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Value of Customer Reliability Main Survey report

6 December 2019

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Executive Summary

Introduction

In January 2019, KPMG and Insync (henceforth referred to as KPMG) were engaged by the Australian Energy Regulator (AER) to provide advice on aspects of the survey design, carry out the survey and analyse the results to support the AER's calculation of the Value of Customer Reliability (VCR). The AER took this advice into account in designing the survey, also taking advice from other stakeholders (e.g. the Melbourne Energy Institute (MEI) and the VCR Consultative Committee).

To support these calculations, the AER required KPMG to utilise both a:

- Contingent valuation method – respondents were asked to place a dollar value on avoiding an outage, reflecting their willingness to Pay (WTP); and
- Choice modelling method – respondents were asked repeatedly to select a preferred option from a set of scenarios where one option is constant (the baseline) and the other two have varying attributes. Attached to each scenario is a dollar amount that the respondent's bills would be lower by.

To determine the appropriate survey form for both methods, we completed the following two step process in close consultation with the AER:

- **STEP 1:** Reviewed the method implemented by Australian Energy Market Operator (AEMO) in 2014 that formed the basis of the most recent VCRs and provided advice on survey design to help the AER define the survey methodology. The outcome of this review was a number of changes to the methodology implemented by AEMO in 2014, These changes to the survey were made by the AER, upon advice from KPMG. These included:
  - The hours for a peak outage were updated, at the request of the AER, to reflect changes in peak system demand and customer usage;
  - Question wording was made less technical to improve accessibility for respondents with lower literacy levels;
  - Definitions of choice modelling attributes were simplified;
  - Language around seasonality was changed to cater for respondents in tropical Australia;
  - Design/font changes were made to direct respondents to the attributes that were variable in the choice modelling; and
  - The definitions of "localised" and "widespread" were improved.
  - Behaviours that might alter the value of reliability were tested and redundant/unused items were deleted from the survey.
- **STEP 2:** Undertook a 'Pilot' survey on behalf of the AER – During April and May 2019, a survey of 1,022 residential and 321 non-residential electricity consumers was completed. These surveys focused mostly on NSW / ACT and major capital cities in Queensland, Victoria and South Australia. The residential Pilot Survey was run in two streams; a control group answered a survey which included the WTP and choice model questions as per the AEMO 2014 survey. The rest of the sample answered the updated version. The contextual and demographic questions were common to both surveys. The purpose of splitting the survey was to differentiate between changes to output WTP resulting from modifications in survey question design, versus changes to broader customer WTP occurring since 2014.

Results from the Pilot survey were then used by the AER to refine the Main Survey taking into account advice provided by KPMG. The changes made by the AER included the way the choice model items were presented to all respondents, and the way dollar amounts were referenced in business respondent WTP questions. In October 2019, 9,314 electricity customers from across the entirety of the National Electricity Market (NEM) including the Northern Territory were surveyed, covering residential, business and very large customers. This is greater than the total of 2,928 residential, business and very large customers surveyed and used for VCR calculations in the 2014 AEMO study.

The purpose of this report is to document the results of the Main Survey, being:

- the average WTP to avoid the baseline outage (using contingent valuation), for both:
  - residential customers, by combination of jurisdiction, climate zone and remoteness classification; and
  - non-residential customers, by business segment; and
- the variance from the baseline WTP, to account for severity, duration and timing (season, time of week and time of day), using choice modelling.

Our report does not contain the VCR calculations. The VCR calculations were undertaken by the AER and set out in the AER's Final report on VCR values https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/values-of-customer-reliability-vcr. The following summary details the results of the Main Survey.

Results

Residential

Average Willingness to Pay (contingent valuation)

To determine average WTP for residential customers, the survey asked three questions, with the second question contingent on the response provided to the first.

Respondents were presented with the attributes of a particular scenario involving two unexpected power outages, described as localised, with each unexpected outage occurring on a different random weekday, in winter (Jun, Jul, Aug), at off-peak times (outside of 7-10am, 5-8pm) of 1 hour duration.

In reference to the particular scenario, respondents were firstly asked "Would you be willing to pay an increase of $x/month in your electricity bill to avoid both of the outages described in the above scenario?", where the dollar amount was randomly assigned between $2 and $9. Where a customer said:

- 'Yes', the follow-up question was "Would you be willing to pay an increase of $x/month in your electricity bill?", where the dollar amount was double the value in the preceding question;
- 'No', the follow-up question was "Would you be willing to pay an increase of $x/month in your electricity bill?", where the dollar amount was half the value in the preceding question;

The third question ask (no matter the answer to the second question, was "What is the maximum increase in $ per month in your electricity bill you would be willing to pay to avoid the same outage?"

The survey was conducted across the NEM with responses being divided into 12 cohorts, with the average residential WTP to avoid the baseline outage being $3.51. Average WTP for residential customers ranges between $2.79 and $4.20, differing by combinations of jurisdiction, climate zone and remoteness. These values are shown in the adjacent table. Climate zone and remoteness classifications are described in the "residential cohorts definitions" part of the "Main Survey Design" section of this report.

Table 1: WTP Results

Cohort Name	Climate Zone	State	Remoteness	n	WTP $/month
NT	Any	NT only	Any	257	$3.33
CZ1 Regional	CZ1	Any excluding NT	Inner regional + outer regional + remote + very remote	195	$2.85
CZ2 CBD & Suburban	CZ2	Any	CBD + suburban	1,039	$3.43
CZ2 Regional	CZ2	Any	Inner regional + outer regional + remote + very remote	410	$3.15
CZ3/4 Regional	CZ3 + CZ4	Any excluding NT	Inner regional + outer regional + remote + very remote	352	$3.73
CZ5 CBD & Suburban NSW	CZ5	NSW only	CBD + suburban	1,013	$4.06
CZ5 CBD & Suburban SA	CZ5	SA only	CBD + Suburban	597	$3.30
CZ5 Regional	CZ5	Any	Inner regional + outer regional + remote + very remote	245	$2.88
CZ6 CBD & Suburban	CZ6	Any	CBD + suburban	2,131	$3.70
CZ6 Regional	CZ6	Any	Inner regional + outer regional + remote + very remote	513	$2.79
CZ7 CBD & Suburban	CZ7	Any	CBD + suburban	211	$4.20
CZ7 Regional	CZ7	Any	Inner regional + outer regional + remote + very remote	462	$3.21

Residential

Choice modelling

Respondents were presented with eight Choice Modelling questions. Each question had three choice cards, one of which described the baseline outage which they would later go on to consider by itself in the WTP section. The position of the baseline outage was randomised.

Overall, there were six attributes, with each broken down into between 2 and 4 levels. An example of the types of cards and attributes is presented adjacent.

The results of the choice modelling identified findings that were significant for some attributes across all cohorts, including:

- Duration is a significant factor affecting the outage preferences for residential respondents. Scenarios with 3, 6 and 12 hours of duration displayed large negative directions to outage preferences.
- The magnitude of the coefficient for the duration attribute increases with the increasing length of the outage i.e., the longer the duration, the less preferred.
- There were highly significant coefficient estimates for Status Quo, The coefficient estimates for Status Quo were positive, indicating that the status quo was preferred under most scenarios.

	Option 1	Option 2	Option 3
Change in bi-monthly electricity bill	$30 less per bill	No change	$14 less per bill
Localised/widespread	Localised	Localised	Widespread
Duration	3 hours	1 hour	3 hours
Frequency	Twice a year	Twice a year	Twice a year
Summer/winter	Winter	Winter	Summer
Weekday/weekend	Weekdays	Weekdays	Weekdays
Peak/Off-peak	Off-peak	Off-peak	Off-peak

The co-efficient estimate for each attribute, across each climate zone (see Main Design Survey chapter for definitions), is detailed in the following table:

Table 2: Summary of co-efficient estimates for all residential cohorts

Attribute	All res	NT	CZ1	CZ2 CBD	CZ2 Reg	CZ3/4 Reg	CZ5 CBD NSW	CZ5 CBD SA	CZ5 Reg	CZ6 CBD	CZ6 Reg	CZ7 CBD	CZ7 Reg
Status Quo	0.486	0.969	0.377	0.607	0.476	0.334	0.327	0.347	0.610	0.517	0.551	0.370	0.407
Severity - Widespread	-0.147	-0.148	-0.232	-0.168	-0.142	-0.228	-0.180	-0.162	-0.111	-0.081	-0.153	-0.203	-0.208
Duration - 3 Hours	-0.441	-0.049	-0.607	-0.493	-0.422	-0.398	-0.535	-0.529	-0.481	-0.344	-0.433	-0.587	-0.580
Duration - 6 Hours	-0.814	-0.426	-0.797	-0.770	-0.807	-0.734	-0.929	-1.077	-0.945	-0.748	-0.764	-0.892	-0.880
Duration - 12 Hours	-1.081	-0.725	-1.089	-1.003	-1.162	-1.088	-1.227	-1.359	-1.136	-0.934	-1.209	-1.448	-1.102
Season - Summer	0.003	-0.255	-0.221	0.031	-0.049	-0.290	0.064	-0.183	0.115	0.026	0.036	0.177	0.245
Time of day - Peak	-0.257	-0.186	-0.187	-0.279	-0.315	-0.228	-0.313	-0.166	-0.392	-0.223	-0.261	-0.333	-0.285
Weekend	-0.028	-0.103	-0.139	-0.022	-0.067	0.019	-0.007	-0.044	0.022	-0.018	-0.028	-0.115	-0.027
Discount	0.077	0.066	0.086	0.076	0.070	0.072	0.077	0.073	0.088	0.075	0.085	0.080	0.080

The sign of the coefficient estimate represents the direction of the effect of that attribute on the preferences of the customer (e.g. negative means less preferred). The magnitude of the estimate is proportional to the strength of that attribute on a consumer's preferences.

Business

Average Willingness to Pay (Contingent Valuation)

Business customers were identified as those that were currently employed (full time, part time) and had input into how much the business they work for, either spends on electricity, or consumes in electricity to support business activities. As per the table below, business customers were assigned, based on ABS/ANZSIC code classification, to be either Agriculture, Industrial or Commercial.

The business survey asked three questions, with the second question contingent on the response provided to the first. Respondents were presented with the attributes of a particular scenario involving two unexpected power outages, described as localised, with each unexpected outage occurring on a different random weekday, in winter (Jun, Jul, Aug), at off-peak times (outside of 7-10am, 5-8pm) of 1 hour duration.

In reference to the particular scenario, respondents were firstly asked "Would you be willing to pay an increase of $x/[billing period] in your electricity bill to avoid both of the outages described in the above scenario?", where the increase was randomly assigned between 1% to 10% of the total bill (presented as a dollar amount based on the respondent's most recent bill, as per a previous item answered in the survey). Where a customer said:

- 'Yes', the follow-up question was "Would you be willing to pay an increase of $x/[billing period] in your electricity bill?", where the dollar amount was double the value in the preceding question;
- 'No', the follow-up question was "Would you be willing to pay an increase of $x/[billing period] in your electricity bill?", where the dollar amount was half the value in the preceding question;

Under all circumstances, the third question asked was "What is the maximum increase in $ in your [billing period] electricity bill you would be willing to pay to avoid the same outage?"

Due to the greater variance in electricity costs for businesses, WTP for this cohort is expressed as a percentage increase in the total bill. The average business WTP is 14.2% of the bill. The following details the WTP percentage of the bill for each cohort:

- Agriculture (n = 123) – 13.5%
- Industrial (n = 315) – 17.5%
- Commercial (n = 1,383) – 13.5%

Choice modelling

The choice modelling for business customers was designed in the same way as residential customers, except that the answer to the first attribute was regarding the "change in your quarterly electricity bill", with choices identifying a % variation.

The results of the choice model demonstrated that:

- The impact of any duration was very significant for business customers, with longer durations being less desirable, however, the coefficient for 6 hour duration was similar to that for 12 hours (for most segments), suggesting that business customers found these outages similarly undesirable.
- All segments prefer outages on weekends compared to weekdays.
- Most business segments prefer outages in off-peak times compared to peak times, excluding agriculture segment.

The co-efficient estimate for each attribute is detailed in the following table:

Table 3: Summary of co-efficient estimates for all business cohorts

Attribute	All business	Agriculture	Industrial	Commercial
Status Quo	0.463	0.980	0.599	0.396
Severity - Widespread	-0.064	-0.097	0.039	-0.082
Duration - 3 Hours	-0.302	-0.393	-0.074	-0.347
Duration - 6 Hours	-0.443	-0.807	-0.346	-0.435
Duration - 12 Hours	-0.474	-1.058	-0.350	-0.459
Season - Summer	-0.023	-0.058	-0.094	-0.005
Time of day - Peak	-0.093	0.079	-0.036	-0.119
Weekend	0.089	0.111	0.213	0.059
Discount	0.160	0.365	0.147	0.148

*The sign of the coefficient estimate represents the direction of the effect of that attribute on the preferences of the customer (e.g. negative means less preferred). The magnitude of the estimate is proportional to the strength of that attribute on a consumer's preferences.

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Introduction

Background

In December 2017, the COAG Energy Council proposed a rule change to the AEMC to give formal responsibility for determining the VCR to the AER. The AEMC approved rule 8.12 on 5 July 2018, and this requires the AER to make its first determination on the VCR prior to 31 December 2019.

The VCRs seeks to reflect the value different types of customers place on reliable electricity supply under different conditions and are usually expressed in dollars per kilowatt hour (kWh) of unserved energy. The VCR is a critical input into identifying efficient levels of system expenditure.

The new Rule 8.12 of the National Electricity Rules requires that the AER:

- Develop, publicly consult on, and publish a methodology for estimating the VCRs on a consistent basis across the NEM and the Northern Territory (NT)
- Publish its first VCRs calculated in accordance with the VCR methodology by 31 December 2019
- Update VCRs at least every five years, and adjust the VCR by an appropriate methodology each year in between updates
- Ensure the methodology and VCRs are fit for purpose for any current and potential range of uses for VCR

Scope

In January 2019, KPMG and Insync (henceforth referred to as KPMG) were engaged by the Australian Energy Regulator (AER) to provide advice on aspects of the survey design, carry out the survey and analyse the results to support the AER's calculation of the Value of Customer Reliability (VCR). The AER took this advice into account in designing the survey, also taking advice from other stakeholders (e.g. the Melbourne Energy Institute (MEI) and the VCR Consultative Committee).

To support these calculations, the AER tasked KPMG to utilise both a:

- Contingent valuation method – respondents were asked to place a dollar value on avoiding an outage, reflecting their willingness to Pay (WTP); and
- Choice modelling method – respondents were asked repeatedly to select a preferred option from a set of scenarios where one option is constant (the baseline) and the other two have varying attributes. Attached to each scenario is a dollar amount that the respondent's bills would be lower by.

The AER split the engagement into two stages:

1. Design and undertake 'Pilot' VCR residential and business customer surveys, and prepare a report summarising findings and recommendations. The purpose of the Pilot Survey was to test the appropriate contingent valuation and choice modelling survey form, with a small sample of customers.
2. Design and undertake 'Main' VCR residential and business surveys, and outline results and findings.

The AER also undertook a third survey type for the largest business customers in the NEM which KPMG helped to carry out. Details of this survey are included in the AER reports' https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/values-of-customer-reliability-vcr

To assure the quality and reliability of the study, the AER introduced a number of mechanisms. These included:

- A preliminary phase where qualitative research was done with customers around the NEM to test the validity and reliability of the wording in the 2014 survey;
- A Pilot survey to test the altered wording and the collection methodology; and
- The use of the Melbourne Energy Institute (MEI) to provide quality assurance and advice to the AER on key aspects of the VCR review.

The AER requested the following deliverables:

- Advice on survey design for each of the customer cohorts:
  - Residential;
  - Business;
- Running of the Pilot and Main Surveys;
- Analysis of the survey data and the provision of reports; and
- Attendance at AER's VCR Consultative Committee (VCRCC) meetings.

Purpose

The purpose of this report is to:

- Document the procedure for design of the survey methodology; and
- Detail the WTP and choice modelling results for both residential and business customers.

This advice is to support the AER's decision on:

- Determining the residential and business samples;
- The assumptions that underpinned the choice modelling;
- The validity of the WTP survey results; and
- The surveys distributed to residential and business customers.

Our approach

The project consisted of three discrete stages:

1. Validation of the survey methodology developed by AEMO for the 2014 study - a series of focus groups and in-depth interviews between January and March 2019 were held across a number of Australian jurisdictions. The sessions were used to validate the survey questions with 'everyday Australians', and to provide assurance that the language was easy to understand and results were reliable.
2. Completion of a Pilot Survey – During the period April to July 2019, a Pilot Survey was placed in the field. KPMG carried out the surveys and made suggestions on improvements which the AER took into account when considering modifications to the survey design for the main survey.

   To quantify this difference, it was agreed with the AER to run two surveys simultaneously – one replicating the 2014 AEMO survey methodology, the other reflecting agreed changes determined through the validation phase. The results from this survey was used to refine the survey method used as the basis for the Main survey.
3. Completion of the Main Survey - the Main Survey fieldwork occurred in October and this report provides the results of the Main VCR residential, and business customer surveys.

These three discrete stages form the basis for the structure of this report.

Use of information

The Main survey will not be converted into $/kWh. This is outlined by the AER in a separate report. The results presented in this report are:

- Average Willingness to Pay (WTP); and
- Outputs from the choice modelling.

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Survey Validation

The following section details testing of the 2014 AEMO survey design, including changes that were proposed to be testing during the Pilot Survey.

Focus Groups and In-depth Interviews

Two critical parts of the VCR survey are the calculation of the WTP to avoid a "baseline" outage, and the choice modelling which determines the differential value that customers place on various attributes of an outage (season, duration, time of day etc.). It was critical that these two elements of the survey were validated with everyday customers to provide assurance that the methodology was fit-for-purpose.

To help support the AER in improving on AEMO's methodology, this undertaking had two main phases:

- a qualitative phase consisting of focus groups and in depth interviews; and
- a quantitative phase consisting of a Pilot survey.

The process and results were peer reviewed by the AER and the MEI. The Value of Customer Reliability Consultative Committee (VCRCC) was also consulted regularly.

Fieldwork

A series of focus groups and in-depth interviews around the NEM were facilitated. These are summarised in the following table:

Table 4: Interviews

Region	Focus Groups	Focus Group Location	In-depth Interviews
Northern Australia	2	Darwin and Cairns	4
South Australia	2	Adelaide	4
Major metro centres	2	Sydney	4
Regional Australia (NEM)	2	Albury Wodonga	4
Remote Australia (NEM)	0		8

During the focus groups, attendees were provided with hard copy handouts to consider. Similar materials were provided by email to the in-depth phone interviewees All research was performed by trained and experienced researchers in accordance with recognised industry association guidelines. Focus groups had on average eight participants and took 90 minutes. AER staff attended two of the focus groups as silent observers.

During the focus groups and interviews, everyday people were encouraged to consider survey wording in great detail. This revealed that the 2014 AEMO survey language was at times complex and lacking in psychometric reliability. A range of changes were suggested by the AER, the MEI, VCRCC and KPMG before the wording of the pilot survey was confirmed by the AER.

Summary of main changes to Survey Design arising from the qualitative phase

WTP questions using cost prompts used by AEMO in 2014 were removed from the revised Pilot Survey in favour of an open-ended WTP question. The Open question provides more granular data in comparison with AEMO's approach in 2014 and does not make assumptions about WTP based on the series of closed question answers.

To enhance understanding of choice modelling attributes and levels and to ensure consistency in interpretation across the NEM, the AER made changes to simplify the definitions in the choice modelling based on the survey validation process:

- The hours for a peak outage were updated to reflect changes in peak system demand and customer usage;
- Question wording was made less technical to improve accessibility for respondents with lower literacy levels;
- Definitions of choice model attributes were simplified;
- Language around seasonality was changed to cater for respondents in tropical Australia;
- Design/font changes were made to direct respondents to the attributes that were variable in the choice model;
- The definitions of "localised" and "widespread" were improved; and
- Behaviours that might alter the value of reliability were tested and redundant/unused items were deleted from the survey.

Overall, the 2019 Revised Pilot Survey was shorter, more accessible and had improved psychometric reliability and validity

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Pilot Survey

Survey Methodology

This section details the Pilot survey methodology adopted, response rates to the Pilot survey, use of climate zones instead of jurisdiction, and recommendations arising from the Pilot survey.

Introduction

The methodology for the Pilot Survey was based on AEMO's National Electricity Market (NEM)-wide VCR study undertaken in 2014. Consistent with this approach, a contingent valuation (stated preference) question was used to assess WTP and a choice model to assess the value of outage scenarios with differing attributes.

As detailed in the previous section, a number of changes were made to the survey method by the AER to improve on AEMO's methodology, in particular the WTP questions and the choices in the model. The intent of the changes was to improve the psychometric properties of the survey, thereby increasing the chances of statistically significant differences among cohorts. As such, this created a risk that by changing the content of the surveys, electricity customer responses could be different (all else being equal).

Further, as the last survey was completed five years ago, there was a strong likelihood that the VCR values would have changed.

A single pilot survey would not have been able to differentiate between these two impacts on the output results. As a result, the AER decided to concurrently run two pilot surveys, one replicating exactly the 2014 AEMO study using a control group of residential customers, and the other an updated VCR survey in line with the findings of the qualitative phase.

Responses

In 2014 the AEMO Pilot survey received 742 residential and 148 business customer responses.

In 2019 the target population for the Pilot Survey was 1000 residential and 300 business responses. KPMG recommended that the control group would be sampled entirely from NSW and ACT residential customers. A control group was used entirely from NSW and ACT, allowing for direct comparison with the reported cohort from the AEMO 2014 study. NSW and ACT also comprised the largest pool of Dynata panel members ensuring we could conduct the control group exercise and have sufficient panel remaining for the main survey phase.

The Pilot Study exceeded its response targets, with 1,022 residential and 321 non-residential responses.

Table 5: Number of responses by survey version and state

	Residential Control	Residential Revised	Business
NSW/ACT	209	209	125
Victoria		272	107
Qld		227	69
SA		105	20
TOTAL	**209**	**813**	**321**

Sample size

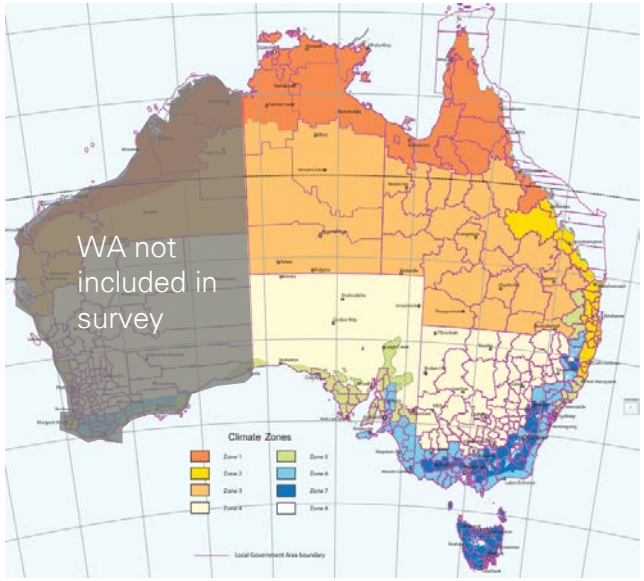


Table 6: Responses

		Survey Responses		Population
Climate zone	Major city	(no.)	(%)	(%)
1	None	12	1%	3%
2	Brisbane	237	23%	21%
3	None	1	0%	1%
4	None	39	4%	5%
5	Sydney, Adelaide	301	29%	26%
6	Melbourne	393	38%	37%
7	Hobart, Canberra	39	4%	8%

Sample plan by climate zone

The AER considered that the climate may be a better predictor of the VCR than jurisdiction. The climate zone of respondents was also assigned to respondent feedback based on residential postcode. Climate zone 8 (Alpine region) was rolled into climate zone 7 for this study, given the small population living in alpine regions. The table and map below show the results of the Pilot Survey by climate zone compared with the Australian population. The Pilot Survey was narrowed to NSW and major capital city respondents from Brisbane, Victoria and Adelaide.

Recommendations arising from Pilot Survey

There were three core findings from the Pilot survey:

1. An open-ended WTP question was necessary to allow consumers the chance to express their actual WTP;
2. Capping the value ascribed to the open-ended question; and
3. Restructuring the baseline outage in the choice model.

Calculating WTP

The decision to split the Pilot was beneficial in understanding the difference between the two survey methodologies.

In the 2014 AEMO survey, respondent were firstly asked whether they would pay a randomly assigned amount between $2 and $15 (the initial cost prompt) to avoid an outage. That number was doubled or halved depending on their answer, and then they were asked for a second time. However, these two closed questions constrained the response to either zero (where a respondent answered no to each question), or to the cost prompt at which the last Yes was selected. Without a follow-up open ended question, the respondent was denied the chance to express their actual WTP to avoid the outage. For example, a customer with a genuine WTP of $5, faced with a $2 dollar opening cost prompt would be ascribed a WTP of $2 (on the basis of Yes to $1 and Yes to $2). The same person, faced with a $15 cost prompt would be ascribed a WTP of $0 (on the basis of No to $15 and then No to $7.50).

KPMG recommended the AER include the open-ended maximum WTP question for the Main Survey, however we also recommend retaining the two cost-prompt questions to provide context and assist in framing realistic values.

High WTP responses

One problematic aspect of the open-ended WTP results is the effect of very large numbers on the average. For the Pilot Survey as specified by the AER, ex-post methods were implemented to cap these at $33. In discussions with the AER, a cap of $33 was suggested by the AER as the approximate per month price of technology readily available for residential customers to avoid the baseline outage of one hour duration.

Choosing the baseline outage in the choice model

We noted that many respondents chose the baseline outage in all eight scenarios presented in the choice model section. In discussions with AER, it was noted that this may be partly due to the baseline outage always being presented as option 1 on the left of the screen. We suggested that we also needed to ensure that respondents had noticed the discount attribute, which was listed at the bottom of each card presented to Pilot respondents. We also suggested that the discounts offered were not sufficient to encourage respondents to opt for the more severe outages represented by the other choices. In considering our suggestions, the AER agreed to the following changes to the way the choice model questions were displayed in the Main survey:

Figure 1: Changes to choice model questions

1. Randomise the position of the baseline option

2. Move discount to the top of the list

	Option 1	Option 2	Option 3
Localised/widespread	Localised	Widespread	Widespread
Duration	1 hour	3 hours	3 hours
Frequency	*Twice a year*	*Twice a year*	*Twice a year*
Summer/winter	Winter	Winter	Summer
Weekday/weekend	Weekdays	Weekdays	Weekends
Time of day	Off-Peak	Peak (7-10am and 5-8pm)	Peak (7-10am and 5-8pm)
Change in your quarterly (every three months) electricity bills	No change	$9 lower	$21 lower

Identical changes were also applied to business choice model layout, along with updating the discount attribute to calculate the actual dollar amount associated with a percentage discount, based on the last bill amount entered by the respondent. For example, a last bill amount of $500, displayed at a 3% discount level would be presented to the particular respondent as: 3% lower ($15 per bill).

Main survey design

The following section details the design of the Main Survey placed into the field, including: the process for recruiting survey respondents, sample size, definition of cohorts, choice model survey design and WTP survey design, for residential and business customers.

Recruitment

In 2014, AEMO recruited respondents using two well established methods. The first was the use of a paid panel provider. The second is known as computer assisted telephone interviewing (CATI) to online. This method involves calling random phone numbers and asking the consumer if they would like to participate in the study, then emailing them a link to the survey. In 2014, 19,824 numbers were called to obtain 395 residential responses to the Main survey, a 2% conversion rate. In 2019 there were three channels used to recruit respondents:

- Panel providers recruited 10,047 respondents (1,343 Pilot and 8,704 Main survey phase);
- The AER distributed the links to different membership organisations and peak bodies to circulate via their various communication channels to their audiences. These links were also available on the AER website. The full list of the customers/members is available in Appendix E; and
- In the final week of the seven week fieldwork window, the AER engaged Newgate to oversee the recruitment of Agriculture business customers via a CATI to online process. Recruitment was conducted by Thinkfield, which included 887 calls and distribution of 163 links.

The respondents recruited by the panel provider received incentives in the form of vouchers or points for their participation. Those who responded to the open link invitation received no incentive. Agricultural respondents recruited through the CATI to online channel were enticed by the chance to win one of five cash prizes, each valued at $100.

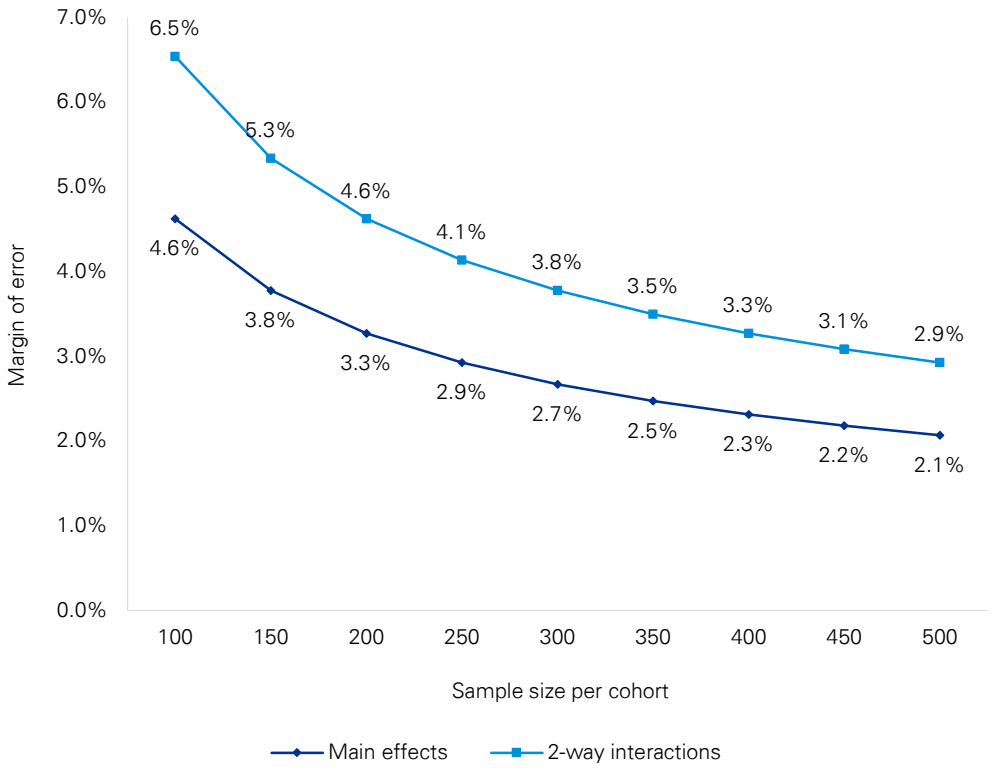
Table 7: Main survey responses by channel

	Residential responses	Business responses
Online panel	6995	1709
Open link	431	81
CATI to online	0	31

Sample size

A minimum number of responses is required to achieve a statistically valid result with the choice model. A minimum sample size of 200 per group was determined for the Pilot survey. This was derived in accordance with established formulae from industry research papers[1]. The chart below shows that a sample size of 200 per cohort is sufficient to ensure the margin of error be within 5 % when allowing for two-way interactions between choice set attributes.

Figure 2: Sample size vs Margin of Error (CI 95%)



1. Johnson, Rich, and Bryan Orme. "Getting the most from CBC." Sequim: Sawtooth Software Research Paper Series, Sawtooth Software (2003). 2. Orme, B (2010) Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research Second Edition, Madison, Wis.: Research Publishers LLC

Residential

Cohorts Definitions

Energy customers across different climate zones (see map included in the "Pilot Survey" section of this report) are unlikely to be homogeneous with respect to their preferences for electricity outages, due to their different energy needs and living conditions. Thus, to increase the interpretability and usefulness of the analyses, different regional groups were used as separate cohorts for this analysis. Remoteness classifications were based on the ARIA+ structure (Australian Remoteness Index of Australia).

As advised by the AER, data was partitioned into 12 "cohorts" based on different combinations of the resident's Climate Zone, State and Remoteness.

The table adjacent identifies the 12 cohorts and the variables used to define each. "CZ" stands for climate zone. Sufficient responses were received to have a separate NT cohort (i.e. all NT responses are in this cohort, and do not appear in any of the other cohorts).

In the cohort names, "Regional" refers to the combined responses with remoteness of inner regional, outer regional, remote or very remote.

In the cohort names, "CBD & Suburban" is used to distinguish this from the simple remoteness designation of "suburban". "CBD & Suburban" covers remoteness of CBD or remoteness of Suburban.

Table 8: Residential Cohorts

Cohort Name	Climate Zone	State	Remoteness
NT	Any	NT only	Any
CZ1 Regional	CZ1	Any excluding NT	Inner regional + outer regional + remote + very remote
CZ2 CBD & Suburban	CZ2	Any	CBD + suburban
CZ2 Regional	CZ2	Any	Inner regional + outer regional + remote + very remote
CZ3/4 Regional	CZ3 + CZ4	Any excluding NT	Inner regional + outer regional + remote + very remote
CZ5 CBD & Suburban NSW	CZ5	NSW only	CBD + suburban
CZ5 CBD & Suburban SA	CZ5	SA only	CBD + Suburban
CZ5 Regional	CZ5	Any	Inner regional + outer regional + remote + very remote
CZ6 CBD & Suburban	CZ6	Any	CBD + suburban
CZ6 Regional	CZ6	Any	Inner regional + outer regional + remote + very remote
CZ7 CBD & Suburban	CZ7	Any	CBD + suburban
CZ7 Regional	CZ7	Any	Inner regional + outer regional + remote + very remote

Business

Table 9: Cohorts Definitions

The business cohorts are based on ABS / ANZSIC codes, which are captured in the responses to Question 1 in the Business Survey in the business respondent data file

QB1 Coding	ANZSIC sector	ANZSIC Description	Responses
1	A	Agriculture, forestry and fishing	123
2	B	Mining	33
3	C	Manufacturing	134
4	D	Electricity, gas, water and waste service	27
5	E	Construction	121
6	F	Wholesale trade	84
7	G	Retail trade	200
8	H	Accommodation and food services	80
9	I	Transport, postal and warehousing	53
10	J	Information media and telecommunications	109
11	K	Financial and insurance services	99
12	L	Rental hiring and real estate services	42
13	M	Professional, scientific and technical services	242
14	N	Administrative and support services	109
15	O	Public administration and safety	14
16	P	Education and training	113
17	Q	Health care and social assistance	130
18	R	Arts and recreation services	73
19	S	Other services	35

Table 10: Business Cohorts

The AER defined 3 business cohorts:

Cohort	QB1 coding	ANZSIC Sectors	Description
1	1	A	Agriculture
2	2, 3, 4, 5	B C D E	Industrial
4	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17 18, 19	F G H I J K L M N O P Q R S T	Commercial

Survey design

The VCR is expressed in dollars per kilowatt hour of unserved energy. The purpose of the survey is to establish customer WTP to avoid a "baseline outage". Variation from this baseline WTP is established by choice model questions. The object of these questions is to establish differential values customers place on outages with different attributes. For example, how much extra (if anything) is the avoidance of a long outage worth than a short outage.

In the survey itself, respondents are presented with the choice model questions prior to providing their WTP to avoid the baseline outage.

The balance between WTP and choice modelling design neutralises the effect of 'loss avoidance bias' (i.e. in cognitive psychology and decision theory, loss aversion refers to people's tendency to prefer avoiding losses to acquiring equivalent gains: it is better to not lose $5 than to find $5). The WTP question asks respondents to pay more. Conversely, the Choice Model questions offer a chance to pay less by offering lower bills but also lower network reliability, expressed as more severe outages.

Choice model survey design

Each respondent is presented with eight Choice Model questions. Each question had three choice cards, one of which described the baseline outage which they would later go on to consider by itself in the WTP section. The position of the baseline outage was randomised.

Overall, there were six attributes, with each broken down into between two and four levels.

There were a total of three cards presented on each screen, with each respondent presented with eight screens. There were five different sets of the eight screens, however each respondent only completed a single set.

The choice sets provided to residential and business customers were almost identical, except for the characterisation of bill impact. This is demonstrated in the following two figures.

Figure 3: Residential example of choice model screen

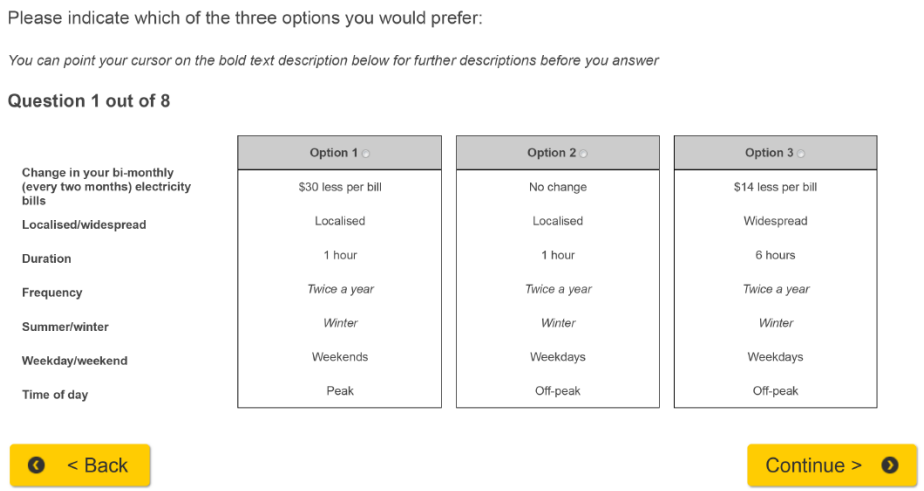
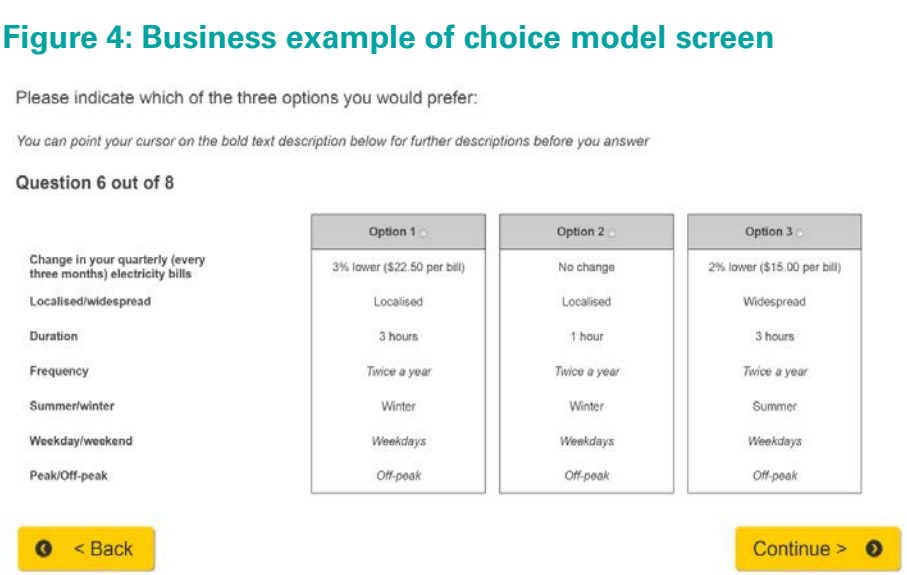


Figure 4: Business example of choice model screen



Residential

Willingness to pay survey design

To determine average WTP for residential customers, the survey asked three questions, with the second question contingent on the response provided to the first.

Respondents were presented with the attributes of a particular scenario involving two unexpected power outages, described as localised, with each unexpected outage occurring on a different random weekday, in winter (Jun, Jul, Aug), at off-peak times (outside of 7-10am, 5-8pm) of 1 hour duration.

In reference to the particular scenario, respondents were firstly asked "Would you be willing to pay an increase of $x/month in your electricity bill to avoid both of the outages described in the above scenario?", where the dollar amount was randomly assigned between $2 and $9. Where a customer said:

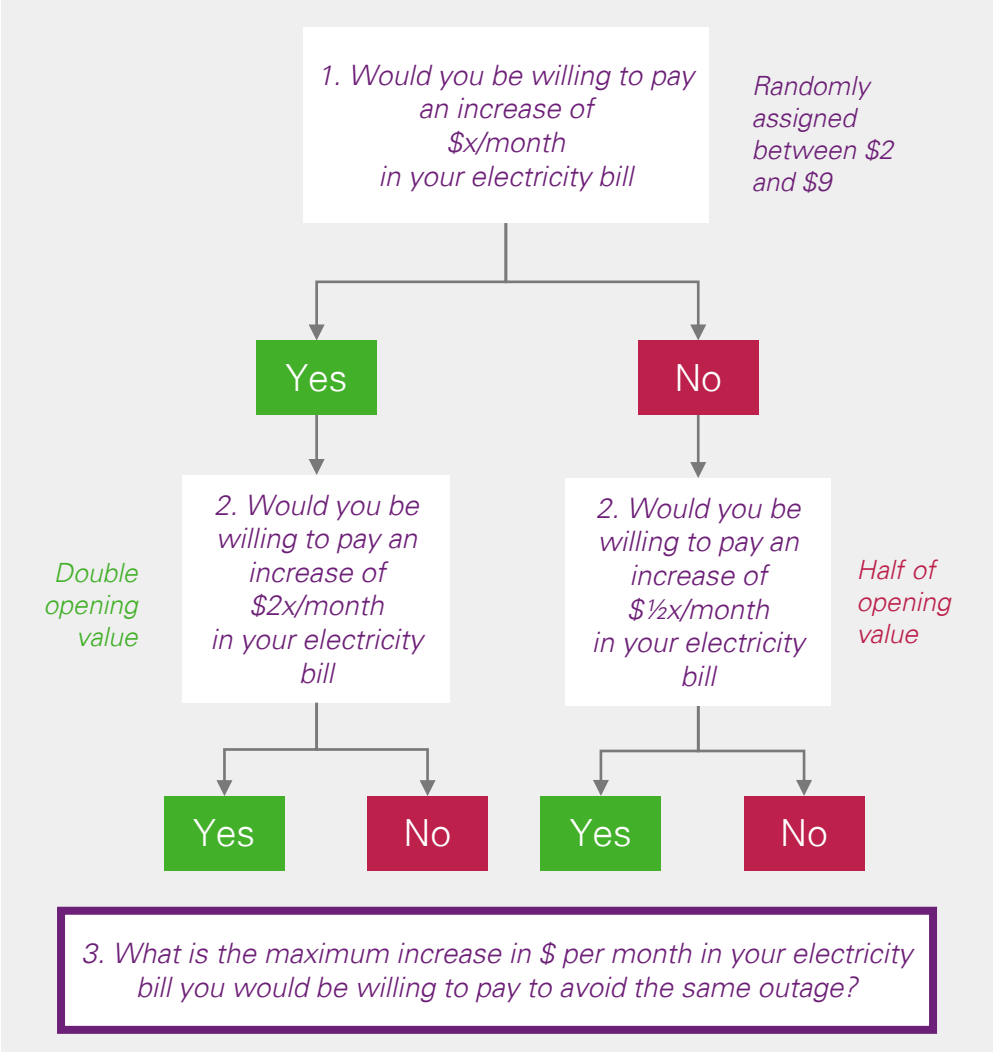
- 'Yes', the follow-up question was "Would you be willing to pay an increase of $x/month in your electricity bill?", where the dollar amount was double the value in the preceding question;
- 'No', the follow-up question was "Would you be willing to pay an increase of $x/month in your electricity bill?", where the dollar amount was half the value in the preceding question;

Under all circumstances, the third question asked was "What is the maximum increase in $ in your [billing period] electricity bill you would be willing to pay to avoid the same outage?"

Responses to the open question were taken as respondents' maximum WTP, except for cases where the value exceeded $22/month. $22/month was advised by the AER as the cost most Australians (house/apartment) could source a backup system that would provide electricity to their premises for one hour (duration of baseline outage).

Respondents entering a maximum WTP open value in excess of $22/month triggered an additional question that appeared later in the survey (see following slide)

Figure 5: WTP structure for residential respondents



Residential

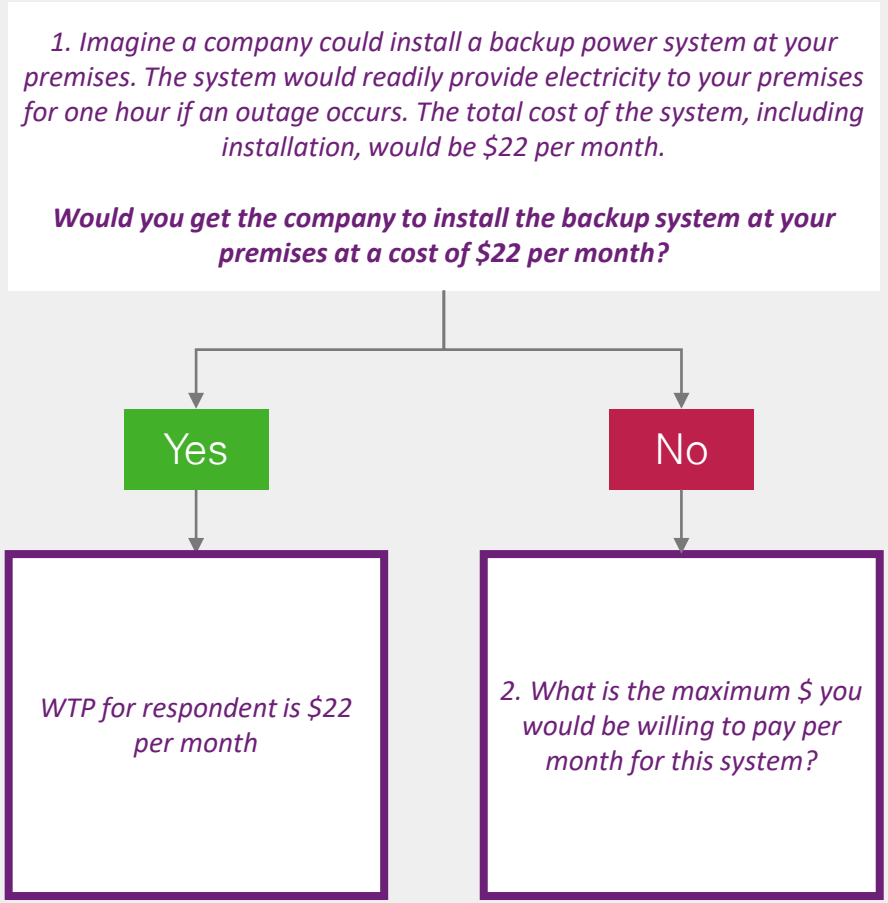
Willingness to pay survey design

Respondents entering a maximum WTP open value in excess of $22/month triggered an additional question that appeared later in the survey.

If a respondent indicated they would have a backup system installed at their premises for $22 per month, their maximum WTP is deemed to be $22 per month.

Respondents who were not willing to pay $22 per month were asked a follow-up open question seeking their maximum WTP per month for the system, which was then used as the respondent's maximum WTP (also capped at $22).

Figure 6: WTP structure for residential respondents



Business

Willingness to pay survey design

To determine average WTP for business customers, the survey asked three questions, with the second question contingent on the response provided to the first.

Respondents were presented with the attributes of a particular scenario involving two unexpected power outages, described as localised, with each unexpected outage occurring on a different random weekday, in winter (Jun, Jul, Aug), at off-peak times (outside of 7-10am, 5-8pm) of 1 hour duration.

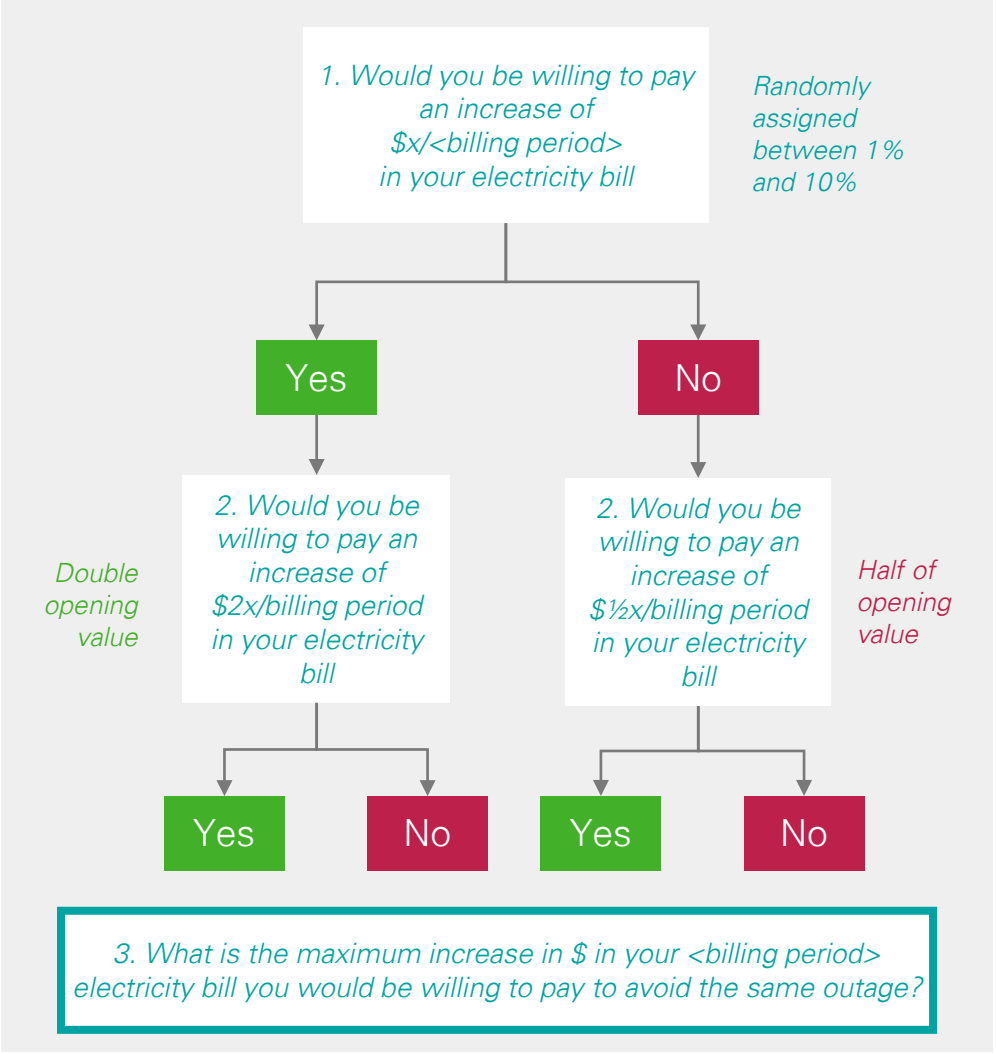
In reference to the particular scenario, respondents were firstly asked "Would you be willing to pay an increase of $x/[billing period] in your electricity bill to avoid both of the outages described in the above scenario?", where the increase was randomly assigned between 1% to 10% of the total bill, though presented as a dollar amount based on the respondent's most recent bill as per a previous item answered in the survey. Where a customer said:

- 'Yes', the follow-up question was "Would you be willing to pay an increase of $x/[billing period] in your electricity bill?", where the dollar amount was double the value in the preceding question;
- 'No', the follow-up question was "Would you be willing to pay an increase of $x/[billing period] in your electricity bill?", where the dollar amount was half the value in the preceding question;

Under all circumstances, the third question asked was "What is the maximum increase in $ in your [billing period] electricity bill you would be willing to pay to avoid the same outage? The proportion of the dollar amount entered, as a percentage of the respondent's last bill, was also displayed on screen

A respondent's WTP was calculated using the % increase provided in the open question, capped at 100%.

Figure 7: WTP structure for business respondents



KPMG insync

Survey Results

Residential

WTP

In 2014, the main VCR study considered the responses of 1,416 residential customers. In 2019 this number was increased to 7,426 residential customers. This enabled much greater granularity in the calculation of results by combinations of climate zone, State, remoteness classification and other demographics.

The average WTP to avoid the baseline outage for residential customers was $3.51. The range varied between $2.79 and $4.20, as demonstrated in the table adjacent.

Table 11: Residential WTP Results

Cohort Name	Climate Zone	State	Remoteness	n	WTP $/month
NT	Any	NT only	Any	257	$3.33
CZ1 Regional	CZ1	Any excluding NT	Inner regional + outer regional + remote + very remote	195	$2.85
CZ2 CBD & Suburban	CZ2	Any	CBD + suburban	1,039	$3.43
CZ2 Regional	CZ2	Any	Inner regional + outer regional + remote + very remote	410	$3.15
CZ3/4 Regional	CZ3 + CZ4	Any excluding NT	Inner regional + outer regional + remote + very remote	352	$3.73
CZ5 CBD & Suburban NSW	CZ5	NSW only	CBD + suburban	1,013	$4.06
CZ5 CBD & Suburban SA	CZ5	SA only	CBD + Suburban	597	$3.30
CZ5 Regional	CZ5	Any	Inner regional + outer regional + remote + very remote	245	$2.88
CZ6 CBD & Suburban	CZ6	Any	CBD + suburban	2,131	$3.70
CZ6 Regional	CZ6	Any	Inner regional + outer regional + remote + very remote	513	$2.79
CZ7 CBD & Suburban	CZ7	Any	CBD + suburban	211	$4.20
CZ7 Regional	CZ7	Any	Inner regional + outer regional + remote + very remote	462	$3.21
Overall NEM	**Any**	**Any**	**Any**	**7,426**	**$3.51**

Residential

Choice Model Results – All residential responses

- Duration is a significant factor affecting the outage preferences for residential respondents. Scenarios with 3, 6 and 12 hours of duration displayed large negative directions to outage preferences;
- The duration of the outage attribute is monotonic, that is, for the residential responses, the magnitude of the negative coefficient increases from 3 to 6 to 12 hours; and
- The highly significant coefficient estimate for Status Quo is mainly driven by the substantial proportion of respondents that have consistently chosen the status-quo choice as the preference for all 8 choice survey questions.*

Choice Model Results – NT Cohort

- Although the magnitude of the coefficients for the duration factor are monotonically increasing, there was no significant difference between NT residential consumers for a 1 hour outage compared to a 3 hour outage (as measured by "Duration – 3 hours" did not have $p<0.05$); and
- NT residential consumers had no preference for outages on weekends as opposed to weekdays.

Table 12: All residential responses

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.486	0.022	22.11	0.00E+00
Severity - Widespread	-0.147	0.013	-11.068	0.00E+00
Duration - 3 Hours	-0.441	0.017	-25.362	0.00E+00
Duration - 6 Hours	-0.814	0.019	-43.449	0.00E+00
Duration - 12 Hours	-1.081	0.021	-52.671	0.00E+00
Season - Summer	0.003	0.014	0.258	8.00E-01
Time of day - Peak	-0.257	0.014	-18.749	0.00E+00
Weekend	-0.028	0.014	-2.047	4.10E-02
Discount	0.077	0.001	57.38	0.00E+00

Number of records: 178,224
Number of respondents: 7,426

Table 13: NT Cohort

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.96940298	0.129926	7.46121	8.57E-14
Severity - Widespread	-0.148744476	0.076778	-1.93732	5.27E-02
Duration - 3 Hours	-0.049525897	0.1012	-0.48939	6.25E-01
Duration - 6 Hours	-0.426085711	0.107881	-3.94958	7.83E-05
Duration - 12 Hours	-0.725667961	0.11888	-6.10421	1.03E-09
Season - Summer	-0.25502973	0.077936	-3.2723	1.07E-03
Time of day - Peak	-0.186030314	0.078437	-2.37171	1.77E-02
Weekend	-0.10331408	0.078158	-1.32186	1.86E-01
Discount	0.066830781	0.007683	8.698466	0.00E+00

Number of records: 6,168
Number of respondents: 257

Note: in accordance with the VCR methodology the status quo efficient is not being used in the calculation of VCR values as the contingent valuation technique is used to determine the WTP of the baseline outage

Residential

Choice Model Results – Climate Zone 1 - Regional

- All Duration factors were significant for residential customers in Climate Zone 1 – Regional;
- Customers in this cohort had no preference for outages over the weekend as compared to the weekday.

Choice Model Results – Climate Zone 2 – CBD & Suburban

- The impact of any duration was very significant for customers in Climate Zone 2 – Regional; and
- Customers in this cohort had no preference for outages over the weekend as compared to the weekdays.

Table 14: Cohort - CZ1 Regional

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.377850859	0.136577	2.766586	5.66E-03
Severity - Widespread	-0.232575573	0.08265	-2.81397	4.89E-03
Duration - 3 Hours	-0.607095973	0.109414	-5.5486	2.88E-08
Duration - 6 Hours	-0.797853069	0.115664	-6.89805	5.27E-12
Duration - 12 Hours	-1.08999124	0.127551	-8.54553	0.00E+00
Season - Summer	-0.22162688	0.084549	-2.62128	8.76E-03
Time of day - Peak	-0.187282294	0.084736	-2.21019	2.71E-02
Weekend	-0.139186505	0.084689	-1.6435	1.00E-01
Discount	0.086449092	0.008357	10.34464	0.00E+00

Number of records: 4,680
Number of respondents: 195

Table 15: Cohort - CZ2 CBD & Suburban

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.607237022	0.059026	10.28753	0.00E+00
Severity - Widespread	-0.168450617	0.036185	-4.65528	3.24E-06
Duration - 3 Hours	-0.493498372	0.04788	-10.307	0.00E+00
Duration - 6 Hours	-0.77071933	0.050658	-15.214	0.00E+00
Duration - 12 Hours	-1.003753595	0.055416	-18.113	0.00E+00
Season - Summer	0.031056844	0.036764	0.844757	3.98E-01
Time of day - Peak	-0.279783392	0.037158	-7.52958	5.08E-14
Weekend	-0.022704588	0.036833	-0.61641	5.38E-01
Discount	0.076212186	0.003623	21.03681	0.00E+00

Number of records: 24,936
Number of respondents: 1,039

Residential

Choice Model Results – Climate Zone 2 - Regional

- All Duration factors were significant for residential customers in Climate Zone 2 – Regional;
- Customers in this cohort had no preference for outages over the weekend as compared to the weekdays; and
- There appeared to be no preference for outages in Summer as opposed to Winter.

Choice Model Results – Climate Zone 3/4 - Regional

- The impact of any duration was very significant for customers in this cohort; and
- Customers in this cohort had no preference for outages over the weekend as compared to the weekdays.

Table 16: Cohort - CZ2 Regional

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.476361596	0.094972	5.015811	5.28E-07
Severity - Widespread	-0.14219993	0.057788	-2.46073	1.39E-02
Duration - 3 Hours	-0.422838229	0.074942	-5.64224	1.68E-08
Duration - 6 Hours	-0.807840849	0.080569	-10.0267	0.00E+00
Duration - 12 Hours	-1.162542005	0.090442	-12.854	0.00E+00
Season - Summer	-0.049623676	0.058599	-0.84683	3.97E-01
Time of day - Peak	-0.315337258	0.059546	-5.29571	1.19E-07
Weekend	-0.067272649	0.058761	-1.14485	2.52E-01
Discount	0.070673463	0.005796	12.19336	0.00E+00

Number of records: 9,840
Number of respondents: 410

Table 17: Cohort - CZ3/4 Regional

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.334329808	0.10075	3.318405	9.05E-04
Severity - Widespread	-0.228575606	0.06111	-3.74039	1.84E-04
Duration - 3 Hours	-0.398448106	0.080164	-4.97041	6.68E-07
Duration - 6 Hours	-0.734208045	0.085207	-8.61675	0.00E+00
Duration - 12 Hours	-1.088348549	0.096079	-11.3277	0.00E+00
Season - Summer	-0.29018628	0.062405	-4.65004	3.32E-06
Time of day - Peak	-0.228797204	0.062917	-3.63649	2.76E-04
Weekend	0.019343418	0.061951	0.312239	7.55E-01
Discount	0.072867097	0.006196	11.76089	0.00E+00

Number of records: 8,448
Number of respondents: 352

Residential

Choice Model Results – Climate Zone 5 – CBD & Suburban NSW

- All Duration factors were significant for residential customers in Climate Zone 5 – CBD & Suburban; and
- Customers in this cohort had no preference for outages over the weekend as compared to the weekdays.

Choice Model Results – Climate Zone 5 – CBD & Suburban SA

- The impact of any duration was very significant for customers in this cohort; and
- Customers in this cohort had no preference for outages over the weekend as compared to the weekdays.

Table 18: Cohort - CZ5 CBD & Suburban NSW

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.327539553	0.058952	5.556023	2.76E-08
Severity - Widespread	-0.180458841	0.035688	-5.05657	4.27E-07
Duration - 3 Hours	-0.535197286	0.04645	-11.5221	0.00E+00
Duration - 6 Hours	-0.929480721	0.050494	-18.4079	0.00E+00
Duration - 12 Hours	-1.227508274	0.055524	-22.1078	0.00E+00
Season - Summer	0.064049895	0.036474	1.756054	7.91E-02
Time of day - Peak	-0.313591261	0.03693	-8.49148	0.00E+00
Weekend	-0.007567099	0.036598	-0.20676	8.36E-01
Discount	0.077693559	0.003608	21.53199	0.00E+00

Number of records: 24,312
Number of respondents: 1,013

Table 19: Cohort - CZ5 CBD & Suburban SA

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.347251165	0.078377	4.430517	9.40E-06
Severity - Widespread	-0.16276487	0.047911	-3.39723	6.81E-04
Duration - 3 Hours	-0.529811654	0.061038	-8.68001	0.00E+00
Duration - 6 Hours	-1.077844517	0.068121	-15.8224	0.00E+00
Duration - 12 Hours	-1.359958137	0.07519	-18.087	0.00E+00
Season - Summer	-0.183980525	0.048896	-3.76266	1.68E-04
Time of day - Peak	-0.16683032	0.049451	-3.37367	7.42E-04
Weekend	-0.044931438	0.048855	-0.91968	3.58E-01
Discount	0.073473116	0.004838	15.18543	0.00E+00

Number of records: 14,328
Number of respondents: 597

Residential

Choice Model Results – Climate Zone 5 Regional

- The impact of any duration was very significant for customers in this cohort;
- Customers in this cohort had no preference for outages over the weekend as compared to the weekdays; and
- Customers in this cohort had no preference for outages over the Summer as opposed to in Winter.

Choice Model Results – Climate Zone 6 – CBD & Suburban

- The impact of any duration was very significant for customers in this cohort; and
- Customers in this cohort had no preference for outages over the weekend as compared to the weekdays.

Table 20: Cohort - CZ5 Regional

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.610304933	0.12348	4.942546	7.71E-07
Severity - Widespread	-0.11147268	0.074657	-1.49313	1.35E-01
Duration - 3 Hours	-0.4818287	0.097225	-4.95581	7.20E-07
Duration - 6 Hours	-0.945180735	0.104978	-9.00357	0.00E+00
Duration - 12 Hours	-1.136861269	0.114903	-9.89413	0.00E+00
Season - Summer	0.11518172	0.075511	1.525357	1.27E-01
Time of day - Peak	-0.392571567	0.077171	-5.08701	3.64E-07
Weekend	0.022704223	0.075717	0.299857	7.64E-01
Discount	0.088433107	0.007477	11.82758	0.00E+00

Number of records: 5,880
Number of respondents: 245

Table 21: Cohort - CZ6 CBD & Suburban

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.517793316	0.040999	12.62941	0.00E+00
Severity - Widespread	-0.081584033	0.024392	-3.34472	8.24E-04
Duration - 3 Hours	-0.344189274	0.03205	-10.7392	0.00E+00
Duration - 6 Hours	-0.748253467	0.034685	-21.5728	0.00E+00
Duration - 12 Hours	-0.934218995	0.037344	-25.0168	0.00E+00
Season - Summer	0.026028094	0.024852	1.047343	2.95E-01
Time of day - Peak	-0.22346022	0.025124	-8.89412	0.00E+00
Weekend	-0.018220828	0.025014	-0.72842	4.66E-01
Discount	0.075764596	0.00246	30.80233	0.00E+00

Number of records: 5,114
Number of respondents: 2,131

Residential

Choice Model Results – Climate Zone 6 – Regional

- The impact of any duration was very significant for customers in this cohort;
- Customers in this cohort had no preference for outages over the weekend as compared to the weekdays; and
- Customers in this cohort had no preference for outages over the Summer as opposed to in Winter.

Choice Model Results – Climate Zone 7 – CBD & Suburban

- The impact of any duration was very significant for customers in this cohort; and
- Customers in this cohort had no preference for outages over the weekend as compared to the weekdays.

Table 22: Cohort - CZ6 Regional

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.551655142	0.083291	6.623209	3.51E-11
Severity - Widespread	-0.153184118	0.050976	-3.00505	2.66E-03
Duration - 3 Hours	-0.433843144	0.066721	-6.50233	7.91E-11
Duration - 6 Hours	-0.764077587	0.070793	-10.7932	0.00E+00
Duration - 12 Hours	-1.209149348	0.080154	-15.0852	0.00E+00
Season - Summer	0.036275489	0.051883	0.699178	4.84E-01
Time of day - Peak	-0.261441157	0.052343	-4.99476	5.89E-07
Weekend	-0.028327819	0.0515	-0.55005	5.82E-01
Discount	0.085387295	0.005113	16.69885	0.00E+00

Number of records: 12,312
Number of respondents: 513

Table 23: Cohort - CZ7 CBD & Suburban

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.370345487	0.128266	2.887326	3.89E-03
Severity - Widespread	-0.203499333	0.079139	-2.57142	1.01E-02
Duration - 3 Hours	-0.587772218	0.103417	-5.68349	1.32E-08
Duration - 6 Hours	-0.89281862	0.11186	-7.98154	1.55E-15
Duration - 12 Hours	-1.448142087	0.126095	-11.4845	0.00E+00
Season - Summer	0.177255701	0.082785	2.141145	3.23E-02
Time of day - Peak	-0.333992269	0.082518	-4.04752	5.18E-05
Weekend	-0.115294806	0.08092	-1.42479	1.54E-01
Discount	0.080943099	0.007998	10.12072	0.00E+00

Number of records: 5,064
Number of respondents: 211

Residential

Choice Model Results – Climate Zone 7 – Regional

- The impact of any duration was very significant for customers in this cohort; and
- Customers in this cohort had no preference for outages over the weekend as compared to the weekdays.

Table 24: Cohort – CZ7 Regional

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.407136475	0.085298	4.773135	1.81E-06
Severity - Widespread	-0.208056396	0.052382	-3.97189	7.13E-05
Duration - 3 Hours	-0.580260724	0.069808	-8.31224	0.00E+00
Duration - 6 Hours	-0.880362916	0.074105	-11.88	0.00E+00
Duration - 12 Hours	-1.102920246	0.079812	-13.8189	0.00E+00
Season - Summer	0.245268866	0.05395	4.546216	5.46E-06
Time of day - Peak	-0.285462866	0.053718	-5.31414	1.07E-07
Weekend	-0.027525918	0.053618	-0.51337	6.08E-01
Discount	0.080585468	0.00528	15.26249	0.00E+00

Number of records: 11,112
Number of respondents: 463

Business

WTP

In 2014, the main VCR study considered the responses of 674 business customers. In 2019, these numbers were increased to 1,821 business customers. The range of business types for which a VCR could be calculated was important to both the AER and the VCRCC. Given this, the open links were distributed to businesses in general but focused more on agricultural business due to the low numbers of agricultural responses received via the panel fieldwork. Incentivised CATI based recruitment occurred in the final week of the fieldwork window to ensure a sufficient number of responses to prepare analysis specific to agricultural customers.

Due to the greater variance in electricity costs for businesses, WTP for this cohort is expressed as a percentage increase in the total bill. Average WTP across all business segments was 14.2%.

Segments were constructed from combinations of ANZSIC business sectors (as per the business cohorts definitions section earlier in this report):

Table 25: Overall NEM

	n	WTP %
Overall NEM	1,821	14.2%

Table 26: Business sector

Business Segment	n	WTP %
Agriculture	123	13.5%
Industrial	315	17.0%
Commercial	1383	13.5%

Business

Choice Model Results – Business: All respondents

- The impact of any duration was very significant for customers in this cohort, with longer durations being less desirable, however, the coefficient for 6 hour duration was similar to that for 12 hours, suggesting that business customers found these outages similarly undesirable;
- Customers in this cohort prefer outages on weekends compared to weekdays; and
- Customers in this cohort prefer outages for off-peak times compared to peak times.

Choice Model Results – Business: Agricultural sector

- The impact of any duration was very significant for customers in this cohort, longer durations being less desirable, with the magnitude of the coefficient monotonically increasing; and
- Interestingly, for this cohort, severity, season, time of day and weekends were not significant in driving outage preferences p>0.05.

Table 27: Cohort - Business All

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.463	0.050	9.326	0.0E+00
Severity - Widespread	-0.064	0.028	-2.279	2.3E-02
Duration - 3 Hours	-0.302	0.037	-8.241	2.2E-16
Duration - 6 Hours	-0.443	0.037	-12.080	0.0E+00
Duration - 12 Hours	-0.474	0.035	-13.550	0.0E+00
Season - Summer	-0.023	0.026	-0.896	3.7E-01
Time of day - Peak	-0.093	0.026	-3.568	3.6E-04
Weekend	0.089	0.027	3.309	9.4E-04
Discount	0.160	0.016	10.092	0.0E+00

Number of records: 43,704
Number of respondents: 1,821

Table 28: Cohort - Agriculture

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.980	0.208	4.723	2.3E-06
Severity - Widespread	-0.097	0.111	-0.870	3.8E-01
Duration - 3 Hours	-0.393	0.140	-2.798	5.1E-03
Duration - 6 Hours	-0.807	0.147	-5.475	4.4E-08
Duration - 12 Hours	-1.058	0.152	-6.973	3.1E-12
Season - Summer	-0.058	0.107	-0.541	5.9E-01
Time of day - Peak	0.079	0.107	0.734	4.6E-01
Weekend	0.111	0.108	1.026	3.0E-01
Discount	0.365	0.066	5.520	3.4E-08

Number of records: 2,952
Number of respondents: 123

Business

Choice Model Results – Business: Industrial sector

- The impact of duration was significant for customers in this cohort, but only for 6 and 12 hour outages; and
- Customers in this cohort prefer outages on weekends rather than weekdays.

Choice Model Results – Business: Commercial sector

- The impact of any duration was very significant for customers in this cohort, with longer durations less desirable;
- Customers in this cohort prefers outage on off-peak times than peak times; and
- Customers in this cohort were indifferent between outages in Summer v Winter.

Table 29: Cohort – Industrial

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.599	0.118	5.058	4.2E-07
Severity - Widespread	0.039	0.066	0.594	5.5E-01
Duration - 3 Hours	-0.074	0.087	-0.850	4.0E-01
Duration - 6 Hours	-0.346	0.088	-3.923	8.7E-05
Duration - 12 Hours	-0.350	0.084	-4.161	3.2E-05
Season - Summer	-0.094	0.062	-1.508	1.3E-01
Time of day - Peak	-0.036	0.062	-0.578	5.6E-01
Weekend	0.213	0.065	3.303	9.6E-04
Discount	0.147	0.038	3.885	1.0E-04

Number of records: 7,560
Number of respondents: 315

Table 30: Cohort – Commercial

Cohort: All Residential	Coefficient Estimate	Standard Error	z-value	Pr(>|z|)
Status Quo	0.396	0.057	6.958	3.5E-12
Severity - Widespread	-0.082	0.032	-2.549	1.1E-02
Duration - 3 Hours	-0.347	0.042	-8.228	2.2E-16
Duration - 6 Hours	-0.435	0.042	-10.370	0.0E+00
Duration - 12 Hours	-0.459	0.040	-11.500	0.0E+00
Season - Summer	-0.005	0.030	-0.177	8.6E-01
Time of day - Peak	-0.119	0.030	-3.988	6.7E-05
Weekend	0.059	0.031	1.925	5.4E-02
Discount	0.148	0.018	8.149	4.4E-16

Number of records: 33,192
Number of respondents: 1,383

Appendices

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Appendix A
Sample details

Introduction

The purpose of this appendix is to demonstrate that samples obtained allow for robust analysis of residential and business results across the NEM and also by relevant demographics. The majority of responses were collated via a paid panel, allowing for targeted samples by postcode, age, and gender. Response numbers were monitored by cohort and screened out prior to the completion of fieldwork where a sample has already been sufficiently obtained.

Residential sample

Residential response numbers by demographic are included in the following tables.

The residential cohorts we have surveyed, more than double the average sample size per cohort of AEMO 2014. A larger sample size provides a greater chance of finding significant differences between subsets of data and increase the precision of regression estimates.

Climate zone, State/jurisdiction and remoteness classification were assigned based on postcode.

Table 31 – Climate zone

Climate zone	n	proportion of total
Zone 1 – High humidity summer, warm winter	407	5%
Zone 2 – Warm humid summer, mild winter	1449	20%
Zone 3 - Hot dry summer, warm winter	83	1%
Zone 4 - Hot dry summer, cool winter	314	4%
Zone 5 – Warm temperate	1855	25%
Zone 6 – Mild temperate	2644	36%
Zone 7 – Cool temperate (incl Alpine)	674	9%

Source: Australian Building Codes Board

The following table provides a breakdown of the sample by state/jurisdiction. As can be seen a good proportion of the sample were from NSW, Victoria and Queensland.

Table 32 – State/Jurisdiction

State	n	proportion of total
Australian Capital Territory	173	2%
New South Wales	2144	29%
Northern Territory	257	3%
Queensland	1616	22%
South Australia	798	11%
Tasmania	315	4%
Victoria	2123	29%

The following table provides a breakdown of the sample by the remoteness classification. As can be seen the majority of the sample were from the major cities of Australia.

Table 33 – Remoteness classification (ARIA Index)

Remoteness classification	n	proportion of total
CBD	21	2%
Major Cities of Australia	4870	66%
Inner Regional Australia	1632	22%
Outer Regional Australia	708	10%
Remote Australia	90	1%
Very Remote Australia	5	0%

The following table provides a breakdown of the sample by age. As can be seen a there is a relatively good split between the different age brackets.

Table 34 – Age

Age	n	proportion of total
Under 30	859	12%
30 - 39	1226	17%
40 - 49	1254	17%
50 - 59	1540	21%
60 - 69	1212	16%
70 or older	1295	17%
Prefer not to say	40	1%

The following table provides a breakdown of the sample by gender. As can be seen a majority of the sample were female

Table 35 – Gender

Age	n	proportion of total
Female	4312	58%
Male	3054	41%
Prefer to self-describe	10	0%
Prefer not to say	50	1%

The following table provides the proportion of respondents that spoke another language other than English at home. As can be seen a only a small proportion of respondents spoke another language other than English at home.

Table 36 – Do you speak a language other than English at home?

Do you speak a language other than English at home?	n	proportion of total
Yes, always	545	7%
Yes, sometimes	638	9%
No	6196	83%
Prefer not to say	47	1%

The following table shows the breakdown of household size by number of persons. Majority of the respondents fell in the 2-3 people household category.

Table 37 – Household size

Household size	n	proportion of total
1 person	1484	20%
2-3 people	4358	59%
4+ people	1584	21%

Business sample

Business response numbers by demographic are included in the tables across.

Table 38: Business segment (grouping supplied by AER)

Cohort	n	proportion of total
Agriculture (ANZSIC Code A)	123	7%
Industrial (ANZSIC Codes B, C, D, E)	315	17%
Commercial (ANZSIC Codes F, G, H, I, J, K, L, M, N, O, P, Q, R, S)	1383	76%

Table 39: Business size

How many employees (or full time equivalent) work across the site(s) that are covered by your electricity bill?	n	proportion of total
0	103	6%
1-10	766	42%
11-20	317	17%
21-100	390	21%
101-200	119	7%
>200	126	7%

Table 40: Business Areas

ABS/ANZSIC Code	n	proportion of total
A - Agriculture, Forestry and Fishing	123	7%
B – Mining	33	2%
C – Manufacturing	134	7%
D - Electricity, Gas, Water and Waste Services	27	1%
E – Construction	121	7%
F - Wholesale Trade	84	5%
G - Retail Trade	200	11%
H - Accommodation and Food Services	80	4%
I - Transport, Postal and Warehousing	53	3%
J - Information Media and Telecommunications	109	6%
K - Financial and Insurance Services	99	5%
L - Rental, Hiring and Real Estate Services	42	2%
M - Professional, Scientific and Technical Services	242	13%
N - Administrative and Support Services	109	6%
O - Public Administration and Safety	14	1%
P - Education and Training	113	6%
Q - Health Care and Social Assistance	130	7%
R - Arts and Recreation Services	73	4%
S - Other Services	35	2%

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Appendix B
Choice modelling assumptions

Statistical Methodology

This section of the appendices details the methodology and statistical theories underlying the choice models. While there are many ways to analyse choice modelling, the adopted methodology is widely used across the practise due to the simplicity and ease of interpretability.

Multinomial Logit Models (MNL) were fit to the choice survey data. These are statistical models appropriate for representing the utility-maximising decision process of an individual or segment in a particular context. These calculate the probability that a respondent gives a particular answer, based on the nature of the outage described. This is the same approach as adopted by AEMO in the 2014 VCR analysis, for further details, refer to the 2014 Report[1].

In this survey, model estimates were derived from an estimated probability function representing the likelihood of a preference for a particular outage scenario in response to the proposed compensation. The theoretical probability function is:

$$\Pr(Y_i = j) = \frac{e^{\lambda \beta' x_{ij}}}{\sum_{j=1}^{j} e^{\lambda \beta' x_{y}}}, \lambda > 0$$

Where:

- The choice process is modelled using a conditional logit specification with Gumbel error scale $\lambda > 0$,
- The probability that outage alternative j will be selected in choice task i

Model estimates were developed for both residential and business respondents, as well as for defined segments within residential and business:

- The residential segments were divided based on climate and remoteness classifications
- The business segments were divided based on the type of business sector classifications

The data manipulation and analysis procedures were conducted using R statistical software, the package used for MNL specifically was "mlogit"[2].

The model results were compared in terms of their coefficient estimates for positive/negative impact on preference, as well as factors determining the level of significance including standard error, z-value and p-value.

1. https://www.aemo.com.au/-/media/Files/PDF/VCR-final-report--PDF-update-27-Nov-14.pdf
2. https://cran.r-project.org/web/packages/mlogit/index.html

Appendix C
Validity of WTP results

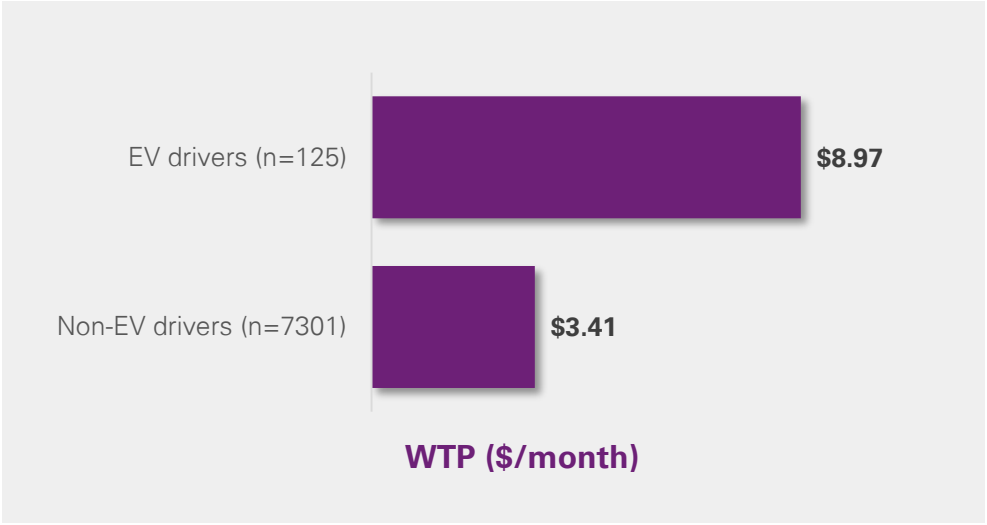
Introduction

Various tests were done to assess whether the data had face validity. This was an essential step in the process since some people assume that paid online panel recruitment is fundamentally flawed and that respondents "skip through" the survey without really engaging or contemplating their answers. If this were the case, then WTP would be the same across all cohorts, regardless of the presence of other independent variables that should logical drive differences in WTP.

Residential

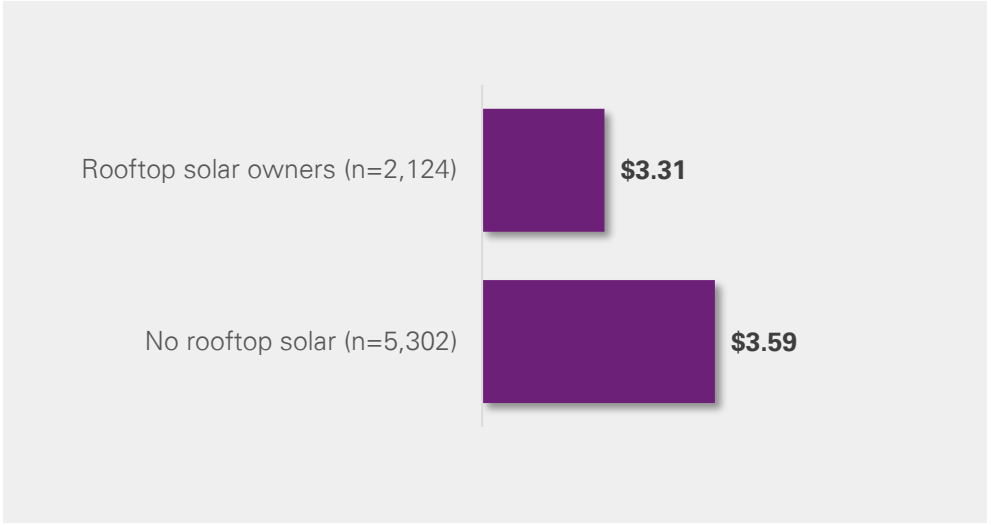
For example, 125 respondents drove electric vehicles (not hybrids, which were explicitly excluded). One might expect that EV owners would have a higher WTP to avoid outages since they depend on electricity for transport. The results certainly support this hypothesis as the chart below shows:

Figure 8: Electric vehicles



More than 2,000 respondents had rooftop solar. Whether this cohort would have a higher or lower WTP was debated by the VCRCC and in the Focus Groups. Some solar PV owners had a very high WTP precisely because their bills were so low. Some incorrectly (and others correctly) thought that they were immune from blackouts as a result of their solar panels. Regardless, a difference in WTP was observed:

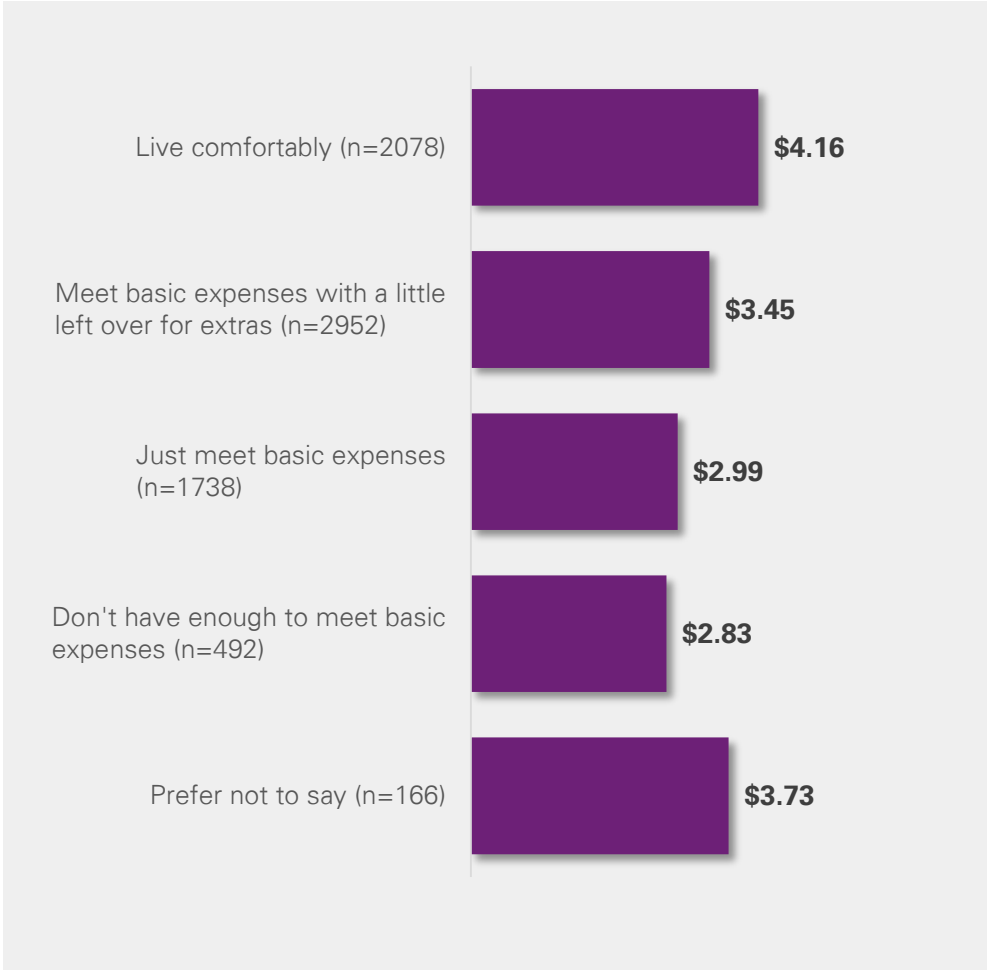
Figure 9: Rooftop solar



A third test for face validity is the hypothesis that those who are in straightened financial circumstances would on average have a lower WTP to avoid an outage. Conversely, those who live comfortably would have a higher WTP. This hypothesis was well supported by the results.

Overall, the idea that the residential WTP results were compromised by the involvement of paid online panellists was not supported by any of the tests for face validity.

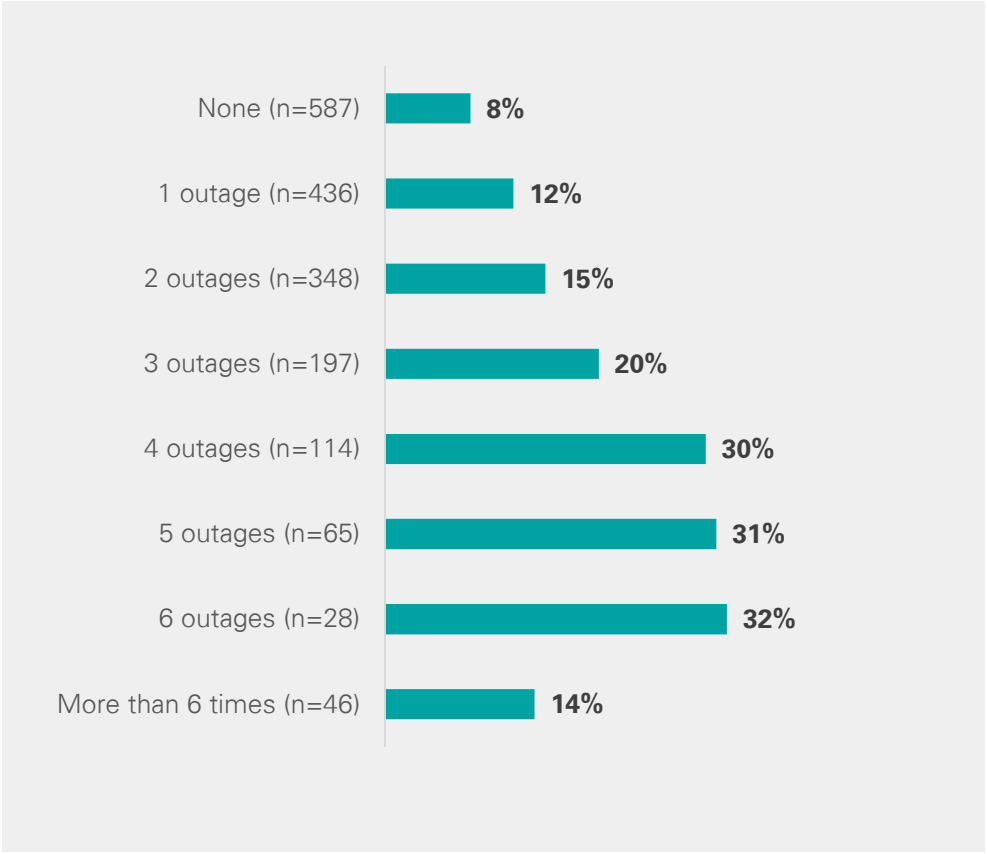
Figure 10: Current financial situation



Business sample

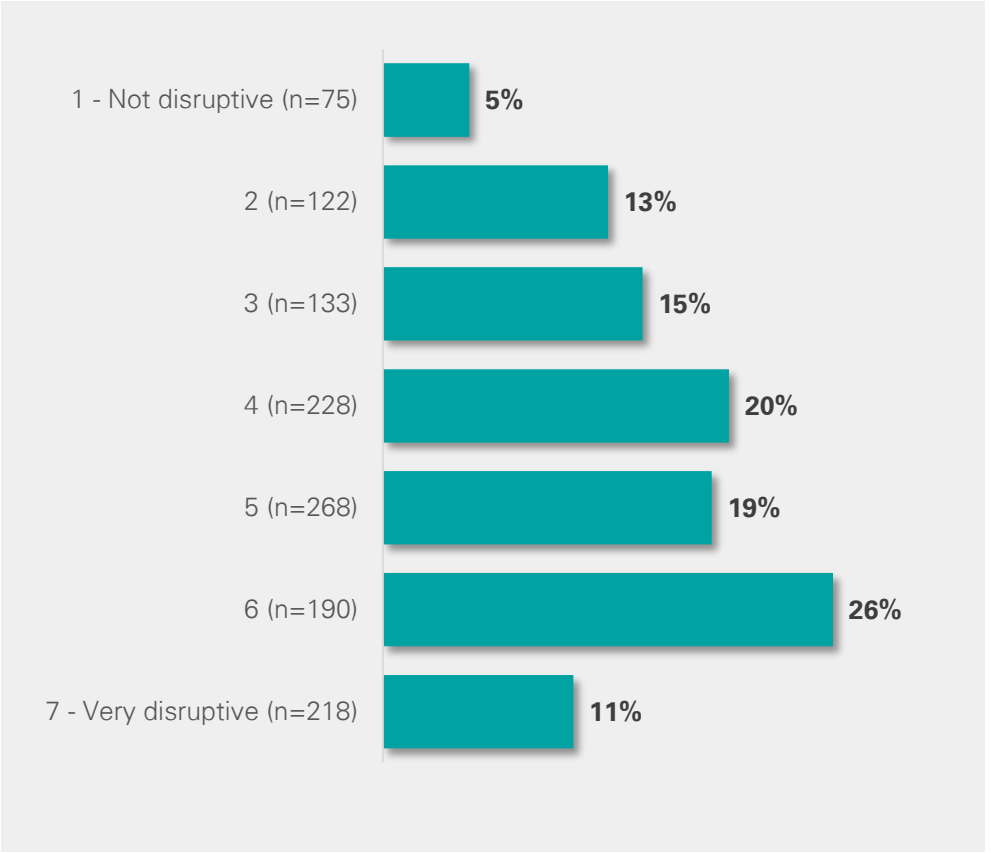
On the non-residential side, a logical test was that business which had experienced many outages would have a higher WTP than those who hadn't. The findings support this idea with the exception of those who had been subjected to more than six outages.

Figure 11: Number of outages in last year



Of those businesses which had experienced an outage, a further logical test was whether the disruptiveness of the outage was positively correlated with WTP. The data strongly support this notion with the exception of those for whom the outage(s) had been Very Disruptive.

Figure 12: Disruptiveness of outages



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Appendix D Survey questionnaire

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Residential Survey

Residential

Introduction

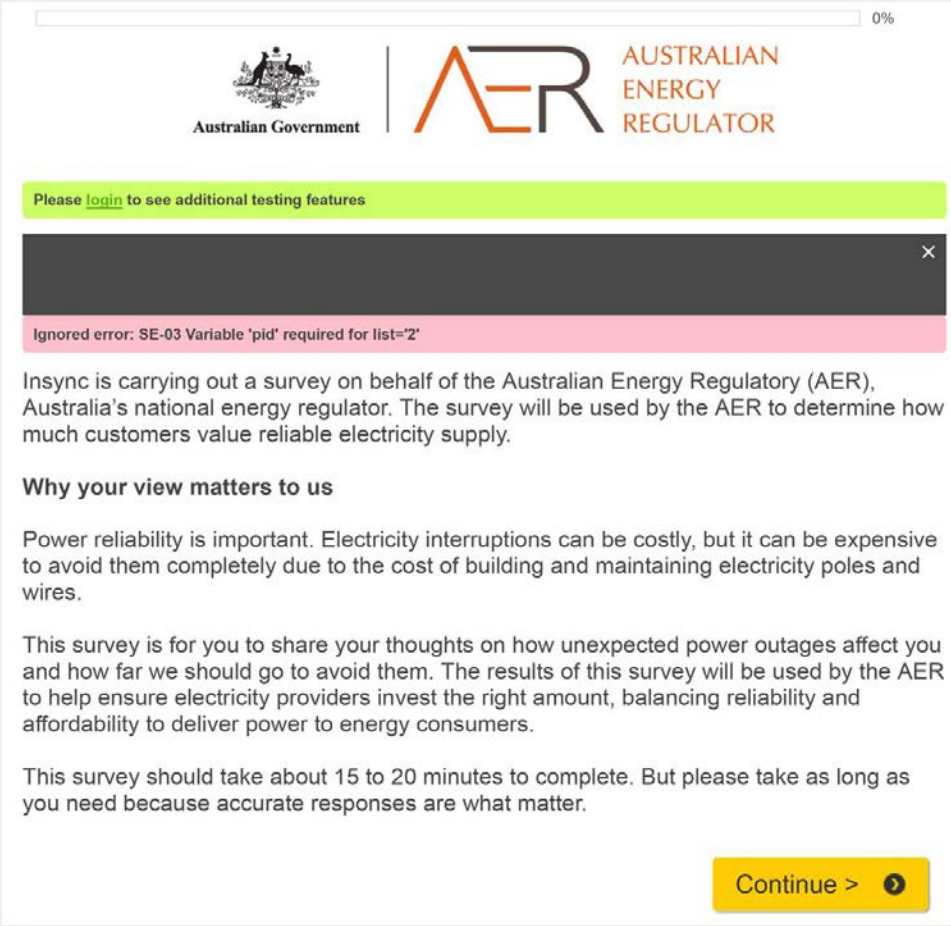
The purpose of this appendix is to document the Main survey for residential respondents that was hosted by Dynata. The survey was released to Dynata's paid panel on Thursday 5 September. The survey was open for six weeks, closing on Wednesday 16 October. Respondents could save partially completed responses and were followed up with reminders by Dynata.

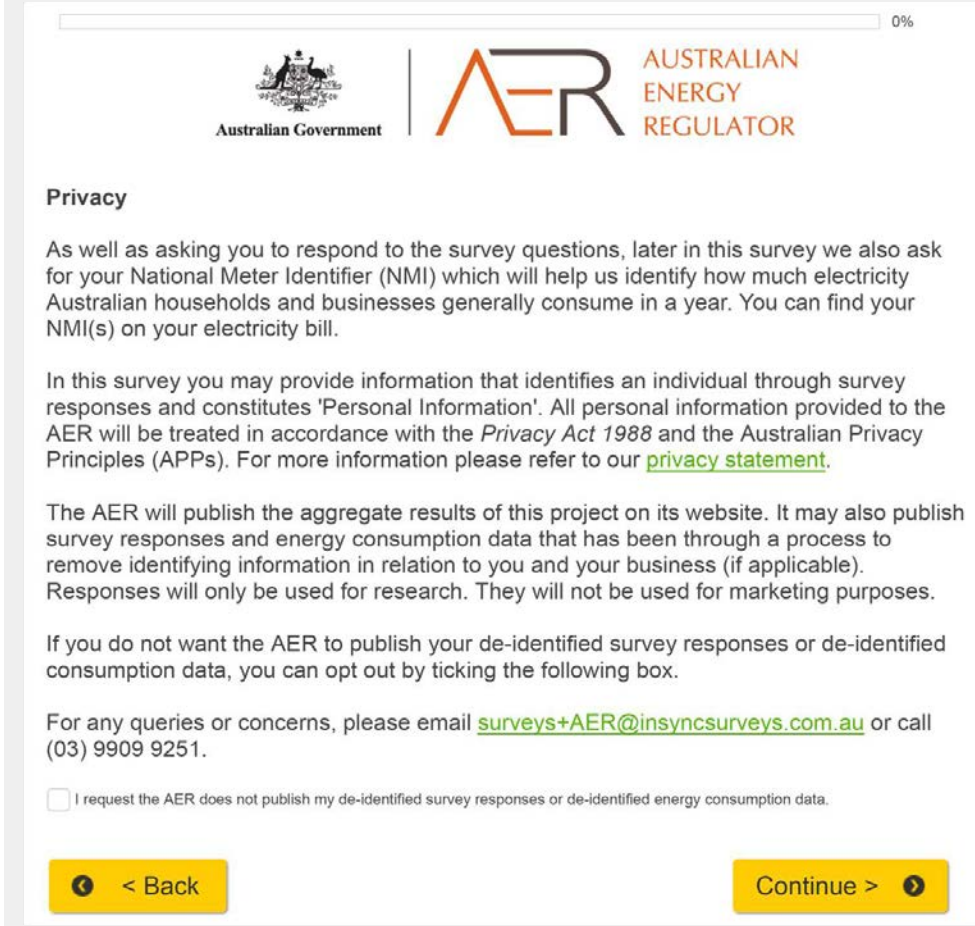
An open link version of the residential survey was also hosted by Dynata and available from Tuesday 24 September for a period of one month, closing on Wednesday 23 October. Respondents completing the open link version were unable to save partially completed responses and needed to complete the entire survey in a single session.

Notes have been included throughout the survey screens to explain any automation, piping and branching that altered the flow or way information was presented on screen.

Residential

Throughout the survey, the 'back' button was only visible during the testing phase prior to official survey launch.





Residential

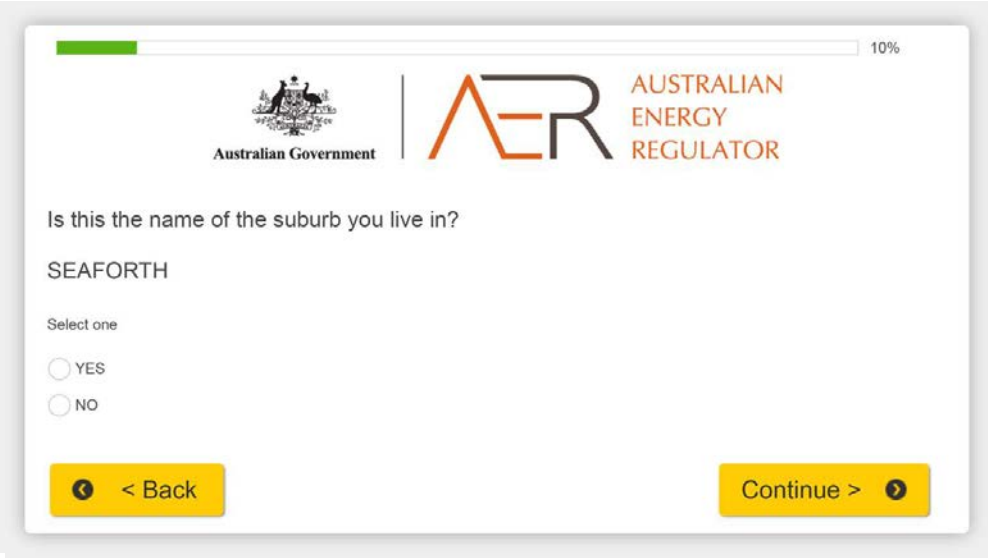
Post code was used to screen out non-NEM respondents.

Throughout the survey live period, the post code was also used to screen out regions where sufficient sample had already been obtained (for example, major capital cities/suburban).

Used as a confirmation to ensure the respondent had not mis-typed their post code.

Residential

Example of where only one suburb corresponds with the entered post code.

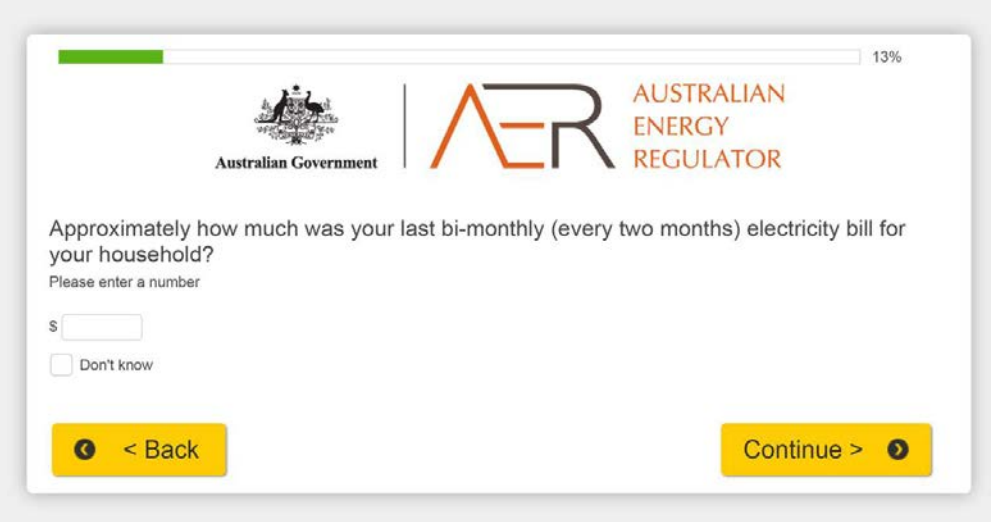


The response to this question is used throughout the survey at various points where the respondent's billing frequency is piped in to questions. $ amounts for WTP prompts are also scaled to the billing frequency (for example, $2/month is displayed as $6/quarter).

"Pay-as-you-go / Other" and "Don't know" were treated as "monthly" billing cycle for the purposes of piping throughout the survey.

Residential

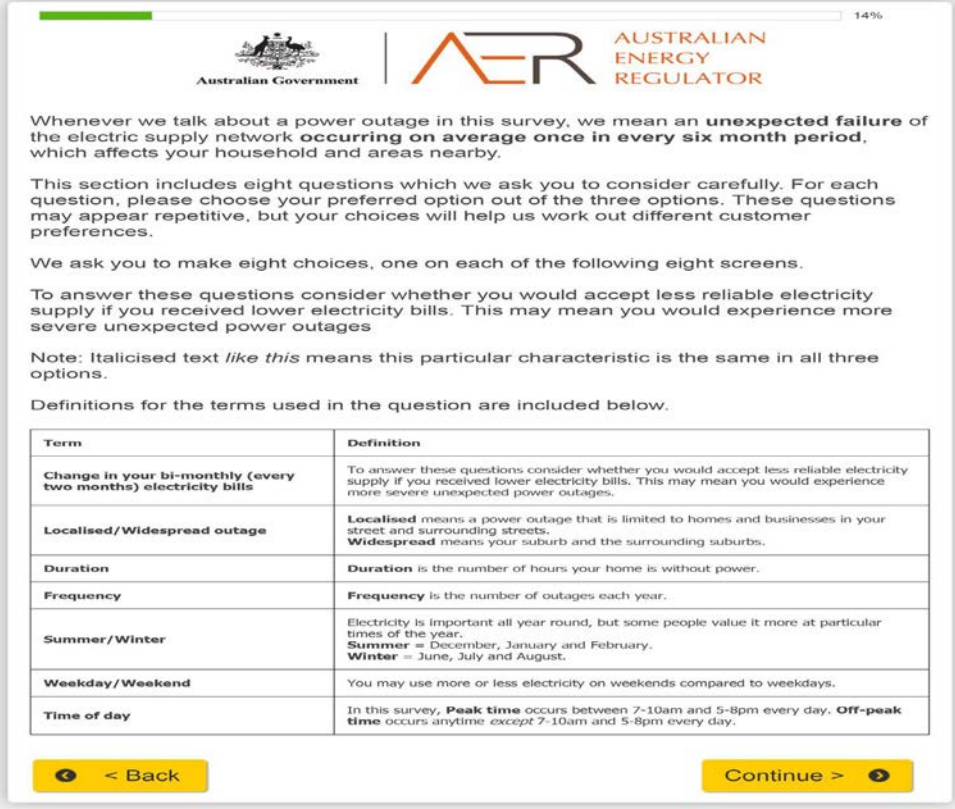
Screen is an example of bi-monthly billing frequency.



This item is used to tailor the definition displayed for the "localised/widespread" choice model attribute.

Residential

There were 5 sets of 8 screens, with each screen presenting three options. A single respondent only ever completed one set of the 8 screens. The order in which the eight sets of options were presented to users was randomised. The positioning of the options on each screen was also randomised.



14%

Australian Government | AUSTRALIAN ENERGY REGULATOR

Whenever we talk about a power outage in this survey, we mean an **unexpected failure** of the electric supply network **occurring on average once in every six month period**, which affects your household and areas nearby.

This section includes eight questions which we ask you to consider carefully. For each question, please choose your preferred option out of the three options. These questions may appear repetitive, but your choices will help us work out different customer preferences.

We ask you to make eight choices, one on each of the following eight screens.

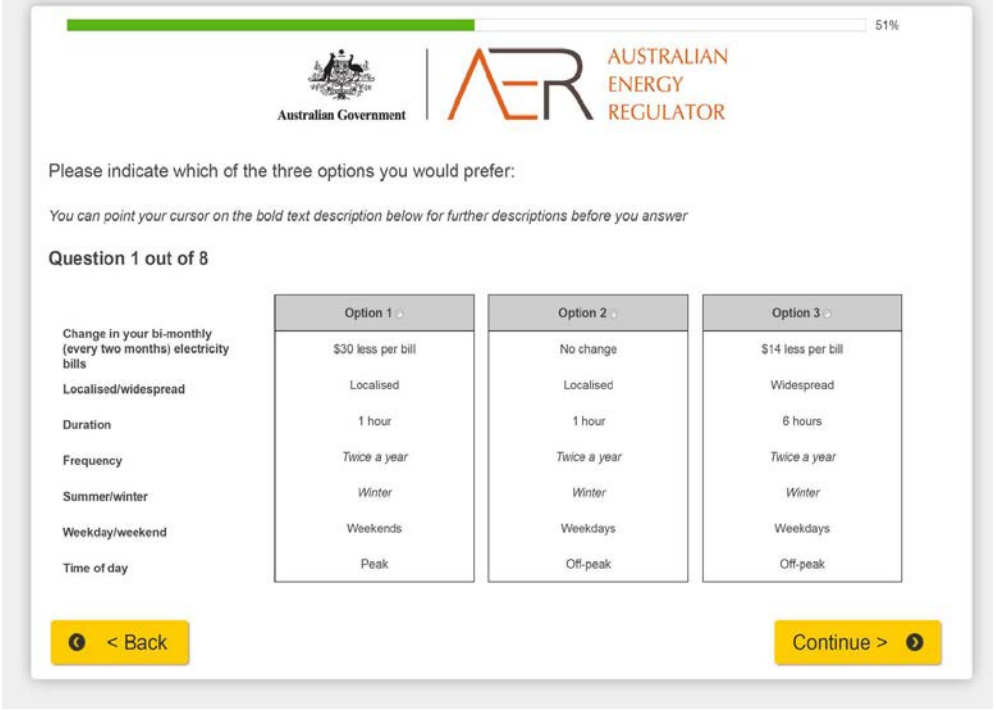
To answer these questions consider whether you would accept less reliable electricity supply if you received lower electricity bills. This may mean you would experience more severe unexpected power outages

Note: Italicised text *like this* means this particular characteristic is the same in all three options.

Definitions for the terms used in the question are included below.

Term	Definition
Change in your bi-monthly (every two months) electricity bills	To answer these questions consider whether you would accept less reliable electricity supply if you received lower electricity bills. This may mean you would experience more severe unexpected power outages.
Localised/Widespread outage	**Localised** means a power outage that is limited to homes and businesses in your street and surrounding streets. **Widespread** means your suburb and the surrounding suburbs.
Duration	**Duration** is the number of hours your home is without power.
Frequency	**Frequency** is the number of outages each year.
Summer/Winter	Electricity is important all year round, but some people value it more at particular times of the year. **Summer** = December, January and February. **Winter** = June, July and August.
Weekday/Weekend	You may use more or less electricity on weekends compared to weekdays.
Time of day	In this survey, **Peak time** occurs between 7-10am and 5-8pm every day. **Off-peak time** occurs anytime *except* 7-10am and 5-8pm every day.

< Back | Continue >



51%

Australian Government | AUSTRALIAN ENERGY REGULATOR

Please indicate which of the three options you would prefer:

You can point your cursor on the bold text description below for further descriptions before you answer

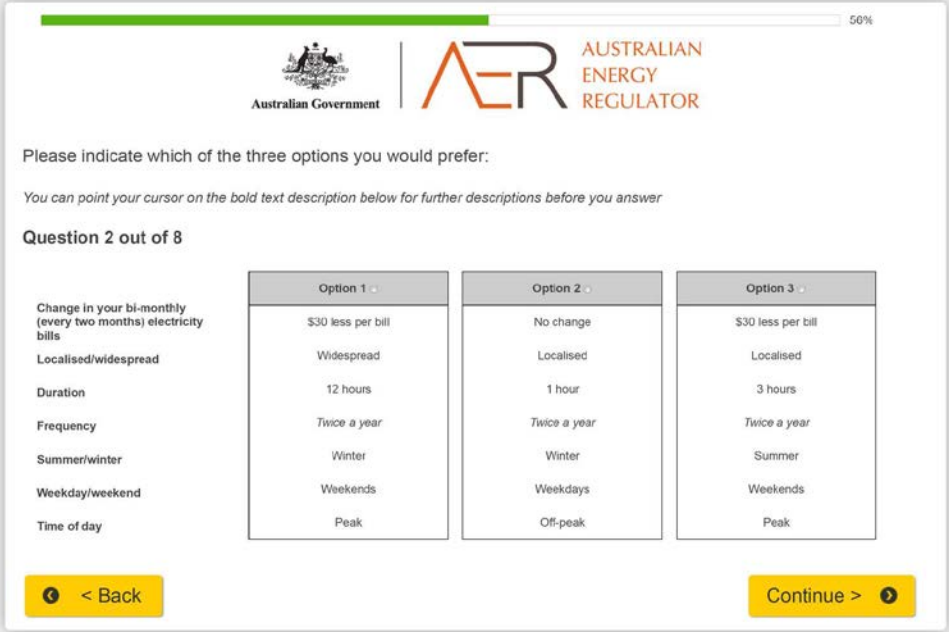
Question 1 out of 8

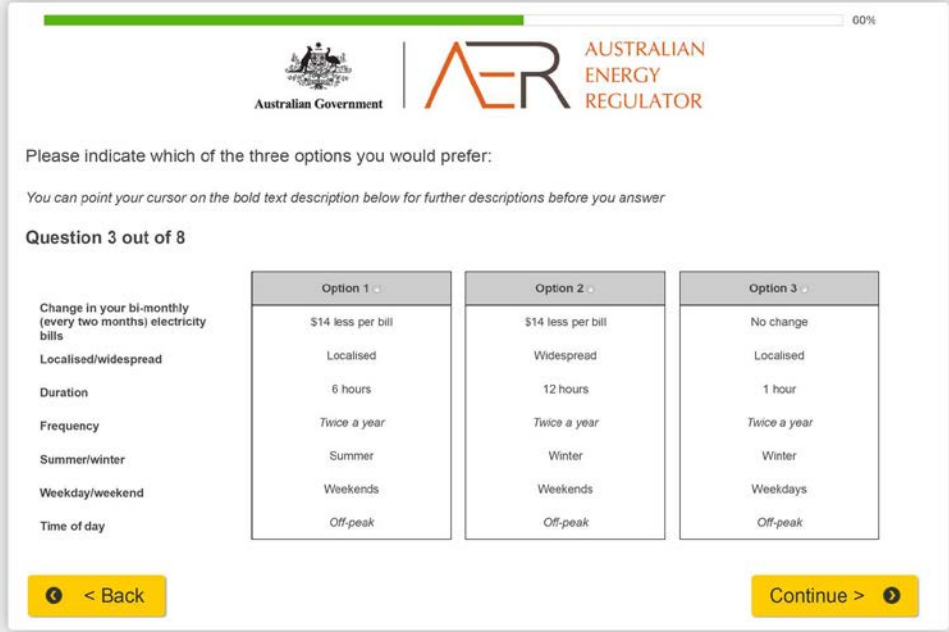
	Option 1	Option 2	Option 3
Change in your bi-monthly (every two months) electricity bills	$30 less per bill	No change	$14 less per bill
Localised/widespread	Localised	Localised	Widespread
Duration	1 hour	1 hour	6 hours
Frequency	*Twice a year*	*Twice a year*	*Twice a year*
Summer/winter	*Winter*	*Winter*	*Winter*
Weekday/weekend	Weekends	Weekdays	Weekdays
Time of day	Peak	Off-peak	Off-peak

< Back | Continue >

Residential

The billing frequency is also used in the top listed attribute on the choice model screens. A discount level of $15/month is displayed as "$30 less per bill" in the above case as the respondent has selected "bi-monthly" billing frequency.





Residential

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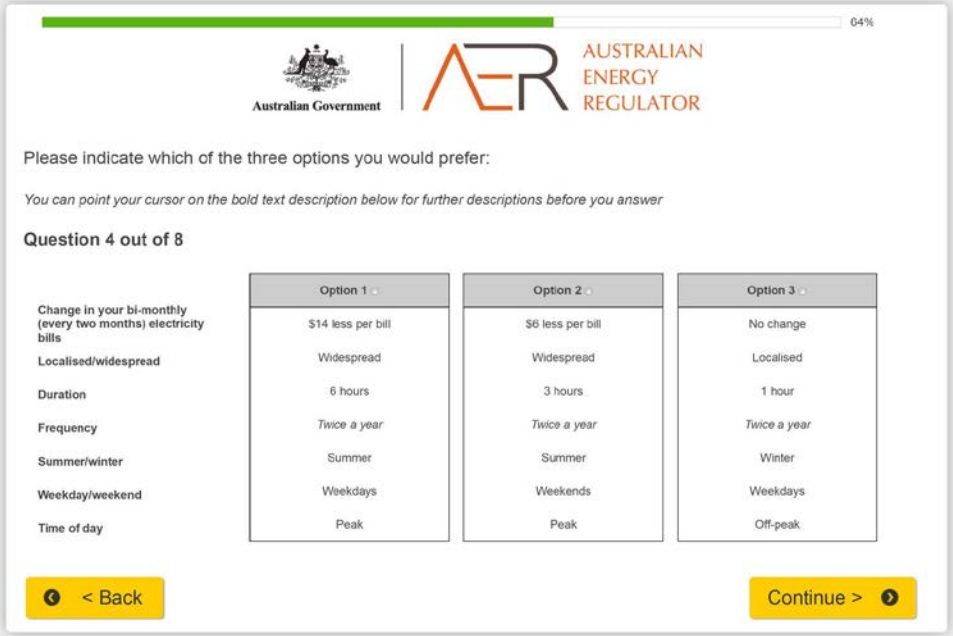
64%

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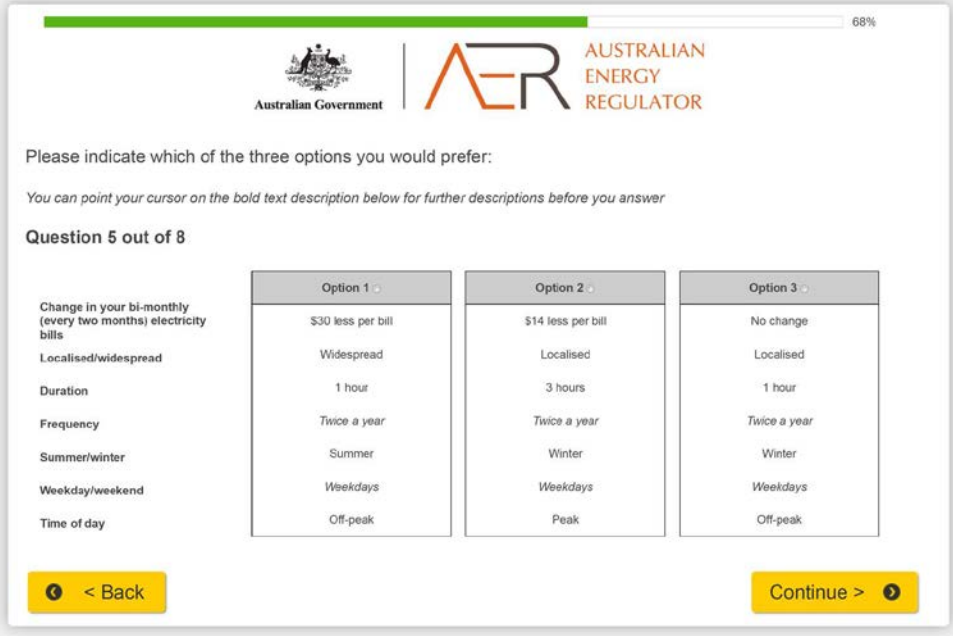
Please indicate which of the three options you would prefer:

You can point your cursor on the bold text description below for further descriptions before you answer

Question 4 out of 8

	Option 1	Option 2	Option 3
Change in your bi-monthly (every two months) electricity bills	$14 less per bill	$6 less per bill	No change
Localised/widespread	Widespread	Widespread	Localised
Duration	6 hours	3 hours	1 hour
Frequency	*Twice a year*	*Twice a year*	*Twice a year*
Summer/winter	Summer	Summer	Winter
Weekday/weekend	Weekdays	Weekends	Weekdays
Time of day	Peak	Peak	Off-peak

< Back | Continue >


68%

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Please indicate which of the three options you would prefer:

You can point your cursor on the bold text description below for further descriptions before you answer

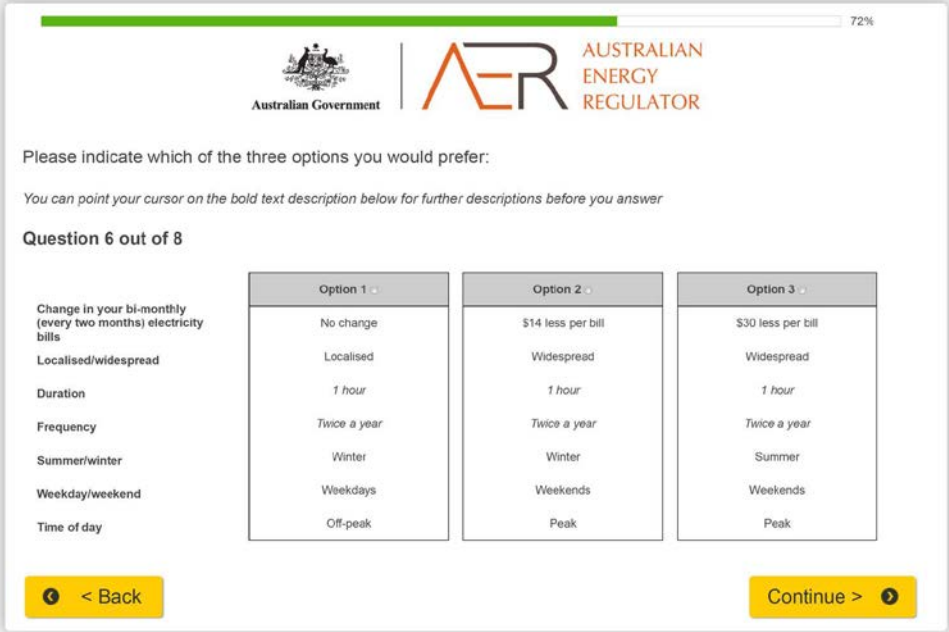
Question 5 out of 8

	Option 1	Option 2	Option 3
Change in your bi-monthly (every two months) electricity bills	$30 less per bill	$14 less per bill	No change
Localised/widespread	Widespread	Localised	Localised
Duration	1 hour	3 hours	1 hour
Frequency	*Twice a year*	*Twice a year*	*Twice a year*
Summer/winter	Summer	Winter	Winter
Weekday/weekend	*Weekdays*	*Weekdays*	*Weekdays*
Time of day	Off-peak	Peak	Off-peak

< Back | Continue >

Residential

- Continued


72%

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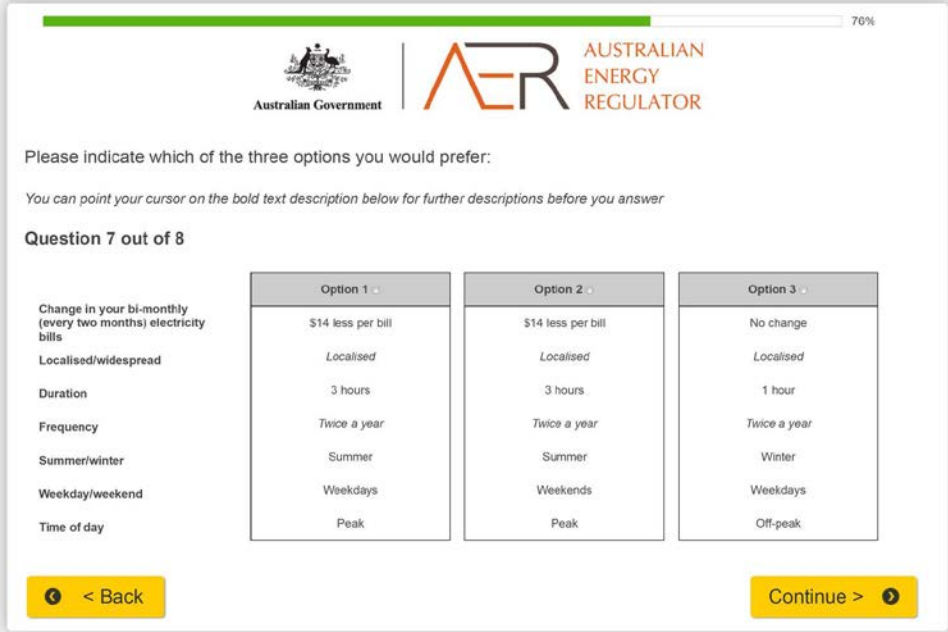
Please indicate which of the three options you would prefer:

You can point your cursor on the bold text description below for further descriptions before you answer

Question 6 out of 8

	Option 1	Option 2	Option 3
Change in your bi-monthly (every two months) electricity bills	No change	$14 less per bill	$30 less per bill
Localised/widespread	Localised	Widespread	Widespread
Duration	*1 hour*	*1 hour*	*1 hour*
Frequency	*Twice a year*	*Twice a year*	*Twice a year*
Summer/winter	Winter	Winter	Summer
Weekday/weekend	Weekdays	Weekends	Weekends
Time of day	Off-peak	Peak	Peak

< Back | Continue >


76%

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Please indicate which of the three options you would prefer:

You can point your cursor on the bold text description below for further descriptions before you answer

Question 7 out of 8

	Option 1	Option 2	Option 3
Change in your bi-monthly (every two months) electricity bills	$14 less per bill	$14 less per bill	No change
Localised/widespread	*Localised*	*Localised*	*Localised*
Duration	3 hours	3 hours	1 hour
Frequency	*Twice a year*	*Twice a year*	*Twice a year*
Summer/winter	Summer	Summer	Winter
Weekday/weekend	Weekdays	Weekends	Weekdays
Time of day	Peak	Peak	Off-peak

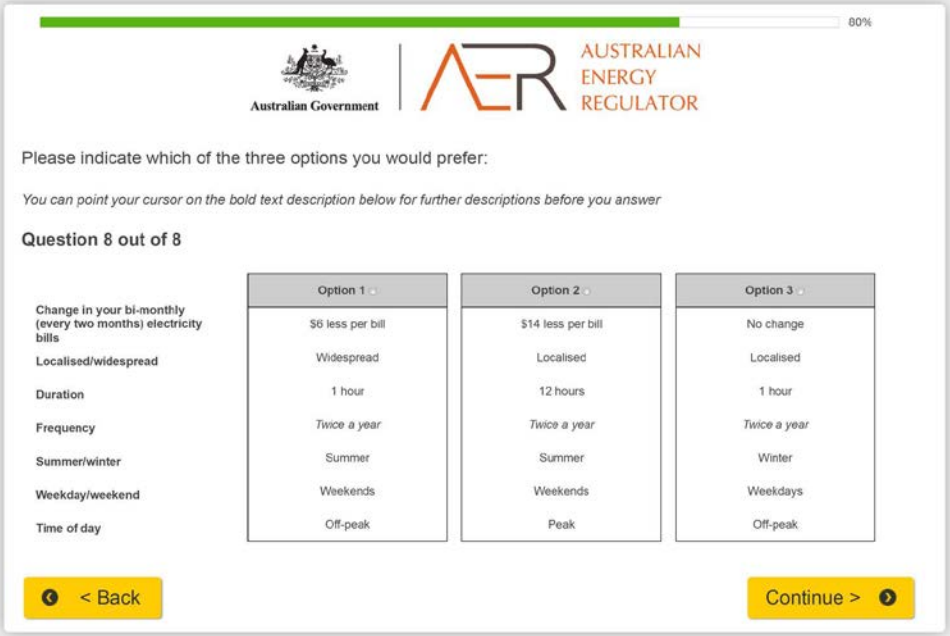
< Back | Continue >

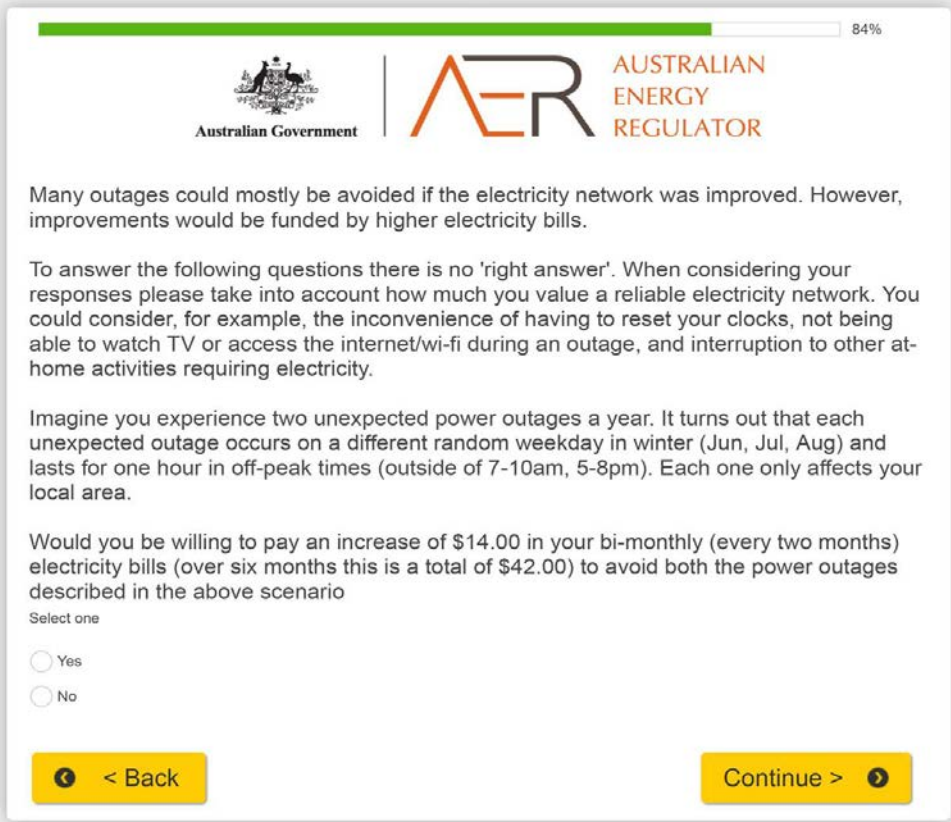
Residential

- Continued

The initial prompts ranged (in whole dollar amounts) between $2 and $9 per month.

In the example presented on this screen, the prompt is $7/month, however is scaled to the billing frequency of the respondent.

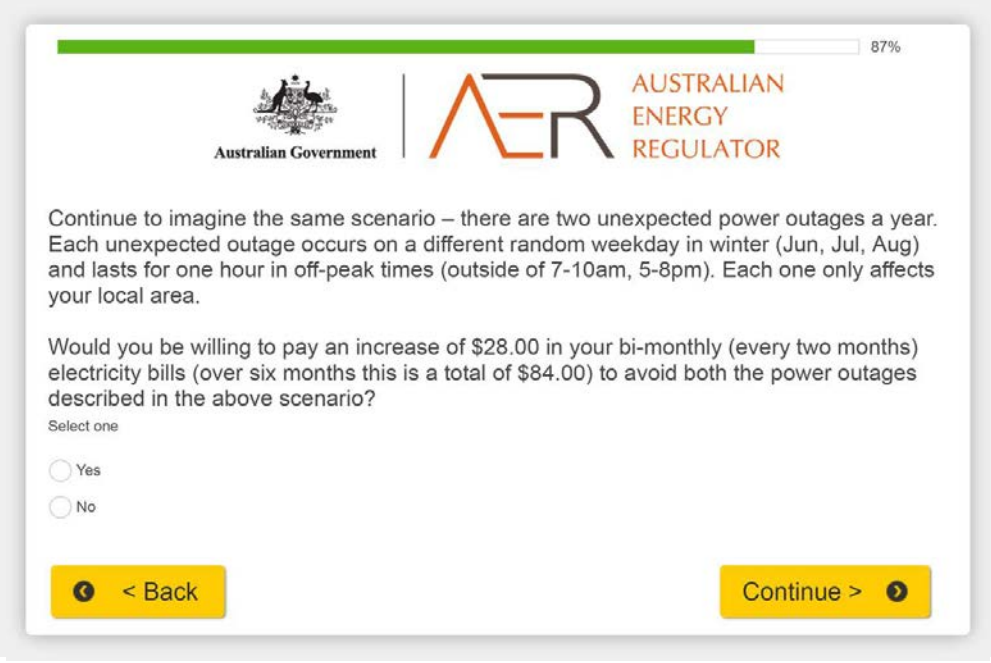




Residential

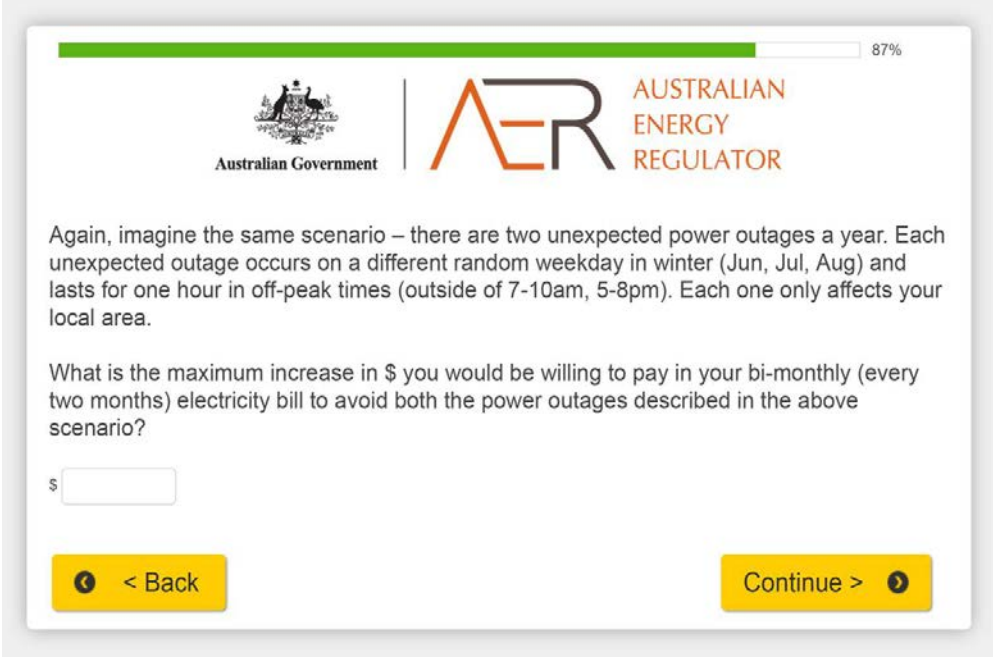
If the respondent selects 'Yes' to the initial prompt (on the previous page), the value is doubled and the question is asked again, as per the above example.

If the user selects 'No' to the initial prompt, the value is halved.

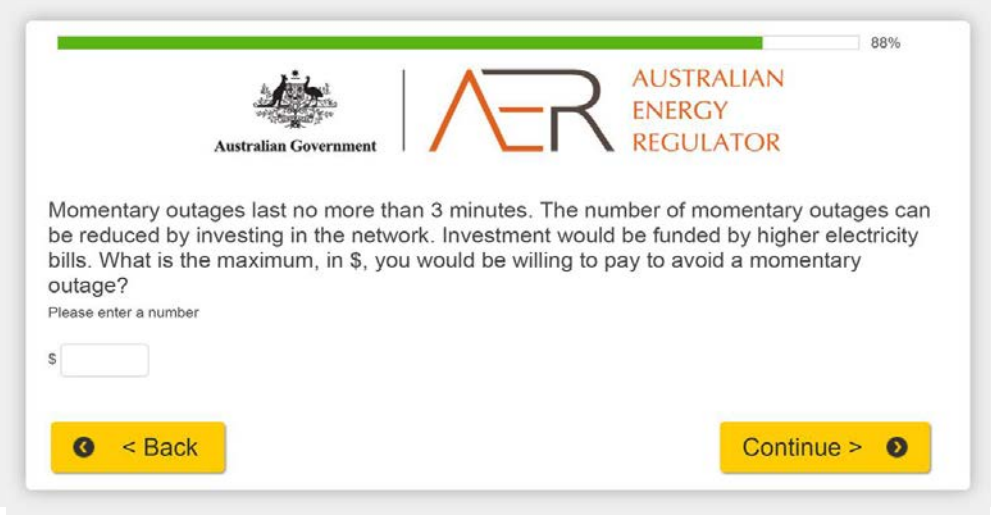


Irrespective to the responses provided to the previous string of Yes/No cost prompts, ALL respondents were asked the open question presented on this page.

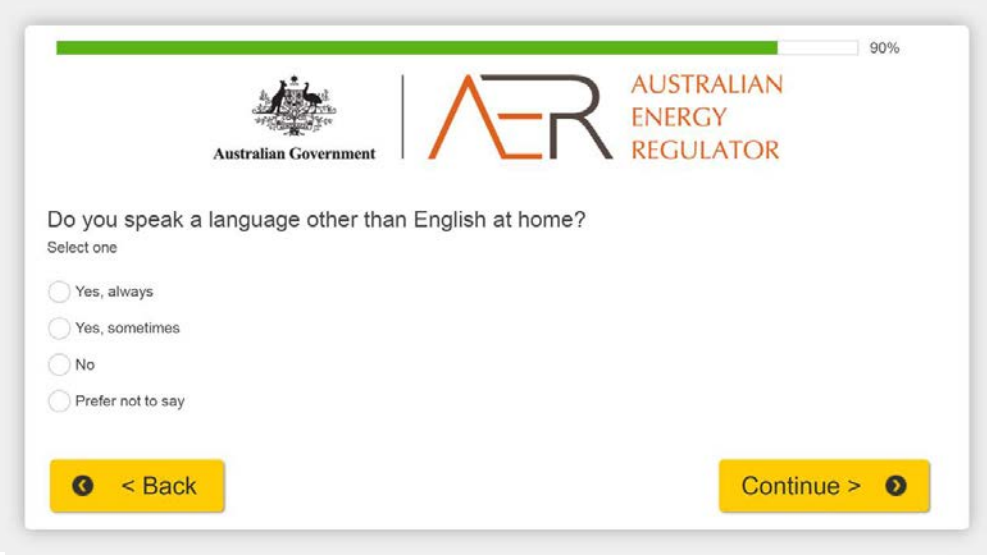
Respondents entering a value in excess of $22 per month (or equivalent based on their billing frequency) trigger an additional question that appears later in the survey, regarding a backup power system.



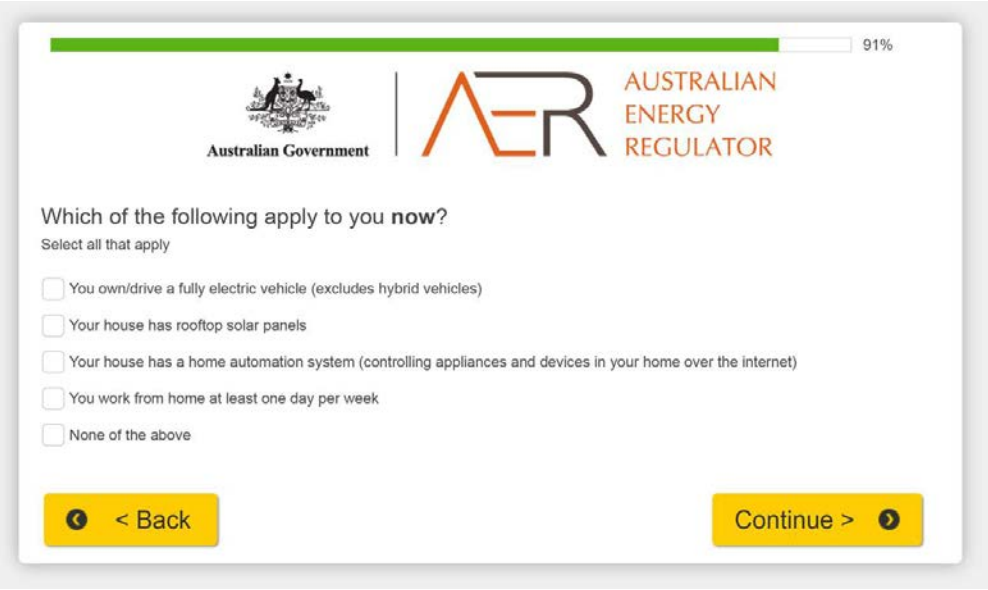
Residential

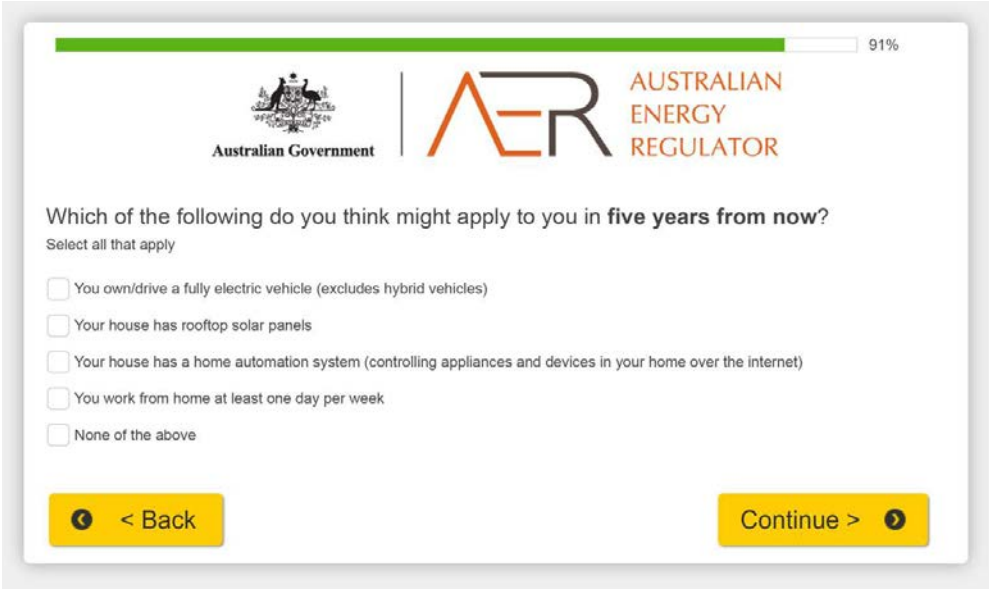


Residential



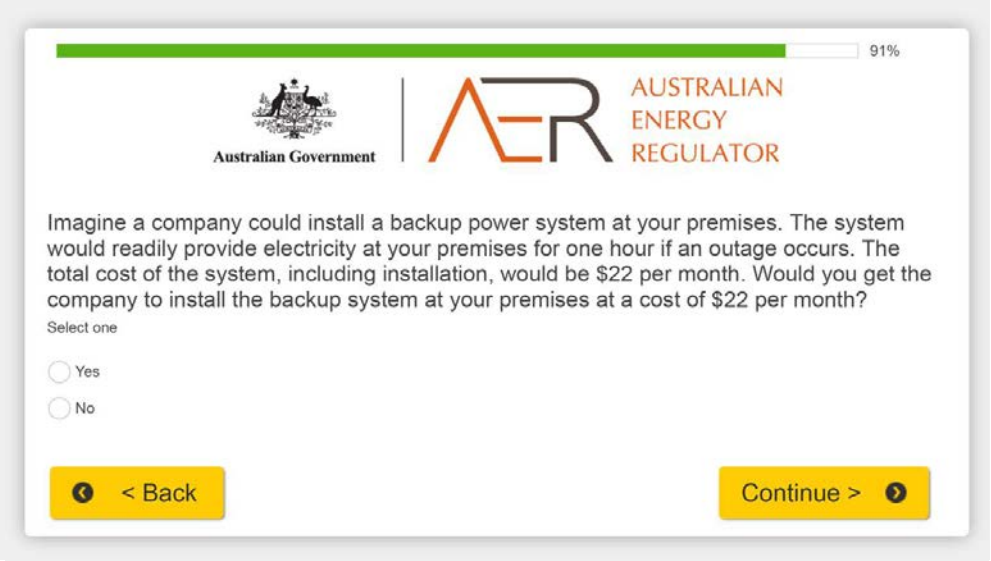
Residential



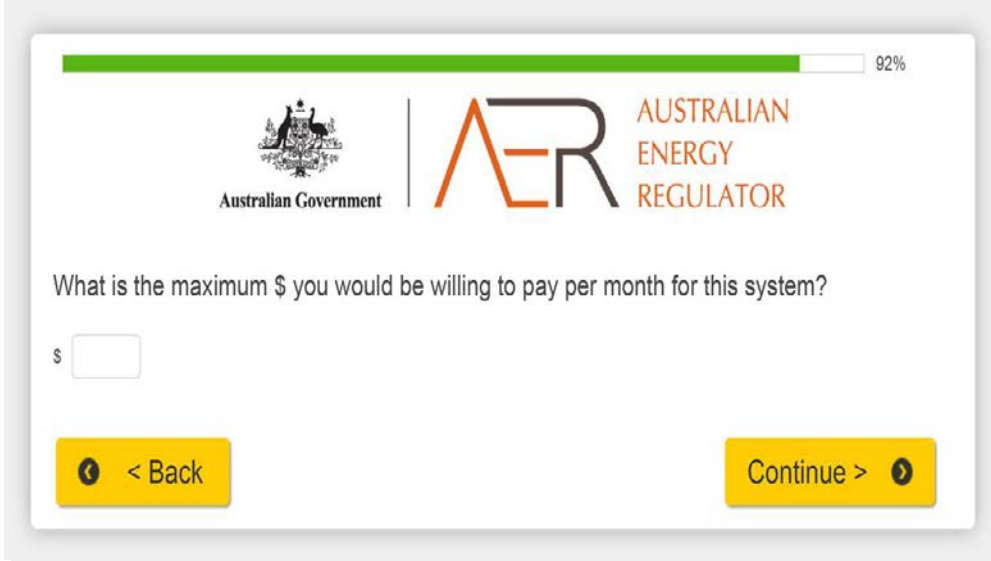


Residential

This question was only presented to respondents who provided an open WTP amount exceeding the equivalent of $22/month.



This question was only presented to respondents who selected 'No' in item on the previous page.



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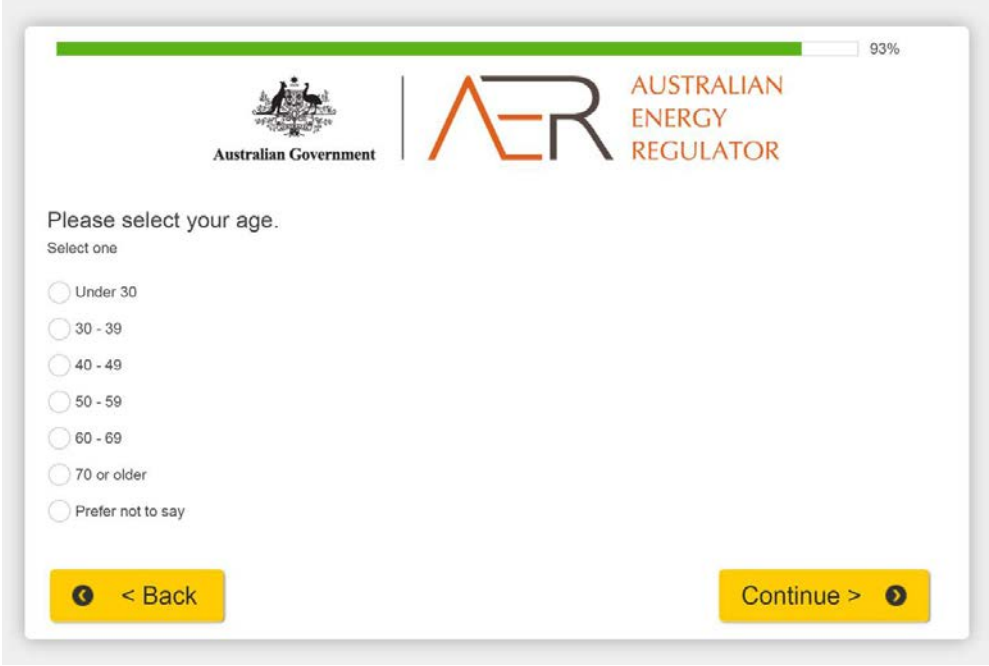

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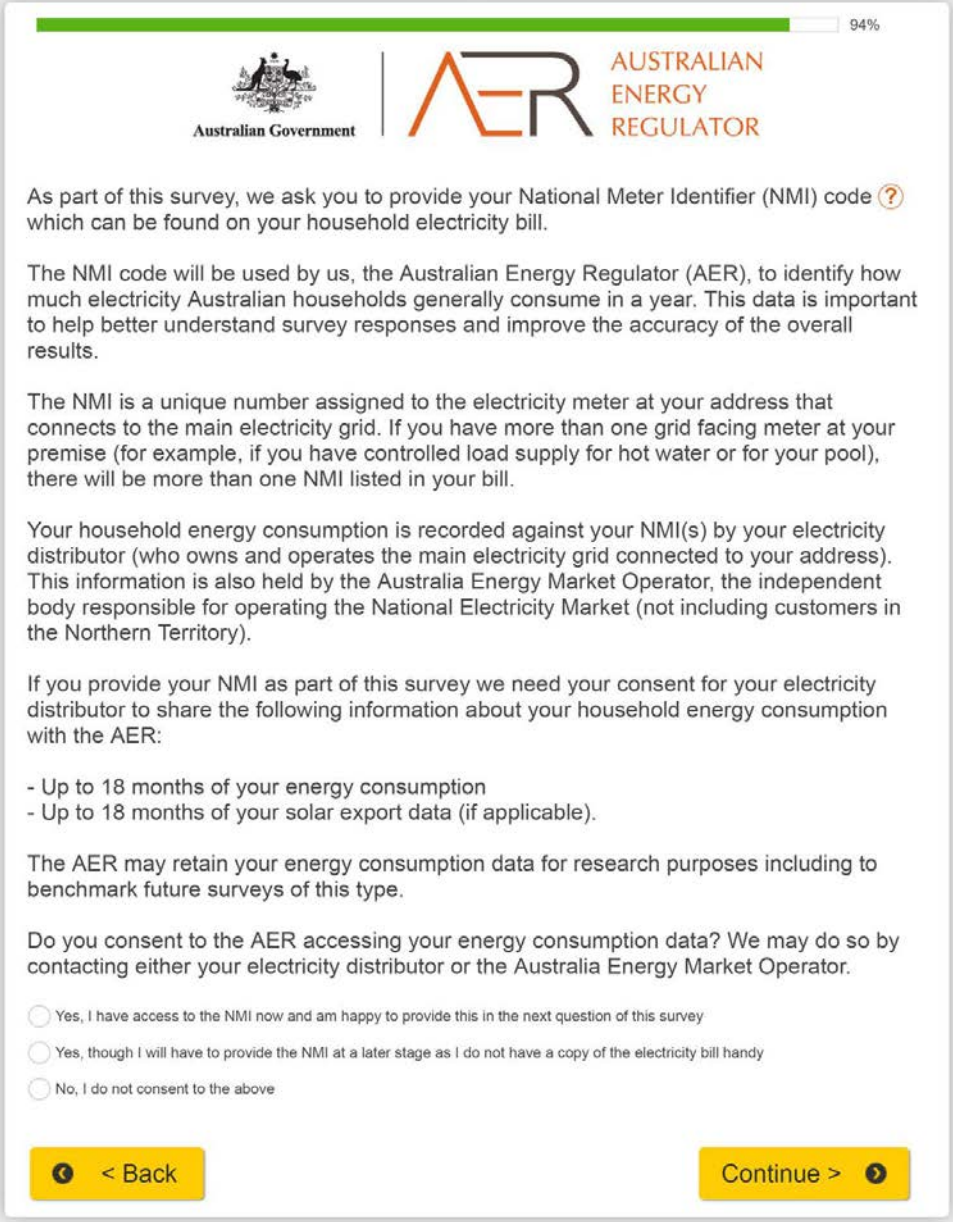


Residential

This page was displayed for respondents who could provide their NMI(s) at the time of completing the survey.

Upon entering in the first text box, a second box appeared beneath for an additional NMI. Up to 10 NMIs were supported per respondent.

Respondents who were not able to provide their NMI(s) at the time of completing the survey were provided an option to submit their response, however come back at a later stage to provide their NMI(s).

Fieldwork provider Dynata issued reminder emails to respondents who took up this option but were yet to log back in.

Respondents completing the open link version of the survey were not provided the option of coming back later to complete their NMI, as there was no unique identifier associated with each respondent.

Residential

KPMG insync

Business Survey

Business

Introduction

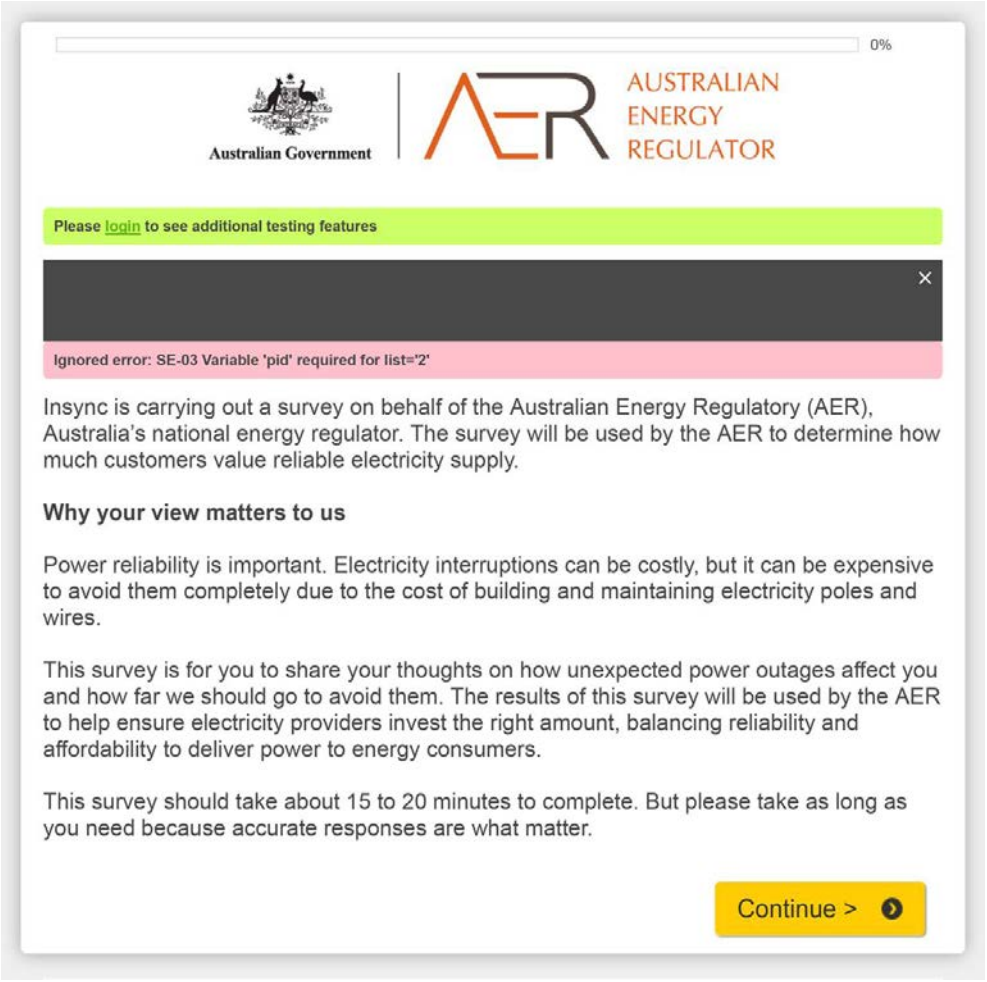
The purpose of this appendix is to document the Main survey for business respondents that was hosted by Dynata. The survey was released to Dynata's paid panel on Thursday 5 September. The survey was open for six weeks, closing on Wednesday 16 October. Respondents could save partially completed responses and were followed up with reminders by Dynata. Panel respondents who did not qualify to complete the business survey were

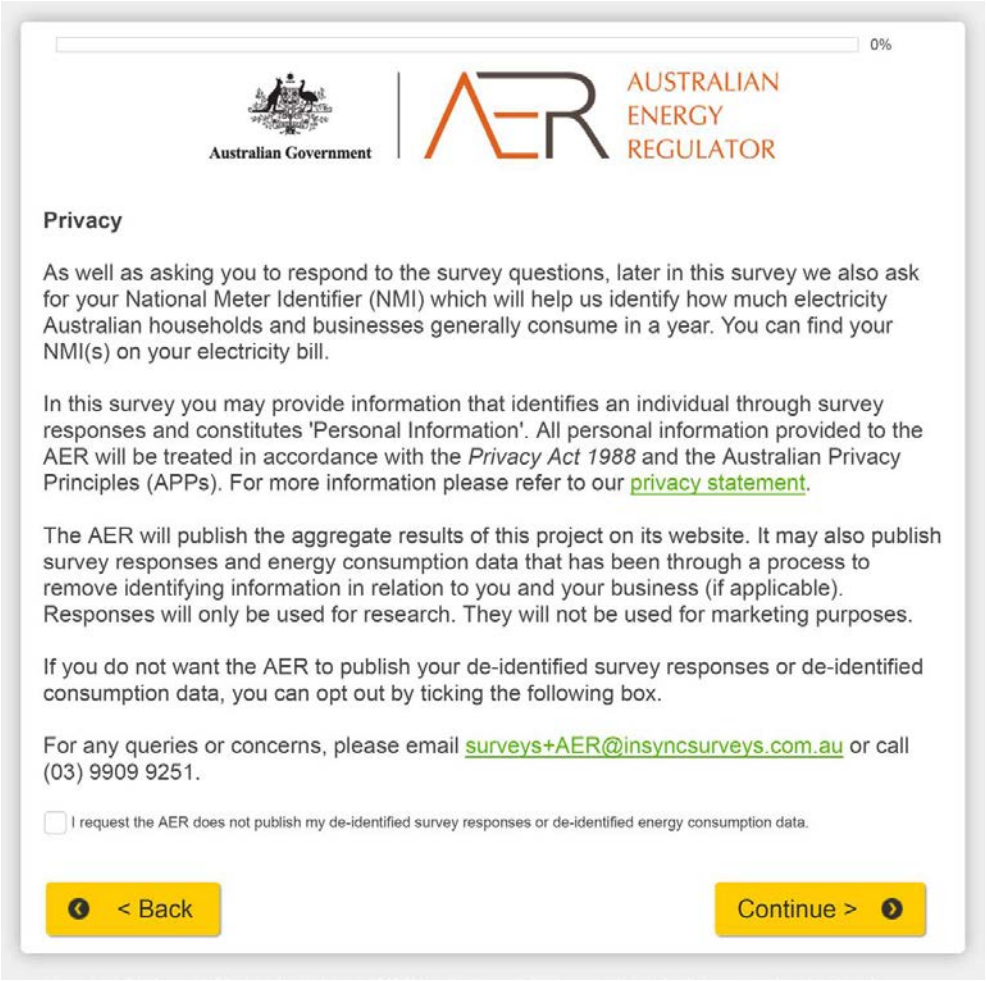
An open link version of the business survey was also hosted by Dynata and available from Tuesday 24 September for a period of one month, closing on Wednesday 23 October. Respondents completing the open link version were unable to save partially completed responses and needed to complete the entire survey in a single session.

For a period of three days (Monday 21 October to Wednesday 23 October), agriculture sector respondents were also directed to complete the Dynata hosted business survey via a CATI to online recruitment process. In this process, respondents were able to save partially completed responses and were reminded by the CATI recruitment firm, Thinkfield.

Notes have been included throughout the survey screens to explain any automation, piping and branching that altered the flow or way information was presented on screen.

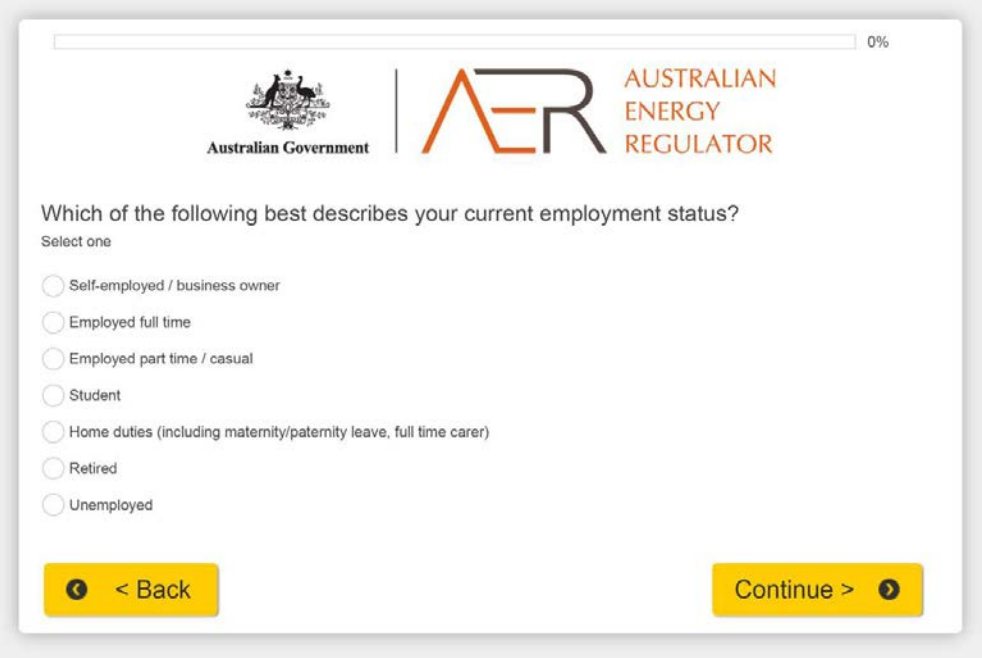
Business

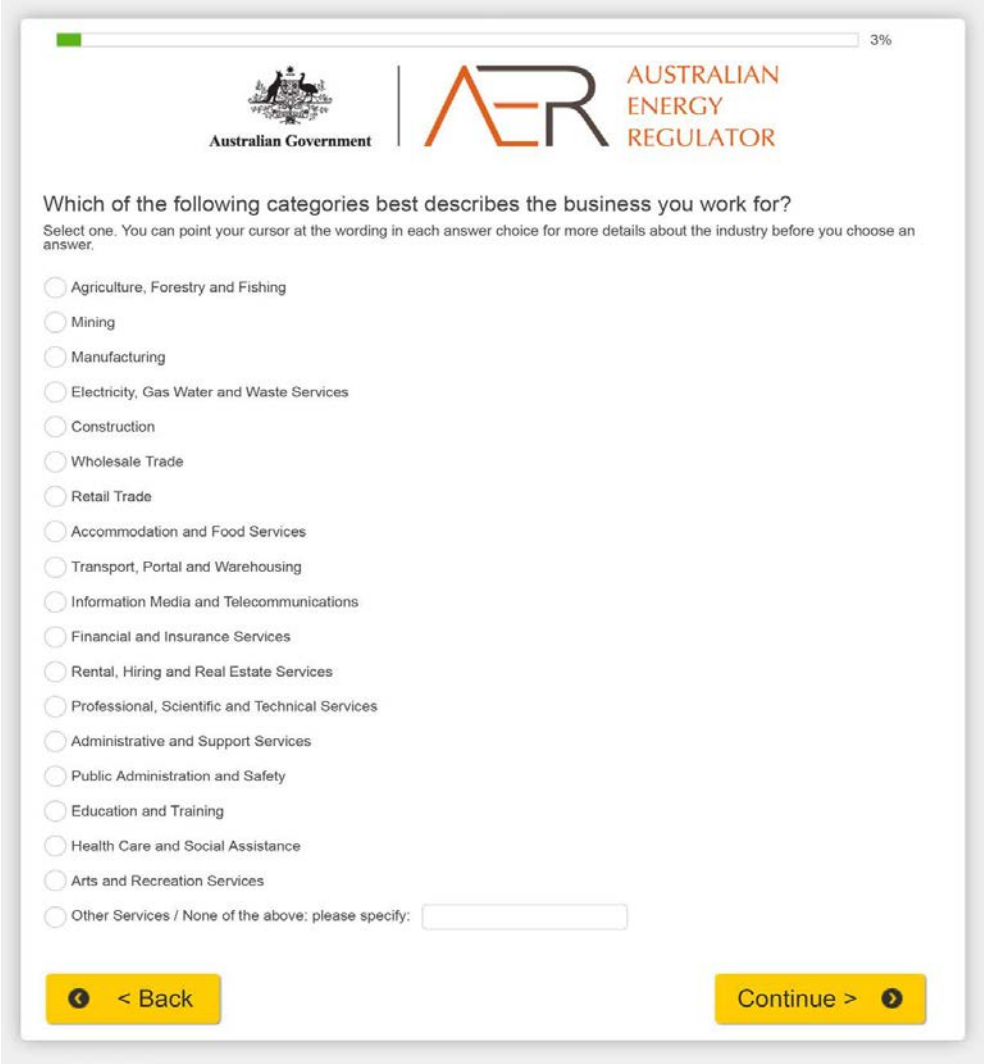




Business

Respondents were screened out (directed to the residential survey) if they selected either Student, Home duties, Retired or Unemployed.



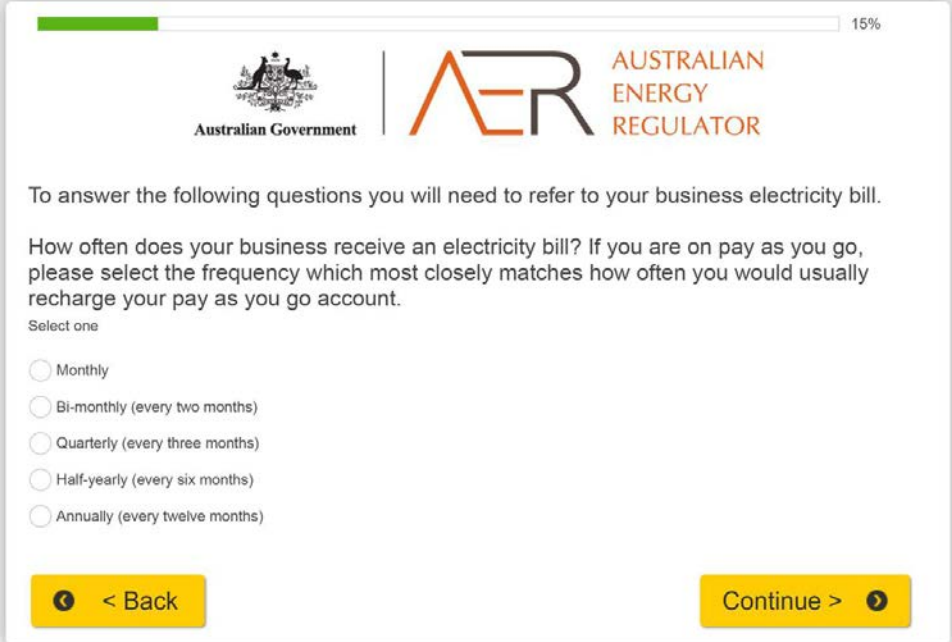


Business

Respondents were screened out (directed to the residential survey) if they selected "No" to the question presented on this screen.

Business

The response to this question is used throughout the survey at various points where the respondent's billing frequency is piped in to questions.

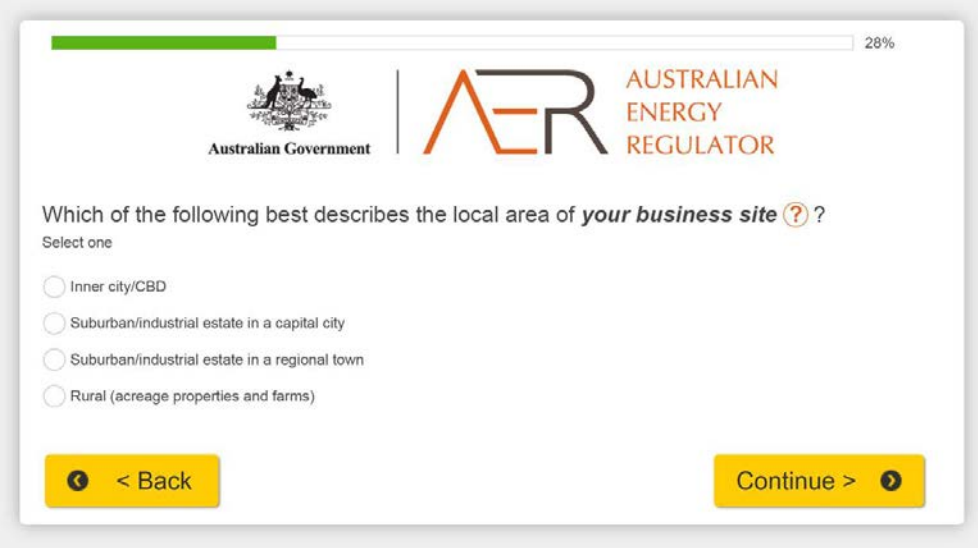


Business

Respondents were screened out (directed to the residential survey) if they entered a bill amount less than the equivalent of $2/month.

In the example presented on this screen the respondent's billing frequency is quarterly, hence they would be screen out if they enter a value less than $6.

This item is used to tailor the definition displayed for the "localised/widespread" choice model attribute.



Business

Post code was used to screen out non-NEM respondents.

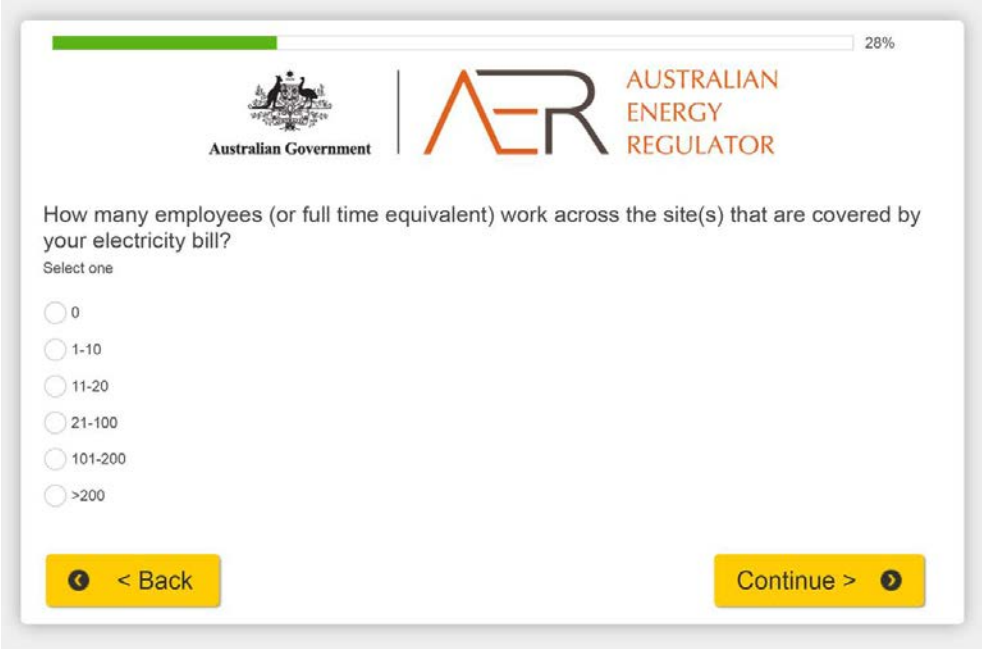
Used as a confirmation to ensure the respondent had not mis-typed their post code.

Business

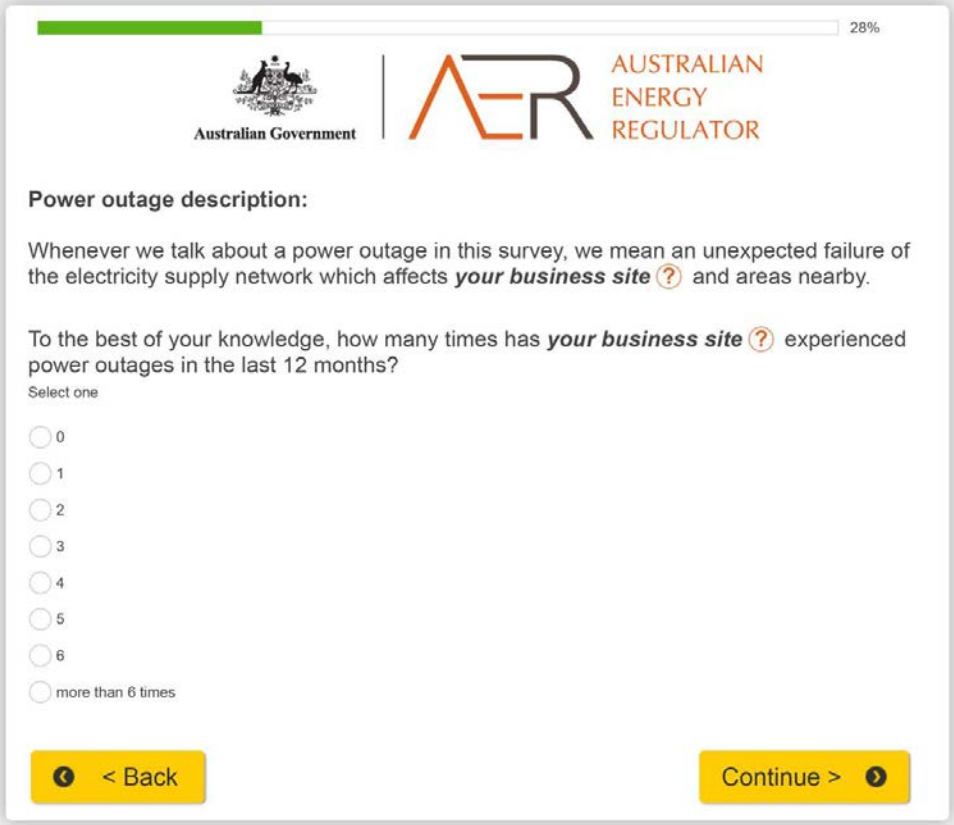
Example of where only one suburb corresponds with the entered post code.

Minimum of one.

Business

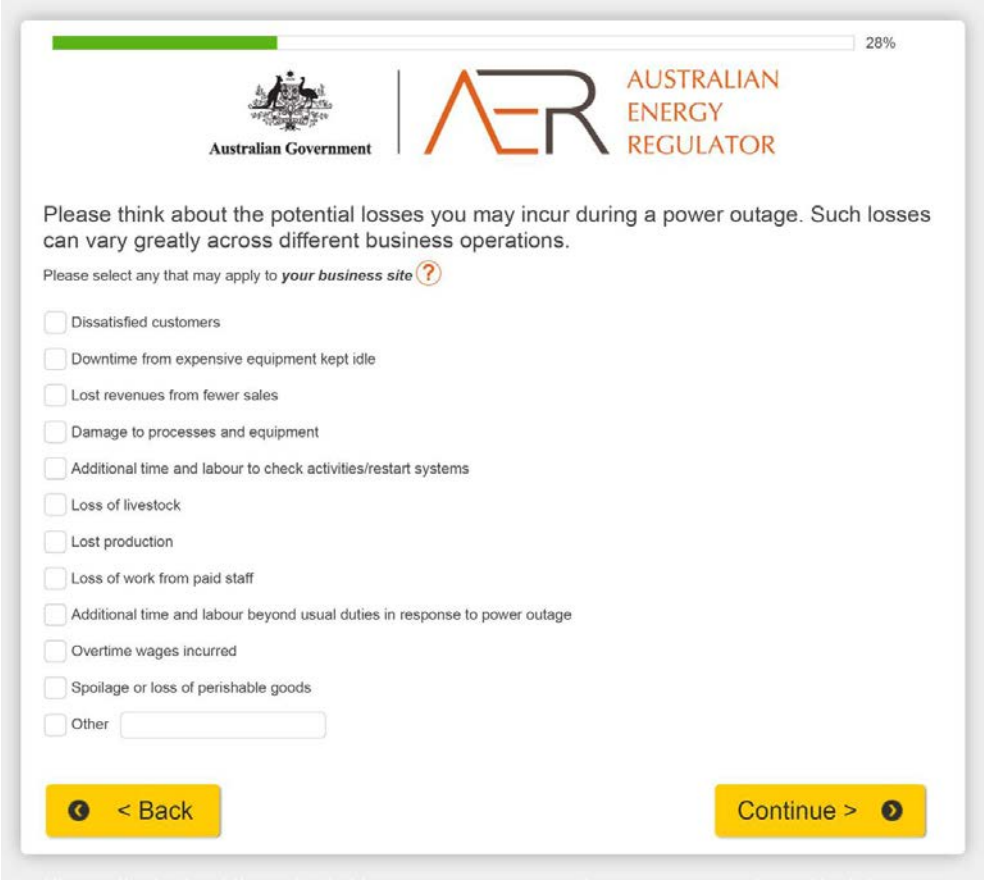


Business

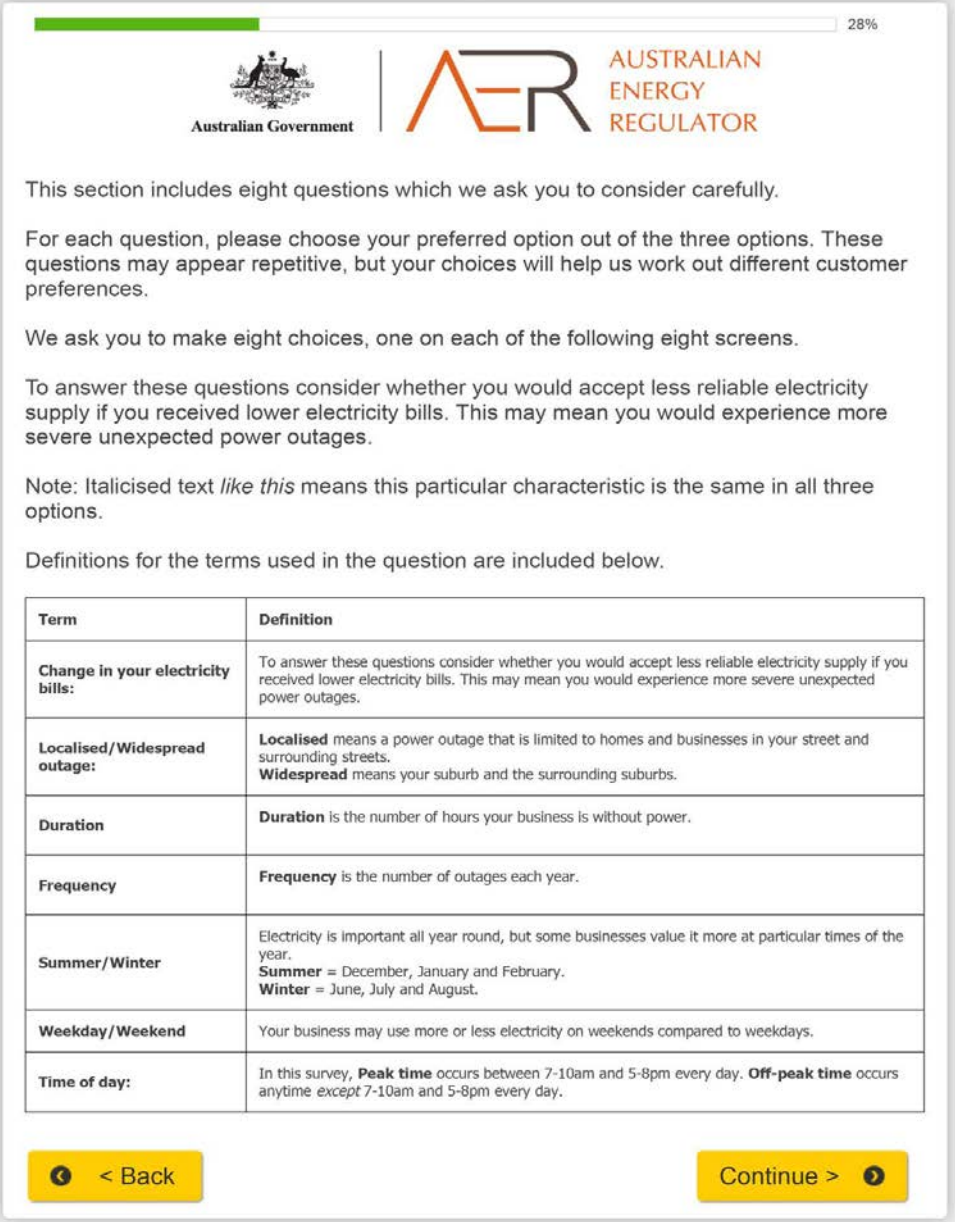


This question was not displayed for respondents who indicated on the previous item that they had experienced zero power outages in the last 12 months.

Business



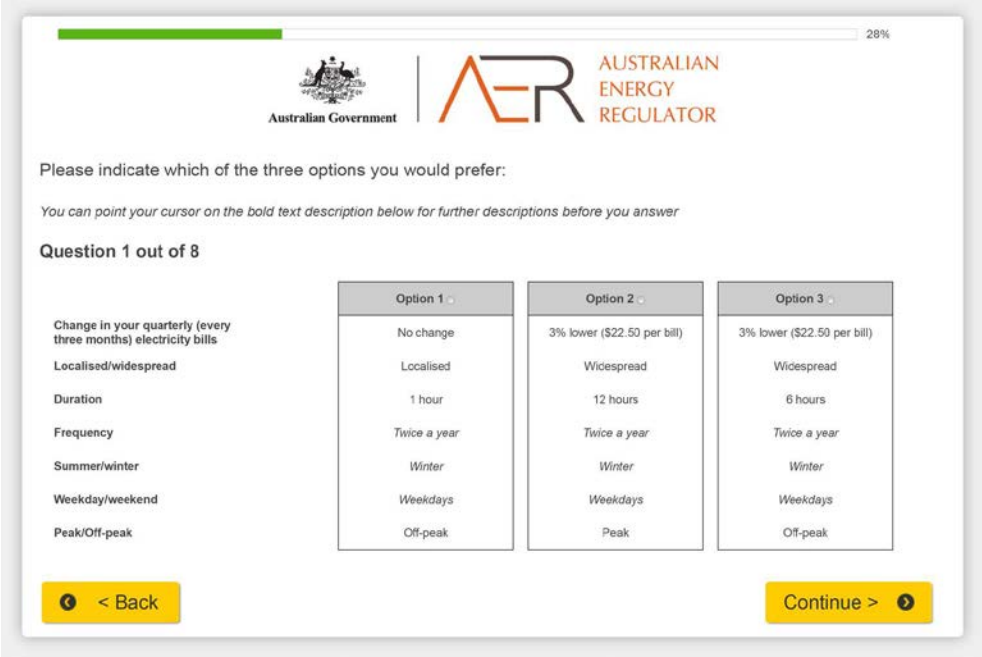
Business

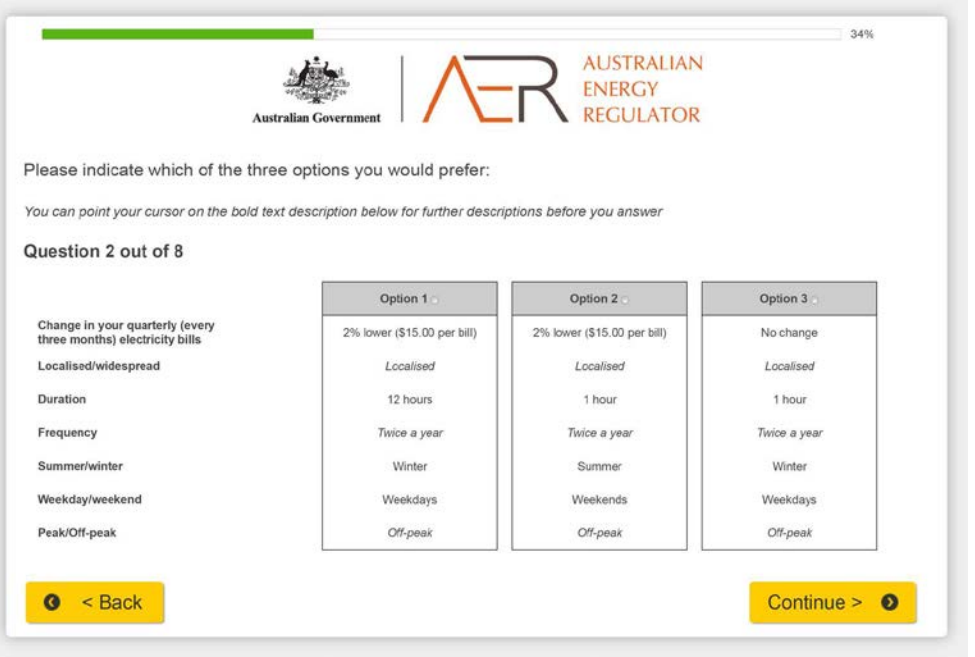


Business

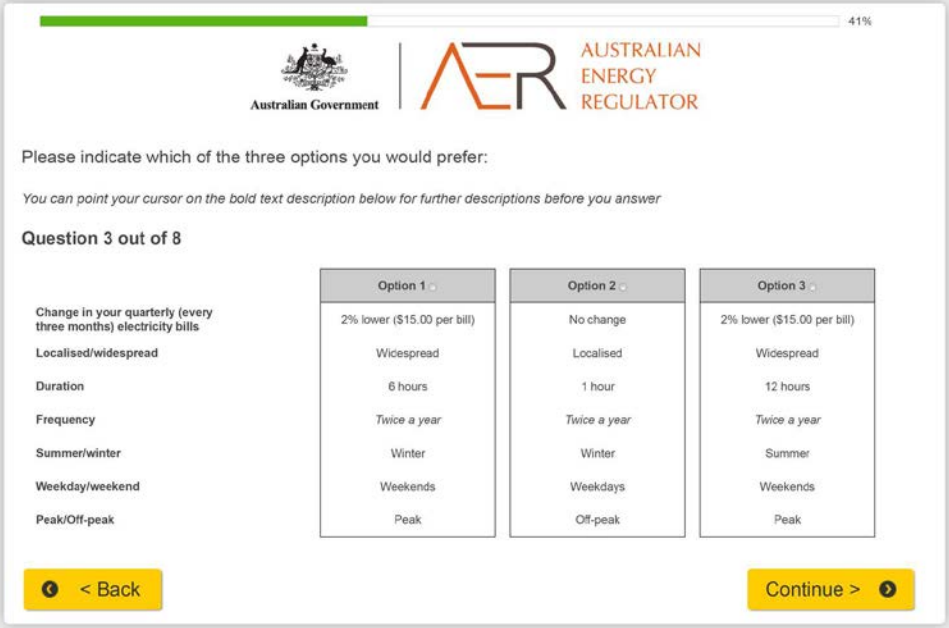
There were 5 sets of 8 screens, with each screen presenting three options. A single respondent only ever completed one set of the 8 screens.

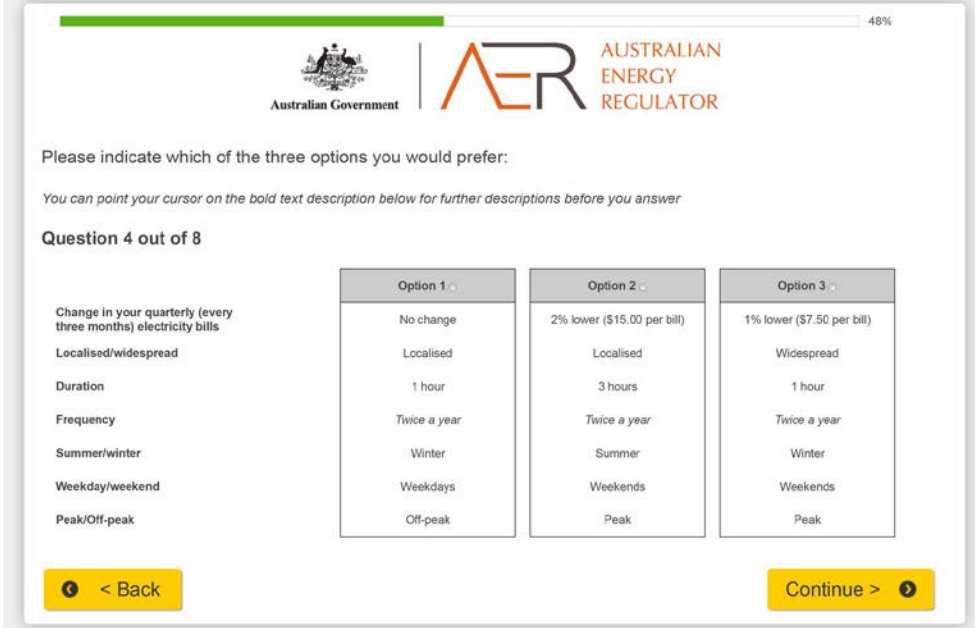
The order in which the eight sets of options were presented to users was randomised. The positioning of the options on each screen was also randomised.



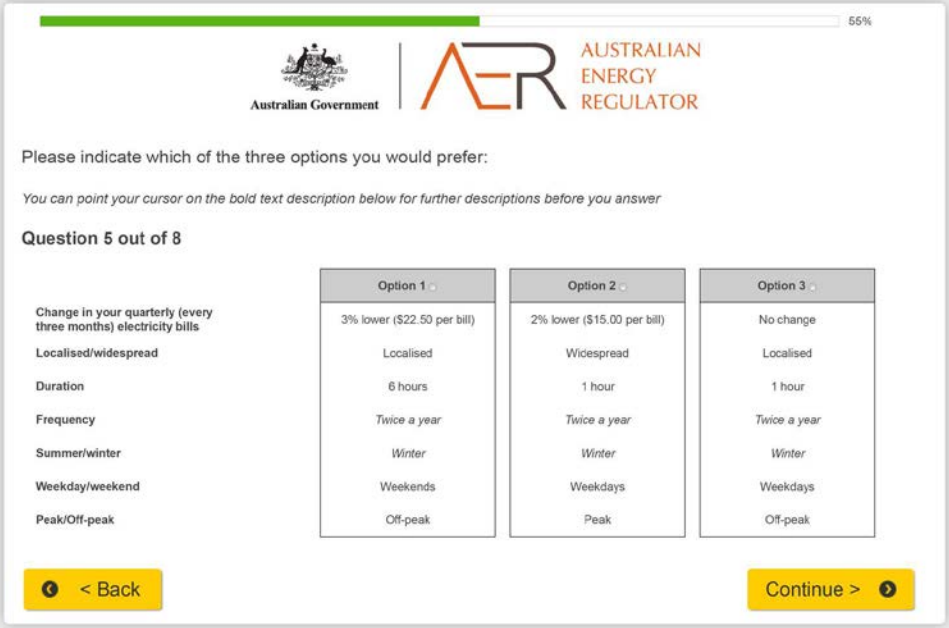


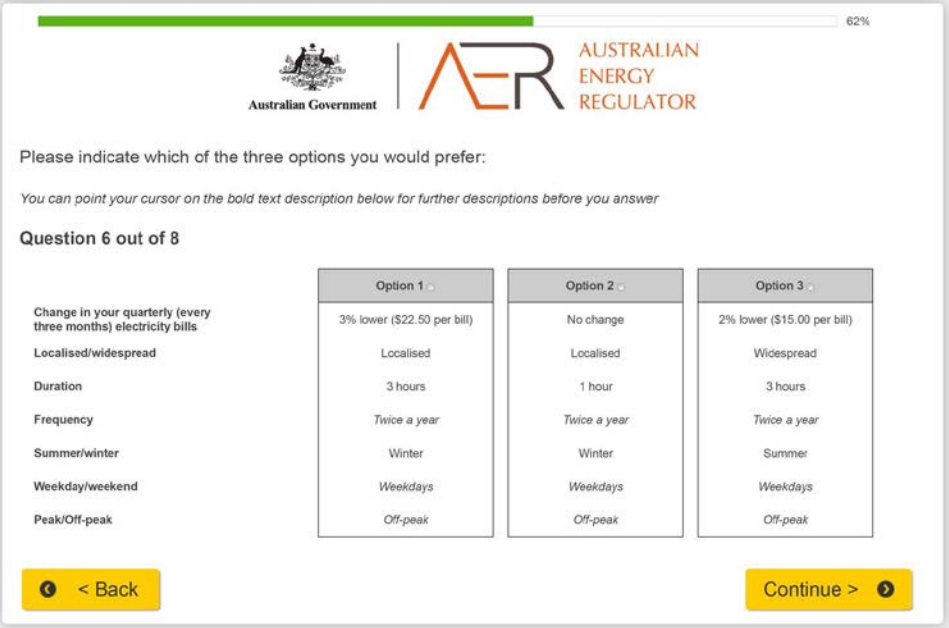
Business



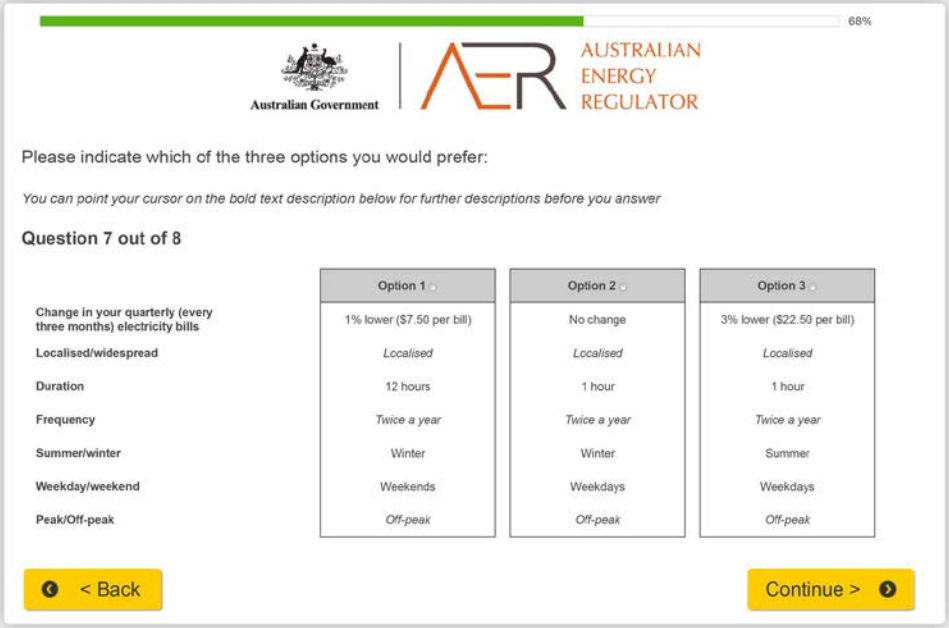


Business





Business


68%

Australian Government | AUSTRALIAN ENERGY REGULATOR

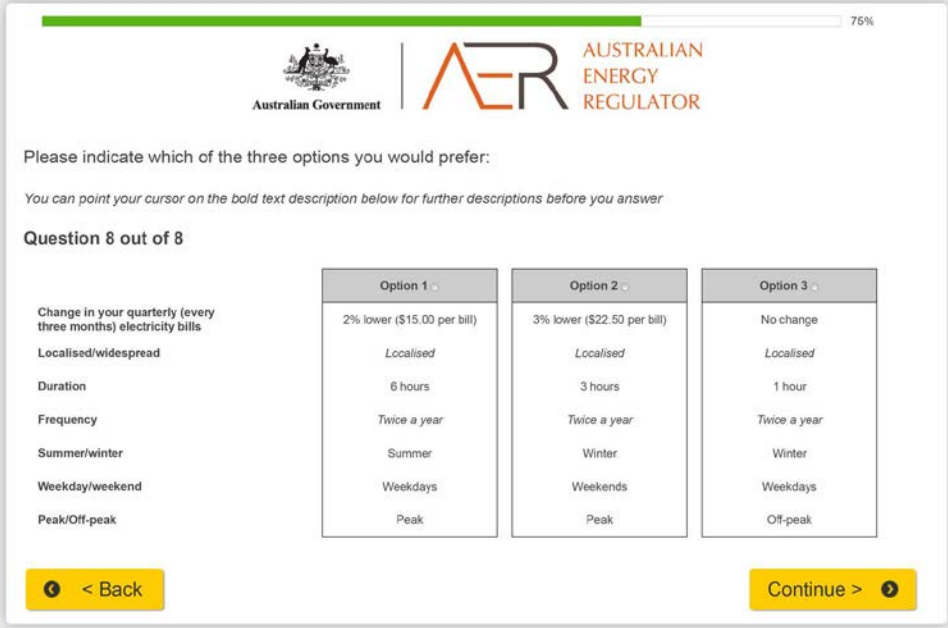
Please indicate which of the three options you would prefer:

You can point your cursor on the bold text description below for further descriptions before you answer

Question 7 out of 8

	Option 1	Option 2	Option 3
Change in your quarterly (every three months) electricity bills	1% lower ($7.50 per bill)	No change	3% lower ($22.50 per bill)
Localised/widespread	*Localised*	*Localised*	*Localised*
Duration	12 hours	1 hour	1 hour
Frequency	*Twice a year*	*Twice a year*	*Twice a year*
Summer/winter	Winter	Winter	Summer
Weekday/weekend	Weekends	Weekdays	Weekdays
Peak/Off-peak	*Off-peak*	*Off-peak*	*Off-peak*

< Back | Continue >


75%

Australian Government | AUSTRALIAN ENERGY REGULATOR

Please indicate which of the three options you would prefer:

You can point your cursor on the bold text description below for further descriptions before you answer

Question 8 out of 8

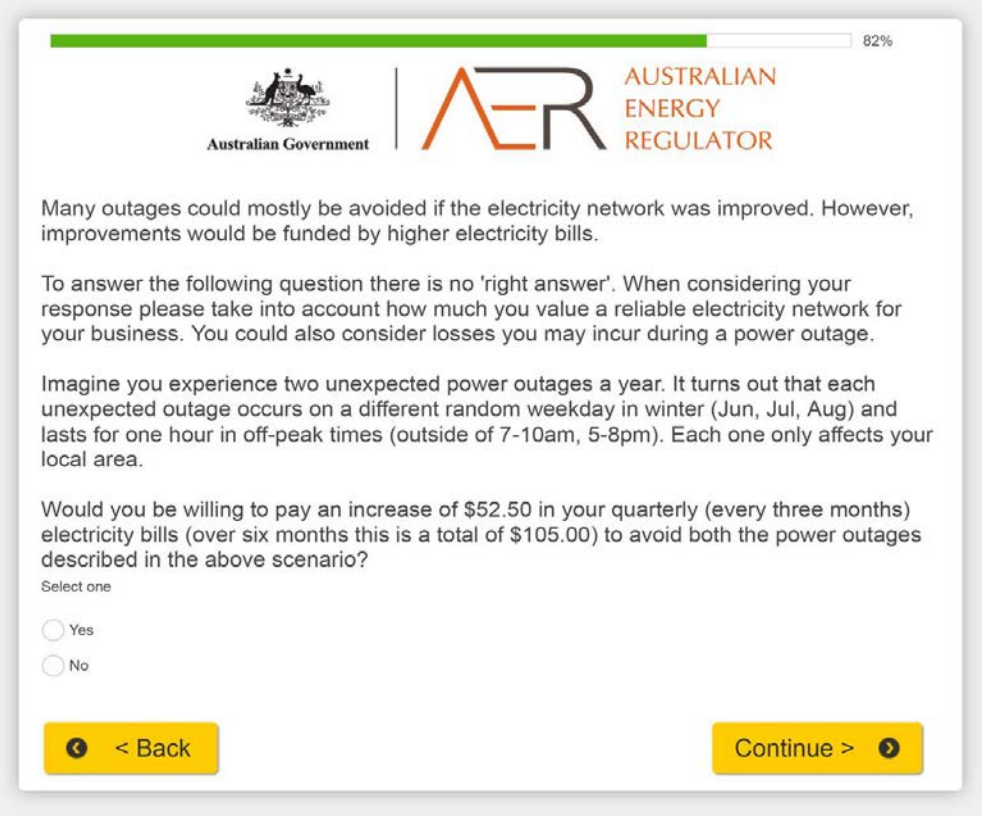
	Option 1	Option 2	Option 3
Change in your quarterly (every three months) electricity bills	2% lower ($15.00 per bill)	3% lower ($22.50 per bill)	No change
Localised/widespread	*Localised*	*Localised*	*Localised*
Duration	6 hours	3 hours	1 hour
Frequency	*Twice a year*	*Twice a year*	*Twice a year*
Summer/winter	Summer	Winter	Winter
Weekday/weekend	Weekdays	Weekends	Weekdays
Peak/Off-peak	Peak	Peak	Off-peak

< Back | Continue >

Business

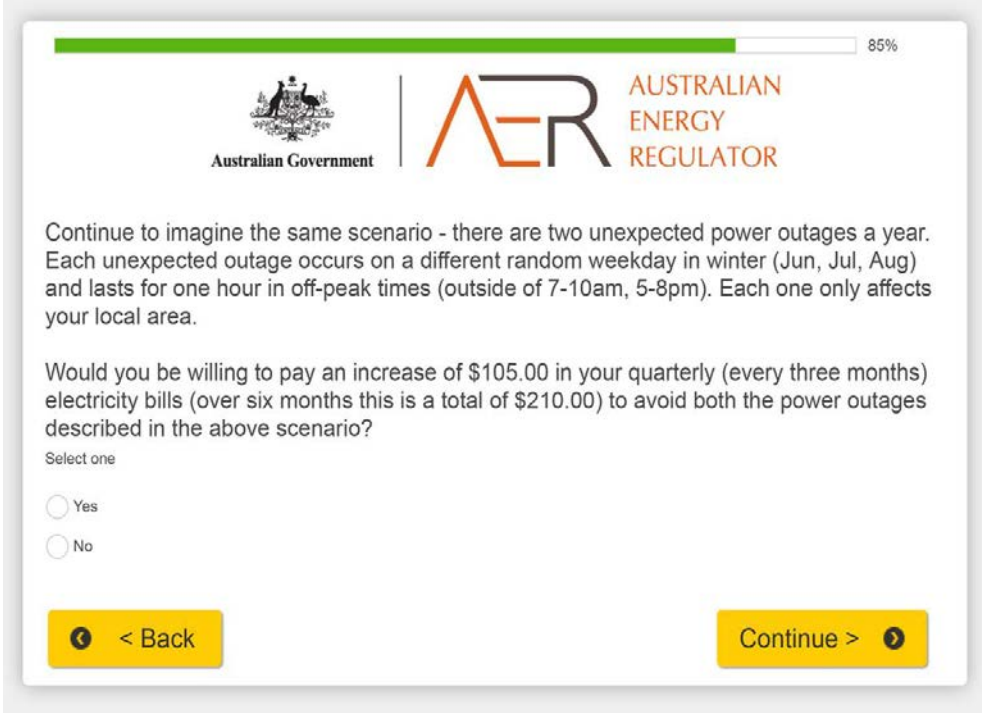
Initial cost prompts ranged from 1% to 10% of the respondent's most recent bill.

All prompts were displayed as dollar amounts. The billing frequency is piped in to the question text, however does not scale up the dollar amount as it is a percentage of a respondent's last bill, which was already stated at the relevant billing frequency.



If the respondent selects 'Yes' to the initial prompt (on the previous page), the value is doubled and the question is asked again, as per the above example.

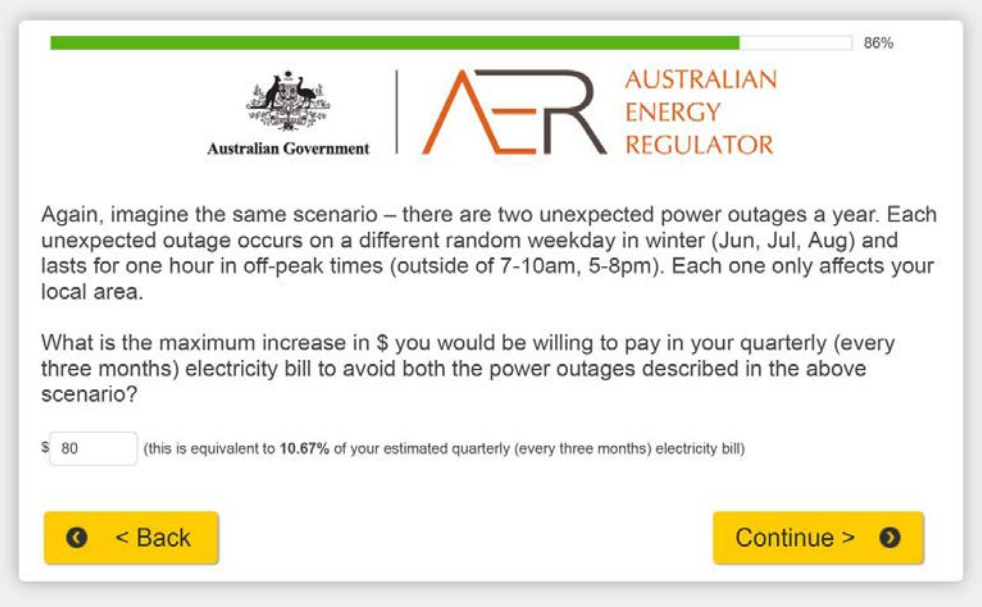
If the user selects 'No' to the initial prompt, the value is halved.

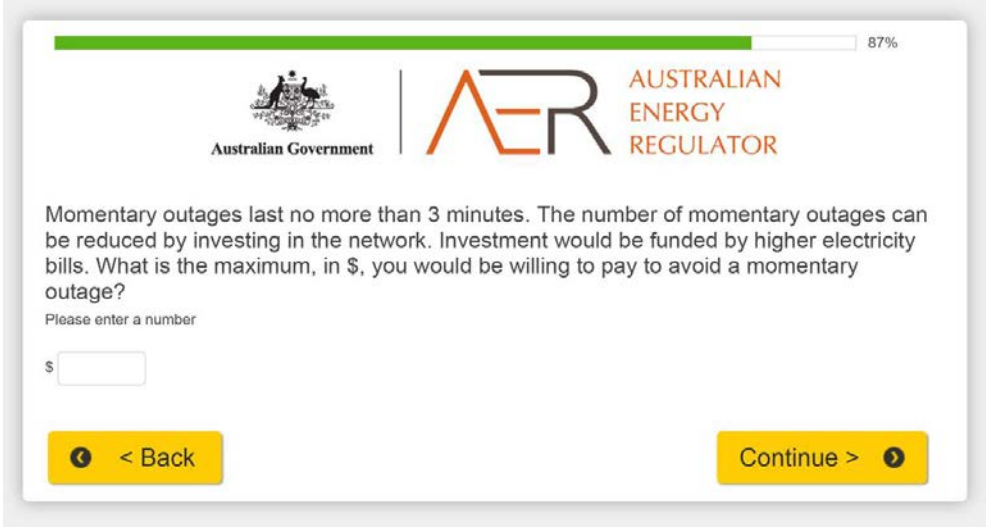


Business

Irrespective to the responses provided to the previous string of Yes/No cost prompts, ALL respondents were asked the open question presented on this page.

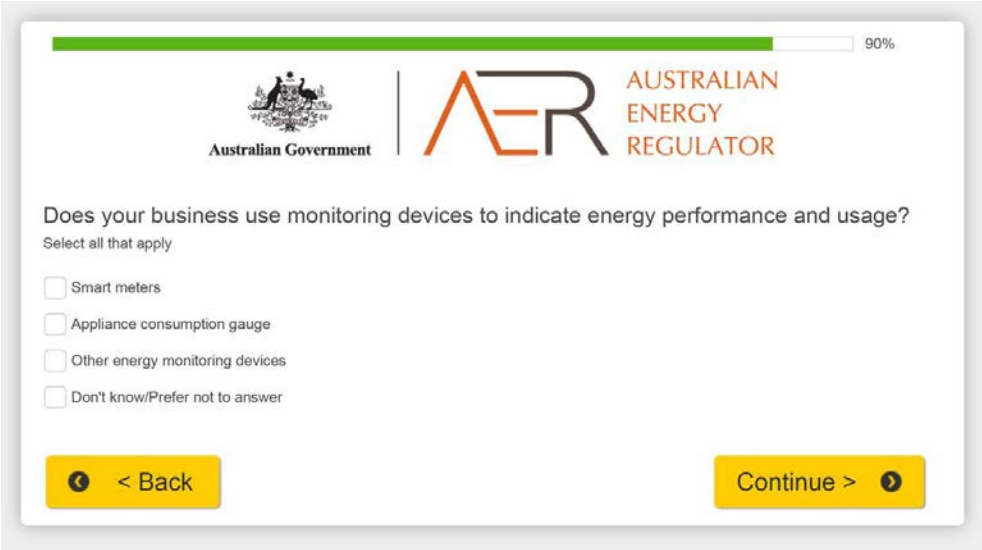
As per the example on this scree, dollar amounts entered were dynamically calculated and displayed as a percentage of a respondent's last bill.

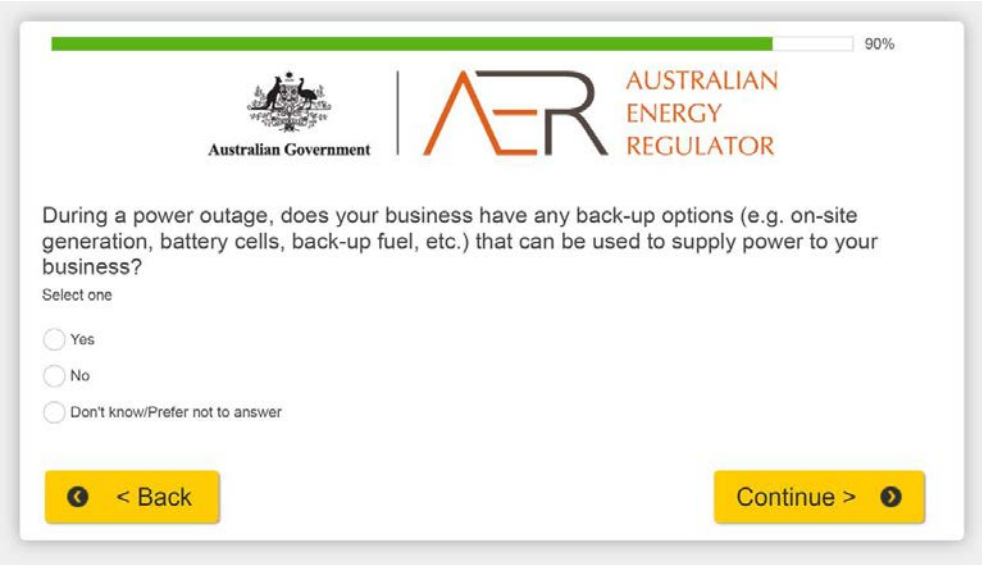




Business

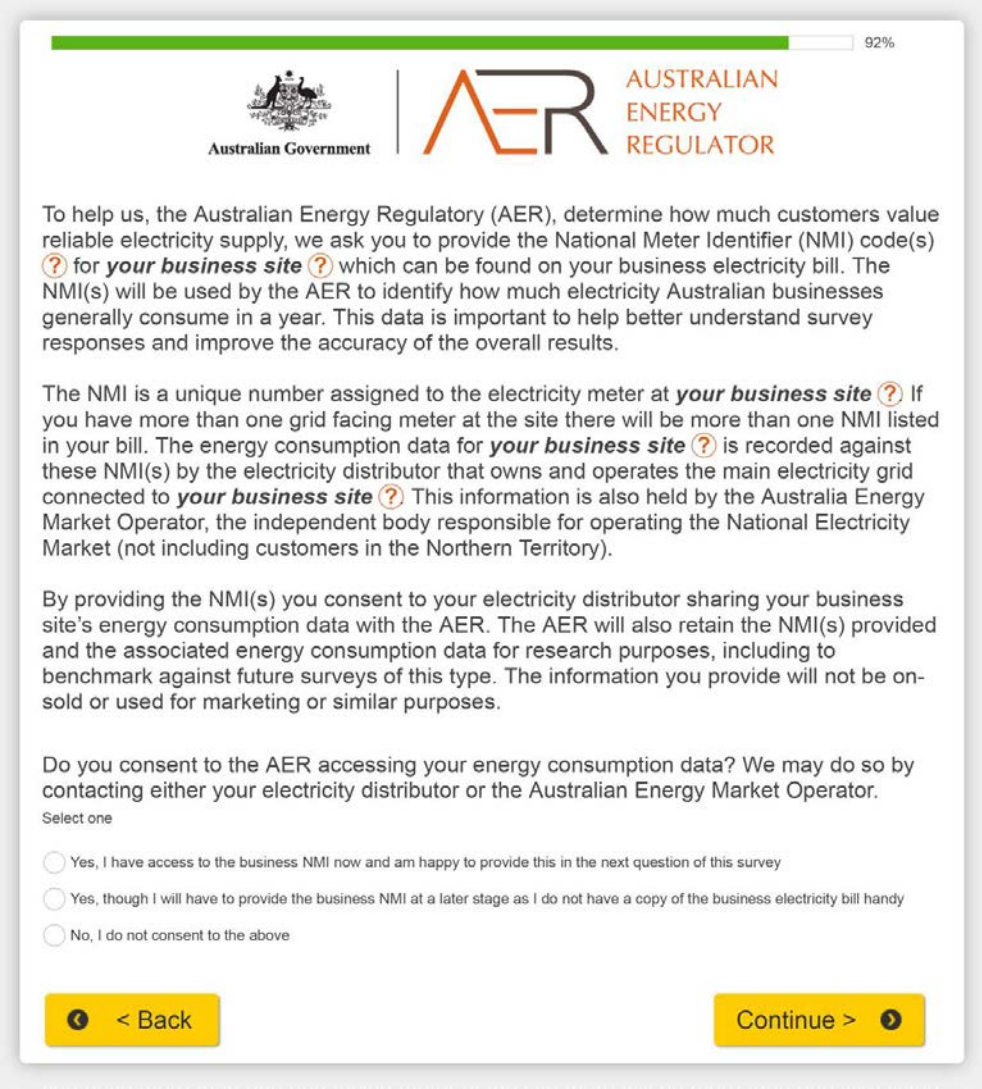
Business





Business

This screen was only presented to respondents who indicated their business already has back-up power options.



Business

This page was displayed for respondents who could provide their NMI(s) at the time of completing the survey.

Upon entering in the first text box, a second box appeared beneath for an additional NMI. Up to 10 NMIs were supported per respondent.

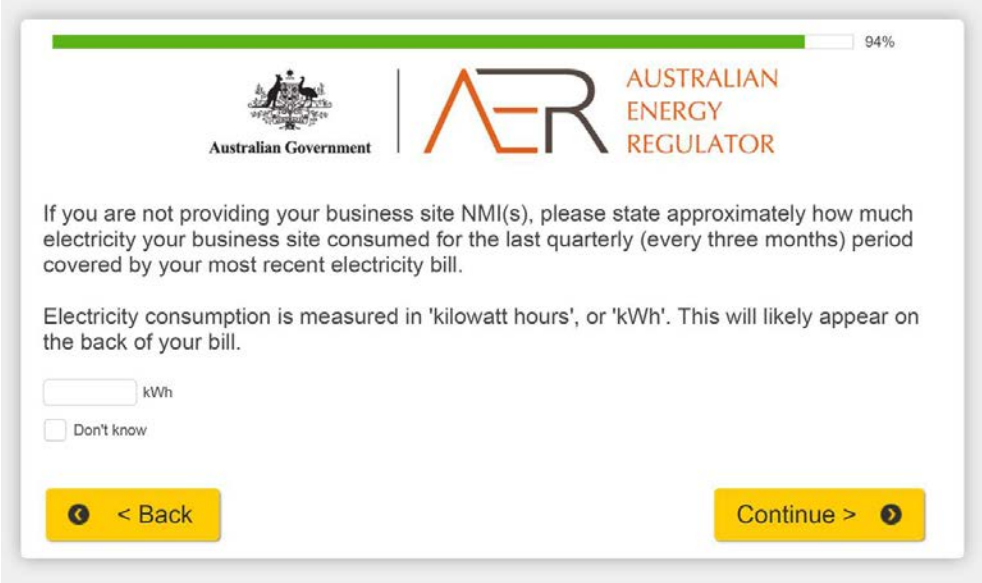
Respondents who were not able to provide their NMI(s) at the time of completing the survey were provided an option to submit their response, however come back at a later stage to provide their NMI(s).

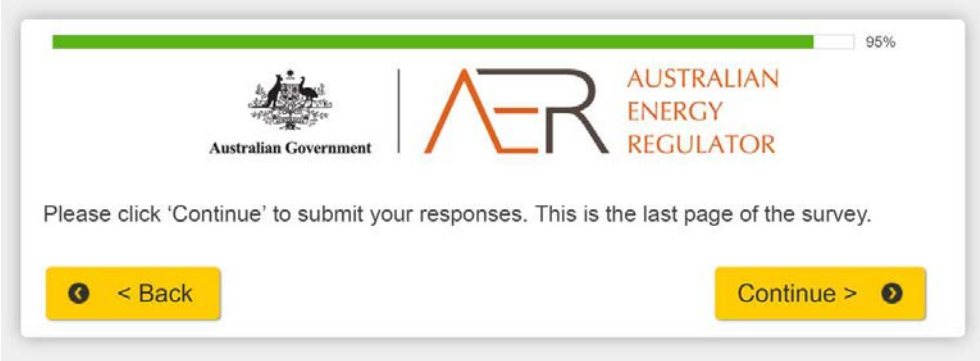
Fieldwork provider Dynata issued reminder emails to respondents who took up this option but were yet to log back in.

Respondents completing the open link version of the survey were not provided the option of coming back later to complete their NMI, as there was no unique identifier associated with each respondent.

Business

Respondents not providing a NMI were presented with this screen.





KPMG insync

Direct Cost Survey

Direct Cost Survey

Introduction

The purpose of this appendix is to document the AER Direct Cost survey that was launched on Friday 23 August and remained open for over six weeks, closing on Monday 7 October. Hosted by Insync, survey questions presented to respondents were tailored to whether the business operated 24 hours a day, 7 days a week. Respondents were permitted to save partially completed responses and were also alerted to unanswered questions.

Partially completed responses were followed up by Insync with reminder emails to encourage completion.

Direct cost - business that operate 24 hours a day, 7 days a week

AUSTRALIAN ENERGY REGULATOR

Direct Cost Survey

POWERED BY insync surveys research consulting

Draft mode. Please don't attempt to complete the survey.

This is page 1 of 8

Direct cost survey

Insync is carrying out a study on behalf of the Australian Energy Regulator (AER). As Australia's national energy regulator, the AER's role includes economic regulation of energy networks and markets to drive competition, and provide regulation where competition is not feasible. This study will be used by the AER to help determine how much customers value a reliable supply of electricity from the grid.

a) Why your view matters to us

You have been contacted to complete this survey because we are interested in understanding how unplanned interruptions to the supply of electricity from the grid (unexpected power outages) affect large business sites in Australia.

We would like to hear from you about how unexpected power outages affect your business and how far we should go to avoid or mitigate them. The results of this survey will be used by the AER to help ensure electricity providers invest the right amount in electricity infrastructure, balancing reliability and cost to deliver power to businesses.

Even if your business has installed back-up supply options to enable business operations to continue as usual through a power outage limiting the cost of an outage for your business, it is still important your views are captured by filling out this survey because the costs of electricity network investment are shared by all customers.

Please take as long as you need to complete the survey because accurate responses are what matters.

b) Privacy

As well as asking you respond to the survey questions, later in this survey we also ask for the National Meter Identifier (NMI) of your relevant business sites which will help us identify how much electricity Australian businesses generally consume in a year. You can find the NMI(s) for your business site on your energy bill.

Please note that some of the information you provide in your response to the survey may constitute 'Personal Information'. All personal information will be treated in accordance with the *Privacy Act 1988* and the Australian Privacy Principles (APPs). For more information please refer to our privacy statement.

The AER will publish the results of this project on its website. Responses will primarily be used for research and to produce aggregate statistics. You would not be identified in the published data, and your response will not be used for marketing purposes. At the end of the survey, you will be given the opportunity to indicate whether any information you have provided is confidential and should not be published.

For any queries or concerns please phone the AER on 02 9230 3856, or 03 9290 1469, or email the AER at VCR@aer.gov.au

c) About this survey

You have been asked to complete this survey because we want to understand how unexpected power outages affect your large business site(s). We define a large business site as one that has used more than 10 megavolt amps (10MVA) of electricity at a moment in time, sometime during the previous 12 months. We understand your business has one or more site locations which may meet this criteria.

Please complete this survey in relation to the site locations identified in the email originally notifying you of this survey. **Please note, the questions in this survey are designed to be answered in relation to a single large business site**. If the email identifies more than one site, please complete a separate survey for each large business site. Instructions for how to do this are included in the email.

We would really appreciate it if you could provide a survey response for **each** of your large business sites identified in the email originally notifying you of this survey. This will help improve the accuracy of our results and contribute to ensuring there is no unnecessary customer-funded expenditure (via electricity bills) on networks. However, if you are only able to complete the survey once, if possible, please answer in relation to the site which consumes the largest amount of electricity.

In this survey, a **power outage** is a complete loss of electricity supply from the grid affecting your site. This survey relates to outages that are unexpected, or which you find out about shortly before they happen.

Direct cost - business that operate 24 hours a day, 7 days a week

A summary of the survey questions was provided to you in the email originally notifying you of this survey to assist you in collating the information needed to answer the questions before you respond in this online survey. You may also wish to collect information from colleagues or external service providers to help you answer the questions.

To complete the survey in one session, we suggest you collect all information necessary before commencing the survey, though you can complete the survey in several sessions if needed, by saving any changes each time. Please submit the survey once you have completed all questions.

Please ensure you submit the survey by the survey closing date: **4th October 2019**.

For any queries or concerns please phone the AER on 02 9230 3856, or 03 9290 1469, or email the AER at VCR@aer.gov.au

Your contact information

Please enter your email address, company name and relevant site name to receive a unique link to access the survey. The survey link will be emailed to you, and you can use it to complete the survey or forward the link to a colleague to complete the survey. The survey can be completed over several sessions if necessary, and any changes can be saved each time.

Your email:

Your large business site

Please provide the name of the company that owns the site you are answering this survey in relation to.

Company name:

Please provide the name of the large business site which you are answering this survey in relation to.

Site name:

In this survey, when we refer to '***your business site***' we mean the site you have entered here and which appears at the top of each page of this online survey.

Does your business operate (continue its core functions) 24 hours a day, 7 days a week at *your business site*?

Choose one of the options below:

- ◯ Yes, *my business site* does operate 24 hours a day, 7 days a week.
- ◯ No, *my business site* does not operate 24 hours a day, 7 days a week.

Save and Continue ►

Direct cost - business that operate 24 hours a day, 7 days a week

Please provide the name of the large business site which you are answering this survey in relation to.

Site name:

In this survey, when we refer to '***your business site***' we mean the site you have entered here and which appears at the top of each page of this online survey.

Does your business operate (continue its core functions) 24 hours a day, 7 days a week at *your business site*?

Choose one of the options below:

- (●) Yes, *my business site* does operate 24 hours a day, 7 days a week.
- ( ) No, *my business site* does not operate 24 hours a day, 7 days a week.

Save and Continue ►

This is page 2 of 8

Please complete this survey in relation to your nominated business site: {Site name as provided}

Please note, at any point throughout the survey you can save your responses and continue at a later stage by clicking the survey link in the email you received from Insync for your nominated business site.

a) Worst-case power outage scenarios

1. Describe the core business processes that are carried out at *your business site* which are critically reliant on continuous energy supply.

2. Is there a time of day / week / year that is worse for *your business site* to experience an unexpected outage ⓘ, or is the impact of an outage the same regardless of when it happens?

Choose one of the options below:

- ( ) No, the impact of an outage is the same, regardless of the day / week / year (please skip to question 4)
- (●) Yes, the impact of an outage differs depending on the time of day, day of the week or time of year (please continue to question 3)

Direct cost - business that operate 24 hours a day, 7 days a week

3. If you answered 'yes' to question 2, please specify when is the worst time (of the day / week / year) for an unexpected outage to occur at *your business site*.

(For example, the worst time may be: '10am-2pm, on a weekday in summer')

4. Is there an ambient temperature that is worse for *your business site* to experience an unexpected outage, or is the impact of an outage the same regardless of the temperature?

Choose one of the options below:

- ◯ No, the impact of an outage is the same, regardless of the temperature.
- ◯ Yes, the impact of an outage is worse depending on hot or cold temperatures.

◄ Save and Go Back | Save and Continue ►

This is page 3 of 8

Please complete this survey in relation to your nominated business site: {Site name as provided}

b) Costs of power outage

5. Provide a description of the types of costs your business would incur (i.e. lost production, damage to plant or equipment, overtime labour costs, damaged goods etc.), if an unexpected outage ⓘ of 10 minutes occurred at *your business site*.

Please **do not** include in your description of types of costs any loss of production that is simply deferred and will be made up for later. Where you expect that production would be made up for later, please **do** include a description of any **extra** costs in making up for the production later.

6. What is the cost (i.e. lost production, damage to plant or equipment, overtime labour costs, damaged goods etc.), of a 10 minute outage that occurs unexpectedly at *your business site*?

Please **do not** include in your estimate of costs any loss of production that is simply deferred and will be made up for later. Where you expect that production would be made up for later, please **do** include in your estimate any **extra** costs in making up for the production later.

$

Direct cost - business that operate 24 hours a day, 7 days a week

7. If the outage was longer than 10 minutes, would your business incur any additional costs at *your business site*? (i.e. in addition to those identified in Question 5 and 6)?

Choose one of the options below:

- ○ No, the cost of an outage is the same, regardless of the length (please skip to question 8)
- ◉ Yes, the cost of an outage differs depending on the length (please continue to Table 1 below)

If you answered 'yes' to question 7, please fill out Table 1 below. State the estimated total cost your business would incur if you experienced outages of particular lengths/occurring at particular times at *your business site*, as set out in Table 1. If you do not incur any additional cost from what you indicated in question 6, please enter '0'.

Table 1

Outage length	Total costs ($)	Please describe what the costs are for
Outage extended to 1 hour	$	
Outage extended to 3 hours	$	
Outage extended to 6 hours	$	
Outage extended to 12 hours	$	
Outage extended to 24 hours	$	
Outage extended to 48 hours	$	

Direct cost - business that operate 24 hours a day, 7 days a week

8. Momentary outages are outages shorter than 3 minutes. Momentary outages could be reduced by investing more in the network.

8a. Do momentary outages cause disruption to your business at *your business site*?

Choose one of the options below:

- ○ No, momentary outages (less than 3 minutes) do not disrupt business processes (please skip to question 9)
- ◉ Yes, momentary outages (less than 3 minutes) do disrupt business processes in some way (please continue to question 8b)

8b. If you answered 'yes' to question 8a, describe what business processes are disrupted when a momentary outage (less than 3 minutes) occurs.

9. Have you made any changes to your business operations or any investments to reduce the risk/impact of momentary outages on your business at *your business site*?

Choose one of the options below:

- ○ No, my business has not made any changes to business processes or any investments to reduce the risk/impact of momentary outages (less than 3 minutes) at *my business site* (please continue to the next section of the survey by clicking 'Save and Continue' at the bottom of the page)
- ◉ Yes, my business has made changes to business processes and/or investments to reduce the risk/impact of momentary outages (less than 3 minutes) at *my business site* (please continue to question 10)

9. Have you made any changes to your business operations or any investments to reduce the risk/impact of momentary outages on your business at *your business site*?

Choose one of the options below:

- ○ No, my business has not made any changes to business processes or any investments to reduce the risk/impact of momentary outages (less than 3 minutes) at *my business site* (please continue to the next section of the survey by clicking 'Save and Continue' at the bottom of the page)
- ◉ Yes, my business has made changes to business processes and/or investments to reduce the risk/impact of momentary outages (less than 3 minutes) at *my business site* (please continue to question 10)

10. If you answered 'yes' to question 9, describe what business processes you have changed and/or what investments you have made (include dollar cost and description of what you invested in) to reduce the risk/impact of momentary outage (less than 3 minutes) at *your business site*.

◄ Save and Go Back | Save and Continue ►

Direct cost - business that operate 24 hours a day, 7 days a week

This is page 4 of 8

Please complete this survey in relation to your nominated business site: {Site name as provided}

c) Your power outage history

The questions in this section are about your business' experience of power outages at *your business site*.

11. How many times, if any, has *your business site* experienced an unexpected outage for 10 minutes or more in the last 12 months? (enter '0' if none)

12. How long ago was your last experience of an unexpected outage for more than 10 minutes at *your business site*? (enter 'never' if you have not experienced an outage)

13. Did you receive any information from your distribution/transmission company about the outage and its expected length? (enter 'n/a' if not relevant)

14. If you received information about the outage, did this information help you manage or reduce the cost of the outage for your business? If so, how did it help? (enter 'n/a' if not relevant)

◄ Save and Go Back | Save and Continue ►

This is page 5 of 8

Please complete this survey in relation to your nominated business site: {Site name as provided}

d) Your electricity expenditure

15. On average, how much does your business spend on electricity per month for electricity consumed at *your business site*?

To answer this question, only include costs of energy you buy from the grid, not costs associated with any on-site generation or clean energy initiatives. Also, do not include money you earn from supplying energy to the grid.

Approximate values are sufficient.

$ per month

16. How satisfied are you with the reliability of your electricity supply?

◯ Very unsatisfied ◯ Slightly unsatisfied ◯ Neutral ◯ Somewhat satisfied ◯ Very satisfied

◄ Save and Go Back | Save and Continue ►

Direct cost - business that operate 24 hours a day, 7 days a week

This is page 6 of 8

Please complete this survey in relation to your nominated business site: {Site name as provided}

e) Alternative electricity supply and monitoring devices

17. Does *your business site* use any of the following back-up power systems to maintain operations in the event of a power outage, or does your business plan to introduce them within the next five years?

Form of back-up supply	Currently installed	Plan to install	No plan to install
Back-up generator	○	○	○
Battery system	○	○	○
Other (e.g. switch to alternative energy source)	○	○	○

19. Does *your business site* routinely generate any of its own electricity?

To answer this question, exclude occasions when you generated electricity on-site because of a network outage.

○ Yes ○ No

20. Are there any other impacts on your business due to unexpected power outages that have not been addressed above and that you think should be considered?

◄ Save and Go Back | Save and Continue ►

This is page 7 of 8

Please complete this survey in relation to your nominated business site: {Site name as provided}

f) Request for permission in relation to business NMI(s)

21. We ask you to provide the National Meter Identifier (**NMI**) ⓘ for *your business site*. The NMI(s) will be used by the AER to identify how much electricity Australian businesses generally consume in a year. This data is important to help better understand survey responses and improve the accuracy of results. You may have one or more NMIs depending on the number of grid facing electricity meters at the site (i.e. there is one NMI per meter).

The AER may disclose the NMI(s) to the business' electricity distributor or transmission company, and the Australian Energy Market Operator so they can provide the energy consumption data for *your business site* to the AER. By providing the business NMI(s) you consent to the AER disclosing the business' NMI(s) to these parties and obtaining the business' energy consumption data.

Please provide each NMI associated with the business site:

NMI 1:

NMI 2:

NMI 3:

NMI 4:

Direct cost - business that operate 24 hours a day, 7 days a week

NMI 5:

NMI 6:

NMI 7:

NMI 8:

If you are unaware of what your NMI(s) are, you can provide your consent for the Australian Energy Market Operator and your distribution or transmission company to provide these to the AER on your behalf. As stated above, the AER may disclose NMI(s) to the business' electricity distributor or transmission company, or the Australian Energy Market Operator so they can provide the business' energy consumption data to the AER. By providing your consent for these other parties to disclose your NMI(s) to the AER on your behalf, you consent to the AER obtaining the business' energy consumption data.

22. Do you consent for the Australian Energy Market Operator, your business' distribution or transmission company to provide your NMI(s) to the AER?

- ◯ No, I don't provide consent for the Australian Energy Market Operator, my business' distributor and transmission company to provide the business' NMI(s) to the AER.
- ◯ Yes, I give consent for the Australian Energy Market Operator, my business' distributor and transmission company to provide the business' NMI(s) to the AER.

23. Please provide a name and telephone number in case the AER needs to contact you in relation to your response.

Name:

Telephone Number:

g) Confidentiality

Your energy consumption data will be used together with your survey responses to help determine how much customers in aggregate are willing to pay for reliability. The AER may also retain your energy consumption data for research purposes including to benchmark future VCR figures. The information you provide will not be used for marketing or similar purposes.

The AER intends to publish the results of the survey on its website. It may publish survey responses and energy consumption data by removing identifying information in relation to you and your business.

The AER will treat any confidential information in line with our Information Policy. The AER will not publish data that is confidential.

Please outline what confidential information (if any) you have provided.

◄ Save and Go Back | Save and Continue ►

Direct cost - business that operate 24 hours a day, 7 days a week

Thank you for your participation.

Your answers have been submitted to Insync.

If you wish to edit your survey responses please email the AER at VCR@aer.gov.au.

Direct cost - business that DO NOT operate 24 hours a day, 7 days a week

AUSTRALIAN ENERGY REGULATOR

Direct Cost Survey

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Draft mode. Please don't attempt to complete the survey.

This is page 1 of 8

Direct cost survey

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b) Privacy

As well as asking you respond to the survey questions, later in this survey we also ask for the National Meter Identifier (NMI) of your relevant business sites which will help us identify how much electricity Australian businesses generally consume in a year. You can find the NMI(s) for your business site on your energy bill.

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c) About this survey

You have been asked to complete this survey because we want to understand how unexpected power outages affect your large business site(s). We define a large business site as one that has used more than 10 megavolt amps (10MVA) of electricity at a moment in time, sometime during the previous 12 months. We understand your business has one or more site locations which may meet this criteria.

Please complete this survey in relation to the site locations identified in the email originally notifying you of this survey. **Please note, the questions in this survey are designed to be answered in relation to a single large business site**. If the email identifies more than one site, please complete a separate survey for each large business site. Instructions for how to do this are included in the email.

We would really appreciate it if you could provide a survey response for **each** of your large business sites identified in the email originally notifying you of this survey. This will help improve the accuracy of our results and contribute to ensuring there is no unnecessary customer-funded expenditure (via electricity bills) on networks. However, if you are only able to complete the survey once, if possible, please answer in relation to the site which consumes the largest amount of electricity.

In this survey, a **power outage** is a complete loss of electricity supply from the grid affecting your site. This survey relates to outages that are unexpected, or which you find out about shortly before they happen.

Direct cost - business that DO NOT operate 24 hours a day, 7 days a week

A summary of the survey questions was provided to you in the email originally notifying you of this survey to assist you in collating the information needed to answer the questions before you respond in this online survey. You may also wish to collect information from colleagues or external service providers to help you answer the questions.

To complete the survey in one session, we suggest you collect all information necessary before commencing the survey, though you can complete the survey in several sessions if needed, by saving any changes each time. Please submit the survey once you have completed all questions.

Please ensure you submit the survey by the survey closing date: **4th October 2019**.

For any queries or concerns please phone the AER on 02 9230 3856, or 03 9290 1469, or email the AER at VCR@aer.gov.au

Your contact information

Please enter your email address, company name and relevant site name to receive a unique link to access the survey. The survey link will be emailed to you, and you can use it to complete the survey or forward the link to a colleague to complete the survey. The survey can be completed over several sessions if necessary, and any changes can be saved each time.

Your email:

Your large business site

Please provide the name of the company that owns the site you are answering this survey in relation to.

Company name:

Please provide the name of the large business site which you are answering this survey in relation to.

Site name:

In this survey, when we refer to '***your business site***' we mean the site you have entered here and which appears at the top of each page of this online survey.

Does your business operate (continue its core functions) 24 hours a day, 7 days a week at *your business site*?

Choose one of the options below:

- ◯ Yes, *my business site* does operate 24 hours a day, 7 days a week.
- ◯ No, *my business site* does not operate 24 hours a day, 7 days a week.

Save and Continue ►

Direct cost - business that DO NOT operate 24 hours a day, 7 days a week

Please provide the name of the large business site which you are answering this survey in relation to.

Site name:

In this survey, when we refer to '***your business site***' we mean the site you have entered here and which appears at the top of each page of this online survey.

Does your business operate (continue its core functions) 24 hours a day, 7 days a week at *your business site*?

Choose one of the options below:

- ○ Yes, *my business site* does operate 24 hours a day, 7 days a week.
- ◉ No, *my business site* does not operate 24 hours a day, 7 days a week.

Save and Continue ►

This is page 3 of 8

Please complete this survey in relation to your nominated business site: {Site name as provided}

b) Costs of power outage

5. Provide a description of the types of costs your business would incur (i.e. lost production, damage to plant or equipment, overtime labour costs, damaged goods etc.), if an unexpected outage ⓘ of 10 minutes occurred at *your business site*.

Please **do not** include in your description of types of costs any loss of production that is simply deferred and will be made up for later. Where you expect that production would be made up for later, please **do** include a description of any **extra** costs in making up for the production later.

6a. What is the cost (i.e. lost production, damage to plant or equipment, overtime labour costs, damaged goods etc.), of a 10 minute outage that occurs unexpectedly and starts between 7am and 10am, or 5pm and 8pm on a weekday at *your business site*?

Please **do not** include in your estimate of costs any loss of production that is simply deferred and will be made up for later. Where you expect that production would be made up for later, please **do** include in your estimate any **extra** costs in making up for the production later.

$

Direct cost - business that DO NOT operate 24 hours a day, 7 days a week

6b. What is the cost (i.e. lost production, damage to plant or equipment, overtime labour costs, damaged goods etc.), of a 10 minute outage that occurs unexpectedly and starts any time outside the hours of 7am and 10am, or 5pm and 8pm on a weekday at *your business site*?

Please **do not** include in your estimate of costs any loss of production that is simply deferred and will be made up for later. Where you expect that production would be made up for later, please **do** include in your estimate any **extra** costs in making up for the production later.

$ [ ]

7. If the outage was longer than 10 minutes, would your business incur any additional costs at *your business site*? (i.e. in addition to those identified in Questions 5, 6a and 6b)?

Choose one of the options below:

- ○ No, the cost of an outage is the same, regardless of the length (please skip to question 8)
- ◉ Yes, the cost of an outage differs depending on the length (please continue to Tables 1 and 2 below)

If you answered 'yes' to question 7, please fill out Table 1 below. State the estimated total cost (rounded to the nearest thousand) your business would incur if you experienced outages of particular lengths/occurring at particular times at *your business site*, as set out in Table 1. If you do not incur any additional cost from what you indicated in questions 6a and 6b, please enter '0'.

Table 1 — Outages up to 6 hours

Outage length	Total costs ($)	Please describe what the costs are for
Outage extended to 1 hour between 7am and 10pm, or 5pm and 8pm on a weekday (peak hours)	$	
Outage extended to 1 hour any time outside of peak hours	$	
Outage extended to 3 hours between 7am and 10pm, or 5pm and 8pm on a weekday (peak hours)	$	
Outage extended to 3 hours any time outside of peak hours	$	
Outage extended to 6 hours between 7am and 10pm, or 5pm and 8pm on a weekday (peak hours)	$	
Outage extended to 6 hours any time outside of peak hours	$	

Direct cost - business that DO NOT operate 24 hours a day, 7 days a week

If you answered 'yes' to question 7, please also fill out Table 2 below. State the estimated total cost (rounded to the nearest thousand) your business would incur if you experienced outages of particular lengths/occurring at particular times at *your business site*, as set out in Table 2. If you do not incur any additional cost from what you indicated in questions 6a and 6b, please enter '0'.

Table 2 — Outages 12 to 48 hours

The following outages may occur at any time of the day.

Outage length	Total costs ($)	Please describe what the costs are for
Outage extended to 12 hours	$	
Outage extended to 24 hours	$	
Outage extended to 48 hours	$	

8. Momentary outages are outages shorter than 3 minutes. Momentary outages could be reduced by investing more in the network.

8a. Do momentary outages cause disruption to your business at *your business site*?

Choose one of the options below:

- ○ No, momentary outages (less than 3 minutes) do not disrupt business processes (please skip to question 9)
- ◉ Yes, momentary outages (less than 3 minutes) do disrupt business processes in some way (please continue to question 8b)

8b. If you answered 'yes' to question 8a, describe what business processes are disrupted when a momentary outage (less than 3 minutes) occurs.

9. Have you made any changes to your business operations or any investments to reduce the risk/impact of momentary outages on your business at *your business site*?

Choose one of the options below:

- ○ No, my business has not made any changes to business processes or any investments to reduce the risk/impact of momentary outages (less than 3 minutes) at *my business site* (please continue to the next section of the survey by clicking 'Save and Continue' at the bottom of the page)
- ○ Yes, my business has made changes to business processes and/or investments to reduce the risk/impact of momentary outages (less than 3 minutes) at *my business site* (please continue to question 10)

◄ Save and Go Back | Save and Continue ►

Direct cost - business that DO NOT operate 24 hours a day, 7 days a week

This is page 4 of 8

Please complete this survey in relation to your nominated business site: {Site name as provided}

c) Your power outage history

The questions in this section are about your business' experience of power outages at *your business site*.

11. How many times, if any, has *your business site* experienced an unexpected outage for 10 minutes or more in the last 12 months? (enter '0' if none)

12. How long ago was your last experience of an unexpected outage for more than 10 minutes at *your business site*? (enter 'never' if you have not experienced an outage)

13. Did you receive any information from your distribution/transmission company about the outage and its expected length? (enter 'n/a' if not relevant)

14. If you received information about the outage, did this information help you manage or reduce the cost of the outage for your business? If so, how did it help? (enter 'n/a' if not relevant)

◄ Save and Go Back | Save and Continue ►

This is page 5 of 8

Please complete this survey in relation to your nominated business site: {Site name as provided}

d) Your electricity expenditure

15. On average, how much does your business spend on electricity per month for electricity consumed at *your business site*?

To answer this question, only include costs of energy you buy from the grid, not costs associated with any on-site generation or clean energy initiatives. Also, do not include money you earn from supplying energy to the grid.

Approximate values are sufficient.

$ per month

16. How satisfied are you with the reliability of your electricity supply?

○ Very unsatisfied ○ Slightly unsatisfied ○ Neutral ○ Somewhat satisfied ○ Very satisfied

◄ Save and Go Back | Save and Continue ►

Direct cost - business that DO NOT operate 24 hours a day, 7 days a week

This is page 6 of 8

Please complete this survey in relation to your nominated business site: {Site name as provided}

e) Alternative electricity supply and monitoring devices

17. Does *your business site* use any of the following back-up power systems to maintain operations in the event of a power outage, or does your business plan to introduce them within the next five years?

Form of back-up supply	Currently installed	Plan to install	No plan to install
Back-up generator	○	○	○
Battery system	○	○	○
Other (e.g. switch to alternative energy source)	○	○	○

19. Does *your business site* routinely generate any of its own electricity?

To answer this question, exclude occasions when you generated electricity on-site because of a network outage.

○ Yes ○ No

20. Are there any other impacts on your business due to unexpected power outages that have not been addressed above and that you think should be considered?

◄ Save and Go Back | Save and Continue ►

This is page 7 of 8

Please complete this survey in relation to your nominated business site: {Site name as provided}

f) Request for permission in relation to business NMI(s)

21. We ask you to provide the National Meter Identifier (**NMI**) ⓘ for *your business site*. The NMI(s) will be used by the AER to identify how much electricity Australian businesses generally consume in a year. This data is important to help better understand survey responses and improve the accuracy of results. You may have one or more NMIs depending on the number of grid facing electricity meters at the site (i.e. there is one NMI per meter).

The AER may disclose the NMI(s) to the business' electricity distributor or transmission company, and the Australian Energy Market Operator so they can provide the energy consumption data for *your business site* to the AER. By providing the business NMI(s) you consent to the AER disclosing the business' NMI(s) to these parties and obtaining the business' energy consumption data.

Please provide each NMI associated with the business site:

NMI 1:

NMI 2:

NMI 3:

NMI 4:

Direct cost - business that DO NOT operate 24 hours a day, 7 days a week

NMI 5:

NMI 6:

NMI 7:

NMI 8:

If you are unaware of what your NMI(s) are, you can provide your consent for the Australian Energy Market Operator and your distribution or transmission company to provide these to the AER on your behalf. As stated above, the AER may disclose NMI(s) to the business' electricity distributor or transmission company, or the Australian Energy Market Operator so they can provide the business' energy consumption data to the AER. By providing your consent for these other parties to disclose your NMI(s) to the AER on your behalf, you consent to the AER obtaining the business' energy consumption data.

22. Do you consent for the Australian Energy Market Operator, your business' distribution or transmission company to provide your NMI(s) to the AER?

- ◯ No, I don't provide consent for the Australian Energy Market Operator, my business' distributor and transmission company to provide the business' NMI(s) to the AER.
- ◯ Yes, I give consent for the Australian Energy Market Operator, my business' distributor and transmission company to provide the business' NMI(s) to the AER.

23. Please provide a name and telephone number in case the AER needs to contact you in relation to your response.

Name:

Telephone Number:

g) Confidentiality

Your energy consumption data will be used together with your survey responses to help determine how much customers in aggregate are willing to pay for reliability. The AER may also retain your energy consumption data for research purposes including to benchmark future VCR figures. The information you provide will not be used for marketing or similar purposes.

The AER intends to publish the results of the survey on its website. It may publish survey responses and energy consumption data by removing identifying information in relation to you and your business.

The AER will treat any confidential information in line with our Information Policy. The AER will not publish data that is confidential.

Please outline what confidential information (if any) you have provided.

◄ Save and Go Back | Save and Continue ►

Direct cost - business that DO NOT operate 24 hours a day, 7 days a week

Thank you for your participation.

Your answers have been submitted to Insync.

If you wish to edit your survey responses please email the AER at VCR@aer.gov.au.

KPMG insync

Appendix E
List of organisations that supported the 'open' link

This slide provides a list of the organisations that supported the distribution of the open links

Business associations

- Australian Construction Association
- Australian Banking Association
- Australian Chamber of Commerce and Industry
- Accommodation Association of Australia
- Australian Logistics Council
- Australian Retailers Association
- Council of Small Business organisation Australia
- Export Council of Australia
- Retailers Association of Australia
- Insurance Council of Australia
- Manufacturing Australia
- NSW Chamber of Commerce
- Refrigerated Warehouse and Transport Association of Australia
- Small Business Association of Australia

Northern Territory

- Power and Water Corporation
- Utilities Commission
- Jacana Energy
- NTCOSS
- NT Ombudsman
- Chamber of Commerce NT

Agriculture

- Australian Beef Association
- National Farmers' Federation
- Australian Forest Products Association
- Country Women's' Association of Australia
- Dairy Australia
- Dairy Industry Association of Australia
- Australian Dairy Productions Federation
- Australian Dairy Farmers
- Queensland Farmers' Federation
- Victorian Farmers' Federation
- NSW Farmers' Federation
- Seafood Industry Australia
- Primary Producers SA
- Queensland Cane Growers Organisation
- Pioneer Valley Water Co-operative
- Apple and Pear Australia
- Cotton Australia
- Victorian Association of
- Forest Industries
- Australian Forest Products Association
- Department of Agriculture and Water Resources
- United Dairy Farmers of Victoria
- SA Dairyfarmers Association
- Queensland Dairyfamers Organisation
- Tasmanian Farmers and Graziers Association
- Agforce Queensland
- Grain Growers Limited
- Grain Producers Australia
- Horse SA

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