electricity north west

Bringing energy to your door

Annex 15A: Smart Street Consumer Value Proposition (CVP)

Introduction to our Smart Street CVP proposal for RIIO-ED2.

December 2021

Contents

1 Executive Summary

This Annex describes the introduction of the CVP concept for RIIO-ED2 and our considerations behind the Smart Street CVP proposal in our Final Business Plan (FBP).

Ofgem define CVPs as:

Consumer Value Proposition is Stage 2 of the Business Plan Incentive, where a DNO could bid for reward by demonstrating the additional value its business plan will generate for existing and future consumers and consumers in vulnerable situations[1].

We have reviewed our Draft Business Plan (DBP) in this context, considering both the CVP criteria and also where our Proposals go beyond Ofgem's baseline expectations.

We have reviewed potential candidates for CVPs and identified Smart Street as a Whole System CVP that is now included in our FBP.

Smart Street technology manages network voltage so that appliances perform more efficiently, reducing customers' energy consumption. By controlling the output voltage of our distribution transformers, the Smart Street project will provide the following benefits to our customers:

1. A reduction in energy consumption, which potentially translates to a reduction in the customer's electricity bill;
2. Releasing capacity on the network leads to a quicker connection process for low carbon technologies (LCTs), facilitating a wider adoption; and
3. An overall reduction in carbon emissions due to a reduction in energy consumption, reinforcement and technical losses.

Smart Street provides significant support for customers in vulnerable circumstances, particularly those in fuel poverty and clearly goes beyond Ofgem's baseline expectations (set out in Appendix 3 to Annex 1 of the RIIO-ED2 Methodology Decision). Utilising a Social Return On Investment (SROI) approach to articulate the wider or societal benefits to consumers shows that the benefits of Smart Street clearly exceed the minimum level of value to consumers per accepted CVP proposal.

We consider that Smart Street clearly qualifies as a CVP and invite Ofgem to assess Smart Street under stage 2 of the Business Plan Incentive (BPI).

[1] P.93, https://www.ofgem.gov.uk/sites/default/files/docs/2020/12/ed2_ssmd_overview.pdf

2 CVP definition

2.1 CVP background

Ofgem introduced the Consumer Value Proposition as part of the Business Plan Incentive (BPI) for the RIIO-2 price controls. It forms Stage 2 of a four stage BPI process and looks to incentivise companies to propose initiatives that generate additional value for consumers.

A wide range of CVPs were proposed as part of the RIIO-GD and T2 price reviews and the overwhelming majority of them were rejected by Ofgem. As a consequence, Ofgem has issued much greater detail in the Business Plan Guidance on its CVP expectations for RIIO-ED2, including the areas of focus which would make a CVP eligible. Ofgem has stated that its CVP areas of focus are:

i) Proposals that demonstrate approaches to providing services to vulnerable consumers that clearly go beyond the baseline expectations
ii) Proposals that demonstrate approaches to providing services to major connection customers that clearly go beyond the baseline expectations
iii) Proposals that exceed the baseline expectations that Ofgem has set out for Environmental Action Plans
iv) Proposals that demonstrate approaches to Distribution System Operation (DSO) activities that clearly go beyond the baseline expectations set out in the roles and principles for DSO
v) Proposals that exceed the minimum requirements that Ofgem has set out for whole system approaches in the whole systems section of the RIIO-ED2 Business Plan Guidance

For each of these, Ofgem has set out a range of 'baseline expectations' that are effectively minimum requirements that the Business Plans have to satisfy. Satisfying these expectations forms Stage 1 of the BPI, essentially the first hurdle that the Business Plan has to clear. Proposals above these baselines can be considered as eligible for a reward under the CVP process.

2.2 Addressing Ofgem CVP Considerations

Ofgem gave further specific guidance on how to identify CVPs in preparation for our FBP submission. We have therefore taken a selective approach to the identification of CVPs at final submission stage, though our plan overall contains many aspects that provide consumer value within eligible scopes for CVP.

The following section provides the information and benefits assessment behind the selection of Smart Street as a CVP.

In assessing a CVP proposal, Ofgem expects to consider matters including:

Ofgem Criteria	ENWL Response
The monetised value should be at least £3m per proposal and the total number of proposals should not exceed ten per Business Plan.	Our CVP is of value to consumers of at least £3m.
Whether the proposal goes over and above the minimum requirements under Stage 1 of the BPI.	We confirm undertaking Smart Street is not a minimum requirement for ED2.

Ofgem Criteria	ENWL Response
The extent to which the proposal represents additional value to consumers, taking into account the functions typically undertaken by an energy network company as business as usual. For example, we would not expect to reward activities currently undertaken by DNOs in RIIO-ED1.	The activity is not undertaken by other DNOs in ED1. We are uniquely undertaking Smart Street in ED1 and therefore it is not a business as usual (BAU) DNO activity.
The extent to which the proposal includes evidence that shows how it incorporates consumer expectations/priorities and value (which may include willingness to pay).	Our CVP provides the assessment of value to consumers.
The extent to which the proposal has been reviewed by and received the support of the Ofgem RIIO-2 Challenge Group, the DNO's CEG or, otherwise, the extent to which reasons for the lack of such support are clearly and satisfactorily explained.	The ENWL CEG have been involved in the development of Smart Street as a proposal since 2019 due to its early inclusion in customer preference testing. They also reviewed the Smart Street CVP principles at a dedicated session in November 2021. The Challenge Group raised a number of queries relating to the details and operation of Smart Street following the Draft BP which we have addressed with the provision of additional explanatory materials and a follow up explanatory session with CG members.
Whether the proposal includes a monetised consumer benefit and an associated monetisation methodology and the extent to which such a methodology is reasonable. The more confidence we have that the methodology is robust and generates an accurate value of consumer benefit, the more confidence we will have that any associated reward is appropriately sized and will provide a net benefit for the consumer. We consider that the use of a common methodology will enable consistency and comparability between how DNOs estimate consumer benefit and, in doing so, is likely to provide a level of confidence of whether consumer benefit has been reasonably calculated. For the avoidance of doubt, it is the responsibility of the DNO to propose a monetised consumer benefit and an associated monetisation methodology.	We confirm that the CVP has been monetised using a common approach developed across DNOs and reviewed and assured by SIA Partners, who have looked across the CVPs of all DNOs to ensure the monetised benefit is reasonable and consistent with an agreed national framework.

Ofgem Criteria	ENWL Response
The extent to which the monetised benefits associated with the proposal accrue to existing and future consumers including consumers in vulnerable situations.	The benefits accrue to current ENWL customers in the form of bill reductions for the reductions in electricity consumption. The avoided carbon emissions accrue to customers now and in future due to the benefit of addressing net zero that the reduced carbon emissions bring. The benefits accrue to all customers including those in vulnerable situations.
Where a company makes a proposal that includes a commitment to deliver something within RIIO-ED2 (for example, a commitment to complete a project), whether arrangements to address the possibility of non-delivery are set out and the extent to which such arrangements for non-delivery are appropriate and implementable.	We consider the risk of non-delivery to be minimal given the proven technology and current widespread roll-out programme being undertaken via a RIIO-ED1 Innovation Roll-out Mechanism (IRM) programme. In terms of non-delivery, we would propose reporting on both the numbers of substations and customers benefitting from the technology with any clawback based on a shortfall in the number of substations with Smart Street technology fitted compared to plan.

The Smart Street CVP falls into the section of Ofgem's Business Plan Guidance relating to Whole Systems approach due to the majority of its benefits accruing to customers 'beyond the meter' in terms of reductions in units consumed and hence bills.

2.3 Programme description

Smart Street technology manages network voltage so that appliances perform more efficiently reducing customers' energy consumption. By controlling the output voltage of our distribution transformers, the Smart Street project will provide the following benefits to our customers:

1. A reduction in energy consumption, which potentially translates to a reduction in the customer's electricity bill.
2. Releasing capacity on the network leads to a quicker connection process for low carbon technologies (LCTs), facilitating a wider adoption.
3. An overall reduction in carbon emissions due to a reduction in energy consumption, reinforcement and technical losses.

We control the output voltage using specific control and monitoring equipment: distribution transformers fitted with on-load tap changers (OLTCs), Low Voltage (LV) switching devices and LV monitoring. This report outlines our proposal for the widespread roll-out of Smart Street equipment over the RIIO-ED2 period.

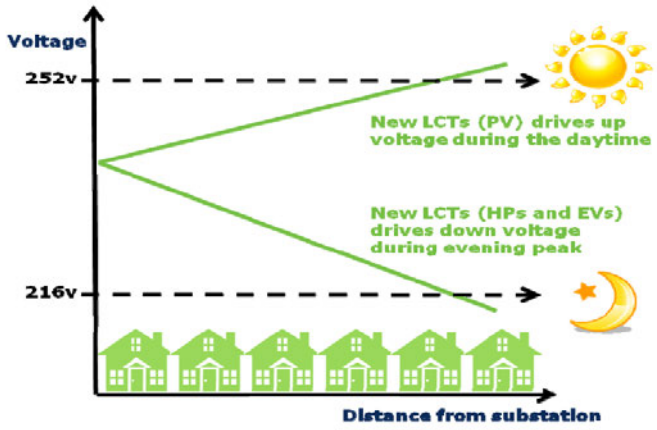
Our roll-out is being proposed following significant support from our stakeholder engagement panels for a wider deployment of the technology to aid groups of our customers who experience fuel poverty. Whilst it is not possible to solely target these customers during the deployment, we will structure our site selection criteria to ensure we install the equipment in areas with a high incidence of fuel poverty.

The principles of utilising active management of the LV network were first demonstrated by the Smart Street low carbon networks (LCN) tier two funded project. The project assessed and quantified the benefits of using innovative control systems to reconfigure the LV network in real time.

Smart Street incorporates a technique known as Conservation Voltage Reduction (CVR). Electrical equipment, including household appliances and lighting, is designed to operate most efficiently in the region of 220 to 230 volts. If power is delivered at a voltage higher than these optimum levels, energy is consequently wasted. Excess voltage can also shorten the useful life of electrical equipment, since the excess energy is dissipated as heat. Therefore, optimising network voltage reduces overall energy consumption, improves power quality and extends the life of customers' equipment. CVR is a proven technology for reducing energy and peak demand and is implemented by controlling the voltage on a network to the lower end of the optimum range.

The transition to a Net Zero world will see network customers adopting a higher number of new technologies such as Electric Vehicles (EVs), Heat Pumps (HPs) and Photo Voltaic panels(PV), placing an additional burden on to the electricity network. Often these technologies occur in clusters which can have a dramatic effect on the local electricity network. For example, on an estate of domestic properties where gas central heating is swapped for an electric alternative, such as a HP, and a new EV is added to each property, the total load could reach over six times the peak demand that the network was originally designed for.

Figure 2-1 Voltage Profile for Low Carbon Technology (LCTs)



Without intervention, this scenario would cause voltage levels to drop below statutory limits and the thermal capacity of network assets to be exceeded. Conversely, clusters of new sources of generation on the distribution network, such as PV, could push voltages above statutory limits. If voltage levels go outside statutory limits, the performance of customer appliances may be negatively affected. This effect is demonstrated in Figure 2.1. We have experienced examples of these issues on our network with customers reporting that PV is not generating due to high volts.

During the trials the Smart Street system optimised the voltage across the distribution network so that all customers could benefit from CVR whilst maintaining statutory limits. This allowed for the peak load to be reduced, hence reducing annual energy consumption and creating additional capacity, to enable the further connection of LCTs.

The Smart Street trials demonstrated that it is possible to optimise voltage on LV networks to prevent statutory limits being exceeded whilst releasing additional capacity for the connection of further LCTs using network reconfiguration

Smart Street was trialled at six primary substations and 38 associated distribution substations, serving customers in Manchester, Wigan, Wigton and Egremont.

A series of customer focus groups were organised to help understand if the new project impacted the electricity supply in homes. All the customers confirmed that they had not noticed any changes when using their everyday appliances. Analysis of the data collected during the trials, carried out by academics at the University of Manchester and Queens University Belfast, confirmed that by actively

adjusting the voltage profile of the LV network it was possible to reduce the energy consumption of customers by between 5.5% and 8%. Utilising average consumption values for domestic properties and a reasonable assumption around the average tariff for the North West translates into a potential saving of up to £61 for profile class (PC) 1 users. The profile class is a defined aggregation of types of customer with similar behaviours, which can be used as part of determining network impacts.

Additionally, in line with the ambitious carbon reduction targets set by public bodies across our area, for example, Greater Manchester Combined Authorities' aim for net zero by 2038, many public housing providers are looking to install various Low Carbon Technologies to aid in achieving this. The active adjustment of the network carried out by the Smart Street system can help the system cope with the more variable nature of these new demands by working to maintain the voltage within the statutory limits.

Based on the findings of the original project, we applied to Ofgem for an adjustment to the RIIO-ED1 price control under the Innovation Roll-out Mechanism (IRM) to carry out a deployment of Smart Street to 180 substations across the license area. This included the development and deployment of the centralised control software as part of the network management system, which carries out the real time assessment and adjustment of the network to ensure that the maximum benefit is realised. Work on this deployment began in 2020 and will be completed by the end of the RIIO-ED1 period. Based on the findings of the original project, we deliberately targeted the Smart Street IRM at areas with a high incidence of fuel poverty, as well as high levels of existing or forecast LCT deployment.

Work with the stakeholder engagement groups in the lead-in to the RIIO-ED2 submission revealed a high level of support for both Smart Street and the site selection criteria used during the IRM to target those most in need of this form of intervention. Discussions on the scale of a future deployment showed a significant amount of support for an extremely ambitious [redacted], during the price control period to deliver the benefits as widely as possible. In order to focus the benefits of the deployment to match the feedback from our stakeholders, we will select sites based on technical constraints and then filter this based on the incidence of fuel poverty in geographic areas.

2.4 Societal benefits evaluation

Economics consultancy, Economic Insight, assisted us with the assessment of social value generated by a range of projects that have been included in the ED2 Business Plan, including CVPs.

Benefit values were forecasted following detailed discussions with relevant stakeholders which were designed to gain an understanding of each projects aims and the changes they influenced. The measurement approach adopted aligns to the national social value measurement framework, government best practice and academic guidance.

A variety of robust data sources were used to derive the societal benefits of Smart Street. As part of an LCNF project, the Tyndall Centre at the University of Manchester carried out an assessment of the carbon benefits and the techno-commercial benefits of the Smart Street approach. An output from this project was a Cost Benefit Analysis (CBA) report which suggested that there would be noticeable financial savings for customers from the application of Smart Street. External specialist consultants WSP were then engaged to create a CBA to evaluate a wider roll-out.

Alongside the first order CBA, quantitative and qualitative analysis of potential second order effects was undertaken to ensure the full impacts of a wider deployment of Smart Street were considered. The primary first order benefits which have been modelled include:

- Financial savings for ENWL customers; and
- Carbon reduction societal benefits.

2.5 Financial savings for customers

Application of the Smart Street system has been proven to produce a reduction in customers' energy consumption of between 5% and 8%. The current Typical Domestic Consumption Values (TDCVs) published by Ofgem in June 2021 translates to the energy reductions as shown in Table 2-1 below.

Table 2-1 Reduction in consumption expected due to the Smart Street system

For the purpose of SROI measurement the average unit cost for electricity in the UK regions (QEP 2.2.4, last updated 29 June 2021) were obtained from the government website. It should be noted that for the CBA associated with the IRM application, WSP used a standard variable tariff of £0.1305 for direct debit customers, taken from a supplier's website.

Applying the average unit rates to the energy consumption savings above produced the following potential savings on the retail price:

Table 2-2 Potential retail price savings for direct debit customers

Bill Savings due to Smart Street	PC1 (£)			PC2 (£)		
	Low	Med	High	Low	Med	High
5%	£17.94	£29.26	£43.42	£23.60	£39.65	£67.02
6%	£21.52	£35.12	£52.11	£28.32	£47.58	£80.43
7%	£25.11	£40.97	£60.79	£33.04	£55.51	£93.83
8%	£28.70	£46.82	£69.48	£37.76	£63.44	£107.24

We calculated that Smart Street would save Profile Class 1[2] customers £39.27 a year (in bill savings) by taking an average of the range of possible bill savings it could generate. £39.27 is the average bill

[2] Profile Class 01 - Domestic Unrestricted: Most household consumers fall under this Class.

saving enabled for Profile Class 1 customers with low, medium and high usage who have their consumption reduced by between 5% and 8%. By taking account of all possible scenarios, from low savings to high savings, this method calculates a representative bill saving for an average customer.

2.5.1 Multiplier applied to financial savings for fuel poor customers

In consultation with Economic Insight we applied a 'welfare weighting' to the average customer bill saving. This is an appropriate proxy for the additional utility value delivered to households in the lowest income quintile, where they have been specifically targeted with financial savings. Applying it is in line with the cabinet office objectives that, "*SROI is about value, rather than money. Money is simply a common unit and as such is a useful and widely accepted way of conveying value.*"

We calculated this value by applying a Green Book approved welfare weighting multiplier to the average £39.27 financial benefit. The theory behind applying this multiplier is that lower income customers place a higher value on each additional pound they receive, than a customer who earns an average income. The Government approved welfare weight for fuel poor customers (who are defined as those in the bottom income quintile) is 2.5x relative to the average taxpayer. As a financial benefit has been applied to all Smart Street customers, we apply a 1.5x (2.5-1) mark-up to this benefit for fuel poor customers. This generates an additional £58.91 benefit for individuals who are fuel poor, bringing their total to 2.5x that of individuals outside of the bottom quintile.

In the SIA Framework, the volume of stakeholders reached is the total number of new customers who have Smart Street deployed each year, profiled in line with the delivery plan. Not all these customers will be fuel poor. Therefore, we utilise the success percentage to represent the proportion of customers enrolled in Smart Street that are fuel poor.

On average, 12.1% of customers in the north west are currently fuel poor. However, we will target the deployment of Smart Street in areas with greater prevalence of fuel poor customers, so they should be overrepresented as a group in this sample.

In ED1 we selected 180 sites from an initial pool of 8,000 so that 16% of all customers benefiting were identified as fuel poor. In ED2, we will relax some of the technical constraints and pick 1,000 from 16,000 substations. This increases the ability to skew, by targeting sites with a higher incidence of fuel poor. However, the more sites that have Smart Street deployed, the closer the project will get to the regional incidence of fuel poverty. Due to the flatness of the distribution curve the majority of ED2 sites will still fall in the mid to high teens % of fuel poor. Our aim is for 16% of customers who are enrolled in Smart Street to be fuel poor. To avoid overestimating the benefit to fuel poor customers, we conservatively set the success percentage to be the mean of the ED2 Business Plan goal and the regional average. This calculation generates a success percentage of 14%.

2.6 Carbon reduction societal benefits

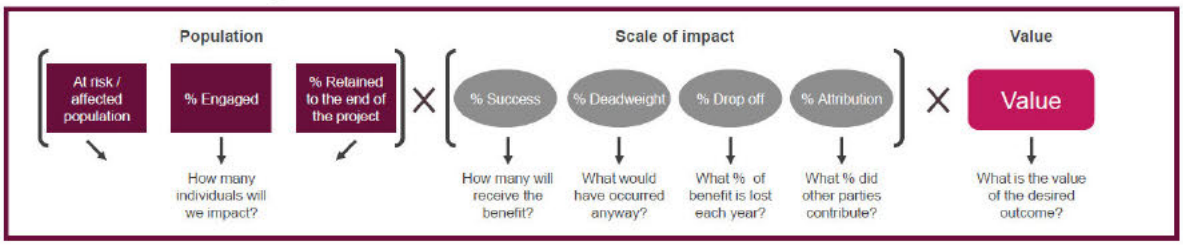
Reducing customer energy usage will also reduce carbon emissions. The proxy used to measure this impact was from Ofgem's CBA template – the 'average traded price of carbon.'

We have modelled drop off for the environmental benefits of Smart Street. As ENWL increases the proportion of renewables connected to the grid, it is likely that carbon emissions per unit of electricity will fall over ED2. Therefore, although Smart Street will continue to save consumers the same amount of electricity each year, the environmental benefit will reduce as the carbon saving from this reduced usage lessens.

2.7 Data validation

Social value analysis requires assumptions to be made and tested. In conjunction with the national social value measurement framework, we improved the robustness of our Smart Street modelling by adjusting the scale of impact and setting an appropriate level of optimism bias. The factors taken into consideration as part of social value analysis are illustrated in Figure 2-2 below.

Figure 2-2 Formula for calculating social value



During the benefit measurement process, we had a significant volume of existing data available on Smart Street, due the roll-out of the technology over the last two years. This enabled us to see what the previous realised outcomes had been and means that the information available to model Smart Street is significantly more accurate than for other programmes. As a result, the proxy values used for both the financial and societal benefits can be attributed solely to Electricity North West. Due to this, there is no reason to make attribution or deadweight adjustments to the benefits values.

Economic Insight advised setting the optimism bias to be 0% for both carbon savings and financial savings per customer. The carbon estimate is in line with the recommended adjustment in SIA's Proxy Bank. Financial savings per customer are based on robust and recent data. The source, specificity, age, and quantity of this data all score highly on the optimism bias confidence grades. High confidence in the accuracy of this data means that, an optimism bias adjustment is not necessary.

2.8 Total benefits quantified

To work out the total net economic benefit per £ spent, commonly referred to as the Social Return on Investment (SROI), Smart Street delivery costs were identified. The SROI was calculated using the national SIA model, with assurance provided by SIA Partners. This model is available for review as part of the FBP process if requested.

The financial and societal benefits have been modelled over a 10-year period. Smart Street will deliver benefits to customers for a much longer time than just the ED2. Estimates suggest that customers could continue to benefit from the project for 45 years. Therefore, restricting the benefits assessment to just the regulatory period would not come close to capturing the total value generated by the project, so we have expanded the period over which benefits can accrue to 10 years. This is the maximum amount available over the SIA Framework, otherwise we would have set it at the lifecycle of the project. **The SROI assessment over a ten-year period is as follows**:

10-year reporting figures		
Economic	[redacted]	
	NPV	£19,925,091

Each proposal that has had SROI measurement applied is presented with a total net economic benefit per £ spent multiplier, which represents the total present value (all benefits minus all costs), divided by the cost of the initiative, giving an indication of total value for money. For net SROI, to break even the multiplier would need to be ≥0. The total net economic benefit per £ spent for Smart Street over a ten-year period is £0.29.

2.9 Direct Customer Benefits

The annual bill impact of the costs of deploying Smart Street will be approximately £0.16 for an individual customer. Customers will take 45 years to pay for the upfront costs of installing Smart Street through their Distribution Use of System charges, whilst receiving reduced bills every year once it is fully operational. Therefore, the direct customer benefit for the 250,000 customers who will have Smart Street rolled out on their network is estimated to be £39.11 per year on average once the technology is installed.

2.10 Other qualitative benefits

The roll-out of Smart Street will also provide additional long-term value for money to all customers by releasing network capacity and reducing losses. This will facilitate the future connection of LCTs and will allow deferred network reinforcement, which, in turn, will lead to a reduction in Distribution Use of System (DUoS) charges for all customers.

2.11 Assurance

SIA Partners has assessed the CVPs of Electricity North West and audited the approach taken to measure the additional benefit to society.

For Smart Street, to ensure consistency with the other DNOs, SIA recommend using the most recent figures from Ofgem's CBA spreadsheet (v9.0) for both the carbon price and greenhouse gas (GHG) conversion factor for each year. It stated, *'it is important to recognise that ENWL has followed the initially suggested values. However, Ofgem's figures provide more granularity, accuracy, and consistency with the rest of the business plan'*. This recommendation was taken-up, with Ofgem's latest figures used in an updated forecast.

SIA observed that Electricity North West had provided sufficient evidence to justify that the reach and qualitative evidence used in Smart Street benefit measurement was appropriate.

In its initial assurance review SIA Partners queried the use of the largest financial savings (£69.48) and consumption profile in our assessment, when more conservative options were available. Subsequently we decided to use a blended average (£39.27).

SIA concluded, *'Based on the effective execution of these adjustments and provision of additional justification where required, we are pleased to provide assurance that ENWL has delivered a conservative picture of the value they will provide, in line with the Social Value Framework.'*

The ENWL CEG reviewed the Smart Street CVP principles at a dedicated session in November 2021.

3 CBA benefits assessment

Given the scale of the proposed programme, we have completed an Engineering Justification Paper (EJP) and Cost Benefit Analysis (CBA) for Smart Street as part of our submission (SS_EJP_Smart_St). Annex 18 gives further details of our approach to and selection of EJPs & CBAs.

Table 3-1 summarises the input variables to the Smart Street CBA model. The high, low and standard values are also shown for those variables considered for the CBA sensitivity analysis where the reference study is Smart Street Option 1.

Table 3-1 CBA Input Variable and Sensitivity Values

[redacted]

The CBA results for Option 4 (preferred option to roll-out to [redacted]) give highly positive NPV values over a range of different time horizons as shown in Table 3-2 below;

Table 3-2 CBA NPV outcomes

[redacted]

The Whole Life NPV value of £456m includes the cost savings to customers, together with the benefits of reduced consumption and deferred reinforcement requirements.

4 Conclusions

CVPs are a new introduction for RIIO-ED2. We have reviewed potential candidates for CVPs in our Draft Business plan and identified Smart Street as a proposed CVP for our Final BP.

Smart Street provides significant support for customers in vulnerable circumstances, particularly those in fuel poverty and clearly goes beyond Ofgem's baseline expectations (set out in Appendix 3 to Annex 1 of the RIIO-ED2 Methodology Decision). The benefits of Smart Street also clearly exceed the minimum level of value to consumers per accepted CVP proposal.

As Smart Street achieves its benefits for customers by improving the efficiency of customer's appliances it addresses a whole system issue and reduces energy consumption, providing an environmental benefit and carbon reduction. Furthermore, Smart Street supports the roll out of low carbon technologies by improving the capacity of the low voltage network and by enhancing the effectiveness of technologies such as photovoltaic cells.

The majority of the benefits of Smart Street accrue to end consumers rather than us as the network operator and we have utilised a SROI approach to articulate the wider or societal benefits to consumers, alongside a traditional CBA analysis.