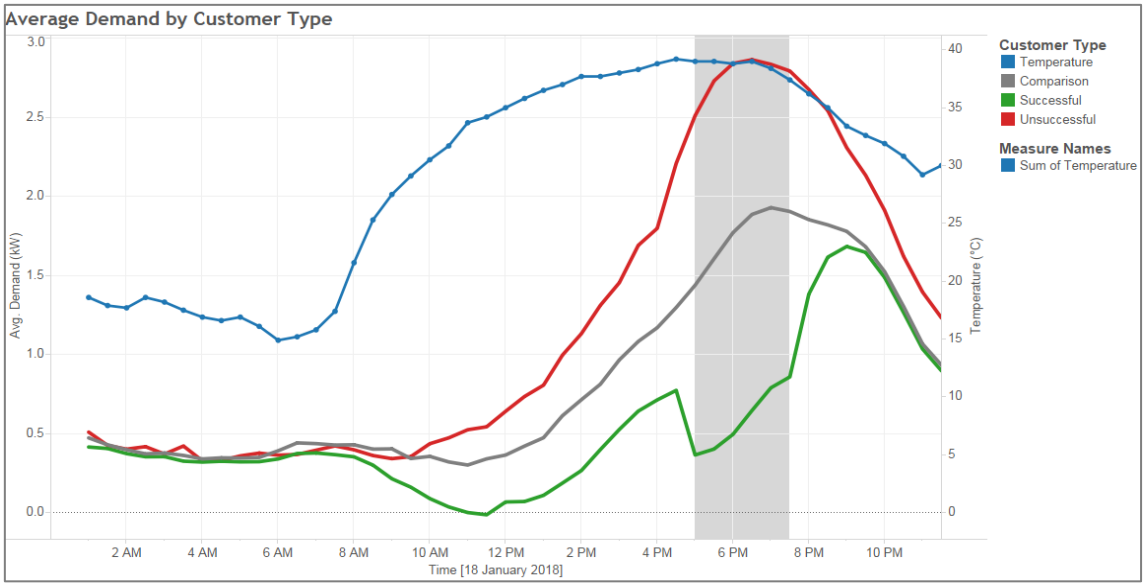
Average Demand of All Customers of Summer Saver Program 2017 on 13/12/2017

1.2. Event 2: Saturday, 06 January 2018 (5:00pm – 8:00pm)



Average Demand of All Customers of Summer Saver Program 2018 on 06/01/2018

1.3. Event 3: Thursday, 18 January 2018 (5:00pm – 8:00pm)



Average Demand of All Customers of Summer Saver Program 2018 on 18/01/2018

1.4. Event 4: Friday, 19 January 2018 (4:00pm – 7:00pm)

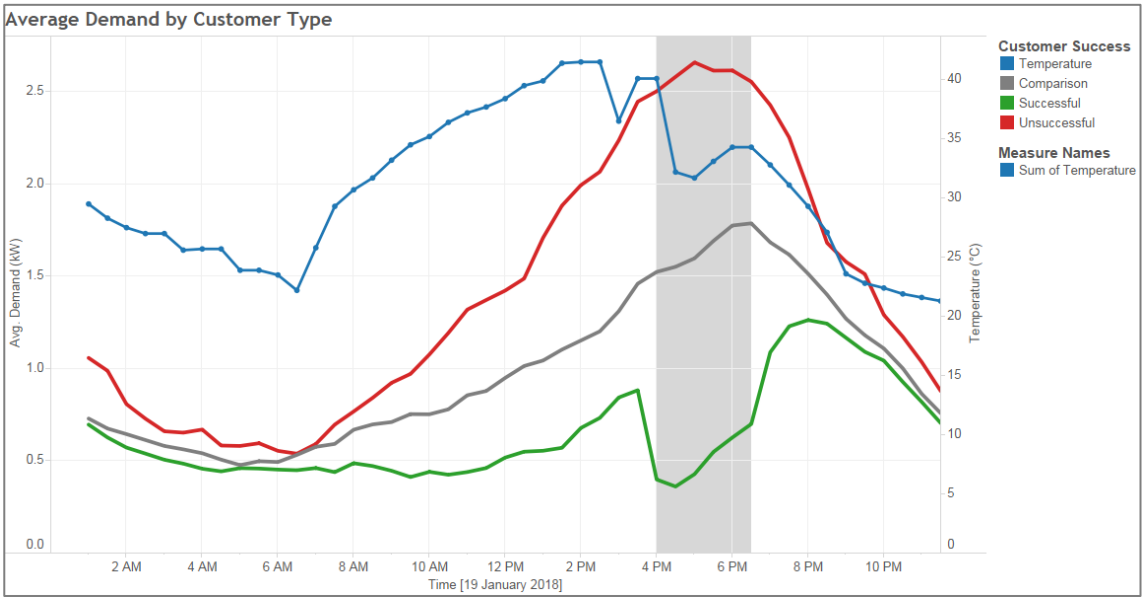


Figure 1: Average Demand of All Customers on 19/01/2018

Frequently Asked Questions

Appendix 1 – 2018 DMIS Report

United Energy Summer Saver Program
Frequently Asked Questions (FAQs)

What is the *Summer Saver Program*?

The United Energy Summer Saver Program is a voluntary demand response program where you can earn cash for reducing your electricity consumption when asked to do so by the Network. The program starts on 1st December 2017 and concludes on 31st March 2018. The notifications for when to reduce your energy use are called “Events”.

What is an Event?

An Event is a period of peak demand on the grid when lots of people are using air-conditioners, TVs, washing machines and other appliances at home. This energy use creates load on the electricity network called peak demand and typically occurs between 3pm and 8pm during the summer when temperatures exceed 35 degrees. We anticipate approximately 4 events this summer.

How will I know if there is an ‘Event Day’?

You will receive an alert from us via the UE Smart Energy app and email 24 hours prior to the ‘event day’ informing you of the exact 3-hour event period. A reminder is sent the morning of an expected ‘event day’ and at the start of the event on the ‘event day’.

Am I eligible to participate in the Program?

To participate, you will need to meet the following criteria:

- You will need a smart meter. Smart meter data allows us to verify consumption patterns prior to and including the program. If you do not have a smart meter and wish to participate in the program, contact us and we will organise to have a smart meter installed at your residence.

- You need to live in selected program areas within United Energy’s network.

UE reserves its right to select participants from those who registered (having regard to the number of participants it requires or such other factors as it considers reasonable). Registration will not guarantee your participation in the program.

Can I participate if I have solar panels installed at my home?

Yes! In addition to earning cash for your reduction, if you if you generate more electricity than you use, you will be eligible for a reward up to a maximum cap of additional generation of 5kWh per hour.

Should I participate if I have medical needs for electricity?

If you have medical equipment that requires a power supply to manage your health we recommend that you do not participate in this program.

How will you use my personal information for the *Summer Saver Program*?

Information relating to your electricity usage will be provided to third parties only for the purpose of analysing your electricity usage during the Program for the program.

Information about you and your household, including your electricity usage prior to and during the Program will be collected and used for the purposes of conducting the Program, to assess whether you

are eligible for an Incentive, to pay the Incentive, for research and analysis purposes and for other purposes associated with the operation and management of our electricity distribution network only. We are committed to complying with the Privacy Act and National Privacy Principles. A copy of United Energy's privacy policy is available here.

I want to participate, so what is the easiest way to do this?

Click the following link unitedenergy.com.au/summersaver or copy and paste it into your browser to register for the program. Your unique Access Code can be found on your invitation letter and must be used to start your registration.

How do I earn a reward?

You can earn $5 per kilowatt hour (kWh) for every kWh the customer reduced in the "event period" when compared to their previous consumption – this is called your baseline. So the longer you participate, the higher the reward. If you reduce consumption in all 3 hours in the "event period" you get an extra 50% bonus!

To set your baseline, we compare the energy consumption on an 'event day' against that your previous consumption on a similar summer day. We will tell you what your baseline is prior to an event and let you know how you compared during the event.

Consumption: 2 kWh

Potential reduction: - 1 kWh

3 hrs x 1 kWh x $5	50% bonus
$15.00	$7.50

Potential Total: $22.50*

Consumption: 3 kWh

Potential reduction: - 2 kWh

3 hrs x 2 kWh x $5	50% bonus
$30.00	$15.00

Potential Total: $45.00*

Consumption: 4 kWh

Potential reduction: - 3 kWh

3 hrs x 3 kWh x $5	50% bonus
$45.00	$22.50

Potential Total: $67.50*

Safety is our number one priority and completely turning off your electricity isn't safe. If you use less than 0.3kWh an hour during the event, you will not be rewarded for any reductions made under that amount.

If you are unable to reduce your consumption during an event, then you will not be eligible to receive a reward for that event. However we measure consumption on an hourly basis, so if you miss the first hour of an event, you can still curtail your use and earn the reward.

You will receive payment into your nominated bank account at the end of SSP in April 2018.

You will also recieve the "UE Smart Energy" app to notify you of events, learn tips on how to reduce your use during an event, and save money on electricity use. Please see the "About the Smart Energy App & Portal" on the United Energy Website.

REPORT

Monash Demand Management Study

Final Report

December 2018

Founding partners Monash University and The Myer Foundation

Monash Demand Management Study

Executive Summary

In 2018, ClimateWorks, BehaviourWorks and Seed Advisory collaborated on a behavioural demand management study at Monash University. The study focused on high-density residential demand, utilising two halls of residence at the Monash Clayton campus. The halls house 600 students in multi-unit, single occupant accommodation and students are charged at a flat rate for accommodation, with no direct identification of, or charge for, individual energy use.

A trial in Semester One focused on providing simple feedback to reduce daily peak demand, while the Semester Two trial examined how varying the timing of notification would influence participants' responses to a peak demand event.

In the Semester One trial, students in the treatment group received weekly emails that included a chart comparing their individual peak demand to that of other students, and a ranking compared to other students in the treatment group. Our analysis shows that after the first email, the treatment group reduced their energy use and maintained this behaviour, with one exception, during the entire six-week study period.

In the Semester Two trial, students who received an 8-hour notification of an upcoming simulated critical peak reduced their energy use by 24 per cent in comparison to those who received no notification. Students who received a 24-hour notification with a 2-hour reminder, also reduced their energy use in comparison to the control, however the statistical significance of this reduction was marginal.

United Energy is interested in this study's capacity to shed light on the potential to expand its Summer Saver Program to high-density and short-term rental environments. The Summer Saver is voluntary, behavioural, residential demand response program run by United Energy. As with the students participating in this study, short-term renters are not directly exposed to the cost of their energy use and may be difficult to target using financial incentives. The results of this study suggest that norms and feedback-based interventions could encourage at least some short-stay residents to reduce their energy demand during peak times. The study also demonstrates the potential to test and refine demand management programs in the Monash "living laboratory", as shown in our test of notification periods for upcoming peak demand events.

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BehaviourWorks Australia

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United Energy

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Monash Net Zero Initiative

The Monash Net Zero Initiative Team provided assistance with onsite set up of this study.

Seed Advisory

Seed Advisory provided expert advice on the Australian electricity market.

About us

ClimateWorks Australia

ClimateWorks Australia is a non-profit, expert and independent adviser, acting as a bridge between research and action to accelerate the transition to net zero emissions for Australia and Asia Pacific. It was co-founded in 2009 by The Myer Foundation and Monash University and works within the Monash Sustainable Development Institute. ClimateWorks also benefits from strong relationships with an international network of affiliated organisations that support effective policies, financing and action for greenhouse gas emissions reductions.

Since launch, ClimateWorks has made significant progress. Its collaborative, end-to-end approach to solutions that will deliver greatest impact is informed by a thorough understanding of the constraints of governments and the practical needs of business. This, combined with philanthropic funding and university ties, has earned the organisation an outstanding reputation as a genuine and impartial adviser.

In the pursuit of its mission, ClimateWorks looks for innovative opportunities to reduce emissions, building an evidence-base for action through a combination of robust research and analysis, clear and targeted engagement, and effective capacity strengthening. ClimateWorks supports decision makers with tailored information and the tools they need, and works with key stakeholders to remove obstacles and help facilitate conditions that encourage and support the transition to a prosperous, net zero emissions future. To learn more visit www.climateworksaustralia.org.

BehaviourWorks Australia

BehaviourWorks Australia is a leading behaviour change research enterprise within the Monash Sustainable Development Institute at Monash University.

Established with funding from a core group of government and industry partners, BehaviourWorks is now the largest university-based applied behaviour change research unit in Australia with offices in Melbourne, representation in Sydney, and ties to a global network of behaviour change researchers and practitioners.

Since 2011, BehaviourWorks' multidisciplinary researchers, who are drawn from the fields of health, behavioural economics, psychology, organisational culture, sociology, political and environmental science and education, have worked on over 300 behaviour change projects across areas including health, safety, waste, environmental education, energy, climate change, organisational change, transport and road safety, pollution, conservation and social inclusion.

The reach of BehaviourWorks' research extends right across the Australian community and has directly impacted policy and practice, helping to make Australia a safer, healthier, more sustainable and inclusive society.

Seed Advisory

Seed Advisory undertakes research, analysis and advocacy, providing advice that has influenced decisions by a range of private and government clients. Seed Advisory was established in 2008. Since it was established, Seed Advisory has advised: the Australian Energy Markets Commission; the Australian Energy Market Operator; the Independent Market Operator, Western Australia; the Western Australian government; the Energy Markets Reform Working Group; the Department of State Development, Business and Innovation, Victoria and its successors; the Clean Energy Finance Corporation; Low Carbon Australia; the Carbon Markets Institute (with ClimateWorks Australia); the Property Council of Australia and, a range of market participants in Australian electricity and gas markets. Seed Advisory's client work in the public domain is available on www.seedadvisory.com.au.

Contents

2. Introduction

In 2018, ClimateWorks, BehaviourWorks and Seed Advisory collaborated on a residential demand management study at Monash University. A trial in Semester One focused on providing simple feedback to reduce daily peak demand, while the Semester Two trial examined different timings for notifying participants of upcoming simulated critical peak events.

The demand management study forms part of Monash's Net Zero Initiative which commits the University to achieving net zero emissions on its Australian campuses by 2030. Monash is installing renewable energy generation, entering into Power Purchase Agreements for off-site renewable energy, and building an on-site microgrid at its Clayton campus. Demand management has an important role to play in Monash's energy transformation. Through reducing peak demand, Monash can use more of the renewable energy generated on campus, rely less on electricity purchased from the grid, and reduce overall costs.

United Energy has recognised the potential importance of demand management for its residential customers and runs a successful behavioural demand response Summer Saver Program. The Monash Demand Management Study provided an opportunity for United Energy to gain insights relevant for expanding their Summer Saver Program into the high-density residential apartment and short-term rental segments of the market. The Study also enabled United Energy to explore different elements of program design, such as notification period and notification method.

The 2018 Monash Demand Management Study focused on high-density residential demand. The trials were conducted in two halls of residence at the Monash Clayton campus, which together house 600 students in multi-unit, single occupant accommodation. The students have similar characteristics to other sub-groups in the broader population, making behavioural insights from this study more widely applicable. Like residents in short-term rental properties, students in the residential halls are charged at a flat rate for accommodation, with no direct identification of, or charge for, individual energy use. And like residential customers in high-density apartments, much of their energy use is affected by equipment and appliances already installed in the building.

Monash's Net Zero Initiative has been designed as a "living laboratory", providing a space to trial new initiatives and technologies that are relevant to the broader electricity grid. This project is one of the first to take advantage of this new experimental environment and demonstrates the potential for future investigations.

3. Semester One trial

3.1 Semester One study design

Study setting

The residential halls where the study was conducted provide an ideal setting for a demand management experiment. The single-occupant apartments are all almost identical in size and are individually metered.

Students have control over their operation of lighting, cooking equipment, electric heaters and fans, entertainment equipment, computers and other appliances. Fridges, hotplates and ceiling lights are provided by Monash Residential Services[1], while other appliances are student-owned. Gas heating is provided centrally and there are no air conditioners installed in students' rooms.

Recruitment and survey of participants

To recruit participants for the study, the 600 students in the residential halls were sent an email from Monash Residential Services inviting them to participate. The email explained that reducing peak energy demand has important benefits for the grid and for the environment, and that by participating in the study, students would be in the running to win a $200 gift voucher (Appendix 1).

Students registered for the study through clicking on a link to complete a survey. The survey included questions about students': age; area of study; behavioural intentions to save energy; feelings of moral obligation to reduce energy consumption; understanding of responsibility for energy demand; awareness of the consequences of energy use; environmental concern, and; environmental indifference. The survey also informed students that the peak time for the residential halls is 8pm to 10pm on weeknights.

In total, 143 students completed the survey and registered to participate in the study (24 per cent sign up rate).

Behavioural intervention

In this trial, students in one residential building were selected as the control group, while the residents of the second building were allocated to the treatment group.

The control group received a single email at the beginning of the trial explaining that reducing energy use has benefits for the grid and the environment and providing some general tips for energy saving (Appendix 2).

The treatment group received weekly emails consisting of six components (Appendix 3):

1. A request that the students reduce their energy use during peak times (8pm to 10pm on weeknights)
2. A reminder that reducing energy use during peak times has important benefits for the environment and the grid
3. A comparison of the student's energy use with that of an efficient student and that of an average student (Figure 1).

[1] Monash Residential Services manage all aspects of student accommodation at Monash University.

4. The student's ranking in comparison to other students in the treatment group - the student with the lowest peak demand for the week was ranked as #1, while the student with the highest peak demand was ranked as #73.
5. A link to a dashboard with more detailed information about the student's energy use, including a 24-hour demand profile, and a chart tracking their progress across the weeks of the study (Appendix 4).
6. Tips for reducing energy use, which were updated each week.

Intervention key dates

The Semester One trial commenced on 13 April 2018 and finished on 31 May 2018. Throughout this time, students' individual energy use and demand was monitored for both the treatment and the control group. An initial period of data collection from 13 April 2018 to 25 April 2018 provided an energy use baseline against which subsequent energy use could be compared. From 25 April 2018 through to 31 May 2018, students in the treatment group received weekly emails, as described above. Table 1 shows the dates when emails were sent, and the breakdown of the trial into periods for statistical analysis.

TABLE 1. STUDY PERIODS AND EMAIL DATES

Period name	Period start - end dates	Email date
Pre-treatment	April 13 – April 25	
Post – 1	April 26 – May 2	April 25
Post – 2	May 3 – May 7	May 1 and May 2
Post – 3	May 8 – May 14	May 7
Post – 4	May 15 – May 21	May 14
Post – 5	May 22 – May 31	May 21

3.2 Semester One results

Survey analysis

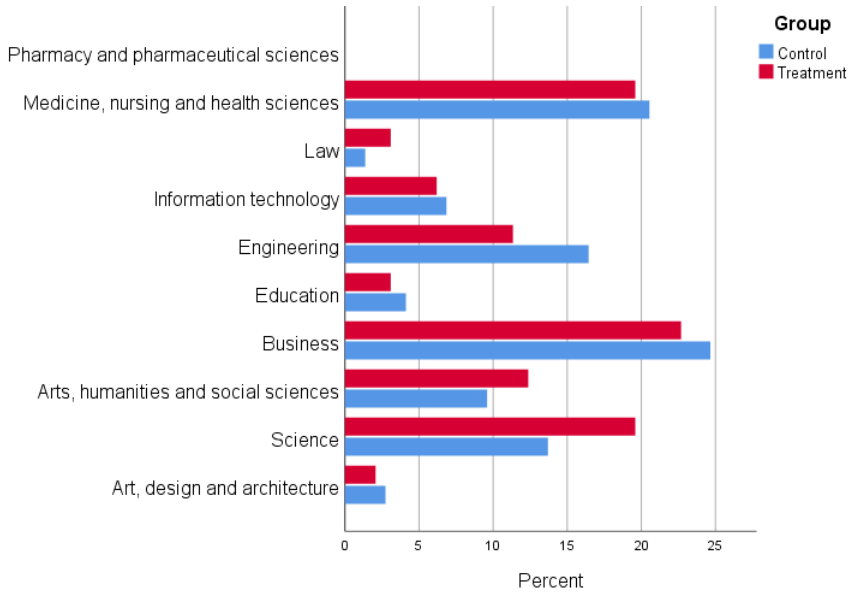
The results of the survey were analysed to better understand the sample population, and to ensure balance had been achieved between the control group and the treatment group.

The survey showed that more than 90 per cent of participants were aged between 18 and 24 years, all were full-time students and the majority had completed three or less years of study. There was slightly higher representation of women than men (57 per cent and 43 per cent, respectively), consistent with the population of the Clayton and Caulfield campuses more broadly.

Participants were undertaking study in a variety of areas, with medicine, business and science well represented (Figure 2). The distribution of participants across study areas was similar to

the distribution of students for the Clayton and Caulfield campuses as a whole. The analysis showed that the control and treatment groups were not significantly different in their areas of study ($p > 0.05$).[2]

FIGURE 2: AREAS OF STUDY BY GROUP



The survey also looked at: students' behavioural intentions to save energy; understanding of responsibility for energy demand; awareness of the consequences of energy use; environmental concern, and; environmental indifference. There was no significant difference between the treatment and control group in their answers to these questions (Mann-Whitney U-test, $p > 0.05$).

Overall, the survey analysis concluded that for the areas examined the treatment and control groups were reasonably well balanced.

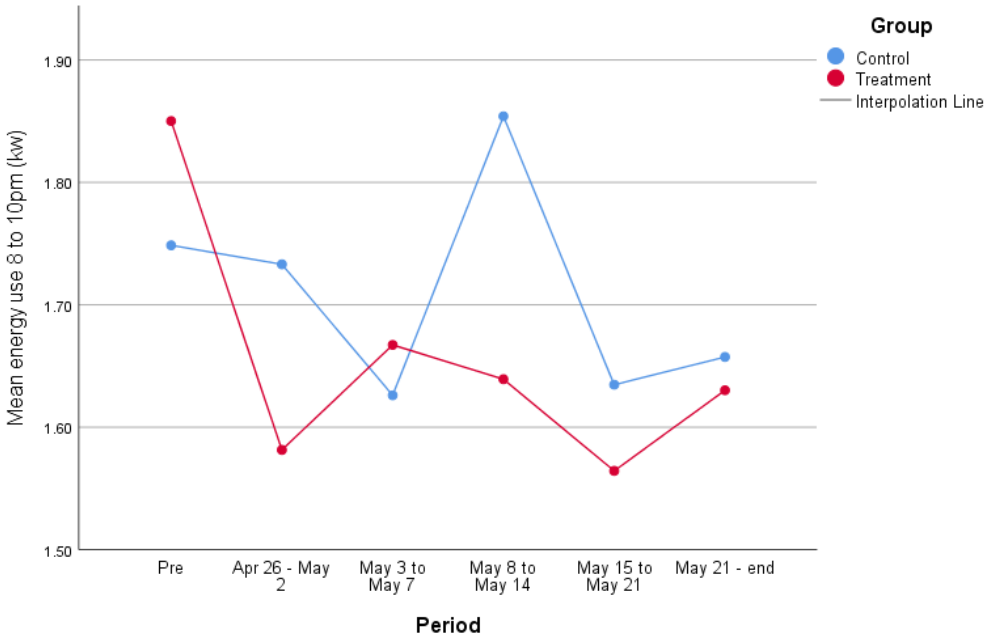
Energy use analysis

An ANOVA statistical test was conducted to analyse the mean energy use data gathered from both the treatment and control groups.[3] The time period and group were set as fixed factors, while the six scale variables (areas surveyed to understand student attitudes: intentions, moral obligation, responsibility, awareness of consequences, environmental concern and environmental indifference) were defined as covariates.

The ANOVA test found a significant group and time period interaction (p=0.043) suggesting the mean energy use of both groups is not parallel, as represented in Figure 3. Additionally, the test demonstrated that out of the six attitude scales surveyed, environmental indifference was the only significant covariate (p=0.007), with higher energy use associated with higher levels of environmental indifference. A full statistical report on the results can be found in the Supplementary Statistics Report.

[2] This statistic indicates that the probability (p) of obtaining an effect equal to what was actually observed is *greater than* 5%. Therefore, this effect is not statistically significant. For the effect to be statistically significant, the probability of obtaining the observed result or larger must be *less than* 5%.
[3] Analysis of Variance (ANOVA) is a statistical procedure used to test differences between three or more means.

FIGURE 3: MEAN ENERGY USE BETWEEN 8 AND 10PM BY PERIODS FOLLOWING EMAILS



Having identified that the treatment and control groups show different patterns of energy use over time, the data analysis then focused on studying the differences between the pre-treatment period and each post-treatment period (Table 3).

The control group showed no significant change over the study. For the control group, the five differences (between the pre-trial period and each week of the study) were identified as not significant (all p-values > 0.05). Therefore, the analysis confirmed the mean energy use for this group did not change significantly over the trial period.

In contrast, the treatment group reduced their energy use after the first email, and maintained this behaviour, with only one exception, during the whole study period. Significant reductions were identified in the energy use of the treatment group ($p < 0.05$) in all post treatment periods except for the period between 3 May 2018 and 7 May 2018 ($p = 0.135$). Averaged across the entire study, we found that for the treatment group, energy use was 12.4 per cent lower than the baseline.

Further investigation of the data for the period between 3 May 2018 and 7 May 2018 has not revealed a clear reason for the unusual results in this week. We did not find any data errors and there were no particularly hot or cold days during the period in question. The data for the control group demonstrates that in the absence of intervention, peak demand for students is inherently variable. The week when the treatment group did not see a statistically significant decrease in peak demand is likely a result of this natural variability.

4. Semester Two trial

4.1 Semester Two study design

Study setting

The Semester Two trial took place in the same residential halls as the Semester One trial. The single-occupant apartments are all almost identical in size and are individually metered. Students have control over their operation of lighting, cooking equipment, electric heaters and fans, entertainment equipment, computers and other appliances. Fridges, hotplates and ceiling lights are provided by Monash Residential Services, while other appliances are student-owned. Gas heating is provided centrally and there are no air conditioners installed in students' rooms.

Recruitment of participants

As for Semester One, the 600 students in the residential halls were sent an email from Monash Residential Services inviting them to participate. The email explained that reducing peak energy demand has important benefits for the grid and for the environment, and that by participating in the study they would be in the running to win a $200 gift voucher. The email also explained that there would be an end of semester survey which would provide them with another chance to win a $200 gift voucher (Appendix 5).

Students registered for the study through clicking on a link to complete a survey. The survey included questions about students' age and area of study, their preference for email or SMS notifications or both, as well as consent to monitor and analyse their energy use data. In total, 88 students completed the survey and registered to participate in the study (15 per cent sign up rate). Most participants (72 per cent) chose to receive notifications by email, while 15 per cent opted for SMS and 14 per cent chose to receive both email and SMS notifications.

Behavioural intervention

The Semester Two trial aimed to test different notification periods for peak demand events:

- An 8-hour notification
- A 24-hour notification with a 2-hour reminder

We allocated eight simulated peak demand events to weeknights over the semester. Based our first semester analysis, these events were scheduled for the peak time for the student rooms: 8 to 10pm.

Students were divided into six groups. Across the eight events of the semester, each group sometimes received an 8-hour notification, sometimes received a 24-hour notification with a 2-hour reminder, and sometimes acted as the control. A fully counterbalanced design was developed, to account for potential changes in students' energy use depending on the order in which they received the different treatment levels (Table 2).

TABLE 2: COUNTERBALANCED STUDY DESIGN FOR SEMESTER TWO TRIAL

		Study week							
Group	No. of students	1	2	3	4	5	6	7	8
1	15	0	8	24+2	0	8	24+2	0	8
2	14	0	24+2	8	0	24+2	8	0	24+2
3	14	8	0	24+2	8	0	24+2	8	0
4	15	8	24+2	0	8	24+2	0	8	24+2
5	15	24+2	0	8	24+2	0	8	24+2	0
6	15	24+2	8	0	24+2	8	0	24+2	8

Note: This table shows the pattern of treatment levels each group of students was exposed to in each week of the study (Week 1 to Week 8). In weeks labelled "0" students did not receive a notification about the upcoming simulated critical peak demand event. "8" signifies an 8-hour notification while "24+2" signifies a 24-hour notification with a 2-hour reminder.

Groups receiving a notification by email or SMS were given the following information (Appendix 6):

1. A request that the students reduce their energy use during peak time (8pm to 10pm) on the evening of the event
2. A reminder that reducing energy use during peak times has important benefits for the environment and the grid

For each simulated peak demand event, all students (including those in the control group for that event) received feedback on their energy use.

Students who had received a notification received feedback that included (Appendix 7):

1. The percentage difference in the student's energy use in comparison to a baseline (calculated before the trial began).
2. The student's ranking in comparison to other participating students - the student with the biggest decrease in energy use in comparison to their baseline was ranked as #1, while the student with the largest increase in energy use in comparison to their baseline was ranked as #88.
3. Normative feedback on energy use:
    a. Students who reduced their energy use in comparison to their baseline received: "Good work! To save even more energy try following the tips below during the next peak demand event."
    b. Students who increased their energy use in comparison to their baseline received: "Looks like you're having a bit of trouble saving energy - the tips below might help you during the next peak demand event."
4. A chart showing their baseline energy demand during peak times in comparison to their energy demand during the simulated peak demand event.
5. Tips for reducing energy use, which were updated each week.

Students who were in the control group for a particular peak demand event received their percentage change in energy use, the chart, and the tips for reducing energy use, but did not receive a ranking or normative feedback (Appendix 8).

End of semester survey

Following the eight weeks of the trial, students were invited to participate in a survey, via email (Appendix 9). Again, students were offered the chance to win a $200 gift voucher in return for participating in the survey. A total of 62 students participated in the survey (70 per cent of participants).

The survey aimed to provide a better understanding of students' experiences during the trial. It included questions on their preference for an 8-hour notification or 24-hour notification with a 2-hour reminder, their motivations for participating in the trial, how much effort they put into reducing their energy use, and their awareness of the consequences of reducing energy use during peak times.

Intervention key dates

The semester two trial commenced on 29 August 2018 and finished on 17 October 2018. Throughout this time, participating students' individual energy use and demand was monitored. An initial period of data collection from 30 July 2018 to 29 August 2018 provided a baseline against which subsequent energy use could be compared. Table 3 shows the key dates for the intervention, including the dates of the simulated peak demand events.

TABLE 3: STUDY DATES FOR SEMESTER TWO TRIAL

Date	Activity
30th July to 29th August	Baseline energy use monitoring
Thursday 30th August	Event 1
Tuesday 4th September	Event 2
Wednesday 12th September	Event 3
Monday 17th September	Event 4
Wednesday 26th September	Event 5
Thursday 4th October	Event 6
Monday 8th October	Event 7
Tuesday 16th October	Event 8
17th October to 26th October	Survey of participants

4.2 Semester Two results

Energy use analysis

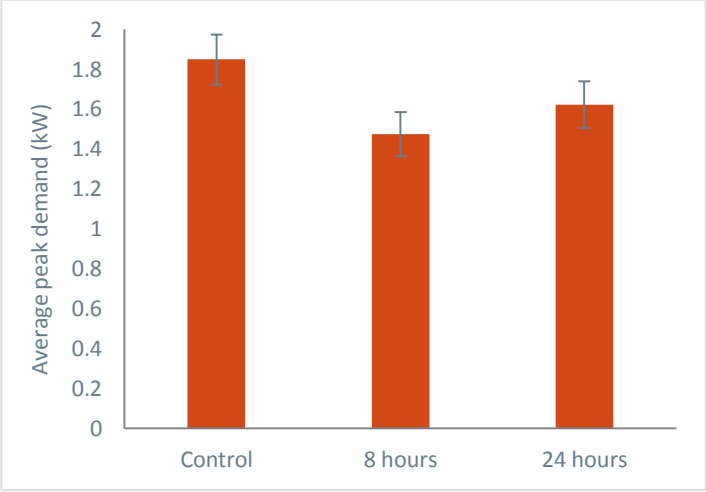
An ANOVA statistical test was conducted to analyse the mean energy use data gathered from the participating students. The time period (i.e. the week of the intervention), sequence of events (i.e., the counter-balancing of the treatment levels in the design shown in Table 2), residential hall (i.e. which of the two residential halls the student resided in) and treatment (i.e. whether students received no notification, 8-hour notification or 24-hour notification with a 2-hour reminder) were set as fixed factors.

It was found that the sequence of events (p = 0.025), the time period (p = 0.001) and the treatment (p = 0.001) all had a significant effect on students' energy use, while residential hall did not (p = 0.237). Therefore, after controlling for differences due to the order of presentation of the notifications and the week of the semester, the type of notification had a statistically significant effect on peak consumption.

The impact of the treatment was analysed further to better understand the effect on mean energy savings for the 8-hour notification in comparison to the 24-hour notification with a 2-hour reminder. While there was a highly significant difference between the 8-hour notification and the control (p = 0.003), the difference between the 24-hour notification with a 2-hour reminder and the control was borderline significant (p = 0.058). This implies that the 8-hour notification is an effective way to promote a reduction in energy use, while the 24-hour notification with a 2-hour reminder had a marginal influence on peak consumption relative to the control.

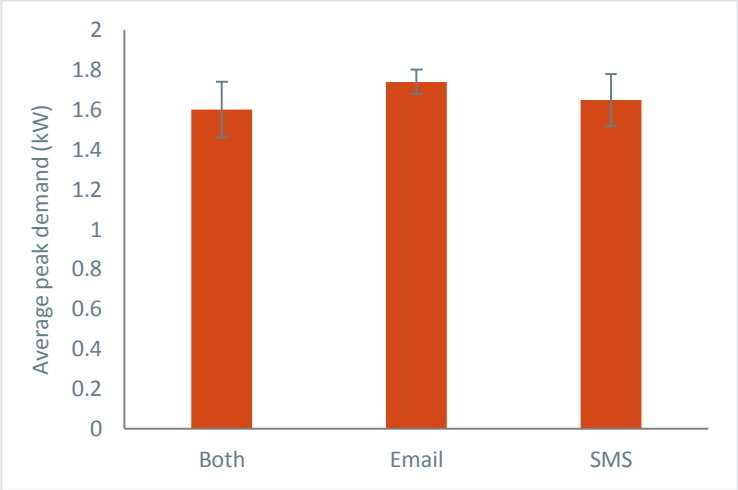
For the control, average peak demand was 1.85kW, while for the 8-hour notification, it was 1.47kW (20% decrease) and for the 24-hour notification (with 2-hour reminder) it was 1.62kW (12% decrease) (Figure 4).

FIGURE 4: AVERAGE PEAK DEMAND FOR DIFFERENT TREATMENT LEVELS, SEMESTER TWO TRIAL



Whether students opted to receive notifications by email, SMS or both was not found to have a significant effect on their energy use (Figure 5).

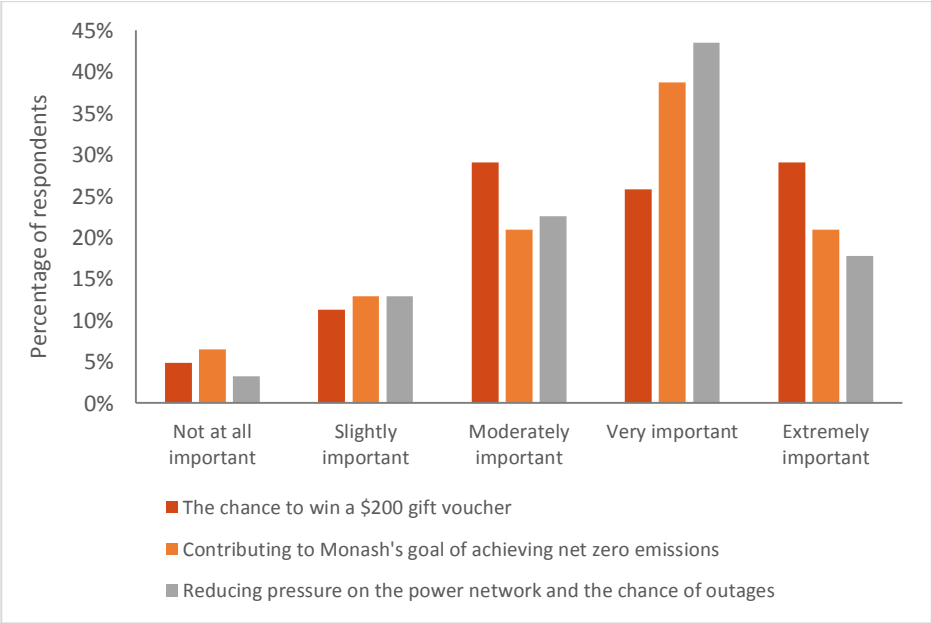
FIGURE 4: AVERAGE PEAK DEMAND FOR DIFFERENT NOTIFICATION PREFERENCES, SEMESTER TWO TRIAL



Survey analysis

As part of the survey, students were asked about their motivations for participating in the study –Monash's goal of net zero emissions, reducing pressure on the power network, and the chance to win a voucher. Students rated all three issues as strong motivations. Around 60 per cent of participants rated the goal of net zero emissions and reducing pressure on the power network as very important or extremely important. Around 55 per cent of students ranked the possibility of winning a prize as very important or extremely important (Figure 6).

FIGURE 6: RESPONDENTS' MOTIVATIONS FOR PARTICIPATING IN THE STUDY

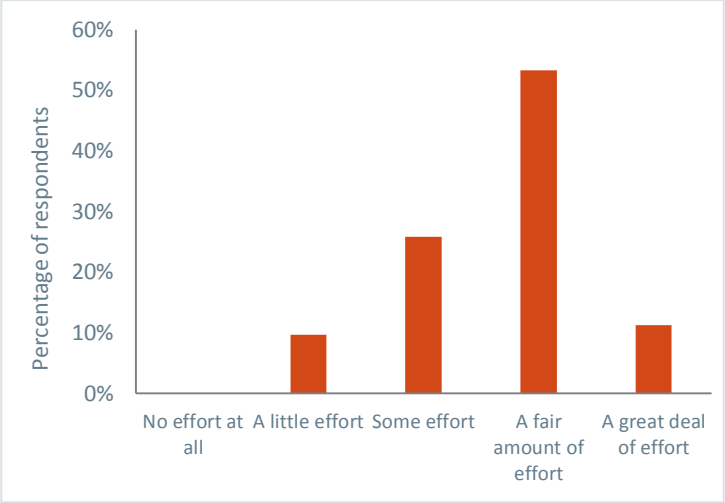


Correlations between these three motivation variables were calculated to better understand their relationships. Students who were motivated to achieve net zero emissions were also more likely to be motivated to reduce pressure on the network and outages ($r = 0.74$, $p < .001$). Furthermore, both these motivations were not significantly correlated with the apparently self-interested motivation of winning the prize. Therefore, these reasons for participation in the trial represented two different sources of motivation: a desire to help Monash University achieve worthy outcomes and the hope of winning a cash prize (the gift voucher). However, there may be additional motivations that were not canvassed in the survey.

The levels of the three motivations were also compared to ascertain whether one reason for participation was more important on average than the others. All three motives had similar mean scores on the 5-point rating scale: 'achieving net zero emissions' = 3.55; 'reduce pressure on the network and outages' = 3.60; 'winning a gift voucher' = 3.63. The statistical test for differences in these means did not produce any significant results. This implies that the motivational goals were considered reasonably important on average by the trial participants and perceived to be of very similar importance.

Students' high level of motivation across all three potential motivators for participating in the study was accompanied by moderate to high levels of effort to reduce energy use during peak times. Of the survey respondents, 90 per cent said they put in some, a fair amount, or a great deal of effort. Only a small number of respondents reported little effort, and no respondents reported no effort at all (Figure 7). A majority (56 per cent) of the students reported trying to generally reduce their energy use during peak times (8 to 10pm on weekdays), rather than only when notified about an upcoming peak demand event (34 per cent).

FIGURE 7: RESPONDENTS' LEVEL OF EFFORT TO REDUCE ENERGY USE DURING PEAK TIMES



Students took a range of actions to reduce their energy use during peak times (Table 4). For the majority of the energy saving actions listed, 50 per cent or more of participants with the appropriate appliances said that they carried out the actions either most of the time or always. The exceptions were only turning on a desktop computer before or after the peak demand event (33 per cent), and only charging a laptop before or after the peak demand event (34 per cent)[4]. This may be due to the need for students to study during peak times.

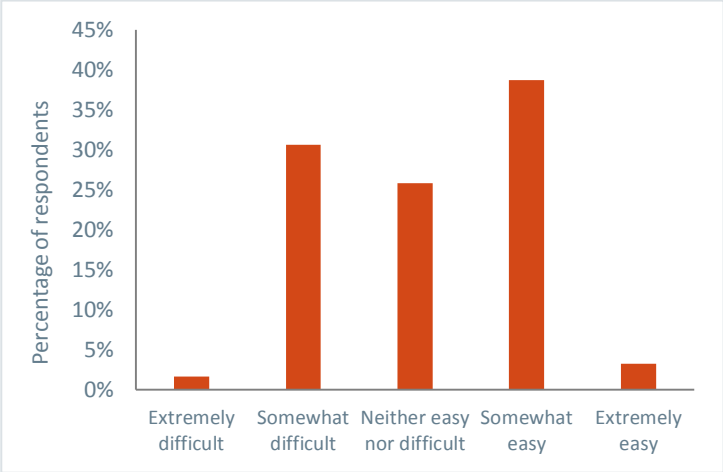
TABLE 4: ACTIONS BY STUDENTS TO REDUCE ENERGY USE

	Never	Sometimes	About half the time	Most of the time	Always
Turn my electric heater off or down	3	7	4	13	27
	5.6%	13.0%	7.4%	24.1%	50.0%
Turn my electric fan off or down	4	11	5	12	25
	7.0%	19.3%	8.8%	21.1%	43.9%
Only turn my desktop computer on before or after the peak demand event	11	12	7	5	10
	24.4%	26.7%	15.6%	11.1%	22.2%
Only charge my laptop before or after the peak demand event	12	21	7	12	9
	19.7%	34.4%	11.5%	19.7%	14.8%
Only use my electric hotplate/oven before or after the peak demand event	9	15	7	13	18
	14.5%	24.2%	11.3%	21.0%	29.0%
Only use my microwave before or after the peak demand event	11	12	8	11	20
	17.7%	19.4%	12.9%	17.7%	32.3%
Only use my kettle before or after the peak demand event	11	8	6	10	16
	21.6%	15.7%	11.8%	19.6%	31.4%
Turn off at the wall any appliances not being used	4	8	11	14	24
	6.6%	13.1%	18.0%	23.0%	39.3%
Turn off all lights not being used	3	5	2	24	28
	4.8%	8.1%	3.2%	38.7%	45.2%
Turn off what I can and leave my dormitory room	6	10	9	13	24
	9.7%	16.1%	14.5%	21.0%	38.7%

There was substantial variation across participants in terms of how easy or hard they found it to reduce their energy use. Around 42 per cent of respondents said that it was somewhat or extremely easy to reduce their energy use, while around 32 per cent said that it was somewhat or extremely difficult (Figure 8). The major reasons given for any difficulty in reducing energy use were the need to cook, study and use a computer and lighting. Students also found that peak times were inconvenient in terms of their daily schedule. Students found it easy to reduce energy use through not being in the room and using communal study areas. A number of students also pointed out that their rooms did not require substantial heating or cooling.

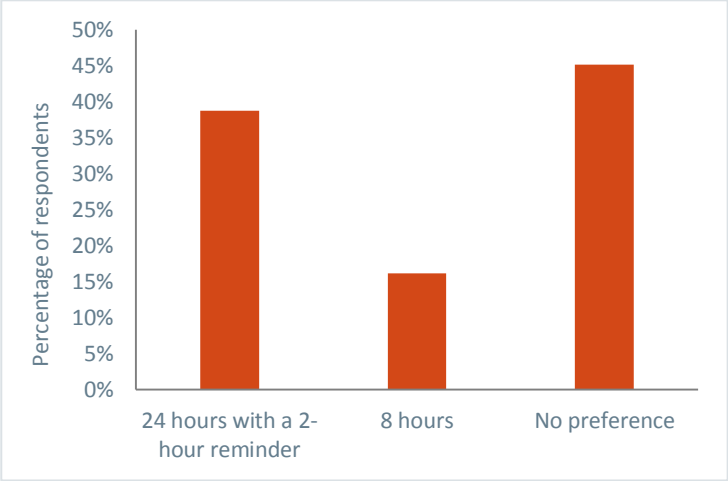
[4] It is important to note that a number of students reported not having some of the appliances required to undertake the energy saving actions listed. For example, 27 per cent of respondents did not have a desktop computer, 18 per cent did not have a kettle, 13 per cent did not have an electric heater and 8 per cent did not have an electric fan.

FIGURE 8: PARTICIPANTS' RESPONSES ABOUT THE EASE OR DIFFICULTY OF REDUCING ENERGY USE DURING PEAK TIMES



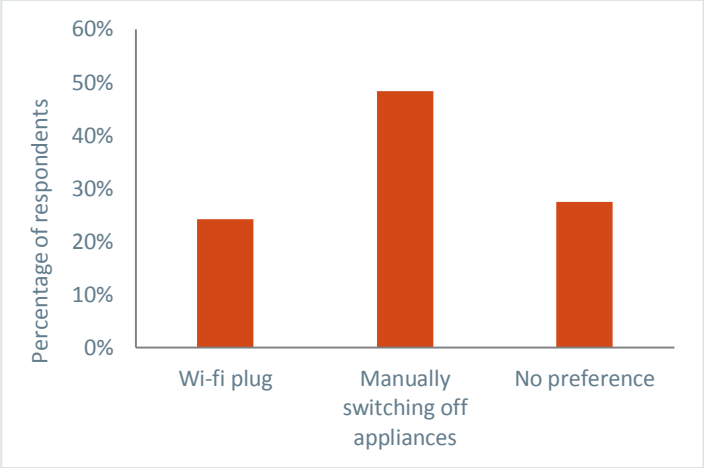
Participants were asked about their preferences for different notification periods about upcoming peak demand events. While 45 per cent of respondents had no preference for a particular notification period, 39 per cent preferred the 24-hour notification with a 2-hour reminder, while 16 per cent preferred an 8-hour notification (Figure 9). Respondents who preferred the 24-hour notification with a 2-hour reminder said that it provided a better ability to plan, and that they found multiple reminders helpful. Respondents who preferred the 8-hour notification said that they preferred not to receive multiple emails.

FIGURE 9: RESPONDENTS' PREFERENCES FOR DIFFERENT NOTIFICATION PERIODS ABOUT PEAK DEMAND EVENTS



Participants were asked about their preferences for switching appliances off themselves, or having a wi-fi enabled plug that would be able to switch off appliances automatically. Almost half the respondents (48 per cent) expressed a preference for manually switching off appliances, while 24 per cent expressed a preference for automation, and 27 per cent had no preference for either method (Figure 10). Those who preferred the manual option said that they wanted to maintain control, and that they were concerned that the plug would switch off appliances that were needed or in use. They were also concerned that technical errors would make the plug less effective. Those who preferred the automated option said that it would be more convenient and would ensure they didn't forget about an upcoming peak demand event.

FIGURE 10: RESPONDENTS' PREFERENCES REGARDING AUTOMATION



The relationship between survey responses and energy use was also investigated, but no significant relationship was found.

Students were asked ten questions regarding the actions they took to reduce their energy use during peak times, and for each student the average of their responses was taken as their "active energy saver" score. Comparing this score to students' energy use during peak times found no significant relationship for the control, 8-hour notification or 24-hour notification with 2-hour reminder (all regression p values > 0.20). The fact that most students had high active energy saver scores may have contributed to the lack of a relationship between this score and students' energy use.

Students were also asked whether or not they possessed the appliances necessary to undertake energy saving actions. For each student, the total of their responses was taken as their "energy saving opportunity" score. This score was compared to students' energy use during peak times but no significant relationship was identified. Again, this could be because all students had similar energy saving opportunity scores.

Students were also asked six questions regarding their awareness of the benefits of reducing their energy use during peak times. For each student, the average of their responses was taken as their "awareness of benefits" score and compared to their energy use during peak times. Again, no statistically significant trends were identified (all regression p values > 0.07).

5. Discussion

This study contributes to a broad body of industry and academic studies on demand management. Researchers and industry have experimented with a number of different types of behavioural and equipment-based interventions over the years, but our understanding of best practice demand management is still evolving. The different types of interventions commonly tested include: providing customers with regular information on their energy use; providing financial rewards in the form of rebates or vouchers; setting higher prices during peak times; and, automated load control (Faruqui and Sergici 2010). However, while there have been successes with each of these interventions, there have also been cases where the interventions have only led to minor reductions in energy use or no reduction at all.

This study focuses on the effectiveness of feedback and social norms as a motivational strategy for reducing daily peak demand and simulated critical peak demand. The results of the study are also relevant in considering the impact of the trial sponsor on the outcome of demand management studies, the financial costs and benefits of behavioural demand management in comparison to equipment-based interventions, and the potential for demand management in transient populations, such as students, seasonal agricultural workers and holiday-makers.

Feedback and social norms as a motivational strategy

Both the Semester One trial and the Semester Two trial found that feedback and social norms can act as effective motivators in demand management programs. In the Semester One trial participants in the treatment group received a simple non-financial, feedback-based intervention and reduced their daily peak demand by an average of 12.4 per cent in comparison to their baseline energy use. In the Semester Two trial, participants who received an 8-hour notification of an upcoming peak demand event reduced their peak demand by 20 per cent in comparison to those who did not receive a notification.

Both the Semester One and Semester Two trials focused on feedback and social norms as a motivational strategy. The emails that students received included a number of components, including an explanation that reducing energy demand during peak times would have benefits for the grid and the environment, a ranking against other participating students, and a comparison of their energy demand to an average and an efficient student (in the Semester One trial). There was no financial motivation for students to reduce their energy use - while participating students were in the running to win a gift voucher, the recipient was randomly selected from all participants; success did not depend on students' performance during the study. Nonetheless, participants were motivated to reduce their energy consumption.

Other studies have also demonstrated that non-financial interventions can successfully encourage reductions in energy use. For example, a US electricity company, OPOWER, provided letters to residential customers comparing their electricity use to that of their neighbours. This decreased overall energy consumption by 2 per cent (Allcott 2011). The Monash trial builds further on this finding. In the OPOWER example, customers were still exposed to the financial motivation to decrease their energy bills. In contrast, in the current study, students pay a flat rate for accommodation, and so did not see any financial benefit from reducing energy use.

Researchers in the United Kingdom have also investigated the impact of non-financial interventions in encouraging reductions in overall energy use among students living in residential halls. Similar to the Monash trial, these researchers found that providing students with social norms and information feedback resulted in a substantial decrease in energy use. In contrast, providing students with a financial incentive, through a prize competition for achieving low energy consumption, was less effective (Alberts et al. 2015). The researchers concluded that external rewards can undermine the intrinsic motivation generated through norms-based interventions. In the current study, the survey of students at the end of Semester Two indicates that while students were motivated by the chance to win the $200 prize, they

were also motivated by helping Monash to achieve its goal of Net Zero emissions by 2030, and by the goal of helping to reduce pressure on the electricity network.

Feedback and social norms to reduce peak demand

Most previous trials of feedback- and norms-based interventions have focused on reducing participants' overall energy use. In contrast, this study investigated whether non-financial feedback-based interventions could be effective in achieving demand response for daily peak demand and critical peak demand events. The results of the trial demonstrated that this is the case. For the Semester One trial, daily peak demand was significantly lower for students in the treatment group in comparison to their baseline. For the Semester Two trial, demand during simulated critical peak events was significantly lower for students who were given an 8-hour warning in comparison to students who were not notified about the upcoming event.

A particular focus of the Semester Two trial was whether the timing of peak demand notifications affects participants' responses to peak demand events. This was found to be the case in that, for the 8-hour notification, peak demand was significantly lower than for the control. However, for the 24-hour notification with a 2-hour reminder, the reduction in peak demand was borderline for statistical significance. It is unclear why this might be the case – it could be related to the timing of the 24-hour notification at 8pm, when students may be distracted by other activities. However, the end of semester survey demonstrated that, of the students who expressed a preference for a particular notification period, 71 per cent preferred the 24-hour notification with a 2-hour reminder, while only 29 per cent preferred the 8-hour notification. Given this, and the fact that the reduction in peak demand seen under the 24-hour notification with a 2-hour reminder was borderline for statistical significance, it is possible that the 24-hour notification may prove effective, at least for some individuals.

The timing of peak demand notifications has not previously been experimentally tested, to our knowledge. Previous studies on critical peak demand management have used varying notification periods. For example a study in Japan utilised a 24-hour notification (Ito 2018), a study in Australia provided notified participants between 24 and 2 hours prior to a peak demand event (Strengers 2010) and a program in France provided customers with a notification about an upcoming peak demand event the evening before (Gyamfi 2013). Further investigation of this issue could assist in improving the effectiveness of future demand management programs.

Trial sponsorship: questions about sponsors and motivation

The Monash demand management trials in the residential halls differ from other current trials in Australia in that the trials were not undertaken by an electricity retailer or distributor (See Section 5). While funding from United Energy was noted in the explanatory statement to the students, United Energy's involvement was not prominently featured in regular communications throughout the study. Communications to recruit the participants were sent by Monash Residential Services, while subsequent communications were sent by the ClimateWorks project manager.

Participants may have been motivated by ClimateWorks' role in the trial. In the survey conducted at the end of the Semester Two trial, 27 per cent of the participants reported that their participation was more strongly motivated by concern for the environment than the opportunity to win a prize, while a further 31 per cent were more motivated by the potential for reducing local network congestion than the opportunity of winning a prize. Students' strong altruistic motivations may have contributed to the strong effect seen in this study, and the role of ClimateWorks in the trial may have reinforced students' perception of the value of their actions to the environment and society. This is consistent with ThinkPlace's findings in its report for ARENA on retailer-sponsored demand response trials. ThinkPlace report that participants built an altruistic/environmental rationale for themselves to explain their participation in trials that might have given rise to some cost and/or inconvenience (Think Place, 2018).

Given the success of the Monash trial in reducing participants' peak demand, the impact of the organisation sponsoring and managing the trial could be tested in future trials.

Cost-effectiveness of behavioural and equipment-based demand management

As described in Section 5, current Australian trials include using existing or subsidised solar PV and batteries to mitigate demand peaks, and remote dispatch equipment to modify cooling, heating, pool pumps and other household equipment that is not time or temperature sensitive. This type of trial often requires considerable incremental investment, which can come from a number of sources. This includes customers voluntarily investing in their own solar PV or domestic batteries; costs arising from program requirements, regulation, network access standards and equipment standards; or, network operators investing in the network.

In contrast, the Monash trials represent a very low cost option for customer demand response – low recruitment and communication expense, no payment other than the possibility of winning a prize, and no equipment investment required by the trial organisers or the students. The Monash trials also had very low costs for recruiting and communicating with participants, as participants have a high level of comfort with electronic media and a common point of contact through Monash Residential Services.

The effectiveness of the Monash trials in encouraging participants to reduce their energy use at peak times may indicate the need to evaluate the relative cost-effectiveness of different demand management interventions. While the costs for the Monash trial may be lower than what is achievable in the broader community, it is still important to consider whether behavioural demand response can provide a more cost-effective alternative than more popular equipment-based interventions.

Demand management for transient populations

Another question raised by the Monash Demand Management Study is the potential to manage the demand profile of transient populations, for example, holiday-makers and seasonal agricultural workers. United Energy's interest in the Monash trials arose in part because the Mornington Peninsula in its franchise area combines network capacity issues at peak summer times with a large transient holidaying population in rental houses, flats and hotels during the summer vacation period.

The engagement of holiday-makers is an important element in addressing summer network demand peaks on the Mornington Peninsula. United Energy's problems in engaging holiday-makers include: the transience of the holiday makers; the absence of any persistent relationship between United Energy or the relevant retailer with holiday makers; and the inability of the owner of a household's electricity intensive equipment to influence or constrain the temporary tenant's usage.

The Monash Demand Management Study suggests that behavioural demand management programs may assist in engaging transient populations, as it does not rely on a financial relationship with energy consumers. This represents a significant departure from the current predominance of financial and equipment-based demand management interventions. As the market moves towards more distributed forms of generation and a greater role for demand management, it will be important for networks, regulators and policy-makers to consider whether currently proposed models of demand management will be effective in engaging of transient populations in weak areas of the network.

Questions for further investigation

Future investigations could examine the persistence of students' response to feedback, the role of reinforcement in encouraging reductions in peak demand and the impact of the organisation sponsoring the trial. The effectiveness of the Monash trials in encouraging participants to reduce their energy use at peak times may indicate the need to evaluate the relative cost-effectiveness of different demand management interventions. Behavioural demand response could potentially provide a more cost-effective alternative than more popular equipment-based interventions currently being trialled in Australia.

6. Demand management in the Australian context

Following from the Finkel Review and the findings of the AEMC's Reliability Frameworks Review, the AEMC is simultaneously considering three proposals in relation to wholesale demand response[5], following from:

- A proposal by the Total Environment Centre (TEC), the Australia Institute (TAI) and the Public Interest Advocacy Centre (PIAC) seeking to introduce a wholesale demand response mechanism. This mechanism would allow third parties to offer demand response into the wholesale electricity market in a transparent, scheduled manner. Third parties are parties who are not the financially responsible market participant (FRMP) – for a consumer this is usually the retailer.
- A proposal by the Australian Energy Council (AEC) seeking to introduce an obligation for retailers to negotiate in good faith with third parties looking to provide wholesale demand response through a wholesale demand response register. These third parties would also be scheduled in the wholesale market.
- A proposal by the South Australian Government to change the regulatory framework to allow third parties to offer wholesale demand response into the wholesale market. The rule change request also proposed the introduction of a transitionary market for wholesale demand response, a separate wholesale demand response market.

In addition, also following from the findings of the Finkel Review and AEMO's concerns in relation to system adequacy to meet near-term peak demand, there are a number of current demand response initiatives, including: the Australian Energy Regulator's Demand Management Innovation Allowance Scheme (DMIA); ARENA's Demand Management Program, and; the Victorian Government's New Energy Jobs Fund program.

A list of current demand management studies is included in Table 5. These studies are investigating a range of demand response interventions, including automated demand management and financial incentives. The table focusses on trials where customer behaviour modification is part of the trial design. We have omitted trials that rely on the uptake of equipment without any element of customer behaviour modification, resulting in the omission of a number of trials undertaken with the support of the DMIA Scheme. Our review of current demand management studies identified that there is limited public information available about trial outcomes. For example, under the DMIA scheme, the most recent reports are from the 2016/17 financial year.

Demand management is likely to become an increasingly important part of the Australian electricity system, as indicated by the current proposals under review by the AEMC, and the significant number of trials under way. In order to make the most of the current trials, it will be important to develop an inventory of trials in Australia that captures trial results. This will minimise the loss of knowledge gained in previous trials and allow the identification of knowledge gaps.

[5] The AEMC distinguishes between *wholesale demand response*, that is, demand response committed to the spot market effectively as a negative load, and ancillary service demand response, emergency demand response and network demand response, which provide specific services to other markets.

TABLE 5. CURRENT AUSTRALIAN DEMAND MANAGEMENT TRIALS

Project	Size of study	Customer type	Demand management target	Intervention type	Timeframe
*AGL demand response project** AGL is proposing to deliver up to 20MW of demand response capacity. Residential customers will be able to connect home battery storage or rooftop solar to the program or will be asked to reduce demand when they receive a text message. Commercial and industrial partners are also involved.	Project aims to provide 17MW of capacity from large industrial and commercial customers and 3 MW from 10,000 NSW households (through demand management and controllable storage)	Commercial, industrial and residential	Critical peak demand	Information provision, rebates	3 years commencing summer 2017/18
*Energy Australia demand response trial** Energy Australia will deliver demand response capacity through a range of initiatives from basic notifications to customers to reduce their energy demand through to high-tech monitoring devices, battery storage and converting some industrial processes to run on biofuel	50MW of capacity (from demand management and controllable storage)	Commercial, industrial and residential	Critical peak demand	Information provision, rebates	3 years commencing summer 2017/18
*Zen Ecosystems automated load control** Zen Ecosystems will deploy a smart, connected, controllable network of thermostats to deliver demand response from air conditioning, heating and ventilation in South Australia and Victoria.	5MW of demand management capacity, 10,000 customers	Commercial and residential (air-conditioning only)	Critical peak demand	Automated load control, and 'voluntary' programs	3 years
*Powershop demand response rebates** Powershop will use a mobile notification system to invite customers to reduce energy consumption in exchange for a financial incentive.	5MW of capacity (including 1MW of battery storage and 1MW of cogeneration at Monash)	Commercial and residential	Critical peak demand	Information provision, rebates	3 years commencing summer 2017/18
ClimateWorks, BehaviourWorks and Seed Monash studies Feedback and norms-based intervention aimed at reducing daily peak demand for students living in residential halls.	143 residential students	Residential (University Halls of Residence)	Daily peak demand	Information provision, social pressure, peer comparisons, lottery reward	Semester One, 2018; Potential for ongoing project
ClimateWorks, BehaviourWorks and Seed Monash studies Feedback and norms-based intervention aimed at reducing students' demand during simulated critical peak demand events.	88 residential students	Residential (University Halls of Residence)	Simulated critical peak demand	Information provision, social pressure, peer comparisons, lottery reward	Semester Two, 2018; Potential for ongoing project
Ausgrid demand management for replacement needs Ausgrid trialled an incentives program to encourage permanent demand reductions in a defined geographic area; and also undertook feasibility studies into demand response as a solution in network equipment failure scenarios.	Only design stage completed as at publication	Commercial and industrial	Daily peak demand; network failure events	Use of incentives; feasibility study	Commenced 2016/17
Jemena Residential Demand Response Jemena targeted alternative approaches to achieving lower energy consumption during periods of network constraint.	600 residential households	Residential	Daily peak demand; network constraints	Actionable tips to reduce consumption; real time data provided by an app; actionable tips and performance feedback to participants.	Commenced summer 2017/18

ClimateWorks, BehaviourWorks and Seed Monash microgrid studies As part of Monash's "living laboratory" approach to the microgrid's introduction on the Clayton campus, a program of trials extending to the wider clients of the microgrid, including university departments and facilities and commercial businesses is in development.	2.5MW peak demand on current microgrid, 1500 residential students	Commercial and residential	Daily peak demand	E.g. Automated load control, rebates	Potential for ongoing project over a number of years

Notes: There are multiple Australian studies examining demand management. This list is restricted to those including an intervention specifically aimed at influencing residential customers' energy use and behaviour. *These projects are part of the ARENA and AEMO demand response trial: This program provides $35.7 million funding for 10 pilot projects to deliver 200 MW of demand management capacity by 2020. There are ten projects which all propose to deliver demand response options

7. Key learnings and recommendations

Effectiveness of Monash as a "living laboratory"

The study demonstrated that Monash University is a suitable experimental setting for demand management studies. Monash offers a large pool of accessible 'customers', with 24 per cent of students approached registering for and participating in the trial in Semester One[6] and 15 per cent registering and participating in Semester Two. In addition, the University provides a flexible setting for testing different demand management interventions. The range of expertise at Monash, from IT, to engineers, to behavioural scientists, proved essential to the success of this trial.

Feedback as motivational strategy

This study also showed that a monetary incentive or an investment in new equipment is not always necessary to influence customers' energy use. Feedback and social norms can effectively motivate people in certain demographics to change their behaviour.

Participant attitudes to automation

Automation is increasingly being utilised as part of demand response programs, with the aim of achieving stronger and more reliable energy use reductions. The results of this study indicate that, at least for residential households, it is important to consider the level of comfort of target participants with automation. Even after an eight-week study, which 32 per cent of survey respondents found "somewhat difficult" or "extremely difficult", a large proportion of participants (48 per cent of survey respondents) still expressed a preference for manually switching off appliances. An important area of investigation in the future may be to investigate the level of incentive required to encourage residential customers to opt for automated demand management options.

Recommendations for United Energy

United Energy's interest in this study is related to the potential to expand their Summer Saver Program to high-density and short-term rental environments on the Mornington Peninsula. As with the students participating in this study, short-term renters are not directly exposed to the cost of their energy use and may be difficult to target using financial incentives.

Given the results of this study, we suggest that norms and feedback-based interventions could encourage at least some short-stay residents to reduce their energy demand during peak times. If United Energy plans to target these customers, it may be worth testing a simple feedback-based intervention before resorting to price-based interventions. Future studies could test how best to communicate with short-stay residents, including the potential for the use of paper-based feedback.

This study also examined the effectiveness of an 8-hour notification in comparison to a 24-hour notification with a 2-hour reminder in encouraging participants to reduce their energy use during simulated critical peak demand events. We found that while the 8-hour notification was more effective in encouraging reductions in energy use, 39 per cent of participants preferred the 24-hour notification with a 2-hour reminder, while only 16 per cent preferred the 8-hour notification. We suggest that the best option may be to tailor notification times based on individual preferences.

[6] All students who registered for the trial participated in the trial – the control group received a single email at the start of the trial, while the treatment group received weekly updates on their energy use.

8. References

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Gyamfi, S., Krumdieck, S., and Urmee, T. 2013. 'Residential peak electricity demand response – Highlights of some behavioural issues'. *Renewable and Sustainable Energy Reviews*, 25, 71 – 77.

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ThinkPlace, *Demand Response Customer Insights Report: v1.0,* ARENA, May 2018

Appendix 1: Semester One - Initial recruitment email

Dear Residents,

Would you like the chance to win a $200 Coles-Myer gift voucher while also helping the Monash electricity grid and the environment?

This semester, ClimateWorks Australia is running a study on energy use in the Briggs and Jackomos residential halls. The aim of the study is to test new ways of reducing pressure on our local Monash University power network during high demand periods this semester.

Participating in the study is easy! Just follow the link below to complete the survey - it only takes 10 minutes. Later in semester, ClimateWorks will provide you with information on how to make simple changes to your energy use to reduce pressure on the electricity network. Just by filling out the survey you will also go in the running to win a $200 Coles-Myer gift voucher to be drawn at the end of semester.

Complete survey here!

You can find out more about ClimateWorks Australia **here**.

A full explanatory statement on the study is attached, and if you have any questions, please don't hesitate to contact Sarah Fumei from ClimateWorks (sarah.fumei@climateworksaustralia.org)

Kind regards,

Monash Residential Services and ClimateWorks Australia

Appendix 2: Semester One - Email sent to students in control group

Dear student,

Thank you for registering to participate in our energy use study.

Through reducing your energy use, you can help to reduce pressure on the Monash electricity network, reduce the chance of power outages and help Monash to achieve its goal of net zero greenhouse gas emissions by 2030.

Here are some helpful tips for reducing energy use:

- Unplug your appliances when they're not in use - your TV, computer and microwave all have a "standby" mode which means they're still using energy even when they're not in use.
- Remember to turn off the lights when you aren't in a room.
- Turn off heaters and coolers when you leave the room, or go to bed. Make sure all your heating or cooling is turned off when you leave the apartment.
- Run your fridge efficiently - make sure the door seal is tight and free from gaps so cold air can't escape.
- Kettles use a lot of electricity. Fill up and boil only the water you need, saving time and electricity,
- Thawing your frozen food in the fridge can save energy and reduce cooking time.

Thanks for your participation.

Kind regards,

Sarah Fumei | PROJECT OFFICER

ClimateWorks
AUSTRALIA

P +61 3 9903 8034 **| E** **sarah.fumei@climateworksaustralia.org**
A Level 16, 41 Exhibition St, Melbourne Vic 3000 **| W** **www.climateworksaustralia.org**

ClimateWorks Australia was co-founded by Monash University and The Myer Foundation and works within the Monash Sustainable Development Institute

Appendix 3: Semester One - Sample of weekly email sent to students in treatment group

ClimateWorks AUSTRALIA
Founding partners Monash University and The Myer Foundation

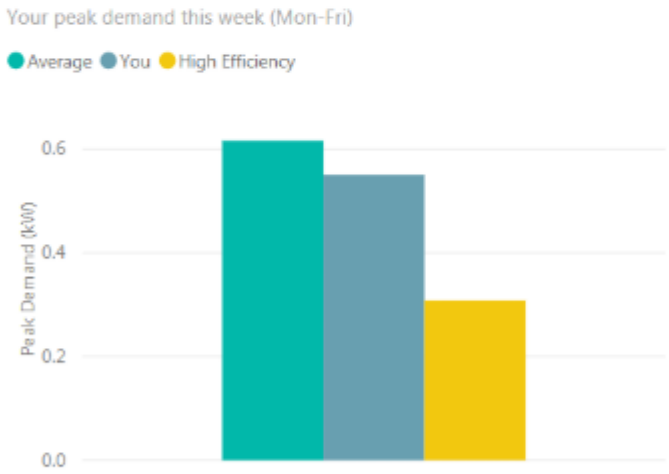
Dear student,

This email is to remind you to reduce your energy use between 8 and 10pm on weekdays, which is peak time for the residential halls.

During certain times of the day, we can use a third more power in our dormitory rooms than usual. When we all do this, the resulting high electricity demand places a large strain on the network, increasing the chance of potential power outages that can affect vital services at the University.

Through reducing energy use during peak times you can also help Monash to reach its goal of achieving net zero greenhouse gas emissions by 2030.

Here's an update on your energy use for the last week:



Your rank this week

37

out of 73 participants

What does this chart mean?

Peak times for the residential halls are 8-10pm on weeknights, and this chart shows your peak energy demand during these times. Peak energy demand is the maximum rate at which you're drawing energy from the electricity grid at any one time - for example if you had just a 10W light switched on, your demand at any particular moment when the light is switched on would be 10W. Peak demand is important because it can place strain on the network.

Follow THIS LINK for more information on your individual energy use.

Here are some helpful tips for reducing energy use:

- Microwaves cook quickly and use about 75% less energy than a cooktop – choose the microwave when possible.
- Charge your laptop, phone and other devices during the day, and then unplug them during peak time (8 – 10pm weekdays). Having them charged and ready to go will reduce your energy use during peak times and reduce pressure on the system.
- Remember to unplug your appliances when they're not in use - your TV, computer and microwave all have a "standby" mode which means they're still using energy even when they're not in use.

Thanks for participating!

Kind regards,

Sarah Fumei | PROJECT OFFICER

ClimateWorks AUSTRALIA

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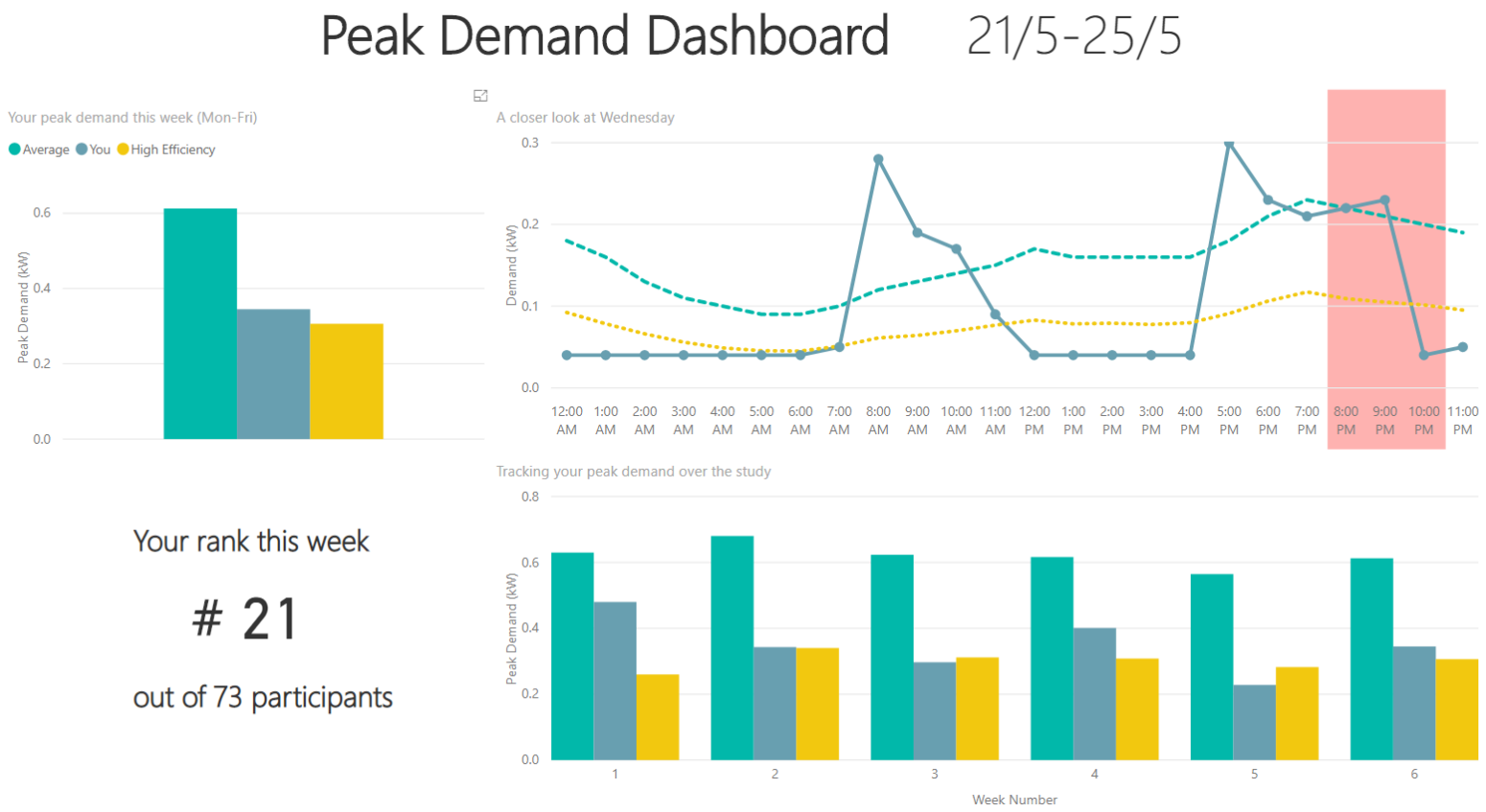
A Level 16, 41 Exhibition St, Melbourne Vic 3000 **| W** **www.climateworksaustralia.org**

Appendix 4: Semester One - Sample student energy use dashboard



Appendix 5: Semester Two - Initial recruitment email

Dear students,

Would you like the chance to win a $200 Coles-Myer gift voucher while also helping the Monash electricity grid and the environment?

This semester, ClimateWorks Australia is running a study on energy use in the Briggs and Jackomos residential halls. The aim of the study is to test new ways of reducing pressure on our local Monash University power network during high demand periods this semester.

This current study will build on the Semester One study that we've just completed. Everyone is very welcome to participate, whether you participated last semester or not.

Participating in the study is easy! Just follow the link below to register - it only takes a few minutes and you will go in the running to win a $200 Coles-Myer gift voucher to be drawn at the end of semester.

Later in semester, ClimateWorks will provide you with information on how and when to make simple changes to your energy use to reduce pressure on the electricity network. We'll also be running a survey at the end of semester to better understand your experiences with the study – **by completing the survey you'll go into the running to win *a second* Coles-Myer gift voucher.**

Register here!

You can find out more about ClimateWorks Australia **here.**

A full explanatory statement of the study is attached, and if you have any questions please don't hesitate to contact Sarah Fumei from ClimateWorks (sarah.fumei@climateworksaustralia.org)

Kind regards,

ClimateWorks and Monash Residential Services

Appendix 6: Semester Two – Peak demand event notification email

Dear student,

Thank you for participating in our energy use study.

This email is to inform you that a peak demand event is coming up.

Please reduce your energy use between 8 and 10pm tonight, 16th October 2018.

During certain times, we can use a third more power in our dormitory rooms than usual. When we all do this, the resulting high electricity demand places a **large strain on the network**, increasing the chance of potential power outages that can affect vital services at the University.

Through reducing energy use during peak times you can also help Monash to reach its **goal of achieving net zero greenhouse gas emissions by 2030**.

Following the event, we'll let you know how you did in reducing your energy use.

Best wishes,

Sarah Fumei | PROJECT MANAGER

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ClimateWorks Australia was co-founded by Monash University and The Myer Foundation and works within the Monash Sustainable Development Institute

Appendix 7: Semester Two – Feedback email post peak demand event (students who received a notification)

ClimateWorks AUSTRALIA
Founding partners Monash University and The Myer Foundation

Dear student,

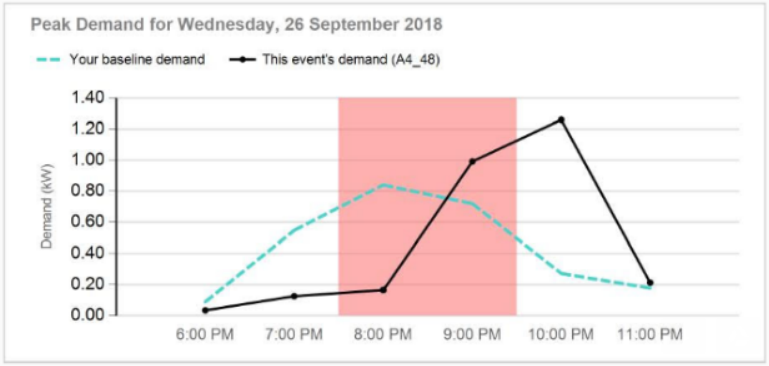
Thanks for participating in our energy study.

During Wednesday's peak demand event, you Decreased your energy demand by -25.88% in comparison to your normal usage.

You are ranked **41 out of 88 students** for this event.

Good work! To save even more energy try following the tips below during the next peak demand event

The chart below shows more information on your individual energy use.



Here are some helpful tips for reducing energy use:

- Entertainment devices use electricity even when in standby mode. Where possible, turn off at the power point when not in use.
- Don't forget to switch off the lights when you aren't in a room.

Kind regards,

Sarah Fumei | PROJECT MANAGER

ClimateWorks AUSTRALIA

P +61 3 9903 8034 | **E** sarah.fumei@climateworksaustralia.org
A Level16, 41 Exhibition St, Melbourne Vic 3000 | **W** www.climateworksaustralia.org

Appendix 8: Semester Two – Feedback email post peak demand event (students who did not receive a notification

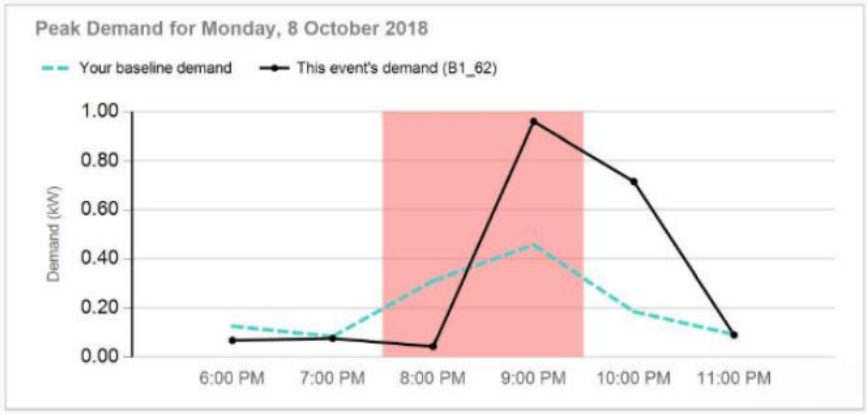
ClimateWorks AUSTRALIA Founding partners Monash University and The Myer Foundation

Dear student,

Thanks for participating in our energy study.

During Monday's peak demand period, you increased your energy demand by 30.55% in comparison to your normal usage.

The chart below shows more information on your individual energy use.



Here are some helpful tips for reducing energy use:

- Remember that kettles use a lot of electricity. Fill up and boil only the water you need, saving time and electricity.
- Unplug your appliances when they're not in use - your TV, computer and microwave all have a 'standby' mode which means they're still using energy even when they're not in use.

Kind regards,

Sarah Fumei | PROJECT MANAGER

ClimateWorks AUSTRALIA

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Appendix 9: End of Semester Two survey

Thanks for participating in this trial. Your participation helped us to test new ways of reducing pressure on our local Monash University power network during high demand periods this semester.

Through reducing energy use during peak times you also helped Monash to reach its goal of achieving net zero greenhouse gas emissions by 2030.

We'd like to ask you a few questions about your experience of the study this semester, which will help us to better understand the results. We expect the survey to take 5 - 10 minutes.

Your responses to these questions will not be used in any way that identifies you publicly, or in any way that identifies you to Residential Services.

Student details

So that we can match your survey answers with your energy use, we'd like to know your email address and room number. Please provide them below.

Email address:

Room number:

Students' experiences in the trial:

On a scale where 1 is "not at all important" and 7 is "extremely important", to what extent was each of the following factors important in your decision to participate in the study.

- Contributing to Monash's goal of achieving net zero emissions
- Reducing pressure on the power network and the chance of outages
- Chance to win a $200 gift voucher

Over the semester, how much effort did you put into reducing your energy use during peak times?

- No effort at all
- A little effort
- Some effort
- A fair amount of effort
- A great deal of effort

Did you try reduce your energy use during daily peak demand times in general (8 to 10pm weekdays) or only when you were notified about an upcoming peak demand event?

- I generally tried to reduce my energy use from 8 to 10pm on weekdays
- I only reduced my energy use when I was notified about an upcoming peak demand event
- I didn't try to reduce my energy use

On a scale where 1 is "never" and 7 is "always" how often did you take the following actions to reduce your energy use during the peak demand events?

- Turn my electric heater off or down
- Turn my electric fan off or down

- Only turn my desktop computer on before or after the peak demand event
- Only charge my laptop before or after the peak demand event
- Only use my electric hotplate/oven before or after the peak demand event
- Only use my microwave before or after the peak demand event
- Only use my kettle before or after the peak demand event
- Turn off at the wall any appliances not being used
- Turn off all lights not being used
- Turn off what I can and leave my dormitory room

Were there any other actions you took or appliances that you turned down or avoided using during peak demand events? (free text)

How difficult or easy was it to reduce your energy use during peak demand events?

- Extremely difficult
- Somewhat difficult
- Neither easy nor difficult
- Somewhat easy
- Extremely easy

What types of things made it difficult to reduce your energy use? (free text)

What types of things made it easy to reduce your energy use? (free text)

Were there any weeks when there was an external event that affected your energy use? E.g. student dinner or social activity during peak demand time, went away for mid-semester break?

- Yes
- No

Please provide further details on the external event(s) that affected your energy use (free text)

You received different notification periods for different peak demand events. Did you have a preference for a particular notification time?

- 24 hours with a 2 hour reminder
- 8 hours
- 2 hours
- No preference

Please explain the reason for your preference regarding the notification period (free text)

Feedback emails

For each peak demand event, you were provided with a feedback email on how you did. How often did you read this information?

- Never
- Sometimes

- About half the time
- Most of the time
- Always

On a scale where 1 is “not at all well” and 5 is “extremely well”, how well did you understand the data provided to you in feedback emails after peak demand events?

- Percentage decrease in energy use compared to your baseline
- Rank out of participating students
- Chart of your energy demand during the peak demand event
- How helpful did you find this data in understanding your energy use?
- Not at all helpful
- Slightly helpful
- Moderately helpful
- Very helpful
- Extremely helpful

If you were able to see your room's energy use data in real time, how helpful do you think this would be in responding to peak demand events?

- Not at all helpful
- Slightly helpful
- Moderately helpful
- Very helpful
- Extremely helpful

Is there any other information on your energy use that it would have been useful for us to provide? (free text)

Preference for behavioural demand response in comparison to automation

Over the semester, you were asked to manually switch off appliances during eight peak demand events. Another option would be to use a wifi enabled plug that would automatically turn off whatever you had chosen to plug in, without input from you. If you had a choice, what would be your preference?

- Preference for plug
- Preference for manual switching off appliances
- Neither option

What is the reason for your preference? (free text)

Awareness of Consequences:

I believe that reducing the use of electricity in my room during high demand periods this semester…

- made more electricity available to provide vital services at the University
- Saved money for the University.

- Helped postpone the need for the University to undertake costly investment in electricity infrastructure.
- Reduced carbon pollution in the atmosphere from coal powered electricity generators.
- Provided an enjoyable challenge.
- Made me feel good about doing something worthwhile.

(Scale from 1 “definitely false” to 5 “definitely true)

Openness to answering further questions:

We might have some further questions about your energy use that would help us in better understanding the study results. Would it be ok if we called you at a later date?

Contact us

For further information about this project, contact:

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Patricia Boyce, Seed Advisory

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MONASH University | MONASH SUSTAINABLE DEVELOPMENT INSTITUTE

THE MYER FOUNDATION

ClimateWorks Australia is an expert, independent adviser, committed to helping Australia transition to net zero emissions by 2050. It was co-founded through a partnership between Monash University and The Myer Foundation and works within the Monash Sustainable Development Institute.

UNITED ENERGY SUMMER SAVER PROGRAM IMPROVEMENT STUDY

DEAKIN BUSINESS SCHOOL

REPORT JULY 6 2018
A/PROF LUBNA ALAM, PROF RENS SCHEEPERS AND DR AMIR ANDARGOLI

EXECUTIVE SUMMARY

United Energy (UE) is aiming to minimise infrastructure investment via alternate peak summer demand management strategies. To meet short-duration peak demand during summer, UE has introduced the Summer Saver Program (SSP) to provide a non-network demand response solution. This project aims to elicit feedback on current SSP experiences, barriers to participation and preferences for technology solutions to inform the future development of digital solutions.

The report articulates the perceptions of the current SSP users' 1) experiences in participating in the program, 2) experiences with the current mobile app and web portal and 3) needs (including support) to enable future participation. Using a qualitative method with focus groups, data were collected from 36 participants across four sessions in multiple locations.

The key recommendations for UE from the analysis of user feedback and perceptions are:

- As the SSP mobile app is only used infrequently and during summer, it is recommended that the mobile app should be simple, easy to use and easy to learn. Information and feedback that is more detailed can be accessed through a link to a web portal. Customers should be able to choose their own password and login.
- Customers would prefer immediate real-time feedback on household energy usage during an event, either through a mobile app or an in-house smart energy-monitoring device.
- Default event notification should follow a 24|2-hour pattern. That is, email and SMS notification at least 24 hours before the event, followed by a reminder 2 hours before.
- UE needs to build trust among customers through the clear and ongoing communication of the objectives and roles of UE within the SSP and the broader energy supply chain.
- UE should use motivating and persuasive language when communicating with customers.
- A majority of participants found financial incentives to be motivating; however, there is room for improvement within the incentive scheme itself (e.g., baseline calculations), balancing it with alternative strategies beyond monetary incentives to instil autonomy, competence and relatedness in customers.
- Participants should be offered options in the form of opt-in/opt-out choices as a way to personalise their ongoing engagement in areas such as the medium of communication/notification and medium of payment.

We further recommend that UE considers the following principles for the development of any future digital solution for the SSP:

1. Autonomy and control: Provide autonomy and control to achieve personalisation.

2. Genuine user-centred design: Improve engagement with customers to ensure better uptake and a clearer mandate.

3. Users as partners: Treat customers as partners in the design and implementation of technology solutions through open and ongoing communication.

4. Balancing intrinsic and extrinsic motivations: Strike a balance between incentive structures to achieve both intrinsic and extrinsic motivation. The long-term aim is to complement extrinsic financial motivations with extrinsic motivations of autonomy, competence and relatedness.

5. Iterative motivation alignment: Aim to align the motivations of the customers with the goals of the SSP program over time through technology versions and relational mechanisms.

TABLE OF CONTENTS

ABBREVIATIONS

IS	Information System
FC	Focus Group
SSA	Summer Saver App
SSP	Summer Saver Program
TAM	Technology Acceptance Model
UE	United Energy

PROJECT SCOPE AND PURPOSE

UE is aiming to minimise infrastructure investment via alternate peak summer demand management strategies. To meet short-duration peak demand during summer, UE has introduced the SSP to provide a non-network demand response solution. This project aims to elicit feedback on current SSP experiences, barriers to participation and preferences for technology solutions to inform the future development of digital solutions.

The report articulates the perceptions of the SSP users' 1) experiences participating in the program, 2) experiences with the current mobile app and web portal and 3) needs (including support) to enable future participation.

RESEARCH METHOD

Qualitative research methods are used to study people's behaviours and experiences in any contexts (Myers & Avison 1997). The focus group is one method of data collection in qualitative research. 'The focus group is a research technique that collects data through group interaction on a topic determined by the researcher' (Morgan 1996, p. 131). The focus group is considered a form of group interview that provides an opportunity for the researchers to capture different viewpoints by encouraging different participants to communicate and negotiate over the phenomena under investigation (Kitzinger 1995). The focus group helps people to express and clarify their viewpoints through a group process to explore the issues of importance to them (Kitzinger 1995) and is typically formed by approximately 6–12 informants and a skilled moderator (Krueger & Casey 2014). The moderator plays the pivotal role of guiding discussion to generate useful data (Krueger & Casey 2014). Further, it is critical to ensure the focus group represents all relevant viewpoints (Powell & Single 1996). Focus groups are employed when the phenomena under investigation are complex; they can be used as an additional data collection method to ensure validity (Powell & Single 1996).

It is important to note the differences between focus groups and traditional surveys. Compared with surveys, focus groups involve fewer participants but explore issues in greater depth. Focus groups yield rich, detailed feedback and insights into how individuals perceive complex issues, areas of consensus and non-conclusive differences. Thus, focus groups elicit the key issues that matter from the perspective of participants. Follow-up survey research is often helpful to assess the identified issues quantitatively and in breadth across a much larger participant base.

Four focus group sessions were conducted at several locations (see Table 1) to gain an insight into the experiences of those who participated in the SSP in three areas of customer engagement: registration, participation and persistence. The participants were recruited through email invitations sent by UE to consumers involved in the SSP using Eventbrite (see Appendix A for the sample Eventbrite invitation).

Focus group session	Location	Day and time	Number of participants
Session 1	Deakin University – Burwood Campus	Thurs 17 May, 7:00–9:00 p.m.	8
Session 2	Deakin University – Burwood Campus	Sat 19 May, 2:00–4:00 p.m.	10
Session 3	Mornington Peninsula – Mornington Town Centre	Sat 19 May, 10:00 a.m.–12:00 p.m.	11
Session 4	Mornington Peninsula – Mornington Town Centre	Sat 26 May, 2:00–4:00 p.m.	7

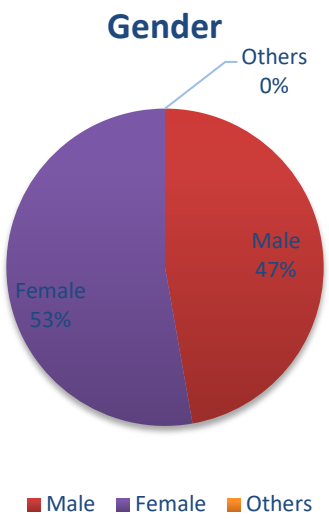
Table 1. Focus group locations.

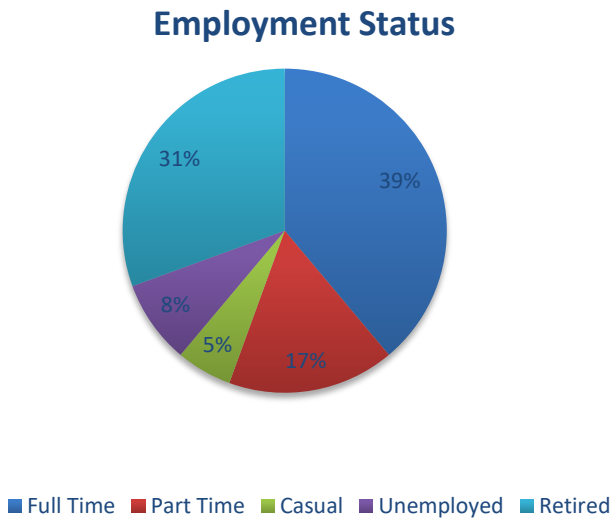
Each focus group began with a short survey to obtain demographic data from the participants (see Appendix B for the survey questionnaire). A semi-structured instrument guided the focus group and participants signed a

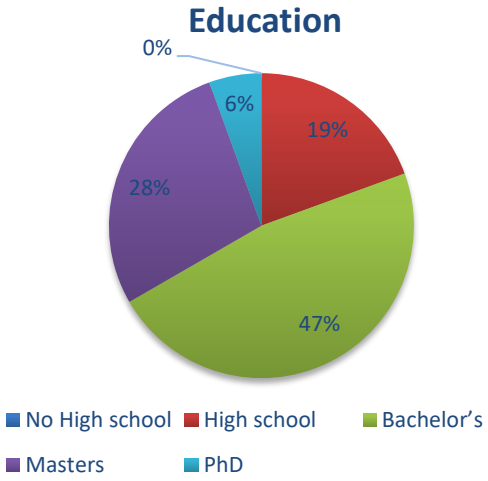
consent form to participate (see Appendix C). The discussions that took place in the focus group sessions were recorded with the permission of participants. There were 8 hours of recording, which were transcribed using a professional transcription service (Pacific Transcription). The focus group data (270 pages) were coded and analysed using NVivo to identify the major underlying themes using an inductive thematic analysis.

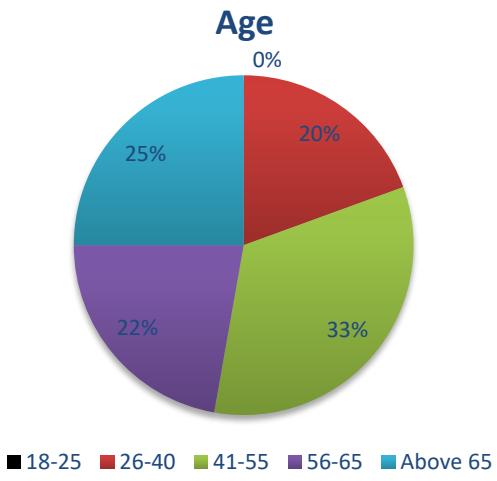
DEMOGRAPHICS OF PARTICIPANTS

The demographic data collected for the participants at the beginning of the sessions are described below (see the below charts). There were 36 participants in total across the four focus group sessions. The majority of participants were middle-aged, were in full-time employment, held a bachelor's degree and earned an average of $75000 to $99000 per year. They had moderate to advanced technology skills. The level of skill required to engage with the SSP was moderate to high.

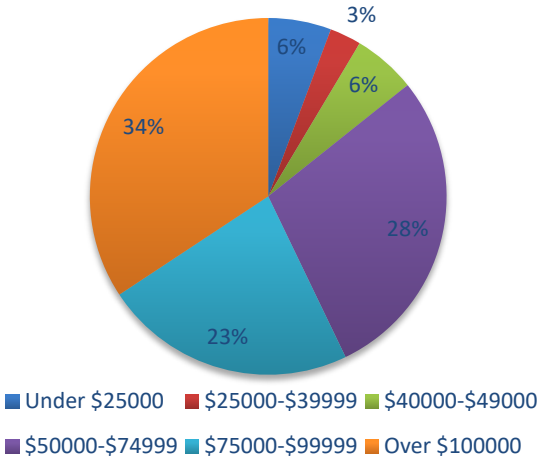




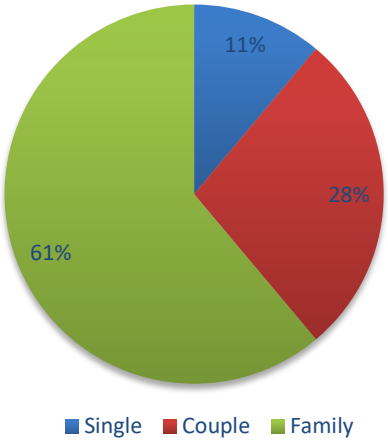




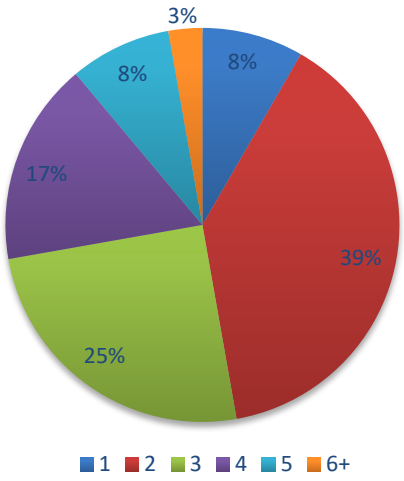
Income



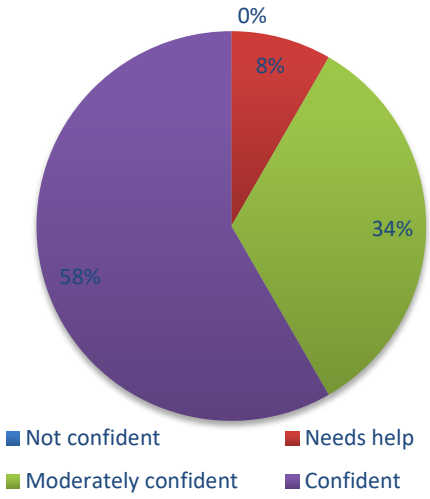
Household Type



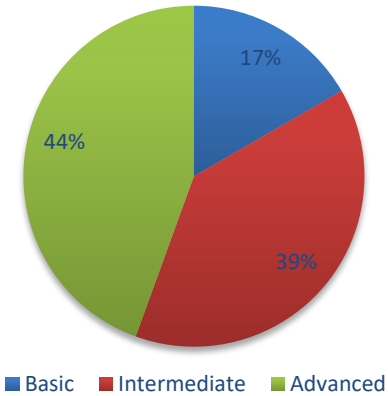
People Living in the House



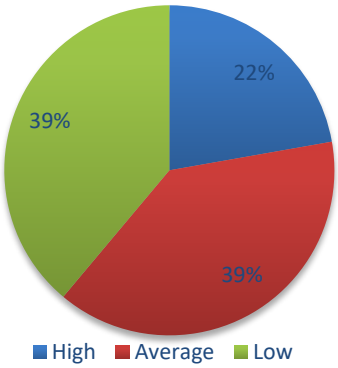
Confidence with Technology

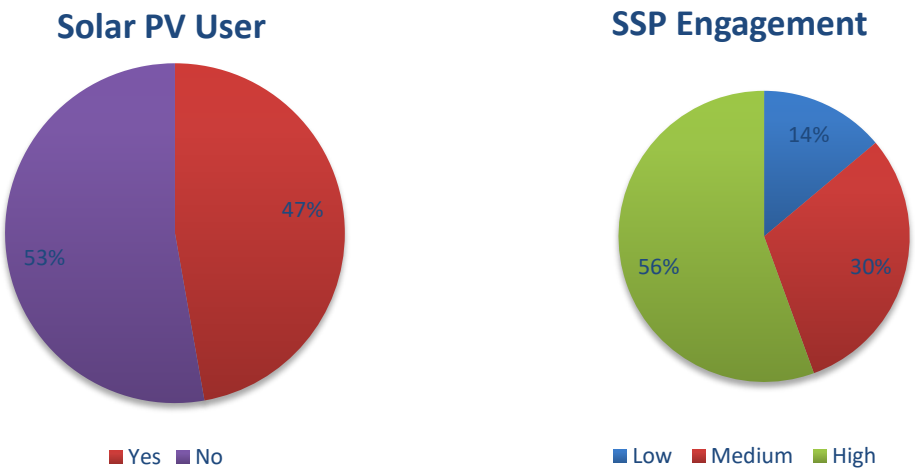


Technological Skill



Energy Usage





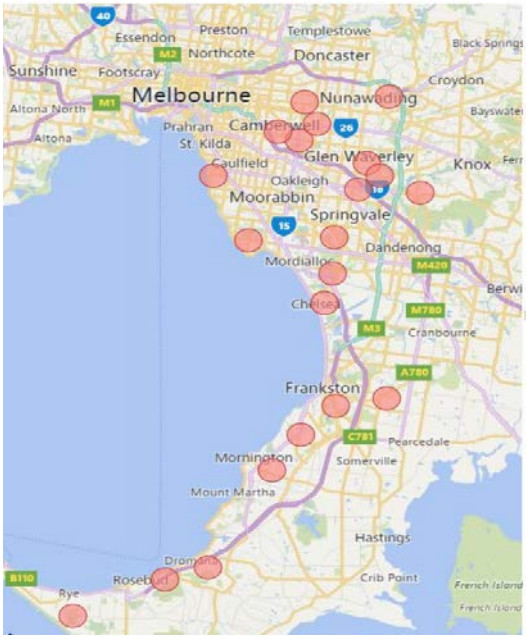


Figure 1: Focus group participants' location distributions.

FOCUS GROUP FINDINGS: KEY THEMES AND ISSUES

The main themes and issues that surfaced during the focus group interviews are discussed below. These key themes and issues are highlighted through the participants' own words. We have identified conclusive findings and when differences of opinion existed.

PERCEPTIONS OF ENERGY CONSUMPTION

ENERGY CONSUMPTION BEHAVIOUR

In general, participants were conscious of their energy usage patterns and were able to identify the following appliances as sources of high energy usage in their households: air conditioners, hot water systems, fridges, air conditioners, kettles, hairdryers, laptops, television sets, heaters, pool pumps and electric cars. One participant in FC1-4, for example, was able to describe succinctly their energy usage behaviour as follows:

> The most energy-consuming item in my household would be the fridge, and then hot water system, and then the reverse cycle heat pump, or the air conditioner, and all the other intermittent—and the modem that's on, but that's not a heavy user, I understand.

Other participants were able to describe their energy usage as it specifically relates to their contextual circumstances in life, such as having to work from home or having to care for a disabled person. FC4-2 described their energy consumption behaviour in the context of living with someone with a disability as follows:

> My son with a disability has got a thing about having lights on, so as soon as it gets dark every light in the house is on.

A common view among participants was that during hot weather air conditioners were the appliances that consumed the most energy in their households. FC2-2 believed that during hot weather they had no choice but to run their air conditioners; otherwise, their houses might become excessively hot and their computers might crash:

> We had to have our air conditioner [as we are] working from home, because the computers crash if it's too hot. Not only that, we had to have the portable fans sitting directed at the computers on those really, really hot days. Also, we can't work when it's too hot.

ENERGY-SAVING STRATEGY

In general, participants adopted a range of devices to save energy, such as solar panels, LED lights, timers to switch off appliances when not in use and in periods of peak usage, and home monitoring devices. FC1-7 described her energy-saving strategy as follows:

> We've just bought our own house maybe three years ago, and we're going through the figuring out what a household electricity bill really is and what things draw power, and things like insulation—that makes a massive difference to heating. So we've both been working through this slowly building level of guilt that our household is not as energy efficient as our parents would approve off, et cetera. So we're looking at the LED lights and the insulation and that kind of stuff.

When the weather was particularly hot, in what might reasonably be referred to as SSP events, some participants adopted multiple strategies to save energy. For example, closing their blinds, turning on the fan setting instead of full air conditioning, adjusting their thermostat controls to 27 degrees, going out of the house to a shopping centre or cinema, pre-cooling their houses by turning their air conditioners on before a heat event and then turning them off during the event, staying at work longer and turning their pool pump off. F2-5 explained her strategies as follows:

> So some of the things that I did, one of the really hot days we basically went and did the shopping late in the day and actually ate dinner out so that we came home and used somebody else's—the shopping centre's—air conditioner. I did find, too, that the energy use also spiked because you tended to put the TV on more to keep them [our kids] entertained. That combined with the air conditioner.

INTERACTIONS WITH CUSTOMERS

PREFERRED COMMUNICATION MEDIUM AND ALERTS FOR EVENT NOTIFICATION

For the most part, participants preferred to receive notification of an event at least 24 hours beforehand, so that they had time to plan. Some participants preferred to receive communication two or three times before an event on a 48/24/2-hours basis, rather than as a one-off notification. The majority view was that they would prefer to receive two notifications before an event: the first 24 hours prior and the second, as a reminder, 2 hours prior.

Some participants further pointed out that they preferred an even longer pre-event notification, so they could better plan for it (48|24|2-hour pattern), as noted by FC1-4:

> Anything longer is fine. The reason why—I use a scheduler. I schedule everything. If I want to do it, I'll just put it in my schedule, I'll put it in there, and I'm then alerted.

Most of the participants said that their preferred method of communication was both SMS and email, specifically an email for an expected event followed by SMS reminders. FC2-10 stated this quite clearly:

> I say I'd prefer a text message but also an email back-up, as well.

Similarly, FC4-5 commented:

> They sent a message to my mobile, just saying reminder that the event is happening today. Plus we got the emails. I'm happy with both. At least with the mobile, I've always got it with me. I check my emails every day anyway. But the phone, if I'm out and I can just, okay, ring the boys. Tell them it's starting soon and so I appreciate it both ways, on the SMS and the email.

However, some participants noted that they missed event notifications because they had not checked their emails until it was too late. For example, FC2-4 mentioned:

> I missed the alert because it was on email. I think the alert came through fairly late. It was just a busy day and you don't check your emails all the time.

Some participants believed that they should be able to customise the notification system so that they could select their preferred communication medium, as noted by FC3-5:

> I think you should be able to choose. So in your particular scenario a text message might be more efficacious for you. But for me that's irritating, so I would much rather an email which I can choose if I look at it or not. Whereas when I'm in the middle of a workshop or I'm in a meeting or something, my phone constantly going off with text messages that aren't related to my day-to-day is irritating. Whereas an email I could say, anything from United Energy send it to that folder and I'll deal with it later. You should be able to choose your settings.

Notably, it was the general consensus that the participants did not want to receive calls, as noted by FC1-2:

> I am comfortable with text, email, anything, as long as it's not a call or a person on the line.

At a practical level, some participants said that, currently, communication with UE was not via the medium that

they had asked for, as noted by FC2-3:

> I asked to be SMSed and I never got a text, it was always email.

ISSUES WITH LANGUAGE USED IN COMMUNICATION LANGUAGE

Many participants had issues with the written communication they had received from UE. Their concern, and in some cases criticisms, were many and varied. To start with, there was some concern about the language and tone used in communications from UE. Some participants found the language to be offensive, particularly UE's *email after an event*. According to one participant, FC2-8:

> I didn't like the wording that was coming in the email saying basically you're naughty, your use has massively increased today….These emails kept coming, saying—just randomly—your energy has massively increased today. I found that annoying and like I was being told off.

Another concern that surfaced in the focus groups was the unprofessional layout of the invitation letter and of later communications. This was made clear in the following comment by FC4-1:

> Initially, when I received the email, I wasn't sure whether it was actually spam or whether it was legitimate. So I tried to make a couple of phone calls, and I got no response, so I wrote it off as being a con job or something…..I received mail, as in snail mail, as well as an email, and it just—the way that it was laid out. To me, it didn't appear to be professionally laid out, and I'd had a lot of spam emails coming through probably around the same era, and of course you hear about things on the media that people are being duped and this sort of thing. I think anything where there is bank accounts involved or channelling of money, you're always a little bit wary of.

LACK OF CLARITY OF OBJECTIVES AND ROLE TRANSPARENCY

There was confusion around two aspects: 1) ambiguity with the objectives of the SSP program and 2) the role of UE within the broader energy supply chain (confusion around retailer vs supplier).

Some participants took umbrage at the language used by UE in the invitation letter because it gave them the sense that they were to blame for the power problems and it confused their understanding of the objective of the SSP, as noted by FC3-5:

> At one point there, there was some correspondence that I received where they were saying that it's to reduce the risk of a blackout. To me, that was like a red rag to a bull because…, I was going to say…I don't think anyone should be put in that situation. Because you have a demand, you have a spike, you have the equipment there to be able to generate to meet that demand. Don't look at me, the end user, to get you out of your problem.

Some people were concerned about joining the program because they were not aware of who UE was, as well as being confused by the difference between a retailer and a supplier. FC2-8 noted:

> When I first heard about it, I thought, 'Well, I can't do this, I'm not with United.' I thought…[I] didn't understand that your supplier's different to your biller. I would imagine that would happen—when I've mentioned it to people, they said the same thing, 'I'm not with United.' I have to explain to them.

Similarly, FC3-2 commented:

> I asked around people, who's in the same area with United Energy? And they say, 'Never heard of it.' I go, 'Oh, okay.'…I think that because United Energy is not my supplier, they're not my retailer, getting

> an email from United Energy I would have thought would have been a scam.

Apart from the non-persuasive language used in UE's correspondence and the lack of sufficient background information (as noted above), some participants voiced concern over the lack of clear goals and objectives for the SSP. This left some participants with the sense that they were receiving mixed signals from UE. Specifically, why would UE want to sell less electricity and in so doing reduce its revenue? FC3-4 commented:

> We get back to the two messages, though. Because the thing is, they're really only wanting us to reduce the electricity on these particular days because it suits them. Because if we all reduced our electricity, then profits would go down. So it seems like the mixed message is that they only want us to be good people on three hours.

Some questioned the very idea that participants would, in fact, save money. The objectives of the SSP were communicated in such a way that, if you were to join the program, you would save money. However, some participants considered that proposition not to be entirely true because they only earn five dollars for each event, whereas, on the other side of the ledger, to earn that money they might have to take their family out during peak hours, resulting in a higher net cost to them. Therefore, they believed the objectives should be set to align with higher social and environmental goals:

> It comes down to the organisation being very clear on what their objectives of this is. Because if people get the idea the objective is I'm going to save money, I think that expectation will not be met. Then they will be discouraged and just go, 'Oh, bugger this, I'm going to go and crank my energy up to 11.' Whereas if their idea is that I'm going to lower usage for the betterment of mankind, or whatever the particular high and mighty principle is or whatever, then that expectation can be achieved. So they've got to be very careful in their messaging. (FC3-4)

Given the ambiguity that some participants felt, they believed UE should be honest and forthright in their message and clearly state why they need people to reduce their consumption during hot days:

> They [UE] should say, 'We can't supply the whole of Melbourne, please help us out by you doing your…you switch yours off so we can supply everybody else.' They don't say, you're helping the world, they're honest in that way, they're just saying, 'We can't do everybody, can you help us out by giving up yours?' (FC1-1)

> I think a better way of doing it is actually coming clean with what it's all about and saying that if you don't reduce your energy use you're going to have brownouts, so your section of the area will be browned out and so hospitals on central uses can have the electricity. Or the alternative is that your power bill is going to go up astronomically because we're going to increase the capacity of your poles and wires….I think the environment message is nothing to do with it, it's just purely money. (FC1-4)

ONGOING COMMUNICATION (TREATING USERS AS PARTNERS)

The focus group participants made suggestions as to having more regular communication from UE. For example, to embed the importance of the program in the minds of users, some participants thought it would be beneficial if they were provided with feedback regarding the outcome of the program in the previous year:

> I'd like to know what proportion of programs like this of demand we are actually reducing. How many people are in these programs. (FC1-2)

On the topic of more regular communication, FC3-1 stated:

> It would be nice to have some sort of communication through the other period of the year before the next event period starts to come up so that you know that you are still in the system. Because

> between the second event that I took part in and the last one, I had no understanding whether I was still in there, whether the event was still going to continue, whether it was worthwhile.

Some participants believed that as there was a problem with lack of community awareness of both the program and the detrimental effects associated with electricity spikes, it would be beneficial to raise social awareness of the program through the mass media and by involving local politicians. Some participants thought it would be useful to explain to users how spikes could adversely affect people and society in general:

> To show how they [spikes] affect people who lose power. You think about if you are on a medical device or something like that, and you've lost power for four hours because everybody's massively turning on all their air conditioners, that's really helpful information for people. I think it makes them stop and think. My neighbour could be on oxygen and I could be affecting their health. So make it a bit more personal, I think is what I'm trying to say. (FC2-3)

PERCEPTIONS OF INCENTIVES: FINANCIAL AND NON-MONETARY

PERCEPTIONS OF FINANCIAL INCENTIVES

In the focus groups, there was a consensus that financial incentives had been a very important trigger for them to join the SSP, as noted by FC3-8:

> It worked well the first year and I think there was some rolling incentives, so it's sort of like if you did it a few hours in a row, or a few days in a row, then your reward got bigger. So I would actually say that was a key thing to making us or getting us to do it again.

There was conclusive support for the financial incentives, even though most thought the financial incentive reduced over the years. Most people said, 'I am here for the money,' but 'more would be better.' However, some thought it was not worth the hassle given the limited financial incentives:

> Because while the monetary reward is nice, it's not really that much in the grand scheme of things. It's not worth dying over. You're like, is it worth me suffering through 32, 34-degree heat, for 15 bucks? I'm going to pay 15 bucks to be comfortable for the next hour and a half basically is what it comes down to. (FC1-2)

One of the main issues in the program for participants was the fairness in calculating incentives. As the model used the previous year's usage data in an arbitrary way (i.e., as a baseline), some felt the incentive model was structured in a way whereby the target was harder to achieve each year and less money was awarded, as noted by FC3-5:

> In the first season I did it, it was a multiplier. So it was like, say, $5 if you reduced it for every hour. Then it went to $25 if you did all three hours. So I did four times and got $100 and it was good. The second time ... I saved $1 or whatever because they said my usage was so low to begin with … which I thought was quite annoying. Because basically what they were doing was penalising you for being a low-usage user to begin with anyway. Therefore, that your contribution didn't count. The worst part was the second one I think they worked that out and they actually set my rate at higher, but then they haven't even paid me.

PAYMENT METHOD (NON-CONCLUSIVE)

There was a difference of opinions in terms of how payment of incentives should be distributed. Some preferred the current method of receiving the money in their bank account—instant gratification. Others preferred reducing their energy bill through the retailer.

With regard to financial incentives, there was a divergence of views. Some participants believed UE should communicate through the retailer, as noted by FC2-11:

> Usually, this [financial incentives] should go through the retailer, even the usage we are talking about. [The] retailer's site has got better information about our usage. They [have] very good information about what you are doing. They are the interface. Finally, the savings could come through the retailer's bill.

Other participants noted that they did not trust the retailer; therefore, financial incentives should not be paid by way of the retailer, with FC2-2 noting:

> I don't trust any retailer enough to just expect that they will…it will just get absorbed, you'll just go, 'Where did that go?' Whereas if it comes separately you know you've got it and this is what it is.

Although the majority of participants were happy to receive the incentives in their bank account, some people were not comfortable with sharing their account details with UE. Some participants preferred to receive a gift voucher or a discount on their bills. Further, UE should pay financial incentives promptly rather than three months later. Some participants also suggested a program be initiated to give money to those people who brought others on board:

> If we could get some sort of financial incentive to refer people to the program, [it] would improve the program. (FC4-4)

NON-MONETARY INCENTIVES TO MOTIVATE SUSTAINED PARTICIPATION

There was a consensus that money on its own motivated them to join, but to maintain participation in the program financial incentives should be complemented with additional incentives.

Some participants were motivated to participate in the SSP out of curiosity and the challenge, as noted by FC3-3:

> I took it up more out of curiosity rather than anything else. My preliminary view was that I wasn't going to save a hell of a lot of money, but I'm not really price sensitive in that regard. I was more just curious to see what this was all about and, given energy appears to be in the media on a daily basis, I was more just curious as to what they were trying to achieve.

Some participants believed that tracking energy, receiving feedback on their usage and providing customers with useful data that they could use to analyse their energy usage would be an extra motivation for them to become involved in the program:

> Motivation, financial like I might need, but also the other thing, I'm pretty sure we were…there was some indication that we would get data back, and I used to work as an analyst, so data is great for me, both our own usage over time, comparison against average households, whatever that may be, average house sizes and numbers of people in those houses. So the idea of getting that sort of thing really appealed to me as well, where I was pitched, or where we were pitched against others. (FC4-6)

In a similar vein, some participants admitted that environmental concerns and a feeling of guilt had been key motivational factors for them to join the program:

> It's easy for me. I'm feeling guilty that my kids will not have a good earth to stay, that's as simple as that. That's my guilt. (FC1-5)

However, the environmental message should be communicated in a clear and precise way. Some participants were perplexed that the objectives of the SSP were not environmentally motivated but rather focused on limiting peak demand on event days. As a consequence, participants motivated by environmental concerns might prefer to save energy all year round, not just for event days. The view was expressed that for some people environmental concerns play an important role in convincing them to participate in this sort of program because the little money that they might earn back is not worth the discomfort:

> My housemate is like, 'Well, I'm paying for it, I'll have the house as cold as I want to.' Because they're not doing it for an environmental reason, and they figure they've got the money to have what they want so why won't you have what you want? I think my understanding would be that you need to have an environmental perspective before it would even interest you. (FC2-10)

Family culture was also cited as a motivational factor by participants who were raised in energy-conscious households, as noted by FC1-3:

> For our household, energy saving is coming from a—it's funny to say—a level of historical guilt. Because my husband and I were raised in very energy-conscious families. (FC1-6)

Some participants also mentioned other motivating influences that provided the impetus for them to embrace the program, such as improving their quality of life, fostering their social consciousness, avoiding blackouts and the fact that the events are short (three hours).

On the negative side of the equation, some participants thought there were demotivating influences that might cause some people not to participate in energy programs, especially during events, including the difficulty of convincing other family members (particularly children) to save energy and the problems associated with having a baby or a disabled person in the house. In this context, the comment of FC2-11 is telling:

> My partner is—he doesn't care about this kind of thing. This … my emphasis for going in here was more environmental than financial. I wanted to just bring our usage down because he's a very—he's terrible, he turns lights on and leaves them on, he leaves the fridge door open. He's not very good at this stuff. He puts the air con' on and I come out into the room and it's freezing, and I say can I please turn the air conditioner off. 'Oh, I forgot about it.' So part of it was…so I say to him do all your work in the morning, we are not having the air con' on during the summer saver program, you go out. I made him leave the house.

There was a scepticism among the participants that people from high socio-economic strata of society would not bother to sacrifice their creature comforts for a few dollars:

> I've spoken to my friends about it, but they just use the energy that they use, and they have these huge bills. They're both high income so they don't really care, they want to be comfortable, so they're comfortable no matter what. (FC1-3)

Further to the above, some people believed that if the weather became very hot they would not bother to participate in the events in any case.

PERCEPTIONS OF MOBILE APP AND WEB PORTAL

NON-ADOPTION OF MOBILE APP AND WEB PORTAL

Of the 36 participants, only four used the app, only five used the website and the rest used only email. This low figure in using the app/web portal is because of several factors.

Lack of awareness: many participants claimed that they were not aware of the app's existence. One participant said he was never notified about the app:

> Originally the app was in its stages of development and they said they're going to notify us later when it's fully functional. I never did get a notification. (F2-8)

Some participants believed the emails they received before and after the event were so informative that there was no reason to use either the app or the web portal—that is, there were no additional benefits in using the app or the website:

> The reason people don't use the app or the website is because the emails coming through provide sufficient information. Everything we need plus more….That's it. We don't need to log into it. It's there in front of us. We know what we've achieved. If we want to, we can keep that email and go back to it later to compare the next time. If you really want to, if you really—then you go onto the website. I think that, from my point of view, I get all the information I need from the emails. (FC2-5)

Some participants believed the app was not available when they needed it because of troubles encountered in downloading it and concluded that it was not user-friendly:

> It just crashed, or it was not available. I don't know if it was my internet connection or whether it…some of the events when it was really hot, all of a sudden you couldn't find out how you'd gone or how you were tracking to your goal because the app was just not available. (FC2-3)

> No, I don't [use the app], because I had trouble downloading it. (FC2-5)

Lack of confidence in using the technology was another barrier to the use of the app/website:

> Does anybody ever consider people who don't use computers at all or don't use mobile phones? Because there must be lots of elderly consumers who don't use computers and don't use mobile phones. Yet everything has got to be accessible by that. You are just leaving out that whole demographic. (FC4-4)

With only two or three events per year, there was insufficient incentive to download the app or use the website, as they did not see any use for the remainder of the year:

> I'm not a fan of adding yet another app for three days a year. I've got hundreds of apps on my phone already. (FC3-4)

Some participants simply did not find any motivation for them to use the app or the web portal:

> If you turn it off, what's the point of looking at an app to see that you've turned it off? (FC1-3)

With very busy lives, some people preferred to spend their time doing things of a higher priority to them, rather than spending time using the app or websites:

> Too much effort logging in and everything. I just can't…you sit down at the computer and log into one thing and then you find something else to do and log into something else and away you go. (FC4-7)

Some people, without a smartphone, could not use the app in any case.

Those participants who did use either the app or the web portal shared their experiences and highlighted some issues in using those technologies. The users of both forms of technology voiced concerns over a lack of functionality. They also thought the information in both the app and the web portal was not useful:

> I found the website was pretty useless. It didn't actually have any information on it and it never updated properly. What it said it would do, it never did. With the app, pretty much the same thing is that it stopped updating. On the day of the event, it actually stopped working at one time. And then it just kept…it gave you really bad error messages that didn't mean anything. I actually ended up uninstalling it and reinstalling it, which fixed it. (FC3-6)

The majority of the participants mentioned login issues and a lack of user-friendliness of the app as being two of the main reasons for not using either technology—screens froze, screens needed to reload and there was no reset button, as noted by FC4-4:

> My main problem is I've had a lot of problems with the app. The first year, I was able to use the app and we actually figured out that our solar wasn't working, and so in that way it was good because it showed us to get it fixed. The second year that I went to log into it, of course, it's been a year since I'd used it and I'd forgotten what my password was. But there's no actual—on the application, on the front page of the thing, there's no…you know, on some websites, it says 'forgot my password', and you click on it and it directs you back, sort of thing. There was nothing for that, so I ended up having to send an email and eventually they told me how to reset it. But again, I had the same problem again this year that I wasn't able to use the app at all. So that's just one little thing that I think needs to be…they need to be able to reset your password.

Some participants voiced concerns over the design and features of the app:

> The other thing about apps is that they're not designed sometimes with all the right features…I might want the rate of which I'm doing something, or someone else wants to know the overall usage. Someone else wants to know the daily usage, in other words, through the day. Someone else might say, 'I want to know what happens between my…when I've got a coming in powered, and not coming in powered, PV power.' So all these are features which I don't know if they're available on…a lot of apps are just made for push or yes, no, not good enough. (FC1-3)

According to some participants, the app and the website were not instantaneous. They recalled that in their first year they were able to obtain semi-instantaneous feedback (within 30 minutes) on their usage, but in the second and third years, this feature did not work. FC2-11 commented:

> Optus, for instance: you've got the app and you can see immediately what you've done right or wrong. But then if you use the app eventually it sort of comes up with the detailed thing anyway. So I can't see why your electricity use can't mirror that sort of thing too where you get immediate feedback on the front screen and if you keep tapping a few things you get all the fine breakdown too.

Some participants thought that there was no help desk for troubleshooting technical issues in using the app or web portal.

IMPORTANCE OF INSTANTANEOUS FEEDBACK (IMMEDIATE AND REAL-TIME FEEDBACK)

Most participants wanted the ability to track their usage and made comments about the importance of having instantaneous feedback on their energy usage. This was a conclusive outcome of the focus group. This is evidenced by FC1-4, who mentioned:

> I checked it throughout, to see how we were going. Because I don't have a good handle on how much power any of my appliances are using, so at least for the first few events I was like, I'll turn off the air conditioner and I have no idea if that's going to satisfy the conditions. So we checked each hour to see how we were going. I've used the website and gone into their tool data and had a look, but I only do that once a year, so it's an elongated process.

Other participants believed tracking of their energy usage and being informed about the energy consumption of their appliances were important reasons for their joining the program:

> I was asked to join, and one of the reasons was because I connected my smart metre up and so I'd been getting updates of my electricity usage. In the first season, they actually gave you a device that you could actually link to your smart metre and it gave you real-time usage, so I knew exactly how much every appliance was working. I really enjoyed the program and I thought it was fantastic. (FC3-6)

Most participants liked the email they received before events and the information it contained about their energy usage but noted that they could not see their live rate of energy usage. FC4-1 mentioned:

> The email gave quite a lot of information…usually about nine o'clock on that morning you'd get another email saying this is what your usage was. This is what you've got to stay under. The emails were quite informative. It was just you couldn't, or I couldn't use the…seeing what the live usage was. But the emails were very informative.

SUGGESTIONS FOR IMPROVEMENT AND PERSONALISATION OF MOBILE APP/WEB PORTAL

Participants in the focus groups made numerous suggestions to improve the functionality of the mobile app. These suggestions ranged from making it more user-friendly to incorporating a capacity to customise. For example, FC3-4 commented on the importance of customisability of the website/app:

> I think the more that you can customise a website, the more likely you're going to go back there. If it's a generic website that looks the same for everybody, I generally think it doesn't warrant repeat visits….If it is configured the way I want it to be looked at—I mean, certain other companies I go to my app and it's got my dashboard up there, whether it's my frequent flyer balance or whatever it is, and it's configured the way I want it, I'll go back there because it's mine, right. Whereas, if it's just generic, like I say, I just don't think people will use it.

One of the participants' main recommendations was to enhance the user-friendliness of the app so that login is simple, there is the ability to change the password and there is provision for the use of a PIN. Another essential feature that participants believed the app should have was the ability to track energy usage in real time. They thought that the app should be able to show their usage of different appliances and to provide tips on how to save energy based on their appliance usage, like a personalised energy-saving plan.

They would like to see trends in their energy usage, have the ability to compare their usage with similar households (preferably in the same neighbourhood), be able to compare their own energy usage over time and be able to set targets for themselves. Several participants commented on the positive role that comparison and competition could play:

> Well, I think the competition idea seems like a good one. Because at least if there was other people…because the thing is, if there was a whole lot of participants…but the reality is nobody knew anyone else was really participating. So, therefore, you didn't even really know if you'd made a difference at all, right. (FC3-6)

> I think the statistics are good, because it's a launching pad for you to—for me to get off my bottom. Put it this way—not you, I don't want to be offensive—to get off our butt and find out why am I using more than you, for instance, if you're a household of two? Just make those enquiries. If there is some area that we could go to find out…we have had things in the past. I've had, I've seen the fire service, they've come into my property and looked and where I can improve it. There are areas that could be improved, but maybe I'm getting off the track. (FC4-5)

Some participants believed the idea of gamification could encourage people to participate more effectively in the program. They also believed a financial reward could be used, creating a competition, with the money going to charities to which the winners wanted to donate.

Also, the app should be designed so that it can be used throughout the year rather than just during the events. For example, FC3-1 suggested:

> I think another thing is this whole app thing is good outside of this three-hour event window. So I think it can be expanded to let people monitor how much energy they're actually using 365 days a year.

Other suggested functionalities were:

- be compatible with mobile phone/computer/I-Pad/tablet
- know about KW usage and saving rather than just money
- education tools about energy efficiency
- the stats and data be available all year round
- information on low and high usage appliances
- linked into the retailer to know what it is actually costing you
- an app with a dashboard of the main matrix.

PREFERRED TECHNOLOGY SOLUTION

Between different technology solutions—app, webpage and in-home monitoring device—a majority of participants preferred as their technology solution an in-home monitoring device requiring no login or passwords. Some of the participants mentioned they did not like the app, as the mobile phone screen is very small. Participants liked the in-home monitoring device as it provides live feedback on the energy consumption of different appliances. This helped them to understand the energy usage of their different appliances and, as a result, they could manage their energy consumption better and smarter. Moreover, they believed this device could help them educate their children about energy consumption and involve their children in an interactive way to save energy during the events.

OTHER WISH LIST

The focus groups discussed the need to educate society about how to use energy in smarter ways. Some people believed UE should educate people to be smarter in using their energy while still maintaining their comfort. For example, FC3-5 commented:

> I've witnessed people: they'll turn them [air conditioners] on, bring the temperature of the house down and they turn it off. To save the cost of power they'll turn it off, and the house temperature comes up and they'll turn it on again. Because it's working a lot harder to maintain that level of cooling, than rather than having it on an economy cycle—once you've got the temperature down, drop it to an economy cycle. So a lot of it gets back to education on how best to get the best out of that appliance.

In the same vein, participants argued that they would like to receive hints and recommendations from UE on how to save energy. They believed these recommendations should be specific to their household. FC2-1 commented on the importance of receiving recommendations from energy companies:

> When I was in New Zealand every time I received my bill….They always give a suggestion by reducing—having a shower, two minutes, you will save how much…they always give what to do, you can do this thing to save how much, reduce shower, reduce this, reduce that. I think the electricity company here should do that because by showing people how much they can save money if they do this it will help people once it becomes a habit.

Participants noted that if there were more people participating in this program it would encourage them to participate in the program more effectively. Similarly, it was mentioned during the focus groups that the participation model should be an opt-out model. That is, everyone is registered unless they expressly indicate they do not want to be part of the program. This would help increase participant numbers, program awareness and effective electricity usage during an event.

Another idea that kept surfacing during the focus groups was to extend the program throughout the year rather than limiting it to a number of events during the year. In this way, effective energy usage would be a constant in their daily lives and, ideally, change their energy usage behaviour. Initiatives such as these could play an important role in changing the energy usage culture in communities. Another idea that participants came up with to help to avoid spikes in energy usage was to have pop-up tents in each suburb, so people could go there rather than staying at home and using energy.

Participants believed it was not fair that businesses were consuming more energy but received a cheaper rate and did not consider saving energy. FC2-9 asserted:

> Go to [the] CBD, the buildings are all full, lit, lights in the night and nobody's working because they have no incentive to turn it off because they get electricity at a very cheap rate. So instead of focusing on all these households, if they focus on the big businesses, give all these incentives to them, you will save a lot of money. A lot of energy.

KEY RECOMMENDATIONS

Based on the findings from the focus groups, we propose that UE consider the following recommendations in their future technology solution development for the SSP.

SIMPLE MOBILE APP (PERCEIVED EASE OF USE)

- As the frequency of use of the SSP mobile app is sporadic and only during summer, the mobile app should be simple, easy to use and easy to learn.
- Information and feedback that is more detailed can be accessed through a link to a web portal.
- Customers should be able to choose their own password and login.

IMMEDIACY OF FEEDBACK (PERCEIVED USEFULNESS)

Customers would prefer immediate real-time feedback on household energy usage during an event. UE should provide immediate real-time feedback on household energy usage during an event. This can be achieved in two ways:

- The app provides real-time tracking on appliance use and progress.
- Provide an in-house smart energy-monitoring device to provide instantaneous feedback on the usage of different appliances. The in-house device can act as stimuli to motivate change in energy consumption behaviour (i.e., instil competency).

COMMUNICATION WITH CUSTOMER (USERS AS PARTNERS)

Default notification:

- Both email and SMS notification should occur at least 24 hours before the event, followed by a reminder 2 hours before.

Clear objectives and role transparency:

- Build trust among customers through clear communication of objectives and the role of UE within the SSP and the broader energy supply chain (to avoid confusion regarding the identity of the retailer vs supplier).
- Use motivating and persuasive language when communicating with customers.

Ongoing communication:

- Regular and informative communication from UE throughout the year (once before summer, then during the event days and at the completion of summer events).
- Provide broad feedback on how the program went for the year, achievements and areas for improvement based on customer feedback.
- Provide household energy usage data on appliance use in comparison to similar households.

INCENTIVES—BALANCE WITH PURPOSE (PERCEIVED BENEFITS)

Financial incentives matter:

- A majority of participants found financial incentives to be the biggest motivator for joining the SSP.
- There is room for improvement in the incentive scheme structure, baseline calculations and actual amounts awarded (‘more is better’), striking a balance with purpose.

Beyond financial incentives:

- Complement with other strategies, such as education, comparative data on household energy use, competition, gamification, raising peoples’ awareness about the effect of energy spikes on the community and the positive effect on the environment of saving energy.

PERSONALISATION (AUTONOMY AND COMPETENCE)

Participants should be offered options in the form of opt-in/opt-out choices as a way to personalise their ongoing engagement.

Participants would like the following options when registering with the SSP:

- preferred mode of communication: email/SMS/app/web
- choosing their own password and login
- frequency of notifications: 48|24|2 hours
- medium of payment: cash reimbursement/discount on energy bill

LOOKING TO THE FUTURE

In light of the focus group findings and general knowledge derived from academic literature, we recommend that UE further consider the following principles for the development of any further digital solution for the SSP.

Guiding principles

1. **Autonomy and control:** Provide autonomy and control to achieve personalisation.
2. **Genuine user-centred design:** Improve engagement with customers to ensure better uptake and a clearer mandate.
3. **Users as partners:** Treat customers as partners in the design and implementation of technology solutions through open and ongoing communication.
4. **Balancing intrinsic and extrinsic motivations**: Strike a balance with the incentive structure to achieve both intrinsic and extrinsic motivation. The long-term aim is to complement extrinsic financial motivations with extrinsic motivations of autonomy, competence and relatedness.
5. **Iterative motivation alignment:** Aim to align the motivations of the customers with those of the SSP program over time through technology versions and relational mechanisms.

Along with the key recommendations and guiding principles, we believe emphasising the usefulness of any digital solution is an important consideration for UE in their future SSP solution endeavours. It would be helpful to conduct follow-up survey-based research to explore how the key issues identified in this report manifest across larger numbers of participants.

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PLAIN LANGUAGE STATEMENT AND CONSENT FORM

Plain Language Statement

Date: **4/5/2018**

Full Project Title: **SUMMER SAVER PROGRAM DIGITAL SOLUTION IMPROVEMENT STUDY**

Principal Researchers: A/Prof Lubna Alam

Prof Rens Scheepers

Associate Researcher: Dr Amir Andargoli

United Energy has introduced the Summer Saver Program to provide an alternative strategy to meet short-duration peak demand during summer. As a valued user of Summer Saver program, we would like to invite you to share your views and experiences with the Summer Saver Program.

Deakin University research team of Associate Professor Lubna Alam and Professor Rens Scheepers would like to cordially invite you to participate in a focus group during May 2018.
Your feedback is valuable and would inform any future development of additional digital solutions for the Summer Saver Program.

This research aims to provide customer requirements and perceptions towards the current Summer Saver Program. We will seek your feedback on:

- your energy consumption behaviour, what drives change in energy consumption behaviour and your desired communication medium.
- your requirements, preferences for technology solution, and barriers to event participation, and
- what would enable you to successfully engage in summer saver events

Participants are invited to take part in focus groups. Participants will receive a Coles Myer voucher worth $50 for their participation. It is anticipated that the focus groups will take approximately 2 hours, which will include refreshments (lunch/dinner). To accommodate your availability, we are offering to host four focus groups at different times and location. You are requested to select and attend one session that suits you.

- Session 1 on 19th May, 2:00 PM - 4:00 PM at Deakin University (LB Building, 70 Elgar Road, Burwood
- Session 2 on Sat 19th May, 10:00 AM – 12.00 PM at Mornington Peninsula (Terrace Room, Brooklands Of Mornington, 99 Tanti Ave, Mornington VIC 3931.
- Session 3 on Thurs 17th May, 7:00 PM - 9:00 PM at Deakin University (Burwood Corporate centre, 70 Elgar Road, Burwood.
- Session 4 on Sat 26th May, 2:00 PM – 4:00 PM at Mornington Peninsula (Cube 37 – Labs East & West, Frankston Arts Centre, 27-37 Davey Street, Frankston)

The privacy and confidentiality of the participants will be assured for all participants. Participants will remain anonymous and will only be identified on the basis of their demographics (for example, age group, gender,

education, employment status, technology experience, energy consumption behaviour). There are no discernible risks of participation to you, and you may withdraw from the project at any stage by completing the attached withdrawal of consent form.

With your consent, the focus group will be recorded and transcribed and stored securely on Deakin University servers. Data will be stored for up to 5 years and will be destroyed thereafter.

The findings of these discussions are likely to be published in a report to United Energy and academic journals. Copies of any form of publication containing the findings of these discussions can be sent to each participant on request.
We look forward to seeing you on the day.

Dr Amir Andargoli
Deakin University, VIC 3125
a.andargoli@gmail.com

Principal Researchers Contact Details:
Name: Associate Professor Lubna Alam
Email: Lubna.alam@deakin.edu.au

Name: Professor Rens Scheepers
Email: rens.scheepers@deakin.edu.au

Name: Dr. Amir Andargoli
Email: a.andargoli@gmail.com

Complaints
If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:
The Manager, Research Integrity, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 9251 7129, research-ethics@deakin.edu.au

Please quote project number **BL-EC 16-18**

PLAIN LANGUAGE STATEMENT AND CONSENT FORM

Consent Form

Date:	**4/5/2018**
Full Project Title:	SUMMER SAVER PROGRAM DIGITAL SOLUTION IMPROVEMENT STUDY
Principal Researchers:	A/Prof Lubna Alam
	Prof Rens Scheepers
Associate Researcher:	Dr Amir Andargoli
Reference Number:	**BL-EC 16-18**

I have read and I understand the attached Plain Language Statement.

I freely agree to participate in this project according to the conditions in the Plain Language Statement.

I have been given a copy of the Plain Language Statement and Consent Form to keep.

Participant's Name (printed) ……

Signature …… Date ……

PLAIN LANGUAGE STATEMENT AND CONSENT FORM

Withdrawal of Consent Form

(To be used for participants who wish to withdraw from the project)

Date:

Full Project Title: SUMMER SAVER PROGRAM DIGITAL SOLUTION IMPROVEMENT STUDY

Principal Researchers: A/Prof Lubna Alam

Prof Rens Scheepers

Associate Researcher: Dr Amir Andargoli

Reference Number: **BL-EC 16-18**

I hereby wish to WITHDRAW my consent to participate in the above research project and understand that such withdrawal WILL NOT jeopardise my relationship with Deakin University and the principal researchers.

Participant's Name (printed) ……

Signature …… Date ……

Please mail or email this form to:

A/Prof Lubna Alam
Director of Engagement
Department of Information Systems and Business Analytics,
Faculty of Business & Law
Deakin University, VIC 3125
Lubna.alam@deakin.edu.au

Summer Saver Program (SSP) Survey

Please circle the most accurate answer under each statement:

1. What is your Gender
    a) Male
    b) Female
    c) Other

2. What is your Age?
    a) 18-25
    b) 26-40
    c) 41-55
    d) 56-65
    e) Above 65

3.

4. What is your employment status?
    a) Full time
    b) Part time
    c) Casual
    d) Unemployed
    e) Retired

5. What would you say was your household annual income?
    a) Under $25,000
    b) $25,000 - $39,999
    c) $40,000 - $49,999
    d) $50,000 - $74,999
    e) $75,000 - $99,999
    f) Over $100,000

6. What is the highest level of education you completed?
    a) Did Not Complete High School
    b) High School
    c) College Bachelor's Degree
    d) Master's Degree
    e) Doctorate degree

7. Which of the option below best describe your household?
    a) Family
    b) Couple
    c) Single

8. How many people live in your house?
    a) 1
    b) 2
    c) 3
    d) 4

e) 5
f) 6 +

9. How confident are you with technology?
    a) Not confident at all
    b) I usually need help
    c) Moderately confident
    d) Confident

10. How would you rate your technological skill level?
    a) Basic
    b) Intermediate
    c) Advance

11. How would you rate your household energy usage?
    a) High
    b) Average
    c) Low

12. How would you rate your engagement with Summer Saver Program?
    a) Low
    b) Medium
    c) High

13. Do you have solar PV (photovoltaic) systems installed at your household?
    A) Yes
    B) No

14. Which Suburb do you live in?

APPENDIX C: FOCUS GROUP GUIDING SCRIPT

A brief intro to the purpose of the focus group, who we are and information on their participation (confidentiality and no risk of individual identification). A brief intro the Summer Saver Program (SSP). We are interested to seek your feedback on the underlying assumptions of the SSP in the context of your usage (e.g. autonomy, take control, responsible, empowerment). Overall, we are interested in your feedback in terms of what type of information, service and support you would like to participate in SSP and suggestions on how to improve your performance (what would you like to see, how it should be or could be). We will look closely through the three areas of customer engagement:

1. Registration – your uptake of the summer saver program;
2. Participation – your intention to reduce electricity consumption for each event; and
3. Performance – your persistence to reduce electricity consumption for all events.

The first part of focus group aims to capture contextual data through asking about your background, energy consumption behaviour, your potential motives for change in energy consumption behaviour and your preferred communication medium. The second part of the focus group aims to capture your perception, needs and experiences about the program.

Part A- Contextual questions:

We will start with introductions. Introduce yourself and tell us about yourself + Talk us through your typical week + Describe your household (Family, pets) + your employment status

Energy consumption behaviour:

1. Talk us through your current electricity usage? (What appliances do you use? Air con? Pool pump etc.)
2. How does this electricity usage differ on a hot day? What the reason for that?
3. How would you describe your interest in your electricity consumption? What the reason for that?
4. When you are at home, are you conscious of the electricity you are using?

Preferred communication medium:

1. How do you like to be communicated with? SMS, phone, email, push notification on your phone
2. What would be the most effective way for us to communication with you about an upcoming hot weather event? How much notice of the event would you like? (e.g. 2 days, 24 hours, 2 hours etc.)
3. How do you typically like to interact with rewards/ incentive programs? App, website, web portal?
4. What device do you typically use when interacting with rewards/ incentive programs? Smartphone, tablet, desktop computer?

Part B- Participant's perception, experience and requirements towards SSP:

Briefly reflection on the SSP and your perception of the program in general (how long have you been using it; what were your goals and motivations behind using it)

Did you use SSA (app) during the event?

- If yes:

Why? What was your motivation for using SSA? Do you use it during every event? What did you like/dislike about using this technology during the event? Do you think using the technology helped you to manage your electricity consumption more effectively?

- If no:

Why not? Would SSA meet your technology needs? If not, why not? Did you have multiple technological solutions available to you to choose from (i.e. app, web portal or energy easy)? Were you aware of the existence of the technology? Would you feel comfortable using technology like SSA? Etc.

Motivation to change energy consumption behaviour:

1. What would motivate you to turn off your appliances and reduce your electricity consumption on a hot day?
    - What if you were rewarded financially?
    - Beyond monetary incentives? What can we offer?
        - What if you were able to compare your electricity consumption with your peers or neighbours?
        - What if you are were able to see the impact of your reduction on the environment?
        - What if you could track the impact of your reduction in consumption in real time throughout the event?
        - What if you could recommend a friend to participate within the program?
        - Would leaderboards help? As if you are participating in a competition?
2. What can we do to reinforce and encourage better performance?
3. Would you like to see a guide on your current usage and possible prescriptive plan for a solution to be successful?

Effective use/desired features (if time permits)

We are interested in your envisaged future functionality and feature sets to enable better performance for a technology solution.

Extra features?

- Goal setting as an option?
- Link to external sites for further information?
- Customisable interface
- Opt-in and opt-out options/features
- Connect with social media – Facebook? Twitter?
- Voice activation for people with disability

Finally before we conclude, anything else you would like to add that hindered your participation? Barriers to use? Will encourage you to participate?

APPENDIX D: GUIDING CONCEPTUAL FRAMEWORK

The guiding conceptual framework is based on the principles and theoretical constructs on user satisfaction and user acceptance theories (e.g. Technology Adoption Model (Davis, 1989; Venkatesh et al, 2003)), and various derivatives of these models (particularly the Delone and McLean (2003) IS Success Model), and effective use of technology for impact on self-determination of participants and operational outcomes.

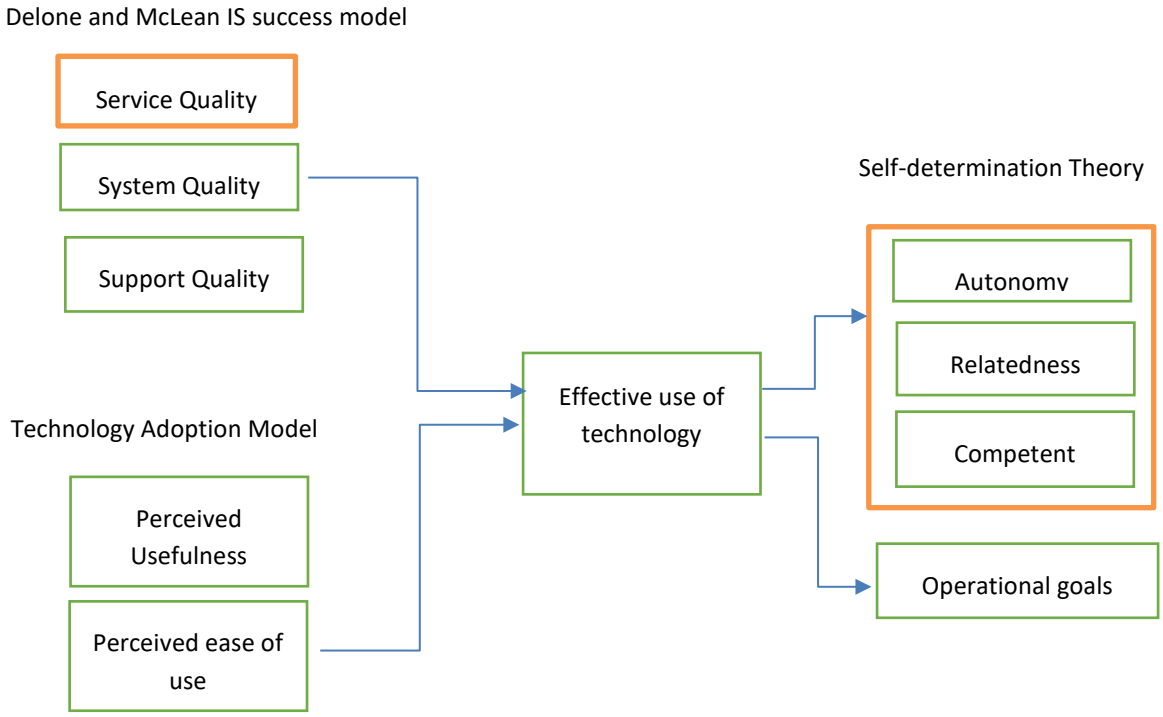

Figure 2: Guiding Conceptual Framework

Final Presentation:

Summer Saver Research Program

Prepared for: CitiPower/Powercor, United Energy, and RACV

CITYSMART QUT USC CLEMENGER BBDO

Housekeeping

Team

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QUT Project manager & research fellow

Dr Ryan McAndrew
QUT Lead researcher – Stage 1 and 2a

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USC lead researcher – Stage 2b

Prof. Adam Clements
QUT Econometrics researcher – Stage 2a

Assoc. Prof. Geoff Walker
QUT Electrical and power engineering– Stage 2a

Dr Charmaine Glavas
QUT lead researcher – Stage 3

Rob Hudson
Managing director
Clemenger BBDO – Stage 3

BACKGROUND

Project Purpose

The purpose of the literature review is to understand how past segmentation activities have been conducted for electricity demand response in domestic households; specifically focusing on successful/unsuccessful lessons that have been learned.

End Goal
Develop segment-specific and relevant value propositions that can be used in marketing communications

Network's Goal
Increase participation by households in the Summer Saver Program and Direct Load Control Program for Summer 18/19.

Stage 1

Literature Review

Stage 2a.

Quantitative Analysis: Load Archetypes

Stage 2b.

Quantitative Research: Survey

Stage 3.

Qualitative Research: Co-Design

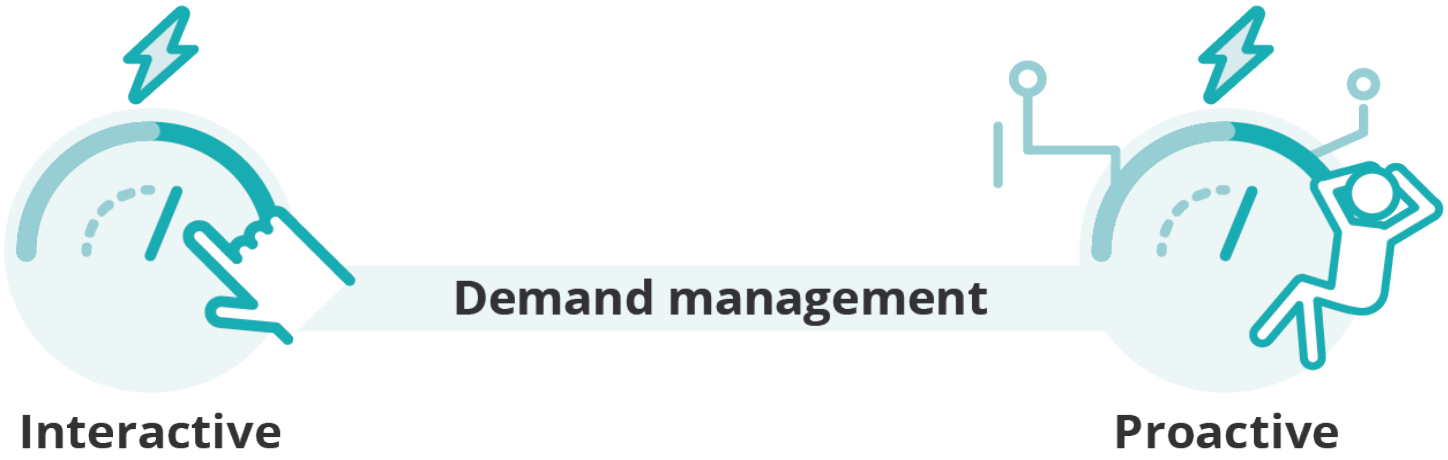
Project Finalisation

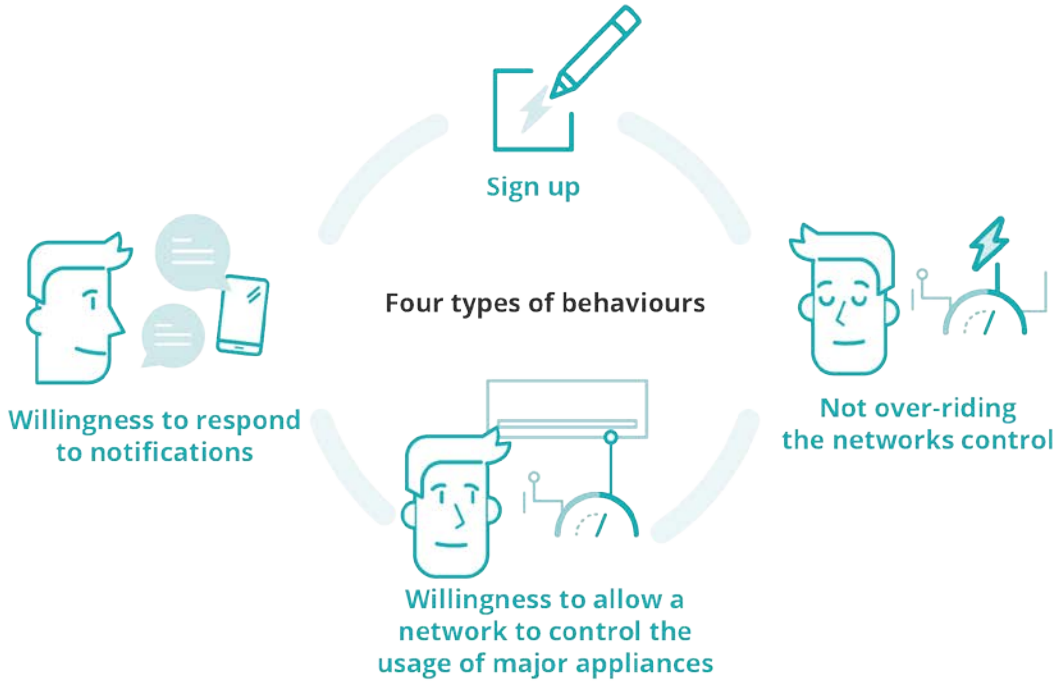




Timeline

BACKGROUND

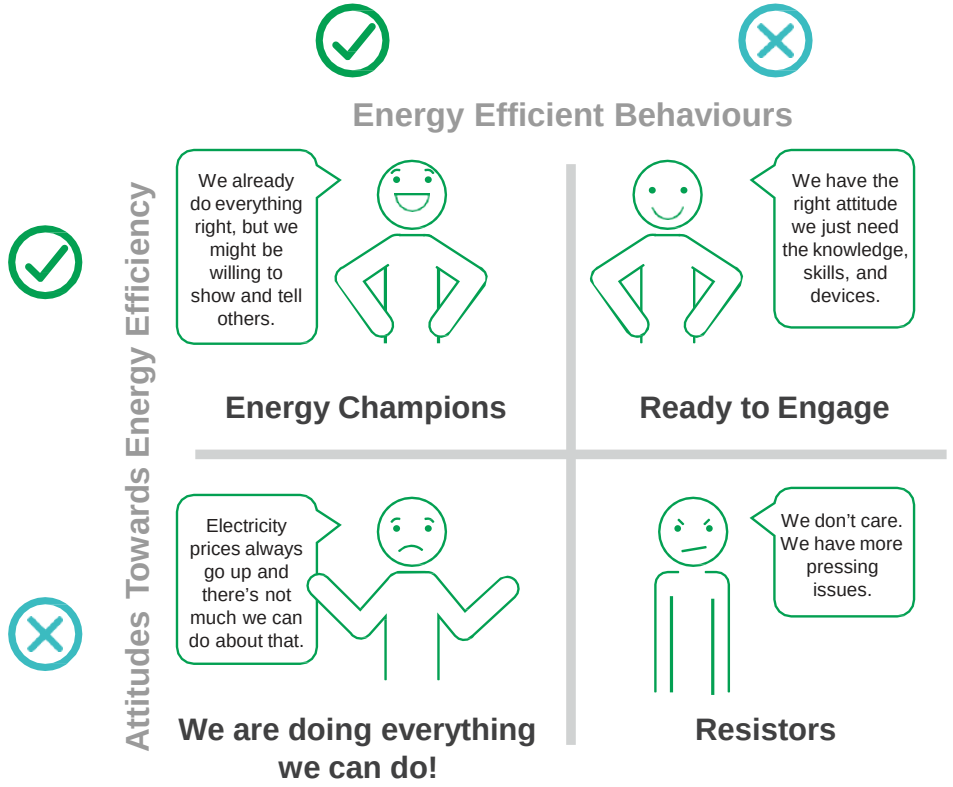

Demand management
Interactive
Proactive


Sign up
Four types of behaviours
Willingness to respond to notifications
Not over-riding the networks control
Willingness to allow a network to control the usage of major appliances

RQ1

Segmentation in Electricity (What works well)

1. Measuring objective behaviours and electricity usage
   - Raising awareness is becoming more a surrogate outcome instead of a primary goal
2. Linking behavioural outcomes with the variable/s used for segmentation
3. Going beyond the individual
4. Household-level variables have better predictive ability than individual-level variables
   - Head of household or bill payer doesn't have the best indication of household makeup or household interactions
5. Load profiles segments (electricity usage over time)
   - Readily available as technology is adopted
   - Linking together load segments with bill payer psychometrics (Frades, 2016)
6. What's missing?

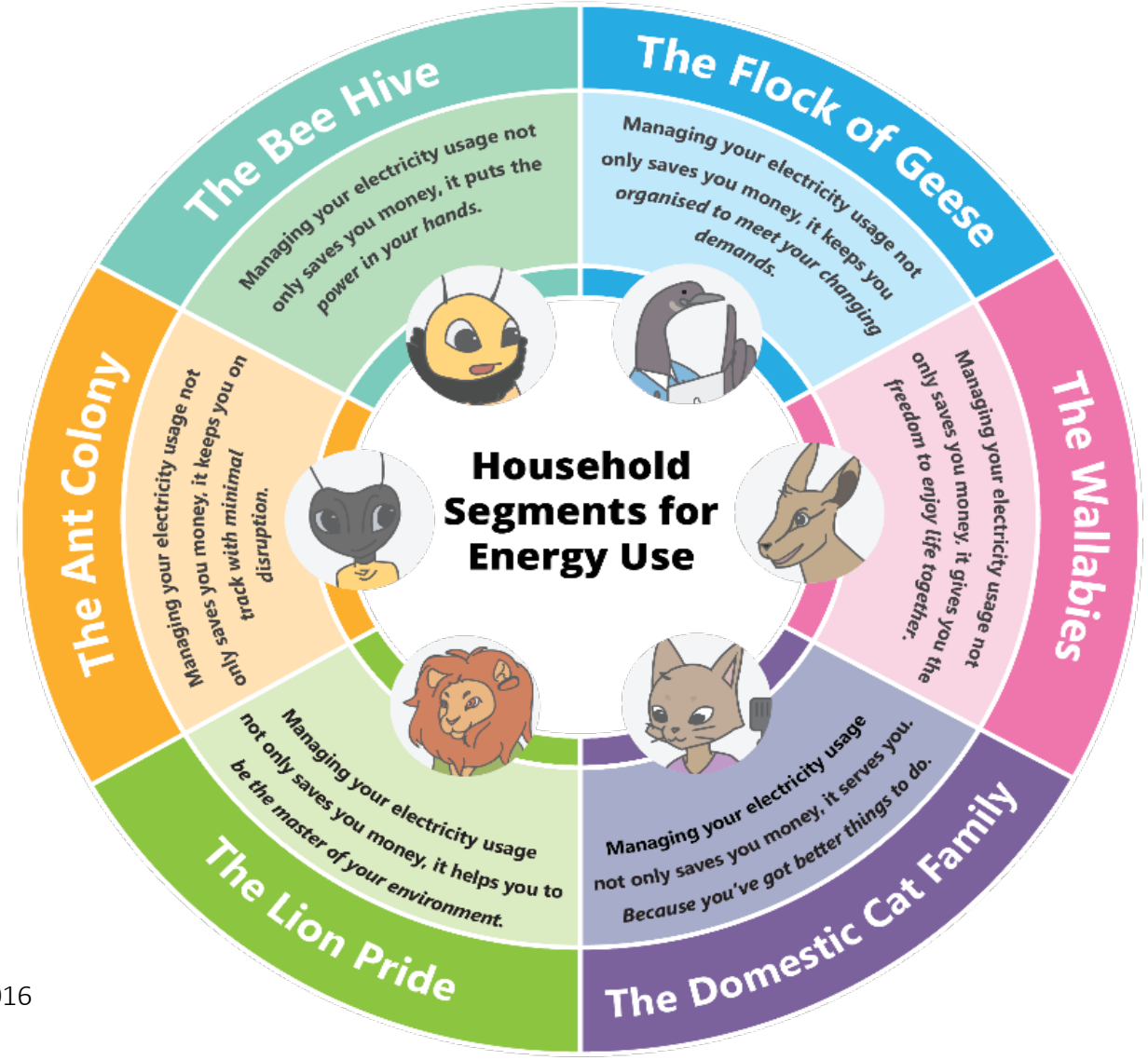


(Sheth & Frazier, 1982)

Data Source

RQ1

Psychological segments for household energy use

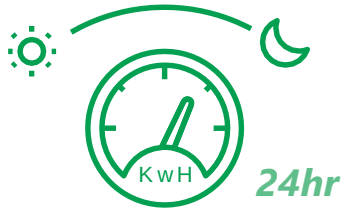


Russell-Bennett et al., 2016

Data Source

RQ2

What are current approaches to developing load profile archetypes?



Load profile segments are patterns of electricity usage that are typically consistent from day to day, they differentiate usage patterns into groups

Historically, total usage was a primary focus

- High usage, high usage per household member

Usage at certain times are key

- High network demand

Depending on the program type and objective, certain types of load profile segments are more desirable than others:

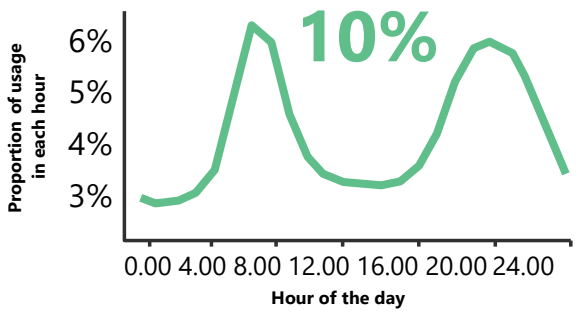
- High total usage customers
- High afternoon usage customers match well with Summer season programs
- Targeting late evening users

Data Source

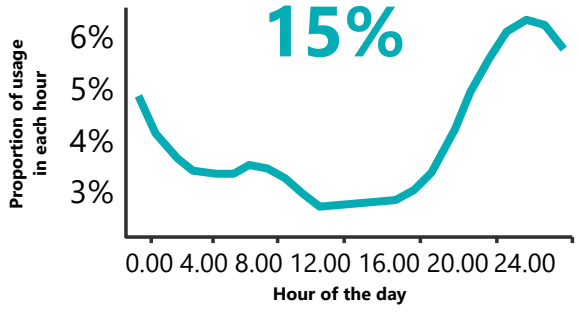
RQ4

What load profile archetypes have been used previously?

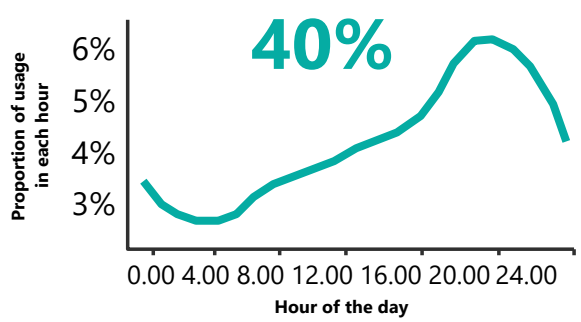
Twin Peaks



Night Owls

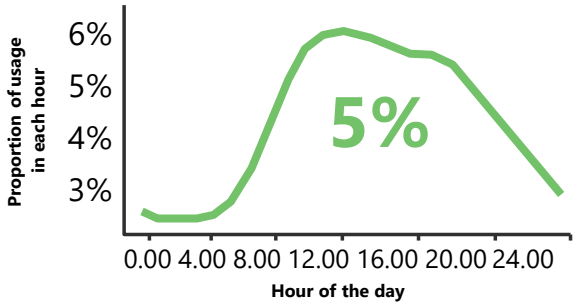


Evening Peakers

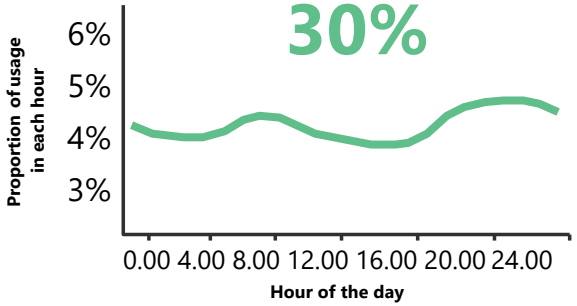


(Frades, Benjamin, and Waters, 2016)

Daytimers



Steady Eddies

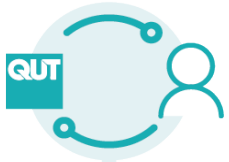


Data Source

Method

Data collection: load profile archetypes

Purpose: To extract and understand load archetypes in the customer database



1. Transfer

- Data is sent from clients to QUT

2. Cleaning

- Data is inspected, and changes made where needed
- Checking to determine if every customer has data for every day
- Outliers were removed from analysis
  - Where residents have multiple days in a row of 0 energy usage
  - Customers still marked to determine who belongs to which network

3. Integration

- One file is created bringing together both data files
- CitiPower/Powercor and United Energy data is merged into one file
- Customers still marked to determine who belongs to which network

4. Filtering

- High energy use entropy is removed
- The top 2.5% of residents with extremely variable load profile data is removed

5. Merging

- Weekday load profiles are merged to form one average

- 90 full days from: 1st December to 28th of February
- 64 weekdays
- Data: 64 * 48 = 3,072 data points
- Average Weekday load profile
  - 48 data points
- Much more manageable for clustering

6. Clustering

- K-means cluster is used to assigned clusters

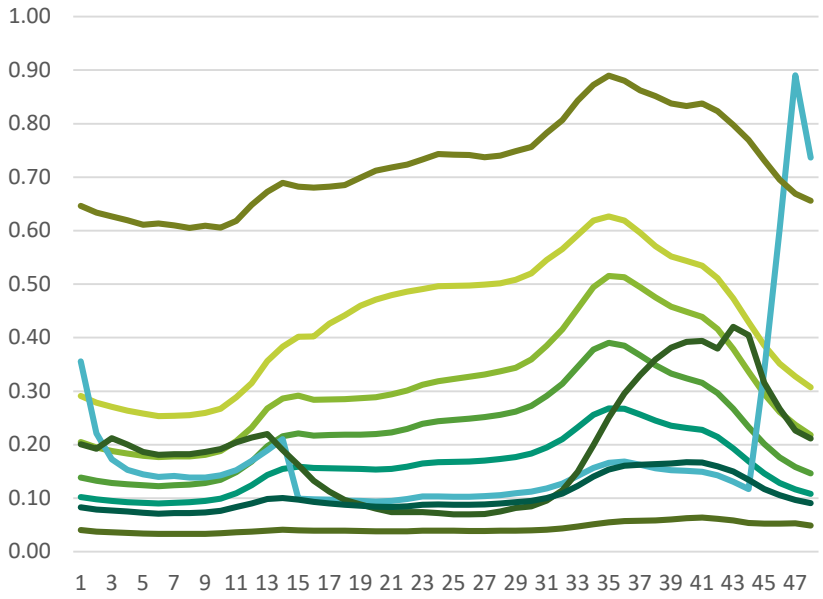
7. Assignment

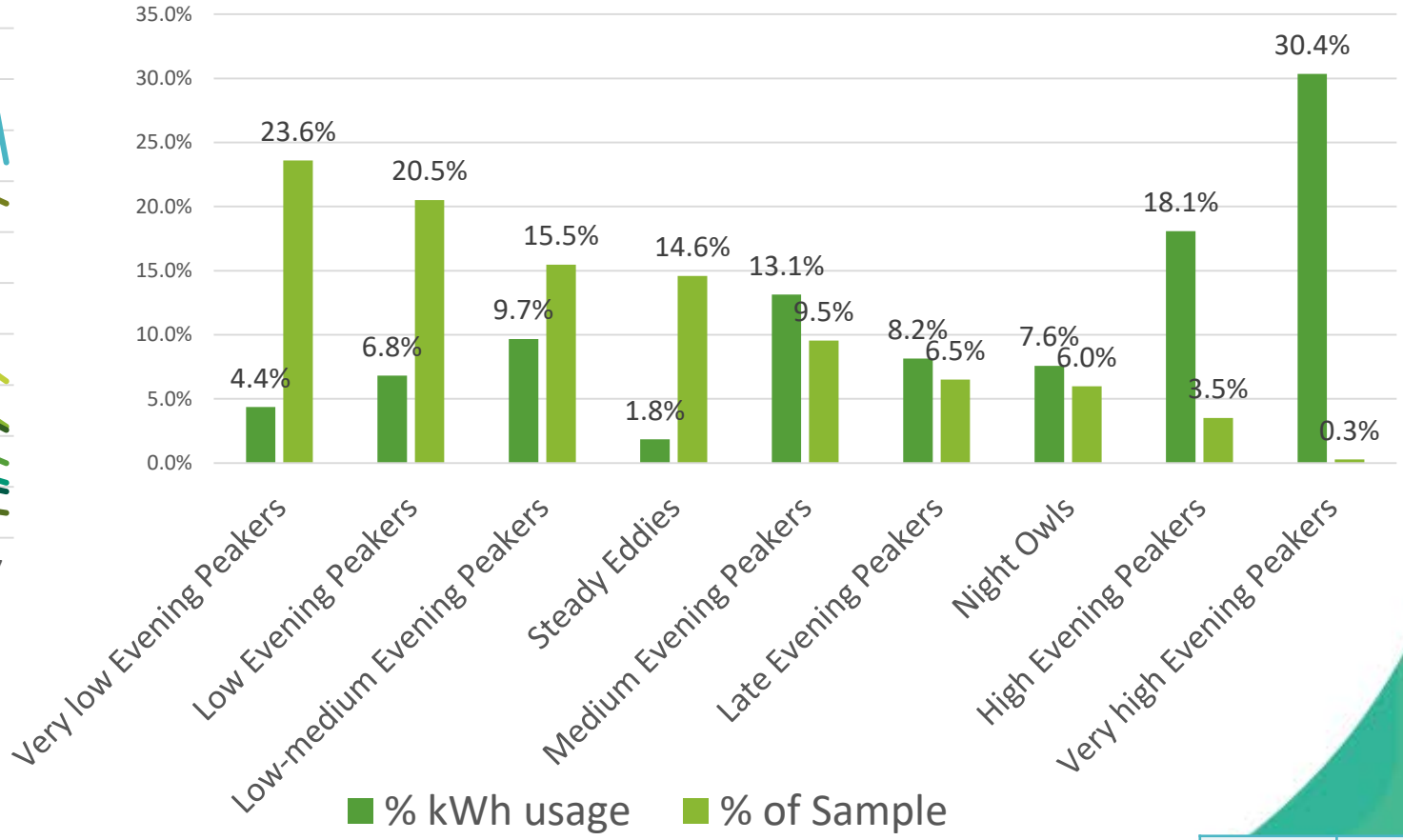
- Each customer is assigned to a load profile segment

Data Source

RQ3 cont

How are load profile archetypes measured and applied? (Current Study)

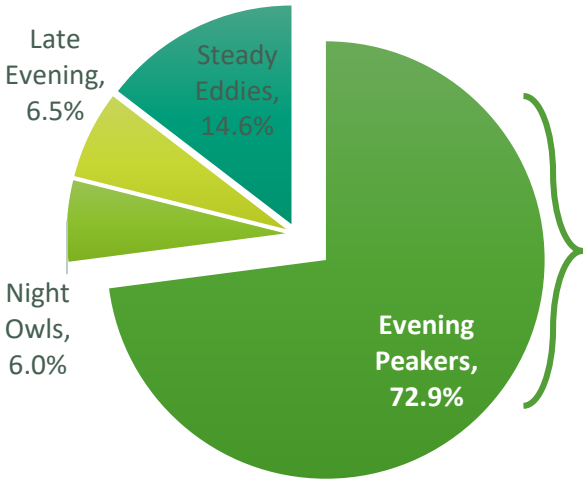


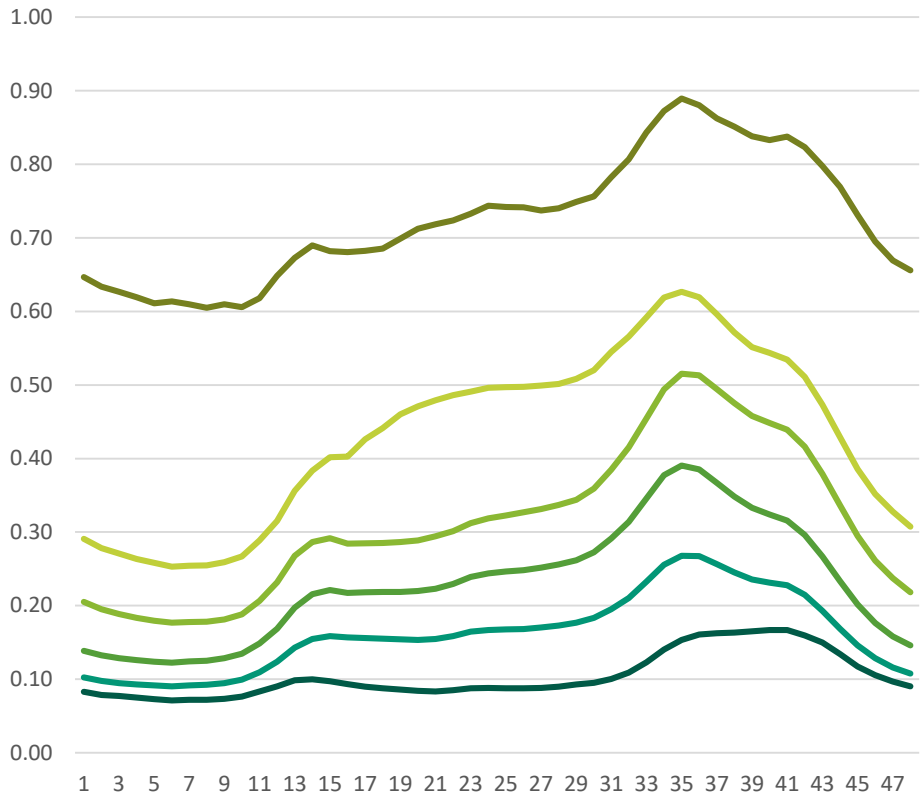


Data Source

RQ3 cont

Four Distinct Load Profile Archetypes
(and six different levels of Evening Peaker)





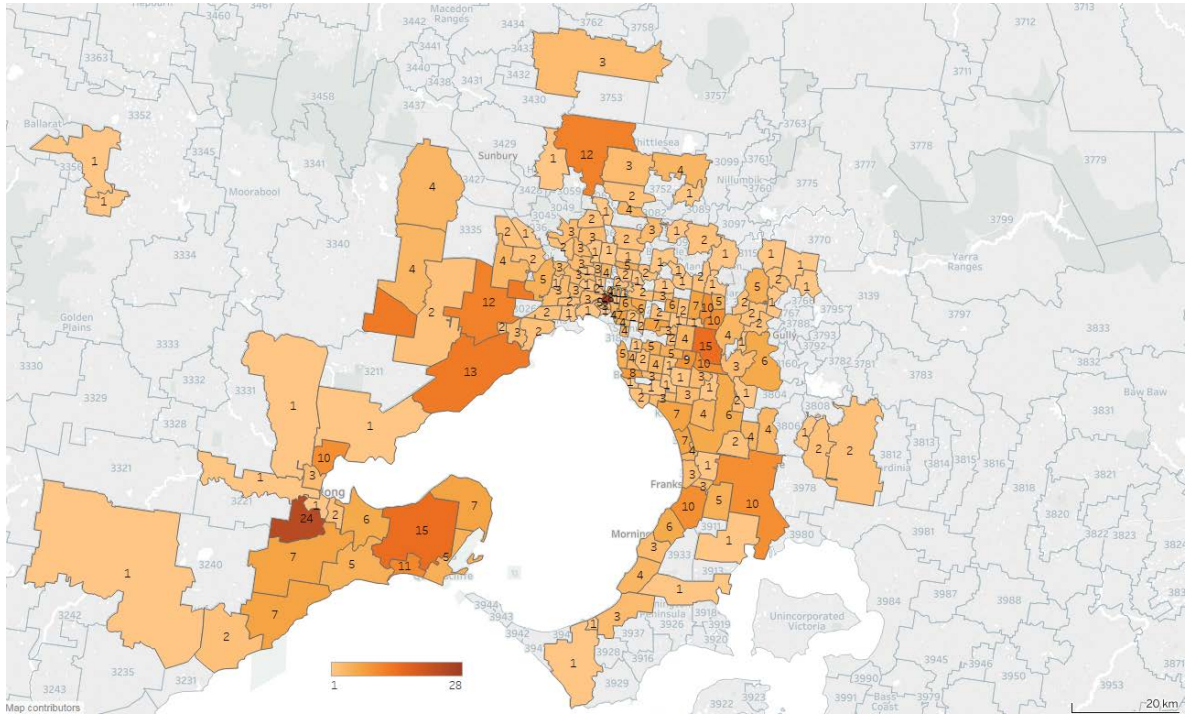
- 40,630 households
- Growing throughout the data from 7am
- Mostly peaking 5:30pm
- 6 different levels of evening peakers (%, kWh)
  - Very low (23.6%, 5.01)
  - Low (20.5%, 7.80)
  - Low-medium (15.5%, 11.07)
  - Medium (9.5%, 15.05)
  - High (3.5%, 20.72)
  - Very High (0.28%, 34.77)
- 40% in Frades (2016) UK Sample

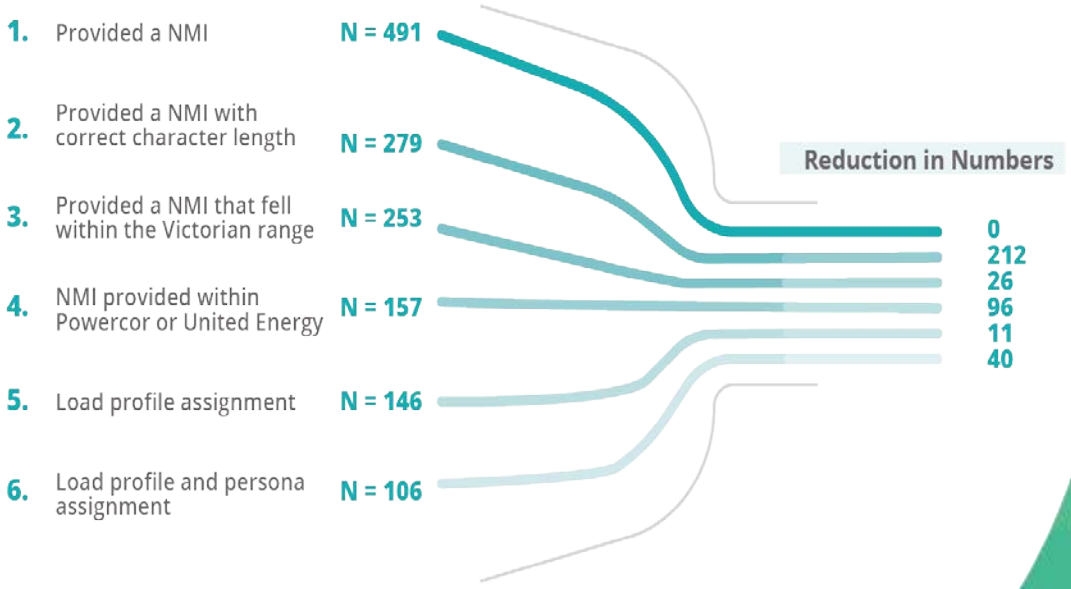
Data Source

Method

Data collection: Psychological segments

Purpose: To identify and understand the psychological segments present in a sample of VIC households

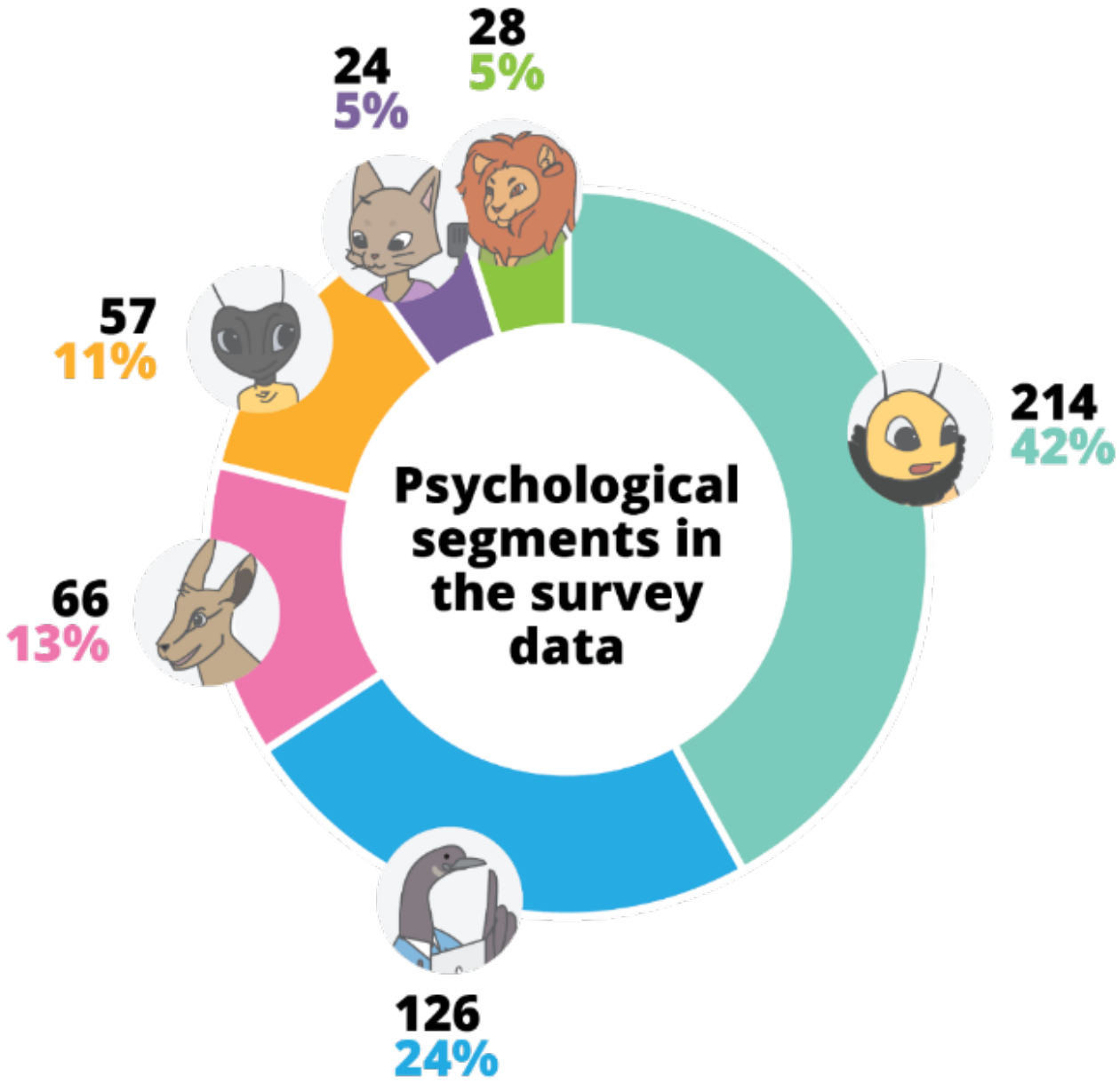




Data Source

RQ7a

Which Segments exist in the data?



Data Source

RQ7b

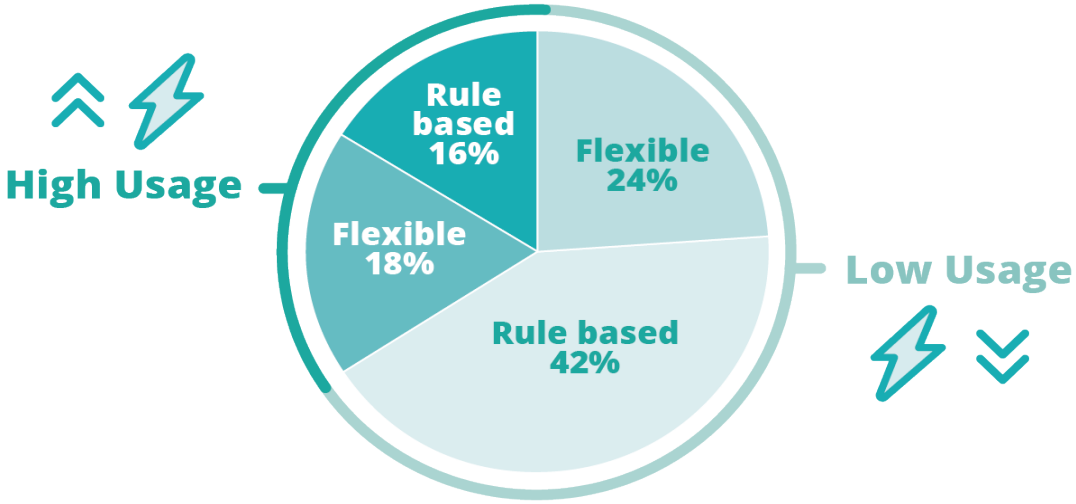
Do the Psychological segments correlate with the UK Load Profile archetypes?

	 Wallaby	 Geese	 Bees	 Cats	 Ants	 Lions
Steady Eddies	2	4	7	0	4	2
Low Afternoon Peakers	2	3	8	0	3	1
Low-medium Afternoon Peakers	2	5	2	0	1	1
Very High Afternoon Peakers	1	0	0	0	0	0
Very Low (Controlled Load Evening)	0	0	0	0	0	0
Outliers	0	0	0	0	0	0
High Afternoon Peakers	3	4	0	0	1	0
Steady Eddy (Controlled Load Evening)	0	0	0	0	0	0
Evening Peakers	0	1	1	1	1	1
Medium Afternoon Peakers	2	7	7	2	1	0

Data Source

RQ7c

What sub-segments exist in the data?



	Rules based	Flexible
High Usage	We are entitled to use **"Indulgers"** *(n = 17, 16%)*	We can't agree on how much to use **"Squanderers"** *(n = 19, 18%)*
Low Usage	We know it's right to use less **"Conservers"** *(n = 45, 42%)*	Some of us would rather use more **"Sustainers"** *(n = 25, 24%)*

Data Source

RQ7c

High Usage Sub-Segments

Indulgers – Entitled to use

Value Proposition (for using less): Ensure the future for my children/descendants.

Goals: Provide for our household and our children. Be in charge of how we control ourselves

Barriers (to using less): comfort, sense of entitlement, anger, negative emotions

Squanderers – We can't agree on how much to use

Value Proposition: You don't have to compromise, there is enough for everyone (have their cake and eat it too).

Goals: To do everything they want with minimal consequences. Want everything, now.

Barriers: Compromising within the household, rules/regulations/penalties. Needs bounded options as may become overwhelmed.

Data Source

RQ7c

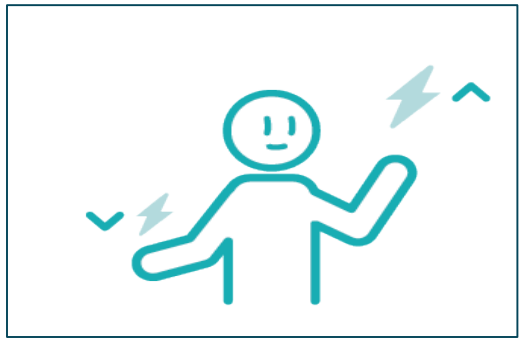
Low Usage Sub-Segments

Conservers – We know it's right to use less

Value Proposition: Stay on track with your values.

Goals: To remain in control and enjoying the fruits of their labour.

Barriers: External factors that they cannot control or easily adjust to (snap price increases, changes to solar feed-in tariffs, etc).



Sustainers –Some of us would rather use more

Value Proposition: Maximise your family lifestyle and keep your bill low.

Goals: To have more access to electricity to maintain a better lifestyle, keep expenses/bills low to reduce stress and strain.

Barriers: Cost, the need to compromise in the household.

Data Source

Other Insight

RACV Members

- ✓ No matter which sub-segment, the two top priorities are saving money and physical comfort.
- ✓ The environment is the next priority, but contributing to a stable grid lacks importance for consumers.
- ✓ RACV members more likely to be Sustainers or Conservers.
- ✓ Technology is a popular desired improvement, with the top choices being solar, batteries, and smart appliances.

Value/Priority	Squanderers	Sustainers	Indulgers	Conservers
Saving money	73.70%	56.50%	76.50%	47.70%
Physical comfort	15.80%	26.10%	23.50%	25.00%
Helping the environment	10.50%	13.00%	0.00%	25.00%
Contributing to a stable energy grid	0.00%	4.30%	0.00%	2.30%

Energy Improvements	Squanderers	Sustainers	Indulgers	Conservers
Solar	19.7%	15.4%	18.8%	21.8%
Battery	16.4%	15.4%	18.8%	13.7%
Smart appliances	13.1%	16.7%	11.6%	16.9%
Double glazing	11.5%	15.4%	14.5%	12.1%
Home energy management systems	13.1%	11.5%	13.0%	12.1%
Insulation	9.8%	14.1%	14.5%	13.7%
Less dependency on gas	11.5%	9.0%	5.8%	7.3%
None	4.9%	2.6%	2.9%	2.4%

Table note: The most desirable energy improvements are highlighted in dark green, followed by yellow, orange and red for the least desirable option.

Data Source

Other Insight

Consumer preferences: Demand response v demand control

Interactive Tech

Consumer takes control (49%)

How would you like an assistant to help you make electricity usage decisions (and hence, reduce your bill)?

Now you can with our digital assistant app:

- You can ask the assistant how you are doing with your electricity usage.
- Make decisions in the app about how to reduce electricity - our digital assistant can suggest the best times of day to use your appliances.
- Use the app to switch appliances on and off

This assistance and much more will help you save energy at peak times. Check out this website to learn more:

www.helpsavemybill.com

Proactive Tech

Network takes control (28%)

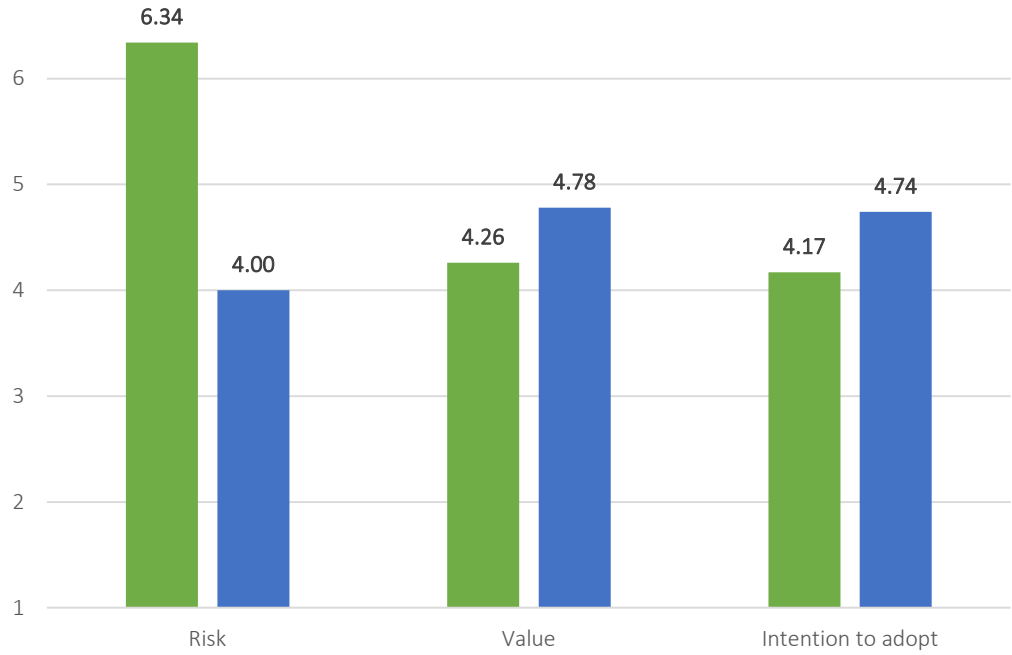
How would you like a household manager to manage your electricity decisions for you (and hence, reduce your bill)?

Now you can with our digital manager app:

- Without you having to ask, the manager will switch your plan with your current retailer if there is a better plan for your household.
- The manager will keep appliances switched off until the best time to use them (unless over-ridden).
- You can check the app to see what the manager has been up to, but only if you want to.

This management and much more will help you save energy at peak times. Check out this new website to learn more:

www.savemybillforme.com



Data Source

RQ5

What is customer engagement for demand management programs?

What is it? How is it defined/measured?

"Accordingly, there is a need to develop strategies to motivate and involve citizens in the future electricity system."

(Moreno-Munoz et. al., 2016)

We can help ensure a reliable energy future by empowering, encouraging and rewarding consumers for participating in demand response measures.

(Finkel, 2017).

Cognitive

Affective

Behavioural

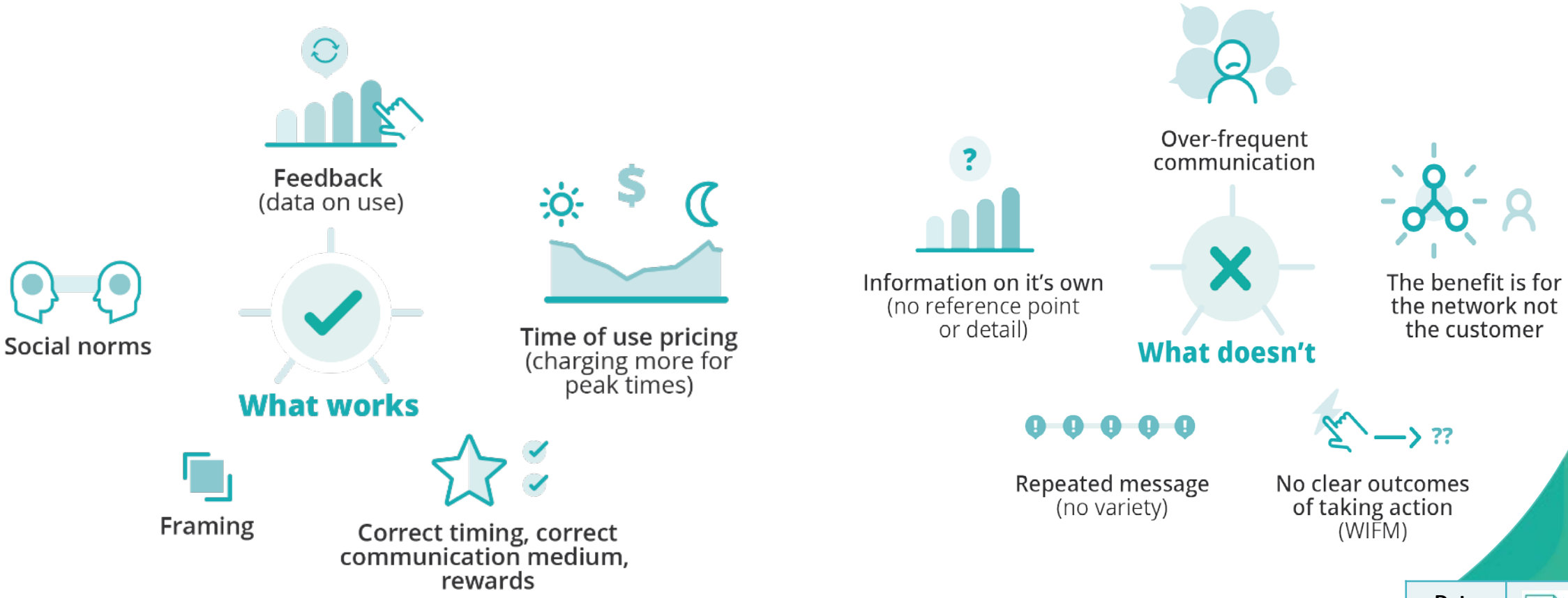
(Hollebeek et al., 2014).

Data Source

RQ6

Which communication strategies have been effective in demand management?

Communication strategies (kWh usage reductions):



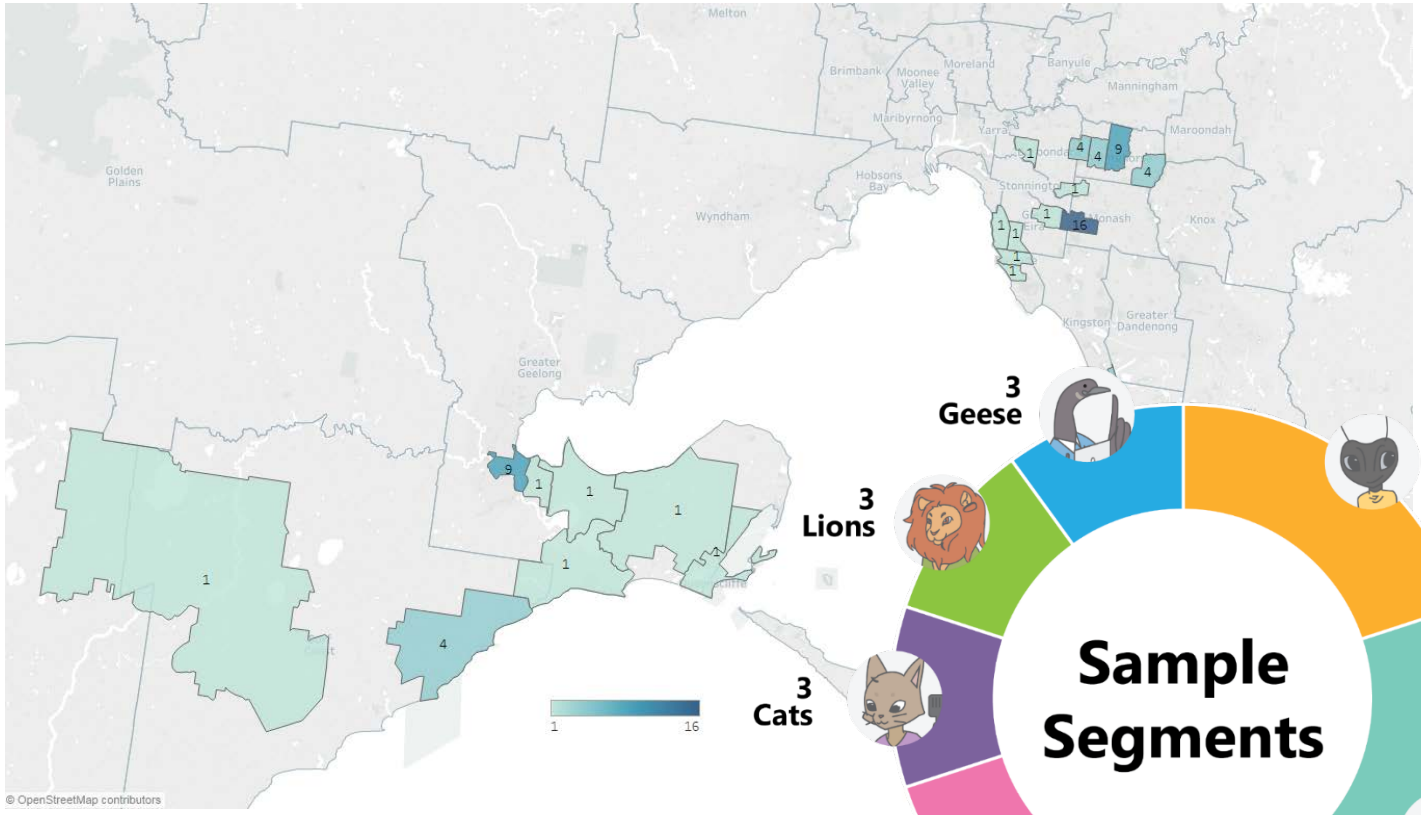
Sources: Asensio et al., 2016; Allcott, 2011; Di Cosmo and O'Hora, 2017; Adan and Fuerst, 2016; Rhodes et al., 2016; Hamilton et al., 2013.

Data Source

Method

Data collection: Co-design workshops

Purpose: To add richness to our understanding of the segments, and how to increase registration, engagement, and performance



46 Average Age

48 Median Age

17 Standard Deviation

78 Maximum Age

19 Minimum Age

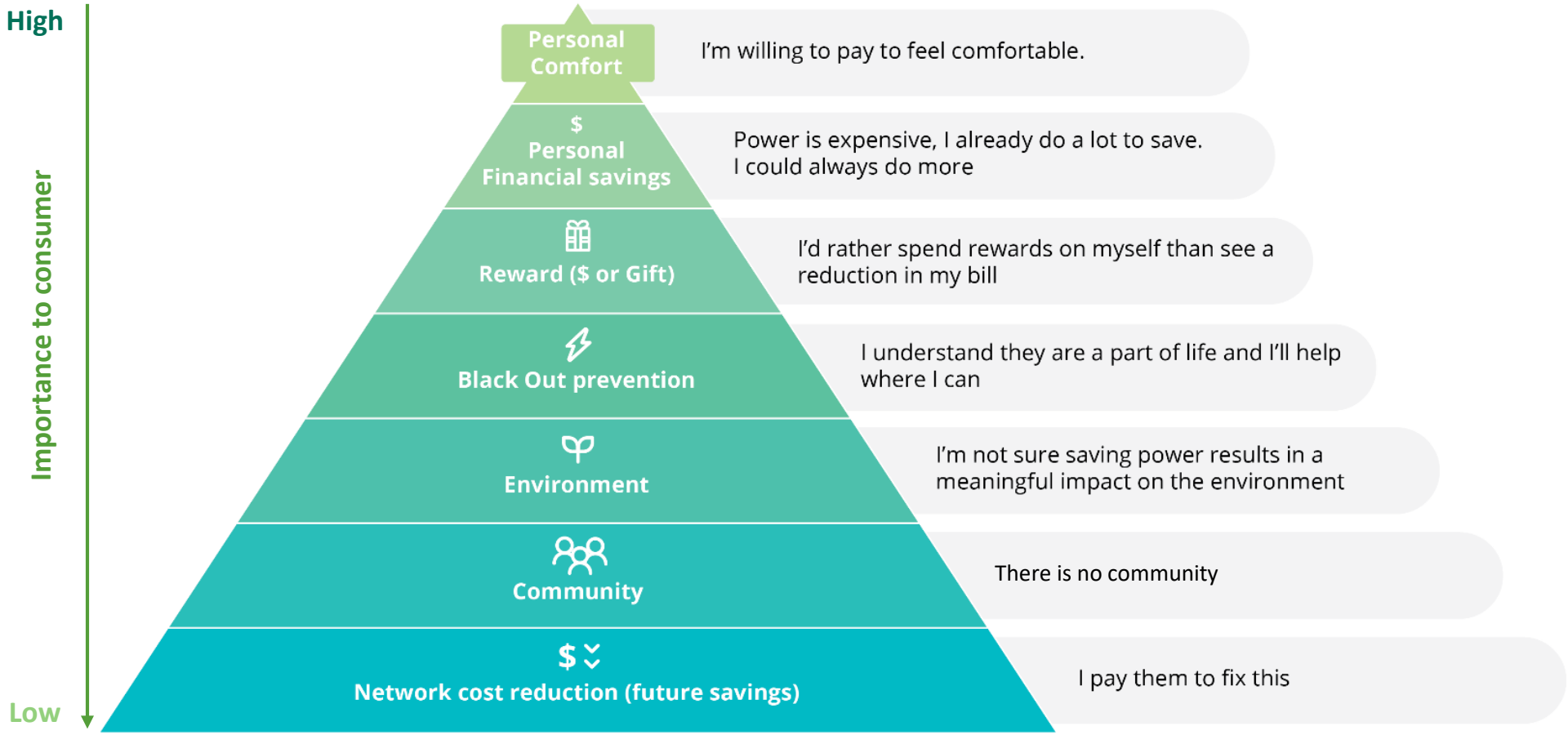
59% Female (24 participants)

41% Male (17 participants)

Data Source

Other Insight

Consumer priorities for energy management



Data Source

Other Insight

How participants engage with electricity management

	 Ants	 Bees	 Geese	 Wallabies	 Cats	 Lions
THINK	Efficiency, control, appliance specific, resignation	Mostly think about behaviour and outcomes, efficiency, waste	Thinks about impact on others, environment, avoiding waste	Mostly thinks about their lack of control, thinks it is all too hard	Mostly thinks about impact on the self	Mostly thinks about control, proper monitoring and management
FEEL	Contentment Happiness Pride Anger Sadness	Contentment Happiness Anger Shame Sadness	Contentment Happiness Pride Fear	Contentment Happiness Anger Fear Shame	Pride Sadness Anger Shame	Love Contentment Anger Shame
DO	• Makes behavioural changes • Asks other householders • Does research	• Makes behavioural or structural changes • Does research	• Very appliance-heavy behaviours • Behavioural changes Research	• This group is the least likely to make behavioural changes – instead tending to think, hope, or make general plans	• More focused on structural and lifestyle changes, reducing the effort for long-term change	• Wants more information to inform behaviour • Behavioural changes

Data Source

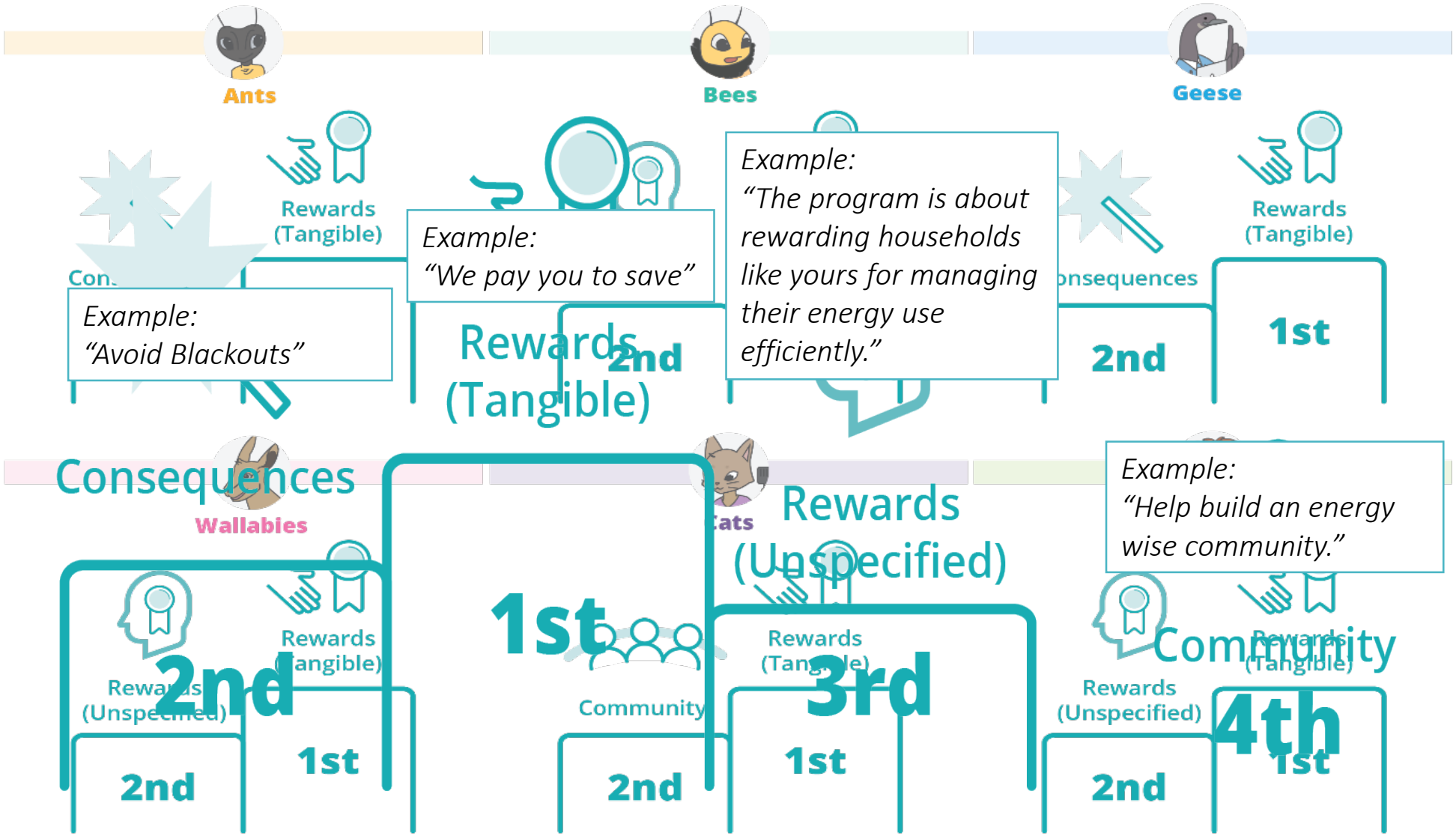
Message attributes for each value proposition and segment

	A smart move means summer savings	Profit through understanding this summer	Cash back for your power this summer	Use Less, Save more	Reduce your power use this summer and gain cash rewards	A small change delivers big rewards this summer
Quick and Easy to understand	⊖	⊖	⊖	✗	✓	✓
Believable	✓	✓	✓	✓	✓	✓
Worthwhile	✓	⊖	✓	✓	✓	✓
Doable	✓	⊖	✓	⊖	✓	✓
Would it provoke memorable messaging	✓	⊖	✓	✓	✓	✓
Ants	✓	✓	✓	⊖	✓	✓
Bees	✓	✓	✓	⊖	✓	✓
Wallabies	✓	✗	✓	⊖	✓	✓
Cats	✓	⊖	✓	✓	⊖	⊖
Geese	✓	✓	✓	⊖	⊖	⊖
Lions	✗	✗	✓	✗	✗	✗

RQ8a

What are the value propositions for each segment?

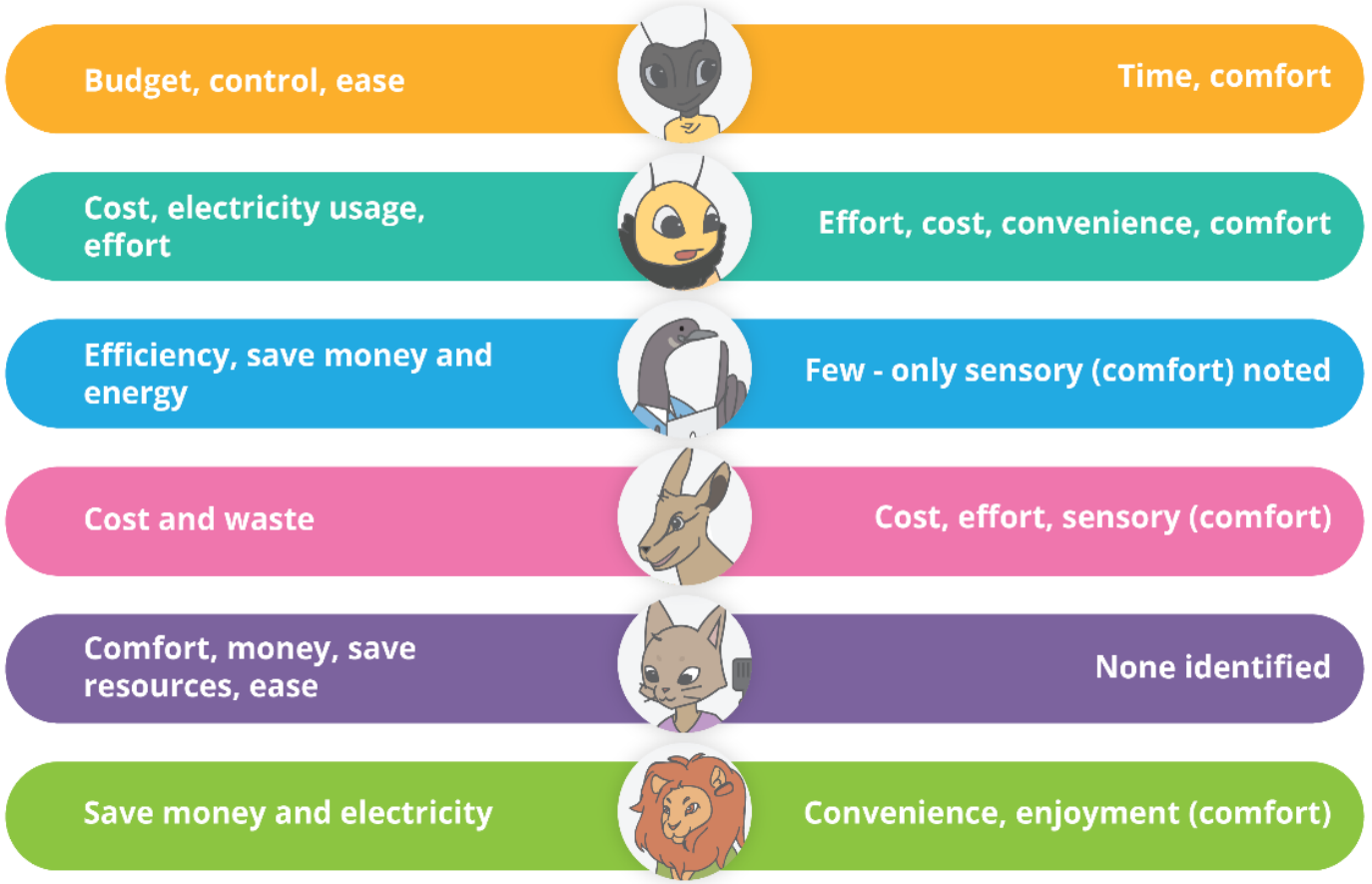
Total sample vs segments



Data Source

RQ8b

How do barriers and perceptions of energy management vary by segment?



Notes

More likely to suggest **behavioural** changes

More likely to suggest **structural** changes

More likely to suggest **behavioural** changes

More likely to suggest **behavioural** changes

More likely to suggest **behavioural** changes

More likely to suggest **behavioural** changes

Data Source

RQ8c

What messaging strategy should be used for each segment?

A smart move means summer savings

I'm smart enough to save

I'm not losing out – I'm winning

Decrease use of high energy device during peak times on event days

A "smart move" can translate to the consum need to feel empowered and the actual acti aiding in recall.

Profit through understanding this summer

Think This looks easy, I'll find out more

Feel Contented

Do Decrease use of high energy devices during peak times on event days

Note Many households displayed a desire to change. This CVP highlights the benefit of making an effort to chance.

Cashback for your power this summer

Think I want that

Feel Rewarded

Do Decrease use of high energy devices during peak times on event days

Note This speaks to the households belief that the power is owned by them already, a familiar messaging construct from FMCG. Removes reward guilt.

Use Less, Save more

That sounds so easy to do

Empowered

Decrease use of high energy devi during peak times on event days

Households were attracted to very simple structured messaging.

Reduce your power use this summer and gain cash rewards

Think That's attractive to me

Feel In control

Do Decrease use of high energy devices during peak times on event days

Note This puts both the control and the reward in the hands of the consumer, addressing issues around losing control.

A small change delivers big rewards this summer

Think I don't have to do a lot to gain something

Feel I come out ahead

Do Decrease use of high energy devices during peak times on event days

Note Provides reassurance that households won't need to put in a lot of effort to see a benefit.

Data Source

RQ8c


Join United Energy's
Summer Saver Trial
Help to ease the pressure on the energy network when we experience extreme temperatures.
Play your part
Beat the heat
On days hotter than
35°
power usage increases by
60%
UNITED ENERGY
Keep your cool and earn rewards this summer...
UNITED ENERGY

RQ8c

Consumer preference for communication channel

	SMS	Billboards	Post	Facebook	Email	Phone	Bill	Word of Mouth
 Ants	12	0	4	8	41	0	0	0
 Bees	29	10	10	0	44	0	0	0
 Wallabies	19	0	19	0	20	0	0	0
 Cats	6	0	1	0	8	0	3	2
 Geese	20	0	0	0	6	0	0	0
 Lions	0	0	0	0	30	0	0	0

Data Source

RQ8c

Achieving registrations for Summer Saver Program

	EASY	ATTRACTIVE	SOCIAL	TIMELY
Ants	**Opt-in option**, digital communication, provide email/SMS communication	**Make communications easy to understand**, provide an online opt-in, provide real incentives, provide an attractive 'package deal', the ability to save money	**NO**- not interested in the social aspect but **would like to know the number of people participating and how much they save in general**	During Winter and just before Summer, in November just before Summer, when your current deal is about to expire or when there is a better plan than the current one
Bees	Email with a "one-click link", SMS with a link to sign-up, reminder emails,	Ability to save money, cash rewards/incentives, provide **genuine examples of people saving money**, no penalties for exiting the program,	**NO**- not interested in the social aspect in general	Start of October, provide communication about the program on the bill,
Geese	Provide an opt-in option, digital communication	Incentives, **the ability to save on the bill**, ensure an environmental focus and/or community benefits	**YES** - would like to see some social aspect in general	**Before Summer**/ a few days in advance
Wallabies	**Quick sign-up online**, provide SMS/email updates, provide updates via the bill, well functioning website, flexible sign-up options	Incentives (i.e., movie vouchers, vouchers for food), provide flexibility (i.e., opt-in and opt-out, can see a real reduction in costs, dollar discounts off the bill, provide promotions, **no hidden terms and conditions**	**NO**- not really interested in the social aspect in general (i.e., "I don't wish to speak business with my neighbours")	Immediately just before Summer or when the hot weather starts to kick in, end of the financial year,
Cats	Provide all information online, email opt-in, ensure there is no paperwork, provide plenty of information, ability to price compare	Provide clear instructions, **support online/offline**, ensure good understanding of program benefits, provide cheap rates/bonuses ($100 bonus), provide money off for referring friends to program, have a prize draw (i.e., holiday to Bali), want to know that Government is doing their bit to address the big picture	**YES**- interested in the social aspect in general "I would especially like to partner with my neighbours"	Consider including invitation in bill prior to peak times; maybe every 3 months
Lions	**Transparent communication**, honesty, ability to compare	Provide rewards, **ensure real cost savings**, ensure transparency, rebates for decreased consumption	**NO**- not interested in the social aspect in general	Before Summer

Adapted from: Behavioural Insights Team, 2013

Data Source

RQ8c

Achieving engagement with a summer saver program

	EASY	ATTRACTIVE	SOCIAL	TIMELY
Ants	**Make it convenient for people to make a change**, send emails or SMS on plans, ensure **information is straightforward**	**Comfort is most important**, provide reminders, use emotive and practical reasons to get people involved, a package that shows cost savings and incentives,	**NO**- not interested in the social aspect in general however, **would like to know if the community is engaged more generally**	Provide communication just before Summer to prepare people, ensure regular communication
Bees	Provide rewards that are worthwhile, **reminders via SMS**, provide handy tips and practical suggestions	Provide the ability for people to save money, **constant communication via SMS/email**, providing encouraging communication	**NO**- not interested in the social aspect in general however, **would like to know if the community is engaged more generally**	**Ensure communications are instant**, provide real-time data, provide prompts via SMS on very hot and very cold days
Geese	Reminders with incentives on how to save	**Provide tips** and incentives	**YES**- interested in the social aspect in general	Just before a hot day (i.e., the day before)
Wallabies	Send encouraging emails with reminders on the positive aspects of the program, provide options for people, timed reminders	Encouragement, provide cost benefits, provide "generous" incentives and positivity, **SMS reminders**	**YES**- interested in the social aspect in general	Provide communication leading up to the hot day, even communication the day after letting you know how you went usage wise, communication early in the day, constant SMS
Cats	Provide suggestions for how to engage, offer a hotline which you can call to receive **practical suggestions that are easy to interpret and make sense of**	Provide ½ price electricity when the temperature increases above 35 degrees, cheaper rates in general, **incentives** that are worthwhile, bonuses for reducing electricity usage	**YES**- interested in the social aspect in general "It would be good to see what my neighbour is doing"	Reminders every three months, as soon as the weather forecast suggests high temperatures, **reminders prior to the peak season**
Lions	**Reduce the barriers to participation**, ensure there are no hidden catches or fees	Reminders of why we signed up in the first place, offer an incentive or a rebate for reducing electricity	**NO**- not interested in the social aspect in general	Before hot days (i.e., 7 days prior to a hot day)

Adapted from: Behavioural Insights Team, 2013

Data Source

Other Insight

Willingness to change behaviour

Ants

Bees

Geese

Wallabies

Cats

Lions

Yes
No
Maybe

Why

Ants	Bees	Geese	Wallabies	Cats	Lions
Work schedules, necessity of usage, do not consider usage high	Necessity of usage, but willing to be flexible	Focused on comfort and necessity	Sometimes work/school schedules and comfort make it necessary. Thinks electricity is a basic right	Already flexible, unless needed for health	Flexible unless constrained by other rules (i.e., noise restrictions)

Data Source

Other Insight

Likelihood of energy management actions

Data Source

Other Insight

Key takeaways - Design principles for a summer saver program

1. Appeal to Immediate Self-Interest
(It's all about me)

2. Do not Defer Responsibility
(I've already paid for this problem)

3. Keep it Simple
(Reduce cognitive load)

4. Provide Evidence
(The proof is in the pudding)

5. Ensure Control
(Let me self-select how and when you communicate with me)

6. Make it Personalised and Relevant
(Ensure personalisation and relevancy across differing segments)

Data Source

So how do you use this research?

- Invest in your CRM. You need basic customer details
- Identify geographic at ‘load risk’ regions
- Engage customers in these regions to profile their psychological segment
- Use our model for tailored and targeted campaigns
- Monitor demand management performance. Identify trends and iterate.

Thank you

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