FINAL REPORT

Willingness to pay for carbon abatement and co-benefits

Stated preference research

Prepared for
Water Services Association of Australia

2 March 2022

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Introduction

The Water Services Association of Australia (WSAA) *Urban water industry climate change position* (WSAA 2021) articulates the urban water industry goal of achieving net zero emissions by 2050 or sooner where it aligns with customer expectations. Many water utilities are considering setting their own goals or pathways. This study supports the industry's commitment to work with customers and communities to understand their expectations and preferences and take those views into account in policy setting.

It uses a discrete choice experiment (DCE) to build the water industry's understanding of:

- customer preferences for various types of carbon offset products, expressed as willingness to pay (WTP) for different attributes of carbon offsets, and
- demographic factors affecting those preferences, including jurisdictional differences across Australia.

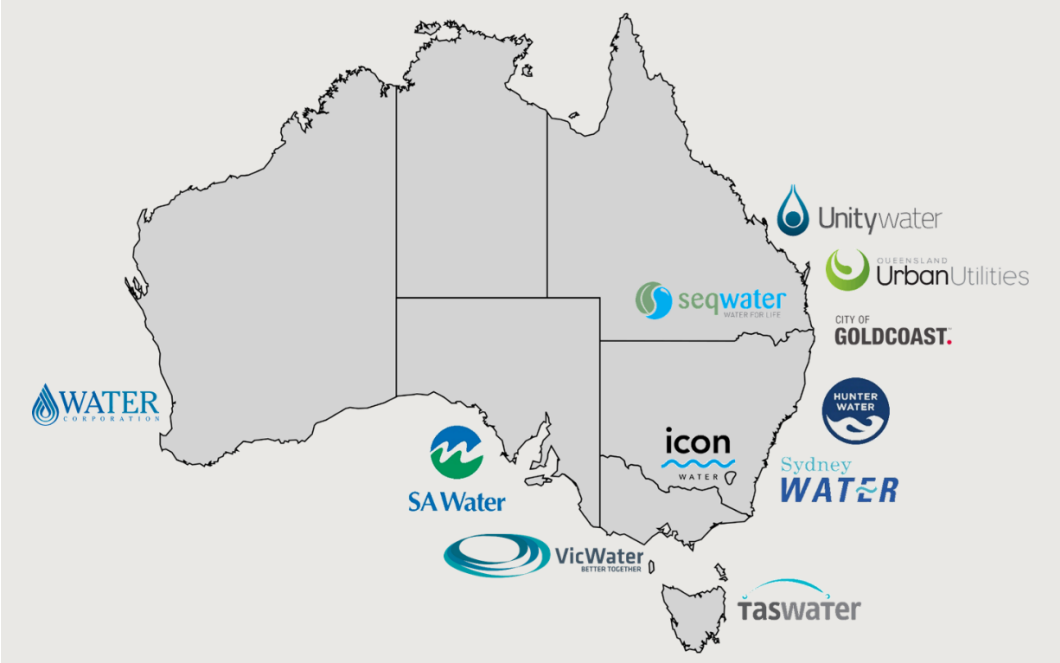
The intention of the study is not to test the popularity or acceptability of specific, costed carbon abatement projects nor to evaluate alternative carbon strategies, but rather to place monetary values on the non-market benefits of emission reduction and offsetting projects. These values can be used by utilities in cost-benefit analysis (CBA) of alternative projects or strategies.

The study scope acknowledges that energy efficiency and renewable energy generation by water utilities are unlikely to be sufficient to meet 'net zero' emission targets due to fugitive emissions from wastewater treatment. To achieve net-zero targets, most water utilities will need to invest in carbon offsets; that is, projects that would reduce or avoid emissions generated by others or sequester or capture emissions.

The study covers most of the Australian urban water sector (figure 1), including:

- Greater Sydney and the Lower Hunter region in New South Wales
- Victoria
- South-East Queensland
- Western Australia
- South Australia
- Tasmania, and
- the Australian Capital Territory.

1 Participating utilities



Research method

A rigorous methodology was applied in this study. The DCE survey instrument was informed by several steps of qualitative research and testing. A literature review, online discussion groups, and workshops with participating utilities were conducted to ensure the service offerings valued by the study were realistic, meaningful to consumers, and covered the range of outcomes on which utilities would be seeking to place a monetary value in CBA.

Both the metropolitan and regional online group discussions revealed very low levels of knowledge about greenhouse gas or carbon emissions, targets, and carbon offsetting. However, once provided with additional information, participants were amenable to various offset methods and some participants expressed a willingness to contribute to bill increases under specific conditions. Detailed findings are available in a separate report (Woolcott Research and Engagement 2021).

The discussion group findings informed the DCE survey design, which was then further refined based on feedback from one-on-one pre-testing interviews and a pilot survey. An example of one of the choice questions used in the survey is set out in figure 2. Each respondent answered nine choice questions. The features included in each option varied over questions and over respondents by design to enable statistical estimation of the amounts households would be willing to pay for changes in each of the features shown.

2 Example of a choice task

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$10** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **0%** = Annual net emissions are reduced by **20%** (the equivalent of 87 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **50%** = Annual net emissions are reduced by **70%** (the equivalent of 305 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **30%** + uses accredited projects to offset **15%** = Annual net emissions are reduced by **45%** (the equivalent of 196 000 cars taken off the road)
	The offset projects deliver **43 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **support** significant biodiversity	The offset projects deliver **22 000** hectares of new native forest The forests are located **in my State, but not in my region** The new forests **do not support** significant biodiversity
		The offset projects employ **45** ATSI people who were seeking job opportunities
o	o	o

Note: This example was drawn from the Wave 3 experimental design for respondents located in Greater Sydney
Data source: CIE

The questionnaire was completed over three waves of fieldwork by a large sample of 4357 respondents from across Australia on behalf of their households. At least 300 completed questionnaires were collected from each of the participating utilities' operating areas. The respondents were recruited through the Pureprofile online panel.

Results

Average willingness to pay

The estimates of average WTP are provided with 95 per cent confidence intervals in table 3. The estimates are unconditional, which means they are not conditional on respondents engaging with or even completing the DCE tasks. They account for the share of respondents with zero WTP. They also account for location-based sampling weights.

Consequently, these estimates can be multiplied directly by the total number of residential properties to estimate total WTP for the outcome.

3 Willingness to pay: National weighted unconditional mean

	Unconditional mean	95 per cent confidence interval
	$ per year for 10 years	$ per year for 10 years
Per percentage point reduction in your water utility annual emissions by 2031	0.382	(0.334, 0.430)
Per percentage point of water utility annual emissions offset by accredited projects by 2031	0.366	(0.329, 0.402)
Per 1000 hectares of new native forest	0.144	(0.108, 0.180)
New forests located 'in my State, but not in my region' rather than 'in Australia, but not in my State'	3.301	(2.236, 4.366)
New forests located 'in my region' rather than 'in Australia, but not in my State'	2.197	(0.505, 3.890)
New forests support significant biodiversity	9.909	(8.696, 11.122)
Per ATSI person employed who was seeking job opportunities	0.193	(0.157, 0.229)

Source: CIE

Contrary to some of the views expressed in the online discussion groups, the values placed on reducing and offsetting emissions are very similar. It is important to bear in mind the questionnaire informed respondents of the barriers to reducing emissions from wastewater treatment and assured respondents offsets would be accredited, selected in consultation with customers, and subject to transparent ongoing reporting.

The ability of new forests (from carbon offsetting projects) to support significant biodiversity was valued very highly. It was more important to customers than the location of forests or even the size of the forests.

On average, customers preferred forests to be located in their state, but not in their region. This preference was primarily driven by customers in major metropolitan areas, like Sydney and Melbourne, where respondents may have perceived limited opportunities for local vegetation projects. In some of the utility-specific results, customers prefer forests to be located in their region.

Survey responses indicated that around 60 per cent of the estimated WTP for ATSI employment can be attributed to cultural benefits (such as transmission of traditional knowledge and preservation of cultural sites), as distinct from improved outcomes for ATSI communities. This break down will be important when applying the results to projects creating ATSI employment that generate one sub-category of benefit and not the other.

Average willingness to pay each year outcome is provided

In a CBA, estimates of WTP need to be applied to outcomes in each year over a forecast period. This application is not easily conducted while the WTP estimates are in the form discussed above, as it combines different time profiles for payments and outcomes.

Payments are a specific amount each year for 10 years and zero thereafter, whereas outcomes will be delivered at an unspecified time between now and 2031 and continue thereafter. A more workable measure of WTP would be the amount households are willing to pay in each year the outcome is provided. Assuming a real discount rate of 7 per cent and linear progress towards outcome delivery by 2031, the average amounts households would be willing to pay per year each outcome is provided are set out in table 4. They indicate, for example, that, for a scenario in which a utility reduces its emissions by 10 per cent in 2027 and maintains the reduction thereafter, households would, on average, be willing to pay an additional $2.92 on their annual bill in 2027 and in each year thereafter.

4 Willingness to pay each year an outcome is provided

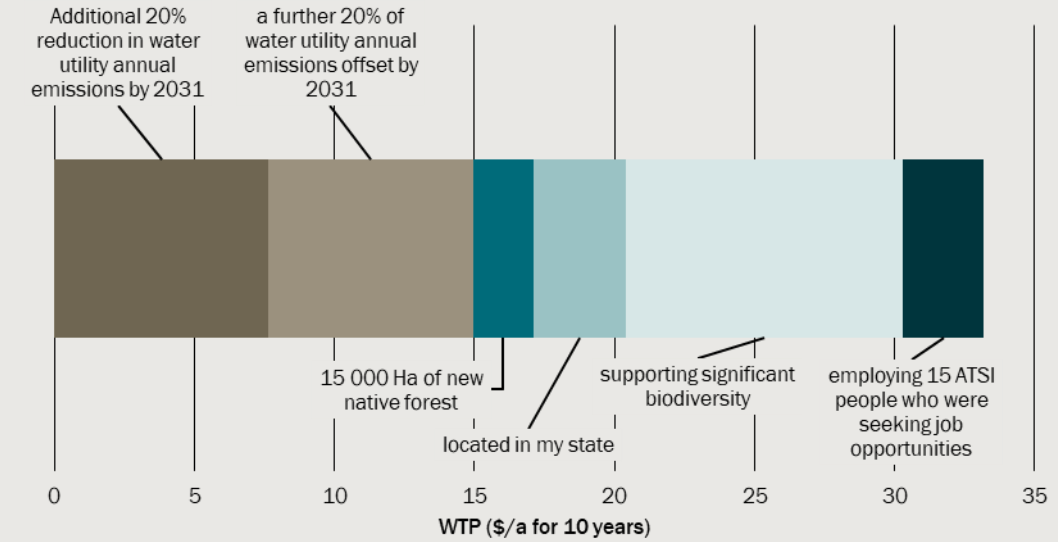
	Point estimate	Lower bound	Upper bound
	$ per year outcome is provided	$ per year outcome is provided	$ per year outcome is provided
Per percentage point reduction in your water utility annual emissions	0.292	0.256	0.328
Per percentage point of water utility annual emissions offset by accredited projects	0.280	0.252	0.307
Per 1000 hectares of new native forest	0.110	0.083	0.137
New forests located 'in my State, but not in my region' rather than 'in Australia, but not in my State'	2.523	1.725	3.321
New forests located 'in my region' rather than 'in Australia, but not in my State'	1.680	0.412	2.947
New forests support significant biodiversity	7.574	6.666	8.483
Per ATSI person employed who was seeking job opportunities	0.147	0.120	0.175
Unspecified action unrelated to attributes above (label effect)	29.129	26.942	31.315

Source: CIE

Average willingness to pay for an example scenario

The WTP estimates can be applied to numerous scenarios. The average WTP for one example of a scenario is set out in chart 5. While the levels of forest area and ATSI employment in this scenario may not be realistic for all utilities, the calculation shows that WTP for co-benefits is an important consideration and may be a similar order of magnitude to WTP for reduced net emissions.

5 Average willingness to pay for an example scenario



Data source: CIE

Variation in willingness to pay across households

The distribution of WTP across respondents for the scenario illustrated above is heavily skewed, with a median WTP of around $15 per year for 10 years — less than half of the mean (figure 6). More than a quarter of households indicated they were not willing to pay anything for the features offered, with affordability the most common reason given. This finding is important from a policy and political perspective. While the overall economic benefit to the community from an investment option is determined by mean WTP, majority support for the option is determined by the median.

6 Distribution of willingness to pay for an example scenario

Data source: CIE

This variation in WTP is related to the characteristics of respondents and their households. The largest statistically significant effects, relative to an average WTP of around $34 per year for the scenario, were found to be:

- WTP increases with income, with a difference in WTP of up to $13 per year between respondents earning over $156 000 per year and those earning less than $41 600 or those who did not wish to answer the question about income
- respondents aged between 40-59 evidenced WTP $6-$7 per year lower than respondents aged under 30 or between 60-69
- female respondents evidenced WTP $5 per year higher than males
- respondents renting their dwelling evidenced WTP around $4 per year higher than respondents who own their dwelling, and
- respondents speaking a language other than English at home evidenced WTP around $4 per year lower than respondents speaking only English at home.

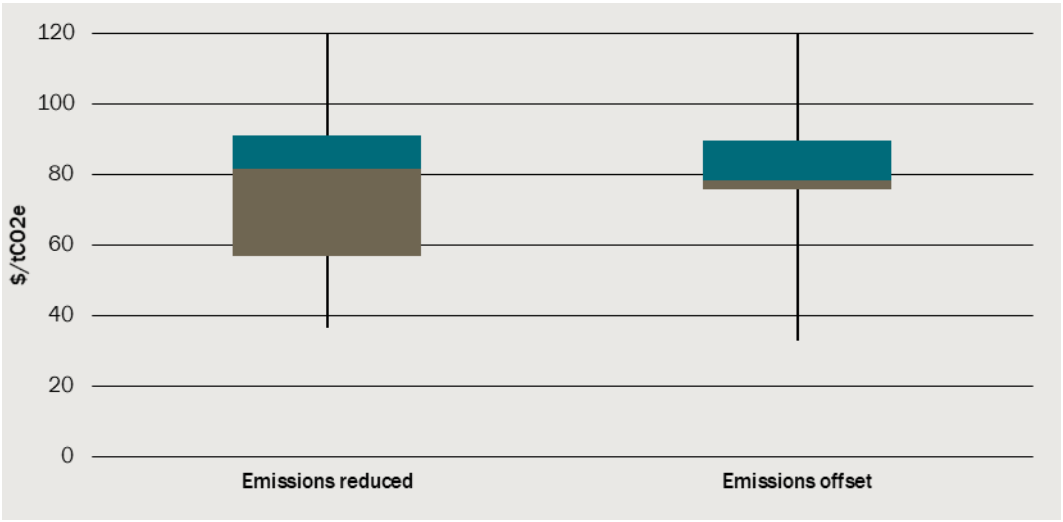
Work status and location (regional vs metropolitan) were not found to be significant effects after controlling for other characteristics. There may be relatively large effects associated with specific occupations, however the sample size of respondents in each occupation was very small and the sampling uncertainty around the marginal effects is too large to allow conclusions to be drawn.

Willingness to pay per tonne of emissions reduced or offset

The estimates of WTP for emission abatement or offsetting can be converted to an amount per tonne to enable comparison with the price of offset products, such as Australian Carbon Credit Units (ACCUs). This involves aggregating WTP estimates across all households on a utility's network and then dividing by one per cent of the expected value of the utility's annual net emissions (tCO2e) as at 2022. For example, the WTP estimate of $0.292 per household per year that a one percentage point reduction in emissions is provided could be converted to $82/tCO2e (by multiplying by 8.3 million households and dividing by 29 790 tCO2e). The equivalent figure for emissions offset is $78/tCO2e. The variation in this measure across participating utilities is illustrated in chart 7.

At the time of writing, the spot price for Australian Carbon Credit Units (ACCUs) was $53.50/tCO2e. Average WTP at most Australian utilities is currently sufficient to cover the cost of offsetting emissions using ACCUs. Note, however, that this finding does not necessarily imply majority support, due to the skewed distribution of WTP.

7 Variation across utilities in willingness to pay per tonne of carbon



Note: Each box and whisker represents a quarter of the utilities. The top of the chart has been truncated to ensure confidentiality for the utility with the highest willingness to pay per tCO2e.

Data source: CIE

Application

When applying the results in CBA, utilities should consider:

- using an estimated income elasticity of WTP to forecast changes in WTP over time
- using median WTP as a sensitivity analysis to inform considerations of majority support
- treating results as more uncertain when applied to forecast outcomes that lie outside the ranges included in the survey
- verifying proposed investments or strategies with customers where bills are changing due to other drivers, and
- in the context of separate bulk and distribution utilities, taking account of investments being made by the other utility, where possible.

1 Introduction

Purpose

The Water Services Association of Australia (WSAA) *Urban water industry climate change position* (WSAA 2021) articulates the urban water industry goal of achieving net zero emissions by 2050 or sooner where it aligns with customer expectations. Many water utilities are considering setting their own goals or pathways. This study supports the industry's commitment to work with customers and communities to understand their expectations and preferences and take those views into account in policy setting.

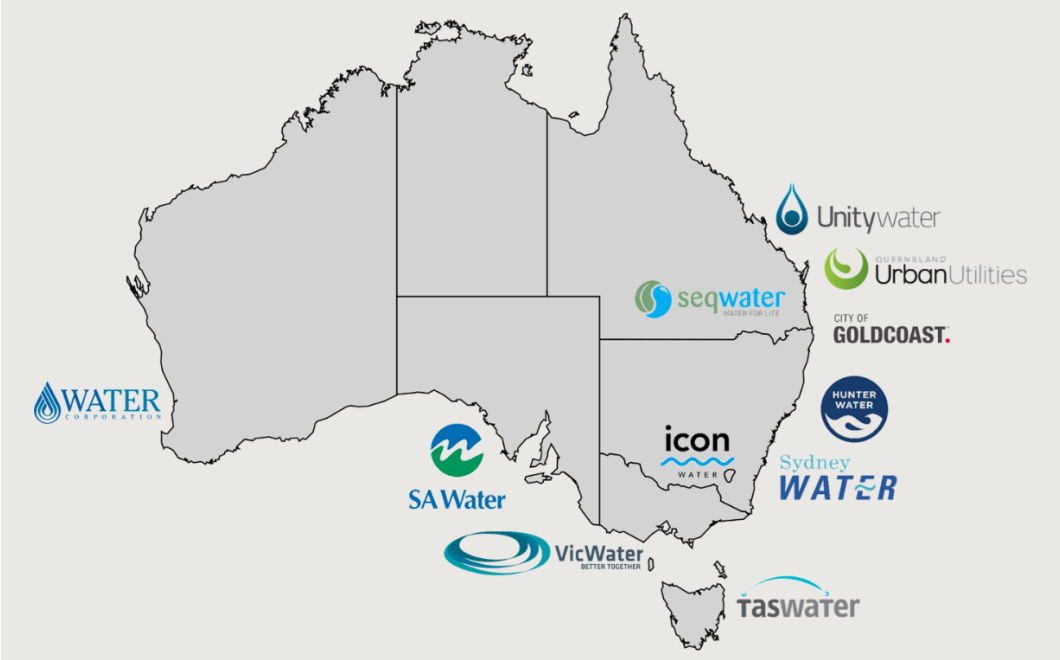
It uses a discrete choice experiment (DCE) to build the water industry's understanding of:

- customer preferences for various types of carbon offset products, expressed as willingness to pay (WTP) for different attributes of carbon offsets, and
- demographic factors affecting those preferences, including jurisdictional differences across Australia.

The study covers most of the Australian urban water sector, including:

- Greater Sydney and the Lower Hunter region in New South Wales
- Victoria
- South-East Queensland
- Western Australia
- South Australia
- Tasmania, and
- the Australian Capital Territory.

1.1 Participating utilities



The aim is to provide findings that WSAA members may use for:

- helping to inform their decisions on the role of carbon offsets in meeting short-term carbon emission reduction targets, such as those set by Victorian water retailers to 2024-25 and beyond under the Statement of Obligations (Emission Reduction)
- setting of medium-term carbon emission reduction targets (e.g. to 2030)
- understanding carbon price risks (e.g. based on demand for carbon offsets with specific attributes)
- engaging with key stakeholders including governments and economic regulators, and
- developing and justifying expenditure proposals in pricing submissions (noting that in some circumstances supplementary customer research may be advantageous).

Water utilities and greenhouse gas emissions

Water utilities' carbon emissions are primarily from two sources:

- electricity usage, and
- fugitive emissions from wastewater treatment.

There are limits to the degree to which fugitive emissions can be reduced using current technology. Carbon offsets are therefore likely to be required to meet 'net zero' emission targets.

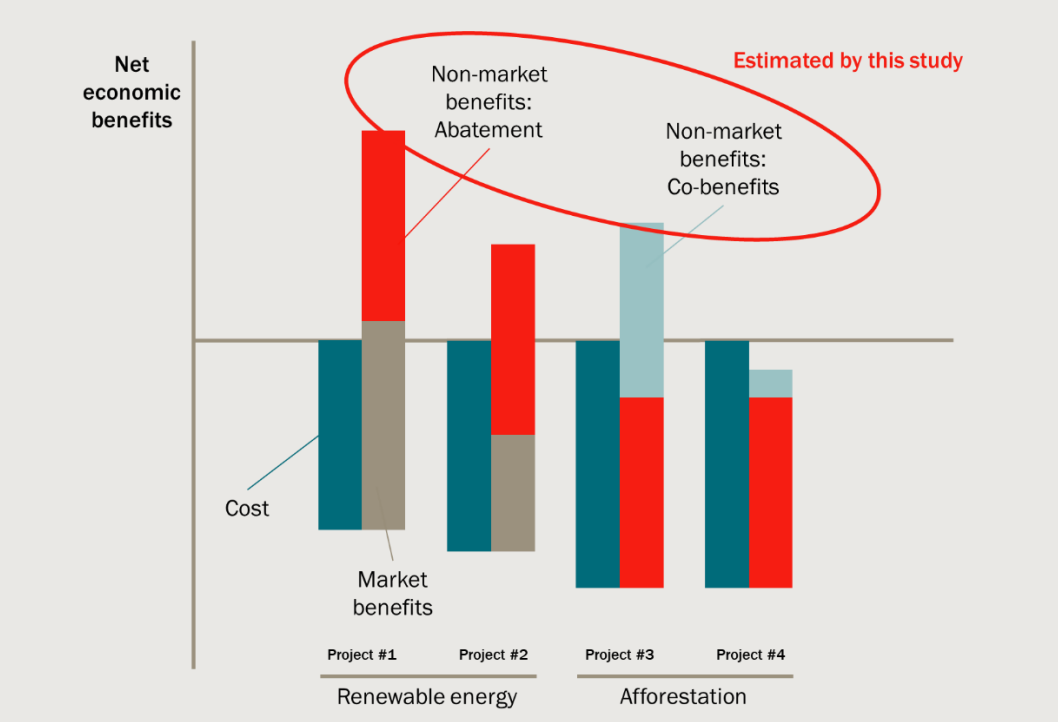
There are a range of carbon offset products available. These products often deliver benefits over and above climate change mitigation (co-benefits). For example, reforestation can improve biodiversity and recreation opportunities. Projects may also have significant health and productivity benefits for local communities. WSAA wishes to

understand water customer demand for both net emission reduction and these co-benefits.

The focus of this study

The intention of this study is not to test the popularity or acceptability of specific, costed carbon abatement projects. Instead, its focus is on placing dollar values on the non-market benefits that may be delivered by various abatement projects. These estimates need to be combined with estimates of project costs and cost savings in economic cost-benefit analysis (CBA) to inform water utilities' greenhouse gas (GHG) abatement strategies (figure 1.2). While the forecast costs and risks from investing in carbon reduction and offset products are critical inputs to decisions about carbon strategies, they are not discussed in this report, since the focus is limited to valuation of benefits.

1.2 The focus of this study



Data source: CIE

Stated preference approach

The conventional measure of economic benefits from an improvement in environmental outcomes is the maximum amount that individuals would be willing to pay for the improvement (Randall and Stoll 1980). We use stated preference techniques to measure this amount for various levels of emission reduction, emission offsetting, and co-benefits from offset projects. Specifically, we use the discrete choice experiment (DCE) technique, which is sometimes called choice modelling or conjoint analysis. DCE surveys involve

presenting respondents with several choice questions. Each choice question presents two or more hypothetical scenarios with specified cost and asks the respondent to indicate their preferred option. The scenarios are described by multiple attributes and the levels assigned to attributes vary (by design) over scenarios and over questions. Respondents' choices reveal the value they place on changes in each attribute.

A rigorous methodology was applied in this study, including:

- discussion groups designed to inform design of the survey instrument
- pre-testing the survey instrument
- conducting fieldwork over three separate waves, with model estimation conducted and adjustments made to stated preference questions between the waves
- using an efficient experimental design (the combinations of attribute levels across DCE alternatives) optimised for each wave of fieldwork using preferences elicited in earlier waves, and
- estimating WTP using advanced statistical models that account for variation in preferences across respondents for each attribute and correlation in that variation across attributes, and
- testing the robustness of results to a range of alternative assumptions and specifications.

2 Research method

Literature review

The first step in the project was to conduct a literature review. The review confirmed the present study is relatively novel. There are few examples of national studies estimating willingness to pay for reductions in net carbon emissions for a specific sector.

The main steps in the review were:

- identifying types of offset products
- identifying the features of offset products, particularly whether there are public co-benefits
- identifying lessons from existing stated and revealed preference studies of the value consumers place on carbon offsets and public co-benefits.

One of the main aims of the review was to identify offset co-benefits for potential inclusion in the choice survey, subject to further testing with discussion groups and pre-testing interviews. The criteria for potential inclusion in the survey, was that the co-benefits should, ideally, be:

- non-market (i.e. cannot be readily valued without the survey), and
- a final outcome (as distinct from a process or causally prior attribute, such as the amount of waste recycled).

Types of carbon offset projects

Apart from directly reducing emissions through greater investment in low-emissions technology and the use of energy from renewable sources, water utilities can compensate for their emissions. They could either undertake activities that remove those emissions from the atmosphere or invest in projects that would avoid or reduce emissions generated by others. This is called carbon offsetting.

There are multiple ways to offset carbon emissions. Australia's Emission Reduction Fund includes:

- Industry methods
  - Landfill and alternative waste methods
  - Energy efficiency methods
  - Oil, mining, and gas methods
- Land sector methods
  - Agricultural methods
  - Vegetation methods

– Savanna burning methods.

Some of these categories include several specific project methods. The methods that appeared to have the greatest potential to deliver significant co-benefits were the land sector methods and landfill/waste methods.

Carbon farming relates to land sector methods. It includes two major sub-types:

- avoiding emissions that would have occurred otherwise by, for example, reducing emissions from livestock, reducing fertiliser, or manure management, and
- sequestering carbon from the atmosphere and storing it in the landscape by, for example, reforestation, managed regrowth, avoided deforestation and soil carbon.

The Australian Government's Carbon Farming Initiative (CFI) enables farmers to undertake carbon farming and trade one carbon credit in a voluntary market for each tonne of CO2 reduced or sequestered.

Avoided deforestation as an offset type has received criticism on the grounds the uncertain timing of logging in the baseline scenario and of impermanence, in that emissions in such cases are only delayed rather than prevented. Hence, it was decided the survey framing did not need to accommodate avoided deforestation.

Waste-to-energy offset projects reduce emissions by treating commercial, agricultural and household waste, rather than releasing it to landfills, thereby preventing the release of GHG emissions into the atmosphere.

Savannah burning projects involve planned burning in the early dry season to prevent the release of strong greenhouse gases such as methane and nitrous oxide from intense fires in the late dry season. The projects help avoid the burning of a large proportion of dead organic matter.

In addition to the projects discussed above, which qualify for the Emission Reduction Fund, offsets can be purchased to fund projects overseas. Distribution of fuel-efficient or solar powered stoves in developing countries is one such example. It reduces GHG emissions from burning wood, charcoal or coal for cooking, while reducing pressure on woodlands. Other examples include provision of clean drinking water by funding maintenance of boreholes, without which people would rely on deforestation for firewood to boil water for drinking.

Types of co-benefits

Carbon offsetting may deliver benefits over and above climate change mitigation. Depending on the project, they could provide varying levels of environmental, social, or cultural benefits. These benefits are referred to as co-benefits.

Carbon farming practices may deliver co-benefits, such as improvement in soil quality due to an increase in organic matter. Reducing stock grazing intensity or planting native species on cleared or partially cleared land may generate biodiversity co-benefits, including preservation of threatened or endangered species. Other ecosystem services obtained through carbon farming may include improvement in water quality, salinity mitigation and Indigenous economic and cultural benefits.

Savannah burning projects have benefits over and above reducing the extent and intensity of late dry season fires in savannas. Earning income through land management enables Traditional Owners to engage with the economy, while actively passing down knowledge and values to younger generations and fulfilling cultural obligations to look after the Country and strengthen communities. By combining traditional practices with contemporary science, these practices help generate employment and training opportunities in job-scarce remote areas.

Community offset projects such as distribution of solar powered stoves provide co-benefits including improved health outcomes through reduced indoor air pollution and improved productivity and educational outcomes due to less time spent gathering fuel. However, a study looking at the first approved carbon offset project in India found the difference in wood use between families who used the new stoves and control group to not be statistically significant (Aung et al 2016). Since none of the participating utilities expected to consider overseas offsets as part of their carbon strategies, it was decided that co-benefits specific to overseas offset projects should not be included in the choice survey.

Existing valuation studies

There is a limited literature on household WTP for carbon offsetting and its co-benefits.

MacKerron et al. (2009) found increased uptake of voluntary offsets in the United Kingdom where there was greater investment in projects with co-benefits (and emphasis of those co-benefits to consumers) in the context of air travel for leisure.

Kragt et al. (2016) used a choice experiment survey to elicit WTP for reduction in carbon emissions, increase in vegetation and soil erosion mitigation through carbon farming practices. While the estimated coefficient for agricultural vegetation was significant (positive but low), WTP to reduce soil erosion was found to be not statistically significant. The authors believe that the stated support for vegetation stems from the 'tangible' nature of tree planting in contrast with the 'invisible' nature of soil erosion.

Glenk and Colombo (2011) conducted a choice experiment and found biodiversity outcomes were important, specifically bird habitat, through a carbon sequestration program. MacKerron et al. (2009) also found biodiversity to be a highly valued co-benefit and concluded that higher support for carbon offsets could be garnered through greater emphasis on the co-benefits accompanied alongside those projects.

High perceived effectiveness and credibility of voluntary carbon offset (VCO) projects along with high knowledge and environmental concern are found to be the main drivers of VCOs (Denton et al 2020). Lange et al. (2017) concluded that offsets are more likely to be a substitute to clean consumption activities when it is perceived to be effective, whereas its complementary use is more likely when is perceived to have medium effectiveness.

Poudyal et al (2015) found that buyers showed an increased willingness to pay for credits sourced from urban forest projects. Increased recognition of the importance of urban forest resources and associated co-benefits of carbon sequestration make this offset project highly relevant.

Projects and co-benefits shortlisted for discussion group research

After filtering the co-benefits of carbon offset programs identified in the literature to ensure they are public co-benefits that represent final outcomes (where possible), we carried the following examples of projects and their co-benefits for further testing with online discussion groups:

- Carbon Sequestration

  Planting trees is one of the most popular ways to offset carbon. They act as a carbon sink by absorbing carbon from the atmosphere and storing it as vegetation. Reforestation can increase native habitat for species and improve biodiversity while providing increasing opportunities for tourism and recreation.

- Landfill Gas Projects

  Decomposing waste produces methane emissions. These projects involve capturing methane at landfill sites and either combusting it or using it to generate power. The projects have potential to improve air quality and reduce odour at landfill sites.

- Fire Management

  Savannah burning projects undertake controlled burning in the early dry season. This helps avoid emissions from more intense bushfires in the late dry season. Controlled fire management projects may also provide additional economic, social, and cultural benefits. They may aid in transmission of traditional knowledge, while providing employment opportunities to Traditional Owners and helping to protect and preserve Indigenous cultural sites.

Discussion groups

Focus groups were used to gain an in-depth understanding of the opinions and perceptions of households, with the objective of providing input into the development of the survey. Woolcott Research and Engagement (Woolcott) was commissioned to moderate two online focus group discussions, with participants from across Australia, to develop our understanding of the community's knowledge, attitudes, preferences, and use of language with respect to carbon offsetting and related issues. The discussion guide used for the sessions is set out in appendix A. Woolcott produced a separate report on the findings from these groups (Woolcott 2021). Here, we provide a summary of the main implications of the findings for the survey.

The focus groups revealed very low levels of knowledge about greenhouse gases, targets and carbon offsetting. This finding shaped the approach adopted in the questionnaire to educate respondents gradually and in layman's terms and provide detailed information only via links.

It was established that while participants generally value reductions in net emissions, they would be willing to contribute via bill increases only under specific conditions:

- Utilities attempt to decrease their own emissions as much as feasible without imposing an additional cost on the customer (even if that requires reducing utility profits).

- To avoid the entire exercise being labelled as a 'PR' stunt, utilities draw a clear distinction between reducing emissions from electricity (through renewable generation, for example) and reducing fugitive emissions from wastewater treatment (through offsets), and clearly explain the barriers to reducing fugitive emissions.
- Customers are part of the decision making when choosing offset projects and receive communication about how any extra payments are being used.
- All offsets are accredited, preferably by the Australian regulator, as participants deemed third party oversight an important indicator of project genuineness.

The survey instrument was designed to present options that satisfied these conditions.

There were several co-benefits that were important to participants. Participants liked all of the offset methods, with forests and fire management being the most preferred. All of the co-benefits that were discussed were seen as important, except opportunities for recreation in new forests, which was not valued as much as we imagined it might be. For this reason, opportunities for recreation was not included as an attribute in the DCE questions, but was covered instead by a Likert scale question. For many of the potential attributes, participants preferred the use of multiple units of measurement (e.g. emissions reductions in terms of percentages and the equivalent number of cars taken off the road).

Pre-testing interviews

One-on-one interviews were conducted with five volunteers from CIE and WSAA who did not have any specialized knowledge about climate change issues. The goal was to assess the draft questionnaire in terms of clarity, length, complexity, and plausibility, using both pre-scripted and spontaneous probes. The pre-scripted questions used in the interviews are in appendix B.

Several changes were made in response to the feedback obtained from pre-testing interviews which helped in further refining the questionnaire design.

Discussion with interviewees indicated that the choice tasks should be introduced with an example to make them comfortable with the format before they start answering questions. Emission reduction levels were accompanied by plus and minus signs to make the meaning of and interaction between percentages easier to interpret. Additionally, to ensure respondents consider benefits before the choice questions, a question about relative importance of the benefits from indigenous employment was brought forward and a question about the importance of recreation in new forests was added. These questions also helped in breaking up a long section of reading material.

Most significantly, it was discovered that cost levels were not high enough to capture the maximum WTP for some participants. By contrast, conclusions drawn from discussion group participants indicated that they were only willing to pay a few dollars per year. We decided to include a filtering question to enable the DCE to more efficiently capture the apparent wide variation in WTP. Respondents who chose a non-zero-cost option in the aforementioned question would see higher cost levels in subsequent choice questions than those who chose the zero-cost option.

Survey instruments

Structure of the questionnaire

The survey instrument was designed to meet best-practice in stated preference research. The questionnaire (see appendix C) comprised the following:

- a welcome, with instructions and information about privacy
- screening questions to ensure the survey was being completed on a computer or large tablet by respondents who pay a bill (or an amount separate from rent) for mains water or wastewater services
- baseline attitudinal questions about climate change, emission targets, and offsetting
- factual information about climate change, water sector carbon emissions, projects that reduce or offset emissions, co-benefits from offset projects
- questions about attitude toward offsets and the relative importance of selected co-benefits
- historical changes in emissions for the relevant utility/region
- instructions about the choice questions, including an example question and a 'cheap talk' script to limit hypothetical bias by reminding respondents of the consequentiality of the survey and their budget constraint
- nine DCE questions – discussed in further detail below
- debriefing questions about the motivation behind and approach taken by the respondent to the DCE questions, plausibility, consequentiality and the impact of the COVID-19 pandemic
- questions about the respondent's characteristics.

The questionnaire was developed through several stages of review and testing, including:

- discussion groups (appendix A)
- review and input from participating utilities
- pre-testing interviews (see appendix B), and
- pilot waves of survey fieldwork.

Number of alternatives per question

Each DCE question comprised three alternatives, with one of those alternatives being a baseline, zero-bill-impact scenario. This design was judged to strike an appropriate balance between statistical power and task complexity. Previous studies have found that statistical significance for a given sample size has been low where choice tasks presented only a status quo alternative and a single change option (for example, see Rolfe and Bennett 2009). Presenting four or more alternatives in each choice task was judged to be too cognitively demanding, based on feedback from participants in past studies conducted by the CIE. Feedback from pre-testing interviews indicated that the choice tasks should not be any more complex than the three-alternative format that was tested.

One of the alternatives was specified as a zero-cost baseline to account for reference-dependent decision making, for which there is now a large body of evidence from behavioural economics, including in support of prospect theory (Kahnemann and Tversky 1979), as well as empirical DCE research (Dhar and Simonson 2003).

Attributes and levels

The alternatives were presented in a format typical of website comparisons of utility or telecommunications plans or service offerings in the real market. Each alternative was described by eight features or attributes (figure 2.1). The measures and wording used for each attribute were based on the findings of the discussion groups and pre-testing interviews.

In principle, all attributes included in DCE should be final outcomes, so that the values can be directly applied to the outcomes of options being assessed using CBA. The application of this principle to the present study required careful thought. Emission reductions are not a final outcome. Rather, they are a process for mitigating climate change, which could in turn be characterised as a process for avoiding the coastal inundation and extreme weather events that households ultimately care about. Yet, CBAs being conducted by utilities are unlikely to include likelihoods of extreme weather events as a measure of benefits. Firstly, because the science linking emission reduction to weather events in specific locations may not have been developed and, if it has, it is likely to be highly uncertain. Second, because these ultimate outcomes depend almost entirely on emission reductions in other countries and, while emission reductions in Australia may improve the chances of emission reductions overseas, the link is difficult to quantify. For these reasons, utilities are likely to include their own emission reductions (or offsetting) as a proxy measure of these benefits in CBA. It is therefore reasonable that we ask respondents their WTP for this measure. While many respondents will not understand the science linking emission reduction to mitigation of climate change, all respondents will have formed at least an impression, as they are used to responding to information about levels of emission reduction in real markets, as well as federal and state elections.

2.1 Example of a choice task

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$10** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **0%** = Annual net emissions are reduced by **20%** (the equivalent of 87 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **50%** = Annual net emissions are reduced by **70%** (the equivalent of 305 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **30%** + uses accredited projects to offset **15%** = Annual net emissions are reduced by **45%** (the equivalent of 196 000 cars taken off the road)
	The offset projects deliver **43 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **support** significant biodiversity	The offset projects deliver **22 000** hectares of new native forest The forests are located **in my State, but not in my region** The new forests **do not support** significant biodiversity
		The offset projects employ **45** ATSI people who were seeking job opportunities
o	o	o

Note: This example was drawn from the Wave 3 experimental design for respondents located in Greater Sydney
Data source: CIE

Similarly, employment of ATSI people is not an outcome, but a process that delivers a range of outcomes, including preservation of culture and improved wellbeing in ATSI communities, for which households may hold altruistic values. Rather than include each of these outcomes as separate benefits, we include employment as a measure of the bundle of benefits and use separate questions to decompose the WTP estimate into its various parts. The employment attribute was defined in terms of people employed who were seeking job opportunities, since there tend to be few, if any, public benefits from employing people who were already employed elsewhere.

Some of the other potential attributes that were raised in workshops with participating water utilities were not included. These attributes included:

- Attributes associated with improving outcomes for communities in developing countries

  Participating utilities are not considering and are unlikely to consider overseas offset products as options in their CBA.

- Project verification/accountability standards

  Verification is effectively a measure of uncertainty over whether each of the other attributes would be delivered as described. Survey respondents are not well placed to estimate the degree of this uncertainty. The DCE was designed to measure WTP for the most reputable, accredited offsets. A probability distribution across outcomes could be applied by the analyst to options as part of any CBA considering less reliable offset products.

- Improved catchment health

  Utilities will be required to meet drinking water guidelines regardless of raw water quality, but treatment costs will be lower if raw water quality is improved. The final outcome for customers from improved raw water quality is therefore likely to be lower water bills (which is already captured in the monetary attribute). If there are differences in final water quality across options, these could be valued in CBA using the results of existing studies of preferences for water quality.

- Mental and physical health attributes

  Rather than ask respondents to value improvements in measures of others' mental and physical health from new forests, the DCE captures each respondents valuation of the health benefits to themselves as part of their WTP for forest attributes.

- Productivity and other economic benefits

  The value respondents place on any improvements in their own productivity from new forests can be captured through their consideration of forest attributes. Aggregation across all respondents will capture the economywide benefit.

The levels that each attribute could take in the survey are set out by utility in table 2.3.

Responses to the first choice question asked of each respondent were used to 'filter' each respondent to either a lower or higher set of cost attribute levels. This approach was adopted to cope with the large variation in WTP across households that was evident from the contrasting views of participants in discussion groups and pre-testing interviews. The potential endogeneity problem caused by this approach was avoided by estimating separate statistical models on each group. The cost levels were adjusted after the first wave of fieldwork to ensure they covered the revealed range of WTP for the best and worst combinations of features offered in the options.

The baseline (Package A) level of emission reduction was set in consultation with each utility, based on the forecast decarbonisation of their electricity grid, a forecast increase in energy usage, and the proportion of baseline utility emissions that are scope 2 (table 2.2). For most utilities, the reduction was around 20 per cent. It was judged that this estimate would avoid the pitfalls of either being so low that it triggers a protest response by not meeting community expectations of at least some abatement being delivered without cost to customers, or being so high that it represents a linear trajectory towards net zero by 2050, leaving no room for the survey to measure WTP to contribute towards meeting that target.

2.2 Calculating the reduction in emissions in the baseline option by utility

Utility/region	Forecast change in grid emissions A	Forecast change in energy usage B	Proportion of emissions Scope 2 C	Forecast change in emissions (A+B)*C	Rounded for survey
	per cent	per cent	per cent	per cent	per cent
Sydney Water	-38	15	90	-21	-20
Hunter Water	-38	15	82	-19	-20
Victoria metropolitan	-38	15	51	-12	-10
Victoria regional	-38	15	62	-14	-15
Urban Utilities/Seqwater	-38	10	66	-18	-20
Unitywater/Seqwater	-38	10	77	-22	-20
City of Gold Coast/Seqwater	-38	10	93	-26	-25
Logan City Council/City Water/Seqwater	-38	10	69	-19	-20
Water Corporation	-42	20	93	-20	-20
SA Water	-38	15	74	-17	-15
TasWater	-38	0	30	-12	-10
Icon Water	-38	0	6	-2	-5

Source: Grid emissions from Department of Industry, Science, Energy and Resources 2020. Australia's emissions projections.

The sum of emission reductions and offsets was allowed to reach as high as 100 per cent in some options, since at least some utilities are considering achieving net zero emissions by 2031.

The levels for cars taken off the road, hectares of new native forest, and ATSI people employed who were seeking job opportunities were based on:

- Cars taken off the road — the relevant percentage reduction in net emissions, multiplied by the utility's current annual emissions (tCO2e), multiplied by 1.21 cars (based on the average combined emissions for a new light vehicle sold in Australia in 2017 as reported by the Green Vehicle Guide website)
- Area of new native forest — up to 20 per cent of the utility's current annual emissions (tCO2e), multiplied by 0.75 Ha (based on the upper end of the range of Ha per tCO2e observed in offset projects registered on the Carbon Market Institute registry website)
- ATSI people employed who were seeking job opportunities — up to 20 per cent of the utility's current annual emissions (tCO2e), multiplied by 0.0008 persons (based on the number of employees per tCO2e observed in the case study of the West Arnhem Land Fire Abatement project reported in Ansell and Evans (2019))

2.3 Attribute levels

Utility / region	You pay an extra $... on your water bill each year for the next 10 years	By 2031 your water utility reduces its annual emissions by ...%	+ uses accredited projects to offset ...%	Annual net emissions are reduced by <sum>% (the equivalent of ... cars taken off the road)	The offset projects deliver ... hectares of new native forest	The forests are located ...	The new forests ... significant biodiversity	The offset projects employ ... ATSI people who were seeking job opportunities
Sydney Water	Package A: 0 Package B/C (if selected A in filtering question): 1, 2, 3, 5, 10, 20 Package B/C (if selected B/C in filtering question): 10, 15, 20, 30, 50, 100	Package A: 20 Package B/C: 20, 30, 50	Package A: 0 Package B/C: 0, 15, 50	Package A: 87 000 Package B/C: 152 000 305 000 131 000 196 000 348 000 218 000 283 000 435 000	Package A: N/A Package B/C: 0 22 000 43 000	Package A: N/A Package B/C: in Australia, but not in my state in my State, but not in my region in my region	Package A: N/A Package B/C: do not support support	Package A: N/A Package B/C: 0 25 45
Hunter Water	As above	Package A: 20 Package B/C: 20, 30, 50	Package A: 0 Package B/C: 0, 15, 50	Package A: 20 000 Package B/C: 35 000 70 000 30 000 45 000 80 000 50 000	Package A: N/A Package B/C: 0 5 000 10 000	As above	As above	Package A: N/A Package B/C: 0 5 10

Utility / region	You pay an extra $... on your water bill each year for the next 10 years	By 2031 your water utility reduces its annual emissions by ...%	+ uses accredited projects to offset ...%	Annual net emissions are reduced by <sum>% (the equivalent of ... cars taken off the road)	The offset projects deliver ... hectares of new native forest	The forests are located ...	The new forests ... significant biodiversity	The offset projects employ ... ATSI people who were seeking job opportunities
				65 000 99 000				
Victoria Metro	As above	Package A: 10 Package B/C: 10, 25, 45	Package A: 0 Package B/C: 0, 20, 55	Package A: 69 000 Package B/C: 208 000 450 000 173 000 312 000 554 000 312 000 450 000 693 000	Package A: N/A Package B/C: 0 39 000 77 000	As above	As above	Package A: N/A Package B/C: 0 40 80
Victoria Regional	As above	Package A: 15 Package B/C: 15, 30, 50	Package A: 0 Package B/C: 0, 15, 50	Package A: 58 000 Package B/C: 117 000 253 000 117 000 175 000 312 000 195 000 253 000	Package A: N/A Package B/C: 0 20 000 41 000	As above	As above	Package A: N/A Package B/C: 0 20 45

Utility / region	You pay an extra $... on your water bill each year for the next 10 years	By 2031 your water utility reduces its annual emissions by ...%	+ uses accredited projects to offset ...%	Annual net emissions are reduced by <sum>% (the equivalent of ... cars taken off the road)	The offset projects deliver ... hectares of new native forest	The forests are located ...	The new forests ... significant biodiversity	The offset projects employ ... ATSI people who were seeking job opportunities
				390 000				
Urban Utilities	As above	Package A: 20 Package B/C: 20, 30, 50	Package A: 0 Package B/C: 0, 15, 50	Package A: 53 000 Package B/C: 93 000 186 000 80 000 119 000 212 000 133 000 172 000 265 000	Package A: N/A Package B/C: 0 13 000 26 000	As above	As above	Package A: N/A Package B/C: 0 15 30
Unitywater	As above	Package A: 20 Package B/C: 20, 30, 50	Package A: 0 Package B/C: 0, 15, 50	Package A: 29 000 Package B/C: 51 000 102 000 44 000 65 000 116 000 73 000 94 000 145 000	Package A: N/A Package B/C: 0 7 000 14 000	As above	As above	Package A: N/A Package B/C: 0 8 15

Utility / region	You pay an extra $... on your water bill each year for the next 10 years	By 2031 your water utility reduces its annual emissions by ...%	+ uses accredited projects to offset ...%	Annual net emissions are reduced by <sum>% (the equivalent of ... cars taken off the road)	The offset projects deliver ... hectares of new native forest	The forests are located ...	The new forests ... significant biodiversity	The offset projects employ ... ATSI people who were seeking job opportunities
Gold Coast	As above	Package A: 25 Package B/C: 25, 35, 55	Package A: 0 Package B/C: 0, 15, 50	Package A: 31 000 Package B/C: 49 000 86 000 43 000 61 000 98 000 67 000 86 000 123 000	Package A: N/A Package B/C: 0 6 000 11 000	As above	As above	Package A: N/A Package B/C: 0 6 10
Logan/City Water	As above	Package A: 20 Package B/C: 20, 30, 50	Package A: 0 Package B/C: 0, 15, 45	Package A: 14 000 Package B/C: 25 000 49 000 21 000 32 000 56 000 35 000 46 000 71 000	Package A: N/A Package B/C: 0 3 000 7 000	As above	As above	Package A: N/A Package B/C: 0 4 7
Water Corp	As above	Package A:	Package A:	Package A:	Package A:	As above	As above	Package A:

Utility / region	You pay an extra $... on your water bill each year for the next 10 years	By 2031 your water utility reduces its annual emissions by ...%	+ uses accredited projects to offset ...%	Annual net emissions are reduced by <sum>% (the equivalent of ... cars taken off the road)	The offset projects deliver ... hectares of new native forest	The forests are located ...	The new forests ... significant biodiversity	The offset projects employ ... ATSI people who were seeking job opportunities
		20 Package B/C: 20, 30, 50	0 Package B/C: 0, 15, 50	179 000 Package B/C: 313 000 625 000 268 000 402 000 714 000 447 000 580 000 893 000	N/A Package B/C: 0 44 000 88 000			N/A Package B/C: 0 45 95
SA Water	As above	Package A: 15 Package B/C: 15, 30, 50	Package A: 0 Package B/C: 0, 15, 50	Package A: 47 000 Package B/C: 94 000 203 000 94 000 141 000 250 000 157 000 203 000 313 000	Package A: N/A Package B/C: 0 16 000 33 000	As above	As above	Package A: N/A Package B/C: 0 20 35
TasWater	As above	Package A: 10	Package A: 0	Package A: 7 000	Package A: N/A	As above	As above	Package A: N/A

Utility / region	You pay an extra $... on your water bill each year for the next 10 years	By 2031 your water utility reduces its annual emissions by ...%	+ uses accredited projects to offset ...%	Annual net emissions are reduced by <sum>% (the equivalent of ... cars taken off the road)	The offset projects deliver ... hectares of new native forest	The forests are located ...	The new forests ... significant biodiversity	The offset projects employ ... ATSI people who were seeking job opportunities
		Package B/C: 10, 25, 45	Package B/C: 0, 20, 55	Package B/C: 21 000 45 000 17 000 31 000 55 000 31 000 45 000 69 000	Package B/C: 0 4 000 8 000			Package B/C: 0 4 8
Icon Water	As above	Package A: 5 Package B/C: 5, 20, 45	Package A: 0 Package B/C: 0, 20, 55	Package A: 1 000 Package B/C: 5 000 13 000 4 000 9 000 16 000 10 000 14 000 21 000	Package A: N/A Package B/C: 0 1 000 3 000	As above	As above	Package A: N/A Package B/C: 0 1 3

Source: CIE

Number of questions per respondent

The questionnaire included nine choice tasks. The risk of respondents dropping out of self-administered questionnaires increases with the number of choice tasks presented. The number of respondents required to obtain statistically significant estimates of WTP reduces with the number of choice tasks presented to each respondent. A sequence of nine choice tasks per respondent was judged to strike an appropriate balance between these two considerations.

In waves 2 and 3 fieldwork, the first three choice questions seen by each respondent contained only the cost, emission reduction and emission offset attributes. They did not include the co-benefit attributes. This approach was taken for two reasons. First, to allow respondents to learn the relatively complex choice task format gradually. Second, to ensure elicitation of the relative preferences for emission reductions and offsetting in the absence of any co-benefits.

Experimental design

To conduct a DCE, the analyst needs to assign combinations of attribute levels to the various alternatives and questions. These combinations are referred to as the experimental design. The experimental design has a direct impact on the statistical significance of estimates of WTP. If some information about preferences is known, it is possible to generate an experimental design that can elicit statistically significant estimates of WTP from a smaller number of respondents than a randomly generated design.

We used an adaptive design approach. An efficient design was developed for the first wave of fieldwork based on responses to pre-testing interviews, with relatively large standard deviations set for the Bayesian prior parameter estimates. Information on preferences gathered in wave 1 fieldwork was then used to generate a design for the second wave of fieldwork that avoided wasteful 'no-brainer' questions and focused on the trade-offs that would most efficiently enable WTP for each attribute to be identified (Scarpa and Rose 2008).[1] The approach improved the statistical confidence intervals around the estimates of WTP derived from responses to the questions in the design. This approach was repeated for the third wave of fieldwork.

All waves of fieldwork used designs with six blocks of eight questions, plus a separately specified filtering question for each block (which looked to respondents like the first of nine choice questions), with each respondent answering only one block. The reason for using multiple blocks was to improve design efficiency and limit the impact of any single choice task on the results. The cost level used in the filtering question was varied to enable testing of any anchoring or ordering bias.

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1 The efficiency criterion was the variance of estimates of marginal WTP. The prior parameter estimates used to generate the efficiency criterion were based on estimates of WTP from basic multinomial logit models run on the data collected in earlier waves of fieldwork.

Priming information and debriefing questions

Some of the noteworthy items included in the background information provided to respondents included:

- stating that the water sector accounts for less than 5 per cent of Australia's greenhouse gas emissions (so that respondents understand the choices in the survey are addressing only a small part of a larger problem), and
- stating any reductions in emissions already achieved by their water utility (so that respondents understand the degree to which the problem has already been addressed).

Before being presented with the choice tasks, respondents were shown an example of a choice task. Respondents were reminded of the following:

- The next nine questions look very similar. Once you select a package, it may not look like a new page, but the numbers describing 'Package B' and 'Package C' will have changed. Please, pay attention to these.
- Some of the combinations may look strange to you. That is because there are a range of emission reduction projects with differing costs and outcomes.
- The results of this survey will influence your water utility's emission reduction activities and your water bill, so please answer the questions as though you are really making the decision and committing to pay the proposed amounts.
- There may be things other than emission reduction you would prefer to spend your money on.

The latter two reminders perform the role of a 'cheap talk' script in maximising the consequentiality of the survey and minimising hypothetical bias.

A list of debriefing questions was included to probe the respondent's decision-making process. The questions covered:

- how easy or difficult it was to answer the questions
- perceptions of the plausibility of the options in the choice questions
- the way respondents answered any questions with options they perceived to be implausible (where applicable)
- reasons for choosing the 'no change' option in all questions (where applicable), and
- perceptions of how influential the survey would be on emission reductions and bill impacts.

3 Sampling

Fieldwork

The fieldwork was conducted from November 2021 to January 2022 across three waves of survey fieldwork. Data were analysed after waves 1 and 2, and results were used to update the choice design for the subsequent data collection. Some 10 per cent of the sample was covered during Wave 1, with another 20 per cent covered during Wave 2 and the remaining sample collected during wave 3 of the survey. All respondents were sampled through the Pureprofile online panel. Panelists receive survey invitations in a feed that does not reveal the survey topics. This helps to minimise selection bias by avoiding an over-sampling of respondents with strong views on the topic. All respondents were compensated for their time through Pureprofile's rewards system.

Overall, 4357 respondents completed the questionnaire. This sample size enabled a statistically significant estimation of WTP for carbon offsets, as well the relationship between respondent characteristics and WTP.

The target sample size for each jurisdiction was set at 300 completes, regardless of the size of the population of the jurisdiction, except for Sydney Water, who agreed a target of 1000 completes, and Logan City Council/City Water, for whom only 240 completes were available. Sampling weights, for the purpose of estimating results representative of the national population, were set using property counts from the Urban National Performance Report for 2019-20. The report is published and prepared independently by the Bureau of Meteorology, State and Territory governments, and WSAA.

Some 1866 respondents were screened out because either:

- they or someone else in their household works in the market research industry or for a water utility or for WSAA; or
- they don't pay either a water bill or an amount separate from rent towards a water bill; or
- their home is serviced by neither mains water nor a sewer system; or
- the survey was attempted on a device other than a desktop computer, laptop or standard sized tablet (screen size greater than 9-inches);[2] or
- their postcode lay outside the regions in which we were conducting the survey.

In addition, there were 424 incomplete responses. These responses were not included in the model estimation, but the count of incomplete responses was used to adjust conditional estimates of WTP to unconditional estimates.

2 This constraint was relaxed late in the fieldwork period to meet sample targets.

The total sample size of respondents who completed the survey or voluntarily opted to drop out of the survey is set out for each of the utilities/regions participating in the study in table 3.1.

3.1 Total sample by region

	Completes	Incompletes (excl screening)	Total
	Respondents	Respondents	Respondents
Sydney Water	1013	88	1101
Hunter Water	307	29	336
Victoria metro	315	45	360
Victoria regional	307	39	346
Urban Utilities/Seqwater	312	23	335
Unitywater/Seqwater	309	39	348
City of Gold Coast/Seqwater	311	21	332
Logan City Council/City Water/Seqwater	249	23	272
Water Corporation	309	32	341
SA Water	309	30	339
TasWater	306	39	345
Icon Water	310	14	324
Total	**4357**	**424**	**4781**

Source: CIE

Representativeness of the sample

Basic sample characteristics set out in table 3.2 show the sample was very representative in terms of annual household income. The highest income category was slightly under sampled, indicating some conservativeness across our WTP estimates. Across property ownership status, those who either owned outright or with a mortgage were oversampled which is in line with the selection criteria restriction imposed on respondents. English speaking households were also oversampled. These latter two types of oversampling had counteracting effects on WTP according to the analysis set out in chapter 4 of this report. The sample included a mix of household compositions, though households with children were undersampled relative to the population.

3.2 Sample representativeness

Cohort	Our Sample	Population	Difference
	Per cent	Per cent	Per cent
Tenure			
Owned outright or with a mortgage	89	62	27
Other	11	38	-27

Cohort	Our Sample	Population	Difference
	Per cent	Per cent	Per cent
Annual household income before tax			
Less than $41,600 per year (less than $800 per week)	27	26	1
$41,600 - $78,000 per year ($800 - $1,500 per week)	26	25	1
$78,000 - $104,000 per year ($1,500 - $2,000 per week)	18	13	5
$104,000 - $156,000 per year ($2,000 - $3,000 per week)	17	19	-2
More than $156,000 per year (more than $3,000 per week)	12	17	-5
Language spoken at home			
English only	84	78	6
Other than English	16	22	-6
Household composition			
Couple/family without children at home	41	25	16
Couple/family with children at home	25	32	-7
One parent family	4	12	-8
Group household	5	4	1
Single person household	23	22	1
Other	2	6	-4

Source: CIE, population statistics from Australian Bureau of Statistics Census 2016, accessed via TableBuilder.

Sampling weights for national results

Sampling weights were calculated for the purpose of estimating results representative of the national population. This was done using property counts data published under the Urban National Performance Report for 2019-20 by the Bureau of Meteorology.

3.3 Sampling weights for estimating nationally-representative results

Region	Sample Proportion	Population Proportion	Sampling weights
Sydney Water	0.23	0.23	1.02
Hunter Water	0.07	0.03	0.42
Victoria metropolitan	0.08	0.25	3.31
Victoria regional	0.07	0.07	1.03
Urban Utilities/Seqwater	0.07	0.07	1.06
Unitywater/Seqwater	0.07	0.04	0.54
Gold Coast/Seqwater	0.07	0.03	0.43
Logan/City Water/Seqwater	0.06	0.02	0.39
Water Corp	0.07	0.11	1.57
SA Water	0.07	0.09	1.27
TasWater	0.07	0.02	0.32
Icon Water	0.07	0.02	0.32

Source: CIE

Other characteristics

Our sample consists of a mix of respondents across age group, gender, household composition, work status and household income. Most of the respondents pay for water and wastewater services to their local water utility/council directly. Basic sample characteristics are listed in table 3.1 below. These characteristics are not compared to population proportions, as data are not available on the target population for the survey, namely, the decision makers/bill payers in each household. For example, we expect this target population is older than the full population of Australian adults. Assessments of representativeness are therefore limited to household characteristics.

3.4 Composition of the sample

	Unweighted	Weighted	Weighted
	# resp	# resp	per cent
Q4- Are you			
Male	2006	2079	48
Female	2342	2267	52
Q5 - Age Recode			
18-29 years	286	243	6
30-39 years	600	581	13
40-49 years	619	634	15
50-59 years	732	771	18
60-69 years	1083	1084	25
70-79 years	863	855	20
80 years or over	174	189	4
Q7 - How do you pay for water and wastewater services?			
I pay bills to my local water utility/council	3529	3650	84
I pay bills to my local water utility/council and to my body corporate	224	215	5
My landlord/household head gets bills from my local water utility/council and charges the full amount to me as a specific charge separate from rent	288	243	6
My landlord/household head gets bills from my local water utility/council and charges part of the bill to me as a specific charge separate from rent	224	175	4
My landlord/household head charges me an amount for water and wastewater, separate from rent, but I don't know how that amount relates to the bill they get from my local water utility/council	92	73	2
Q36 - Do you speak a language other than English at home?			
No, English only	3747	3674	84
Yes	610	683	16
Q37 - Which best describes your household:			
Couple/family without children at home	1809	1768	41
Couple/family with children at home	1097	1103	25

	Unweighted	Weighted	Weighted
	# resp	# resp	per cent
One parent family	213	191	4
Group household	202	215	5
Single person household	956	990	23
Other	80	90	2
Q38 - What is your work status?			
Working full time	1519	1569	36
Working part time/casually	728	719	17
Student	49	48	1
Not currently employed	173	181	4
Home duties	267	285	7
Retired	1563	1507	35
Other	58	48	1
Q41 - What is your approximate annual personal income before tax?			
Less than $41,600 per year (less than $800 per week)	4	2	0
$41,600 - $78,000 per year ($800 - $1,500 per week)	8	5	0
$78,000 - $104,000 per year ($1,500 - $2,000 per week)	6	4	0
$104,000 - $156,000 per year ($2,000 - $3,000 per week)	14	15	0
More than $156,000 per year (more than $3,000 per week)	8	8	0
Do not wish to answer	5	6	0
Did not see the question	4312	4316	99
Q40 - What is your approximate annual household income before tax?			
Less than $41,600 per year (less than $800 per week)	1064	1065	24
$41,600 - $78,000 per year ($800 - $1,500 per week)	1027	993	23
$78,000 - $104,000 per year ($1,500 - $2,000 per week)	681	692	16
$104,000 - $156,000 per year ($2,000 - $3,000 per week)	656	657	15
More than $156,000 per year (more than $3,000 per week)	452	454	10
Do not wish to answer	432	455	10
Did not see the question	45	41	1

Source: CIE

Debriefing

Debriefing questions help understand the researcher the rationale and motivation behind the approach taken by respondent while answering DCE questions. Questions around perceptions of plausibility of options and consequentiality were asked to understand respondent incentives and enable testing of their impact on WTP estimates.

It is worth noting that over 70 per cent of the participants found it fairly easy to answer questions in the survey and close to 90 percent of the sample passed the attention test. Two thirds of respondents believed that the results of the survey could affect water bills

and/or actions taken by water utilities to reduce emissions.[3] A majority of respondents reported the COVID-19 pandemic had not affected their WTP for emission reductions. Of those respondents who did report an effect of COVID-19, twice as many reported an increase in WTP, than a decrease in WTP.

3.5 Responses to debriefing questions

	Unweighted	Weighted	Weighted
	# resp	# resp	per cent
Q28 - How easy did you find answering the options questions on a scale from 1 (very difficult) to 10 (very easy)?			
1	56	61	1
2	80	76	2
3	149	154	4
4	182	201	5
5	383	369	8
6	392	384	9
7	658	678	16
8	920	905	21
9	614	637	15
10	923	892	20
Q29 - If you are paying attention, please choose 'Moderately disagree' below.			
Moderately disagree	3863	3881	89
Other option chosen	494	476	11
Q31 - When you saw options that you did not believe your utility could achieve, how did you go about answering the question(s)?			
I answered the question(s) as though I would be getting the emissions and bill impacts as described in the packages	583	566	13
I answered the question(s) as though I would be getting different emissions and bill impacts to those described in the p	158	167	4
Did not answer	3616	3624	83
Q33 - To what degree do you expect that the results of this survey will affect actions taken by your water utility to reduce emissions?			
I believe it is very likely the survey will affect my utility's actions	643	663	15
I believe it is somewhat likely the survey will affect my utility's actions	2316	2320	53
I don't think the survey will affect my utility's actions	1398	1374	32
Q34 - To what degree do you expect that the results of this survey will affect your water bill?			

3 Carson et al. (2006) found a difference between responses to inconsequential hypothetical questions and questions involving 100 per cent probability of actual payment, but, importantly, found equivalence in responses to all questions involving a non-zero (20 per cent, 50 per cent, 80 per cent and 100 per cent) probability of actual payment.

	Unweighted	Weighted	Weighted
	# resp	# resp	per cent
I believe it is very likely the survey will affect my water bill	976	1006	23
I believe it is somewhat likely the survey will affect my water bill	2086	2086	48
I don't think the survey will affect my water bill	1295	1266	29
Q35 - What effect has the COVID-19 pandemic and associated public health orders had on your willingness to pay for emission reductions?			
I am now more willing to pay for emission reductions	1241	1298	30
I am now less willing to pay for emission reductions	576	583	13
Other (please specify)	64	52	1
No effect	2476	2424	56

Source: CIE

4 Results

Attitudes

Two-thirds of the sample believed human activity was to be blamed for most part of climate change and around half of the sample considered it was worth reaching net-zero emissions before 2050. Towards the start of the questionnaire three quarters of the sample indicated they either had concerns about carbon offsetting or did not know enough to have an opinion about it. After being provided with information about offsets, 70 per cent of the sample were supportive (subject to cost) of their utility purchasing accredited offsets in consultation with the community, with ongoing transparent reporting.

4.1 National level results

	Unweighted	Weighted	Weighted
	# resp	# resp	per cent
Q8 - Which of the following best describes your views on climate change?			
Climate change is occurring mostly because of human activity, such as burning fossil fuels	2905	2935	67
Climate change is occurring, but I don't know what's causing it	1043	993	23
Climate change is not occurring	409	429	10
Q9 - There has been a lot of discussion in the media recently about setting a target of net-zero greenhouse gas emissions (carbon emissions) by 2050. What is your view on this target?			
We should get to net-zero before 2050	2067	2093	48
We should get to net-zero after 2050	362	369	8
The target is about right	801	800	18
We should not have a target	506	499	11
Uncertain/Don't know	621	597	14
Q10 - How familiar are you with the sources of emissions?			
Not at all familiar	395	389	9
Slightly familiar	658	682	16
Somewhat familiar	1700	1690	39
Moderately familiar	1109	1125	26
Very familiar	495	471	11
Q11- Which of the following best describes your view on carbon offsetting?			

	Unweighted	Weighted	Weighted
	# resp	# resp	per cent
I am very supportive of carbon offsetting	993	1034	24
I am supportive, but have concerns about carbon offsetting	1208	1216	28
I don't know enough about carbon offsetting to have a view	1642	1608	37
I do not support carbon offsetting	514	499	11
Q18 - How would you feel about this proposal?			
I would be supportive of the proposal, depending on the cost	3015	3003	69
I would not support the proposal	468	461	11
Other	64	66	2
Don't know	810	827	19

Source: CIE

Model of customer choice

We estimated numerous models on the data from the DCE questions to identify a final set of models that explain the relationship between option features and consumer choice. The central WTP estimates presented in this chapter are estimated as a weighted average across three classes of respondent. Respondents were assigned to classes based on responses given up to and including the filtering DCE question, but not in the main DCE tasks themselves (table 4.2). We refer to the classes as 'revealed classes' to distinguish them from the classes that can be derived by estimating *latent class* multinomial logit models.

4.2 Revealed preference classes

Class	Types of respondents included	Approach to estimation of WTP
1	Respondents dropping out of the survey without being screened out Respondents choosing Package A (the zero-cost option) in all DCE tasks	Assume zero WTP
2	Respondents choosing Package A (the zero-cost option) in the filtering DCE question, but a non-zero-cost option in at least one other DCE task	Panel mixed multinomial logit model
3	Respondents choosing Package B or C (non-zero-cost options) in the filtering DCE question	Panel mixed multinomial logit model

Source: CIE

Respondents choosing Package A (the zero-cost option) in all tasks were asked about their reasons for doing so. The most common response (affordability) and the fourth and fifth most common responses (insufficient benefits) indicate a genuinely low value on emission reductions. The second and third most common responses related to expectations that emission reduction would be costless and distrust in utilities. It is less clear that these responses are driven by a low valuation of emission reductions. Regardless, we do not exclude any of these respondents from the calculation of central

estimates of WTP, as it is possible that people with these views have underlying WTP that is lower than the sample average.

4.3 Reasons for selecting zero-cost option in every choice task

	Proportion of survey completions
	per cent
Q32 - Why did you select Package A in every option question?	
I can't afford any bill increase	6.5
My water utility should achieve net zero emissions without increasing my bill	4.6
I'm concerned that my water utility will put up my bill without reducing emissions	4.0
The outcomes in the other options would not benefit me	3.1
There are other things I would prefer to spend my money on	2.9
Other	1.5
The emission reductions in Package A are on track to achieve net zero by 2050	1.3
I didn't have enough information to be confident choosing the other options	0.6
I didn't have enough time to properly consider the options	0.1

Source: CIE

National preferences for Class 2 and Class 3 respondents were estimated using two separate panel mixed multinomial logit models, with random (normal distribution) parameters for the non-cost attributes.[4] It was important to model preferences for Classes 2 and 3 separately to avoid the endogeneity created by our applying differing cost levels depending on the response to the filtering question.[5] Due to the lower sample size available for each utility region, models of utility-specific preferences were estimated on pooled Class 2 and 3 data, with interactions between a filtering indicator variable and other attributes used to overcome the endogeneity problem. All of these models allowed for full correlation between the distributions of the random parameters. Sampling weights were used to weight utility regions for the purpose of deriving a nationally representative average. The estimation results show that respondents made considered choices on the basis of the attribute levels presented, as evidenced by the signs and relatively large z-

4 The mixed logit model measures the degree to which changes in each feature/attribute affect the probability that an option is chosen (or, when applied within the framework of random utility theory, the degree to which they affect indirect utility) and the degree to which these effects vary across respondents. WTP for a specified change in a non-monetary attribute is calculated as the change in the monetary attribute that, when combined with the change in the non-monetary attribute, would keep choice probability/utility unchanged. For a recent discussion of variants of the mixed logit model, see Hess and Train 2017.

5 In basic (non-panel) models run on data pooled across the two classes, the coefficient on the cost attribute is positive, which indicates that an increase in cost increases the likelihood that an option is chosen. This positive sign is due to the fact that respondents who were revealed by the filtering question to have higher WTP were presented with higher cost options. If all questions are treated as though they were answered by a single representative respondent, it therefore appears as though options are more likely to be chosen if they have a higher cost.

values on the parameter estimates. Appendix D contains detailed estimation results for these models.

Various alternative specifications were tested in an attempt to improve model fit. These alternatives included:

- defining emission reductions in terms of percentage reductions, cars taken off the road, or both
- log transformations of emission reductions
- allowing for a differing value of emission reduction beyond a 30 per cent reduction (approximately on track for net-zero by 2050)
- log transformations of forest area and number of ATSI employees, and
- interactions between forest size and location and biodiversity attributes of the forest.

The only significant improvement in model fit at a national level was obtained by applying a log transformation to the number of ATSI employees. However, this improvement was not found in utility-specific models. The diminishing marginal value of ATSI employees in the national model is therefore due to heterogeneity across regions (and the correlation between region and ATSI employment levels presented in the options), rather than within-subject preferences. To maintain consistency between the national and utility-specific models, we retained a linear specification.

The actual volume of emissions avoided, as measured by the number of cars taken off the road, was excluded from the models. In the national model, the coefficient on the *cars* attribute tended to be positive. As with the log transformation on employment, this result was primarily due to heterogeneity across utility regions, rather than any within-subject preference. The cars attribute was not a significant driver of consumer choice. Respondents clearly focussed on percentage reductions in emissions as their preferred measure of climate action. There was no discernible increase in WTP in regions with higher baseline level of emissions, where a given percentage reduction would have a greater impact. We discuss the implications of this result for application of the results in Chapter 5.

Average willingness to pay

Average willingness to pay per year for ten years

The national average WTP was calculated by multiplying the WTP estimates derived from the models for each class by the class shares (table 4.4). Both the WTP estimates and the shares were calculated using sampling weights to ensure a nationally-representative result.

4.4 Calculation of unconditional willingness to pay using class results

	Class 2	Class 2 weight	Class 3	Class 3 weight	Unconditional mean
	$ per year for 10 years	per cent	$ per year for 10 years	per cent	$ per year for 10 years
Per percentage point reduction in your water utility annual emissions by 2031	0.077	19	0.622	59	0.382
Per percentage point of water utility annual emissions offset by accredited projects by 2031	0.062	19	0.600	59	0.366
Per 1000 hectares of new native forest	0.026	19	0.235	59	0.144
New forests located 'in my State, but not in my region' rather than 'in Australia, but not in my State'	2.687	19	4.726	59	3.301
New forests located 'in my region' rather than 'in Australia, but not in my State'	2.490	19	2.918	59	2.197
New forests support significant biodiversity	1.003	19	16.484	59	9.909
Per ATSI person employed who was seeking job opportunities	0.033	19	0.317	59	0.193
Unspecified action unrelated to attributes above (label effect)	0.586	19	64.456	59	38.109

Source: CIE

The estimates of WTP are provided with 95 per cent confidence intervals in table 4.5. The estimates are unconditional, which means they are not conditional on respondents engaging with or even completing the DCE tasks. They account for the share of respondents with zero WTP. They also account for location-based sampling weights. Consequently, these estimates can be multiplied directly by the total number of residential properties to estimate total WTP for the outcome. It is important to remember there is a wide distribution of individual WTP underlying this average. Further discussion of this distribution is provided later in this chapter.

4.5 Willingness to pay: National weighted unconditional mean

	Unconditional mean	95 per cent confidence interval
	$ per year for 10 years	$ per year for 10 years
Per percentage point reduction in your water utility annual emissions by 2031	0.382	(0.334, 0.430)
Per percentage point of water utility annual emissions offset by accredited projects by 2031	0.366	(0.329, 0.402)
Per 1000 hectares of new native forest	0.144	(0.108, 0.180)
New forests located 'in my State, but not in my region' rather than 'in Australia, but not in my State'	3.301	(2.236, 4.366)
New forests located 'in my region' rather than 'in Australia, but not in my State'	2.197	(0.505, 3.890)
New forests support significant biodiversity	9.909	(8.696, 11.122)
Per ATSI person employed who was seeking job opportunities	0.193	(0.157, 0.229)

	Unconditional mean	95 per cent confidence interval
	$ per year for 10 years	$ per year for 10 years
Unspecified action unrelated to attributes above (label effect)	38.109	(35.190, 41.028)

Source: CIE

The average value placed on emission reduction is $0.38 per year for 10 years per percentage point reduction by 2031. For example, a 10 per cent reduction by 2031 would be valued at $3.82 per year for 10 years. A 50 per cent reduction by 2031 would be valued at $19.08 per year for 10 years.

Contrary to some of the views we heard in the online discussion groups, a very similar value ($0.37 per year for 10 years per percentage point offset by 2031) is placed on the offsetting of emissions. It is important to bear in mind the questionnaire informed respondents of the barriers to reducing emissions from wastewater treatment and assured respondents offsets would be accredited, selected in consultation with customers, and subject to transparent ongoing reporting.

The WTP for forests should not be interpreted as WTP for abatement from forests, since those values are captured in the attributes discussed above. Nor should it be interpreted as the value of any forest. It is the WTP for carbon offsetting to be achieved by planting new native forest, rather than by some other method. The ability of these forests to support significant biodiversity was valued very highly. It was more important to customers than the location of forests or even the size of the forests.

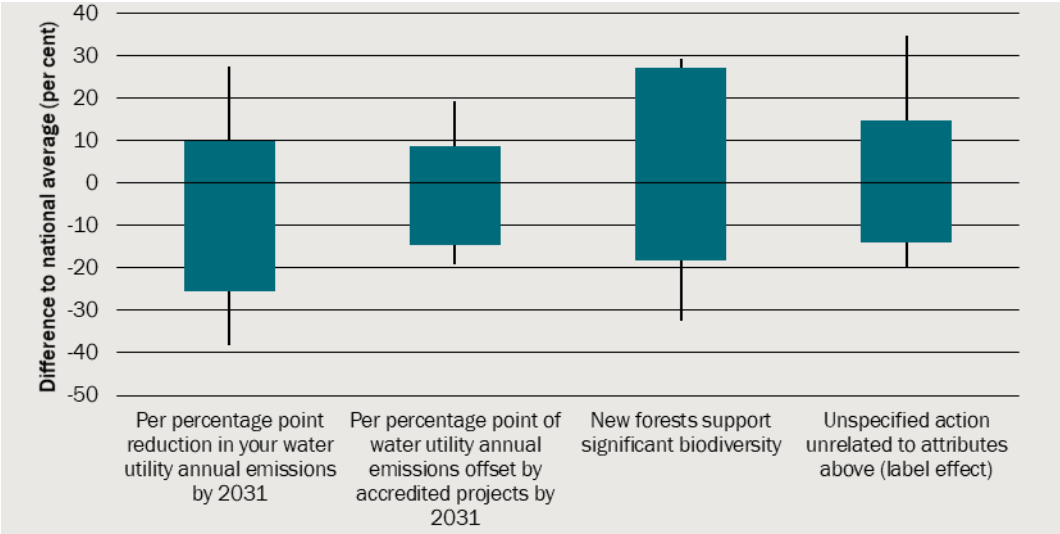
On average, customers preferred forests to be located in their state, but not in their region. This preference was primarily driven by customers in major metropolitan areas, like Sydney and Melbourne, where respondents may have perceived limited opportunities for local vegetation projects. In some of the utility-specific results, customers prefer forests to be located in their region.

There was also a significant WTP for a residual 'label effect' for Package B and C in the DCE tasks. The choice behaviour leading to this result is selection of Package B or C even when they are very expensive and deliver very little in the way of emission reductions, offsets or co-benefits. There are a range of possible reasons for this choice behaviour. Given the risk that it arises due to 'yea saying' or a 'warm glow' effect, we would advise against using this estimate in CBA. We can conclude, however, that around six in ten households have a very strong preference for climate action by their utility.

Variation in average willingness to pay across utilities

WTP was also calculated for each utility using models estimated only on respondents from the relevant utility's operating area. These results are provided in separate, confidential appendices to this report. The variation in WTP estimates across utilities was largely within ±30 per cent for emission reductions, emission offsets, forest biodiversity, and the label effect (figure 4.6).

4.6 Attributes with lower variation in willingness to pay across utilities

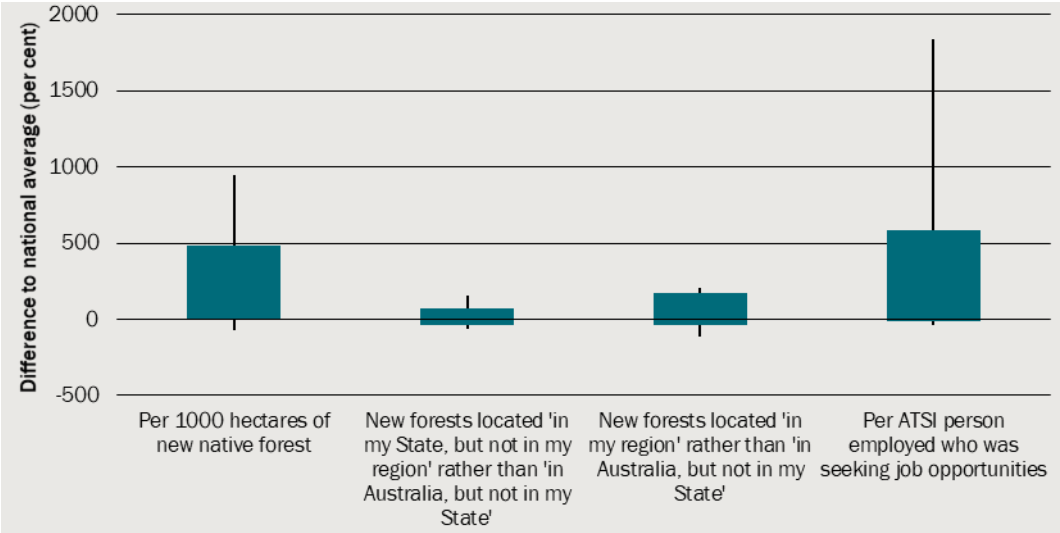


Note: The box plots indicate the lowest, third-lowest, third-highest, and highest of the values across the 12 participating utilities

Data source: CIE

Much larger variation across utilities was observed for other attributes, particularly area of new forests and number of people employed. The levels used for these two attributes varied dramatically across utilities, since they were proportional to each utility's current level of annual emissions. This chart highlights the importance of each utility applying its WTP estimates only to scenarios that lie within the range of levels used in the survey.

4.7 Attributes with higher variation in willingness to pay across utilities



Note: The box plots indicate the lowest, third-lowest, third-highest, and highest of the values across the 12 participating utilities

Data source: CIE

Decomposing willingness to pay for ATSI employment

The estimate of WTP for employment of ATSI persons who would otherwise be unemployed represents a bundle of various benefits, including both improved outcomes

for ATSI communities, such as improved health, and cultural benefits, such as preserving traditional knowledge and heritage sites. Respondents were asked to indicate the degree to which their willingness to support ATSI employment was due to these two types of sub-benefit. Around half the sample indicated a 50-50 split. Only 6 per cent of the sample indicated that community outcomes were more important than the cultural benefits. Those respondents also evidenced lower WTP than other respondents for the ATSI employment attribute. On average, around 60 per cent of the WTP for ATSI employment can be attributed to cultural benefits, as distinct from community wellbeing benefits.

4.8 Decomposition of willingness to pay for ATSI employment

Proportion of value due to cultural benefits	Proportion of sample (weighted)	Average WTP for ATSI employment	Average WTP for cultural component	Average WTP for community component
per cent	per cent	$/year/employee for 10 years	$/year/employee for 10 years	$/year/employee for 10 years
10	2.0	0.17	0.02	0.15
20	0.7	0.15	0.03	0.12
30	1.6	0.17	0.05	0.12
40	1.4	0.18	0.07	0.11
50	50.8	0.24	0.12	0.12
60	6.3	0.23	0.14	0.09
70	4.3	0.18	0.13	0.05
80	6.3	0.24	0.19	0.05
90	4.2	0.25	0.22	0.02
100	7.8	0.26	0.26	0.00
No benefit	5.7	0.06	0.03	0.03
Drop-outs	8.9	0.00	0	0
Total	**100.0**	**0.20**	**0.12**	**0.08**

Source: CIE

Variation in willingness to pay across households

Given the WTP estimates were constructed from separate 'revealed class' models and class membership shares, the most tractable method for assessing correlation between respondent characteristics and WTP was to analyse the posterior estimates of individual WTP for a specific scenario derived from the mixed logit models estimated on the pooled national sample. The scenario that was used is set out in table 4.9. Note that this specific scenario may not be a plausible combination of features for some of the smaller utilities.

4.9 Scenario used to test variation in willingness to pay across respondents

	Baseline	Proposed scenario
Reduction in water utility annual emissions by 2031	20%	40%

	Baseline	Proposed scenario
Water utility annual emissions offset by 2031	0%	20%
New native forest (Ha)	0	15 000
Location of new native forests	N/A	In my state but not in my region
Do new native forests support significant biodiversity?	N/A	Yes
Employment of ATSI people seeking job opportunities (persons)	0	15
Label effect		Exclude label effect

Source: CIE

The distribution of WTP for this scenario is heavily skewed, with a median WTP of around $15 per year for 10 years — less than half of the mean of around $34 per year for 10 years (figure 4.10). More than a quarter of households indicated they were not willing to pay anything for the features offered, with affordability the most common reason given. This finding is important from a policy and political perspective. While the overall economic benefit to the community from an investment option is determined by mean WTP, majority support for the option is determined by median WTP.

4.10 Distribution of willingness to pay for an example scenario

Data source: CIE

We used two approaches. First, we analysed the correlation between each respondent characteristic and WTP without controlling for other characteristics. Second, we analysed the correlations while controlling for other available characteristics. The first approach showed that WTP was higher for respondents who were female, were aged under 30 or in their 60s, were renting their dwelling, speak only English at home, were employed (particularly in energy efficiency, environmental regulation, or climate science), and were earning higher levels of income (table 4.11).

4.11 Willingness to pay for an example scenario by respondent characteristic without controlling for other characteristics

	Mean WTP
	$ per year for 10 years
Full sample	34.45
Gender	
Male	31.66
Female	36.94
Age	
18_29	41.47
30_39	37.40
40_49	32.49
50_59	31.74
60_69	36.71
70 and over	31.76
Tenure type	
Owner	33.90
Renter	37.96
Area	
Metro	34.56
Regional	34.20
Language	
LOTE	30.99
English	35.02
Work status	
Employed	36.14
Other	32.71
Occupation	
Manufacturing, selling or installing renewable energy solutions	31.66
Assessing or improving the energy efficiency of buildings	55.03
Farming/Agriculture	38.18
Mining	27.24
Forestry	33.11
Environmental regulation or policy	49.03
Coal- or gas-fired electricity generation	41.17
Climate science or ecology	51.72
Household income	
Less than $41,600 per year (less than $800 per week)	29.94
$41,600 - $78,000 per year ($800 - $1,500 per week)	34.47

	Mean WTP
	$ per year for 10 years
$78,000 - $104,000 per year ($1,500 - $2,000 per week)	36.84
$104,000 - $156,000 per year ($2,000 - $3,000 per week)	37.86
More than $156,000 per year (more than $3,000 per week)	41.66
Do not wish to answer	29.72

Source: CIE

For the second approach, we used a Tobit model to estimate the marginal effects of each characteristic on WTP for the example scenario holding other characteristics constant (see table 4.12 for marginal effects and appendix D for estimation output). The largest statistically significant effects, relative to an average WTP of $34 per year for the scenario, were found to be:

- WTP increases with income, with a difference in WTP of up to $13 per year between respondents earning over $156 000 per year and those earning less than $41 600 or those who did not wish to answer the question about income
- respondents aged between 40-59 evidenced WTP $6-$7 per year lower than respondents aged under 30 or between 60-69
- female respondents evidenced WTP $5 per year higher than males
- respondents renting their dwelling evidenced WTP around $4 per year higher than respondents who own their dwelling, and
- respondents speaking a language other than English at home evidenced WTP around $4 per year lower than respondents speaking only English at home.

Work status and location (regional vs metro) were not found to be significant effects after controlling for other characteristics. There may be relatively large effects associated with specific occupations, however the sample size of respondents in each occupation was very small and the sampling uncertainty around the marginal effects is too large to allow conclusions to be drawn.

Many of these effects, such as the positive relationship of WTP with income and female respondents, are consistent with the results of other stated preference surveys for environmental goods.

4.12 Marginal effects of respondent characteristics on average willingness to pay for the example scenario

	Marginal effect	Lower bound	Upper bound	Z value
	$/year for 10 years	$/year for 10 years	$/year for 10 years	
Gender: Female (Base: Male)	5.36	3.07	7.65	4.6
Age: 30-39 (Base: 18-29)	-2.80	-8.07	2.46	-1.0
Age: 40-49 (Base: 18-29)	-6.98	-12.25	-1.71	-2.6
Age: 50-59 (Base: 18-29)	-6.12	-11.28	-0.95	-2.3
Age: 60-69 (Base: 18-29)	0.91	-4.22	6.05	0.4

	Marginal effect	Lower bound	Upper bound	Z value
	$/year for 10 years	$/year for 10 years	$/year for 10 years	
Age: 70+ (Base: 18-29)	-2.43	-7.88	3.02	-0.9
Tenure: Renter/other (Base: Owner)	3.60	0.30	6.90	2.1
Location: Regional (Base: Metro)	0.21	-2.26	2.68	0.2
Language: LOTE (Base: English)	-4.39	-7.67	-1.12	-2.6
Work status: Employed (Base: Other)	0.80	-2.19	3.79	0.5
Occupation: ...renewable energy solutions (Base: None of the above)	-3.90	-15.97	8.17	-0.6
Occupation: ...energy efficiency of buildings (Base: None of the above)	13.97	-5.72	33.66	1.4
Occupation: Farming/Agriculture (Base: None of the above)	2.07	-9.84	13.97	0.3
Occupation: Mining (Base: None of the above)	-6.94	-18.19	4.31	-1.2
Occupation: Forestry (Base: None of the above)	2.66	-16.80	22.12	0.3
Occupation: Environmental regulation or policy (Base: None of the above)	6.63	-8.16	21.41	0.9
Occupation: Coal- or gas-fired electricity generation (Base: None of the above)	-0.17	-25.38	25.04	0.0
Occupation: Climate science or ecology (Base: None of the above)	9.20	-17.19	35.59	0.7
Income: Less than $41,600 per year (Base: Do not wish to answer)	-0.13	-4.44	4.19	-0.1
Income: $41,600 - $78,000 per year (Base: Do not wish to answer)	4.85	0.62	9.09	2.3
Income: $78,000 - $104,000 per year (Base: Do not wish to answer)	7.14	2.59	11.68	3.1
Income: $104,000 - $156,000 per year (Base: Do not wish to answer)	8.88	4.26	13.50	3.8
Income: More than $156,000 per year (Base: Do not wish to answer)	12.98	7.94	18.03	5.0

Source: CIE

Robustness checks

We tested several model variants to provide an indication of the robustness of the results to different sample frames (based on exclusion criteria). A short description of each of the models is set out in table 4.13.

4.13 Subsamples for robustness checks

Model	Description	Weighted completes
		Respondents
Base	Full Sample	4357
A	Excluding respondents who failed the attention test	3881

Model	Description	Weighted completes
		Respondents
B	Excluding respondents who deemed choice task options as implausible	4190
C	Excluding respondents who found emission reduction inconsequential	2983
D	Excluding respondents who found water bill impact inconsequential	3091
E	Excluding respondents with Length of Interview (LOI) < 5.75 minutes	3844

Source: CIE

Estimates of willingness to pay from each of the 6 models described above are set out in table 4.14. The 'Base' model estimates of WTP are unconditional means. The other models measure conditional WTP estimates by excluding respondents based on length of interview (LOI), attention, plausibility, and consequentiality of the survey on emission reductions and water bill impacts.

4.14 Estimates of willingness to pay based on various subsamples

Change in attribute	Base	A	B	C	D	E
	$ per year for 10 years	$ per year for 10 years	$ per year for 10 years	$ per year for 10 years	$ per year for 10 years	$ per year for 10 years
Per percentage point reduction in your water utility annual emissions by 2031	0.367	0.380	0.383	0.474	0.454	0.381
Per percentage point of water utility annual emissions offset by accredited projects by 2031	0.370	0.382	0.382	0.470	0.429	0.384
Per 1000 hectares of new native forest	0.069	0.078	0.075	0.091	0.075	0.069
New forests located 'in my State, but not in my region' rather than 'in Australia, but not in my State'	4.188	4.258	4.312	5.257	4.811	4.269
New forests located 'in my region' rather than 'in Australia, but not in my State'	1.806	1.414	1.688	1.441	1.403	1.680
New forests support significant biodiversity	11.448	11.559	11.772	14.523	13.322	12.311
Per ATSI person employed who was seeking job opportunities	0.159	0.159	0.163	0.219	0.202	0.159
Unspecified action related to attributes above (label effect)	-32.950	-31.993	-33.701	-42.755	-39.018	-33.113

Source: CIE

Limiting the sample to only those who see the emission reduction and water bill impact of this survey as consequential tends to increase the WTP estimates by quite a lot (Model C and D). This jump mainly arises from an increase in the share of respondents in the high WTP category after applying the exclusion restriction while Class 2 shares remain almost the same. This indicates that respondents who found the survey inconsequential tended to choose Package A every time. Rather than being an understatement of WTP due to hypothetical bias, it seems more likely this result is simply a correlation between preferences and attitudes towards consequentiality. People who are sceptical about climate change may also be sceptical about the genuineness of utility consultation on investment decisions. Hence, we keep those respondents who view the survey as inconsequential in the main results.

Restricting the survey based on LOI or to only those who passed the attention test or deemed the options as plausible tends to increase WTP only slightly. This is consistent across all attributes except forest location. Overall, the model is reasonably robust to decisions about respondent-exclusion criteria.

Respondents are sometimes influenced by the first piece of information they are offered. They interpret subsequent information with reference to that first piece of information. This is sometimes referred to as an anchoring bias or order effect. DCE surveys typically vary the first question across respondents by using several blocks of choice question and sometimes by also randomising the order in which questions are presented within each block. In this survey, we used a separately-designed filtering question, which was very similar across respondents. Most respondents were offered $10 options in packages B and C, but some were offered $5 options or $20 options. To test whether the cost levels shown in the filtering question affected preferences stated over the remaining choice tasks, we used a Tobit model to estimate the marginal effect of the cost levels on stated WTP for an example scenario (see appendix D for estimation output). The marginal effects were statistically insignificant (as shown in table 4.15), so there is no evidence that the cost level chosen for filtering question ultimately had an effect on stated WTP.

4.15 Marginal effect of cost level in the filtering question on willingness to pay

	Marginal Effect	Lower Bound	Upper Bound	Z value
	$/year for 10 years	$/year for 10 years	$/year for 10 years	
Anchoring cost level: $5 (Base: $10)	1.69	-2.04	5.41	0.89
Anchoring cost level: $20 (Base: $10)	1.21	-1.60	4.02	0.85

Source: CIE

5 Discussion

Willingness to pay for a specific scenario

An example of the calculation of average WTP for a specific scenario is set out in table 5.1. The estimates of average WTP per unit change in each attribute are multiplied by the change in each attribute relative to a baseline scenario. This estimate is an unconditional mean, taking account of the estimated proportion of the population who are not willing to pay any amount. It can therefore be multiplied by the total number of households to derive an estimate of total willingness to pay.

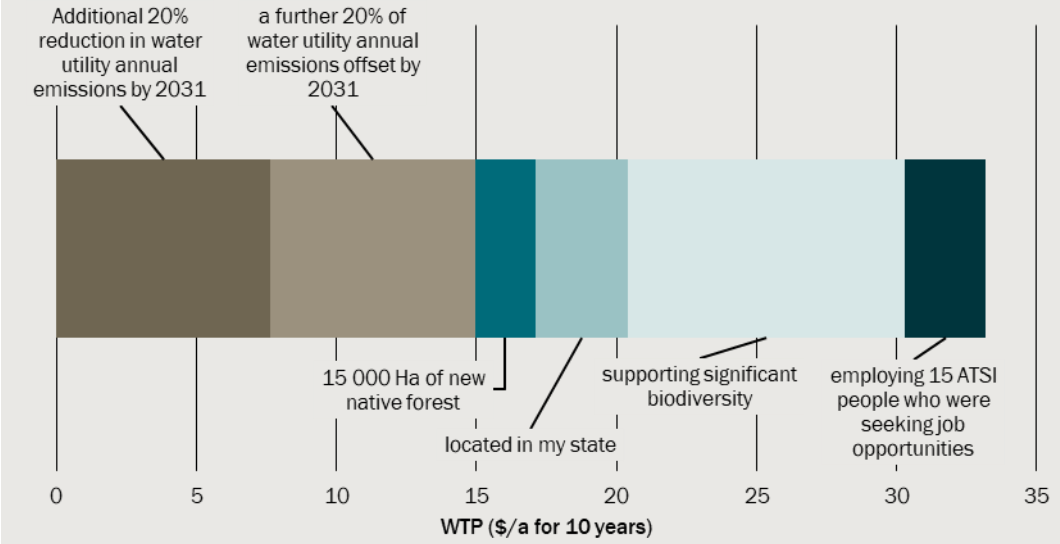
5.1 Calculation of average willingness to pay for an example scenario

	Baseline	Proposed scenario	Difference	Average WTP per unit	Average WTP for difference
				$ per year for 10 years	$ per year for 10 years
Reduction in water utility annual emissions by 2031	20%	40%	20%	0.38	7.63
Water utility annual emissions offset by 2031	0%	20%	20%	0.37	7.32
New native forest	0 Ha	15 000 Ha	15 000 Ha	0.14	2.15
Location of new native forests	N/A	in my state, but not in my region		3.30	3.30
Biodiversity in new native forests	N/A	support biodiversity		9.91	9.91
Employment of ATSI people seeking job opportunities	0 persons	15 persons	15 persons	0.19	2.89
Total					**33.20**

Source: CIE

While the levels of forest area and ATSI employment in this scenario may not be realistic for smaller utilities, the calculation shows that WTP for co-benefits is an important consideration and may be a similar order of magnitude to WTP for reduced net emissions (chart 5.2).

5.2 Average willingness to pay for an example scenario



Data source: CIE

Converting the units of measurement

The attribute descriptions were necessarily simplified for the purpose of the survey. As a result, the example above may not correspond directly to the options being considered by utilities for their carbon strategies. In a CBA, estimates of WTP need to be applied to outcomes in each year over a forecast period. This application is not easily conducted while the WTP estimates are in the form discussed above, as it combines different time profiles for payments and outcomes. Payments are a specific amount each year for 10 years and zero thereafter, whereas outcomes will be delivered at an unspecified time between now and 2031 and continue thereafter.

A more tractable measure of WTP would be the amount households are willing to pay in each year the outcome is provided. The total stream of payments under this alternative measure needs to be equivalent in present values terms to the payments expressed in the survey. Two key assumptions are required to derive this estimate:

- the discount rate respondents apply when comparing amounts in different years, and
- the timing with which respondents assume the outcome is delivered (respondents' interpretation of "by 2031").

Table 5.3 shows examples, under a range of assumptions, of the factor for converting WTP estimates from the measure used in the survey to the amount paid each year the outcome is provided. In all cases, it is assumed the outcome is provided in perpetuity once it has been delivered.

5.3 Factors for converting estimates to amounts paid each year outcome provided

Discount rate	3 per cent	4 per cent	5 per cent	6 per cent	7 per cent	8 per cent	9 per cent	10 per cent
Delivery in 2031	0.68	0.77	0.87	0.97	1.09	1.22	1.35	1.50

Discount rate	3 per cent	4 per cent	5 per cent	6 per cent	7 per cent	8 per cent	9 per cent	10 per cent
Delivery likelihood rising to 50% by 2030	0.59	0.66	0.73	0.80	0.88	0.96	1.05	1.13
Delivery likelihood rising to 100% by 2031	0.53	0.59	0.65	0.70	0.76	0.83	0.89	0.95
Delivery likelihood rising to 100% by 2027	0.48	0.53	0.57	0.61	0.66	0.70	0.75	0.79
Delivery in 2023	0.44	0.47	0.50	0.53	0.57	0.60	0.62	0.65

Source: CIE

Our central estimate of the factor is 0.76, based on a discount rate of 7 per cent, which, despite some evidence indicating a slightly lower opportunity cost of capital, remains the rate recommended by the Office of Best Practice Regulation (2016) and some state CBA guidelines (e.g. NSW Treasury 2017), and a likelihood of outcome provision that increases linearly to one by 2031. This factor can be used, for example, to convert:

- $0.38 per year for 10 years for a one percentage point reduction in emissions by 2031, to
- $0.29 for each percentage point reduction in emissions (relative to 2021/22) provided in each year.

For a scenario in which a utility reduces its emissions by 10 per cent in 2027 and maintains the reduction thereafter, for example, households would, on average, be willing to pay an additional $2.92 on their annual bill in 2027 and in each year thereafter.

5.4 Willingness to pay each year an outcome is provided

	Point estimate	Lower bound	Upper bound
	$ per year outcome is provided	$ per year outcome is provided	$ per year outcome is provided
Per percentage point reduction in your water utility annual emissions	0.292	0.256	0.328
Per percentage point of water utility annual emissions offset by accredited projects	0.280	0.252	0.307
Per 1000 hectares of new native forest	0.110	0.083	0.137
New forests located 'in my State, but not in my region' rather than 'in Australia, but not in my State'	2.523	1.725	3.321
New forests located 'in my region' rather than 'in Australia, but not in my State'	1.680	0.412	2.947
New forests support significant biodiversity	7.574	6.666	8.483
Per ATSI person employed who was seeking job opportunities	0.147	0.120	0.175
Unspecified action unrelated to attributes above (label effect)	29.129	26.942	31.315

Source: CIE

Willingness to pay per tonne of carbon reduced or offset

The estimates of WTP for emission abatement or offsetting can be converted to an amount per tonne to enable comparison with the price of offset products, such as Australian Carbon Credit Units (ACCUs). This involves aggregating the WTP estimates described above across all households on a utility's network and then dividing that aggregate WTP by one per cent of the expected value of the utility's annual net emissions (tCO2e) as at 2022. For example, the WTP estimate of $0.292 per household per year that a one percentage point reduction in emissions is provided could be converted to $82/tCO2e (by multiplying by 8.3 million households and dividing by 29 790 tCO2e). The equivalent figure for emissions offset is $78/tCO2e.

It is important to recognise the uncertainty around these point estimates. We conducted systematic sensitivity analysis across three sources of uncertainty:

- sampling uncertainty in WTP estimates
- respondent-assumed discount rate, and
- respondent-assumed timing of outcome delivery.

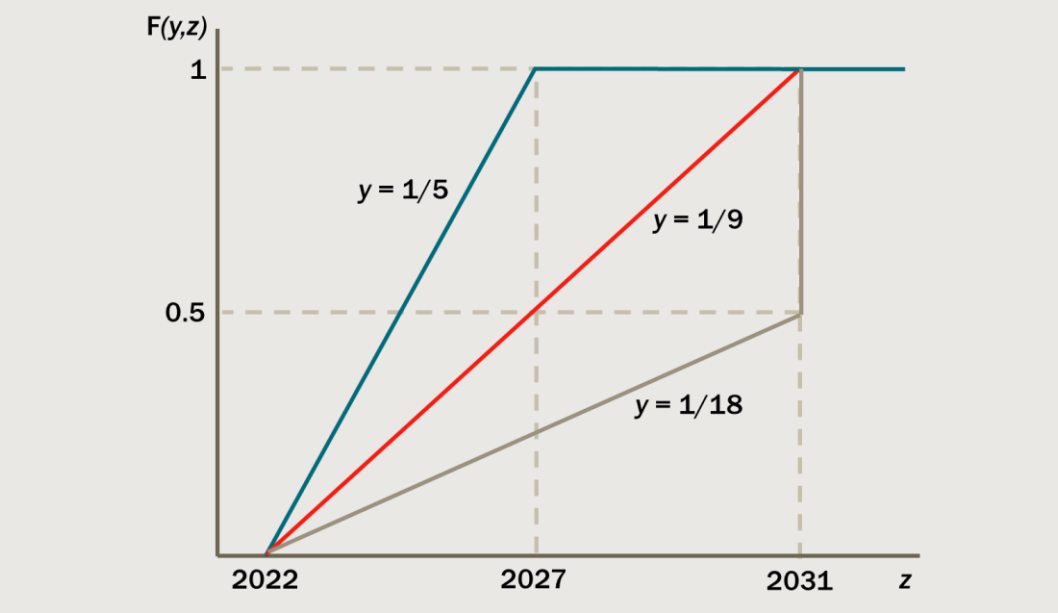
Taking 10 000 sets of random draws from the distributions described in table 5.5 gives the probability distribution of WTP illustrated in chart 5.7.

5.5 Distributions used for systematic sensitivity analysis

Input	Distribution
WTP for emissions reduction ($ per household per year for 10 years)	Normal, with mean 0.382 and std dev 0.024
WTP for emissions offsetting ($ per household per year for 10 years)	Normal, with mean 0.366 and std dev 0.018
Respondent discount rate (per cent)	Cumulative density function: 0 for $x < 3$ $1/8*(x - 3)$ for $3 \leq x < 7$ $1/2 + 1/6*(x - 7)$ for $7 \leq x \leq 10$ 1 for $x > 10$
Respondent-assumed timing of outcome delivery, defined as the parameter y in the function for the probability, $F(y,z)$, that the outcome has been delivered by year z: $F(y,z) = \min(1, y.(z - 2022))$ for $z < 2031$ 1 for $z \geq 2031$ See chart 5.6 for examples.	Cumulative density function: 0 for $y < 0$ $1/18*y$ for $0 \leq y < 1/9$ $17/16 - 1/(16*y)$ for $1/9 \leq y \leq 1$ 1 for $y > 1$

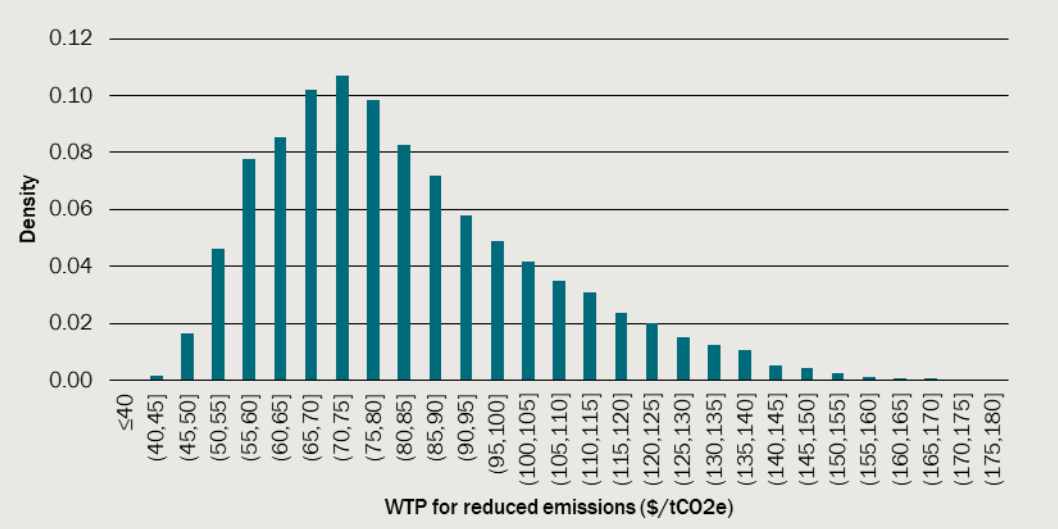
Source: CIE

5.6 Parameter for testing sensitivity of respondent-assumed timing of delivery



Data source: CIE

5.7 Systematic sensitivity analysis of willingness to pay per tonne of CO2e



Data source: CIE

When varying the inputs in this way, 95 per cent of the estimates of WTP for emission reductions lie between $54/tCO2e and $126/tCO2e and 95 per cent of the estimates of WTP for emissions offset lie between $51/tCO2e and $120/tCO2e (table 5.8). The point estimates for nine of the 12 participating utilities also lie within these ranges (chart 5.9). At the time of writing, the spot price for Australian Carbon Credit Units (ACCUs) was $53.50/tCO2e. The results therefore suggest that average WTP at most Australian utilities is currently sufficient to cover the cost of offsetting emissions using ACCUs. Note, however, that this finding does not necessarily imply majority support due to the skewed distribution of WTP.

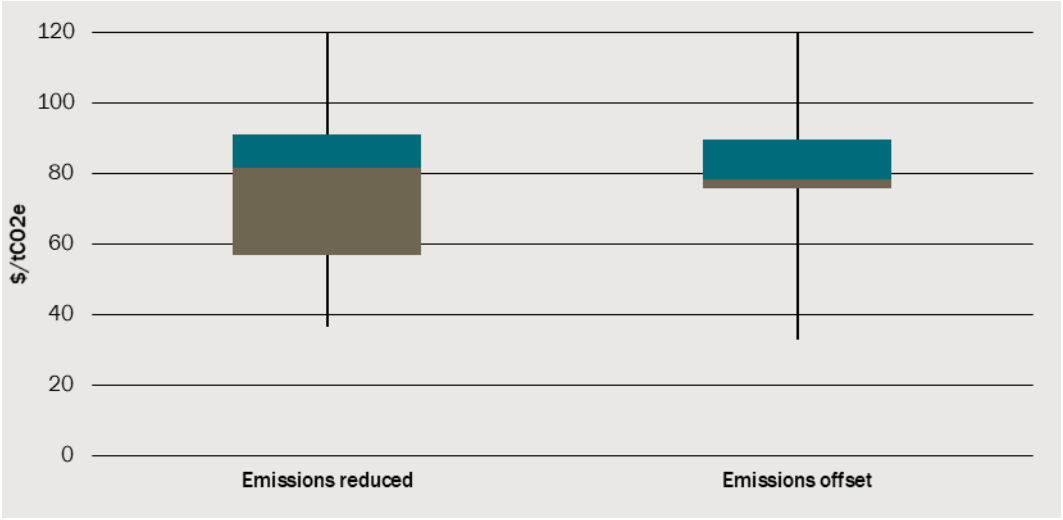
5.8 Average willingness to pay per tonne of emissions abated or offset

	Point estimate	Lower bound	Upper bound
	$/tCO2e	$/tCO2e	$/tCO2e
Emissions reduced	82	54	126
Emissions offset	78	51	120

Source: CIE

These WTP estimates are based on our estimate of annual emissions from participating regions of 3.0 MtCO2e. We have included preliminary estimates for each utility in the confidential appendices that set out utility-specific results. Each utility should refine these estimates based on the total water sector emissions in their area of operations. While the questionnaire informed respondents of estimates of emissions, measured in terms of equivalent number of cars taken off the road, it did not detail assumptions about whether emissions associated with separate bulk water providers or privately-owned treatment and desalination plants were included or excluded from those estimates. It would be reasonable to assume respondents perceived the percentage reductions listed in the choice tasks as applying to the whole water sector in their city or region.

5.9 Variation across utilities in willingness to pay per tonne of carbon



Note: Each box and whisker represents a quarter of the utilities. The top of the chart has been truncated to ensure confidentiality for the utility with the highest willingness to pay per tCO2e.

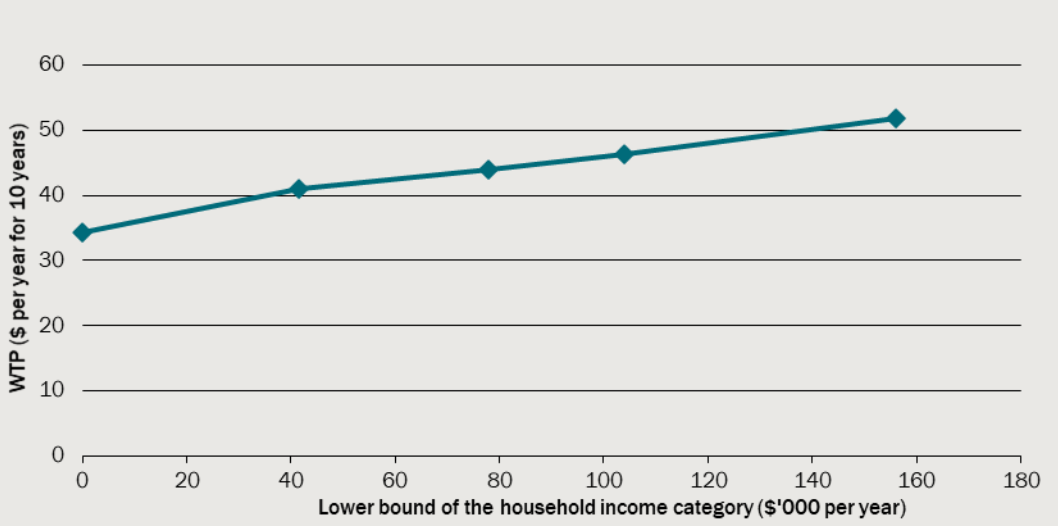
Source: CIE

Forecasting growth in willingness to pay

The analysis horizon in a CBA is often between 20 and 40 years. Estimates of WTP will be needed for each of those years. The Federal MYEFO forecast real wage growth of 0.25 per cent in 2022-23, 0.5 per cent for 2023-24, and 0.75 per cent for 2024-25. The analysis in chapter 4 showed a significant positive relationship between household income and WTP (see chart 5.10). At the mean income level in the sample, the income elasticity of WTP is around 0.2. This means if a CBA includes an assumption that real wages will grow at 0.75 per cent per year, it would be reasonable to assume WTP (per

household) will increase by 0.15 per cent (0.2 * 0.75 per cent) per year over the forecast period.

5.10 Relationship between income and willingness to pay for a specific scenario



Data source: CIE

Consideration of majority support

For the purpose of considering whether an option or strategy would have majority support among households, utilities may wish to conduct sensitivity analysis using estimates of median WTP. Median WTP in the national results, as a proportion of the mean, for each of the DCE attributes is set out in table 5.11. Alternatively, utilities could calculate the median for their own region using the confidential Excel file provided.

5.11 Median WTP as a proportion of the mean

Attribute	Median WTP
	Proportion of mean WTP
Reduction in your water utility annual emissions	0.48
Water utility annual emissions offset by accredited projects	0.60
Area of new native forest	0.81
New forests located 'in my State, but not in my region' rather than 'in Australia, but not in my State'	0.74
New forests located 'in my region' rather than 'in Australia, but not in my State'	0.80
New forests support significant biodiversity	0.33
Employment of ATSI people who were seeking job opportunities	0.55

Source: CIE

Limits on the application of results

As a general rule, WTP estimates should be applied only to attribute changes that lie within the range of changes that were put to respondents in the study. This rule is particularly important in the case of the utility-specific estimates of WTP for the forest area and ATSI employment attributes included in this study. The range of changes in these attributes presented to respondents differed dramatically across utilities and, potentially as a result, estimates of marginal WTP also differed dramatically across utilities. The maximum levels of change to which each utility should apply their WTP estimates are set out in table 5.12.

5.12 Maximum levels used in co-benefit attributes

	Maximum level for new native forests	Maximum level for ATSI people employed who were seeking job opportunities
	Ha '000s	Persons
Sydney Water	43	45
Hunter Water	10	10
Victoria metro	77	80
Victoria regional	41	45
Urban Utilities	26	30
Unitywater	14	15
City of Gold Coast	11	10
Logan City Council/City Water	7	7
Water Corporation	88	95
SA Water	33	35
TasWater	8	8
Icon Water	3	3

Source: CIE

Validation in the context of baseline bill impacts

Development of pricing proposals or business plans typically involves bringing together a package of service offerings and investments that have been analysed in isolation. It is best-practice customer engagement to conduct a validation exercise late in the process of developing a pricing proposal, in which the bill and service impacts of a draft combination of service offerings and investments (along with external impacts, such as demand forecasts and return on capital) are presented to customers and tested for acceptability. Ideally, customers would be given the opportunity to make adjustments to the service offerings and investments that comprise the package. Carbon strategies developed using the results of this study are no exception. WTP was estimated in this study in the context of a baseline with zero bill impacts. Any carbon strategy option identified as preferred by CBA should be validated with customers, particularly in contexts where water bills are increasing due to other drivers.

Application by vertically disintegrated utilities

Seqwater supplies bulk water to Urban Utilities, Unitywater, and City of Gold Coast, as well as the Logan and Redland local government areas. Similarly, Melbourne Water supplies three retail water businesses. Sydney Water distributes raw water supplied by Water NSW.

For the emissions-based attributes, we recommend each utility uses the $/tCO2e measures provided in their confidential appendix to this report. The emissions denominator used to derive these measures for each of the Queensland distributor-retailers included an allocation of Seqwater emissions to each region. The measure for Seqwater is based on the total WTP and total emissions for South-East Queensland. The measure for Sydney Water is based on an estimate of the total emissions, including emissions from Water NSW and the build-own-operate plants. When using this measure, there is no need to consider the levels of emissions reduction being undertaken by other utilities, unless one or more of the utilities goes beyond net zero to climate-positive outcomes.

Each utility can apply the estimates of WTP for area of new forest and employment of ATSI people seeking job opportunities, subject to the limits on levels discussed in the section above. This presents a coordination challenge when bulk suppliers and distributor-retailers are conducting their analysis concurrently. At a minimum, each utility should treat WTP as more uncertain when applied to levels exceeding those listed for their utility/region in table 5.12 (and, in Seqwater's case, when applied to levels exceeding the sum of those listed for Queensland utilities). Ideally, the utilities would treat WTP as more uncertain when the *sum* of the levels across bulk and retailer-distributor utilities exceed these thresholds.

Applying estimates of WTP for forest attributes (location and biodiversity) presents an even greater coordination challenge. These are amounts households are willing to pay *once*, if at least one forest is delivered, *regardless* of the number of forests or the size of the forests. If a distributor-retailer and a bulk supplier were both planning to deliver a new forest, a reasonable approach would be to halve (or apportion based on forest size) the WTP estimates for forecast location and biodiversity in the CBAs being conducted by the respective utilities.

Application by multiple utilities within a region

The Victorian water sector was treated as two groups of utilities for the purpose of this study — metropolitan, which included Melbourne Water and the three metropolitan water retailers, and regional, which included the other 14 government-owned water businesses in Victoria.

We recommend that each utility measure WTP for emissions reduced or offset in terms of $/tCO2e or dollars per percentage point of their own emissions, and aggregate WTP only over their own customers and not over customers from any other utility. This approach will avoid double counting of benefits across utilities. WTP was not measured for percentage reductions in each utility's own emissions. Rather the choice options

reported an equivalent number of cars taken off the road based on reductions across all of metro/regional Victoria. However, analysis of the survey results across utilities of various sizes indicated that respondents focused on percentage reductions and not on the equivalent number of cars taken off the road. The results did not provide any evidence to suggest that per-household WTP for emissions reductions achieved by their own utility acting unilaterally would differ from per-household WTP for similar percentage reductions achieved by all utilities across the state.

Each utility can apply the estimates of WTP for area of new forest and employment of ATSI people seeking job opportunities, subject to the limits on levels discussed in the section above. We have no reason to doubt the 'per hectare' and 'per employee' WTP estimates are applicable to forest areas or employment levels significantly lower than the minimum level used in the survey, since testing of alternative functional forms did not find evidence of a non-linear relationship with WTP.

The smallest levels for forest area used in the survey were 39 000 hectares for respondents in metropolitan Victoria and 20 000 hectares for respondents in regional Victoria. Individual regional utilities are likely to be considering much smaller forests. In such cases, it would be prudent to conduct sensitivity analysis with WTP estimates for location and biodiversity multiplied by the size of the proposed forest as a proportion of 20 000 hectares.

Comparing projects of the same method

It was possible to include only a selection of co-benefits and offset project attributes in the choice tasks. For example, new forests were described as native and described in terms of area, location, and whether they support significant biodiversity. Other features, such as the natural beauty of the forest, were not described. It is reasonable to assume respondents held these undescribed attributes constant across options and it's important to bear this assumption in mind when comparing projects of the same method.

Consider a comparison between two forests that deliver the same emissions sequestration — a 1000 Ha forest in a high-rainfall area and a 2000 Ha forest in a low-rainfall area. At face value, the choice analysis in this study would suggest greater benefits from the forest in the low-rainfall area due to the value placed by customers on forest size. However, the value of forest size needs to be interpreted as the value of generating a large forest instead of generating a small forest *that is otherwise identical*. The two forests in this comparison may not be otherwise identical. The forest in the high-rainfall area may be more scenic. The two forests may be different types, such as eucalypt and acacia. A choice between these options would need to be informed by evidence from outside this study, such as benefit transfer from forest valuation studies and/or engagement with customers on offset project options.

Utilities adopting an approach that involves searching the market for offset products with the largest co-benefits per tonne of CO2e reduced or avoided will need to be particularly conscious of this issue.

Hypothetical bias

It is important that CBA practitioners consider whether the stated preference studies they use to inform inputs may be biased. Stated preference studies are subject to a range of biases, some of which are also present in real market decision making. Practitioners particularly worry about over-estimation of WTP due to hypothetical bias; that is, the difference between choices made in survey and real-market settings. For several reasons, we do not think WTP has been over-estimated in this study.

First, preference surveys about utility service offerings have a less severe problem with hypothetical bias than surveys in some other contexts, since utilities can credibly claim to be able to make investment decisions and coerce payment through water bills.

Second, our robustness checks indicated that retaining in the sample respondents who did not believe the survey would affect real outcomes decreased, rather than increased, estimates of WTP.

Third, we have taken a conservative approach in several respects. In the examples that follow, we exclude from welfare estimates the average 'label effect' of approximately $38 per year for 10 years. There would be a risk of overestimating WTP if the label effect were included, since any 'yea saying', 'warm glow' and other biases present in the responses would have a significant impact on the label effect. However, by excluding it, it is possible we are omitting a component relating to genuine WTP for the scenario. Further, the highest income category was slightly under-sampled in this study. Since there is a significant, positive relationship between income and WTP, this feature of the sample will tend to result in lower estimates of average WTP.

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A Discussion guide

Introduction (2 minutes)

Introduce yourself; welcome; explain the project and process:

- Work for an independent research company called WR
- Doing this project for Water Services Association of Australia (WSAA), an organisation that represents water utilities from across Australia
- The purpose of the group discussion is to gain feedback on how your water utility manages its carbon emissions.
- Your views tonight are going to help water utilities with their planning and future strategies.
- Our role is to report back to WSAA on your feedback. However, your responses are confidential and anonymous. We report in an overall basis only and do not mention specific names, etc.
- Explain that this focus group will be used to design an online survey, which will ask people about specific options for reducing emissions.

Check ok to record the discussion – only for our purposes.

Warm up (3 mins)

Ask them to introduce themselves and which state and city/town they live in.

1. Water utilities and emissions (10 minutes)

TRY TO MOVE QUICKLY AND ENSURE DISCUSSION DOES NOT GET BOGGED DOWN IN THIS SECTION. THE PURPOSE IS TO UNDERSTAND THE MOTIVATION FOR RESPONSES TO LATER SECTIONS AND TO GAUGE THE LEVEL OF UNDERSTANDING.

Climate change

- There has been a lot of discussion in the papers regarding Climate Change, do think most people agree that climate change is happening and we should be doing something about it?
- If so, do you think there is enough evidence to say what's causing climate change?
- How important is climate change compared to other issues? e.g. immigration, ageing population

Emissions

- What does the term 'greenhouse gas emissions' mean to you?
- Do you think enough is being done to reduce emissions?

NOTE TO MODERATOR (FYI. DON'T DISCUSS UNLESS RAISED.): Some participants may be convinced human activity is causing climate change, but don't want to reduce emissions because Australia is too small to influence climate outcomes on its own. Other participants may recognise that reducing emissions influences international negotiations that do affect climate outcomes.

- Who do you think has the primary responsibility to reduce emissions? (e.g. national governments, individuals, businesses, environmental organisations, international organisations)

EXPLAIN TO GROUP MEMBERS:
Water utilities are large producers of greenhouse gas emissions and overall these emissions have been steadily rising. There are two main sources of greenhouse gas emissions from the water and sewerage services you use:

1. *Emissions from the generation of the electricity your water utility draws from the grid to treat and pump water to your home and pump and treat wastewater that comes from your home*
2. *Emissions from the process of treating the wastewater that comes from your home.*

NOTE TO MODERATOR*: An informed participant might raise that the wastewater emissions include methane and nitrous oxide, which have much greater global warming potential than carbon dioxide.* If so, ask respondents:

- There is a measure called carbon dioxide equivalent (CO2e), which takes account of the differences in global warming potential from the different gases. If your utility was consulting on different options for reducing emissions, would you want to know separate amounts of each type of greenhouse gas emissions (carbon dioxide, methane, and nitrous oxide), or would you only want to know CO2e?

- Do you see any benefits and/or downsides from water utilities reducing emissions?

2. Targets (15 minutes)

- Does the Australian government and/or your state government have a target for reducing greenhouse gas emissions to zero? Do you know what it is?
- Do you support these targets?
- Are you aware of any businesses that have committed to reducing emissions? What are they doing? How do you feel about this?

Show slides 1-2: Targets

- How much of this information is new to you?
- Does it change your views at all? If so, how?

- Reducing emissions is not always expensive, but reducing them to zero is likely to involve some additional cost. Roughly, how much extra would you be willing to pay every year on your water bill to ensure zero emissions from water and wastewater services?
    - PROMPT IF NEEDED: $10? $50? $100?

3. Ways of reducing emissions (25 minutes)

EXPLAIN TO GROUP MEMBERS:
Over time, water utilities can reduce the emissions from their electricity usage by investing in more energy-efficient technology and using electricity from renewable sources, like solar, wind, and waste.

Water utilities can also compensate for their emissions by doing things that remove emissions from the atmosphere or investing in projects that would avoid, reduce, or capture emissions generated by others. This is called carbon offsetting.

> *NOTE TO MODERATOR: Water utilities cannot reduce to zero the emissions that come from wastewater treatment processes. Some, but not all, of the emissions can be captured using current technology. So, offsets are likely to be required to achieve net zero emissions.*

- Have you heard of carbon offsets?
- Can you think of any examples? What do you think about them?
- How would you feel about your water utility investing in carbon offset projects?

Show slides 4-10: Ways of reducing emissions

- How would you feel about your water utility investing in these sorts of projects?
- Which examples of projects are most appealing to you? Why?
- Do you think paying someone else to reduce their emissions is just as good an outcome as reducing your own emissions by the same amount? If not, why not?
- Do you think emitting and capturing carbon is just as good an outcome as not emitting carbon in the first place? If not, why not?
- When your water utility is consulting on options for its emission reduction strategy, would you want to know about only net emissions (<u>after</u> accounting for offsets), or would you want to know the breakdown of gross emissions and offsets?

Co-benefits

- What additional benefits do you see these projects having aside from slowing climate change?
- Does it matter to you how close the projects are to where you live? e.g. in your region, or in your state, or in Australia, or overseas?

Accreditation

- Do you think accreditation is important?
- Do you have a view on which types of accreditations are most reliable?
- If not, what information would help you judge which accreditation is best?
- How confident would you be that your water utility would choose a credible, accredited offset scheme?

4. Other benefits from carbon offset projects (15 minutes)

As we discussed ways to reduce carbon emissions through the carbon offset projects, there were some other benefits mentioned in addition to slowing climate change. I will

now like you to rate how important each specific benefit is to you on a scale from 1 (not important) to 5 (very important)?

LAUNCH POLL

Q. How important to you are the following benefits of carbon offset projects?
(Very important 5, quite important 4, neither important nor unimportant 3, quite unimportant 2, Not important at all 1)

- Increased area of native habitat from new/restored forests
- Increased biodiversity from new/restored forests
- Increased opportunities for tourism and recreation from new/restored forests
- Improved income and/or health outcomes for rural or socially-disadvantaged communities (e.g. by employing indigenous Australians, or investing in cleaner cook stoves in developing countries)
- Improved air quality and/or odour at the project location (e.g. reduced smog from landfill by capturing gas, or closing a coal power station)
- Protection of indigenous cultural sites and transmission of traditional knowledge (through fire management projects managed by Traditional Owners)

5. Describing benefits (10 minutes)

There are several ways they could describe some of those benefits to help them make sense to people. I am going to show you some alternative descriptions and I would like you to select which option for describing the benefit makes the most sense to you? Can you think of a better way of describing the benefit?

LAUNCH POLL: If preference is split, ask why some people preferred that description they chose over the others.

Q. Which of the following descriptions to describe …. INSERT….. makes the most sense to you?

A. Reduction in emissions:
- Tonnes of carbon dioxide equivalent (tCO2e)
- Percentage of your water utility's emissions
- Equivalent number of cars taken off the road

B. Baseline for reduction in emissions:
- Reduction by 2030 relative to 2020 levels
- Reduction by 2030 relative to 2030 levels without new actions

> *NOTE TO MODERATOR: 2030 levels without new actions may differ from current levels due to increasing energy demands from water supply (e.g. desalination) and increasing renewable energy in the grid.*

C. Time period for reduction in emissions:
- Emission reduction by 2030

- Emission reduction by 2040
- Year in which net zero emissions achieved
- Emission reduction by 2030 and year in which net zero emissions achieved

D. Increased native vegetation:
- Hectares
- Percentage of existing native vegetation on farmland
- Number of rugby fields

E. Increased biodiversity
- New forests supporting significant biodiversity (e.g. in hectares, percentage of existing native vegetation on farmland or number of rugby fields)
- Percentage of new forests supporting significant biodiversity
- Number of species in new forests

F. Increased opportunities for tourism and recreation:
- Whether access for recreation is allowed at new/restored forests (yes/no)
- Number of new/restored forests with scenic walking tracks
- Number of new/restored forests with guided tours

G. Better outcomes for socially disadvantaged communities:
- Percentage of projects employing indigenous Australians
- Percentage of projects located in remote areas
- Number of indigenous Australians employed who would otherwise have been unemployed
- Number of people employed who would otherwise have been unemployed
- Number of people experiencing significantly better health outcomes

Thank, give incentive and close

B Pre-testing interview questions

- How long did the questionnaire take to complete?
- Were there any parts of the survey that were confusing or unclear?
- Was the reading material too long or too brief?
- Which questions other than the choice questions did you need to stop and think most about?
- Were the choice questions difficult to answer?
- How did you feel towards the end of the eight questions? e.g. were you bored of the repetition? Without an interviewer present, would you have dropped out of the survey?
- How did you go about answering the choice questions? e.g. which attributes did you look at first?
- What did you think about Package A? Did it align with your impression of how much emissions should be reduced without any bill increase?
- Did you think about Australia's net zero 2050 target when answering the questions? If so, how did this affect your answers?
- Did any of the options look strange to you? Which ones, and why?
- In the choice questions, did you find you were picking the 'no change' option a lot? If so, why?
- In the choice questions, did you find you were picking the option with the biggest emission reduction in every question?
- In the choice questions, did you believe that your water bill would be affected under the different options?
- Did the questionnaire seem neutral and factual about the topic?

C Questionnaire

Welcome

Thank you for participating in this survey, which is being run by Pureprofile and the Centre for International Economics on behalf of the Water Services Association of Australia.

This survey is about how water utilities manage carbon emissions. Your input is very important and will help water utilities with their planning and future strategies.

This questionnaire will take around 15 minutes to complete.

We wish to reassure you that this is genuine market research and, as always, your individual survey responses will remain confidential and anonymous at all times.

In the unlikely event of any technical difficulties please click on the technical support e-mail link.

Please Keep In Mind

Do not use your Back or Forward browser buttons while you are taking this survey. Once you answer a question, you will not be able to go back and change your answer.

Before we go through to the main study, we would like to ask you some questions to make sure we are interviewing a good cross section of people.

1. What type of device are you using to answer this survey? **AUTOMATIC NEXT QUESTION**

   (WE CAN REMOVE THIS QUESTION TOWARDS THE END OF FIELDWORK IF TARGET COMPLETIONS ARE PROVING DIFFICULT TO MEET)

   a. Desktop computer
   b. Laptop computer
   c. Standard-sized tablet (larger than 9-inch screen)
   d. Mini tablet (screen 9-inch or smaller) **RAISE ERROR**
   e. Mobile phone **RAISE ERROR**

ERROR PAGE

The device you are using is too small for this survey. Please resume the survey on a desktop computer, laptop computer or standard-sized tablet.

2. Do you or a member of your household work in the market research industry or for a water utility? **AUTOMATIC NEXT QUESTION**
    a. Yes **TERMINATE**
    b. No
3. What is the postcode of your home address? **TERMINATE IF OUT OF AREA. CHECK QUOTAS.**

    SET HQREGION BASED ON POSTCODE
4. Are you… **AUTOMATIC NEXT QUESTION.**
    a. Male
    b. Female
    c. Other
    d. Prefer not to say
5. What is your age? **AUTOMATIC NEXT QUESTION.**
    a. Less than 18 years **TERMINATE**
    b. 18-29 years
    c. 30-39 years
    d. 40-49 years
    e. 50-59 years
    f. 60-69 years
    g. 70-79 years
    h. 80 years or over
6. Is your home serviced by… **AUTOMATIC NEXT QUESTION**
    a. Mains water and a wastewater system
    b. Mains water, but not a wastewater system
    c. A wastewater system, but not mains water
    d. Neither mains water nor a wastewater system **TERMINATE**

7. How do you pay for water and wastewater services? **AUTOMATIC NEXT QUESTION**

    a. I pay bills to my local water utility/council

    b. I pay bills to my local water utility/council and to my body corporate

    c. My landlord/household head gets bills from my local water utility/council and charges the full amount to me as a specific charge separate from rent

    d. My landlord/household head gets bills from my local water utility/council and charges part of the bill to me as a specific charge separate from rent

    e. My landlord/household head charges me an amount for water and wastewater, separate from rent, but I don't know how that amount relates to the bill they get from my local water utility/council

    f. Water and wastewater is covered by my rent/board **TERMINATE**

    g. I don't pay anything for water and wastewater services **TERMINATE**

TERMINATE PAGE

Thank you for your patience in answering these questions. Unfortunately, we do not need you to participate in our research this time, but we sincerely appreciate your time and assistance today.

This questionnaire is about carbon emissions from the water and wastewater services you use.

It has four main parts:

- questions about your views on climate change issues
- information about carbon emissions and options for reducing them
- questions about options for reducing carbon emissions
- questions about you

8. Which of the following best describes your views on climate change? **AUTOMATIC NEXT QUESTION**

    a. Climate change is occurring mostly because of human activity, such as burning fossil fuels

b. Climate change is occurring, but I don't know what's causing it

c. Climate change is not occurring

9. There has been a lot of discussion in the media recently about setting a target of net-zero greenhouse gas emissions (carbon emissions) by 2050. What is your view on this target? **AUTOMATIC NEXT QUESTION**

   a. We should get to net-zero before 2050

   b. We should get to net-zero after 2050

   c. The target is about right

   d. We should not have a target

   e. Uncertain/Don't know

10. There are other sources of greenhouse gas emissions aside from burning fossil fuels, such as livestock, decomposing waste, and bushfires. How familiar are you with the sources of emissions on a scale from 1 (not at all familiar) to 5 (very familiar)? **AUTOMATIC NEXT QUESTION**

    1_____2_____3_____4_____5

11. Which of the following best describes your view on carbon offsetting? **AUTOMATIC NEXT QUESTION**

    a. I am very supportive of carbon offsetting

    b. I am supportive, but have concerns about carbon offsetting

    c. I don't know enough about carbon offsetting to have a view

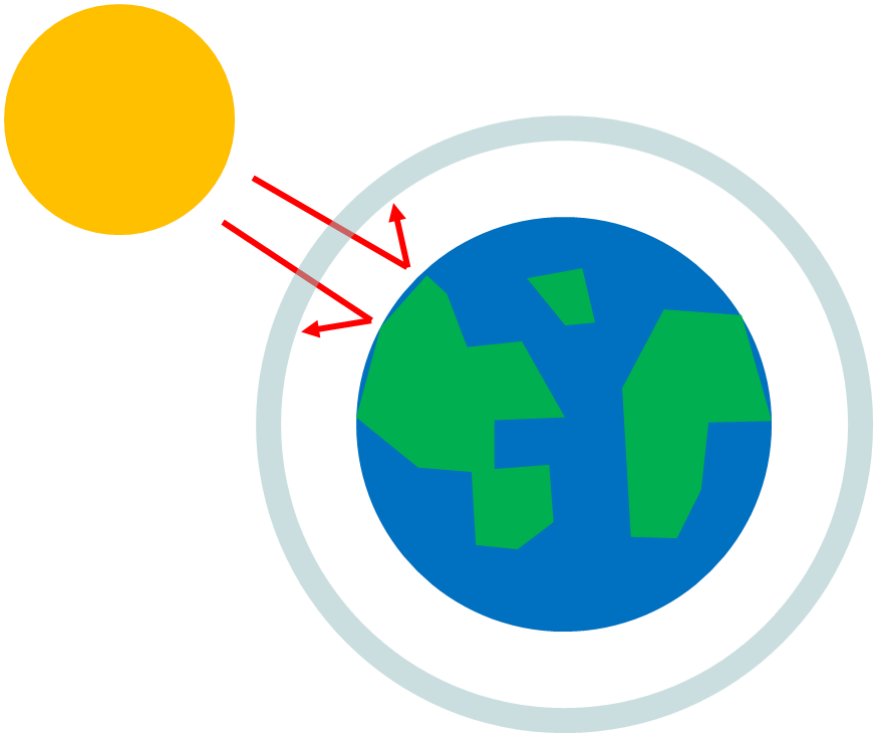
    d. I do not support carbon offsetting

12. **IF b or d ABOVE** In one sentence, what are your main concerns about carbon offsetting?

    _____

Greenhouse gas emissions are gases that trap heat in the Earth's atmosphere. They are a major cause of global warming.

Global warming is expected to make extreme weather events such as land and marine heatwaves to increase in frequency, intensity, and duration. Some parts of Australia will be more likely to experience drought, bushfires, coastal inundation, and destructive storms.



The Intergovernmental Panel on Climate Change (IPCC) has warned that global emissions must drop to net-zero by **2050** to limit global warming to **2˚C**.

We reach net zero emissions when the amount of emissions we add to the atmosphere each year is no more than the amount taken out of the atmosphere each year by plants and numerous microscopic organisms in the ocean.

If global emissions are reduced to net zero by **2035**, global warming may be limited to **1.5˚C**.

If you want further information, click here.

PROVIDE THE FOLLOWING IN A POP-UP WINDOW FROM LINK ABOVE

The Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment Report states that global temperatures are set to exceed 1.5˚C of warming earlier than previously projected in the 2030s and the world is extremely likely to exceed 2˚C warming during the 21st century if greenhouse gas emissions do not start declining significantly before 2050.

With further warming, both land and marine heatwave events will continue to increase in frequency, duration, and intensity. Marine heatwaves contribute to coral bleaching in Pacific, marine productivity and location of fish populations which are integral to local economies.

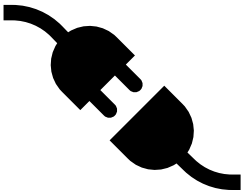
IPCC notes that the land and ocean CO2 sinks' ability to remove emissions has been reduced since over the past six decades they have removed more than half of all human emitted CO2. In 2019, atmospheric CO2 concentrations reached its highest level in 2 million years at 210 ppm.

The report also suggests that emission reduction needs to be assisted by CO2 removal or sequestration to limit global warming to 1.5˚C or 2˚C.

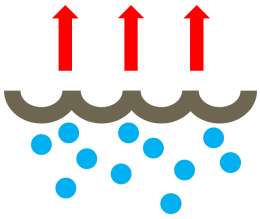
Under the Paris Agreement, Australia committed to reducing its domestic greenhouse gas emissions by 26-28% below 2005 levels by 2030.

Water and wastewater services produce less than 5% of Australia's greenhouse gas emissions, but these emissions have been increasing over time.

There are two main sources of these emissions:



Emissions from the coal- and gas-fired power stations that generate the electricity your water utility draws from the grid. Water utilities use electricity to run the pumps and treatment plants needed to deliver safe drinking water and clean up the wastewater that comes from your home and local businesses. Electricity is increasingly needed for desalinating and recycling water to make sure there is enough water during droughts.



Emissions from the process of treating the wastewater that comes from your home and local businesses. During the treatment process, friendly bacteria work to break down organic material and remove unwanted nutrients. As they do this, greenhouse gases are produced.

If you want further information, click here.

PROVIDE THE FOLLOWING IN A POP-UP WINDOW FROM LINK ABOVE

Water supply chain elements including drinking water production, wastewater treatment, sludge treatment and discharge all contribute to greenhouse gas emissions.

For water utilities, wastewater collection and treatment are the main sources of diffuse emissions, mainly associated with nitrous oxide and methane emissions. These direct emissions are called fugitive gases because they escape from the collection and treatment systems.

To prevent nutrient enrichment of receiving waters, wastewater containing nitrogen is treated resulting in the release of nitrous oxide (N2O) into the atmosphere. N2O's global warming potential is 300 times that of carbon dioxide in equivalent terms.

Methane (CH4) emissions occur when wastewater containing organics (converted under anaerobic conditions) are released into the atmosphere. Sewer systems and dams are other sources of fugitive methane emissions. CH4 global warming potential is 34 times that of carbon dioxide in equivalent terms.

The first type of emissions, from electricity, can be reduced by:

Improving energy efficiency

Water utilities can avoid emissions by reducing their energy use.

This could include measures such as:

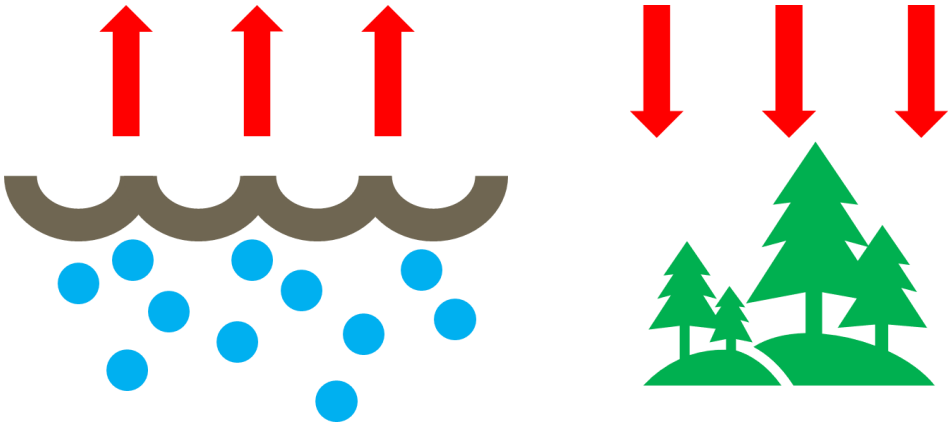
- upgrading equipment at water and wastewater treatment plants
- lighting controls through timers and occupancy sensors
- restructuring buildings to make them more energy efficient.

Generating renewable energy

Water utilities can generate the electricity they need using cleaner sources, such as wind turbines, solar panels or gas captured from wastewater treatment. These avoid emissions from the coal- and gas-fired power stations that generate electricity for the grid.

Reducing the second type of emissions (emissions from the process of treating wastewater) is much more difficult. With current technology, some of the emissions can be captured, but not all of them.

To compensate for these emissions, water utilities can invest in projects that reduce or capture emissions generated elsewhere. This is called **carbon offsetting**.



There are many different types of carbon offsetting. The Federal Government's Emissions Reduction Fund currently recognises 26 different project types to create carbon offsets.

Here is an example of two different projects that produce carbon offsets:

Planting trees

Your water utility could restore or plant new forests.

This would take emissions out of the atmosphere by storing carbon in trees and other vegetation.

Depending on the type of trees and their location, these projects may have other benefits, such as increasing biodiversity and creating opportunities for tourism and recreation.

One of the benefits from planting new forests is that they provide an additional option for recreation, such as walking, hiking, mountain biking, and horse riding. How important is this benefit to you on a scale from 1 (=Not important) to 5 (=Very important)?

1_____2_____3_____4_____5

Fire Management

Another example of a type of carbon offset project is fire management. For example, in the savannas of Northern Australia, indigenous traditional knowledge can be used to undertake controlled burning in the early dry season. This helps avoid emissions from large, intense bushfires in the late dry season.

These projects may have other benefits, such as:

- providing employment opportunities to Traditional Owners
- helping to protect Indigenous cultural sites
- transmission of traditional knowledge.

There may be several benefits from employing Aboriginal and Torres Strait Islander (ATSI) people who are seeking job opportunities. Please move the slider below to indicate the degree to which your willingness to support these projects is:

Mainly due to seeing improved outcomes for ATSI communities through job opportunities	Due to a mix of both benefits	Mainly due to preserving traditional knowledge and cultural heritage sites through offset projects

---

or

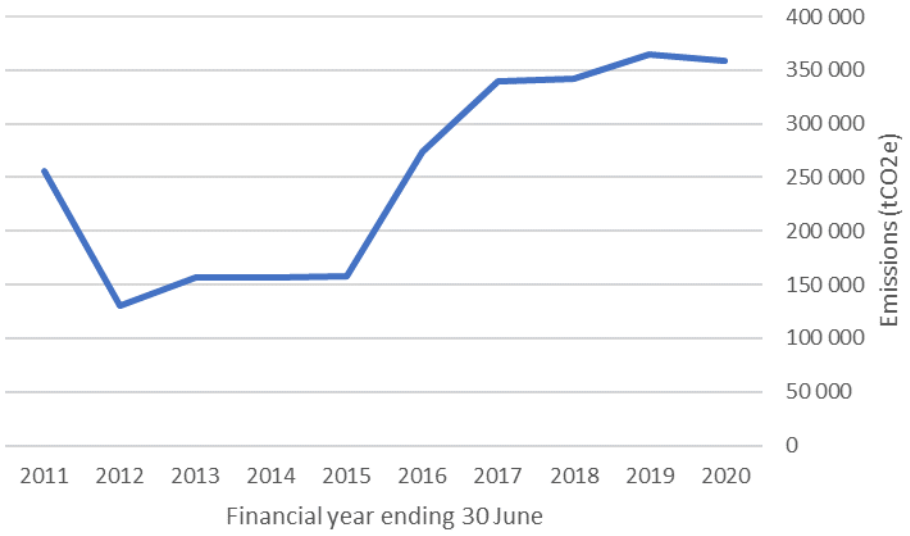
○ I do not support these projects

Consider a situation where your water utility is proposing to invest in carbon offset projects that are:

- accredited by the Australian Government Clean Energy Regulator
- selected in close consultation with the community
- reported on annually, so the community can see how any extra payments on their water bill are being used.

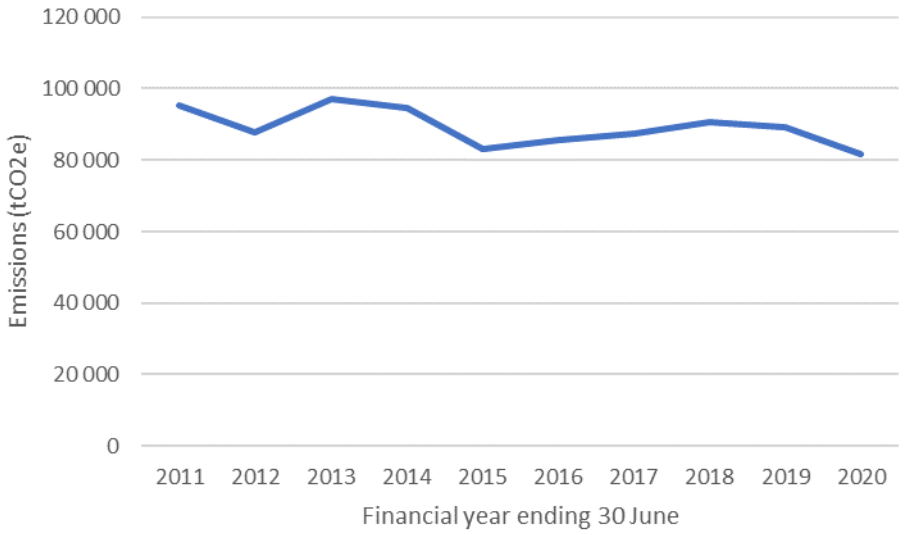
13. How would you feel about this proposal?
    a. I would be supportive of the proposal, depending on the cost
    b. I would not support the proposal
    c. Don't know
    d. Other _____

IF HQREGION = SYDNEY WATER, "Over the past 10 years, emissions from water and wastewater services in Greater Sydney, the Illawarra and the Blue Mountains have not decreased."



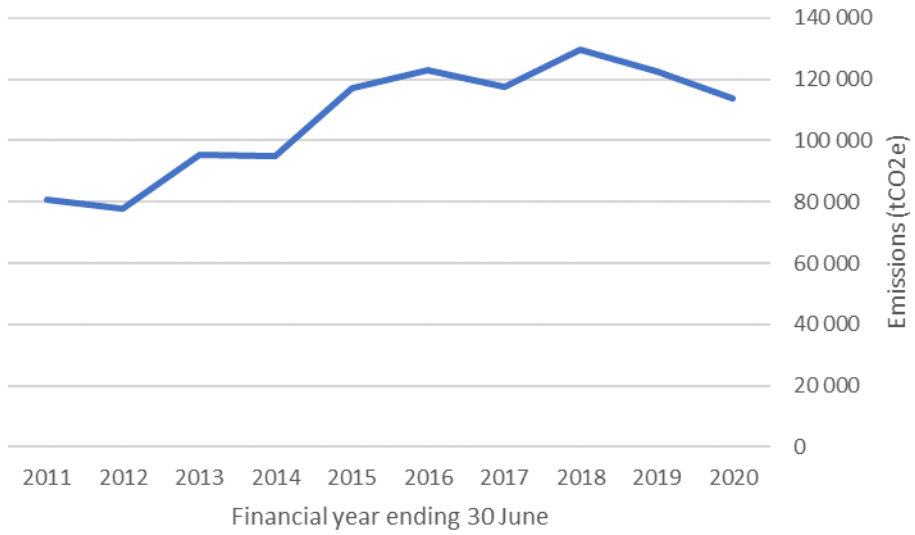
Note: tCO2-e = Tonnes of carbon dioxide equivalent

IF HQREGION = HUNTER WATER, "Over the past 10 years, emissions from water and wastewater services in the Lower Hunter region have decreased by around 15%."



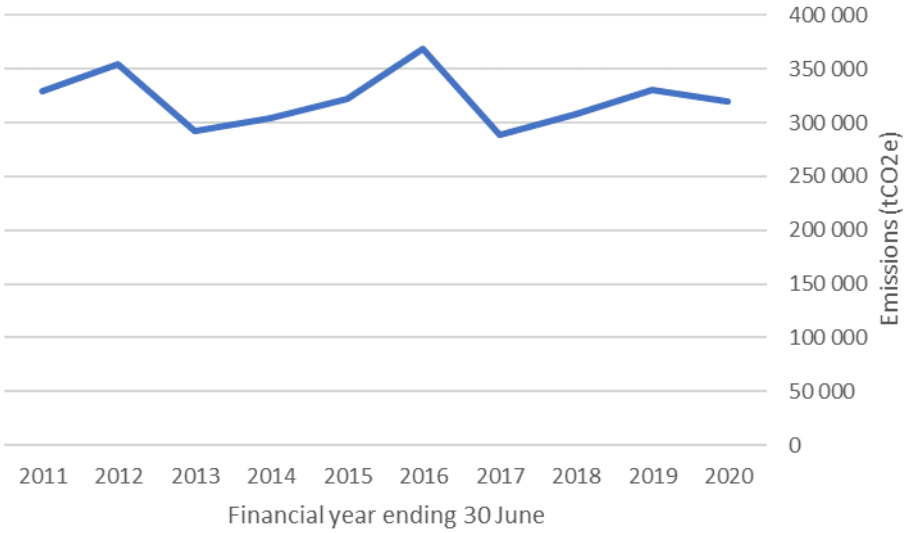
Note: tCO2-e = Tonnes of carbon dioxide equivalent

IF HQREGION = VICTORIA METRO, "Over the past 10 years, emissions from water and wastewater retailers in Greater Melbourne have not decreased."



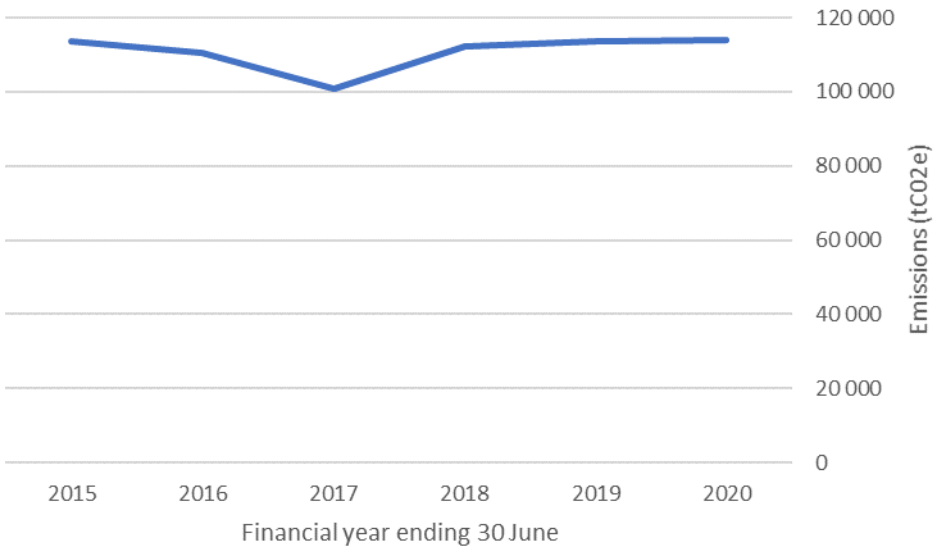
Note: tCO2-e = Tonnes of carbon dioxide equivalent

IF HQREGION = VICTORIA REGIONAL, "Over the past 10 years, emissions from water and wastewater services in regional Victoria have not significantly decreased."



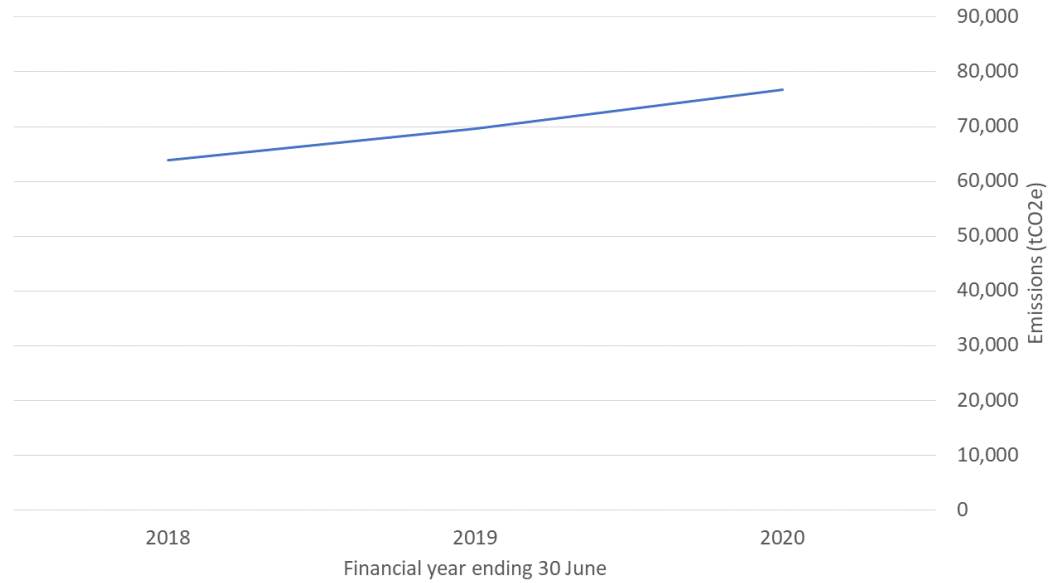
Note: tCO2-e = Tonnes of carbon dioxide equivalent

IF HQREGION = URBAN UTILITIES, "Over the past 5 years, emissions from water and wastewater services in Brisbane have not decreased."



Note: tCO2-e = Tonnes of carbon dioxide equivalent

IF HQREGION = UNITYWATER, "Over the past 3 years, emissions from water and wastewater services in the Sunshine Coast have not decreased."



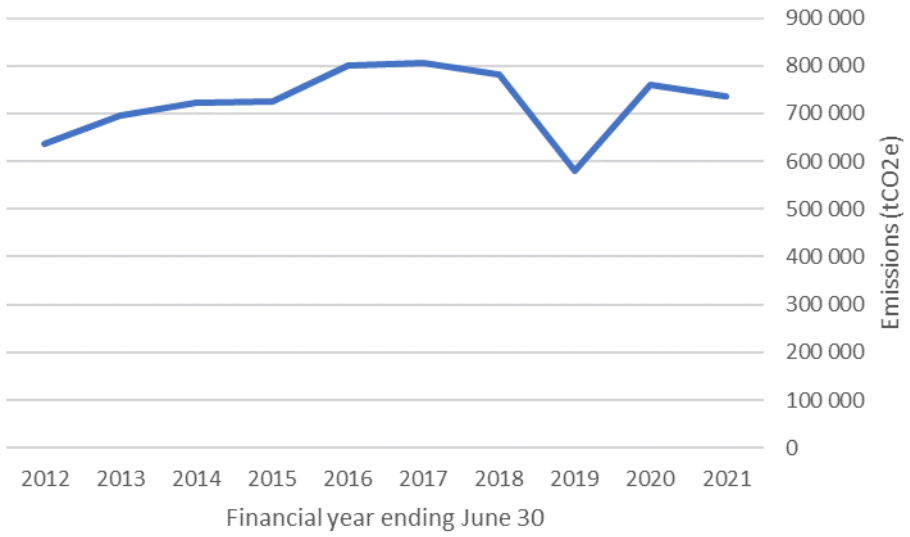
Note: tCO2-e = Tonnes of carbon dioxide equivalent

IF HQREGION = GOLD COAST, "Over the past 10 years, emissions from water and wastewater services in the Gold Coast have not decreased."

NO CHART

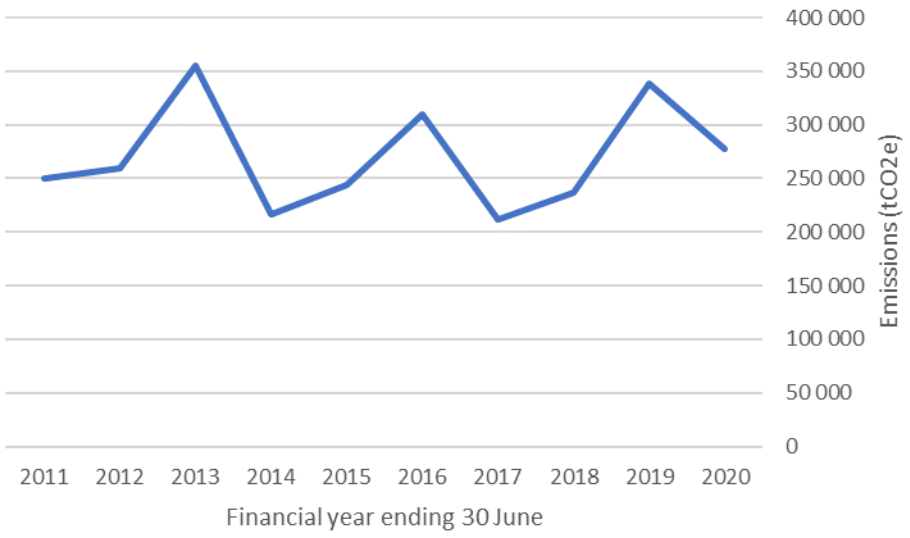
IF HQREGION = LOGAN/REDLAND, SKIP THIS PAGE

IF HQREGION = WATER CORP, "Over the past 10 years, emissions from water and wastewater services in Western Australia have not decreased."



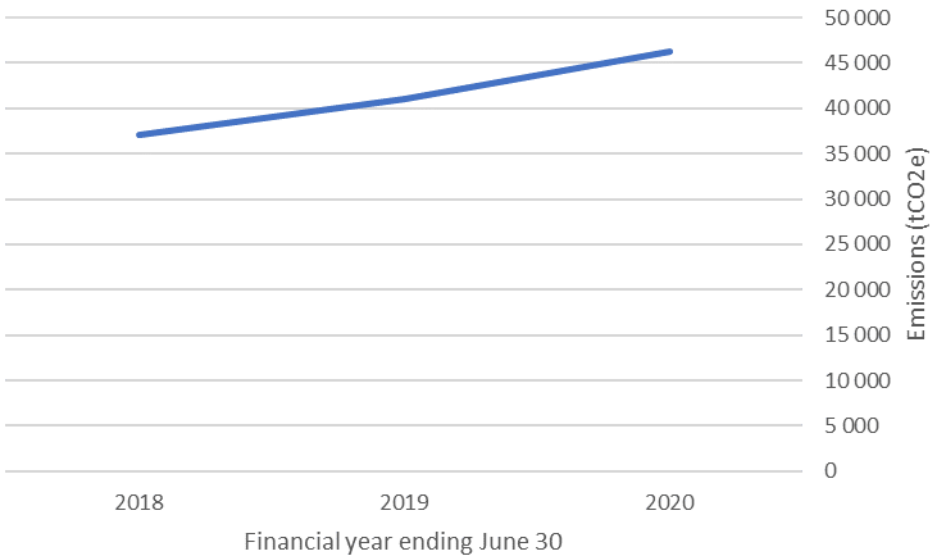
Note: tCO2-e = Tonnes of carbon dioxide equivalent

IF HQREGION = SA WATER, "Over the past 10 years, emissions from water and wastewater services in South Australia have not decreased."



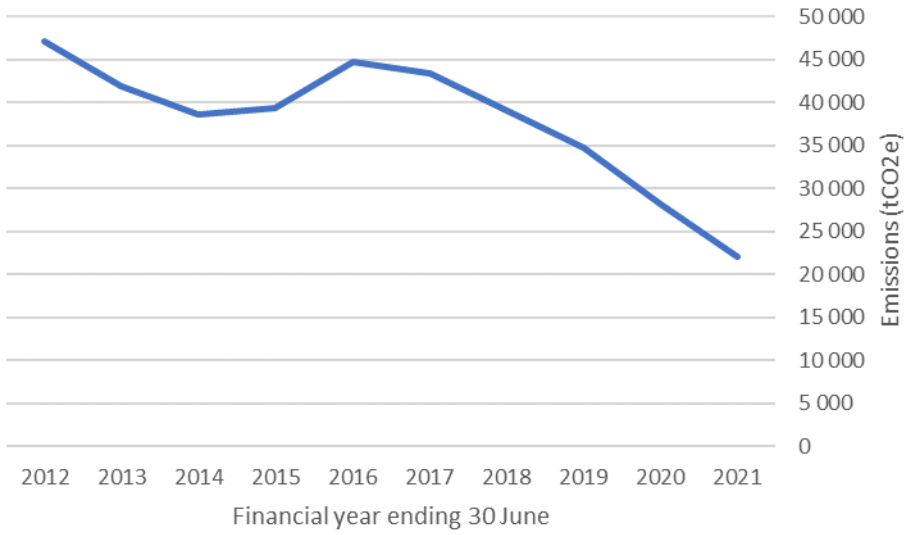
Note: tCO2-e = Tonnes of carbon dioxide equivalent

IF HQREGION = TASWATER, "Over the past 3 years, emissions from water and wastewater services in Tasmania have not decreased."



Note: tCO2-e = Tonnes of carbon dioxide equivalent

IF HQREGION = ICON WATER, "Over the past 10 years, emissions from water and wastewater services in the Australian Capital Territory have roughly halved."



Note: tCO2-e = Tonnes of carbon dioxide equivalent

SET TEXT [AREA]:

IF HQREGION = SYDNEY WATER, "Greater Sydney, the Illawarra and the Blue Mountains"

IF HQREGION = HUNTER WATER, "the Lower Hunter region"

IF HQREGION = VICTORIA METRO, "Greater Melbourne"

IF HQREGION = VICTORIA REGIONAL, "regional Victoria"

IF HQREGION = URBAN UTILITIES, "Brisbane"

IF HQREGION = UNITYWATER, "the Sunshine Coast"

IF HQREGION = GOLD COAST, "the Gold Coast"

IF HQREGION = LOGAN/REDLAND, "the Logan and Redland local government areas"

IF HQREGION = WATER CORP, "Western Australia"

IF HQREGION = SA WATER, "South Australia"

IF HQREGION = TASWATER, "Tasmania"

IF HQREGION = ICON WATER, "the Australian Capital Territory"

Over the next 10 years, we expect emissions from water and wastewater services in **[AREA]** could be reduced by

IF HQREGION = SYDNEY WATER, "20%"

IF HQREGION = HUNTER WATER, "a further 20%"

IF HQREGION = VICTORIA METRO, "10%"

IF HQREGION = VICTORIA REGIONAL, "15%"

IF HQREGION = URBAN UTILITIES, "20%"

IF HQREGION = UNITYWATER, "20%"

IF HQREGION = GOLD COAST, "25%"

IF HQREGION = LOGAN/REDLAND, "20%"

IF HQREGION = WATER CORP, "20%"

IF HQREGION = SA WATER, "15%"

IF HQREGION = TASWATER, "10%"

IF HQREGION = ICON WATER, "a further 5%"

(relative to current levels) without needing to increase water bills. This accounts for increased use of renewable energy in the grid. It also accounts for increasing energy needs in the water sector over time.

Bigger reductions are possible, if water companies invest in more renewable energy, more energy efficient technologies, or carbon offsets. These reductions would come at an extra cost that would be paid in water bills by you and all households and businesses in **[AREA]**.

You will now be asked 9 questions about emission reduction options.

Each question has 3 packages. Each package is described by the cost to you, the reduction in emissions from water and wastewater services in **[AREA]**, and the emissions that are offset. Some packages include new native forests and/or employment of Aboriginal and Torres Strait Islander (ATSI) people.

You will be asked to consider all of these features and choose your preferred package – on behalf of your household – by clicking one box in the bottom row.

The information in the question will be positioned as shown below.

Package A	Package B	Package C
Cost	Cost	Cost
Emissions reduction	Emissions reduction	Emissions reduction
Features of any new forests	Features of any new forests	Features of any new forests
Employment of ATSI people	Employment of ATSI people	Employment of ATSI people
Select package	Select package	Select package

An example of what the questions will look like is provided below.

The package on the left-hand side – Package A – involves the reduction in emissions that your water utility can achieve without needing to increase bills.

The other two packages involve extra reductions in emissions at a specified cost to you over the next 10 years. For context, the average water and wastewater bill for a household in **[AREA]** is roughly

IF HQREGION = SYDNEY WATER, "$1100"

IF HQREGION = HUNTER WATER, "$1200"

IF HQREGION = VICTORIA METRO, "$1000"

IF HQREGION = VICTORIA REGIONAL, "$1100"

IF HQREGION = URBAN UTILITIES, "$1400"

IF HQREGION = UNITYWATER, "$1500"

IF HQREGION = GOLD COAST, "$1700"

IF HQREGION = LOGAN/REDLAND, "$1600"

IF HQREGION = WATER CORP, "$1600"

IF HQREGION = SA WATER, "$1300"

IF HQREGION = TASWATER, "$1200"

IF HQREGION = ICON WATER, "$1200"

per year.

The emission reductions apply to water and wastewater services across **[AREA]**, not only the services used by your own household. Please assume the reductions would happen smoothly between now and 2031.

INSERT RELEVANT CHOICE EXAMPLE FOR HQREGION (SEE BELOW)

IF HQREGION = SYDNEY WATER:

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **20%** (the equivalent of 87 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **45%** (the equivalent of 191 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **45%** (the equivalent of 191 000 cars taken off the road)
	The offset projects deliver **22 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **do not support** significant biodiversity	
		The offset projects employ **25** ATSI people who were seeking job opportunities
Select package	**Select package**	**Select package**

IF HQREGION = HUNTER WATER:

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **0%** = Annual net emissions are reduced by **20%** (the equivalent of 20 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **25%** = Annual net emissions are reduced by **45%** (the equivalent of 44 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **25%** = Annual net emissions are reduced by **45%** (the equivalent of 44 000 cars taken off the road)
	The offset projects deliver **5 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **do not support** significant biodiversity	
		The offset projects employ **5** ATSI people who were seeking job opportunities
Select package	**Select package**	**Select package**

IF HQREGION = VICTORIA METRO:

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **10%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **10%** (the equivalent of 139 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **10%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **35%** (the equivalent of 305 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **10%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **35%** (the equivalent of 305 000 cars taken off the road)
	The offset projects deliver **39 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **do not support** significant biodiversity	
		The offset projects employ **40** ATSI people who were seeking job opportunities
Select package	**Select package**	**Select package**

IF HQREGION = VICTORIA REGIONAL:

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **15%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **15%** (the equivalent of 78 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **15%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **40%** (the equivalent of 172 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **15%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **40%** (the equivalent of 172 000 cars taken off the road)
	The offset projects deliver **20 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **do not support** significant biodiversity	
		The offset projects employ **20** ATSI people who were seeking job opportunities
Select package	**Select package**	**Select package**

IF HQREGION = URBAN UTILITIES:

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **20%** (the equivalent of 53 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **45%** (the equivalent of 117 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **45%** (the equivalent of 117 000 cars taken off the road)
	The offset projects deliver **13 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **do not support** significant biodiversity	
		The offset projects employ **15** ATSI people who were seeking job opportunities
Select package	**Select package**	**Select package**

IF HQREGION = UNITYWATER:

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **20%** (the equivalent of 29 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **45%** (the equivalent of 64 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **45%** (the equivalent of 64 000 cars taken off the road)
	The offset projects deliver **7 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **do not support** significant biodiversity	
		The offset projects employ **8** ATSI people who were seeking job opportunities
Select package	**Select package**	**Select package**

IF HQREGION = GOLD COAST:

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **25%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **25%** (the equivalent of 25 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **25%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **50%** (the equivalent of 54 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **25%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **50%** (the equivalent of 54 000 cars taken off the road)
	The offset projects deliver **6 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **do not support** significant biodiversity	
		The offset projects employ **6** ATSI people who were seeking job opportunities
Select package	**Select package**	**Select package**

IF HQREGION = LOGAN/REDLAND:

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **20%** (the equivalent of 14 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **45%** (the equivalent of 31 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **45%** (the equivalent of 31 000 cars taken off the road)
	The offset projects deliver **3 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **do not support** significant biodiversity	
		The offset projects employ **4** ATSI people who were seeking job opportunities
Select package	**Select package**	**Select package**

IF HQREGION = WATER CORP:

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **20%** (the equivalent of 179 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **45%** (the equivalent of 393 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **45%** (the equivalent of 393 000 cars taken off the road)
	The offset projects deliver **44 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **do not support** significant biodiversity	
		The offset projects employ **45** ATSI people who were seeking job opportunities
Select package	**Select package**	**Select package**

IF HQREGION = SA WATER:

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **15%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **15%** (the equivalent of 63 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **15%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **40%** (the equivalent of 138 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **15%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **40%** (the equivalent of 138 000 cars taken off the road)
	The offset projects deliver **16 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **do not support** significant biodiversity	
		The offset projects employ **20** ATSI people who were seeking job opportunities
Select package	**Select package**	**Select package**

IF HQREGION = TASWATER:

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **10%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **10%** (the equivalent of 14 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **10%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **35%** (the equivalent of 31 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **10%** **+** uses accredited projects to offset **25%** **=** Annual net emissions are reduced by **35%** (the equivalent of 31 000 cars taken off the road)
	The offset projects deliver **4 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **do not support** significant biodiversity	
		The offset projects employ **4** ATSI people who were seeking job opportunities
Select package	**Select package**	**Select package**

IF HQREGION = ICON WATER:

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **5%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **5%** (the equivalent of 4 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **5%** **+** uses accredited projects to offset **30%** **=** Annual net emissions are reduced by **35%** (the equivalent of 9 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **5%** **+** uses accredited projects to offset **30%** **=** Annual net emissions are reduced by **35%** (the equivalent of 9 000 cars taken off the road)
	The offset projects deliver **1 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **do not support** significant biodiversity	
		The offset projects employ **1** ATSI people who were seeking job opportunities
Select package	**Select package**	**Select package**

A few things to remember:

- The next nine questions look very similar. Once you select a package, it may not look like a new page, but the numbers describing 'Package B' and 'Package C' will have changed. Please, pay attention to these.
- Some of the combinations may look strange to you. That is because there are a range of emission reduction projects with differing costs and outcomes.
- The results of this survey will influence your water utility's emission reduction activities and your water bill, so please answer the questions as though you are really making the decision and committing to pay the proposed amounts.
- There may be things other than emission reduction you would prefer to spend your money on.

14. If these were the only options available, which package would you choose?
AUTOMATIC NEXT QUESTION

INSERT FILTERING QUESTION HERE. NOTE IT IS USED TO ASSIGN RESPONDENTS TO ONE OF TWO SETS OF COST LEVELS FOR THE SUBSEQUENT 8 CHOICE QUESTIONS. EXAMPLE FOR SYDNEY WATER PROVIDED BELOW.

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$10** on your water bill each year for the next 10 years	You pay an extra **$10** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **20%** (the equivalent of 87 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **30%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **30%** (the equivalent of 131 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **15%** **=** Annual net emissions are reduced by **35%** (the equivalent of 152 000 cars taken off the road)
Select package	**Select package**	**Select package**

15. If these were the only options available, which package would you choose?
AUTOMATIC NEXT QUESTION

THERE ARE 6 BLOCKS OF 8 QUESTIONS FOR EACH UTILITY/REGION. EACH RESPONDENT IS ALLOCATED ONE BLOCK OF QUESTIONS. EXAMPLES FOR SYDNEY WATER BLOCK 1, ASSUMING THE RESPONDENT ANSWERED A IN THE FILTERING QUESTION, ARE PROVIDED BELOW.

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$1** on your water bill each year for the next 10 years	You pay an extra **$3** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **20%** (the equivalent of 87 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **50%** **+** uses accredited projects to offset **0%** **=** Annual net emissions are reduced by **50%** (the equivalent of 218 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** **+** uses accredited projects to offset **50%** **=** Annual net emissions are reduced by **70%** (the equivalent of 305 000 cars taken off the road)
o	o	o

16. If these were the only options available, which package would you choose?
AUTOMATIC NEXT QUESTION

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$1** on your water bill each year for the next 10 years	You pay an extra **$1** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **0%** = Annual net emissions are reduced by **20%** (the equivalent of 87 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **50%** = Annual net emissions are reduced by **70%** (the equivalent of 305 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **50%** + uses accredited projects to offset **0%** = Annual net emissions are reduced by **50%** (the equivalent of 218 000 cars taken off the road)
o	o	o

17. If these were the only options available, which package would you choose?
AUTOMATIC NEXT QUESTION

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$3** on your water bill each year for the next 10 years	You pay an extra **$1** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **0%** = Annual net emissions are reduced by **20%** (the equivalent of 87 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **50%** = Annual net emissions are reduced by **70%** (the equivalent of 305 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **30%** + uses accredited projects to offset **15%** = Annual net emissions are reduced by **45%** (the equivalent of 196 000 cars taken off the road)
	The offset projects deliver **43 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **support** significant biodiversity	The offset projects deliver **22 000** hectares of new native forest The forests are located **in my State, but not in my region** The new forests **do not support** significant biodiversity
		The offset projects employ **45** ATSI people who were seeking job opportunities
o	o	o

18. If these were the only options available, which package would you choose?
AUTOMATIC NEXT QUESTION

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$10** on your water bill each year for the next 10 years	You pay an extra **$20** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **0%** = Annual net emissions are reduced by **20%** (the equivalent of 87 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **15%** = Annual net emissions are reduced by **35%** (the equivalent of 152 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **15%** = Annual net emissions are reduced by **35%** (the equivalent of 152 000 cars taken off the road)
		The offset projects deliver **43 000** hectares of new native forest The forests are located **in my State, but not in my region** The new forests **support** significant biodiversity
o	o	o

19. If these were the only options available, which package would you choose?
AUTOMATIC NEXT QUESTION

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$2** on your water bill each year for the next 10 years	You pay an extra **$5** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **0%** = Annual net emissions are reduced by **20%** (the equivalent of 87 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **30%** + uses accredited projects to offset **15%** = Annual net emissions are reduced by **45%** (the equivalent of 196 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **50%** + uses accredited projects to offset **50%** = Annual net emissions are reduced by **100%** (the equivalent of 435 000 cars taken off the road)
	The offset projects deliver **22 000** hectares of new native forest The forests are located **in my State, but not in my region** The new forests **support** significant biodiversity	The offset projects deliver **43 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **do not support** significant biodiversity
	The offset projects employ **45** ATSI people who were seeking job opportunities	The offset projects employ **45** ATSI people who were seeking job opportunities
o	o	o

20. If these were the only options available, which package would you choose?
AUTOMATIC NEXT QUESTION

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$10** on your water bill each year for the next 10 years	You pay an extra **$5** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **0%** = Annual net emissions are reduced by **20%** (the equivalent of 87 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **15%** = Annual net emissions are reduced by **35%** (the equivalent of 152 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **15%** = Annual net emissions are reduced by **35%** (the equivalent of 152 000 cars taken off the road)
	The offset projects deliver **43 000** hectares of new native forest The forests are located **in my State, but not in my region** The new forests **support** significant biodiversity	
o	o	o

21. If these were the only options available, which package would you choose?
AUTOMATIC NEXT QUESTION

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$3** on your water bill each year for the next 10 years	You pay an extra **$3** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **0%** = Annual net emissions are reduced by **20%** (the equivalent of 87 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **30%** + uses accredited projects to offset **50%** = Annual net emissions are reduced by **80%** (the equivalent of 348 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **50%** = Annual net emissions are reduced by **70%** (the equivalent of 305 000 cars taken off the road)
	The offset projects deliver **43 000** hectares of new native forest The forests are located **in my region** The new forests **do not support** significant biodiversity	The offset projects deliver **22 000** hectares of new native forest The forests are located **in my region** The new forests **support** significant biodiversity
	The offset projects employ **25** ATSI people who were seeking job opportunities	The offset projects employ **25** ATSI people who were seeking job opportunities
o	o	o

22. If these were the only options available, which package would you choose?
AUTOMATIC NEXT QUESTION

Package A	Package B	Package C
There is **no change** in your water bill each year for the next 10 years	You pay an extra **$1** on your water bill each year for the next 10 years	You pay an extra **$2** on your water bill each year for the next 10 years
By 2031 your water utility reduces its annual emissions by **20%** + uses accredited projects to offset **0%** = Annual net emissions are reduced by **20%** (the equivalent of 87 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **30%** + uses accredited projects to offset **50%** = Annual net emissions are reduced by **80%** (the equivalent of 348 000 cars taken off the road)	By 2031 your water utility reduces its annual emissions by **30%** + uses accredited projects to offset **15%** = Annual net emissions are reduced by **45%** (the equivalent of 196 000 cars taken off the road)
	The offset projects deliver **22 000** hectares of new native forest The forests are located **in my State, but not in my region** The new forests **do not support** significant biodiversity	The offset projects deliver **43 000** hectares of new native forest The forests are located **in Australia, but not in my state** The new forests **support** significant biodiversity
	The offset projects employ **25** ATSI people who were seeking job opportunities	The offset projects employ **45** ATSI people who were seeking job opportunities
o	o	o

23. How easy did you find answering the options questions on a scale from 1 (very difficult) to 10 (very easy)? AUTOMATIC NEXT QUESTION

1__2__3__4__5__6__7__8__9__10

24. Reading instructions carefully and paying attention are very important in this survey. If you are paying attention, please choose 'Moderately disagree' below.
AUTOMATIC NEXT QUESTION

a. Strongly agree
b. Moderately agree
c. Somewhat agree
d. Neither agree nor disagree
e. Somewhat disagree

f. Moderately disagree

g. Strongly disagree

h. Don't know

25. Did you believe that your water utility would be able to achieve any of the options presented? **AUTOMATIC NEXT QUESTION**

    a. Yes **SKIP TO Q27**

    b. No

    c. Don't know **SKIP TO Q27**

26. When you saw options that you did not believe your utility could achieve, how did you go about answering the question(s)? **AUTOMATIC NEXT QUESTION**

    a. I answered the question(s) as though I would be getting the emissions and bill impacts as described in the packages

    b. I answered the question(s) as though I would be getting different emissions and bill impacts to those described in the packages

Q27 IS ONLY FOR RESPONDENTS WHO CHOSE 'PACKAGE A' IN ALL 8 CHOICE QUESTIONS

27. Why did you select Package A in every option question? *Select all that apply.* **MULTIPLE SELECTION. ROTATE.**

    a. The outcomes in the other options would not benefit me

    b. The emission reductions in Package A are on track to achieve net zero by 2050

    c. I didn't have enough time to properly consider the options

    d. I didn't have enough information to be confident choosing the other options

    e. I'm concerned that my water utility will put up my bill without reducing emissions

    f. My water utility should achieve net zero emissions without increasing my bill

    g. I can't afford any bill increase

    h. There are other things I would prefer to spend my money on

    i. Other _____

28. To what degree do you expect that the results of this survey will affect actions taken by your water utility to reduce emissions? **AUTOMATIC NEXT QUESTION**
    a. I believe it is very likely the survey will affect my utility's actions
    b. I believe it is somewhat likely the survey will affect my utility's actions
    c. I don't think the survey will affect my utility's actions

29. To what degree do you expect that the results of this survey will affect your water bill? **AUTOMATIC NEXT QUESTION**
    a. I believe it is very likely the survey will affect my water bill
    b. I believe it is somewhat likely the survey will affect my water bill
    c. I don't think the survey will affect my water bill

30. What effect has the COVID-19 pandemic and associated public health orders had on your willingness to pay for emission reductions?
    a. I am now more willing to pay for emission reductions
    b. I am now less willing to pay for emission reductions
    c. Other (please specify) _____

       or

    d. No effect

Finally, some questions about you to help us make sure we have a good cross-section of the community.

31. Do you speak a language other than English at home? **AUTOMATIC NEXT QUESTION**
    a. No, English only
    b. Yes

32. Which best describes your household: **AUTOMATIC NEXT QUESTION**
    a. Couple/family without children at home
    b. Couple/family with children at home
    c. One parent family
    d. Group household

e. Single person household

f. Other

33. What is your work status? **AUTOMATIC NEXT QUESTION**

a. Working full time

b. Working part time/casually

c. Student

d. Not currently employed

e. Home duties

f. Retired

g. Other

34. Does your work involve…? *Please select all that apply* **MULTIPLE SELECTION**

a. Manufacturing, selling or installing renewable energy solutions

b. Assessing or improving the energy efficiency of buildings

c. Farming/Agriculture

d. Mining

e. Forestry

f. Environmental regulation or policy

g. Coal- or gas-fired electricity generation

h. Climate science or ecology

or

i. None of the above

35. **ONLY IF ANSWERED NOT d in Q32** What is your approximate annual household income before tax? **AUTOMATIC NEXT QUESTION**

a. Less than $41,600 per year (less than $800 per week)

b. $41,600 - $78,000 per year ($800 - $1,500 per week)

c. $78,000 - $104,000 per year ($1,500 - $2,000 per week)

d. $104,000 - $156,000 per year ($2,000 - $3,000 per week)

e. More than $156,000 per year (more than $3,000 per week)

f. Do not wish to answer

36. **ONLY IF ANSWERED d in Q32** What is your approximate annual personal income before tax? **AUTOMATIC NEXT QUESTION**

    a. Less than $41,600 per year (less than $800 per week)

    b. $41,600 - $78,000 per year ($800 - $1,500 per week)

    c. $78,000 - $104,000 per year ($1,500 - $2,000 per week)

    d. $104,000 - $156,000 per year ($2,000 - $3,000 per week)

    e. More than $156,000 per year (more than $3,000 per week)

    f. Do not wish to answer

37. Finally, is there any feedback you would like to provide on this survey? **ALLOW ZERO INPUT**

    _____
    _____
    _____
    _____

Thank you for participating in this survey. Your opinions are very important.

D Model estimation

D.1 Model of household choice: Class 2

	Coef.	Z value
Fixed parameters		
You pay an extra ... on your water bill each year for the next 10 years ($)	-0.1824	-13.46
Random parameters: means		
Alternative-specific constant: Package A	-0.1068	-0.92
By 2031 your water utility reduces its annual emissions by ...% (1=1 per cent)	0.0141	6.20
plus uses accredited projects to offset ...% (1=1 per cent)	0.0112	6.70
The offset projects deliver ... 000 hectares of new native forest (Ha '000s)	0.0048	2.49
The forests are located: in my State, but not in my region (dummy)	0.4900	6.78
The forests are located: in my region (dummy)	0.4542	4.34
The new forests: support significant biodiversity (dummy)	0.1829	2.69
The offset projects employ ... ATSI people who were seeking job opportunities (persons)	0.0059	3.29
Random parameters: Standard deviations		
Alternative-specific constant: Package A	1.5022	9.34
By 2031 your water utility reduces its annual emissions by ...% (1=1 per cent)	-0.0164	-4.72
plus uses accredited projects to offset ...% (1=1 per cent)	-0.0010	-0.16
The offset projects deliver ... 000 hectares of new native forest (Ha '000s)	0.0070	1.72
The forests are located: in my State, but not in my region (dummy)	0.2603	0.63
The forests are located: in my region (dummy)	-0.2571	-0.65
The new forests: support significant biodiversity (dummy)	-0.1650	-0.38
The offset projects employ ... ATSI people who were seeking job opportunities (persons)	0.0100	3.13
Random parameters: cross-parameter correlations		
/l21	0.0020	0.42
/l31	0.0031	1.02
/l41	0.0066	2.12
/l51	-0.0202	-0.16
/l61	0.3191	2.10
/l71	0.0431	0.42

	Coef.	Z value
/l81	-0.0029	-1.14
/l32	-0.0179	-8.15
/l42	-0.0029	-0.88
/l52	0.0611	0.32
/l62	-0.4092	-2.28
/l72	-0.2714	-2.01
/l82	0.0021	0.87
/l43	-0.0074	-1.07
/l53	0.3676	0.91
/l63	0.7830	3.35
/l73	0.0527	0.08
/l83	-0.0032	-0.78
/l54	0.4262	1.08
/l64	-0.2400	-0.34
/l74	-0.3983	-1.30
/l84	-0.0001	-0.04
/l65	-0.0126	-0.04
/l75	0.5164	1.49
/l85	0.0100	2.27
/l76	0.4410	1.30
/l86	0.0007	0.12
/l87	0.0036	0.52
Model fit		
Choice observations		7064
Individuals		883
Log likelihood		-6844

Source: CIE

D.2 Model of household choice: Class 3

	Coef.	Z value
Fixed parameters		
You pay an extra ... on your water bill each year for the next 10 years ($)	-0.0433	-28.28
Random parameters: means		
Alternative-specific constant: Package A	-2.7884	-25.86
By 2031 your water utility reduces its annual emissions by ...% (1=1 per cent)	0.0269	15.66

	Coef.	Z value
plus uses accredited projects to offset ...% (1=1 per cent)	0.0260	19.58
The offset projects deliver ... 000 hectares of new native forest (Ha '000s)	0.0102	7.55
The forests are located: in my State, but not in my region (dummy)	0.2045	5.16
The forests are located: in my region (dummy)	0.1262	1.99
The new forests: support significant biodiversity (dummy)	0.7131	15.60
The offset projects employ ... ATSI people who were seeking job opportunities (persons)	0.0137	10.23
Random parameters: Standard deviations		
Alternative-specific constant: Package A	1.6786	9.64
By 2031 your water utility reduces its annual emissions by ...% (1=1 per cent)	0.0357	11.76
plus uses accredited projects to offset ...% (1=1 per cent)	-0.0117	-1.83
The offset projects deliver ... 000 hectares of new native forest (Ha '000s)	-0.0125	-3.01
The forests are located: in my State, but not in my region (dummy)	0.5404	4.07
The forests are located: in my region (dummy)	0.2115	0.52
The new forests: support significant biodiversity (dummy)	0.7643	1.51
The offset projects employ ... ATSI people who were seeking job opportunities (persons)	-0.0038	-0.73
Random parameters: cross-parameter correlations		
/l21	0.0004	0.10
/l31	-0.0087	-1.43
/l41	-0.0051	-1.06
/l51	0.0348	0.36
/l61	0.0702	0.57
/l71	-0.4010	-3.25
/l81	-0.0044	-1.23
/l32	0.0229	8.63
/l42	0.0030	1.16
/l52	0.1570	1.79
/l62	0.0749	0.73
/l72	0.4429	4.84
/l82	0.0118	5.87
/l43	0.0020	0.10
/l53	0.0629	0.35
/l63	-0.3751	-1.61
/l73	-0.0694	-0.41
/l83	-0.0031	-0.70
/l54	0.2158	1.12
/l64	0.4464	1.50
/l74	0.5931	2.39

	Coef.	Z value
/l84	0.0018	0.19
/l65	0.2390	0.87
/l75	-0.5199	-1.63
/l85	0.0065	1.11
/l76	0.2991	0.39
/l86	0.0142	4.34
/l87	-0.0001	-0.01
Model fit		
Choice observations		23256
Individuals		2907
Log likelihood		-18434

Source: CIE

D.3 Tobit model relating respondent characteristics for posterior respondent-specific estimates of willingness to pay for the example scenario

	Coef.	Z value
Gender: Female (Base: Male)	7.16	4.6
Age: 30-39 (Base: 18-29)	-3.75	-1.0
Age: 40-49 (Base: 18-29)	-9.33	-2.6
Age: 50-59 (Base: 18-29)	-8.18	-2.3
Age: 60-69 (Base: 18-29)	1.22	0.4
Age: 70+ (Base: 18-29)	-3.25	-0.9
Tenure: Renter/other (Base: Owner)	4.81	2.1
Location: Regional (Base: Metro)	0.28	0.2
Language: LOTE (Base: English)	-5.88	-2.6
Work status: Employed (Base: Other)	1.07	0.5
Occupation: ...renewable energy solutions (Base: None of the above)	-5.21	-0.6
Occupation: ...energy efficiency of buildings (Base: None of the above)	18.67	1.4
Occupation: Farming/Agriculture (Base: None of the above)	2.77	0.3
Occupation: Mining (Base: None of the above)	-9.28	-1.2
Occupation: Forestry (Base: None of the above)	3.56	0.3
Occupation: Environmental regulation or policy (Base: None of the above)	8.86	0.9
Occupation: Coal- or gas-fired electricity generation (Base: None of the above)	-0.23	0.0
Occupation: Climate science or ecology (Base: None of the above)	12.30	0.7
Income: Less than $41,600 per year (Base: Do not wish to answer)	-0.17	-0.1
Income: $41,600 - $78,000 per year (Base: Do not wish to answer)	6.49	2.3

	Coef.	Z value
Income: $78,000 - $104,000 per year (Base: Do not wish to answer)	9.54	3.1
Income: $104,000 - $156,000 per year (Base: Do not wish to answer)	11.87	3.8
Income: More than $156,000 per year (Base: Do not wish to answer)	17.36	5.0
Constant	25.58	5.8

Source: CIE

D.4 Tobit model with indicators for cost level in filtering question

	Coef.	Z value
Gender: Female (Base: Male)	7.14	4.6
Age: 30-39 (Base: 18-29)	-3.60	-1.0
Age: 40-49 (Base: 18-29)	-9.10	-2.5
Age: 50-59 (Base: 18-29)	-8.00	-2.3
Age: 60-69 (Base: 18-29)	1.46	0.4
Age: 70+ (Base: 18-29)	-3.03	-0.8
Tenure: Renter/other (Base: Owner)	4.73	2.1
Location: Regional (Base: Metro)	0.25	0.2
Language: LOTE (Base: English)	-5.90	-2.6
Work status: Employed (Base: Other)	1.11	0.5
Occupation: ...renewable energy solutions (Base: None of the above)	-5.12	-0.6
Occupation: ...energy efficiency of buildings (Base: None of the above)	18.44	1.4
Occupation: Farming/Agriculture (Base: None of the above)	2.79	0.3
Occupation: Mining (Base: None of the above)	-9.52	-1.2
Occupation: Forestry (Base: None of the above)	3.66	0.3
Occupation: Environmental regulation or policy (Base: None of the above)	8.95	0.9
Occupation: Coal- or gas-fired electricity generation (Base: None of the above)	0.02	0.0
Occupation: Climate science or ecology (Base: None of the above)	12.47	0.7
Income: Less than $41,600 per year (Base: Do not wish to answer)	-0.25	-0.1
Income: $41,600 - $78,000 per year (Base: Do not wish to answer)	6.41	2.2
Income: $78,000 - $104,000 per year (Base: Do not wish to answer)	9.47	3.1
Income: $104,000 - $156,000 per year (Base: Do not wish to answer)	11.79	3.7
Income: More than $156,000 per year (Base: Do not wish to answer)	17.22	5.0
Anchoring cost level: $5 (Base: $10)	2.25	0.9
Anchoring cost level: $20 (Base: $10)	1.62	0.9
Constant	24.91	5.6

Source: CIE

E Region-specific results

See separate confidential files.

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