



# Willingness To Pay Research Results

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# Background Information

# Objective

Undertake quantitative research for Willingness To Pay (WTP) which will provide a £ value from customers on changes to current levels of service.

Monetary values will be used in Cost Benefit Analysis and to determine areas of focus in the plan.



Outcome:  
Future decisions directly guided by customers' priorities



So . . . we need an accurate and representative WTP covering a range of customer groups



Project will guide investment strategies and help NGN improve its plan

# Common criteria for NGN outputs

Customer bill impact is a key business plan evaluation criteria

**DRAFT**

## Criteria for overall business plan

Evaluation area	Overall criteria
Combined scores of outputs	<ul style="list-style-type: none"><li>Has NGN met their evaluation criteria for each individual output area?</li></ul>
Business plan approach and priorities	<ul style="list-style-type: none"><li>Has NGN appropriately considered their priorities and given suitable weighting to different areas and/or output categories?</li><li>Has NGN considered any interlinkages between the output categories?</li><li>Has NGN considered that any interlinkages have been considered appropriately with input from stakeholders and historical performance?</li><li>Is there evidence that any interlinkages have been considered appropriately with input from stakeholders and historical performance?</li><li>Has NGN appropriately considered the balance between investment and innovation throughout the plan?</li></ul>
Long term planning	<ul style="list-style-type: none"><li>Is there evidence that NGN has taken a long term view, beyond the price control period?</li><li>Has NGN considered market developments, and scenarios that may occur beyond the price control period and are the plans reflective of this?</li></ul>
Regional issues	<ul style="list-style-type: none"><li>Has NGN tailored the overall business plan to address specific regional issues or areas of contention?</li></ul>
Customer impact	<ul style="list-style-type: none"><li>Is there evidence that NGN have considered the overall customer impact of all options in the plan?</li><li>Has additional research been done on willingness to pay and value for money for the plan as a whole (rather than just individual outputs)?</li><li>Does Willingness to Pay (WTP) research support the overall business plan?</li></ul>
Quality of presentation	<ul style="list-style-type: none"><li>Is the business plan written clearly and concisely?</li><li>Has NGN used signposting to assist with clarity of the overall plan?</li><li>Is the narrative, evidence and rationale written in a way that is accessible to all stakeholders, including those who may not be familiar with certain technical terms or the RBO2 process?</li></ul>

KPMG

- Has NGN demonstrated value for money by taking account of willingness to pay research?
- Has NGN considered the impact on customer bills?

# Two key inputs to 2019 WTP quantitative research

2018

Priorities  
research

17 areas were ranked  
in importance through  
a max diff exercise

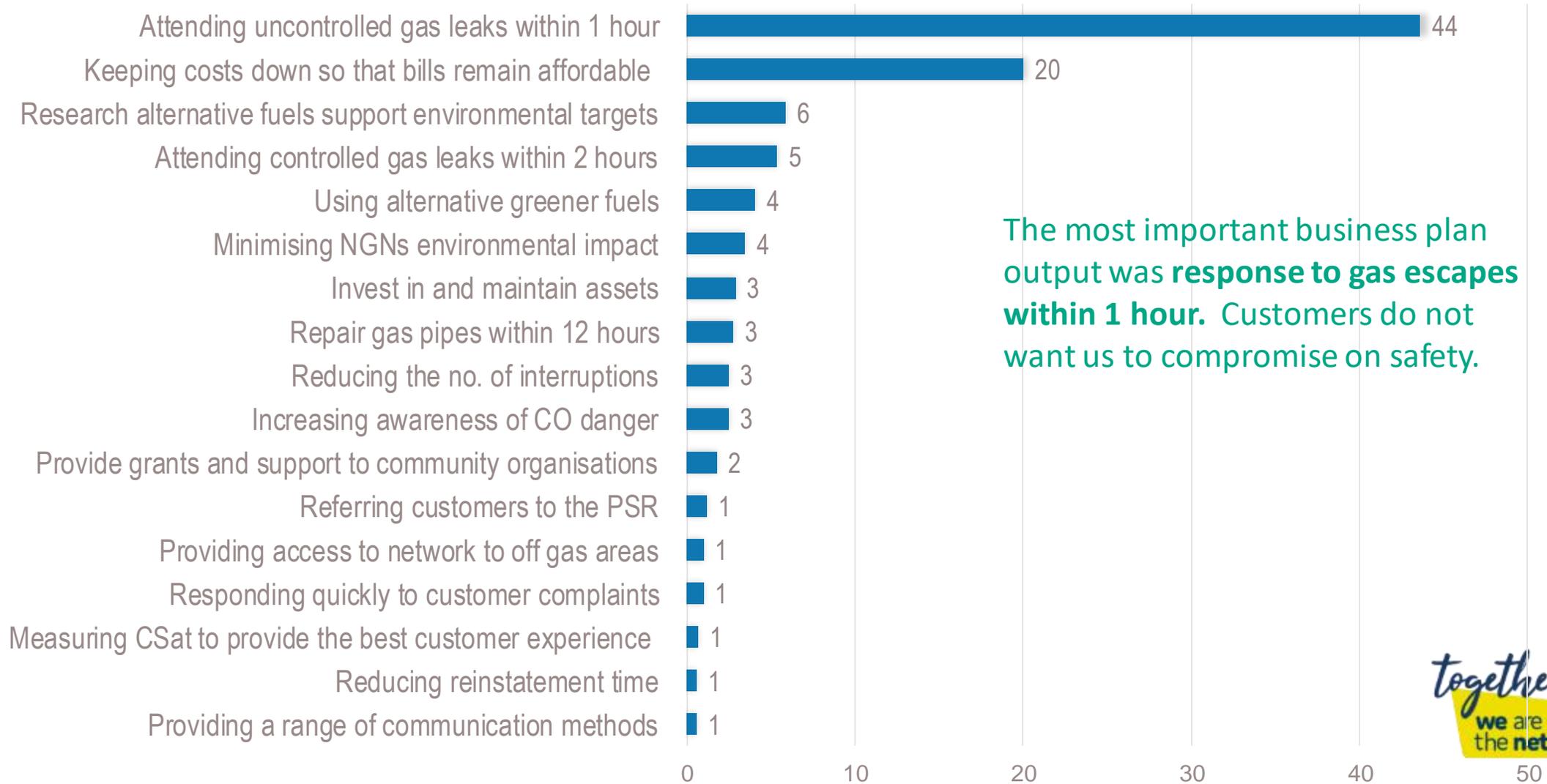
2019

WTP focus  
groups

Exploratory focus  
groups to test the  
business plan outputs

# Priorities Research 2018

642 customers rated **17 priorities** based on an understanding of NGN's obligations and current performance.



The most important business plan output was **response to gas escapes within 1 hour**. Customers do not want us to compromise on safety.



# WTP prioritisation criteria

Prioritisation of the 81 outputs was necessary to ensure WTP scenarios are not over-complicated and the modelling robust. The following criteria was used:

Evidence required for enhanced level of service

ODIs linked to Ofgem's RIIO-2 consultation

Materiality of output areas/investment options to customers' bills

Any investment options that are not covered by outputs

Triangulation with other data sources e.g. complaints

# Qualitative research helped us refine WTP attributes

In-depth conversations with a range of customer segments:



The outputs from this research enabled refinement of the educational material and wording of attributes and levels to be tested in the next stage, which improved **content validity**.

# Care was taken to contextualise potential bill £ changes

Customers co-created the wording below which was shown in the WTP survey

**Before answering these questions, please consider :**

- Whether the changes in the services are **important to you**; and
- Your **overall household income & expenses**, remembering that:

Approximately 83% of your gas bill goes toward the services provided by energy suppliers. This component could still change during the same time period

Any money you pay for these improvements will not be available for you to spend elsewhere

Other household bills may go up or down affecting the amount of money you have to spend in general

Your household bills will also be affected by the rate of inflation each year.

**Please consider your choices carefully.** The results from this survey will be used by NGN to help plan future investment in gas distribution services. It is therefore important that your answers reflect as best possible your views on these services and whether they need improving.

# Agenda

Five key  
questions

1

How have we measured WTP?

2

To what extent are customers WTP for service improvements?

3

Where are improvements valued most highly?

4

How is WTP differentiated by output and customer segment?

5

What should we do next?

# A stated preference\* methodology was used to establish willingness to pay values



## HOW?

Combination of online self-completion surveys, face to face interviewer assisted, and telephone recruitment.



## WHO?

2,206 customers of NGN with quotas set to ensure the sample was representative of the socio-economic profile of the NGN region.



## WHEN?

Fieldwork took place in April and May 2019. Surveys took approximately 25 mins to complete.

\*Stated preference (SP) methods involve asking survey participants a series of carefully designed questions to explore their preferences in relation to the object of the study. When used for social valuation, SP methods invariably involve participants having to make a **trade-off** between **having more or less** of the good or service in question and having to make, or receive, a **higher or lower payment**. It is the trade-off between money and the provision of the good or service that defines the value measure.

# Customers were shown SP trade-off exercises

Customers were prompted to make a preferred choice from three possible options (always including awareness of the current situation) where each was characterised by a number of attributes.

In the next 7 years...	OPTION A	OPTION B
Duration of planned interruptions <i>(currently 90% restored within 12 hours)</i>	97.5% restored within 12 hours	100% restored within 12 hours
Restoration of land once gas work completed ... <i>(currently 5 calendar days)</i>	3 working days	1 working day
Time taken to resolve general enquiries... <i>(currently 95% within 24 hours)</i>	95% within 12 hours	95% within 12 hours
Customer service satisfaction level... <i>(currently GOOD; 9.2 out of 10)</i>	EXCELLENT (9.5 out of 10)	OUTSTANDING (9.9 out of 10)
The CHANGE IN YOUR <u>ANNUAL</u> GAS BILL	NO INCREASE	INCREASE OF £5

In total 24 trade-off exercises were presented to customers in two blocks of 12.

# We tested 13 business plan outputs across 5 thematic areas



Safety

x1 output



Vulnerability

X2 outputs



Environment

X2 outputs



Customer Service

X4 outputs



Interruptions

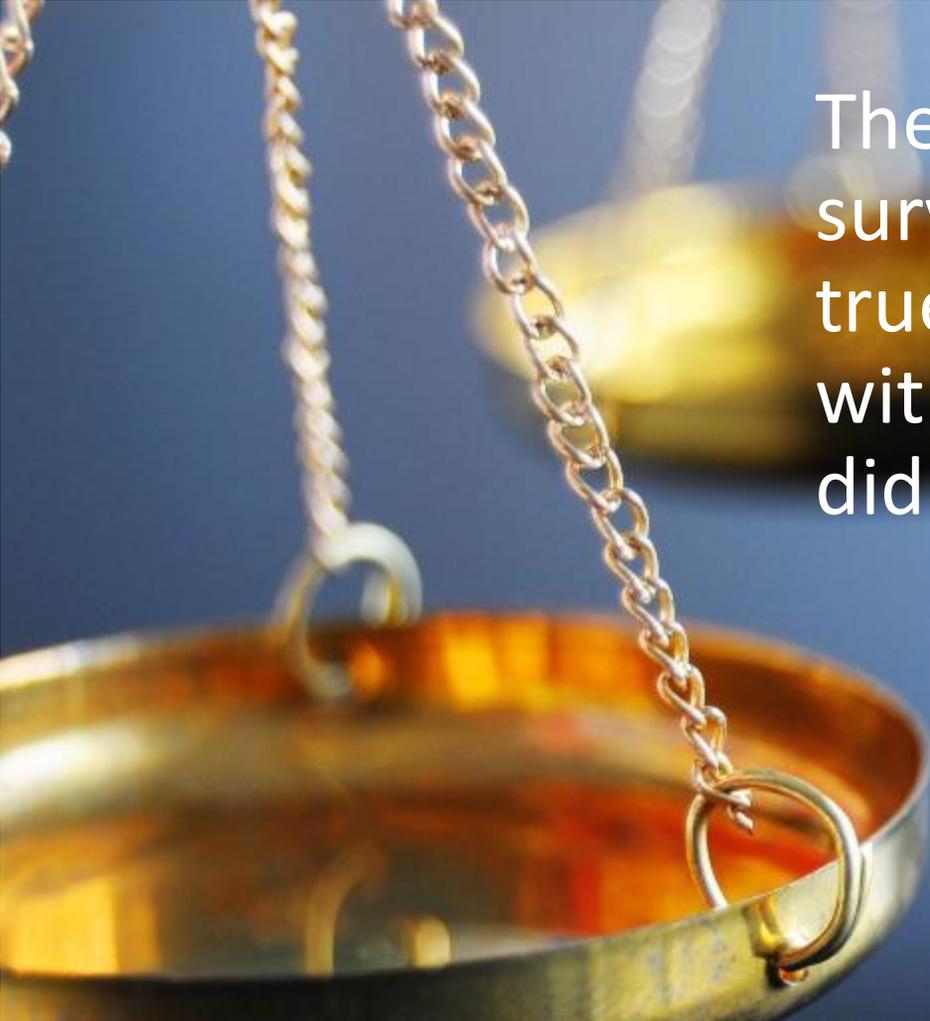
X3 outputs

# The following price levels were tested in the survey

Commercial customers were asked as a % of their bill due to the variation in bills



# The data in this presentation is representative of NGN's region



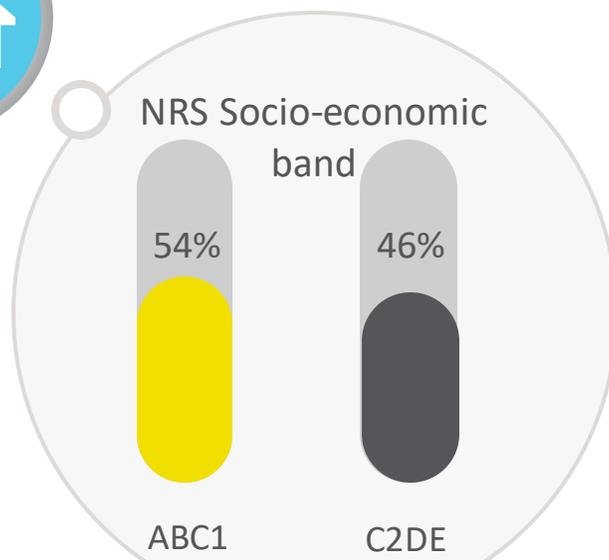
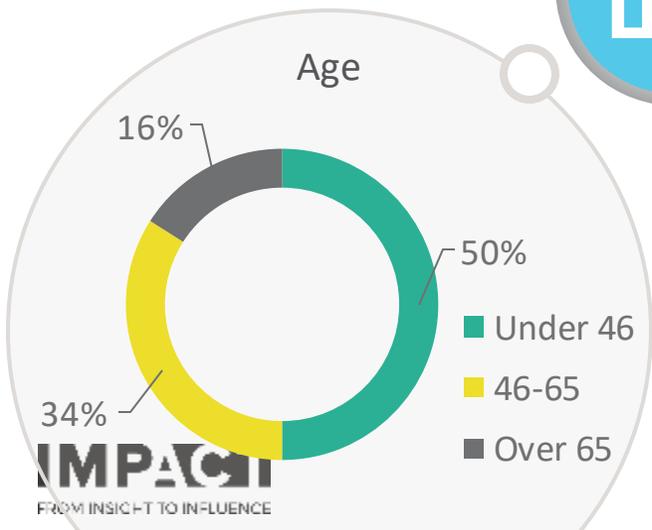
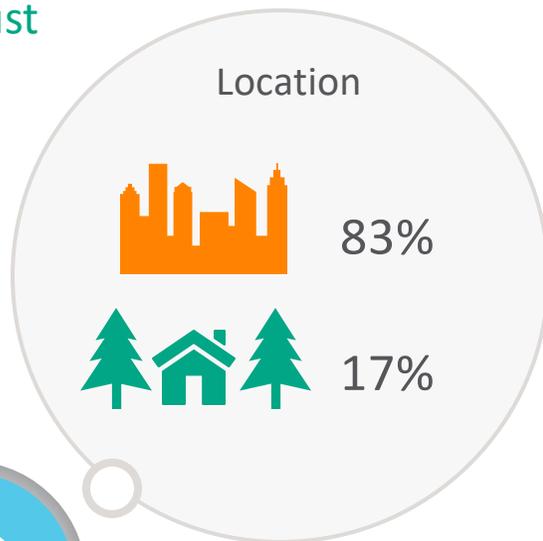
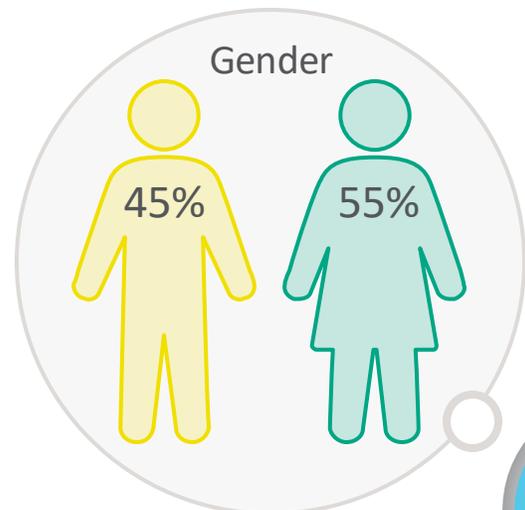
The socio-demographic profile of the survey population is within 5% of the true incidence of customer groups within the region, therefore the data did not require weighting.

Data representative based on: gender, age, socio-economic class, vulnerable population, English as a second language, ethnic minority population, experienced a gas interruption.

# Domestic and commercial customer were taken through bespoke surveys with appropriate wording

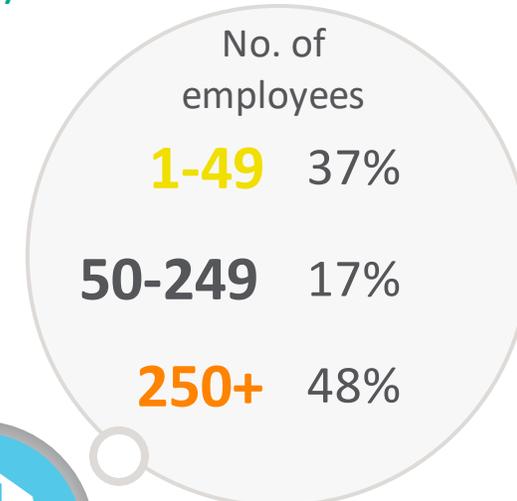
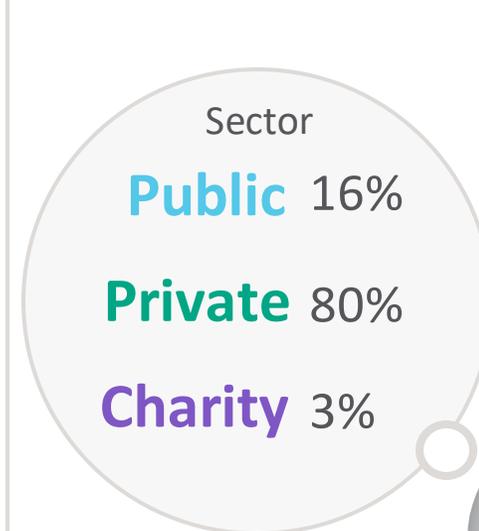
## 1,828 DOMESTIC

Statistically robust



## 378 Commercial

Statistically robust



S5 Please state your gender. Base (Domestic) = 1828.  
 S6 Which of the following age categories applies to you? Base (Domestic) = 1828.  
 S7 Which ONE of the following categories best describes the employment status of the *Chief Income Earner* (CIE) in your household? Base (Domestic) = 1828  
 S8 How would you describe the location where you [DOMESTIC] live / [COMMERCIAL] work? Base (All) = 2206.  
 S9 How many employees are there at the company you work for? If your company operates across multiple sites please include the total number of people across all sites. Base (SME) = 378.  
 S11 Which of the following best describes your organisation? Base (SME) = 378.

# The survey population is closely correlated to population density on NGN's network

We have used postcode mapping to illustrate the spread of customers surveyed, ranging from densely populated cities to sparsely populated rural areas.

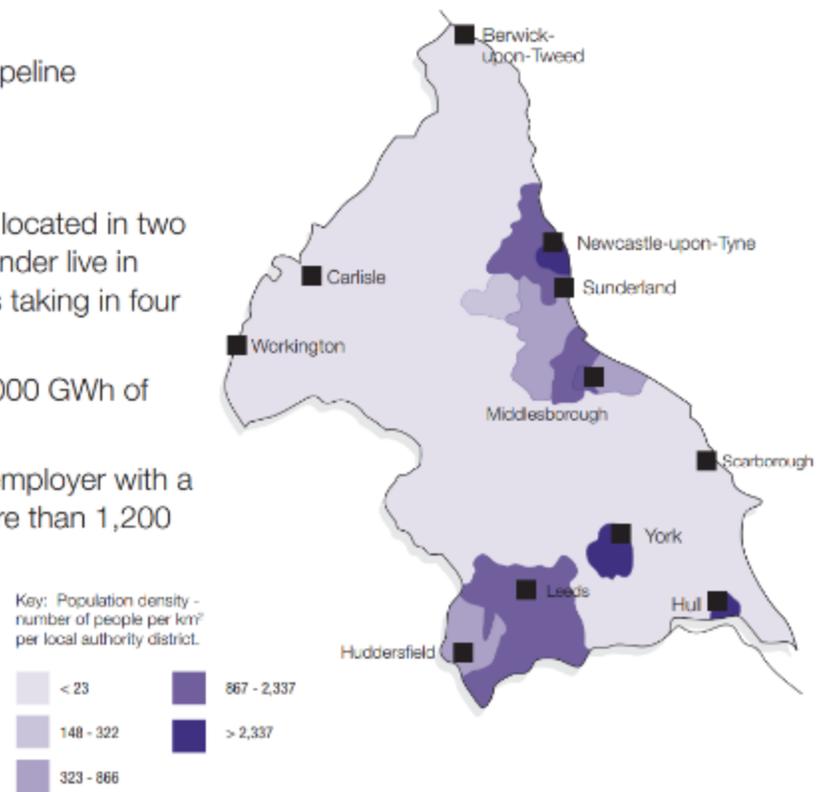
NGN's network:

- Consists of 37,000km of pipeline
- Covers 25,000km<sup>2</sup>
- Serves 2.6m customers

50% of NGN's customers are located in two large conurbations. The remainder live in sparsely populated rural areas taking in four national parks.

The network transports c.82,000 GWh of energy annually.

NGN is a significant regional employer with a highly skilled workforce of more than 1,200 staff and 800 contractors.



Where our WTP participants live



# Vulnerable customers and those who had experienced gas disruptions were interviewed as part of the mix of groups



1,828 household customers were interviewed meaning we have been able to analyse WTP by a diverse range of groups. Customers self-classified themselves, often into multiple groups:



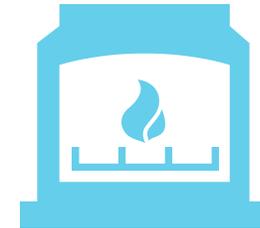
34% experienced planned/ unplanned interruptions in last 10 years



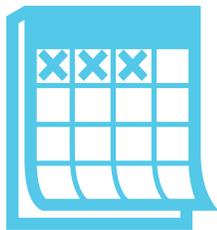
97% considered English their first language



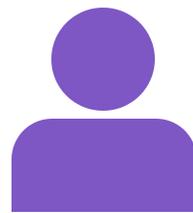
50% of households met vulnerability criteria



40% claim to spend >10% of income on heating their home



9% experienced a major service incident



9% were part of an ethnic minority



5% were digitally disengaged



11% were financially vulnerable



D1 There are a wide range of factors that could mean anyone might need extra help or support. Base (Domestic) = 1828. D3 Do you spend more than 10% of your household income on heating your home? Base (Domestic) = 1828. D4 Which of the following best describes your ethnicity? Base (Domestic) = 1828. D5 Do you consider English to be your primary/first language? Base (Domestic) = 1828. D6 How often do you use the internet? Base (Domestic) = 273. Q4 Have you had an interruption to your gas supply at your <home (DOMESTIC) / business (COMMERCIAL)> in the last 10 years? This could be where you were told about it in advance (a planned interruption) or where there was no warning (an unplanned interruption). Please think only about an interruption to your gas, not any other source of energy (for example electricity). Base (All) = 2000. Q5c Have you ever had an unplanned interruption to your gas which affected a large amount of people in your area and was longer than 48 hours? Base (All) = 650.

# Customers initially ranked their priority areas before completing the WTP exercise

1  Safety  
71% ranked safety in top 2

2  Vulnerability  
39% ranked vulnerable in top 2

3  Environment  
32% ranked environment in top 2

4  Customer Service  
29% ranked customer service in top 2

4  Interruptions  
29% ranked interruptions in top 2

Vulnerability was initially ranked highly by customers, more so than in other Priorities Research. This is likely to be linked to **social norms**.

Q11 Thinking about the services NGN provides, please rank the following priorities from 1 to 5 based on how important you feel they should be to NGN's plans, where 1 is most important and 5 is least important. Asked on a 1-5 rating scale.

# Agenda

Five key  
questions

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Where are improvements valued most highly?

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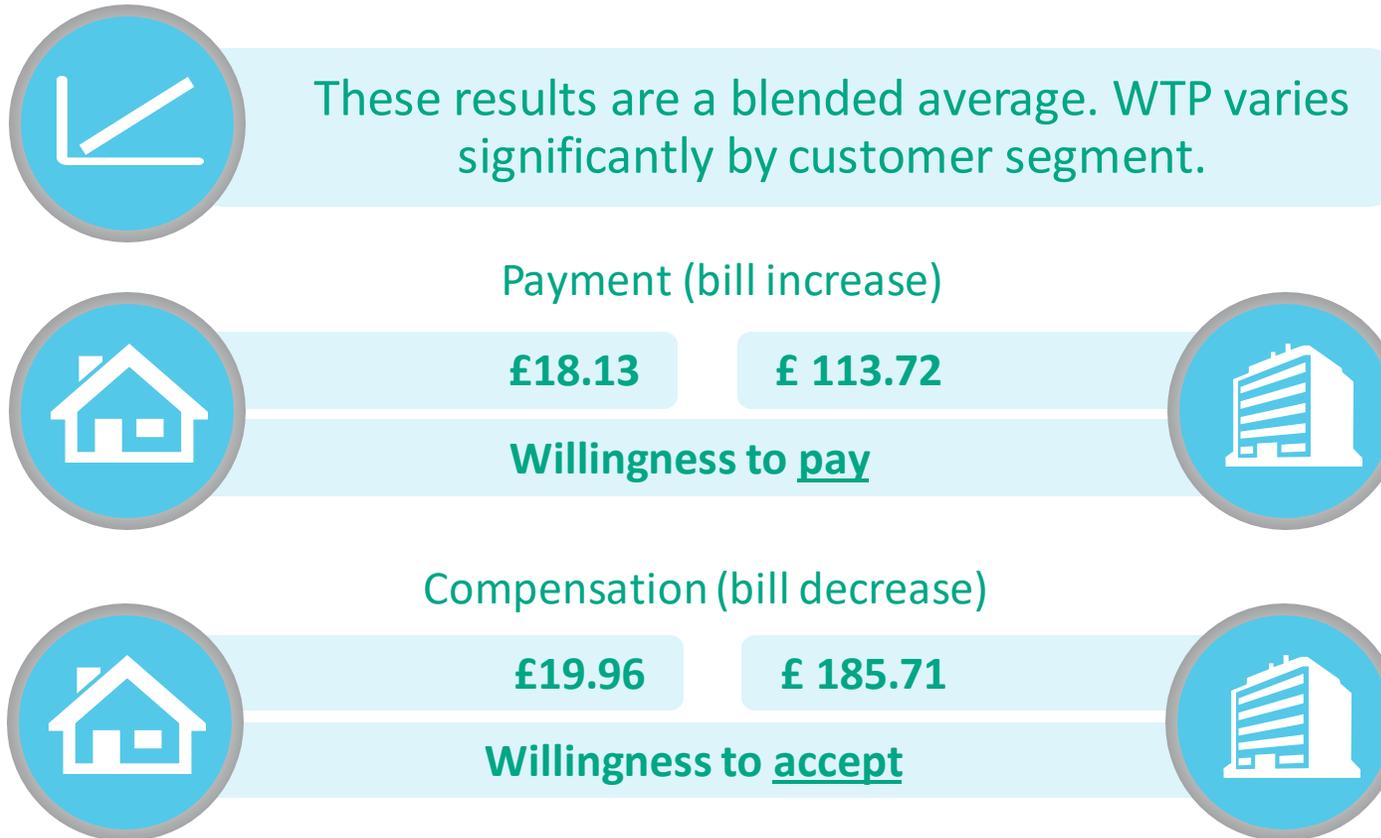
How is WTP differentiated by output and customer segment?

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What should we do next?

# Customers are willing to pay more for improved outputs

The average bill increase that customers are willing to pay for the most improved level of service across all 13 business plan outputs is:



# The validity of WTP results is appraised using content and construct indicators

## Content validity

Refers to whether the survey instrument has been developed in such a way that respondents from varied backgrounds and varied interest levels can comprehend the questions being asked and can in turn, formulate accurate preferences.

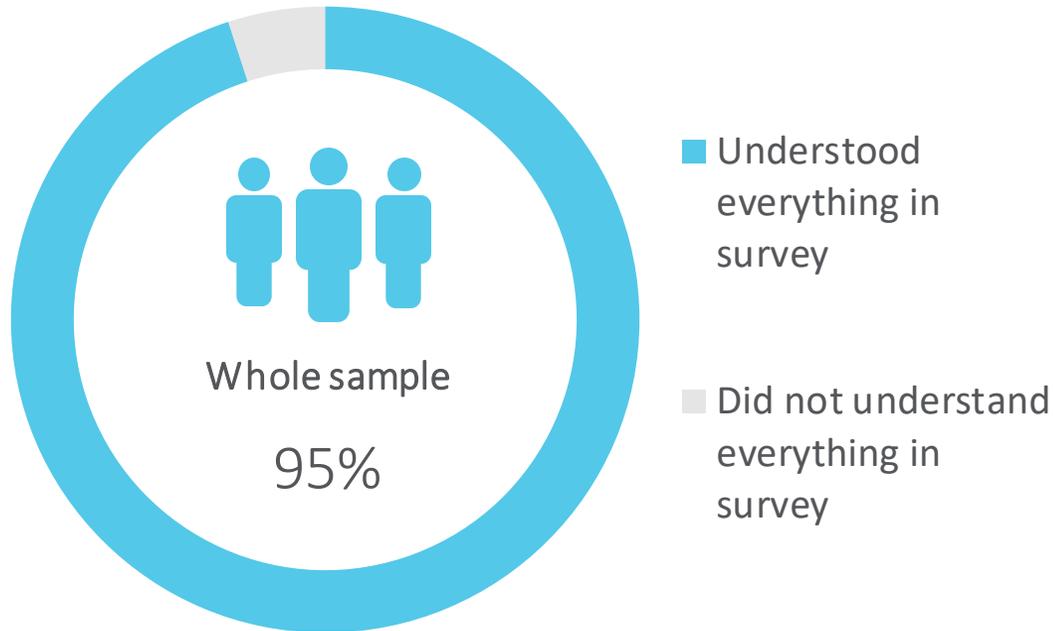
Content validity looks for evidence demonstrating that attributes have been **correctly perceived**, that the choices are **relatively straightforward** to make, and that the material presented was considered to be **plausible** by respondents.

## Construct validity

Assesses whether the results of the SP experiments link with **other measures, economic theory and expectations**. As part of our assessment we have triangulated the results with third party insights.

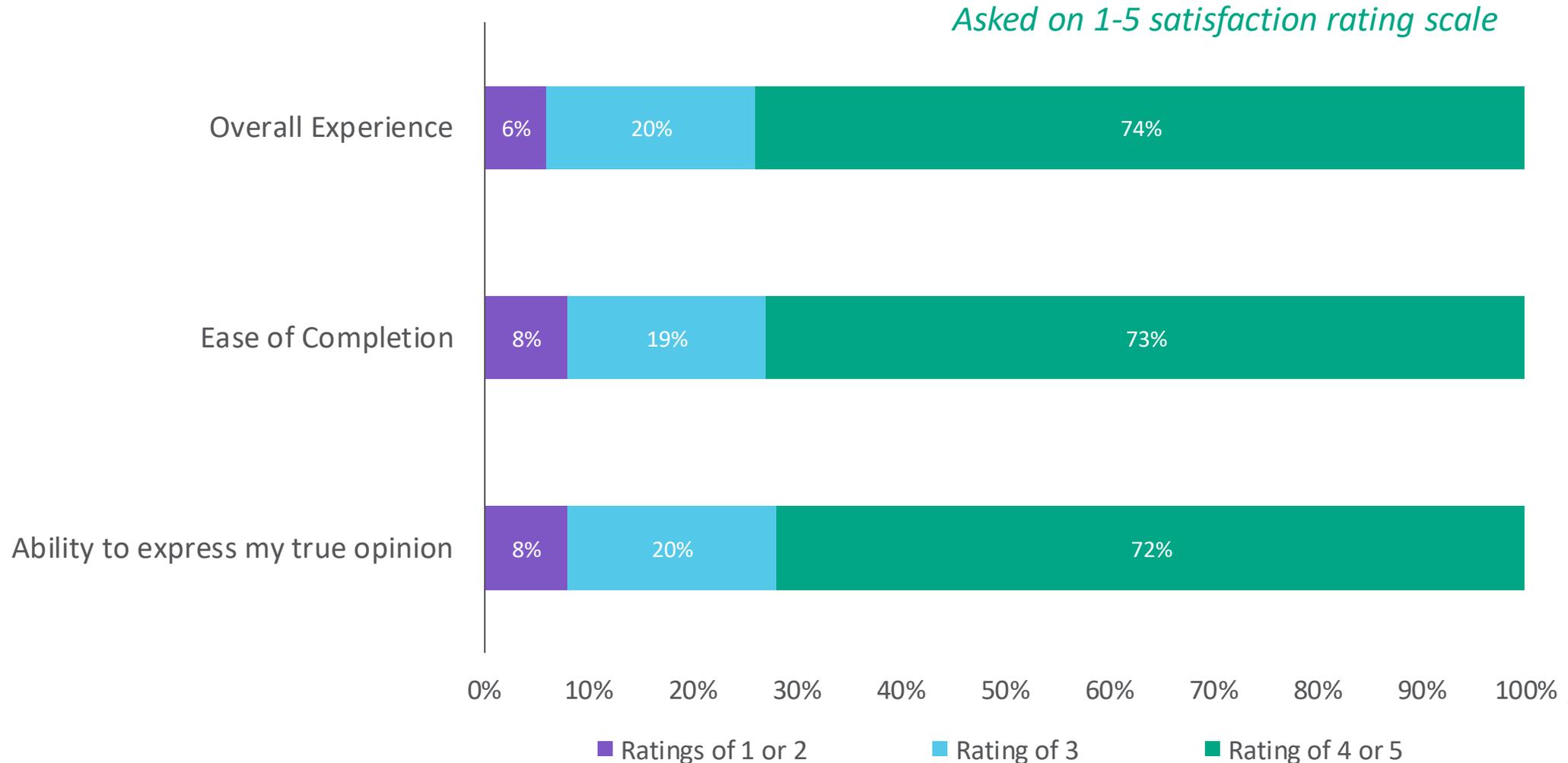
# Content validity: how easy was the survey to understand?

Customers, including those in vulnerable circumstances, felt they understood everything included within the WTP survey.



# Content validity: how did customers rate the survey?

These statistics are satisfactory for a stated preference survey such as this, particularly given the complex subject matter of the survey.



# Construct validity:

- We have seen evidence in the segmentation analysis that more affluent customers and those that have experienced interruptions in the past were found to have higher WTP, as expected.
- Triangulation demonstrates that WTP values are comparable to those published through third party insights (see slides 30-31).
- Overall, the valuation estimates presented in this report can be considered to be meaningful measures of customers' values for the range of service initiatives contained within the survey. This is based on the validity assessment (goodness-of-fit and predictive accuracy) of the SP results.

# Triangulation – Yorkshire Water PR19



## Comparing % of customers that always go for the lowest possible price

### The detail

Quantitative surveys conducted via a combination of Computer Aided Personal Interviewing (CAPI) and online panel. A total of 1,020 household and 542 business surveys are included. For each choice experiment, household customers were shown four sets of three choices, the status quo and two alternative options with different bill impacts associated with each.

### The outcome

Around 1/3 of respondents consistently choose the status quo when given multiple choices.

WTP for the best level of improvement presented was £15.46 – comparable to our domestic WTP of £18.13.

Table 2. Proportion of serial status quo choices and bill reduction option choices

Service area	Always choose status quo	Always choose bill increases	Always choose bill reductions
Water quality	39%	15%	6%
Supply of water	33%	13%	9%
Sewerage services	34%	16%	8%
Environment	32%	24%	6%

NGN

28% of customers selected the status quo (no bill increase) regardless of the improvement options presented to them. This is in line with Yorkshire W.



# Triangulation – DNOs WTP ‘19



## Comparing customers WTP across sectors

### The detail

Quantitative surveys conducted with household customers. A mixed-method approach was adopted for the main survey, combining face-to-face and online fieldwork. The target sample was for 1,200 household participants, representatively split by DNO area.

### The outcome

WTP for the best level of improvement presented was £26 – higher than our domestic WTP of £18.13.

Service bundle - ENWL	WTP for all initiatives in bundle [£/HH/Yr]
<i>Customer support</i>	£6.92
<i>Vulnerable customer support</i>	£6.15
<i>Sustainability</i>	£5.18
<i>Resilience</i>	£4.40
<i>Smart networks</i>	£3.13
<b>Total</b>	<b>£25.78</b>

Service bundle - UKPN	WTP for all initiatives in bundle [£/HH/Yr]
<i>Customer satisfaction</i>	£6.09
<i>Vulnerable customer</i>	£7.05
<i>Community engagement</i>	£3.37
<i>Smart networks</i>	£9.58
<b>Total</b>	<b>£26.09</b>

### Why would WTP be higher for DNO services?

Unplanned power cuts are a 1 in 3 year event compared to a 1 in 200 year event for gas interruptions, meaning greater importance is placed upon customer support. The DNO Proportion of the bill is 25% vs. 17% GDN.

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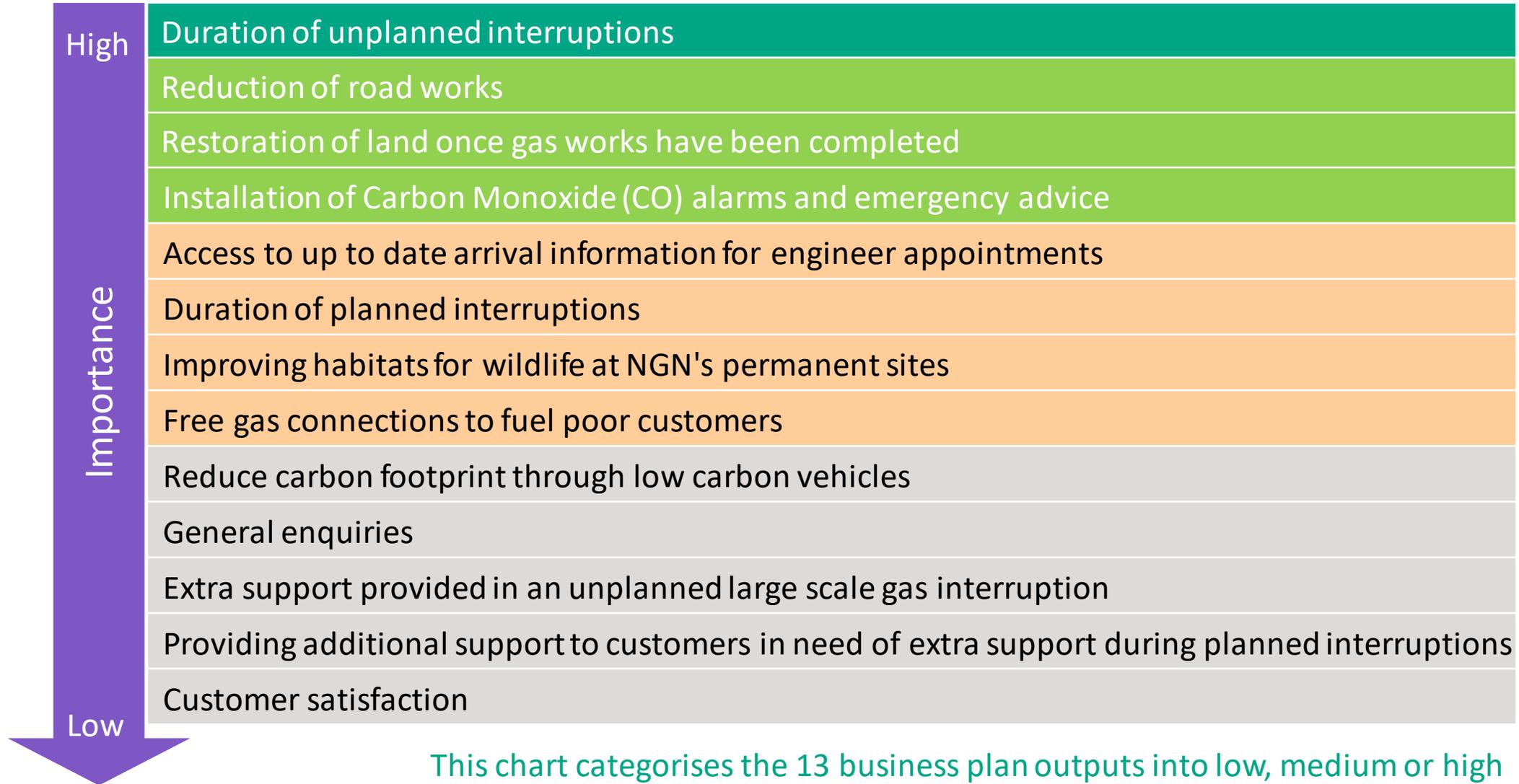
4

How is WTP differentiated by output and customer segment?

5

What should we do next?

# For domestic customers the most valued outputs are:



This chart categorises the 13 business plan outputs into low, medium or high influence in driving customers' WTP in the SP exercise.

# Monetary values *within* service outputs are not cumulative

## Domestic customers – summary of WTP by output area

There is significant incremental value attached to the best level of service vs. the current situation for interruptions and safety outputs



### Interruptions



### Safety



Chart 37 onwards illustrate the average monetary value that customers are WTP for each individual level of improvement available, by output.

Within each output (e.g. duration of unplanned interruptions) the values are not cumulative i.e. we shouldn't sum the WTP for no gas for 12 hours, 8 hours or the best level of service – 2 hours.

One level of service can be taken from each output to arrive at a total WTP bill value.

# Domestic customers – summary of WTP by output area



There is significant incremental value attached to the best level of service vs. the current situation for interruptions and safety outputs

## Interruptions

### Duration of unplanned interruptions



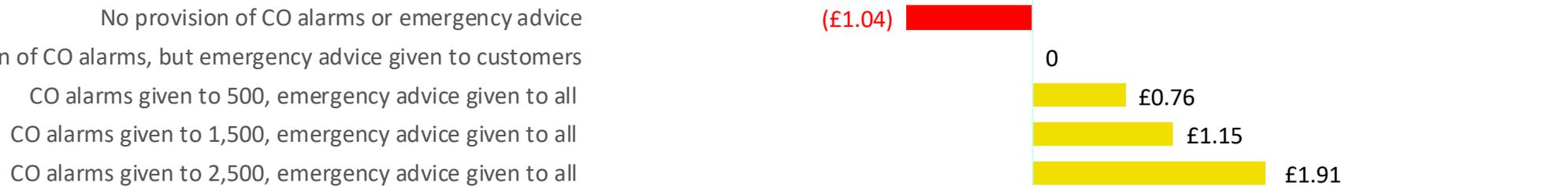
### Reduction of road works



### Duration of planned interruptions



### Installation of Carbon Monoxide (CO) alarms and emergency advice



## Safety

# Domestic customers – summary of WTP by output area



WTA (compensation) values are relatively high vs. WTP for detriments in service in improving habitats for wildlife and a low carbon vehicle fleet

## Environment

Improving habitats for wildlife at NGN's permanent sites



■ WTA  
■ WTP

Reduce carbon footprint through low carbon vehicles

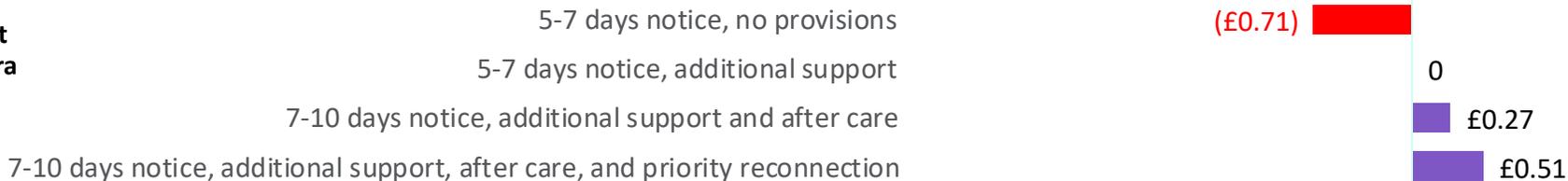


Free gas connections to fuel poor customers

## Vulnerability



Providing additional support to customers in need of extra support during planned interruptions



# Domestic customers – summary of WTP by output area



WTA (compensation) values are relatively high for moving from an 8hr to 12hr appointment

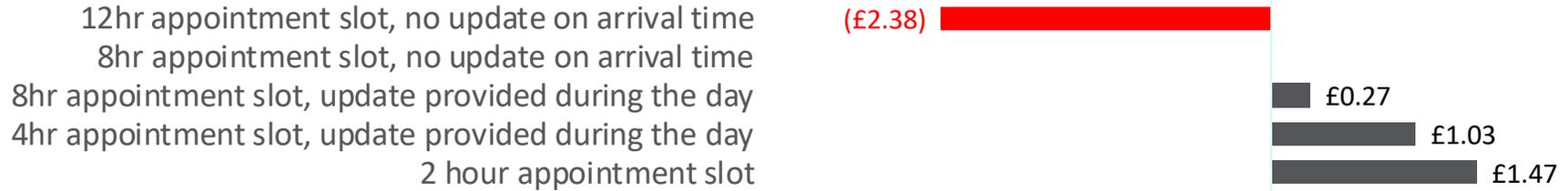
## Customer Service



Restoration of land once gas works have been completed



Access to up to date arrival information for engineer appointments



■ WTA  
■ WTP

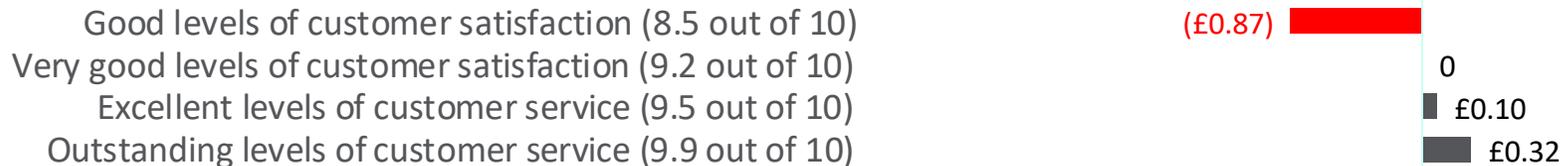
General enquiries



Extra support provided in an unplanned large scale gas interruption



Customer satisfaction



# Commercial customers place more importance on low carbon vehicles than domestic customers



Importance	High	Access to up to date arrival information for engineer appointments
		Duration of unplanned interruptions
		Installation of Carbon Monoxide (CO) alarms and emergency advice
		Duration of planned interruptions
		Reduce carbon footprint through low carbon vehicles
		Restoration of land once gas works have been completed
		Free gas connections to fuel poor customers
		Reduction of road works
		General enquiries
		Improving habitats for wildlife at NGN's permanent sites
		Providing additional support to customers in need of extra support during planned interruptions
		Customer satisfaction
	Low	Extra support provided in an unplanned large scale gas interruption

This chart categorises the 13 business plan outputs into low, medium or high influence in driving customers' WTP in the SP exercise.

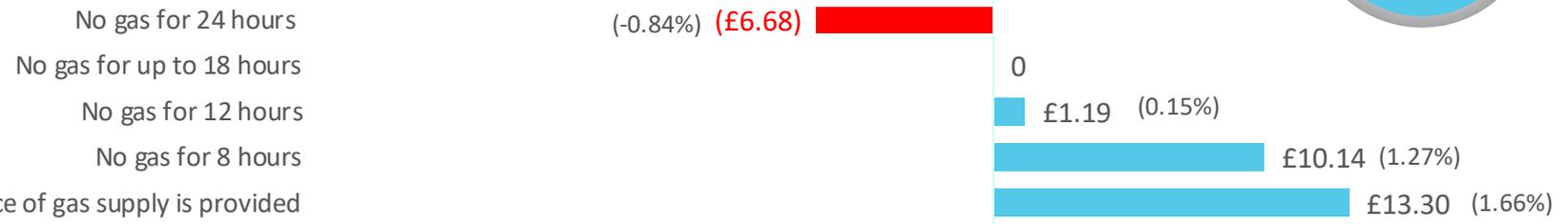
# Commercial – summary of WTP by output area



## Interruptions

### Duration of unplanned interruptions

A short interruption (less than 2 hours) before an alternative source of gas supply is provided



### Duration of planned interruptions

90% restored within 12 hours  
 95% restored within a maximum of 12 hours  
 97.5% restored within 12 hours  
 99% restored within 12 hours  
 Planned work is conducted without any disruption



### Reduction of road works

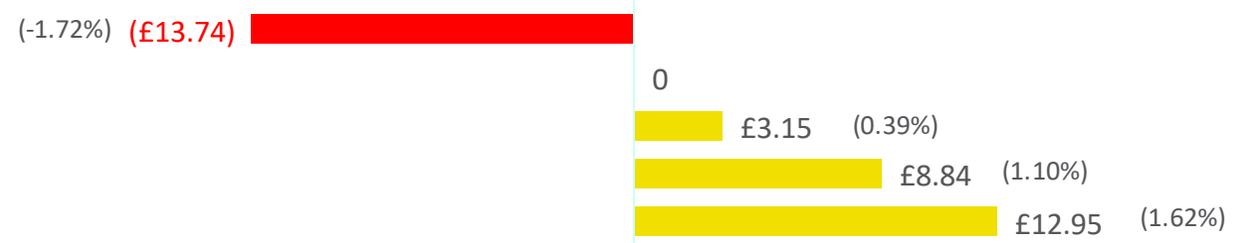
Average duration of road works, 20 days  
 The average duration of a repair is, 16 days  
 Average duration of road works, 12 days  
 Average duration of road works, 8 days  
 Average duration of road works, 4 days



## Safety

### Installation of Carbon Monoxide (CO) alarms and emergency advice

No provision of CO alarms or emergency advice  
 No provision of CO alarms, but emergency advice given to customers  
 CO alarms given to 500, emergency advice given to all  
 CO alarms given to 1,500, emergency advice given to all  
 CO alarms given to 2,500, emergency advice given to all

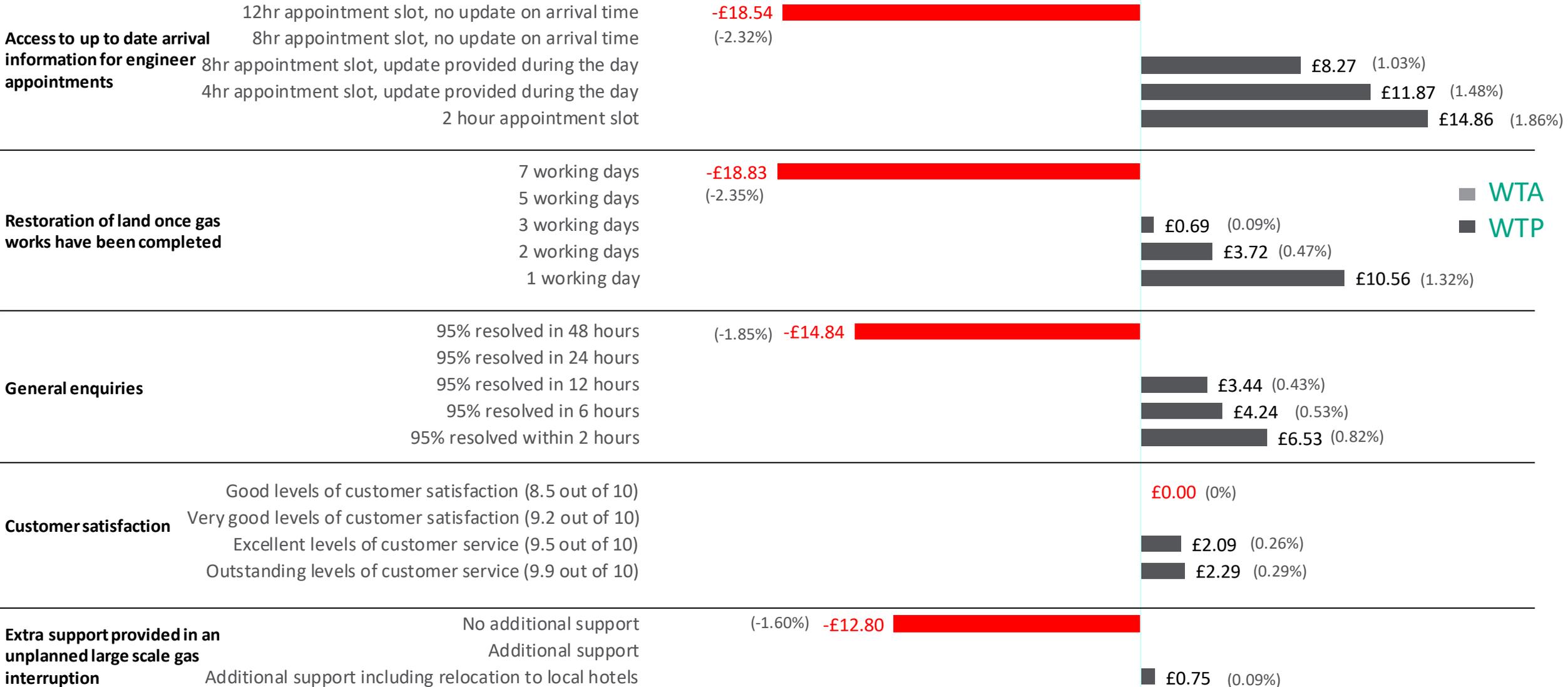




# Commercial – summary of WTP by output area



Customer Service



■ WTA  
■ WTP

# Commercial – summary of WTP by output area



## Environment

WTA values are very high for NGN not progressing replacement of its vehicle fleet

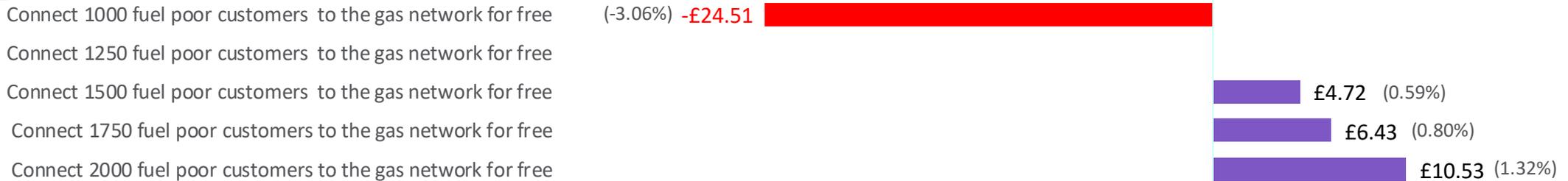
### Reduce carbon footprint through low carbon vehicles



### Improving habitats for wildlife at NGN's permanent sites



### Free gas connections to fuel poor customers



### Providing additional support to customers in need of extra support during planned interruptions



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# Customer groups with the greatest willingness to pay more

The average WTP for all domestic customers is **£18.13**

Ethnic minorities £25.87	<i>Ethnic minorities who can also be classified as:</i>					
	C2DE £36.93	Suffered interruption £39.41	Male £34.18	Vulnerable £30.77	Urban £26.00	Under 45 £25.73 Female £23.12

Under 45 £19.42	<i>Under 45's who can also be classified as:</i>		
	Suffered large scale interruption £42.08	Vulnerable £23.42	Suffered interruption £23.30

ABC1 suffered large scale interruption  
£23.75

Blind/partially sighted £31.42	Poor sense of smell £30.01	Hearing/speech difficulties £28.52	Mental health difficulties £23.35	Temporary life change £23.38
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Broadly speaking the groups who are more likely to be willing to pay more are: ethnic minorities, those that have suffered an interruption (particularly large) affluent customers and those with specific types of vulnerability.

# Customer groups with relatively low willingness to pay more

The average WTP for all domestic customers is £18.13

Rural £13.81	<i>Rural customers who can also be classified as:</i>			
	Under 45 £12.09	Suffered interruption £10.44	C2DE £5.10	

Digitally disengaged £10.15	<i>Digitally disengaged who can also be classified as:</i>			
	65+ £10.62	Female £9.40	C2DE £8.91	Vulnerable £8.03



Male  
Not vulnerable  
£13.04



45-65  
Suffered interruption  
£12.71

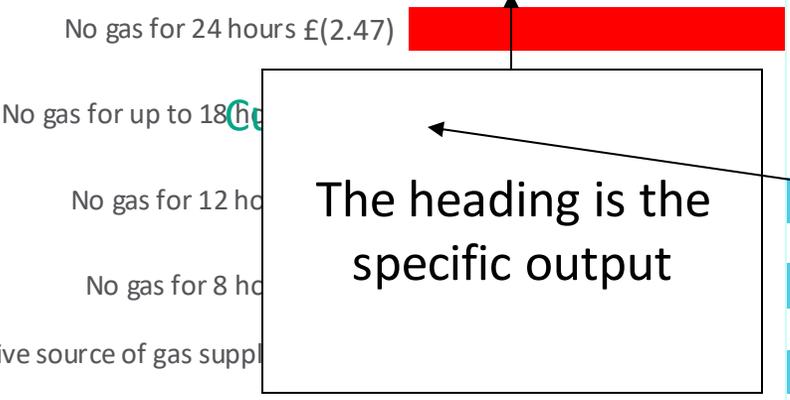
Broadly speaking the groups who are less likely to be willing to pay more are: rural, relatively low income, digitally disengaged.

The following slides provide more granular detail into how different groups of domestic customers have responded to specific business plan outputs.

The outputs are ordered by WTP (highest to lowest).

**Interruptions**

**ATTRIBUTE Duration of unplanned interruptions**



This key shows the thematic area

The heading is the specific output

This is the current service level and therefore there is no WTP or WTA value

The top bar is what customers are willing to accept for a reduction in service

The bottom 3 bars are the improvement attributes and what customers are willing to pay for these

**Key sub-groups**

**More willing to pay (a short interruption)**

This box includes subgroups of customers who are willing to pay **more** for the top level of service improvement

**Less willing to pay (a short interruption)**

This box includes subgroups of customers who are want to pay **less** for the top level of service improvement

This box includes subgroups of customers who are 'vanilla' i.e. in line with the average

Average groups:

# Interruptions

## Duration of unplanned interruptions



A short interruption (less than 2 hours) before an alternative source of gas supply is provided

## Key sub-groups

### More willing to pay (a short interruption)

- Ethnic minorities, £5.15
- Females, £4.38
- Vulnerable, £4.17
- 65+, £4.06

### Less willing to pay (a short interruption)

- Digitally disengaged, £2.19
- Males, £2.65
- Rural, £2.74
- Not vulnerable, £2.92

Average groups: Urban, under 65.

# Agenda

Five key  
questions

1

How have we measured WTP?

2

To what extent are customers WTP for service improvements?

3

Where are improvements valued most highly?

4

How is WTP differentiated by output and customer segment?

5

What should we do next?

# Conclusions (1)

- WTP research has found a **positive value** for improvements to all service outputs.
- However, not all outputs are equal. The most important outputs (i.e. influential in driving WTP) are those that **minimise customer disruption**: duration of unplanned interruptions, roadworks and re-instatement.
- This provides compelling evidence to support NGN's '**Project Zero**' aspiration; to enable routine maintenance in a live gas situation, thereby preventing customer disruption.

## Conclusions (2)

- **WTA estimates** are on average higher than the comparable WTP estimates.
- This is as expected. When customers are used to enjoying a **reliable service** that they pay for, they typically want a greater payment in order to bear a loss of that service than they are willing to pay to improve it further.
- An analogy here would be the transport sector; comparing the amount customers are willing to pay for a train ticket and the compensation they may expect if the service is cancelled and replaced with a bus service.

# Conclusions (3)

- WTP varies significantly across the full spectrum of **customer segments**.
  - **Commercial customers** place relatively high importance (vs. households) on low carbon vehicle fleet and reducing any type of gas supply interruption, including planned works.
  - Despite general appetite for improvements, some customer segments have a much lower **willingness/ ability to pay more**: those in rural areas, low income households and the digitally disengaged, to name a few. Approx. ¼ of customers always opted for no changes to bills, by opting for the status quo in the SP exercise.
- The results will support NGN in determining the most appropriate **performance level** to meet within each output, aligned to stakeholders priorities and CBA.

## Conclusions (4)

- WTP, like the learnings from Mini Public, indicate a willingness amongst bill payers to **pay more for improved services.**
- However evidence from across NGN's stakeholder engagement programme suggests that customers want bills that are no higher than absolutely necessary. The provision of gas is essential - and it **must be affordable for all .**

# Next steps: CBA

- The reported estimates do not in themselves indicate an economic order or priority for determining the types of improvement that NGN should focus on because they only indicate the benefits of the improvements and do not take account of costs.
- The CBA work undertaken by NGN should incorporate the cost estimates.
  - The WTP values derived from the discrete choice exercises can be converted into a 'per unit' value by relating each result to the approximate number of customers affected.
  - In general, the ordering of initiatives that will give rise to maximum benefits given constrained expenditure, will be found by dividing each of the value estimates by estimates of the corresponding costs that would necessarily be incurred to implement them.