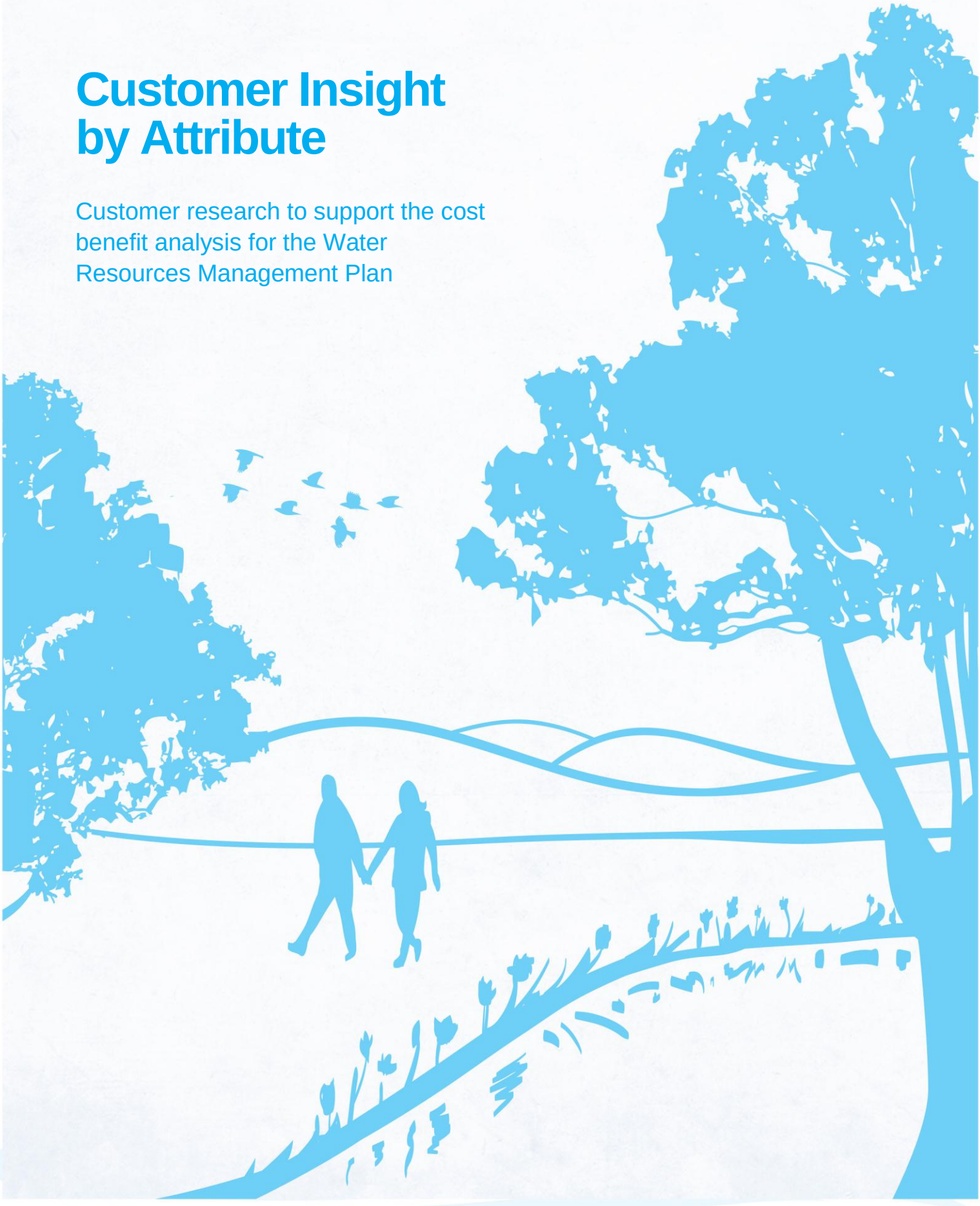
BRISTOL WATER

September 15, 2017

Customer Insight by Attribute

Customer research to support the cost benefit analysis for the Water Resources Management Plan



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22.09.2017	1		Dani Emerson
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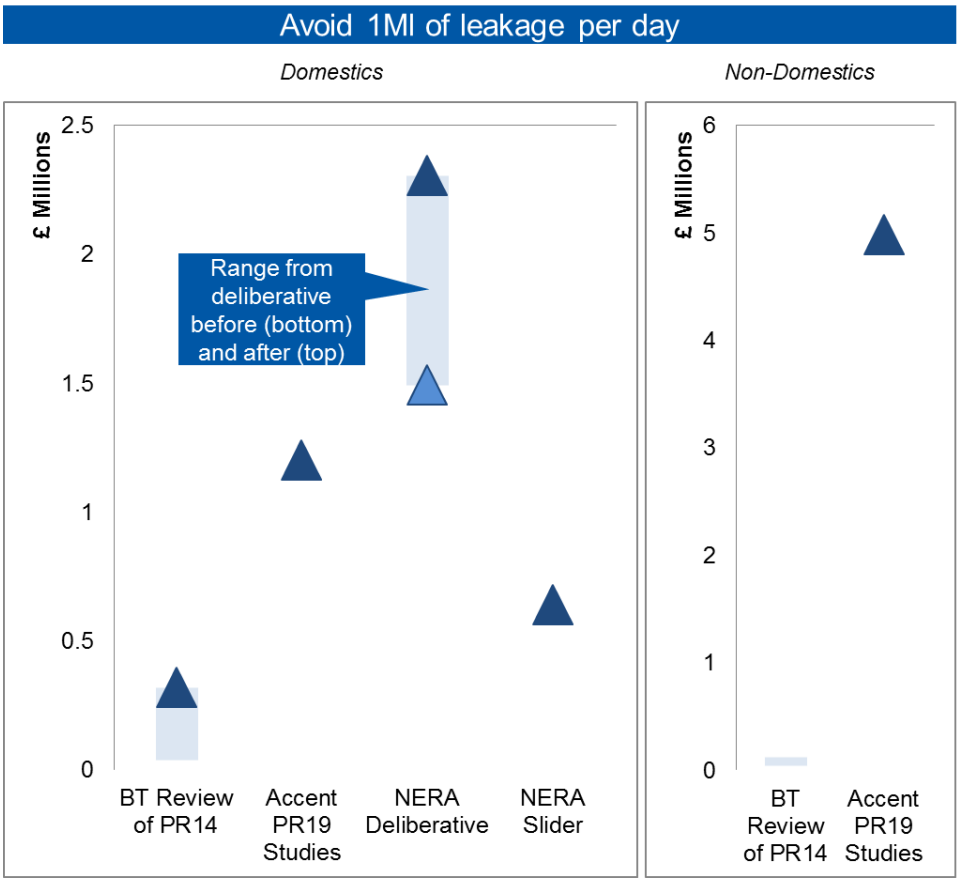
Leakage reduction

Type	Source	#	Findings
	PR14		
Valuation	Stated preference stage 1		
	Stated preference stage 2		Customers valued avoiding 1Ml of leakage per day at £0.66.
Desk review	Benefits transfer review **14**		The range from PR14 across the industry was between £0.08 and £0.57. Bristol's valuations were above the range but not dramatically.
PR19			
Valuation	Stated preference research stage 1 **11**	HH: 1116 NHH: 300	
	Stated preference research stage 2 **12**	HH: 573 NHH: 300	Participants most valued leakage reduction and which was allocated the highest valuation. Participants valued avoiding 1Ml of leakage per day at £2.27.
	Online attributes scenario game **20**	400	Participants valued avoiding 1Ml of leakage per day at £1.21
	Revealed preference research **26**	HH: 500 NHH: 250	
	Deliberative resilience research **19**	111	Participants were willing to pay more to reduce leakage following the discussions held during the event. The WTP increased from £2.83 to £4.37 to avoid 1ML of leakage per day.
	Resilience cost study **15**	285	
Qualitative	Qualitative research: customer priorities	27	Leakage was un-prioritised in two groups and was ranked as a low

	3		priority in the control group. There were few conservations relating to leakage across all three groups.
	Revealed preference research **26**	HH: NHH: 12	
	Deliberative resilience research – **19**	111	Customers cite leakage reduction as a concern and the need to consider the use of demand conservation measures (including leakage reduction) before taking new "supply side" measures to enhance or maintain security of supply. On the first round of allocations, reducing leakage received the highest average allocation of all the top trump cards. Most people reduced their allocations for leakage later in the day following information about the economic level of leakage and BW strong performance compared to other companies. Although it still remained a top priority.
	Qualitative research: Vulnerability	20	
	Qualitative research: Performance commitments	30	Leakage was one of customers preferred choices for performances commitments.
Ongoing	Online customer panel **7**	1600 1100	98% of panel members said 'reducing the amount of water that leaks from pipes' is very or quite important (April 2016). 96% of panel members said 'reducing the amount of water that leaks from pipes' is very or quite important (Dec 2016).
	Customer Forum Group	40	

	6		
	Annual survey (priorities and perceptions) **8**	1000 x 4 4000	'Repairs leaks as quickly as possible' has been ranked as a top customer priorities since 2015 at 98.3% of customers saying it is very or quite important. However, our performance on leakage has been viewed in the middle of the range since 2014 (72.8% believe we perform very well or quite well)
	Stakeholder survey **10**		
	ICS benchmarking survey **9**	200	
	SIM survey **4**	200 x 4 800	Leakage was the top reason for dissatisfaction in the SIM for 2016/17. There were 12/17 dissatisfied customers picked up through the SIM survey due to leaks on the road or leaks on the property in 2016/17. This made up 38% of all dissatisfied for SIM.
	Monthly replica surveys **4**	1360 per year	Lower than average satisfaction due to calls reporting leakage. Average satisfaction for leakage calls– 82.9% compared with average call satisfaction of 84.8%.
	Customer complaints data **4**		Leakage is a top cause of complaints. It accounted for 9.5% of complaints in 2016/17
	Inbound calls **4**		Leakage is the top reason for inbound calls at 25% of all operational inbound calls in 2016/17
Acceptability testing	TBC		



The qualitative results and the ongoing customer contact support leakage as being a top priority for customers. The ongoing insight shows that it is a key area for improvement. However, it is widely understood that this is an attribute that customers may care about “for its own sake”, so high values placed on this are likely to be scrutinised.

It is important to emphasise that leakage reduction is not an attribute of service from which customers necessarily benefit, though customers can associate (correctly or incorrectly) with various other attributes of service, such as environmental impact, reducing the incidence of bursts (and hence interruptions and disruption due to water ingress or street works), or cost/bill effects.

Hence, while customers may express preferences for leakage reduction for its own sake, or possibly as an alternative to other forms of supply side or demand management measures, we need to be cautious when applying resulting valuations in CBAs due to the considerable risk of double counting benefits.

Triangulated valuation Avoid 1Ml/day in the whole supply area

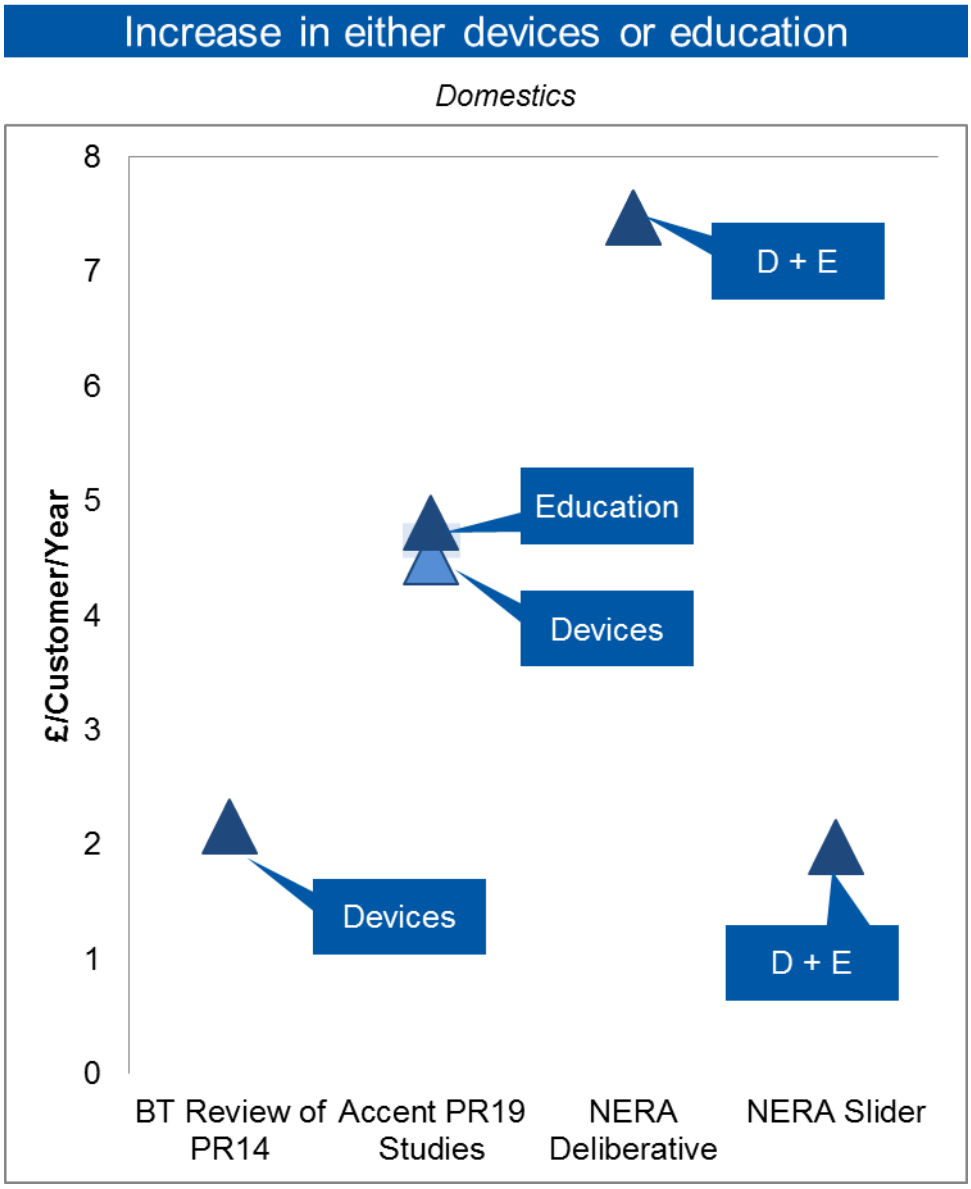
Customers	Central	Low	High
Domestics	£0.7		£2.3
Non domestics	£0.0		£148.7

Water efficiency – Devices

Type	Source	#	Findings
	PR14		
Valuation	Stated preference stage 1		
	Stated preference stage 2		Customers valued an increase in water efficiency devices from 0% to 6% penetration at £2.15
Desk review	Benefits transfer review **14**		
	PR19		
Valuation	Stated preference research stage 1 **11**	HH: 1116 NHH: 300	
	Stated preference research stage 2 **12**	HH: 573 NHH: 300	Participants valued the measure 'issue water saving devises to customers' as their third highest preference. Participants were willing to pay £4.50. Participants were willing to pay £4.80 for education
	Online attributes scenario game **20**	400	Participants were willing to pay £1.97 for an increase in education
	Revealed preference research **26**	HH: 500 NHH:	

		300	
	Deliberative resilience research **19**	111	Willingness to pay for water efficiency did not change significantly following the discussions held during the event. Participant's willingness to pay for an improvement by one category was £7.70 before and £7.46 after the day.
	Resilience cost study **15**	285	Investing in water efficiency measures was the second most popular action customers said they would do to minimise disruption after water saving measures.
Qualitative	Qualitative research: customer priorities **3**	27	Water efficiency devices were not discussed as a priority by customers, however conserving water was mentioned by many participants as being important, and as something that people 'should do'.
	Revealed preference research **26**	HH: NHH: 12	
	Deliberative resilience research – **19**	111	Increasing the use of water efficiency devices was identified as a priority by some groups whilst others felt Bristol Water should prioritise investment in education and the installation of water meters first as they believed this would encourage people to buy their own water saving devices.
	Qualitative research: Vulnerability	20	
	Qualitative research:	30	Customers ranked per capita

	Performance commitments		consumption as a high priority performance commitment but the subject did not raise a large amount of discussion.
Ongoing	Online customer panel **7**	1600-1100	83% of panel members said 'providing water saving advice' is very or quite important. 92% of panel members said that 'improving water efficiency to reduce demand and help meet future needs of a growing population" is important (Dec 2016)
	Customer Forum Group **6**	40	
	Annual survey (priorities and perceptions) **8**	1000	
	Stakeholder survey **10**		
	ICS benchmarking survey **9**	200	
	SIM survey **4**	200 x 4 800	
	Monthly replica surveys **4**	1360 per year	
	Customer complaints data **4**		
	Inbound calls **4**		
Acceptability testing	TBC		



Customers – in both qualitative and quantitative research are supportive of reducing water usage and some value education over devices, or see the two as inseparable.
Each available valuation source uses a different definition of "water efficiency measures", therefore the results are not directly comparable

Triangulation valuation – improving water efficiency (education and devices)

Attribute	Central	Low	High
Domestics	£8.4	£2.0	

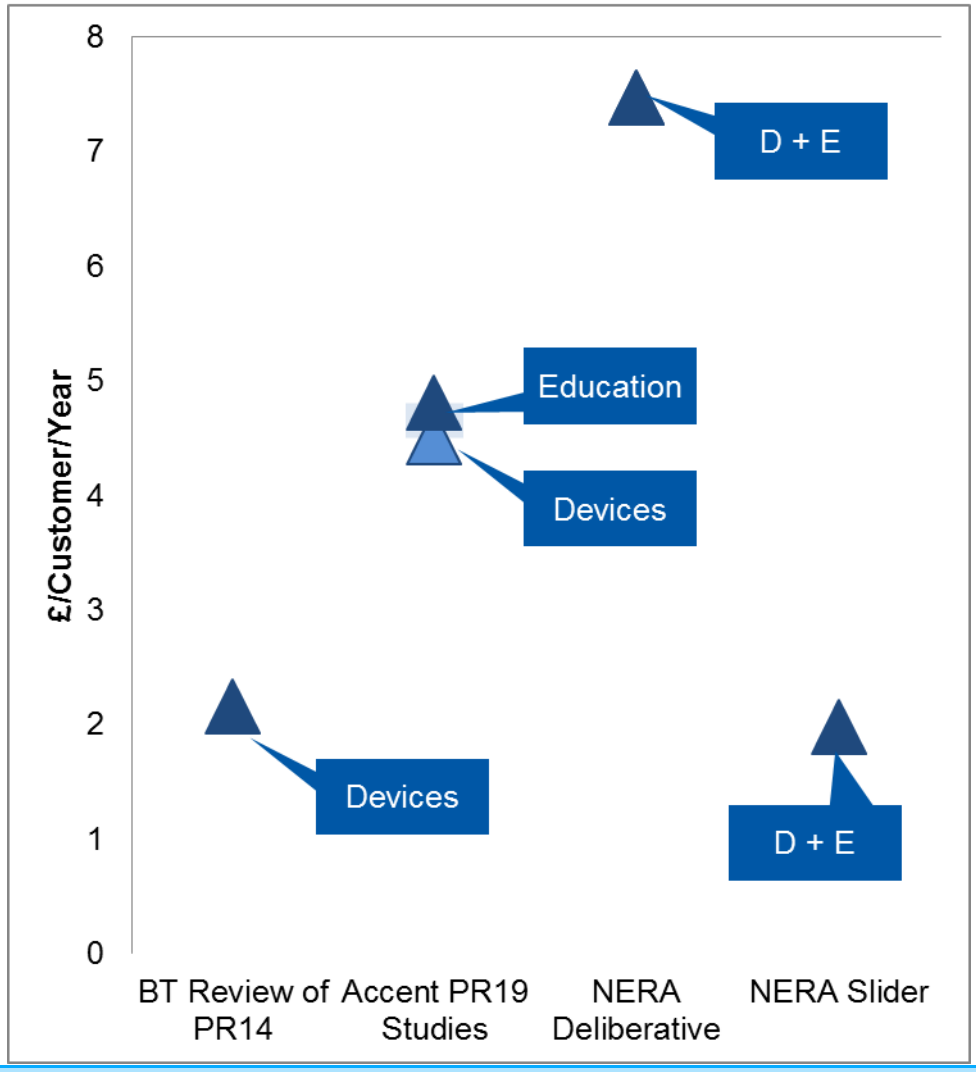
Education/behaviour change

Type	Source	#	Findings
	PR14		
Valuation	Stated preference stage 1		
	Stated preference stage 2		
Desk review	Benefits transfer review **14**		
	PR19		
Valuation	Stated preference research stage 1 **11**	HH: 1116 NHH: 300	
	Stated preference research stage 2 **12**	HH: 573 NHH: 300	Participants valued 'education on how to save water' as their second highest preference for managing supply and demand. Participants were willing to pay £9.59.
	Online attributes scenario game **20**	400	
	Revealed preference research **26**	HH: 500 NHH: 300	
	Deliberative resilience research **19**	111	
	Resilience cost study **15**	285	Investing in water efficiency measures was the second most popular action customers said they would do to minimise disruption after water saving measures.
Qualitative	Qualitative research: customer priorities **3**	27	Conserving water was mentioned by many participants as being important, and as something that people 'should do'. Some participants advocated for educating young people about water and water

			conservation and working more closely with schools.
	Revealed preference research **26**	HH: NHH: 12	
	Deliberative resilience research – **19**	111	All participants agreed that education is important but were not willing to pay more on their bills for this as they did not feel it was Bristol Water's responsibility and most participants felt water efficiency was the responsibility of the government. Most groups reduced their allocation for education when they discovered the low cost and low certainty of success.
	Qualitative research: Vulnerability	20	
	Qualitative research: Performance commitments	30	
Ongoing	Online customer panel **7**	1600-1100	83% of panel members said 'providing water saving advice' is very or quite important (Dec 2016) Only 3% of members said they had been affected by water efficiency campaigns in the last year (April 2016) We asked members if there were any other areas that were not included in a list of priorities which are important to them, one of the top responses was 'advice on saving water' (Dec 2016) 76% of respondents said they had

			reduced their water usage in the last year, 44% did to saving money and 34% did for environmental reasons. Only 5% cited 'water company providing information' as the reason (Dec 2016) Respondents said they were most likely to try and use less water through being careful when they brushed their teeth, encouraging other people in the house to use less and taking showers rather than baths (April 2017)
	Customer Forum Group **6**	40	When asked about Bristol Water's role in the Bristol area in the future, many members said education and helping customers to reduce water usage is important (Sept 2017)
	Annual survey (priorities and perceptions) **8**	1000	
	Stakeholder survey **10**		
	ICS benchmarking survey **9**	200	
	SIM survey **4**	200 x 4 800	
	Monthly replica surveys **4**	1360 per year	
	Customer complaints data **4**		
	Inbound calls **4**		
Acceptability testing	TBC		

Increase in either devices or education



Each available valuation source uses a different definition of “water efficiency measures”, therefore the results are not directly comparable

There is limited customer research on behaviour change, and it is closely linked to the use of water saving devices. Customers – in both qualitative and quantitative research are supportive of reducing water usage and some value education over devices, or see the two as inseparable.

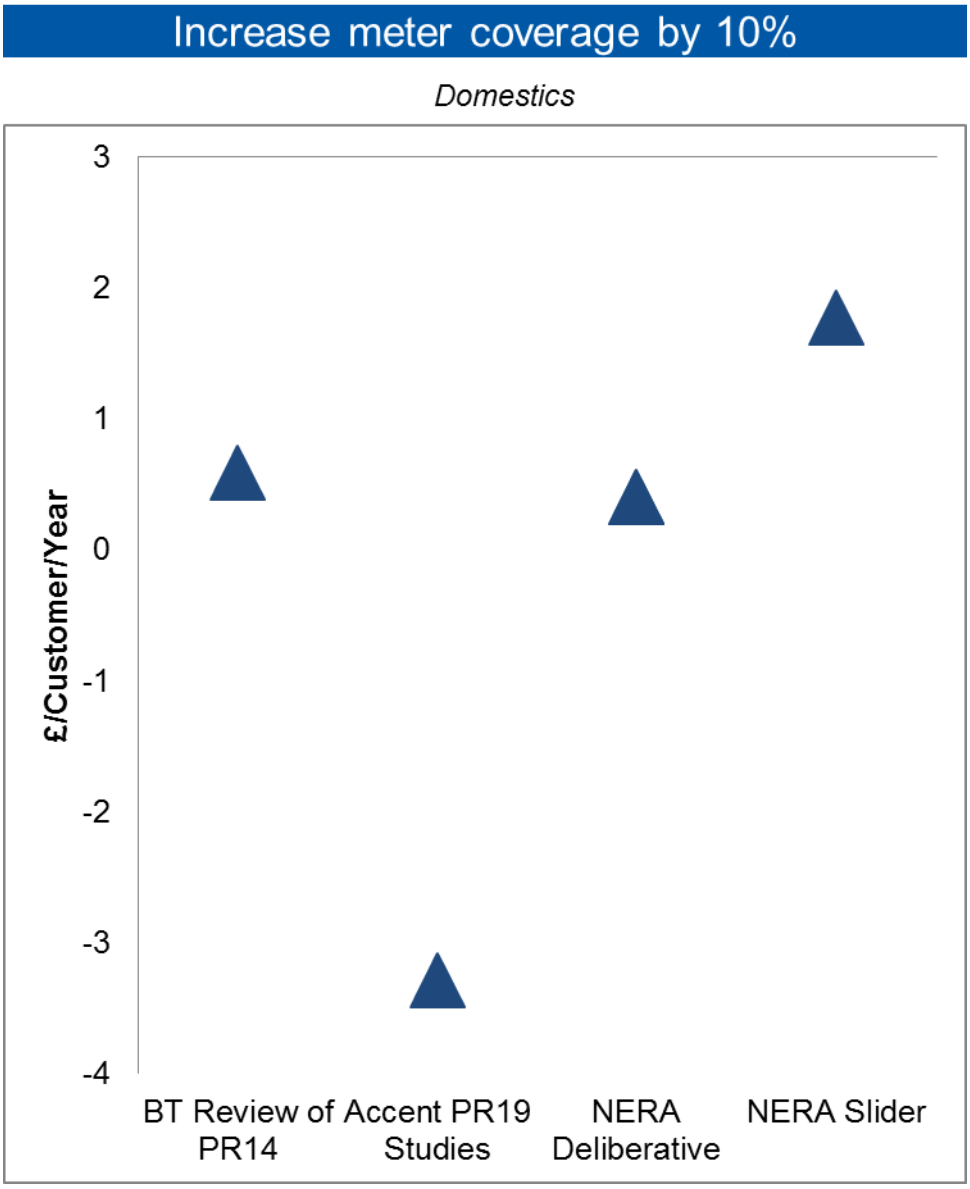
Attribute	Unit	Central	Low	High
Water Efficiency Measures	Improving water efficiency (education and devices)	£8.4	£2.0	

Water meters

Type	Source	#	Findings
		PR14	
Valuation	Stated preference stage 1		
	Stated preference stage 2		Metering was a low priority for participants. Participants were willing to pay £0.58 to increase meter penetration by 10%. However the results are not significantly different to 0.
Desk review	Benefits transfer review **14**		
		PR19	
Valuation	Stated preference research stage 1 **11**	HH: 1116 NHH: 300	
	Stated preference research stage 2 **12**	HH: 573 NHH: 300	Out of all the measures for balancing supply and demand, this was the least popular measure. Participants gave a negative value to metering at -£3.30 to increase meter penetration by 10%.
	Online attributes scenario game **20**	400	Participants were willing to pay £1.76 to increase meter penetration by 10%
	Revealed preference research **26**	HH: 500 NHH: 300	
	Deliberative resilience research **19**	111	Participant's willingness to pay for metering did not change before and after the event. Participants were willing to pay £0.40 to increase meter penetration by 10%. However the results are not significantly different to 0.
	Resilience cost study	285	

	15		
Qualitative	Qualitative research: customer priorities **3**	27	There were little discussions around metering as it was not listed on the cards. However a couple of participants created new service attributes for installing meters.
	Revealed preference research **26**	HH: NHH: 12	
	Deliberative resilience research – **19**	111	Increasing the roll out of water meters was a divisive issue and there were strongly held views on both side, Many participants called for more investment in smart meters so they could monitor their water usage more effectively.
	Qualitative research: Vulnerability	20	
	Qualitative research: Performance commitments	30	Metering was not highly prioritised as a performance commitment.
Ongoing	Online customer panel **7**	1600-1100	75% of panel members said 'Understanding the benefits of metering' is very or quite important. 63% of members said 'encouraging customers to have water meters' is very or quite important. 69% of panel members said 'increase the number of customers who are metered and therefore only pay for the water they use' is very or quite important (Dec 2016) A key area of interest with our panel. Customers show a preference towards metering as a fairer way to pay and support wider water

			efficiency programmes in connection with metering
	Customer Forum Group **6**	40	
	Annual survey (priorities and perceptions) **8**	1000 x 4 4000	Metering is not specifically listed as an attribute in the list of priorities however customers consistently show support for reducing leakage
	Stakeholder survey **10**		
	ICS benchmarking survey **9**	200	
	SIM survey **4**	200 x 4 800	There was only 1/17 dissatisfied customers picked up through the SIM survey due to meter installations in 2016/17. This made up 3% of all dissatisfied for SIM.
	Monthly replica surveys **4**	1360 per year	Customers are more satisfied than average if they call about metering
	Customer complaints data **4**		In 2016/17 there were 31 complaints about metering which made up 4.7% of all complaints.
	Inbound calls **4**		In 2016/17 there were 638 inbound calls about metering which made up 1.7% of all inbound operational contact.
	CCWater Research **4**	150	Bristol Water customers are more aware of metering than the average for all water companies
Acceptability testing	TBC		



Results from qualitative research studies demonstrated that customers didn't tend to prioritise metering, or held very conflicting, at times polarised views. There is also a challenge in that customers prioritise leakage, but not metering, so it's possible that customers struggle to reconcile impacts on individuals with more generalised impacts, or that they don't fully understand the connection between leakage and metering.

Triangulated valuation - 10 percentage points increase in metering

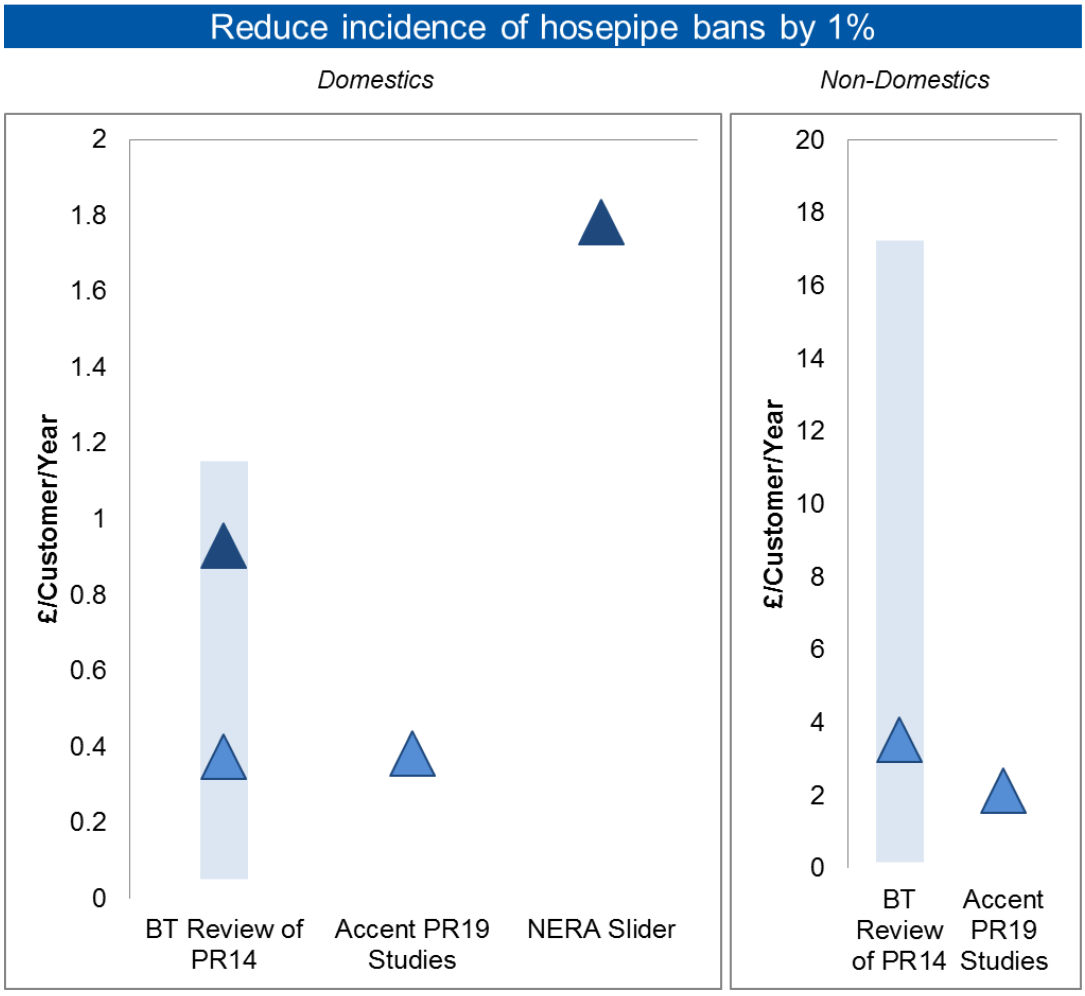
	Central	Low	High
Domestics	£0.6	£0.4	£1.8
Non-domestics	£0.0		

Hosepipe bans

Type	Source	#	Findings
	PR14		
Valuation	Stated preference stage 1		Hosepipe bans were the least strongly prioritised. Participants were willing to pay £0.37 to reduce the incidence of hosepipe bans by 1%
	Stated preference stage 2		Hosepipe bans were the least strongly prioritised. Participants were willing to pay £0.93 to reduce the incidence of hosepipe bans by 1%
Desk review	Benefits transfer review **14**		The industry range for PR14 was between £0.05 & £1.15. Bristol Water's valuation from the WTP PR14 research indicated a valuation towards the middle of the range of valuations.
PR19			
Valuation	Stated preference research stage 1 **11**	HH: 1116 NHH: 300	Hosepipe bans had the lowest impact score from the MaxDiff exercise. Participants were willing to pay £0.38 to reduce the incidence of hosepipe bans by 1%
	Stated preference research stage 2 **12**	HH: 573 NHH: 300	
	Online attributes scenario game **20**	400	Participants were willing to pay £1.78 to reduce the incidence of hosepipe bans by 1%.
	Revealed preference research **26**	HH: 500 NHH: 300	
	Deliberative resilience research **19**	111	

	Resilience cost study **15**	285	
Qualitative	Qualitative research: customer priorities **3**	27	There were few conservations relating to droughts and water restrictions.
	Revealed preference research **26**	HH: NHH: 12	
	Deliberative resilience research – **19**	111	Most participants were unwilling to pay more to reduce the impact of disruptive events such as drought and felt that the current level of risk was acceptable.
	Qualitative research: Vulnerability	20	
	Qualitative research: Performance commitments	30	Drought measures were given a low priority by customers for a performance commitment.
Ongoing	Online customer panel **7**	1600	This was the second lowest priority. Only 44% of panel members said 'avoiding hosepipe bans' is very or quite important (April 2016)
	Customer Forum Group **6**	40	
	Annual survey (priorities and perceptions) **8**	1000	
	Stakeholder survey **10**		
	ICS benchmarking survey **9**	200	
	SIM survey **4**	200 x 4 800	
	Monthly replica surveys **4**	1360 per year	
	Customer complaints data		

	4
	Inbound calls **4**
Acceptability testing	TBC



The qualitative findings from the deliberative events revealed participants are comfortable with the present level of drought risk and were more concerned with using preventative resilience measures to reduce demand. Overall the qualitative evidence supports the valuation data. Hosepipe bans are consistently given as a low priority across the customer research. A lack of experience of drought – and a low likelihood in the Bristol area, means customers see this as less relevant to their immediate experience.

Triangulation valuation - Reducing probability that one property is affected by hosepipe bans by 1 percentage point

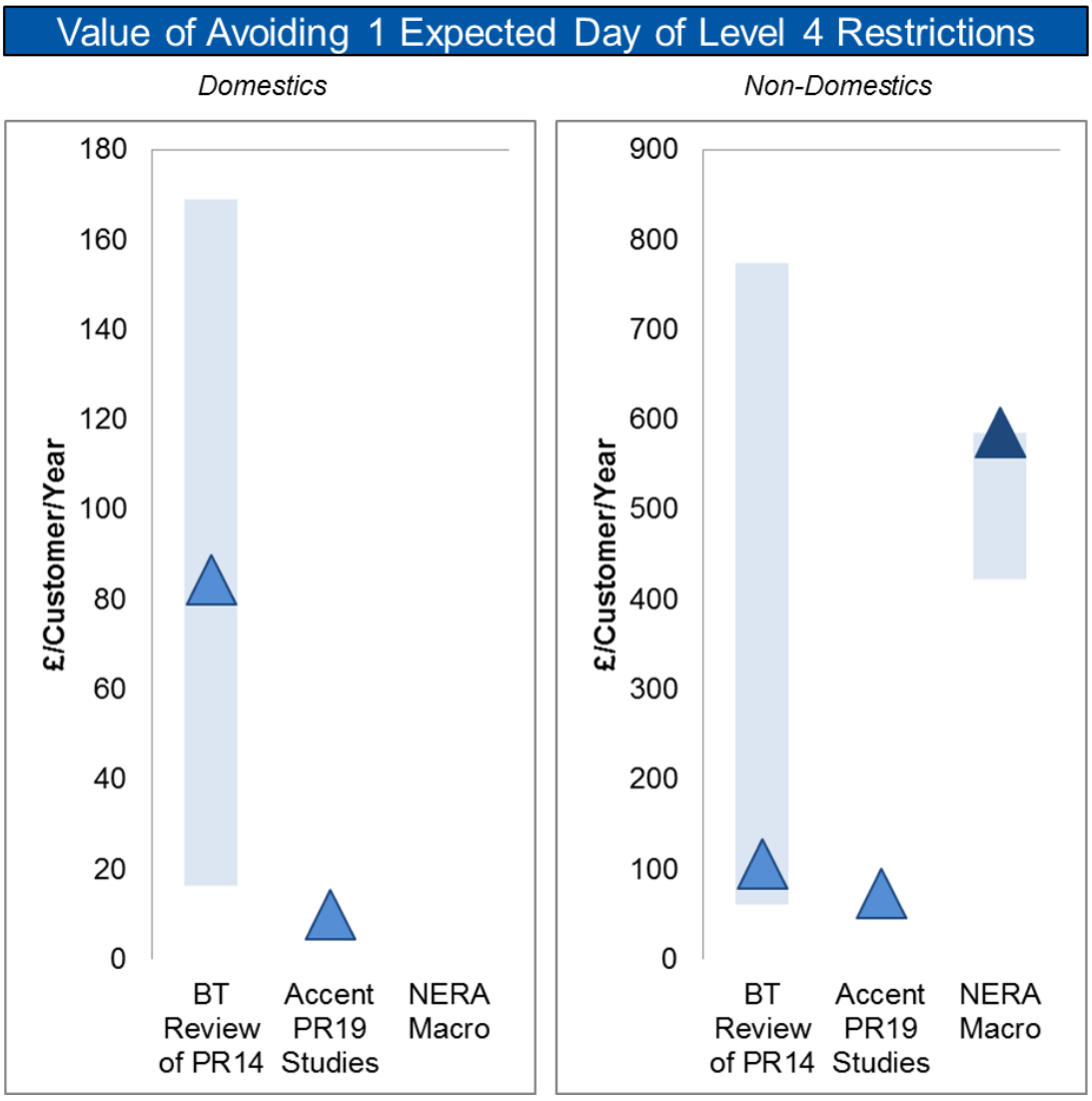
Customer	Central	Low	High
Domestics	£0.4	£0.1	£1.8
Non-domestics	£2.8	£0.2	

Rota Cuts (level 4 drought restrictions)

Type	Source	#	Findings
	PR14		
Valuation	Stated preference stage 1		Stoppages for 2-3 weeks were the most strongly prioritised. Participants were willing to pay £84.36 to avoid one expected day of level 4 restrictions.
	Stated preference stage 2		
Desk review	Benefits transfer review **14**		The industry range for PR14 was between £16.28 & £169.07. Bristol Water's valuation from the WTP PR14 research indicated a valuation towards the middle of the range of valuations.
PR19			
Valuation	Stated preference research stage 1 **11**	HH: 1116 NHH: 300	Participants were willing to pay £9.90 to avoid one expected day of level 4 restrictions. These valuations are extremely conservative.
	Stated preference research stage 2 **12**	HH: 573 NHH: 300	
	Online attributes scenario game **20**	400	
	Revealed preference research **26**	HH: 500 NHH: 300	
	Deliberative resilience research **19**	111	
	Resilience cost study **15**	285	This only relates to NHH Participants were willing to pay

			£422.72 during a 1 month drought, £525.70 during a 3 month drought and £585.60 during a 6 month drought to avoid one expected day of level 4 restrictions
Qualitative	Qualitative research: customer priorities **3**	27	Customers did not prioritise drought measures.
	Revealed preference research **26**	HH: NHH: 12	
	Deliberative resilience research – **19**	111	As with hosepipe bans, customers are comfortable with the present level of drought risk and were more concerned with using preventative resilience measures to reduce demand.
	Qualitative research: Vulnerability	20	
	Qualitative research: Performance commitments	30	Drought measures were not prioritised as a performance commitment as risk of drought was seen to be low.
Ongoing	Online customer panel **7**	1600- 1100	
	Customer Forum Group **6**	40	
	Annual survey (priorities and perceptions) **8**	1000 x 4 4000	'Having a clear plan of how to maintain water supply during drought' has been ranked as one of the lowest priorities for customers in 2017 at 80% of customers saying it is very or quite important. This was the lowest performing area in 2017 (only 23% believe we perform very well or quite well)
	Stakeholder survey		

	10	
	ICS benchmarking survey **9**	200
	SIM survey **4**	200 x 4 800
	Monthly replica surveys **4**	1360 per year
	Customer complaints data **4**	
	Inbound calls **4**	
Acceptability testing	TBC	



As per the customer views on hosepipe bans, there is evidence that customers do not prioritise drought avoidance, and that experience of drought measures is rare.

Triangulation valuation - Avoiding one expected day of interruption in one property

Attribute	Central	Low	High
Domestics	£47.10	£9.90	£84.40
Non-domestics	£299.20	£72.70	£525.70

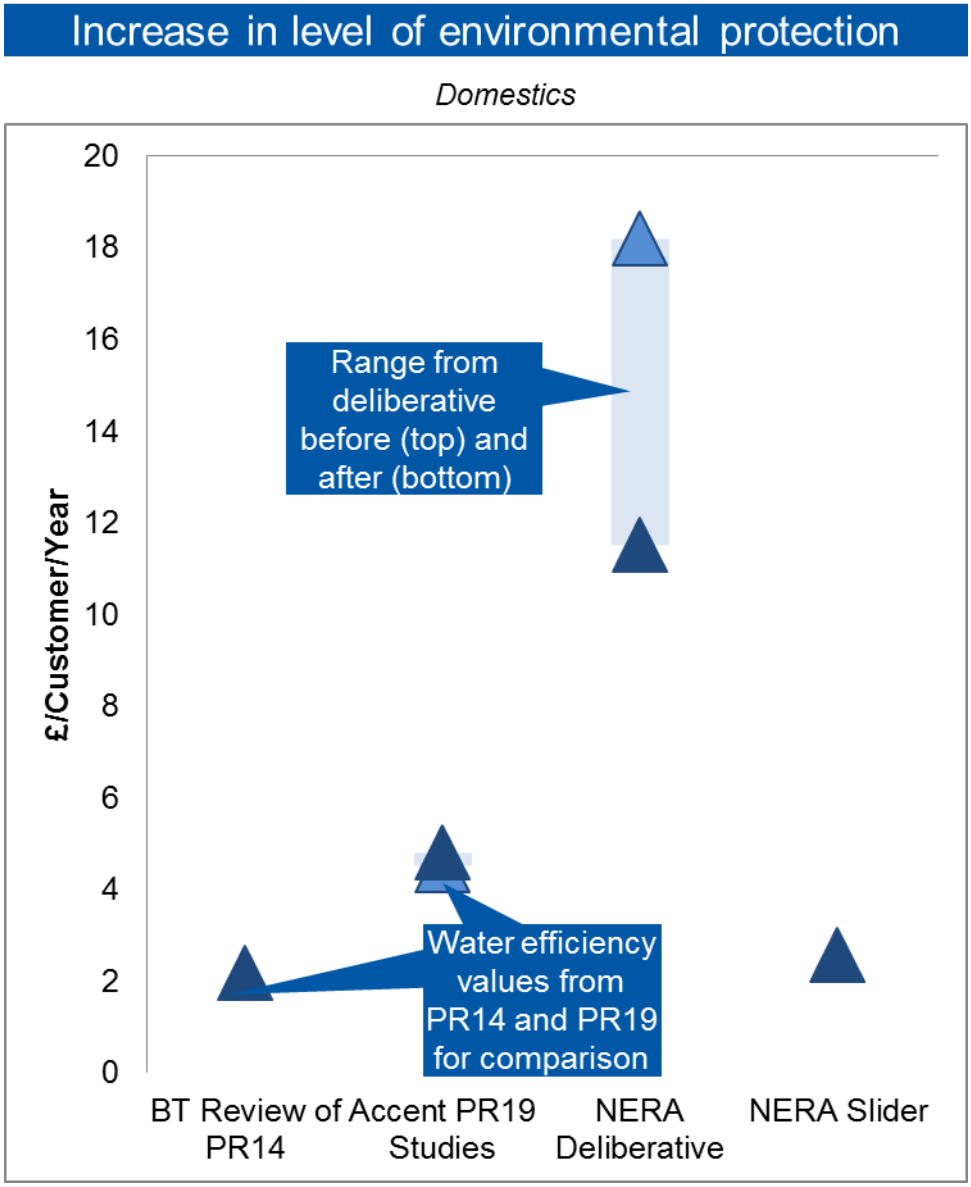
Environmental protection

Type	Source	#	Findings
	PR14		
Valuation	Stated preference stage 1		
	Stated preference stage 2		Customers valued addressing low flowing rivers as a second priority and willing to pay £8.19
Desk review	Benefits transfer review **14**		PR14 estimate for "proportion of rivers with low flows" are considerably higher than estimates from other studies. As the survey question refers to the share of river stretch improved rather than to an absolute length, it is possible that BW customers overestimate the rivers in the supply area relative to the assumptions made by customers in other areas.
	PR19		
Valuation	Stated preference research stage 1 **11**	HH: 1116 NHH: 300	
	Stated preference research stage 2 **12**	HH: 573 NHH: 300	Participants were willing to pay £4.80 for increased environmental protection.
	Online attributes scenario game **20**	400	Participants were willing to pay £2.54 for increased environmental protection.
	Revealed preference research **26**	HH: 500 NHH: 300	
	Deliberative resilience research **19**	111	Customers were willing to pay less for improving the environment following the discussions held during the event. Their WTP reduced from

			£18.17 to £11.50
	Resilience cost study **15**	285	
Qualitative	Qualitative research: customer priorities **3**	27	There was little consistency in prioritising environmental issues. Many participants placed a higher ranking on environment-related attributes when asked to rank their priorities when considering the future
	Revealed preference research **26**	HH: NHH: 12	
	Deliberative resilience research – **19**	111	Participants expressed support for enhancing the environment but many could not see the link between the environment & BW was not clear. Participants were not willing to pay more for the environment unless the money was ring-fenced for specific environmental projects. Customers were willing to pay less for improving the environment following the discussion held at the event.
	Qualitative research: Vulnerability	20	
	Qualitative research: Performance commitments	30	Protecting the environment was one of the top-ranked performance commitments. Customers thought that biodiversity index and energy efficiency are the best measures for Bristol Water's environmental impact
Ongoing	Online customer panel **7**	1600-1100	'The water company is environmentally friendly' was ranked as the lowest priority. 85% of participants agreed that it should be a priority and 88% said that it is

			important now. 'Improve the environment – focusing on the quality of our lakes and water sources – 92% of participants said this is important whereas only 81% said 'reducing carbon emissions by half' is important (Dec 2016) The environment is a key interest for our online panel. 60% felt that we should encourage more access and recreational enjoyment at our lakes where there is minimal impact of wildlife (April 2017)
	Customer Forum Group **6**	40	When asked about Bristol Water's role in the Bristol area in the future, many members said environmental protection is important (Sept 2017)
	Annual survey (priorities and perceptions) **8**	1000	'Helps protect the environment' has been ranked in the middle of customers priorities since 2015 at 93% of customers saying it is very or quite important. This is one of our lowest performing areas since 2014 (59.7% believe we perform very well or quite well) This has been highlighted as the key area for improvement in 2016
	Stakeholder survey **10**		52% of respondents state that we are very good or good at looking after the environment In 2015 stakeholders and businesses rated 'environmentally sustainable water services' as their

			fourth priority with 89% of respondents considering it very important or quite important.
	ICS benchmarking survey **9**	200	
	SIM survey **4**	200 x 4 800	
	Monthly replica surveys **4**	1360 per year	
	Customer complaints data **4**		
	Inbound calls **4**		
Acceptability testing	TBC		



Both the valuation data, and other customer research around the environment is inconclusive – largely because customers have been asked varying questions on issues relating to the environment. In general, customers don't seem to place a high priority on the environment in valuation studies, nor do they prioritise it in qualitative studies. However, it is regularly identified as an area for improvement, and is a key area of interest for more engaged customer groups.