Cost-benefit analysis tables 2021-22

Use *Bookmarks* function to navigate to the respective file, using the file names from the list below.

Cost-benefit analysis summaries associated with Annex 4 (Losses)

Northeast licence area:

- NE RRP 2021-22 11kV 300 cable CBA RIIO ED1
- NE RRP 2021-22 LV 300 wf cable CBA RIIO ED1
- NE RRP 2021-22 Pre-1958 transformers CBA RIIO ED1

Yorkshire licence area:

- YE RRP 2021-22 11kV 300 cable CBA RIIO ED1
- YE RRP 2021-22 LV 300 wf cable CBA RIIO ED1
- YE RRP 2021-22 Pre-1958 transformers CBA RIIO ED1

Cost-benefit analysis summaries associated with Annex 6 (Innovative Solutions)

- NPg RRP 2015-16 Table E6 CBA **(APRS)**
- NPg RRP 2015-16 Table E6 CBA **(LV technology)**
- NPg RRP 2015-16 Table E6 CBA **(PFT)**
- NPg RRP 2015-16 Table E6 CBA **(Telematics)**
- NPg RRP 2016-17 Table E6 CBA **(OilRegeneration)**

version number	use / purpose	date	changes made
Template CBA RIIO ED1 v1.xls	initial draft RIIO-GD1 model issued for demo purposes		-
Template CBA RIIO ED1 v2.xls	draft RIIO-ED1 model demonstrated during the CBA meeting held on the 19 March	19/03/2013	updated the model to reflect ED1 rather than GD1
Template CBA RIIO ED1 v3.xls	issued to DNOs to complete the 2 worked examples (leaking cable and QoS)	28/03/2013 03/04/2013	updated to reflect discussions at the CBA meeting including straight line depreciation assumption for ED1, addition of fixed parameter assumptions for non-monetary items re-issued on 3 April to correct CI/CML fixed data transpose error
Template CBA RIIO ED1 v4.xls	final version of CBA spreadsheet to take into account worked examples	16/04/2013	updated to reflect DNO feedback following completion of worked examples main changes include: - included baseline scenario worksheet - removed VOLL as CI/CML method of monetising loss of supply was viewed as robust method - amended the CO2 conversion factor associated with losses to take into account assumptions regarding future decarbonisation of electricity - updated fixed data parameters to 2012/13 prices
		29/04/2013	removed '~~do minimum~~' text in cell B9 of *Option summary* worksheet
		10/01/2014	Inserted clarification comment in cell C9 of the *Option 1* worksheet.
		10/01/2014	Clarified text in cell B1 of *Option summary* worksheet.
		10/01/2014	Clarified text in cell F26 of *Option summary* worksheet.

Guidance for CBA spreadsheet model

Tab	Instructions
Option summary	Provide a description of the stated aim / investment decision contained within this CBA analysis workbook, along with a list of options considered to meet the aim. Also include here the short list of options contained within this workbook which have been fully costed and specify which option has been adopted following CBA and included in your business plan submission.
Fixed data	Enter pre-tax WACC and prices consistent with your business plan
Baseline scenario	Enter costs and benefits associated with the baseline scenario. The baseline scenario represents status quo; that is the cost of business as usual in the absence of any investment intervention. Where business as usual is not an option i.e. an investment intervention of some kind is required DNOs should chose the option with the lowest investment to represent the baseline scenario.
Working baseline	Show any calculation used to derive the values in your baseline scenario
Option 1	Enter costs and benefits *over and above the baseline scenario* i.e. the marginal or incremental costs / benefits of the option being considered. Enter capitalisation rates consistent with your business plan.
Working 1	Show any calculation used to derive the values in your CBA

Colour code:

User populated cells
Fixed data
Summation formula
Other formula

The user should populate the light blue cells. All other cells are either fixed or auto-populated.

Enter costs / benefits in 2012/13 prices (£m).

Costs should be entered as negative values.

Benefits (i.e. avoided costs) should be entered a positive values.

Costs entered should correspond to values set out in company business plans i.e. should exclude RPEs and include ongoing efficiencies consistent with assumptions contained in your business plan submission.

Copy *Option 1 worksheet & workings 1* for each CBA option and label these *option 2 & workings 2* etc.

Where a 'do minimum option' exists, Option 1 should represent your 'do minimum' or 'reference scenario' e.g. do nothing, ongoing maintenance of existing asset or the option which requires the minimum investment .

Use the relevant *Workings worksheet* to demonstrate any calculation/information that can support the costs and benefits you have entered for each option. This is free fill and provides you with an opportunity to show additional underlying data you believe will assist Ofgem in evaluating/understanding your CBA.

Please highlight your chosen option by colouring the worksheet tab yellow.

Purpose of CBA: describe the primary driver of the investment decision

To quantify loss savings between 185mm2 and 300mm2 Triplex for 11kV cables (from second leg of feeder downstream)

If investment is to replace an existing asset / asset class, please state the condition of the asset / asset class (H1 / C1 etc.)

List below all options considered to meet the stated aim

Options considered / project name	Comment
"do minimum" option	Existing design policy of using 185mm2 for 11kV feeders from second leg downstream. (300mm2 for first leg from Primary S/S).
Using 300mm2 11kV Cable	Using 300mm2 for all 11kV feeder sections

List below the short list of those options which have been costed within this CBA workbook

Option no.	Options considered	Decision	Comment	For the chosen option only, provide detail of where CBA expenditure included in this CBA is reported in the BPDT pack. e.g. LV switchgear BPDT CV3 rows 15 to 22.	NPVs based on payback periods				
					5 years	10 years	30 years	45 years	DNO view
1	300mm2 for all 11kV network feeders	Adopted	To be considered as a design policy change as appears to be cost effective.	Not reported directly in BDPT pack. These CBAs were used to quantify options for the 11 years 'Strategy review'. Not finance expertise	£0.16	£0.21	£0.03	£0.15	
2									
3									
4									
5									

If more options are costed, please copy Option 1 and workings / worksheets and add detail to the short list table above.

Parameters

zero rate WACC	3.5%	zero-DNS rate(B) revenue WACC (force
Discount Rate +/- 10 years	3.5%	
Discount Rate +/-30 years	3.5%	
Discount rate for safety	3.5%	
Assumed Asset Life (Years)	30	

RPI INDICES

Index-linked revenues (Real) (m/Mw.sh)

Index		Index
		2012=1
Convert from	2009/10	0.9551
	2010/11	1.0000
	2011/12	1.0420
	2012/13	1.0700
	2013/14	1.1000
	2014/15	1.1300
	2015/16	1.1600
	2016/17	1.1900
	2017/18	1.2200
	2018/19	1.2500
	2019/20	1.2800

Prices

2012/13 prices	1 2009	2 2010	3 2011	4 2012	5 2013	6 2014	7 2015	8 2016	9 2017	10 2018	11 2019	12 2020	13 2021	14 2022	15 2023	16 2024	17 2025	18 2026	19 2027	20 2028	21 2029	22 2030	23 2031	24 2032	25 2033	26 2034	27 2035	28 2036	29 2037	30 2038	31 2039	32 2040	33 2041	34 2042	35 2043	36 2044	37 2045	38 2046	39 2047	40 2048	41 2049	42 2050	43 2051	44 2052	45 2053	46 2054	47 2055	48 2056	49 2057	50 2058	51 2059	52 2060
Traded carbon price (£/t 2012 t) [1]	4.76	7.12	7.13	8.13	8.16	11.34	12.14	28.48	42.37	61.13	68.81	80.14	87.13	88.38	89.63	90.88	92.08	93.28	94.48	95.68	96.88	98.08	99.28	100.48	101.68	102.88	104.08	105.28	106.48	107.68	108.88	110.08	111.28	112.48	113.68	114.88	116.08	117.28	118.48	119.68	120.88	122.08	123.28	124.48	125.68	126.88	128.08	129.28	130.48	131.68	132.88	134.08	135.28
Wholesale electricity (£/MWh)	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9
Lunar (£/MWh)	245.00																																																						
C1 (£/t.year transmission)	4,514.00																																																						
CPA (£/t.year retrace.km)	49.04																																																						
Cost per leader (£/km)[2]	41.70																																																						
Cost per major injury (£/m)[3]	49.00																																																						
Cost per loss of Ofdmat	200																																																						
Recession GHG conversion factor: tonnes cap/MWh[4]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

[1] https://www.ofgem.gov.uk/ofgem-publications

[2] Source: Ofgem, Strat. Inno. 2013, Wilkinson and Cavendish Ashton

[3] Source: Ofgem, Ofdfm - www.ofdfm.com/Ofdfm.aspx?PAGE=OFDFM/Home/OFDFM_Table_conversion.htm?

[4] Variable annual benefits

note: 2010 to 2030 DECC's updated traded sector carbon values published Dec 2012, 2031 onwards based on DECC carbon values published Dec 2011.

note: HSE values are at 2012 prices

note: Nature Work Force 2013 (Institute in Delhi, DHEC), GHG conversion factors for consumer electricity "case 2030" factor: annex 3 table 3b1.

Decarbonisation of electricity assumption

Power sector emissions are anticipated to reduce to 15kt/MWh by 2050

assume a linear decarbonisation factor of not 2009/10 and 2050

Power sector emissions reduce by 16.5 ktCO2/t.a.c between now and 2050.

Second 2050 base emissions at 15ktCO2

		g CO2e per kWh
1,000 km = 1 tonne	2009/10	599.82 - (Defra)
1,000 kWh = 1 MWh	2010/11	575.32
1 km = 1 kWh	2011/12	550.83
	2012/13	544.33
	2013/14	531.84
	2014/15	517.34
	2015/16	502.85
	2016/17	488.35
	2017/18	473.86
	2018/19	459.36
	2019/20	444.87
	2020/21	430.37
	2021/22	415.87
	2022/23	401.38
	2023/24	386.88
	2024/25	372.39
	2025/26	357.89
	2026/27	343.40
	2027/28	328.90
	2028/29	314.41
	2029/30	299.91
	2030/31	285.41
	2031/32	270.92
	2032/33	256.42
	2033/34	241.93
	2034/35	227.43
	2035/36	212.94
	2036/37	198.44
	2037/38	183.95
	2038/39	169.45
	2039/40	154.96
	2040/41	140.46
	2041/42	125.96
	2042/43	111.47
	2043/44	96.97
	2044/45	82.48
	2045/46	67.98
	2046/47	53.49
	2047/48	38.99
	2048/49	24.50
	2049/50	10.00
check		10.00 assumption: sector carrier should reduce to 10 g CO2e/kWh

0.00	n.a. reduction in carbon intensity

CBA Option 1 300mm2 for all 11kV network feeders

Term (years from first out flow)	NPV (£m)
5	-£0.16
10	-£0.21
30	£0.03
45	£0.15

first year of investment out flow: 1

		Units	RIIO-ED1							
			1	2	3	4	5	6	7	8
	Calculation		2016	2017	2018	2019	2020	2021	2022	2023
Investment	Asset Replacement	£m	(0.06)	(0.16)	(0.05)	(0.22)	(0.23)	(0.15)	(0.15)	-
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total investment	£m	(0.06)	(0.16)	(0.05)	(0.22)	(0.23)	(0.15)	(0.15)	-
Avoided DNO costs	Inspections & Maintenance	£m								
	Asset Replacement	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total avoided DNO costs	£m								
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	(0.06)	(0.16)	(0.05)	(0.22)	(0.23)	(0.15)	(0.15)
	Capitalisation rate	(2)	%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%
	Capitalised investment	(3)=(1)x(2)	£m	(0.04)	(0.11)	(0.03)	(0.16)	(0.17)	(0.11)	(0.11)
	Investment to be expensed	(4)=(1)-(3)	£m	(0.02)	(0.04)	(0.01)	(0.06)	(0.06)	(0.04)	(0.04)
	Depreciation	(5)=∑(3)L	£m	-	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
	Cost of Capital	(6)=wp[(3)-∑(3)*(L-1)]+(4)*WACC	£m	(0.00)	(0.00)	(0.01)	(0.01)	(0.02)	(0.02)	(0.03)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	£m	(0.02)	(0.05)	(0.02)	(0.08)	(0.09)	(0.07)	(0.08)
Societal benefits (£m) i.e. costs avoided	Losses	£m	0.00	0.01	0.01	0.02	0.03	0.03	0.04	0.04
	CO2e associated with losses	£m	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
	Customer interruptions (CI)	£m	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)	£m	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	£m	-	-	-	-	-	-	-	-
	Fatality	£m	-	-	-	-	-	-	-	-
	Major injury	£m	-	-	-	-	-	-	-	-
	Oil leakage	£m	-	-	-	-	-	-	-	-
	Other 1 (specify)	£m								
	Other 2 (specify)	£m								
	Other 3 (specify)	£m								
	Total societal net benefits	£m	**0.002**	**0.009**	**0.010**	**0.019**	**0.029**	**0.037**	**0.045**	**0.047**
	Net benefits	£m	(0.02)	(0.04)	(0.01)	(0.06)	(0.06)	(0.04)	(0.03)	**0.00**
	Discount factor	=1/((1+SRTP)^n)	0.97	0.93	0.90	0.87	0.84	0.81	0.79	0.76
	Discount factor (safety)	=1/((1+PTPR)^n)	0.99	0.97	0.96	0.94	0.93	0.91	0.90	0.89
	Discounted net benefits	£m	(0.01)	(0.04)	(0.01)	(0.05)	(0.05)	(0.03)	(0.03)	0.00
	Cumulative discounted net benefits	£m	**(0.01)**	**(0.05)**	**(0.06)**	**(0.11)**	**(0.16)**	**(0.20)**	**(0.22)**	**(0.2192)**

		Units	RIIO-ED2							
			9	10	11	12	13	14	15	16
	Calculation		2024	2025	2026	2027	2028	2029	2030	2031
Investment	Asset Replacement	£m	-							
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total investment	£m	-	-	-	-	-	-	-	-
Avoided DNO costs	Inspections & Maintenance	£m								
	Asset Replacement	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total avoided DNO costs	£m								
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-	-	-	-
	Capitalisation rate	(2)	%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%
	Capitalised investment	(3)=(1)x(2)	£m	-	-	-	-	-	-	-
	Investment to be expensed	(4)=(1)-(3)	£m	-	-	-	-	-	-	-
	Depreciation	(5)=∑(3)L	£m	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
	Cost of Capital	(6)=wp[(3)-∑(3)*(L-1)]+(4)*WACC	£m	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	£m	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Societal benefits (£m) i.e. costs avoided	Losses	£m	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	CO2e associated with losses	£m	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
	Customer interruptions (CI)	£m	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)	£m	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	£m	-	-	-	-	-	-	-	-
	Fatality	£m	-	-	-	-	-	-	-	-
	Major injury	£m	-	-	-	-	-	-	-	-
	Oil leakage	£m	-	-	-	-	-	-	-	-
	Other 1 (specify)	£m								
	Other 2 (specify)	£m								
	Other 3 (specify)	£m								
	Total societal net benefits	£m	**0.05**	**0.05**	**0.05**	**0.05**	**0.06**	**0.06**	**0.06**	**0.06**
	Net benefits	£m	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.02**	**0.02**
	Discount factor	=1/((1+SRTP)^n)	0.73	0.71	0.68	0.66	0.64	0.62	0.60	0.58
	Discount factor (safety)	=1/((1+PTPR)^n)	0.87	0.86	0.85	0.84	0.82	0.81	0.80	0.79
	Discounted net benefits	£m	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Cumulative discounted net benefits	£m	**(0.21)**	**(0.21)**	**(0.20)**	**(0.19)**	**(0.18)**	**(0.17)**	**(0.16)**	**(0.14)**

		Units	RIIO-ED3							
			17	18	19	20	21	22	23	24
	Calculation		2032	2033	2034	2035	2036	2037	2038	2039
Investment	Asset Replacement	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total investment	£m	-	-	-	-	-	-	-	-
Avoided DNO costs	Inspections & Maintenance	£m								
	Asset Replacement	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total avoided DNO costs	£m								
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-	-	-	-
	Capitalisation rate	(2)	%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%
	Capitalised investment	(3)=(1)x(2)	£m	-	-	-	-	-	-	-
	Investment to be expensed	(4)=(1)-(3)	£m	-	-	-	-	-	-	-
	Depreciation	(5)=∑(3)L	£m	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
	Cost of Capital	(6)=wp[(3)-∑(3)*(L-1)]+(4)*WACC	£m	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	£m	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)
Societal benefits (£m) i.e. costs avoided	Losses	£m	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	CO2e associated with losses	£m	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Customer interruptions (CI)	£m	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)	£m	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	£m	-	-	-	-	-	-	-	-
	Fatality	£m	-	-	-	-	-	-	-	-
	Major injury	£m	-	-	-	-	-	-	-	-
	Oil leakage	£m	-	-	-	-	-	-	-	-
	Other 1 (specify)	£m								
	Other 2 (specify)	£m								
	Other 3 (specify)	£m								
	Total societal net benefits	£m	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**
	Net benefits	£m	**0.02**	**0.02**	**0.02**	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**
	Discount factor	=1/((1+SRTP)^n)	0.56	0.54	0.52	0.50	0.49	0.47	0.45	0.44
	Discount factor (safety)	=1/((1+PTPR)^n)	0.78	0.76	0.75	0.74	0.73	0.72	0.71	0.70
	Discounted net benefits	£m	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Cumulative discounted net benefits	£m	**(0.13)**	**(0.12)**	**(0.10)**	**(0.09)**	**(0.08)**	**(0.06)**	**(0.05)**	**(0.04)**

		Units	RIIO-ED4							
			25	26	27	28	29	30	31	32
	Calculation		2040	2041	2042	2043	2044	2045	2046	2047
Investment	Asset Replacement	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total investment	£m	-	-	-	-	-	-	-	-
Avoided DNO costs	Inspections & Maintenance	£m								
	Asset Replacement	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total avoided DNO costs	£m								
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-	-	-	-
	Capitalisation rate	(2)	%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%
	Capitalised investment	(3)=(1)x(2)	£m	-	-	-	-	-	-	-
	Investment to be expensed	(4)=(1)-(3)	£m	-	-	-	-	-	-	-
	Depreciation	(5)=∑(3)L	£m	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
	Cost of Capital	(6)=wp[(3)-∑(3)*(L-1)]+(4)*WACC	£m	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	£m	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Societal benefits (£m) i.e. costs avoided	Losses	£m	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	CO2e associated with losses	£m	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01
	Customer interruptions (CI)	£m	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)	£m	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	£m	-	-	-	-	-	-	-	-
	Fatality	£m	-	-	-	-	-	-	-	-
	Major injury	£m	-	-	-	-	-	-	-	-
	Oil leakage	£m	-	-	-	-	-	-	-	-
	Other 1 (specify)	£m								
	Other 2 (specify)	£m								
	Other 3 (specify)	£m								
	Total societal net benefits	£m	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.05**	**0.05**
	Net benefits	£m	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.02**
	Discount factor	=1/((1+SRTP)^n)	0.42	0.41	0.40	0.38	0.37	0.36	0.40	0.39
	Discount factor (safety)	=1/((1+PTPR)^n)	0.69	0.68	0.67	0.66	0.65	0.64	0.63	0.62
	Discounted net benefits	£m	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Cumulative discounted net benefits	£m	**(0.03)**	**(0.01)**	**(0.00)**	**0.01**	**0.02**	**0.03**	**0.04**	**0.05**

		Units	RIIO-ED5							
			33	34	35	36	37	38	39	40
	Calculation		2048	2049	2050	2051	2052	2053	2054	2055
Investment	Asset Replacement	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total investment	£m	-	-	-	-	-	-	-	-
Avoided DNO costs	Inspections & Maintenance	£m								
	Asset Replacement	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total avoided DNO costs	£m								
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-	-	-	-
	Capitalisation rate	(2)	%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%
	Capitalised investment	(3)=(1)x(2)	£m	-	-	-	-	-	-	-
	Investment to be expensed	(4)=(1)-(3)	£m	-	-	-	-	-	-	-
	Depreciation	(5)=∑(3)L	£m	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
	Cost of Capital	(6)=wp[(3)-∑(3)*(L-1)]+(4)*WACC	£m	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	£m	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)
Societal benefits (£m) i.e. costs avoided	Losses	£m	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	CO2e associated with losses	£m	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Customer interruptions (CI)	£m	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)	£m	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	£m	-	-	-	-	-	-	-	-
	Fatality	£m	-	-	-	-	-	-	-	-
	Major injury	£m	-	-	-	-	-	-	-	-
	Oil leakage	£m	-	-	-	-	-	-	-	-
	Other 1 (specify)	£m								
	Other 2 (specify)	£m								
	Other 3 (specify)	£m								
	Total societal net benefits	£m	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**
	Net benefits	£m	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**
	Discount factor	=1/((1+SRTP)^n)	0.38	0.37	0.36	0.35	0.33	0.33	0.32	0.31
	Discount factor (safety)	=1/((1+PTPR)^n)	0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55
	Discounted net benefits	£m	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Cumulative discounted net benefits	£m	**0.06**	**0.06**	**0.07**	**0.08**	**0.09**	**0.09**	**0.10**	**0.11**

		Units	RIIO-ED6							
			41	42	43	44	45	46	47	48
	Calculation		2056	2057	2058	2059	2060	2061	2062	2063
Investment	Asset Replacement	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total investment	£m	-	-	-	-	-			
Avoided DNO costs	Inspections & Maintenance	£m								
	Asset Replacement	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total avoided DNO costs	£m								
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-	-	-	-
	Capitalisation rate	(2)	%	72.0%	72.0%	72.0%	72.0%			
	Capitalised investment	(3)=(1)x(2)	£m	-	-	-	-			
	Investment to be expensed	(4)=(1)-(3)	£m	-	-	-	-			
	Depreciation	(5)=∑(3)L	£m	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
	Cost of Capital	(6)=wp[(3)-∑(3)*(L-1)]+(4)*WACC	£m	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	£m	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
Societal benefits (£m) i.e. costs avoided	Losses	£m	0.04	0.04	0.04	0.04	0.05	-	-	-
	CO2e associated with losses	£m	0.00	0.00	0.00	0.00	0.00	-	-	-
	Customer interruptions (CI)	£m	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)	£m	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	£m	-	-	-	-	-	-	-	-
	Fatality	£m	-	-	-	-	-	-	-	-
	Major injury	£m	-	-	-	-	-	-	-	-
	Oil leakage	£m	-	-	-	-	-	-	-	-
	Other 1 (specify)	£m								
	Other 2 (specify)	£m								
	Other 3 (specify)	£m								
	Total societal net benefits	£m	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	-	-	-
	Net benefits	£m	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**	(0.02)	(0.02)	(0.01)
	Discount factor	=1/((1+SRTP)^n)	0.30	0.29	0.28	0.27	0.26	0.26	0.25	0.24
	Discount factor (safety)	=1/((1+PTPR)^n)	0.54	0.54	0.53	0.52	0.51	0.50	0.50	0.49
	Discounted net benefits	£m	0.01	0.01	0.01	0.01	0.01	(0.00)	(0.00)	(0.00)
	Cumulative discounted net benefits	£m	**0.14**	**0.14**	**0.13**	**0.13**	**0.13**	**0.13**	**0.13**	**0.13**

		Units	RIIO-ED7							
			49	50	51	52				
	Calculation		2064	2065	2066	2067				
Investment	Asset Replacement	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total investment	£m								
Avoided DNO costs	Inspections & Maintenance	£m								
	Asset Replacement	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Please specify	£m								
	Total avoided DNO costs	£m								
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-			
	Capitalisation rate	(2)	%							
	Capitalised investment	(3)=(1)x(2)	£m							
	Investment to be expensed	(4)=(1)-(3)	£m							
	Depreciation	(5)=∑(3)L	£m	(0.01)	(0.01)	(0.00)	(0.00)			
	Cost of Capital	(6)=wp[(3)-∑(3)*(L-1)]+(4)*WACC	£m	(0.00)	(0.00)	(0.00)	(0.00)			
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	£m	(0.01)	(0.01)	(0.00)	(0.00)			
Societal benefits (£m) i.e. costs avoided	Losses	£m	-	-	-	-				
	CO2e associated with losses	£m	-	-	-	-				
	Customer interruptions (CI)	£m	-	-	-	-				
	Customer minutes lost (CML)	£m	-	-	-	-				
	Other GHG emissions (CO2e) i.e. not associated with losses	£m	-	-	-	-				
	Fatality	£m	-	-	-	-				
	Major injury	£m	-	-	-	-				
	Oil leakage	£m	-	-	-	-				
	Other 1 (specify)	£m								
	Other 2 (specify)	£m								
	Other 3 (specify)	£m								
	Total societal net benefits	£m	-	-	-	-				
	Net benefits	£m	(0.01)	(0.01)	(0.00)	(0.00)				
	Discount factor	=1/((1+SRTP)^n)	0.23	0.23	0.22	0.22				
	Discount factor (safety)	=1/((1+PTPR)^n)	0.48	0.48	0.47	0.46				
	Discounted net benefits	£m	(0.00)	(0.00)	(0.00)	(0.00)				
	Cumulative discounted net benefits	£m	**0.13**	**0.13**	**0.13**	**0.13**				

Non-DNO (eg societal) benefits

Enter values as increments (delta) relative to your reference scenario. If this is your reference scenario enter 0. Reductions are entered as positive numbers and increases as negative numbers.

		Units	RIIO-ED1								RIIO-ED2								RIIO-ED3								RIIO-ED4								RIIO-ED5								RIIO-ED6								RIIO-ED7			
Societal (or benefits impact relative to business as usual)	Reduced losses	MWh	64	164	300	367	544	639	772	776	779	783	787	791	795	799	803	807	811	815	819	824	828	832	836	840	844	849	853	857	861	866	870	874	879	883	888	892	896	901	905	910	913	919	924	928	933								
	Reduced emissions associated with losses	tCO2e	22.30	80.41	94.67	168.72	241.80	283.47	320.95	311.31	301.57	291.72	281.77	271.71	261.55	251.27	240.89	230.39	219.79	209.07	198.24	187.29	176.23	165.06	153.77	142.36	130.83	119.19	107.42	95.54	83.53	71.40	59.14	46.77	34.26	21.63	8.88	8.92	8.96	9.01	9.05	9.10	9.15	9.19	9.24	9.28	9.33	-	-	-	-	-	-	-	-
	Reduced number of customers interrupted	nos.																																																					
	Reduced customer minutes lost	Mins																																																					
	Reduced emissions (not associated with losses)[1]	tCO2e																																																					
	Reduced probability of fatality[2]	%																																																					
	Reduced probability of major injury[2]	%																																																					
	Reduced oil leakage	Litres																																																					

[1] Includes all GHG not associated with losses e.g. SF6 converted to tCO2e using Defra conversion factors

http://www.defra.gov.uk/publications/2011/05/20/pb13773-2012-ghg-conversions/

Where losses are entered in terms of MWh, the CO2e associated with those losses will be calculated based on an assumed GHG conversion factor. The tCO2e are monetised using DECC traded carbon values.

All other GHG emissions not associated with losses should be entered in row 90 to avoid double counting.

[2] http://www.hse.gov.uk/risk/theory/alarpcheck.htm

Please specify
Total investment
Connections
Diversions
Reinforcement
ESQCR
Asset Replacement
Refurbishment
Civil Works
Operational IT & Telecoms
Legal & Safety
QoS
High Value Projects
Flooding
BT21CN
Technical losses and other environmental
High impact Low Probability (HILP)
Critical National Infrastructure
Black Start
Rising Mains and Laterals
Undergrounding Wires/ Outside designated areas
Worst Served Customers
Trouble Call / faults
OHds
Inspections & Maintenance
Tree Cutting
NOC's Other
Network Design & Engineering
Project Management
Engineering Mgt & Clerical Support
System Mapping - Cartographical
Control Centre
Call Centre
Stores
Operational Training
Vehicles & Transport
Atypicals Non Sev Weather
Smart Meters
Network Policy
HR & Non-operational Training
Finance & Regulation
CEO
IT & Telecoms
Property Mgt
Non Op Capex

version number	use / purpose	date	changes made
Template CBA RIIO ED1 v1.xls	initial draft RIIO-GD1 model issued for demo purposes		-
Template CBA RIIO ED1 v2.xls	draft RIIO-ED1 model demonstrated during the CBA meeting held on the 19 March	19/03/2013	updated the model to reflect ED1 rather than GD1
Template CBA RIIO ED1 v3.xls	issued to DNOs to complete the 2 worked examples (leaking cable and QoS)	28/03/2013 03/04/2013	updated to reflect discussions at the CBA meeting including straight line depreciation assumption for ED1, addition of fixed parameter assumptions for non-monetary items re-issued on 3 April to correct CI/CML fixed data transpose error
Template CBA RIIO ED1 v4.xls	final version of CBA spreadsheet to take into account worked examples	16/04/2013	updated to reflect DNO feedback following completion of worked examples main changes include: - included baseline scenario worksheet - removed VOLL as CI/CML method of monetising loss of supply was viewed as robust method - amended the CO2 conversion factor associated with losses to take into account assumptions regarding future decarbonisation of electricity - updated fixed data parameters to 2012/13 prices
		29/04/2013	removed '~~do minimum~~' text in cell B9 of *Option summary* worksheet
		10/01/2014	Inserted clarification comment in cell C9 of the *Option 1* worksheet.
		10/01/2014	Clarified text in cell B1 of *Option summary* worksheet.
		10/01/2014	Clarified text in cell F26 of *Option summary* worksheet.

Guidance for CBA spreadsheet model

Tab	Instructions
Option summary	Provide a description of the stated aim / investment decision contained within this CBA analysis workbook, along with a list of options considered to meet the aim. Also include here the short list of options contained within this workbook which have been fully costed and specify which option has been adopted following CBA and included in your business plan submission.
Fixed data	Enter pre-tax WACC and prices consistent with your business plan
Baseline scenario	Enter costs and benefits associated with the baseline scenario. The baseline scenario represents status quo; that is the cost of business as usual in the absence of any investment intervention. Where business as usual is not an option i.e. an investment intervention of some kind is required DNOs should chose the option with the lowest investment to represent the baseline scenario.
Working baseline	Show any calculation used to derive the values in your baseline scenario
Option 1	Enter costs and benefits *over and above the baseline scenario* i.e. the marginal or incremental costs / benefits of the option being considered. Enter capitalisation rates consistent with your business plan.
Working 1	Show any calculation used to derive the values in your CBA

Colour code:

User populated cells
Fixed data
Summation formula
Other formula

The user should populate the light blue cells. All other cells are either fixed or auto-populated.

Enter costs / benefits in 2012/13 prices (£m).

Costs should be entered as negative values.

Benefits (i.e. avoided costs) should be entered a positive values.

Costs entered should correspond to values set out in company business plans i.e. should exclude RPEs and include ongoing efficiencies consistent with assumptions contained in your business plan submission.

Copy *Option 1 worksheet & workings 1* for each CBA option and label these *option 2 & workings 2* etc.

Where a 'do minimum option' exists, Option 1 should represent your 'do minimum' or 'reference scenario' e.g. do nothing, ongoing maintenance of existing asset or the option which requires the minimum investment .

Use the relevant *Workings worksheet* to demonstrate any calculation/information that can support the costs and benefits you have entered for each option. This is free fill and provides you with an opportunity to show additional underlying data you believe will assist Ofgem in evaluating/understanding your CBA.

Please highlight your chosen option by colouring the worksheet tab yellow.

Purpose of CBA: describe the primary driver of the investment decision

To quantify loss savings between the existing LV design policy of oversizing LV cables and previous policy on sizing cables on minimum network parameters.

If investment is to replace an existing asset / asset class, please state the condition of the asset / asset class (HI / CI etc.)

List below all options considered to meet the stated aim

Options considered / project name	Comment
"do minimum" option	Overlay old LV Cable with 185WI Cable as per previous design policy.
Overlay with 300WI	Overlay old LV Cable with 300WI Cable as per existing design policy.

List below the short list of those options which have been costed within this CBA workbook

Option no.	Options considered	Decision	Comment	For the chosen option only, provide detail of where CBA expenditure included in this CBA is reported in the BPDT pack. e.g. LV switchgear BPDT CV3 rows 15 to 22.	NPVs based on payback periods				
					5 years	10 years	30 years	45 years	DNO view
1	Overlaying LV cable with 300mm2 WI	Adopted	As per NPG Design Policy	Not reported directly in BDPT pack. These CBAs were used to quantify options for cha 1 rows 'Strategy owner - New Investment'	£0.116	£0.00	£0.72	£0.99	
2									
3									
4									
5									

If more options are costed, please copy Option 1 and workings / worksheets and add detail to the short list table above.

Parameters

zero rate WACC	3.5%	zero-DNS rate(B) revenue WACC (force
Discount Rate +/- 10 years	3.5%	
Discount Rate +/-30 years	3.5%	
Discount rate for safety	3.5%	
Assumed Asset Life (Years)	30	

RPI INDICES

Index-linked revenues (Real) (m/Mw.sh)

Index		Index
		2012=1
Convert from	2009/10	0.9551
	2010/11	1.0000
	2011/12	1.0420
	2012/13	1.0700
	2013/14	1.1000
	2014/15	1.1300
	2015/16	1.1600
	2016/17	1.1900
	2017/18	1.2200
	2018/19	1.2500
	2019/20	1.2800

Prices

2012/13 prices	1 2009	2 2010	3 2011	4 2012	5 2013	6 2014	7 2015	8 2016	9 2017	10 2018	11 2019	12 2020	13 2021	14 2022	15 2023	16 2024	17 2025	18 2026	19 2027	20 2028	21 2029	22 2030	23 2031	24 2032	25 2033	26 2034	27 2035	28 2036	29 2037	30 2038	31 2039	32 2040	33 2041	34 2042	35 2043	36 2044	37 2045	38 2046	39 2047	40 2048	41 2049	42 2050	43 2051	44 2052	45 2053	46 2054	47 2055	48 2056	49 2057	50 2058	51 2059	52 2060
Traded carbon price (£/t 2012 t) [1]	4.76	7.12	7.13	8.13	8.16	11.34	12.14	28.48	42.37	61.13	68.81	80.14	87.13	88.38	89.63	90.88	92.08	93.28	94.48	95.68	96.88	98.08	99.28	100.48	101.68	102.88	104.08	105.28	106.48	107.68	108.88	110.08	111.28	112.48	113.68	114.88	116.08	117.28	118.48	119.68	120.88	122.08	123.28	124.48	125.68	126.88	128.08	129.28	130.48	131.68	132.88	134.08	135.28
Wholesale electricity (£/MWh)	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9
Lunar (£/MWh)	245.00																																																						
C1 (£/t.year transmission)	4,514.00																																																						
CPA (£/t.year retrace.km)	49.04																																																						
Cost per leader (£/km)[2]	41.70																																																						
Cost per major injury (£/m)[3]	49.00																																																						
Cost per loss of Ofdmat	200																																																						
Recession GHG conversion factor: tonnes cap/MWh[4]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

[1] https://www.ofgem.gov.uk/ofgem-publications

[2] Source: Ofgem, Strat. Inno. 2013, Wilkinson and Cavendish Ashton

[3] Source: Ofgem, Ofdfm - www.ofdfm.com/Ofdfm.aspx?PAGE=OFDFM/Home/OFDFM_Table_conversion.htm?

[4] Variable annual benefits

note: 2010 to 2030 DECC's updated traded sector carbon values published Dec 2012, 2031 onwards based on DECC carbon values published Dec 2011.

note: HSE values are at 2012 prices

note: Nature Work Force 2013 (Institute in Delhi, DHEC), GHG conversion factors for consumer electricity "case 2030" factor: annex 3 table 3b1.

Decarbonisation of electricity assumption

Power sector emissions are anticipated to reduce to 15kt/MWh by 2050

assume a linear decarbonisation factor of not 2009/10 and 2050

Power sector emissions reduce by 16.5 ktCO2/t.a.c between now and 2050.

Second 2050 base emissions at 15ktCO2

		g CO2e per kWh
1,000 km = 1 tonne	2009/10	599.82 - (Defra)
1,000 kWh = 1 MWh	2010/11	575.32
1 km = 1 kWh	2011/12	550.83
	2012/13	544.33
	2013/14	531.84
	2014/15	517.34
	2015/16	502.85
	2016/17	488.35
	2017/18	473.86
	2018/19	459.36
	2019/20	444.87
	2020/21	430.37
	2021/22	415.87
	2022/23	401.38
	2023/24	386.88
	2024/25	372.39
	2025/26	357.89
	2026/27	343.40
	2027/28	328.90
	2028/29	314.41
	2029/30	299.91
	2030/31	285.41
	2031/32	270.92
	2032/33	256.42
	2033/34	241.93
	2034/35	227.43
	2035/36	212.94
	2036/37	198.44
	2037/38	183.95
	2038/39	169.45
	2039/40	154.96
	2040/41	140.46
	2041/42	125.96
	2042/43	111.47
	2043/44	96.97
	2044/45	82.48
	2045/46	67.98
	2046/47	53.49
	2047/48	38.99
	2048/49	24.50
	2049/50	10.00
check		10.00 assumption: sector carrier should reduce to 10 g CO2e/kWh

0.00	n.a. reduction in carbon intensity

CBA Option 1 | **Overlaying LV cable with 300mm2 Wf**

Term (years from first out flow)	NPV (£m)
5	-£8.12
10	-£8.00
30	£0.72
45	£0.99

first year of investment out flow: 1

		Calculation	Units	RIIO-ED1								RIIO-ED2								RIIO-ED3							
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
				2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Investment	Please specify		£m	(0.19)	(0.09)	(0.09)	(0.22)	(0.20)	(0.15)	(0.15)	-																
	Please specify		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Total investment		£m	(0.19)	(0.09)	(0.09)	(0.22)	(0.20)	(0.15)	(0.15)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Avoided DNO costs	Inspections & Maintenance		£m																								
	Asset Replacement		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Total avoided DNO costs		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	(0.19)	(0.09)	(0.09)	(0.22)	(0.20)	(0.15)	(0.15)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Capitalisation rate	(2)	%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%
	Capitalised investment	(3)=(1)x(2)	£m	(0.14)	(0.06)	(0.06)	(0.16)	(0.14)	(0.11)	(0.11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Investment to be expensed	(4)=(1)-(3)	£m	(0.05)	(0.02)	(0.03)	(0.06)	(0.06)	(0.04)	(0.04)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Depreciation	(5)=∑(3)L	£m	-	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
	Cost of Capital	(6)=wp[(6.%*)(6.%*)]x WACC	£m	(0.00)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(0.06)**	**(0.03)**	**(0.04)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.05)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**
Societal benefits (£m) i.e. costs avoided	Losses		£m	0.01	0.02	0.02	0.04	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
	CO2e associated with losses		£m	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	Customer interruptions (CI)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other 1 (specify)		£m																								
	Other 2 (specify)		£m																								
	Other 3 (specify)		£m																								
	Total societal net benefits		**£m**	**0.0138**	**0.0201**	**0.0268**	**0.0429**	**0.0576**	**0.0729**	**0.0886**	**0.0925**	**0.10**	**0.10**	**0.10**	**0.10**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**
	Net benefits		**£m**	**(0.04)**	**(0.01)**	**(0.01)**	**(0.04)**	**(0.03)**	**(0.01)**	**0.01**	**0.05**	**0.05**	**0.06**	**0.06**	**0.06**	**0.07**	**0.07**	**0.07**	**0.07**	**0.07**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**
	Discount factor	=1/[(1+SRTP)^n]		0.97	0.93	0.90	0.87	0.84	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.64	0.62	0.60	0.58	0.56	0.54	0.52	0.50	0.49	0.47	0.45	0.44
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.99	0.97	0.96	0.94	0.93	0.91	0.90	0.89	0.87	0.86	0.85	0.84	0.82	0.81	0.80	0.79	0.78	0.76	0.75	0.74	0.73	0.72	0.71	0.70
	Discounted net benefits		£m	(0.04)	(0.01)	(0.01)	(0.03)	(0.02)	(0.00)	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03
	Cumulative discounted net benefits		**£m**	**(0.04)**	**(0.05)**	**(0.06)**	**(0.09)**	**(0.12)**	**(0.12)**	**(0.11)**	**(0.07[illegible])**	**(0.04)**	**(0.00)**	**0.04**	**0.08**	**0.12**	**0.16**	**0.21**	**0.25**	**0.29**	**0.33**	**0.37**	**0.41**	**0.44**	**0.48**	**0.52**	**0.55**

		Calculation	Units	RIIO-ED4								RIIO-ED5								RIIO-ED6							
				25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
				2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063
Investment	Please specify		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Total investment		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Avoided DNO costs	Inspections & Maintenance		£m																								
	Asset Replacement		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Total avoided DNO costs		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Capitalisation rate	(2)	%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%			
	Capitalised investment	(3)=(1)x(2)	£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Investment to be expensed	(4)=(1)-(3)	£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	Depreciation	(5)=∑(3)L	£m	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	Cost of Capital	(6)=wp[(6.%*)(6.%*)]x WACC	£m	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.01)**	**(0.01)**
Societal benefits (£m) i.e. costs avoided	Losses		£m	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-
	CO2e associated with losses		£m	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-
	Customer interruptions (CI)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other 1 (specify)		£m																								
	Other 2 (specify)		£m																								
	Other 3 (specify)		£m																								
	Total societal net benefits		**£m**	**0.11**	**0.11**	**0.11**	**0.10**	**0.10**	**0.10**	**0.09**	**0.09**	**0.09**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	-	-	-
	Net benefits		**£m**	**0.08**	**0.08**	**0.08**	**0.07**	**0.07**	**0.07**	**0.06**	**0.06**	**0.06**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.06**	**0.06**	**0.06**	**0.06**	**(0.02)**	**(0.02)**	**(0.01)**
	Discount factor	=1/[(1+SRTP)^n]		0.42	0.41	0.40	0.38	0.37	0.36	0.40	0.39	0.38	0.37	0.36	0.35	0.33	0.33	0.32	0.31	0.30	0.29	0.28	0.27	0.26	0.26	0.25	0.24
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.69	0.68	0.67	0.66	0.65	0.64	0.63	0.62	0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55	0.54	0.54	0.53	0.52	0.51	0.50	0.50	0.49
	Discounted net benefits		£m	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	(0.01)	(0.00)	(0.00)
	Cumulative discounted net benefits		**£m**	**0.58**	**0.61**	**0.64**	**0.67**	**0.69**	**0.72**	**0.74**	**0.77**	**0.79**	**0.81**	**0.83**	**0.84**	**0.86**	**0.88**	**0.90**	**0.91**	**0.93**	**0.94**	**0.96**	**0.98**	**0.99[illegible]**	**0.99**	**0.98**	**0.98**

		Calculation	Units	RIIO-ED7							
				49	50	51	52				
				2064	2065	2066	2067				
Investment	Please specify		£m								
	Total investment		£m								
Avoided DNO costs	Inspections & Maintenance		£m								
	Asset Replacement		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total avoided DNO costs		£m	-	-	-	-				
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-				
	Capitalisation rate	(2)	%								
	Capitalised investment	(3)=(1)x(2)	£m								
	Investment to be expensed	(4)=(1)-(3)	£m								
	Depreciation	(5)=∑(3)L	£m	(0.01)	(0.01)	(0.00)	(0.00)				
	Cost of Capital	(6)=wp[(6.%*)(6.%*)]x WACC	£m	(0.00)	(0.00)	(0.00)	(0.00)				
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(0.01)**	**(0.01)**	**(0.00)**	**(0.00)**				
Societal benefits (£m) i.e. costs avoided	Losses		£m	-	-	-	-				
	CO2e associated with losses		£m	-	-	-	-				
	Customer interruptions (CI)		£m	-	-	-	-				
	Customer minutes lost (CML)		£m	-	-	-	-				
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-				
	Fatality		£m	-	-	-	-				
	Major injury		£m	-	-	-	-				
	Oil leakage		£m	-	-	-	-				
	Other 1 (specify)		£m								
	Other 2 (specify)		£m								
	Other 3 (specify)		£m								
	Total societal net benefits		**£m**	-	-	-	-				
	Net benefits		**£m**	**(0.01)**	**(0.01)**	**(0.00)**	**(0.00)**				
	Discount factor	=1/[(1+SRTP)^n]		0.23	0.23	0.22	0.22				
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.48	0.48	0.47	0.46				
	Discounted net benefits		£m	(0.00)	(0.00)	(0.00)	(0.00)				
	Cumulative discounted net benefits		**£m**	**0.97**	**0.97**	**0.97**	**0.97**				

Non-DNO (eg societal) benefits

Enter values as increments (delta) relative to your reference scenario. If this is your reference scenario enter 0. Reductions are entered as positive numbers and increases as negative numbers.

		Calculation	Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
				2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Societal (net benefits project relative to business as usual)	Reduced losses		MWh	365	366	513	819	1,057	1,313	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520
	Reduced emissions associated with losses		tCO2e	133.20	188.38	242.93	376.22	488.00	565.19	632.12	610.09	588.06	566.02	543.99	521.96	499.93	477.89	455.86	433.83	411.79	389.76	367.73	345.69	323.66	301.63	279.60	257.56
	Reduced number of customers interrupted		mn																								
	Reduced customer minutes lost		Mmin																								
	Reduced emissions (not associated with losses)[1]		tCO2e																								
	Reduced probability of fatality[2]		%																								
	Reduced probability of major injury[2]		%																								
	Reduced oil leakage		Litres																								

		Calculation	Units	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
				2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063
Societal (net benefits project relative to business as usual)	Reduced losses		MWh	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520	1,520			
	Reduced emissions associated with losses		tCO2e	235.53	213.50	191.46	169.43	147.40	125.36	103.33	81.30	59.27	37.23	15.20	15.20	15.20	15.20	15.20	15.20	15.20	15.20	15.20	15.20	15.20	-	-	-
	Reduced number of customers interrupted		mn																								
	Reduced customer minutes lost		Mmin																								
	Reduced emissions (not associated with losses)[1]		tCO2e																								
	Reduced probability of fatality[2]		%																								
	Reduced probability of major injury[2]		%																								
	Reduced oil leakage		Litres																								

[1] Includes all GHG not associated with losses e.g. SF6 converted to tCO2e using Defra conversion factors

http://www.defra.gov.uk/publications/2011/05/20/pb13773-2012-ghg-conversions/

Where losses are entered in terms of MWh, the CO2e associated with those losses will be calculated based on an assumed GHG conversion factor. The tCO2e are monetised using DECC traded carbon values.

All other GHG emissions not associated with losses should be entered in row 90 to avoid double counting.

[2] http://www.hse.gov.uk/risk/theory/alarpcheck.htm

Please specify
Total investment
Connections
Diversions
Reinforcement
ESQCR
Asset Replacement
Refurbishment
Civil Works
Operational IT & Telecoms
Legal & Safety
QoS
High Value Projects
Flooding
BT21CN
Technical losses and other environmental
High impact Low Probability (HILP)
Critical National Infrastructure
Black Start
Rising Mains and Laterals
Undergrounding Wires/ Outside designated areas
Worst Served Customers
Trouble Call / faults
ORIs
Inspections & Maintenance
Tree Cutting
NOC's Other
Network Design & Engineering
Project Management
Engineering Mgt & Clerical Support
System Mapping - Cartographical
Control Centre
Call Centre
Stores
Operational Training
Vehicles & Transport
Atypicals Non Sev Weather
Smart Meters
Network Policy
HR & Non-operational Training
Finance & Regulation
CEO
IT & Telecoms
Property Mgt
Non Op Capex

version number	use / purpose	date	changes made
Template CBA RIIO ED1 v1.xls	initial draft RIIO-GD1 model issued for demo purposes		-
Template CBA RIIO ED1 v2.xls	draft RIIO-ED1 model demonstrated during the CBA meeting held on the 19 March	19/03/2013	updated the model to reflect ED1 rather than GD1
Template CBA RIIO ED1 v3.xls	issued to DNOs to complete the 2 worked examples (leaking cable and QoS)	28/03/2013 03/04/2013	updated to reflect discussions at the CBA meeting including straight line depreciation assumption for ED1, addition of fixed parameter assumptions for non-monetary items re-issued on 3 April to correct CI/CML fixed data transpose error
Template CBA RIIO ED1 v4.xls	final version of CBA spreadsheet to take into account worked examples	16/04/2013	updated to reflect DNO feedback following completion of worked examples main changes include: - included baseline scenario worksheet - removed VOLL as CI/CML method of monetising loss of supply was viewed as robust method - amended the CO2 conversion factor associated with losses to take into account assumptions regarding future decarbonisation of electricity - updated fixed data parameters to 2012/13 prices
		29/04/2013	removed '~~do minimum~~' text in cell B9 of *Option summary* worksheet
		10/01/2014	Inserted clarification comment in cell C9 of the *Option 1* worksheet.
		10/01/2014	Clarified text in cell B1 of *Option summary* worksheet.
		10/01/2014	Clarified text in cell F26 of *Option summary* worksheet.

Guidance for CBA spreadsheet model

Tab	Instructions
Option summary	Provide a description of the stated aim / investment decision contained within this CBA analysis workbook, along with a list of options considered to meet the aim. Also include here the short list of options contained within this workbook which have been fully costed and specify which option has been adopted following CBA and included in your business plan submission.
Fixed data	Enter pre-tax WACC and prices consistent with your business plan
Baseline scenario	Enter costs and benefits associated with the baseline scenario. The baseline scenario represents status quo; that is the cost of business as usual in the absence of any investment intervention. Where business as usual is not an option i.e. an investment intervention of some kind is required DNOs should chose the option with the lowest investment to represent the baseline scenario.
Working baseline	Show any calculation used to derive the values in your baseline scenario
Option 1	Enter costs and benefits *over and above the baseline scenario* i.e. the marginal or incremental costs / benefits of the option being considered. Enter capitalisation rates consistent with your business plan.
Working 1	Show any calculation used to derive the values in your CBA

Colour code:

User populated cells
Fixed data
Summation formula
Other formula

The user should populate the light blue cells. All other cells are either fixed or auto-populated.

Enter costs / benefits in 2012/13 prices (£m).

Costs should be entered as negative values.

Benefits (i.e. avoided costs) should be entered a positive values.

Costs entered should correspond to values set out in company business plans i.e. should exclude RPEs and include ongoing efficiencies consistent with assumptions contained in your business plan submission.

Copy *Option 1 worksheet & workings 1* for each CBA option and label these *option 2 & workings 2* etc.

Where a 'do minimum option' exists, Option 1 should represent your 'do minimum' or 'reference scenario' e.g. do nothing, ongoing maintenance of existing asset or the option which requires the minimum investment .

Use the relevant *Workings worksheet* to demonstrate any calculation/information that can support the costs and benefits you have entered for each option. This is free fill and provides you with an opportunity to show additional underlying data you believe will assist Ofgem in evaluating/understanding your CBA.

Please highlight your chosen option by colouring the worksheet tab yellow.

Purpose of CBA: describe the primary driver of the investment decision

To quantify losses savings of targeted replacement of pre-1958 distribution transformers.

If investment is to replace an existing asset / asset class, please state the condition of the asset / asset class (HI / CI etc.)

Targeted replacement of pre-1958 distribution transformers with a Health Index of 3.

List below all options considered to meet the stated aim

Options considered / project name	Comment
"do minimum" option	Transformers replacement due to their condition (where the Health Index ≥ H4) and/or as a consequence of other works at site, e.g. due to the condition of the LV board and/or HV switchgear and/or building and/or if it's closely coupled, i.e. where there are secondary drivers.
Targeted replacement of pre-1958 distribution transformers	Targeted/accelerated replacement of pre-1958 distribution transformers with a Health Index of 3 as part of the work programme selection criteria for the replacement of indoor and outdoor substations.

List below the short list of those options which have been costed within this CBA workbook

Option no.	Options considered	Decision	Comment	For the chosen option only, provide detail of where CBA expenditure included in this CBA is reported in the BPDT pack. e.g. LV switchgear BPDT CV3 rows 15 to 22.	NPVs based on payback periods (£m)				
					5 years	10 years	20 years	45 years	DNO view
1	Targeted replacement of pre-1958 distribution transformers with a Health Index of 3	Adopted	Adopted as a design policy due to payback period being within 10 years of investment.	Not reported directly in BDPT pack. These CBAs could be used to quantify options for the Losses Strategy. Not licence specific	-£0.03	£0.02	£0.23	£0.31	
2									
3									
4									
5									

If more options are costed, please copy Option 1 and workings / worksheets and add detail to the short list table above.

Parameters

zero rate WACC	3.5%	zero-DNS rate(B) revenue WACC (force
Discount Rate +/- 10 years	3.5%	
Discount Rate +/-30 years	3.5%	
Discount rate for safety	3.5%	
Assumed Asset Life (Years)	30	

RPI INDICES

Index-linked revenues (Real) (m/Mw.sh)

Index		Index
		2012=1
Convert from	2009/10	0.9551
	2010/11	1.0000
	2011/12	1.0420
	2012/13	1.0700
	2013/14	1.1000
	2014/15	1.1300
	2015/16	1.1600
	2016/17	1.1900
	2017/18	1.2200
	2018/19	1.2500
	2019/20	1.2800

Prices

2012/13 prices	1 2009	2 2010	3 2011	4 2012	5 2013	6 2014	7 2015	8 2016	9 2017	10 2018	11 2019	12 2020	13 2021	14 2022	15 2023	16 2024	17 2025	18 2026	19 2027	20 2028	21 2029	22 2030	23 2031	24 2032	25 2033	26 2034	27 2035	28 2036	29 2037	30 2038	31 2039	32 2040	33 2041	34 2042	35 2043	36 2044	37 2045	38 2046	39 2047	40 2048	41 2049	42 2050	43 2051	44 2052	45 2053	46 2054	47 2055	48 2056	49 2057	50 2058	51 2059	52 2060
Traded carbon price (£/t 2012 t) [1]	4.76	7.12	7.13	8.13	8.16	11.34	12.14	28.48	42.37	61.13	68.81	80.14	87.13	88.38	89.63	90.88	92.08	93.28	94.48	95.68	96.88	98.08	99.28	100.48	101.68	102.88	104.08	105.28	106.48	107.68	108.88	110.08	111.28	112.48	113.68	114.88	116.08	117.28	118.48	119.68	120.88	122.08	123.28	124.48	125.68	126.88	128.08	129.28	130.48	131.68	132.88	134.08	135.28
Wholesale electricity (£/MWh)	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9
Lunar (£/MWh)	245.00																																																						
C1 (£/t.year transmission)	4,514.00																																																						
CPA (£/t.year retrace.km)	49.04																																																						
Cost per leader (£/km)[2]	41.70																																																						
Cost per major injury (£/m)[3]	49.00																																																						
Cost per loss of Ofdmat	200																																																						
Recession GHG conversion factor: tonnes cap/MWh[4]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

[1] https://www.ofgem.gov.uk/ofgem-publications

[2] Source: Ofgem, Strat. Inno. 2013, Wilkinson and Cavendish Ashton

[3] Source: Ofgem, Ofdfm - www.ofdfm.com/Ofdfm.aspx?PAGE=OFDFM/Home/OFDFM_Table_conversion.htm?

[4] Variable annual benefits

note: 2010 to 2030 DECC's updated traded sector carbon values published Dec 2012, 2031 onwards based on DECC carbon values published Dec 2011.

note: HSE values are at 2012 prices

note: Nature Work Force 2013 (Institute in Delhi, DHEC), GHG conversion factors for consumer electricity "case 2030" factor: annex 3 table 3b1.

Decarbonisation of electricity assumption

Power sector emissions are anticipated to reduce to 15kt/MWh by 2050

assume a linear decarbonisation factor of not 2009/10 and 2050

Power sector emissions reduce by 16.5 ktCO2/t.a.c between now and 2050.

Second 2050 base emissions at 15ktCO2

		g CO2e per kWh
1,000 km = 1 tonne	2009/10	599.82 - (Defra)
1,000 kWh = 1 MWh	2010/11	575.32
1 km = 1 kWh	2011/12	550.83
	2012/13	544.33
	2013/14	531.84
	2014/15	517.34
	2015/16	502.85
	2016/17	488.35
	2017/18	473.86
	2018/19	459.36
	2019/20	444.87
	2020/21	430.37
	2021/22	415.87
	2022/23	401.38
	2023/24	386.88
	2024/25	372.39
	2025/26	357.89
	2026/27	343.40
	2027/28	328.90
	2028/29	314.41
	2029/30	299.91
	2030/31	285.41
	2031/32	270.92
	2032/33	256.42
	2033/34	241.93
	2034/35	227.43
	2035/36	212.94
	2036/37	198.44
	2037/38	183.95
	2038/39	169.45
	2039/40	154.96
	2040/41	140.46
	2041/42	125.96
	2042/43	111.47
	2043/44	96.97
	2044/45	82.48
	2045/46	67.98
	2046/47	53.49
	2047/48	38.99
	2048/49	24.50
	2049/50	10.00
check		10.00 assumption: sector carrier should reduce to 10 g CO2e/kWh

0.00	n.a. reduction in carbon intensity

CBA Option 1 **Capitalised Cost Transformer**

Term (years from first out flow)	NPV (£m)
5	-£0.03
10	£0.03
30	£0.23
45	£0.31

first year of investment out flow: 2

		Calculation	Units	RIIO-ED1								RIIO-ED2								RIIO-ED3								RIIO-ED4								RIIO-ED5								RIIO-ED6								RIIO-ED7			
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
				2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067
Investment	Asset Replacement		£m	-	(0.0750)	(0.0900)	-	(0.0600)	(0.0300)	-	-																																														
	Please specify		£m																																																					
	Please specify		£m																																																					
	Please specify		£m																																																					
	Please specify		£m																																																					
	Total investment		£m	-	(0.08)	(0.09)	-	(0.06)	(0.03)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Avoided DNO costs	Inspections & Maintenance		£m																																																					
	Asset Replacement		£m																																																						
	Please specify		£m																																																						
	Please specify		£m																																																						
	Please specify		£m																																																						
	Please specify		£m																																																						
	Total avoided DNO costs		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	(0.08)	(0.09)	-	(0.06)	(0.03)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Capitalisation rate	(2)	%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	(3)=(1)x(2)	£m	-	(0.05)	(0.06)	-	(0.04)	(0.02)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Investment to be expensed	(4)=(1)-(3)	£m	-	(0.02)	(0.03)	-	(0.02)	(0.01)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Depreciation	(5)=∑(3)/L	£m	-	-	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	-
	Cost of Capital	(6)=exp[(6%*L)]/(6%*L)]x(WACC	£m	-	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	0.00
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	-	**(0.02)**	**(0.03)**	**(0.01)**	**(0.03)**	**(0.02)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**0.00**
Societal benefits (£m) i.e. costs avoided	Losses		£m	-	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	-	-	-	-	-	-	-
	CO2e associated with losses		£m	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-
	Customer interruptions (CI)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other 1 (specify)		£m																																																					
	Other 2 (specify)		£m																																																					
	Other 3 (specify)		£m																																																					
	Total societal net benefits		£m	-	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	-	-	-	-	-	-	-
	Net benefits		£m	-	**(0.02)**	**(0.02)**	**0.01**	**(0.01)**	**0.00**	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**0.00**
	Discount factor	=1/((1+SRTP)^n)		0.97	0.93	0.90	0.87	0.84	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.64	0.62	0.60	0.58	0.56	0.54	0.52	0.50	0.49	0.47	0.45	0.44	0.42	0.41	0.40	0.38	0.37	0.36	0.40	0.39	0.38	0.37	0.36	0.35	0.33	0.33	0.32	0.31	0.30	0.29	0.28	0.27	0.26	0.26	0.25	0.24	0.23	0.23	0.22	0.22
	Discount factor (safety)	=1/((1+PTPR)^n)		0.99	0.97	0.96	0.94	0.93	0.91	0.90	0.89	0.87	0.86	0.85	0.84	0.82	0.81	0.80	0.79	0.78	0.76	0.75	0.74	0.73	0.72	0.71	0.70	0.69	0.68	0.67	0.66	0.65	0.64	0.63	0.62	0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55	0.54	0.54	0.53	0.52	0.51	0.50	0.50	0.49	0.48	0.48	0.47	0.46
	Discounted net benefits		£m	-	(0.02)	(0.02)	0.01	(0.01)	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	0.00
	Cumulative discounted net benefits		£m	-	**(0.02)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.03)**	**(0.02)**	**(0.01)**	**(0.01)**	**0.01**	**0.02**	**0.03**	**0.04**	**0.06**	**0.07**	**0.08**	**0.09**	**0.10**	**0.11**	**0.13**	**0.14**	**0.15**	**0.16**	**0.17**	**0.18**	**0.19**	**0.20**	**0.20**	**0.21**	**0.22**	**0.23**	**0.24**	**0.24**	**0.25**	**0.25**	**0.26**	**0.27**	**0.27**	**0.28**	**0.28**	**0.29**	**0.29**	**0.30**	**0.30**	**0.30**	**0.30%**	**0.31**	**0.31**	**0.31**	**0.31**	**0.31**	**0.31**	**0.31**

Non-DNO (eg societal) benefits

Enter values as increments (debits) relative to your reference scenario. If this is your reference scenario enter 0. Reductions are entered as positive numbers and increases as negative numbers.

Societal net benefits project relative to business as usual	Reduced losses		MWh	-	112	251	252	335	384	386	388	390	392	394	396	398	400	402	404	406	408	410	412	414	416	418	420	422	424	426	429	431	433	435	437	439	442	444	446	448	450	453	455	457	460	462	464	467	-	-	-	-	-	-	-
	Reduced emissions associated with losses		tCO2e	-	54.58	118.92	115.86	149.18	165.25	160.48	155.66	150.79	145.87	140.89	135.86	130.78	125.64	120.45	115.20	109.90	104.54	99.12	93.65	88.12	82.53	76.89	71.18	65.42	59.60	53.71	47.77	41.77	35.70	29.57	23.38	17.13	10.82	4.44	4.46	4.48	4.50	4.53	4.55	4.57	4.60	4.62	4.64	4.67	-	-	-	-	-	-	-
	Reduced number of customers interrupted		m																																																					
	Reduced customer minutes lost		Mins																																																					
	Reduced emissions (not associated with losses)[1]		tCO2e																																																					
	Reduced probability of fatality[2]		%																																																					
	Reduced probability of major injury[2]		%																																																					
	Reduced oil leakage		Litres																																																					

1.1.17

[1] Includes all GHG not associated with losses e.g. SF6 converted to tCO2e using Defra conversion factors

http://www.defra.gov.uk/publications/2011/05/20/pb13773-2012-ghg-conversions/

Where losses are entered in terms of MWh, the CO2e associated with those losses will be calculated based on an assumed GHG conversion factor. The tCO2e are monetised using DECC traded carbon values.

All other GHG emissions not associated with losses should be entered in row 90 to avoid double counting.

[2] http://www.hse.gov.uk/risk/theory/alarpcheck.htm

Please specify
Total investment
Connections
Diversions
Reinforcement
ESQCR
Asset Replacement
Refurbishment
Civil Works
Operational IT & Telecoms
Legal & Safety
QoS
High Value Projects
Flooding
BT21CN
Technical losses and other environmental
High impact Low Probability (HILP)
Critical National Infrastructure
Black Start
Rising Mains and Laterals
Undergrounding Wires/ Outside designated areas
Worst Served Customers
Trouble Call / faults
ORIs
Inspections & Maintenance
Tree Cutting
NOC's Other
Network Design & Engineering
Project Management
Engineering Mgt & Clerical Support
System Mapping - Cartographical
Control Centre
Call Centre
Stores
Operational Training
Vehicles & Transport
Atypicals Non Sev Weather
Smart Meters
Network Policy
HR & Non-operational Training
Finance & Regulation
CEO
IT & Telecoms
Property Mgt
Non Op Capex

version number	use / purpose	date	changes made
Template CBA RIIO ED1 v1.xls	initial draft RIIO-GD1 model issued for demo purposes		-
Template CBA RIIO ED1 v2.xls	draft RIIO-ED1 model demonstrated during the CBA meeting held on the 19 March	19/03/2013	updated the model to reflect ED1 rather than GD1
Template CBA RIIO ED1 v3.xls	issued to DNOs to complete the 2 worked examples (leaking cable and QoS)	28/03/2013 03/04/2013	updated to reflect discussions at the CBA meeting including straight line depreciation assumption for ED1, addition of fixed parameter assumptions for non-monetary items re-issued on 3 April to correct CI/CML fixed data transpose error
Template CBA RIIO ED1 v4.xls	final version of CBA spreadsheet to take into account worked examples	16/04/2013	updated to reflect DNO feedback following completion of worked examples main changes include: - included baseline scenario worksheet - removed VOLL as CI/CML method of monetising loss of supply was viewed as robust method - amended the CO2 conversion factor associated with losses to take into account assumptions regarding future decarbonisation of electricity - updated fixed data parameters to 2012/13 prices
		29/04/2013	removed '~~do minimum~~' text in cell B9 of *Option summary* worksheet
		10/01/2014	Inserted clarification comment in cell C9 of the *Option 1* worksheet.
		10/01/2014	Clarified text in cell B1 of *Option summary* worksheet.
		10/01/2014	Clarified text in cell F26 of *Option summary* worksheet.

Guidance for CBA spreadsheet model

Tab	Instructions
Option summary	Provide a description of the stated aim / investment decision contained within this CBA analysis workbook, along with a list of options considered to meet the aim. Also include here the short list of options contained within this workbook which have been fully costed and specify which option has been adopted following CBA and included in your business plan submission.
Fixed data	Enter pre-tax WACC and prices consistent with your business plan
Baseline scenario	Enter costs and benefits associated with the baseline scenario. The baseline scenario represents status quo; that is the cost of business as usual in the absence of any investment intervention. Where business as usual is not an option i.e. an investment intervention of some kind is required DNOs should chose the option with the lowest investment to represent the baseline scenario.
Working baseline	Show any calculation used to derive the values in your baseline scenario
Option 1	Enter costs and benefits *over and above the baseline scenario* i.e. the marginal or incremental costs / benefits of the option being considered. Enter capitalisation rates consistent with your business plan.
Working 1	Show any calculation used to derive the values in your CBA

Colour code:

User populated cells
Fixed data
Summation formula
Other formula

The user should populate the light blue cells. All other cells are either fixed or auto-populated.

Enter costs / benefits in 2012/13 prices (£m).

Costs should be entered as negative values.

Benefits (i.e. avoided costs) should be entered a positive values.

Costs entered should correspond to values set out in company business plans i.e. should exclude RPEs and include ongoing efficiencies consistent with assumptions contained in your business plan submission.

Copy *Option 1 worksheet & workings 1* for each CBA option and label these *option 2 & workings 2* etc.

Where a 'do minimum option' exists, Option 1 should represent your 'do minimum' or 'reference scenario' e.g. do nothing, ongoing maintenance of existing asset or the option which requires the minimum investment .

Use the relevant *Workings worksheet* to demonstrate any calculation/information that can support the costs and benefits you have entered for each option. This is free fill and provides you with an opportunity to show additional underlying data you believe will assist Ofgem in evaluating/understanding your CBA.

Please highlight your chosen option by colouring the worksheet tab yellow.

Purpose of CBA: describe the primary driver of the investment decision

To quantify loss savings between 185mm2 and 300mm2 Triplex for 11kV cables (from second leg of feeder downstream)

If investment is to replace an existing asset / asset class, please state the condition of the asset / asset class (HI / CI etc.)

List below all options considered to meet the stated aim

Options considered / project name	Comment
"do minimum" option	Existing design policy of using 185mm2 for 11kV feeders from second leg downstream. (300mm2 for first leg from Primary S/S).
Using 300mm2 11kV Cable	Using 300mm2 for all 11kV feeder sections

List below the short list of those options which have been costed within this CBA workbook

Option no.	Options considered	Decision	Comment	For the chosen option only, provide detail of where CBA expenditure included in this CBA is reported in the BPDT pack. e.g. LV switchgear BPDT CV3 rows 15 to 22.	NPVs based on payback periods				
					5	10	30	45 years	DNO view
1	300mm2 for all 11kV network feeders	Adopted	To be considered as a design policy change as appears to be cost effective.	Not reported directly in BDPT pack. These CBAs were used to quantify options for the Losses Strategy paper. Not licence specific.	£0.18	£0.47	£0.06	£0.33	
2									
3									
4									
5									

If more options are costed, please copy Option 1 and workings 1 worksheets and add detail to the short list table above.

Parameters

zero rate WACC	3.5%	zero-DNS rate(B) revenue WACC (force
Discount Rate +/- 10 years	3.5%	
Discount Rate +/-30 years	3.5%	
Discount rate for safety	3.5%	
Assumed Asset Life (Years)	30	

RPI INDICES

Index-linked revenues (Real) (m/Mw.sh)

Index		Index
		2012=1
Convert from	2009/10	0.9551
	2010/11	1.0000
	2011/12	1.0420
	2012/13	1.0700
	2013/14	1.1000
	2014/15	1.1300
	2015/16	1.1600
	2016/17	1.1900
	2017/18	1.2200
	2018/19	1.2500
	2019/20	1.2800

Prices

2012/13 prices	1 2009	2 2010	3 2011	4 2012	5 2013	6 2014	7 2015	8 2016	9 2017	10 2018	11 2019	12 2020	13 2021	14 2022	15 2023	16 2024	17 2025	18 2026	19 2027	20 2028	21 2029	22 2030	23 2031	24 2032	25 2033	26 2034	27 2035	28 2036	29 2037	30 2038	31 2039	32 2040	33 2041	34 2042	35 2043	36 2044	37 2045	38 2046	39 2047	40 2048	41 2049	42 2050	43 2051	44 2052	45 2053	46 2054	47 2055	48 2056	49 2057	50 2058	51 2059	52 2060
Traded carbon price (£/t 2012 t) [1]	4.76	7.12	7.13	8.13	8.16	11.34	12.14	28.48	42.37	61.13	68.81	80.14	87.13	88.38	89.63	90.88	92.08	93.28	94.48	95.68	96.88	98.08	99.28	100.48	101.68	102.88	104.08	105.28	106.48	107.68	108.88	110.08	111.28	112.48	113.68	114.88	116.08	117.28	118.48	119.68	120.88	122.08	123.28	124.48	125.68	126.88	128.08	129.28	130.48	131.68	132.88	134.08	135.28
Wholesale electricity (£/MWh)	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9
Lunar (£/MWh)	245.00																																																						
C1 (£/t.year transmission)	4,514.00																																																						
CPA (£/t.year retrace.km)	49.04																																																						
Cost per leader (£/km)[2]	41.70																																																						
Cost per major injury (£/m)[3]	49.00																																																						
Cost per loss of Ofdmat	200																																																						
Recession GHG conversion factor: tonnes cap/MWh[4]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

[1] https://www.ofgem.gov.uk/ofgem-publications

[2] Source: Ofgem, Strat. Inno. 2013, Wilkinson and Cavendish Ashton

[3] Source: Ofgem, Ofdfm - www.ofdfm.com/Ofdfm.aspx?PAGE=OFDFM/Home/OFDFM_Table_conversion.htm?

[4] Variable annual benefits

note: 2010 to 2030 DECC's updated traded sector carbon values published Dec 2012, 2031 onwards based on DECC carbon values published Dec 2011.

note: HSE values are at 2012 prices

note: Nature Work Force 2013 (Institute in Delhi, DHEC), GHG conversion factors for consumer electricity "case 2030" factor: annex 3 table 3b1.

Decarbonisation of electricity assumption

Power sector emissions are anticipated to reduce to 15kt/MWh by 2050

assume a linear decarbonisation factor of not 2009/10 and 2050

Power sector emissions reduce by 16.5 ktCO2/t.a.c between now and 2050.

Second 2050 base emissions at 15ktCO2

		g CO2e per kWh
1,000 km = 1 tonne	2009/10	599.82 - (Defra)
1,000 kWh = 1 MWh	2010/11	575.32
1 km = 1 kWh	2011/12	550.83
	2012/13	544.33
	2013/14	531.84
	2014/15	517.34
	2015/16	502.85
	2016/17	488.35
	2017/18	473.86
	2018/19	459.36
	2019/20	444.87
	2020/21	430.37
	2021/22	415.87
	2022/23	401.38
	2023/24	386.88
	2024/25	372.39
	2025/26	357.89
	2026/27	343.40
	2027/28	328.90
	2028/29	314.41
	2029/30	299.91
	2030/31	285.41
	2031/32	270.92
	2032/33	256.42
	2033/34	241.93
	2034/35	227.43
	2035/36	212.94
	2036/37	198.44
	2037/38	183.95
	2038/39	169.45
	2039/40	154.96
	2040/41	140.46
	2041/42	125.96
	2042/43	111.47
	2043/44	96.97
	2044/45	82.48
	2045/46	67.98
	2046/47	53.49
	2047/48	38.99
	2048/49	24.50
	2049/50	10.00
check		10.00 assumption: sector carrier should reduce to 10 g CO2e/kWh

0.00	n.a. reduction in carbon intensity

CBA Option 1 300mm2 for all 11kV network feeders

Term (years from first out flow)	NPV (£m)
5	-£0.38
10	-£0.47
30	£0.06
45	£0.33

first year of investment out flow: 1

			Units	RIIO-ED1								RIIO-ED2								RIIO-ED3								RIIO-ED4								RIIO-ED5								RIIO-ED6								RIIO-ED7			
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
				2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067
Investment	Asset Replacement		£m	(0.34)	(0.34)	(0.34)	(0.36)	(0.36)	(0.32)	(0.31)	-																																													
	Please specify		£m																																																					
	Please specify		£m																																																					
	Please specify		£m																																																					
	Please specify		£m																																																					
	Total investment		£m	(0.34)	(0.34)	(0.34)	(0.36)	(0.36)	(0.32)	(0.31)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Avoided DNO costs	Inspections & Maintenance		£m																																																					
	Asset Replacement		£m																																																					
	Please specify		£m																																																					
	Please specify		£m																																																					
	Please specify		£m																																																					
	Please specify		£m																																																					
	Total avoided DNO costs		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	(0.34)	(0.34)	(0.34)	(0.36)	(0.36)	(0.32)	(0.31)																																													
	Capitalisation rate	(2)	%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%							
	Capitalised investment	(3)=(1)x(2)	£m	(0.24)	(0.24)	(0.17)	(0.26)	(0.26)	(0.23)	(0.22)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
	Investment to be expensed	(4)=(1)-(3)	£m	(0.09)	(0.09)	(0.07)	(0.10)	(0.10)	(0.09)	(0.09)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
	Depreciation	(5)=∑(3)L	£m	-	(0.01)	(0.01)	(0.01)	(0.02)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)	(0.01)	(0.00)
	Cost of Capital	(6)=e[(8^L)/(8^T)]x WACC	£m	(0.00)	(0.01)	(0.02)	(0.03)	(0.04)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	£m	(0.10)	(0.11)	(0.10)	(0.14)	(0.16)	(0.17)	(0.19)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)	(0.01)	(0.00)
Societal benefits (£m) i.e. costs avoided	Losses		£m	0.01	0.02	0.03	0.05	0.06	0.07	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	-	-	-	-	-	-	-
	CO2e associated with losses		£m	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.02	0.02	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-
	Customer interruptions (CI)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other 1 (specify)		£m																																																					
	Other 2 (specify)		£m																																																					
	Other 3 (specify)		£m																																																					
	Total societal net benefits		£m	**0.0132**	**0.0266**	**0.0360**	**0.0503**	**0.0649**	**0.0821**	**0.1001**	**0.1050**	**0.11**	**0.11**	**0.12**	**0.12**	**0.12**	**0.13**	**0.13**	**0.13**	**0.13**	**0.14**	**0.14**	**0.14**	**0.14**	**0.14**	**0.14**	**0.14**	**0.14**	**0.13**	**0.13**	**0.13**	**0.13**	**0.12**	**0.12**	**0.12**	**0.11**	**0.11**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.11**	**0.11**	**0.11**	-	-	-	-	-	-	-
	Net benefits		£m	(0.09)	(0.09)	(0.06)	(0.09)	(0.10)	(0.08)	(0.07)	**0.01**	**0.02**	**0.02**	**0.03**	**0.03**	**0.04**	**0.04**	**0.05**	**0.05**	**0.05**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.07**	**0.07**	**0.07**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.05**	**0.05**	**0.04**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)	(0.01)	(0.00)
	Discount factor	=1/((1+SRTP)^n)		0.97	0.93	0.90	0.87	0.84	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.64	0.62	0.60	0.58	0.56	0.54	0.52	0.50	0.49	0.47	0.45	0.44	0.42	0.41	0.40	0.38	0.37	0.36	0.40	0.39	0.38	0.37	0.36	0.35	0.33	0.33	0.32	0.31	0.30	0.29	0.28	0.27	0.26	0.36	0.35	0.34	0.23	0.23	0.22	0.22
	Discount factor (safety)	=1/((1+PTPR)^n)		0.99	0.97	0.96	0.94	0.93	0.91	0.90	0.89	0.87	0.86	0.85	0.84	0.82	0.81	0.80	0.79	0.78	0.76	0.75	0.74	0.73	0.72	0.71	0.70	0.69	0.68	0.67	0.66	0.65	0.64	0.63	0.62	0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55	0.54	0.54	0.53	0.52	0.51	0.50	0.50	0.49	0.48	0.48	0.47	0.46
	Discounted net benefits		£m	(0.08)	(0.08)	(0.06)	(0.08)	(0.08)	(0.06)	(0.06)	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
	Cumulative discounted net benefits		£m	**(0.08)**	**(0.17)**	**(0.22)**	**(0.30)**	**(0.38)**	**(0.45)**	**(0.51)**	**(0.49)**	**(0.48)**	**(0.47)**	**(0.45)**	**(0.43)**	**(0.40)**	**(0.36)**	**(0.33)**	**(0.30)**	**(0.27)**	**(0.24)**	**(0.21)**	**(0.18)**	**(0.15)**	**(0.12)**	**(0.09)**	**(0.06)**	**(0.03)**	**(0.01)**	**0.02**	**0.04**	**0.06**	**0.09**	**0.11**	**0.13**	**0.15**	**0.16**	**0.18**	**0.19**	**0.21**	**0.23**	**0.24**	**0.26**	**0.28**	**0.29**	**0.31**	**0.33**	**0.35**	**0.36**	**0.32**	**0.31**	**0.30**	**0.30**	**0.29**	**0.29**	**0.29**

Non-DNO (eg societal) benefits

Enter values as increments (delta) relative to your reference scenario. If this is your reference scenario enter 0. Reductions are entered as positive numbers and increases as negative numbers.

Societal net benefits (project relative to business as usual)	Reduced losses	MWh		253	510	689	960	1,236	1,479	1,716	1,725	1,734	1,742	1,751	1,760	1,769	1,778	1,786	1,795	1,804	1,813	1,822	1,832	1,841	1,850	1,859	1,869	1,878	1,887	1,897	1,906	1,916	1,925	1,935	1,945	1,954	1,964	1,974	1,984	1,994	2,004	2,014	2,024	2,034	2,044	2,055	2,065	2,075							
	Reduced emissions associated with losses	tCO2e		127.44	248.92	326.59	440.94	549.80	636.63	713.84	692.41	670.74	648.84	626.71	604.33	581.72	558.87	535.77	512.43	488.84	465.00	440.91	416.57	391.97	367.11	342.00	316.63	290.99	265.09	238.92	212.49	185.78	158.80	131.55	104.02	76.21	48.12	19.74	19.84	19.94	20.04	20.14	20.24	20.34	20.44	20.55	20.65	20.75	-	-	-	-	-	-	-
	Reduced number of customers interrupted	nis																																																					
	Reduced customer minutes lost	Mins																																																					
	Reduced emissions (not associated with losses)[1]	tCO2e																																																					
	Reduced probability of fatality[2]	%																																																					
	Reduced probability of major injury[2]	%																																																					
	Reduced oil leakage	Litres																																																					

[1] Includes all GHG not associated with losses e.g. SF6 converted to tCO2e using Defra conversion factors

http://www.defra.gov.uk/publications/2011/05/20/pb13773-2012-ghg-conversions/

Where losses are entered in terms of MWh, the CO2e associated with those losses will be calculated based on an assumed GHG conversion factor. The tCO2e are monetised using DECC traded carbon values.

All other GHG emissions not associated with losses should be entered in row 90 to avoid double counting.

[2] http://www.hse.gov.uk/risk/theory/alarpcheck.htm

Please specify
Total investment
Connections
Diversions
Reinforcement
ESQCR
Asset Replacement
Refurbishment
Civil Works
Operational IT & Telecoms
Legal & Safety
QoS
High Value Projects
Flooding
BT21CN
Technical losses and other environmental
High impact Low Probability (HILP)
Critical National Infrastructure
Black Start
Rising Mains and Laterals
Undergrounding Wires/ Outside designated areas
Worst Served Customers
Trouble Call / faults
OHLs
Inspections & Maintenance
Tree Cutting
NOC's Other
Network Design & Engineering
Project Management
Engineering Mgt & Clerical Support
System Mapping - Cartographical
Control Centre
Call Centre
Stores
Operational Training
Vehicles & Transport
Atypicals Non Sev Weather
Smart Meters
Network Policy
HR & Non-operational Training
Finance & Regulation
CEO
IT & Telecoms
Property Mgt
Non Op Capex

version number	use / purpose	date	changes made
Template CBA RIIO ED1 v1.xls	initial draft RIIO-GD1 model issued for demo purposes		-
Template CBA RIIO ED1 v2.xls	draft RIIO-ED1 model demonstrated during the CBA meeting held on the 19 March	19/03/2013	updated the model to reflect ED1 rather than GD1
Template CBA RIIO ED1 v3.xls	issued to DNOs to complete the 2 worked examples (leaking cable and QoS)	28/03/2013 03/04/2013	updated to reflect discussions at the CBA meeting including straight line depreciation assumption for ED1, addition of fixed parameter assumptions for non-monetary items re-issued on 3 April to correct CI/CML fixed data transpose error
Template CBA RIIO ED1 v4.xls	final version of CBA spreadsheet to take into account worked examples	16/04/2013	updated to reflect DNO feedback following completion of worked examples main changes include: - included baseline scenario worksheet - removed VOLL as CI/CML method of monetising loss of supply was viewed as robust method - amended the CO2 conversion factor associated with losses to take into account assumptions regarding future decarbonisation of electricity - updated fixed data parameters to 2012/13 prices
		29/04/2013	removed '~~do minimum~~' text in cell B9 of *Option summary* worksheet
		10/01/2014	Inserted clarification comment in cell C9 of the *Option 1* worksheet.
		10/01/2014	Clarified text in cell B1 of *Option summary* worksheet.
		10/01/2014	Clarified text in cell F26 of *Option summary* worksheet.

Guidance for CBA spreadsheet model

Tab	Instructions
Option summary	Provide a description of the stated aim / investment decision contained within this CBA analysis workbook, along with a list of options considered to meet the aim. Also include here the short list of options contained within this workbook which have been fully costed and specify which option has been adopted following CBA and included in your business plan submission.
Fixed data	Enter pre-tax WACC and prices consistent with your business plan
Baseline scenario	Enter costs and benefits associated with the baseline scenario. The baseline scenario represents status quo; that is the cost of business as usual in the absence of any investment intervention. Where business as usual is not an option i.e. an investment intervention of some kind is required DNOs should chose the option with the lowest investment to represent the baseline scenario.
Working baseline	Show any calculation used to derive the values in your baseline scenario
Option 1	Enter costs and benefits *over and above the baseline scenario* i.e. the marginal or incremental costs / benefits of the option being considered. Enter capitalisation rates consistent with your business plan.
Working 1	Show any calculation used to derive the values in your CBA

Colour code:

User populated cells
Fixed data
Summation formula
Other formula

The user should populate the light blue cells. All other cells are either fixed or auto-populated.

Enter costs / benefits in 2012/13 prices (£m).

Costs should be entered as negative values.

Benefits (i.e. avoided costs) should be entered a positive values.

Costs entered should correspond to values set out in company business plans i.e. should exclude RPEs and include ongoing efficiencies consistent with assumptions contained in your business plan submission.

Copy *Option 1 worksheet & workings 1* for each CBA option and label these *option 2 & workings 2* etc.

Where a 'do minimum option' exists, Option 1 should represent your 'do minimum' or 'reference scenario' e.g. do nothing, ongoing maintenance of existing asset or the option which requires the minimum investment .

Use the relevant *Workings worksheet* to demonstrate any calculation/information that can support the costs and benefits you have entered for each option. This is free fill and provides you with an opportunity to show additional underlying data you believe will assist Ofgem in evaluating/understanding your CBA.

Please highlight your chosen option by colouring the worksheet tab yellow.

Purpose of CBA: describe the primary driver of the investment decision

To quantify loss savings between the existing LV design policy of oversizing LV cables and previous policy on sizing cables on minimum network parameters.

If investment is to replace an existing asset / asset class, please state the condition of the asset / asset class (HI / CI etc.)

List below all options considered to meet the stated aim

Options considered / project name	Comment
"do minimum" option	Overlay old LV Cable with 185WI Cable as per previous design policy.
Overlay with 300WI	Overlay old LV Cable with 300WI Cable as per existing design policy.

List below the short list of those options which have been costed within this CBA workbook

Option no.	Options considered	Decision	Comment	For the chosen option only, provide detail of where CBA expenditure included in this CBA is reported in the BPDT pack. e.g. LV switchgear BPDT CV3 rows 15 to 22.	NPVs based on payback periods				
					8	24 years	32 years	45 years	DNO view
1	Overlaying LV cable with 300mm2 WI	Adopted	As per NPG Design Policy	Not reported directly in BDPT pack. These CBAs were used to quantify options for this LI mean 'firm-away cost'. Not finance expertise	-£0.238	-£0.01	£1.51	£2.09	
2									
3									
4									
5									

If more options are costed, please copy Option 1 and workings / worksheets and add detail to the short list table above.

Parameters

zero rate WACC	3.5%	zero-DNS rate(B) revenue WACC (force
Discount Rate +/- 10 years	3.5%	
Discount Rate +/-30 years	3.5%	
Discount rate for safety	3.5%	
Assumed Asset Life (Years)	30	

RPI INDICES

Index-linked revenues (Real) (m/Mw.sh)

Index		Index
		2012=1
Convert from	2009/10	0.9551
	2010/11	1.0000
	2011/12	1.0420
	2012/13	1.0700
	2013/14	1.1000
	2014/15	1.1300
	2015/16	1.1600
	2016/17	1.1900
	2017/18	1.2200
	2018/19	1.2500
	2019/20	1.2800

Prices

2012/13 prices	1 2009	2 2010	3 2011	4 2012	5 2013	6 2014	7 2015	8 2016	9 2017	10 2018	11 2019	12 2020	13 2021	14 2022	15 2023	16 2024	17 2025	18 2026	19 2027	20 2028	21 2029	22 2030	23 2031	24 2032	25 2033	26 2034	27 2035	28 2036	29 2037	30 2038	31 2039	32 2040	33 2041	34 2042	35 2043	36 2044	37 2045	38 2046	39 2047	40 2048	41 2049	42 2050	43 2051	44 2052	45 2053	46 2054	47 2055	48 2056	49 2057	50 2058	51 2059	52 2060
Traded carbon price (£/t 2012 t) [1]	4.76	7.12	7.13	8.13	8.16	11.34	12.14	28.48	42.37	61.13	68.81	80.14	87.13	88.38	89.63	90.88	92.08	93.28	94.48	95.68	96.88	98.08	99.28	100.48	101.68	102.88	104.08	105.28	106.48	107.68	108.88	110.08	111.28	112.48	113.68	114.88	116.08	117.28	118.48	119.68	120.88	122.08	123.28	124.48	125.68	126.88	128.08	129.28	130.48	131.68	132.88	134.08	135.28
Wholesale electricity (£/MWh)	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9
Lunar (£/MWh)	245.00																																																						
C1 (£/t.year transmission)	4,514.00																																																						
CPA (£/t.year retrace.km)	49.04																																																						
Cost per leader (£/km)[2]	41.70																																																						
Cost per major injury (£/m)[3]	49.00																																																						
Cost per loss of Ofdmat	200																																																						
Recession GHG conversion factor: tonnes cap/MWh[4]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

[1] https://www.ofgem.gov.uk/ofgem-publications

[2] Source: Ofgem, Strat. Inno. 2013, Wilkinson and Cavendish Ashton

[3] Source: Ofgem, Ofdfm - www.ofdfm.com/Ofdfm.aspx?PAGE=OFDFM/Home/OFDFM_Table_conversion.htm?

[4] Variable annual benefits

note: 2010 to 2030 DECC's updated traded sector carbon values published Dec 2012, 2031 onwards based on DECC carbon values published Dec 2011.

note: HSE values are at 2012 prices

note: Nature Work Force 2013 (Institute in Delhi, DHEC), GHG conversion factors for consumer electricity "case 2030" factor: annex 3 table 3b1.

Decarbonisation of electricity assumption

Power sector emissions are anticipated to reduce to 15kt/MWh by 2050

assume a linear decarbonisation factor of not 2009/10 and 2050

Power sector emissions reduce by 16.5 ktCO2/t.a.c between now and 2050.

Second 2050 base emissions at 15ktCO2

		g CO2e per kWh
1,000 km = 1 tonne	2009/10	599.82 - (Defra)
1,000 kWh = 1 MWh	2010/11	575.32
1 km = 1 kWh	2011/12	550.83
	2012/13	544.33
	2013/14	531.84
	2014/15	517.34
	2015/16	502.85
	2016/17	488.35
	2017/18	473.86
	2018/19	459.36
	2019/20	444.87
	2020/21	430.37
	2021/22	415.87
	2022/23	401.38
	2023/24	386.88
	2024/25	372.39
	2025/26	357.89
	2026/27	343.40
	2027/28	328.90
	2028/29	314.41
	2029/30	299.91
	2030/31	285.41
	2031/32	270.92
	2032/33	256.42
	2033/34	241.93
	2034/35	227.43
	2035/36	212.94
	2036/37	198.44
	2037/38	183.95
	2038/39	169.45
	2039/40	154.96
	2040/41	140.46
	2041/42	125.96
	2042/43	111.47
	2043/44	96.97
	2044/45	82.48
	2045/46	67.98
	2046/47	53.49
	2047/48	38.99
	2048/49	24.50
	2049/50	10.00
check		10.00 assumption: sector carrier should reduce to 10 g CO2e/kWh

0.00	n.a. reduction in carbon intensity

CBA Option 1 **Overlaying LV cable with 300mm2 Wf**

Term (years from first out flow)	NPV (£m)
5	-£0.24
10	-£0.01
30	£1.51
45	£2.09

first year of investment out flow: 1

			RIIO-ED1								RIIO-ED2								RIIO-ED3								RIIO-ED4							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Calculation	Units	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Investment	Please specify	£m	(0.29)	(0.21)	(0.26)	(0.43)	(0.39)	(0.34)	(0.37)	-																
	Please specify	£m																								
	Please specify	£m																								
	Please specify	£m																								
	Please specify	£m																								
	Total investment	£m	(0.29)	(0.21)	(0.26)	(0.43)	(0.39)	(0.34)	(0.37)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Avoided DNO costs	Inspections & Maintenance	£m																								
	Asset Replacement	£m																								
	Please specify	£m																								
	Please specify	£m																								
	Please specify	£m																								
	Please specify	£m																								
	Total avoided DNO costs	£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	(0.29)	(0.21)	(0.26)	(0.43)	(0.39)	(0.34)	(0.37)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Capitalisation rate	(2)	%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%
	Capitalised investment	(3)=(1)x(2)	£m	(0.21)	(0.15)	(0.19)	(0.31)	(0.28)	(0.24)	(0.26)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Investment to be expensed	(4)=(1)-(3)	£m	(0.08)	(0.06)	(0.07)	(0.12)	(0.11)	(0.10)	(0.10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Depreciation	(5)=∑(3)L	£m	-	(0.00)	(0.01)	(0.01)	(0.02)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
	Cost of Capital	(6)=wx[(RV^L)/R^L]x WACC	£m	(0.00)	(0.01)	(0.02)	(0.03)	(0.04)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(0.08)**	**(0.08)**	**(0.10)**	**(0.16)**	**(0.17)**	**(0.17)**	**(0.19)**	**(0.10)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.07)**	**(0.07)**
Societal benefits (£m) i.e. costs avoided	Losses	£m	0.02	0.03	0.05	0.08	0.11	0.13	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
	CO2e associated with losses	£m	0.00	0.00	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.05	0.06	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.08	0.08	0.08
	Customer interruptions (CI)	£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)	£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fatality	£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major injury	£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oil leakage	£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other 1 (specify)	£m																								
	Other 2 (specify)	£m																								
	Other 3 (specify)	£m																								
	Total societal net benefits	**£m**	**0.0211**	**0.0368**	**0.0562**	**0.0882**	**0.1172**	**0.1505**	**0.1882**	**0.1965**	**0.2041**	**0.2110**	**0.2173**	**0.2228**	**0.2277**	**0.2319**	**0.2355**	**0.2370**	**0.2395**	**0.2413**	**0.2424**	**0.2428**	**0.2425**	**0.2408**	**0.2391**	**0.2367**
	Net benefits	**£m**	**(0.066)**	**(0.047)**	**(0.045)**	**(0.073)**	**(0.055)**	**(0.023)**	**(0.005)**	**0.10**	**0.11**	**0.12**	**0.13**	**0.13**	**0.14**	**0.14**	**0.15**	**0.15**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**
	Discount factor	=1/[(1+SRTP)^n]		0.97	0.93	0.90	0.87	0.84	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.64	0.62	0.60	0.58	0.56	0.54	0.52	0.50	0.49	0.47	0.45
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.99	0.97	0.96	0.94	0.93	0.91	0.90	0.89	0.87	0.86	0.85	0.84	0.82	0.81	0.80	0.79	0.78	0.76	0.75	0.74	0.73	0.72	0.71
	Discounted net benefits	£m	(0.06)	(0.04)	(0.04)	(0.06)	(0.04)	(0.01)	(0.00)	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.07	0.07
	Cumulative discounted net benefits	**£m**	**(0.06)**	**(0.10)**	**(0.14)**	**(0.20)**	**(0.24)**	**(0.25)**	**(0.25)**	**(0.177)**	**(0.10)**	**(0.01)**	**0.07**	**0.16**	**0.25**	**0.34**	**0.43**	**0.51**	**0.60**	**0.69**	**0.77**	**0.85**	**0.93**	**1.01**	**1.08**	**1.16**

	RIIO-ED5										RIIO-ED6								RIIO-ED7							
	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067
Investment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
Avoided DNO costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%	72.0%							
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)	(0.01)	(0.01)
	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	(0.07)	**(0.07)**	**(0.07)**	**(0.07)**	**(0.07)**	**(0.06)**	**(0.06)**	**(0.06)**	**(0.06)**	**(0.06)**	**(0.06)**	**(0.06)**	**(0.05)**	**(0.05)**	**(0.05)**	**(0.05)**	**(0.05)**	**(0.05)**	**(0.05)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.03)**	**(0.03)**	**(0.02)**	**(0.02)**	**(0.01)**	**(0.01)**
	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	-	-	-	-	-	-	-
	0.08	0.07	0.07	0.06	0.06	0.05	0.04	0.04	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0.2334	**0.2298**	**0.2253**	**0.2201**	**0.2142**	**0.2075**	**0.2000**	**0.1920**	**0.1833**	**0.1739**	**0.1637**	**0.1640**	**0.1643**	**0.1645**	**0.1647**	**0.1650**	**0.1653**	**0.1655**	**0.1657**	**0.1660**	**0.1662**	-	-	-	-	-	-	-
	0.16	**0.16**	**0.16**	**0.15**	**0.15**	**0.14**	**0.14**	**0.13**	**0.12**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.12**	**0.12**	**0.12**	**0.12**	**0.12**	**(0.04)**	**(0.04)**	**(0.03)**	**(0.03)**	**(0.02)**	**(0.01)**	**(0.01)**
	0.42	0.41	0.40	0.38	0.37	0.36	0.40	0.39	0.38	0.37	0.36	0.35	0.33	0.33	0.32	0.31	0.30	0.29	0.28	0.27	0.26	0.26	0.25	0.24	0.23	0.22	0.22	0.22
	0.69	0.68	0.67	0.66	0.65	0.64	0.63	0.62	0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55	0.54	0.54	0.53	0.52	0.51	0.50	0.50	0.49	0.48	0.48	0.47	0.46
	0.07	0.07	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
	1.22	**1.29**	**1.35**	**1.41**	**1.46**	**1.51**	**1.57**	**1.62**	**1.67**	**1.71**	**1.75**	**1.78**	**1.82**	**1.86**	**1.89**	**1.93**	**1.96**	**2.00**	**2.03**	**2.06**	**2.09**	**2.08**	**2.07**	**2.07**	**2.06**	**2.06**	**2.05**	**2.05**

Non-DNO (eg societal) benefits

Enter values as increments (delta) relative to your reference scenario. If this is your reference scenario enter 0. Reductions are entered as positive numbers and increases as negative numbers.

Societal net benefits project relative to business as usual scenario	Reduced losses	MWh	406	766	1,075	1,683	2,230	2,710	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229
	Reduced emissions associated with losses	tCO2e	203.76	344.76	509.61	773.18	992.22	1,166.34	1,342.72	1,295.92	1,249.12	1,202.32	1,155.52	1,108.72	1,061.91	1,015.11	968.31	921.51	874.71	827.91	781.11	734.31	687.50	640.70	593.90	547.10	500.30	453.50	406.70	359.90	313.09	266.29	219.49	172.69	125.89	79.09	32.29	32.29	32.29	32.29	32.29	32.29	32.29	32.29	32.29	32.29	32.29	-	-	-	-	-	-
	Reduced number of customers interrupted	no.																																						
	Reduced customer minutes lost	Mins																																						
	Reduced emissions (not associated with losses)[1]	tCO2e																																						
	Reduced probability of fatality[2]	%																																						
	Reduced probability of major injury[2]	%																																						
	Reduced oil leakage	Litres																																						

[1] Includes all GHG not associated with losses e.g. SF6 converted to tCO2e using Defra conversion factors

http://www.defra.gov.uk/publications/2011/05/20/pb13773-2012-ghg-conversions/

Where losses are entered in terms of MWh, the CO2e associated with those losses will be calculated based on an assumed GHG conversion factor. The tCO2e are monetised using DECC traded carbon values.

All other GHG emissions not associated with losses should be entered in row 90 to avoid double counting.

[2] http://www.hse.gov.uk/risk/theory/alarpcheck.htm

Please specify
Total investment
Connections
Diversions
Reinforcement
ESQCR
Asset Replacement
Refurbishment
Civil Works
Operational IT & Telecoms
Legal & Safety
QoS
High Value Projects
Flooding
BT21CN
Technical losses and other environmental
High impact Low Probability (HILP)
Critical National Infrastructure
Black Start
Rising Mains and Laterals
Undergrounding Wires/ Outside designated areas
Worst Served Customers
Trouble Call / faults
ODIs
Inspections & Maintenance
Tree Cutting
NOC's Other
Network Design & Engineering
Project Management
Engineering Mgt & Clerical Support
System Mapping - Cartographical
Control Centre
Call Centre
Stores
Operational Training
Vehicles & Transport
Atypicals Non Sev Weather
Smart Meters
Network Policy
HR & Non-operational Training
Finance & Regulation
CEO
IT & Telecoms
Property Mgt
Non Op Capex

version number	use / purpose	date	changes made
Template CBA RIIO ED1 v1.xls	initial draft RIIO-GD1 model issued for demo purposes		-
Template CBA RIIO ED1 v2.xls	draft RIIO-ED1 model demonstrated during the CBA meeting held on the 19 March	19/03/2013	updated the model to reflect ED1 rather than GD1
Template CBA RIIO ED1 v3.xls	issued to DNOs to complete the 2 worked examples (leaking cable and QoS)	28/03/2013 03/04/2013	updated to reflect discussions at the CBA meeting including straight line depreciation assumption for ED1, addition of fixed parameter assumptions for non-monetary items re-issued on 3 April to correct CI/CML fixed data transpose error
Template CBA RIIO ED1 v4.xls	final version of CBA spreadsheet to take into account worked examples	16/04/2013	updated to reflect DNO feedback following completion of worked examples main changes include: - included baseline scenario worksheet - removed VOLL as CI/CML method of monetising loss of supply was viewed as robust method - amended the CO2 conversion factor associated with losses to take into account assumptions regarding future decarbonisation of electricity - updated fixed data parameters to 2012/13 prices
		29/04/2013	removed '~~do minimum~~' text in cell B9 of *Option summary* worksheet
		10/01/2014	Inserted clarification comment in cell C9 of the *Option 1* worksheet.
		10/01/2014	Clarified text in cell B1 of *Option summary* worksheet.
		10/01/2014	Clarified text in cell F26 of *Option summary* worksheet.

Guidance for CBA spreadsheet model

Tab	Instructions
Option summary	Provide a description of the stated aim / investment decision contained within this CBA analysis workbook, along with a list of options considered to meet the aim. Also include here the short list of options contained within this workbook which have been fully costed and specify which option has been adopted following CBA and included in your business plan submission.
Fixed data	Enter pre-tax WACC and prices consistent with your business plan
Baseline scenario	Enter costs and benefits associated with the baseline scenario. The baseline scenario represents status quo; that is the cost of business as usual in the absence of any investment intervention. Where business as usual is not an option i.e. an investment intervention of some kind is required DNOs should chose the option with the lowest investment to represent the baseline scenario.
Working baseline	Show any calculation used to derive the values in your baseline scenario
Option 1	Enter costs and benefits *over and above the baseline scenario* i.e. the marginal or incremental costs / benefits of the option being considered. Enter capitalisation rates consistent with your business plan.
Working 1	Show any calculation used to derive the values in your CBA

Colour code:

User populated cells
Fixed data
Summation formula
Other formula

The user should populate the light blue cells. All other cells are either fixed or auto-populated.

Enter costs / benefits in 2012/13 prices (£m).

Costs should be entered as negative values.

Benefits (i.e. avoided costs) should be entered a positive values.

Costs entered should correspond to values set out in company business plans i.e. should exclude RPEs and include ongoing efficiencies consistent with assumptions contained in your business plan submission.

Copy *Option 1 worksheet & workings 1* for each CBA option and label these *option 2 & workings 2* etc.

Where a 'do minimum option' exists, Option 1 should represent your 'do minimum' or 'reference scenario' e.g. do nothing, ongoing maintenance of existing asset or the option which requires the minimum investment .

Use the relevant *Workings worksheet* to demonstrate any calculation/information that can support the costs and benefits you have entered for each option. This is free fill and provides you with an opportunity to show additional underlying data you believe will assist Ofgem in evaluating/understanding your CBA.

Please highlight your chosen option by colouring the worksheet tab yellow.

Purpose of CBA: describe the primary driver of the investment decision

To quantify losses savings of targeted replacement of pre-1958 distribution transformers.

If investment is to replace an existing asset / asset class, please state the condition of the asset / asset class (HI / CI etc.)

Targeted replacement of pre-1958 distribution transformers with a Health Index of 3.

List below all options considered to meet the stated aim

Options considered / project name	Comment
"do minimum" option	Transformers replacement due to their condition (where the Health Index ≥ H4) and/or as a consequence of other works at site, e.g. due to the condition of the LV board and/or HV switchgear and/or building and/or if it's closely coupled, i.e. where there are secondary drivers.
Targeted replacement of pre-1958 distribution transformers	Targeted/accelerated replacement of pre-1958 distribution transformers with a Health Index of 3 as part of the work programme selection criteria for the replacement of indoor and outdoor substations.

List below the short list of those options which have been costed within this CBA workbook

Option no.	Options considered	Decision	Comment	For the chosen option only, provide detail of where CBA expenditure included in this CBA is reported in the BPDT pack. e.g. LV switchgear BPDT CV3 rows 15 to 22.	NPVs based on payback periods (£m)				
					5 years	10 years	20 years	45 years	DNO view
1	Targeted replacement of pre-1958 distribution transformers with a Health Index of 3	Adopted	Adopted as a design policy due to payback period being within 10 years of investment.	Not reported directly in BDPT pack. These CBAs could be used to quantify options for the Losses Strategy. Not licence specific	-£0.06	-£0.02	£0.35	£0.51	
2									
3									
4									
5									

If more options are costed, please copy Option 1 and workings / worksheets and add detail to the short list table above.

Parameters

zero rate WACC	3.5%	zero-DNS rate(B) revenue WACC (force
Discount Rate +/- 10 years	3.5%	
Discount Rate +/-30 years	3.5%	
Discount rate for safety	3.5%	
Assumed Asset Life (Years)	30	

RPI INDICES

Index-linked revenues (Real) (m/Mw.sh)

Index		Index
		2012=1
Convert from	2009/10	0.9551
	2010/11	1.0000
	2011/12	1.0420
	2012/13	1.0700
	2013/14	1.1000
	2014/15	1.1300
	2015/16	1.1600
	2016/17	1.1900
	2017/18	1.2200
	2018/19	1.2500
	2019/20	1.2800

Prices

2012/13 prices	1 2009	2 2010	3 2011	4 2012	5 2013	6 2014	7 2015	8 2016	9 2017	10 2018	11 2019	12 2020	13 2021	14 2022	15 2023	16 2024	17 2025	18 2026	19 2027	20 2028	21 2029	22 2030	23 2031	24 2032	25 2033	26 2034	27 2035	28 2036	29 2037	30 2038	31 2039	32 2040	33 2041	34 2042	35 2043	36 2044	37 2045	38 2046	39 2047	40 2048	41 2049	42 2050	43 2051	44 2052	45 2053	46 2054	47 2055	48 2056	49 2057	50 2058	51 2059	52 2060
Traded carbon price (£/t 2012 t) [1]	4.76	7.12	7.13	8.13	8.16	11.34	12.14	28.48	42.37	61.13	68.81	80.14	87.13	88.38	89.63	90.88	92.08	93.28	94.48	95.68	96.88	98.08	99.28	100.48	101.68	102.88	104.08	105.28	106.48	107.68	108.88	110.08	111.28	112.48	113.68	114.88	116.08	117.28	118.48	119.68	120.88	122.08	123.28	124.48	125.68	126.88	128.08	129.28	130.48	131.68	132.88	134.08	135.28
Wholesale electricity (£/MWh)	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9	41.9
Lunar (£/MWh)	245.00																																																						
C1 (£/t.year transmission)	4,514.00																																																						
CPA (£/t.year retrace.km)	49.04																																																						
Cost per leader (£/km)[2]	41.70																																																						
Cost per major injury (£/m)[3]	49.00																																																						
Cost per loss of Ofdmat	200																																																						
Recession GHG conversion factor: tonnes cap/MWh[4]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

[1] https://www.ofgem.gov.uk/ofgem-publications

[2] Source: Ofgem, Strat. Inno. 2013, Wilkinson and Cavendish Ashton

[3] Source: Ofgem, Ofdfm - www.ofdfm.com/Ofdfm.aspx?PAGE=OFDFM/Home/OFDFM_Table_conversion.htm?

[4] Variable annual benefits

note: 2010 to 2030 DECC's updated traded sector carbon values published Dec 2012, 2031 onwards based on DECC carbon values published Dec 2011.

note: HSE values are at 2012 prices

note: Nature Work Force 2013 (Institute in Delhi, DHEC), GHG conversion factors for consumer electricity "case 2030" factor: annex 3 table 3b1.

Decarbonisation of electricity assumption

Power sector emissions are anticipated to reduce to 15kt/MWh by 2050

assume a linear decarbonisation factor of not 2009/10 and 2050

Power sector emissions reduce by 16.5 ktCO2/t.a.c between now and 2050.

Second 2050 base emissions at 15ktCO2

		g CO2e per kWh
1,000 km = 1 tonne	2009/10	599.82 - (Defra)
1,000 kWh = 1 MWh	2010/11	575.32
1 km = 1 kWh	2011/12	550.83
	2012/13	544.33
	2013/14	531.84
	2014/15	517.34
	2015/16	502.85
	2016/17	488.35
	2017/18	473.86
	2018/19	459.36
	2019/20	444.87
	2020/21	430.37
	2021/22	415.87
	2022/23	401.38
	2023/24	386.88
	2024/25	372.39
	2025/26	357.89
	2026/27	343.40
	2027/28	328.90
	2028/29	314.41
	2029/30	299.91
	2030/31	285.41
	2031/32	270.92
	2032/33	256.42
	2033/34	241.93
	2034/35	227.43
	2035/36	212.94
	2036/37	198.44
	2037/38	183.95
	2038/39	169.45
	2039/40	154.96
	2040/41	140.46
	2041/42	125.96
	2042/43	111.47
	2043/44	96.97
	2044/45	82.48
	2045/46	67.98
	2046/47	53.49
	2047/48	38.99
	2048/49	24.50
	2049/50	10.00
check		10.00 assumption: sector carrier should reduce to 10 g CO2e/kWh

0.00	n.a. reduction in carbon intensity

CBA Option 1 **Capitalised Cost Transformer**

Term (years from first out flow)	NPV (£m)
5	-£0.06
10	-£0.05
30	£0.35
45	£0.51

first year of investment out flow: 1

		Calculation	Units	RIIO-ED1							RIIO-ED2							RIIO-ED3							RIIO-ED4							RIIO-ED5							RIIO-ED6							RIIO-ED7			
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
				2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067
Investment	Asset Replacement		£m	(0.04500)	(0.01350)	(0.04500)	(0.10350)	(0.16500)	(0.10350)	(0.04050)	-																																												
	Please specify		£m																																																				
	Please specify		£m																																																				
	Please specify		£m																																																				
	Please specify		£m																																																				
	Total investment		£m	(0.05)	(0.02)	(0.05)	(0.11)	(0.17)	(0.11)	(0.06)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Avoided DNO costs	Inspections & Maintenance		£m																																																			
	Asset Replacement		£m																																																				
	Please specify		£m																																																				
	Please specify		£m																																																				
	Please specify		£m																																																				
	Please specify		£m																																																				
	Total avoided DNO costs		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	(0.05)	(0.02)	(0.05)	(0.11)	(0.17)	(0.11)	(0.06)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Capitalisation rate	(2)	%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%							
	Capitalised investment	(3)=(1)x(2)	£m	(0.03)	(0.01)	(0.03)	(0.07)	(0.12)	(0.07)	(0.04)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
	Investment to be expensed	(4)=(1)-(3)	£m	(0.01)	(0.00)	(0.01)	(0.03)	(0.05)	(0.03)	(0.02)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
	Depreciation	(5)=∑(3),	£m	-	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	Cost of Capital	(6)=wa[(8-%)]b-%]]x WACC	£m	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(0.01)**	**(0.01)**	**(0.02)**	**(0.04)**	**(0.06)**	**(0.05)**	**(0.04)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.02)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.00)**	**(0.00)**	**(0.00)**
Societal benefits (£m) i.e. costs avoided	Losses		£m	0.00	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	-	-	-	-	-	-	-
	CO2e associated with losses		£m	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-
	Customer interruptions (CI)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other 1 (specify)		£m																																																			
	Other 2 (specify)		£m																																																			
	Other 3 (specify)		£m																																																			
	Total societal net benefits		**£m**	**0.0041**	**0.0057**	**0.0082**	**0.0166**	**0.0276**	**0.0264**	**0.0431**	**0.0441**	**0.0461**	**0.0479**	**0.0496**	**0.0511**	**0.0525**	**0.0537**	**0.0548**	**0.0554**	**0.0563**	**0.0570**	**0.0575**	**0.0579**	**0.0581**	**0.0580**	**0.0579**	**0.0576**	**0.0571**	**0.0565**	**0.0557**	**0.0546**	**0.0534**	**0.0520**	**0.0504**	**0.0486**	**0.0467**	**0.0445**	**0.0421**	**0.0424**	**0.0427**	**0.0429**	**0.0432**	**0.0435**	**0.0438**	**0.0441**	**0.0443**	**0.0446**	**0.0449**	-	-	-	-	-	-	-
	Net benefits		**£m**	**(0.01)**	**(0.00)**	**(0.01)**	**(0.02)**	**(0.03)**	**(0.01)**	**0.00**	**0.02**	**0.02**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.01)**	**(0.00)**	**(0.00)**
	Discount factor	=1/[(1+SRTP)^n]		0.97	0.93	0.90	0.87	0.84	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.64	0.62	0.60	0.58	0.56	0.54	0.52	0.50	0.49	0.47	0.45	0.44	0.42	0.41	0.40	0.38	0.37	0.36	0.40	0.39	0.38	0.37	0.36	0.35	0.33	0.33	0.32	0.31	0.30	0.29	0.28	0.27	0.26	0.26	0.25	0.24	0.23	0.23	0.22	0.22
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.99	0.97	0.96	0.94	0.93	0.91	0.90	0.89	0.87	0.86	0.85	0.84	0.82	0.81	0.80	0.79	0.78	0.76	0.75	0.74	0.73	0.72	0.71	0.70	0.69	0.68	0.67	0.66	0.65	0.64	0.63	0.62	0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55	0.54	0.54	0.53	0.52	0.51	0.50	0.50	0.49	0.48	0.48	0.47	0.46
	Discounted net benefits		£m	(0.01)	(0.00)	(0.01)	(0.02)	(0.03)	(0.01)	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	Cumulative discounted net benefits		**£m**	**(0.01)**	**(0.01)**	**(0.02)**	**(0.04)**	**(0.06)**	**(0.07)**	**(0.07)**	**(0.05)**	**(0.04)**	**(0.02)**	**0.00**	**0.02**	**0.04**	**0.06**	**0.08**	**0.10**	**0.12**	**0.14**	**0.17**	**0.19**	**0.20**	**0.22**	**0.24**	**0.26**	**0.28**	**0.29**	**0.31**	**0.32**	**0.34**	**0.35**	**0.37**	**0.38**	**0.39**	**0.40**	**0.41**	**0.42**	**0.43**	**0.44**	**0.45**	**0.46**	**0.47**	**0.48**	**0.49**	**0.50**	**0.50[1]**	**0.51**	**0.50**	**0.50**	**0.50**	**0.50**	**0.50**	**0.50**

Non-DNO (eg societal) benefits

Enter values as increments (delta) relative to your reference scenario. If this is your reference scenario enter 0. Reductions are entered as positive numbers and increases as negative numbers.

Societal net benefits (project impact on Scottish society)	Reduced losses		MWh	78	169	156	317	525	506	722	725	729	733	736	740	744	748	751	755	759	763	766	770	774	778	782	786	790	794	798	802	806	810	814	818	822	826	830	834	838	843	847	851	855	860	864	868	873	-	-	-	-	-	-	-
	Reduced emissions associated with losses		tCO2e	39.83	53.25	73.95	145.76	233.69	282.46	300.19	291.18	282.07	272.86	263.55	254.14	244.63	235.02	225.31	215.49	205.57	195.55	185.42	175.18	164.83	154.38	143.82	133.15	122.37	111.48	100.47	89.36	78.13	66.78	55.32	43.74	32.05	20.23	8.30	8.34	8.38	8.43	8.47	8.51	8.55	8.60	8.64	8.68	8.73	-	-	-	-	-	-	-
	Reduced number of customers interrupted		m																																																				
	Reduced customer minutes lost		Mins																																																				
	Reduced emissions (not associated with losses)[1]		tCO2e																																																				
	Reduced probability of fatality[2]		%																																																				
	Reduced probability of major injury[2]		%																																																				
	Reduced oil leakage		Litres																																																				

2.0544

[1] Includes all GHG not associated with losses e.g. SF6 converted to tCO2e using Defra conversion factors

http://www.defra.gov.uk/publications/2011/05/20/pb13773-2012-ghg-conversions/

Where losses are entered in terms of MWh, the CO2e associated with those losses will be calculated based on an assumed GHG conversion factor. The tCO2e are monetised using DECC traded carbon values.

All other GHG emissions not associated with losses should be entered in row 90 to avoid double counting.

[2] http://www.hse.gov.uk/risk/theory/alarpcheck.htm

Please specify
Total investment
Connections
Diversions
Reinforcement
ESQCR
Asset Replacement
Refurbishment
Civil Works
Operational IT & Telecoms
Legal & Safety
QoS
High Value Projects
Flooding
BT21CN
Technical losses and other environmental
High impact Low Probability (HILP)
Critical National Infrastructure
Black Start
Rising Mains and Laterals
Undergrounding Wires/ Outside designated areas
Worst Served Customers
Trouble Call / faults
ORIs
Inspections & Maintenance
Tree Cutting
NOC's Other
Network Design & Engineering
Project Management
Engineering Mgt & Clerical Support
System Mapping - Cartographical
Control Centre
Call Centre
Stores
Operational Training
Vehicles & Transport
Atypicals Non Sev Weather
Smart Meters
Network Policy
HR & Non-operational Training
Finance & Regulation
CEO
IT & Telecoms
Property Mgt
Non Op Capex

Guidance for CBA spreadsheet model

Tab	Instructions
Option summary	Provide a description of the stated aim / investment decision contained within this CBA analysis workbook, along with a list of options considered to me Also include here the short list of options contained within this workbook which have been fully costed and specify which option has been adopted follo business plan submission.
Fixed data	Enter pre-tax WACC and prices consistent with your business plan
Baseline scenario	Enter costs and benefits associated with the baseline scenario. The baseline scenario represents status quo; that is the cost of business as usual in the a intervention. Where business as usual is not an option i.e. an investment intervention of some kind is required DNOs should chose the option with the lowest investi scenario
Working baseline	Show any calculation used to derive the values in your baseline scenario
Option 1	Enter costs and benefits *over and above the baseline scenario* i.e. the marginal or incremental costs / benefits of the option being considered. Enter capitalisation rates consistent with your business plan.
Working 1	Show any calculation used to derive the values in your CBA

Colour code:

User populated cells
Fixed data
Summation formula
Other formula

The user should populate the light blue cells. All other cells are either fixed or auto-populated.

Enter costs / benefits in 2012/13 prices (£m).
Costs should be entered as negative values.
Benefits (i.e. avoided costs) should be entered a positive values.

Costs entered should correspond to values set out in company business plans i.e. should exclude RPEs and include ongoing efficiencies consistent with assumptions contained in your business plan submis

Copy *Option 1 worksheet & workings 1* for each CBA option and label these *option 2 & workings 2* etc.

Where a 'do minimum option' exists, Option 1 should represent your 'do minimum' or 'reference scenario' e.g. do nothing, ongoing maintenance of existing asset or the option which requires the minim

Use the relevant *Workings worksheet* to demonstrate any calculation/information that can support the costs and benefits you have entered for each option. This is free fill and provides you with an oppo believe will assist Ofgem in evaluating/understanding your CBA.

Please highlight your chosen option by colouring the worksheet tab yellow.

Purpose of CBA: describe the primary driver of the investment decision

Savings from investment in the automatic power restoration system (APRS)

If investment is to replace an existing asset / asset class, please state the condition of the asset / asset class (HI / CI etc.)

List below all options considered to meet the stated aim

Options considered / project name	Comment

List below the short list of those options which have been costed within this CBA workbook

Option no.	Options considered	Decision	Comment	For the chosen option only, provide detail of where CBA expenditure included in this CBA is reported in the BPDT pack. e.g. LV swtichgear BPDT CV3 rows 15 to 22.	NPVs based on payback periods				
					16 years	24 years	32 years	45 years	DNO view
1	installing APRS	Adopted			£2.18	£1.90	£1.72	£1.54	
2					£0.00	£0.00	£0.00	£0.00	
3					£0.00	£0.00	£0.00	£0.00	
4									
5									

If more options are costed, please copy *Option 1* and *workings 1* worksheets and add detail to the short list table above.

Parameters

pre-tax WACC	3.9%	*enter DNO specific pre-tax WACC figure*
Discount Rate <= 30 years	3.5%	
Discount Rate > 30 years	3.0%	
Discount rate for safety	1.5%	
Assumed Asset Life (Years)	45	

RPI INDICES

Using yearly averages (April to March)

Index		Convert to
		2012/13
Convert from	2003/04	1.3409
	2004/05	1.3004
	2005/06	1.2670
	2006/07	1.2214
	2007/08	1.1730
	2008/09	1.1392
	2009/10	1.1340
	2010/11	1.0804
	2011/12	1.0309
	2012/13	1.0000

Prices

| | | |

CBA Option 1 **Automatic Power Restoration System (APRS)**

Term (years from first out flow)	NPV (£m)
16	£2.18
24	£1.90
32	£1.72
45	£1.54

first year of investment out flow: 1

				RIIO-ED1							
				1	2	3	4	5	6	7	8
		Calculation	Units	2016	2017	2018	2019	2020	2021	2022	2023
Investment	Operational IT & Telecoms		£m	(1.80)							
	Please specify		£m		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total investment		£m	(1.80)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Avoided DNO costs	Inspections & Maintenance		£m								
	Asset Replacement		£m								
	Trouble Call / faults		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total avoided DNO costs		£m	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	(1.80)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
	Capitalisation rates	(2)	%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	(3)=(1)x(2)	£m	(1.26)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
	Investment to be expensed	(4)=(1)-(3)	£m	(0.54)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
	Depreciation	(5)=$\sum$(3),	£m	-	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
	Cost of Capital	(6)=avg[(6^{t-1}),(6^{t})]xWACC	£m	(0.02)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(0.56)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.10)**	**(0.10)**	**(0.10)**	**(0.10)**
Societal benefits (£m) i.e. costs avoided	Losses		£m	-	-	-	-	-	-	-	-
	CO2e associated with losses		£m	-	-	-	-	-	-	-	-
	Customer interruptions (CI)		£m	0.04	0.24	0.34	0.46	0.57	0.67	0.79	0.91
	Customer minutes lost (CML)		£m	-	-	0.04	0.04	0.10	0.10	0.10	0.10
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-
	Other 1 (specify)		£m								
	Other 2 (specify)		£m								
	Other 3 (specify)		£m								
	Total societal net benefits		**£m**	**0.04**	**0.24**	**0.38**	**0.50**	**0.67**	**0.77**	**0.89**	**1.01**
	Net benefits		**£m**	**(0.52)**	**0.14**	**0.28**	**0.40**	**0.58**	**0.67**	**0.80**	**0.91**
	Discount factor	=1/[(1+SRTP)^n]		0.97	0.93	0.90	0.87	0.84	0.81	0.79	0.76
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.99	0.97	0.96	0.94	0.93	0.91	0.90	0.89
	Discounted net benefits		£m	(0.50)	0.13	0.26	0.35	0.49	0.55	0.63	0.69
	Cumulative discounted net benefits		**£m**	**(0.50)**	**(0.37)**	**(0.11)**	**0.24**	**0.72**	**1.27**	**1.90**	**2.59**

		RIIO-ED2							
		9	10	11	12	13	14	15	16
		2024	2025	2026	2027	2028	2029	2030	2031
Investment	Operational IT & Telecoms								
	Please specify								
	Please specify								
	Please specify								
	Please specify								
	Total investment	-	-	-	-	-	-	-	-
Avoided DNO costs	Inspections & Maintenance								
	Asset Replacement								
	Trouble Call / faults								
	Please specify								
	Please specify								
	Please specify								
	Total avoided DNO costs	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	-	-	-	-	-	-	-	-
	Capitalisation rates	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	-	-	-	-	-	-	-	-
	Investment to be expensed	-	-	-	-	-	-	-	-
	Depreciation	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
	Cost of Capital	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)
	Total Net DNO benefits	**(0.08)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.07)**
Societal benefits (£m) i.e. costs avoided	Losses	-	-	-	-	-	-	-	-
	CO2e associated with losses	-	-	-	-	-	-	-	-
	Customer interruptions (CI)	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	-	-	-	-	-	-	-	-
	Fatality	-	-	-	-	-	-	-	-
	Major injury	-	-	-	-	-	-	-	-
	Oil leakage	-	-	-	-	-	-	-	-
	Other 1 (specify)								
	Other 2 (specify)								
	Other 3 (specify)								
	Total societal net benefits	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Net benefits	**(0.08)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.07)**
	Discount factor	0.73	0.71	0.68	0.66	0.64	0.62	0.60	0.58
	Discount factor (safety)	0.87	0.86	0.85	0.84	0.82	0.81	0.80	0.79
	Discounted net benefits	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)
	Cumulative discounted net benefits	**2.53**	**2.47**	**2.41**	**2.36**	**2.31**	**2.26**	**2.22**	**2.18**

		RIIO-ED3							
		17	18	19	20	21	22	23	24
		2032	2033	2034	2035	2036	2037	2038	2039
Investment	Operational IT & Telecoms								
	Please specify								
	Please specify								
	Please specify								
	Please specify								
	Total investment	-	-	-	-	-	-	-	-
Avoided DNO costs	Inspections & Maintenance								
	Asset Replacement								
	Trouble Call / faults								
	Please specify								
	Please specify								
	Please specify								
	Total avoided DNO costs	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	-	-	-	-	-	-	-	-
	Capitalisation rates	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	-	-	-	-	-	-	-	-
	Investment to be expensed	-	-	-	-	-	-	-	-
	Depreciation	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
	Cost of Capital	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
	Total Net DNO benefits	**(0.07)**	**(0.07)**	**(0.07)**	**(0.07)**	**(0.07)**	**(0.07)**	**(0.07)**	**(0.06)**
Societal benefits (£m) i.e. costs avoided	Losses	-	-	-	-	-	-	-	-
	CO2e associated with losses	-	-	-	-	-	-	-	-
	Customer interruptions (CI)	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	-	-	-	-	-	-	-	-
	Fatality	-	-	-	-	-	-	-	-
	Major injury	-	-	-	-	-	-	-	-
	Oil leakage	-	-	-	-	-	-	-	-
	Other 1 (specify)								
	Other 2 (specify)								
	Other 3 (specify)								
	Total societal net benefits	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Net benefits	**(0.07)**	**(0.07)**	**(0.07)**	**(0.07)**	**(0.07)**	**(0.07)**	**(0.07)**	**(0.06)**
	Discount factor	0.56	0.54	0.52	0.50	0.49	0.47	0.45	0.44
	Discount factor (safety)	0.78	0.76	0.75	0.74	0.73	0.72	0.71	0.70
	Discounted net benefits	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
	Cumulative discounted net benefits	**2.14**	**2.10**	**2.06**	**2.03**	**1.99**	**1.96**	**1.93**	**1.90**

		RIIO-ED4							
		25	26	27	28	29	30	31	32
		2040	2041	2042	2043	2044	2045	2046	2047
Investment	Operational IT & Telecoms								
	Please specify								
	Please specify								
	Please specify								
	Please specify								
	Total investment	-	-	-	-	-	-	-	-
Avoided DNO costs	Inspections & Maintenance								
	Asset Replacement								
	Trouble Call / faults								
	Please specify								
	Please specify								
	Please specify								
	Total avoided DNO costs	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	-	-	-	-	-	-	-	-
	Capitalisation rates	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	-	-	-	-	-	-	-	-
	Investment to be expensed	-	-	-	-	-	-	-	-
	Depreciation	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
	Cost of Capital	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)
	Total Net DNO benefits	**(0.06)**	**(0.06)**	**(0.06)**	**(0.06)**	**(0.06)**	**(0.06)**	**(0.05)**	**(0.05)**
Societal benefits (£m) i.e. costs avoided	Losses	-	-	-	-	-	-	-	-
	CO2e associated with losses	-	-	-	-	-	-	-	-
	Customer interruptions (CI)	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	-	-	-	-	-	-	-	-
	Fatality	-	-	-	-	-	-	-	-
	Major injury	-	-	-	-	-	-	-	-
	Oil leakage	-	-	-	-	-	-	-	-
	Other 1 (specify)								
	Other 2 (specify)								
	Other 3 (specify)								
	Total societal net benefits	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Net benefits	**(0.06)**	**(0.06)**	**(0.06)**	**(0.06)**	**(0.06)**	**(0.06)**	**(0.05)**	**(0.05)**
	Discount factor	0.42	0.41	0.40	0.38	0.37	0.36	0.40	0.39
	Discount factor (safety)	0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55
	Discounted net benefits	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
	Cumulative discounted net benefits	**1.88**	**1.85**	**1.83**	**1.81**	**1.79**	**1.77**	**1.74**	**1.72**

		RIIO-ED5							
		33	34	35	36	37	38	39	40
		2048	2049	2050	2051	2052	2053	2054	2055
Investment	Operational IT & Telecoms								
	Please specify								
	Please specify								
	Please specify								
	Please specify								
	Total investment	-	-	-	-	-	-	-	-
Avoided DNO costs	Inspections & Maintenance								
	Asset Replacement								
	Trouble Call / faults								
	Please specify								
	Please specify								
	Please specify								
	Total avoided DNO costs	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	-	-	-	-	-	-	-	-
	Capitalisation rates	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	-	-	-	-	-	-	-	-
	Investment to be expensed	-	-	-	-	-	-	-	-
	Depreciation	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
	Cost of Capital	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	Total Net DNO benefits	**(0.05)**	**(0.05)**	**(0.05)**	**(0.05)**	**(0.05)**	**(0.05)**	**(0.04)**	**(0.04)**
Societal benefits (£m) i.e. costs avoided	Losses	-	-	-	-	-	-	-	-
	CO2e associated with losses	-	-	-	-	-	-	-	-
	Customer interruptions (CI)	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	-	-	-	-	-	-	-	-
	Fatality	-	-	-	-	-	-	-	-
	Major injury	-	-	-	-	-	-	-	-
	Oil leakage	-	-	-	-	-	-	-	-
	Other 1 (specify)								
	Other 2 (specify)								
	Other 3 (specify)								
	Total societal net benefits	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Net benefits	**(0.05)**	**(0.05)**	**(0.05)**	**(0.05)**	**(0.05)**	**(0.05)**	**(0.04)**	**(0.04)**
	Discount factor	0.38	0.37	0.36	0.35	0.33	0.33	0.32	0.31
	Discount factor (safety)	0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55
	Discounted net benefits	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
	Cumulative discounted net benefits	**1.70**	**1.69**	**1.67**	**1.65**	**1.64**	**1.62**	**1.61**	**1.59**

		RIIO-ED6							
		41	42	43	44	45	46	47	48
		2056	2057	2058	2059	2060	2061	2062	2063
Investment	Operational IT & Telecoms								
	Please specify								
	Please specify								
	Please specify								
	Please specify								
	Total investment	-	-	-	-	-			
Avoided DNO costs	Inspections & Maintenance								
	Asset Replacement								
	Trouble Call / faults								
	Please specify								
	Please specify								
	Please specify								
	Total avoided DNO costs	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	-	-	-	-	-	-	-	-
	Capitalisation rates	70.0%	70.0%	70.0%	70.0%	70.0%			
	Capitalised investment	-	-	-	-	-			
	Investment to be expensed	-	-	-	-	-			
	Depreciation	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.01)	(0.00)
	Cost of Capital	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	Total Net DNO benefits	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.01)**	**(0.01)**
Societal benefits (£m) i.e. costs avoided	Losses	-	-	-	-	-	-	-	-
	CO2e associated with losses	-	-	-	-	-	-	-	-
	Customer interruptions (CI)	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	-	-	-	-	-	-	-	-
	Fatality	-	-	-	-	-	-	-	-
	Major injury	-	-	-	-	-	-	-	-
	Oil leakage	-	-	-	-	-	-	-	-
	Other 1 (specify)								
	Other 2 (specify)								
	Other 3 (specify)								
	Total societal net benefits	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Net benefits	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.04)**	**(0.01)**	**(0.01)**
	Discount factor	0.30	0.29	0.28	0.27	0.26	0.26	0.25	0.24
	Discount factor (safety)	0.54	0.54	0.53	0.52	0.51	0.50	0.50	0.49
	Discounted net benefits	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
	Cumulative discounted net benefits	**1.58**	**1.57**	**1.56**	**1.55**	**1.54**	**1.53**	**1.53**	**1.53**

		RIIO-ED7			
		49	50	51	52
		2064	2065	2066	2067
Investment	Operational IT & Telecoms				
	Please specify				
	Please specify				
	Please specify				
	Please specify				
	Total investment	-	-	-	-
Avoided DNO costs	Inspections & Maintenance				
	Asset Replacement				
	Trouble Call / faults				
	Please specify				
	Please specify				
	Please specify				
	Total avoided DNO costs	-	-	-	-
	Total DNO net benefits before capitalisation	-	-	-	-
	Capitalisation rates				
	Capitalised investment				
	Investment to be expensed				
	Depreciation	(0.00)	(0.00)	(0.00)	(0.00)
	Cost of Capital	(0.00)	(0.00)	(0.00)	(0.00)
	Total Net DNO benefits	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
Societal benefits (£m) i.e. costs avoided	Losses	-	-	-	-
	CO2e associated with losses	-	-	-	-
	Customer interruptions (CI)	-	-	-	-
	Customer minutes lost (CML)	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	-	-	-	-
	Fatality	-	-	-	-
	Major injury	-	-	-	-
	Oil leakage	-	-	-	-
	Other 1 (specify)				
	Other 2 (specify)				
	Other 3 (specify)				
	Total societal net benefits	**-**	**-**	**-**	**-**
	Net benefits	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
	Discount factor	0.23	0.23	0.22	0.22
	Discount factor (safety)	0.48	0.48	0.47	0.46
	Discounted net benefits	(0.00)	(0.00)	(0.00)	(0.00)
	Cumulative discounted net benefits	**1.53**	**1.53**	**1.53**	**1.52**

Non-DNO (eg societal) benefits

Enter values as increments (delta) relative to your reference scenario. If this is your reference scenario enter 0. Reductions are entered as positive numbers and increases as negative numbers.

Societal net benefits (impact relative to business as usual scenario)	Reduced losses	MWh							
	Reduced emissions associated with losses	tCO2e	-	-	-	-	-	-	-
	Reduced number of customers interrupted	no.	3,888	22,632	32,004	43,668	54,637	64,009	75,672
	Reduced customer minutes lost	Mins	-	-	159,637	159,637	388,790	388,790	388,790
	Reduced emissions (not associated with losses)[1]	tCO2e							
	Reduced probability of fatality[2]	%							
	Reduced probability of major injury[2]	%							
	Reduced oil leakage	Litres							

[1] Includes all GHG not associated with losses e.g. SF6 converted to tCO2e using Defra conversion factors
http://www.defra.gov.uk/publications/2012/05/30/pb13773-2012-ghg-conversion/
Where losses are entered in terms of MWh, the CO2e associated with those losses will be calculated based on an assumed GHG conversion factor. The tCO2e are monetised using DECC traded carbon values.
All other GHG emissions not associated with losses should be entered in row 90 to avoid double counting.

[2] http://www.hse.gov.uk/risk/theory/alarpcheck.htm

Guidance for CBA spreadsheet model

Tab	Instructions
Option summary	Provide a description of the stated aim / investment decision contained within this CBA analysis workbook, along with a list of options considered to me Also include here the short list of options contained within this workbook which have been fully costed and specify which option has been adopted follo business plan submission.
Fixed data	Enter pre-tax WACC and prices consistent with your business plan
Baseline scenario	Enter costs and benefits associated with the baseline scenario. The baseline scenario represents status quo; that is the cost of business as usual in the a intervention. Where business as usual is not an option i.e. an investment intervention of some kind is required DNOs should chose the option with the lowest investi scenario
Working baseline	Show any calculation used to derive the values in your baseline scenario
Option 1	Enter costs and benefits *over and above the baseline scenario* i.e. the marginal or incremental costs / benefits of the option being considered. Enter capitalisation rates consistent with your business plan.
Working 1	Show any calculation used to derive the values in your CBA

Colour code:

User populated cells
Fixed data
Summation formula
Other formula

The user should populate the light blue cells. All other cells are either fixed or auto-populated.

Enter costs / benefits in 2012/13 prices (£m).
Costs should be entered as negative values.
Benefits (i.e. avoided costs) should be entered a positive values.

Costs entered should correspond to values set out in company business plans i.e. should exclude RPEs and include ongoing efficiencies consistent with assumptions contained in your business plan submis

Copy *Option 1 worksheet & workings 1* for each CBA option and label these *option 2 & workings 2* etc.

Where a 'do minimum option' exists, Option 1 should represent your 'do minimum' or 'reference scenario' e.g. do nothing, ongoing maintenance of existing asset or the option which requires the minim

Use the relevant *Workings worksheet* to demonstrate any calculation/information that can support the costs and benefits you have entered for each option. This is free fill and provides you with an oppo believe will assist Ofgem in evaluating/understanding your CBA.

Please highlight your chosen option by colouring the worksheet tab yellow.

Purpose of CBA: describe the primary driver of the investment decision

Savings from investment in the LV automatic reclosers

If investment is to replace an existing asset / asset class, please state the condition of the asset / asset class (HI / CI etc.)

List below all options considered to meet the stated aim

Options considered / project name	Comment

List below the short list of those options which have been costed within this CBA workbook

Option no.	Options considered	Decision	Comment	For the chosen option only, provide detail of where CBA expenditure included in this CBA is reported in the BPDT pack. e.g. LV swtichgear BPDT CV3 rows 15 to 22.	NPVs based on payback periods				
					16 years	24 years	32 years	45 years	DNO view
1	installing APRS	Adopted			£2.70	£1.64	£0.94	£0.23	
2					£0.00	£0.00	£0.00	£0.00	
3					£0.00	£0.00	£0.00	£0.00	
4									
5									

If more options are costed, please copy *Option 1* and *workings 1* worksheets and add detail to the short list table above.

Parameters

pre-tax WACC	3.9%	*enter DNO specific pre-tax WACC figure*
Discount Rate <= 30 years	3.5%	
Discount Rate > 30 years	3.0%	
Discount rate for safety	1.5%	
Assumed Asset Life (Years)	45	

RPI INDICES

Using yearly averages (April to March)

Index		Convert to
		2012/13
Convert from	2003/04	1.3409
	2004/05	1.3004
	2005/06	1.2670
	2006/07	1.2214
	2007/08	1.1730
	2008/09	1.1392
	2009/10	1.1340
	2010/11	1.0804
	2011/12	1.0309
	2012/13	1.0000

Prices

| | | |

CBA Option 1 **LV Auto-reclose devices**

Term (years from first out flow)	NPV (£m)
16	£2.70
24	£1.64
32	£0.94
45	£0.23

first year of investment out flow: 1

				RIIO-ED1							
				1	2	3	4	5	6	7	8
				2016	2017	2018	2019	2020	2021	2022	2023
Investment	Refurbishment		£m	(13.54)							
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total investment		£m	(13.54)	-	-	-	-	-	-	-
Avoided DNO costs	Worst Served Customers	Avoided EGS2 failures	£m	0.17	0.23	0.23	0.23	0.23	0.23	0.23	0.23
	Trouble Call / faults	Overtime savings	£m	0.20	0.27	0.28	0.29	0.29	0.30	0.31	0.32
	Trouble Call / faults	Avoided annual maintenance cost	£m	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.09
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total avoided DNO costs		£m	0.44	0.58	0.59	0.59	0.60	0.61	0.62	0.63
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	(13.10)	0.58	0.59	0.59	0.60	0.61	0.62	0.63
	Capitalisation rates	(2)	%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	(3)=(1)x(2)	£m	(9.17)	0.40	0.41	0.42	0.42	0.43	0.44	0.44
	Investment to be expensed	(4)=(1)-(3)	£m	(3.93)	0.17	0.18	0.18	0.18	0.18	0.19	0.19
	Depreciation	$(5)=\Sigma(3)_t$	£m	-	(0.20)	(0.19)	(0.19)	(0.18)	(0.17)	(0.16)	(0.15)
	Cost of Capital	$(6)=wg[(6^{t-1})+(5^{t-1})]x$WACC	£m	(0.18)	(0.35)	(0.32)	(0.30)	(0.28)	(0.25)	(0.23)	(0.21)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(4.11)**	**(0.38)**	**(0.34)**	**(0.31)**	**(0.27)**	**(0.23)**	**(0.20)**	**(0.16)**
Societal benefits (£m) i.e. costs avoided	Losses		£m	-	-	-	-	-	-	-	-
	CO2e associated with losses		£m	-	-	-	-	-	-	-	-
	Customer interruptions (CI)		£m	0.24	0.48	0.48	0.48	0.48	0.48	0.48	0.48
	Customer minutes lost (CML)		£m	0.54	1.07	1.07	1.07	1.07	1.07	1.07	1.07
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-
	Other 1 (specify)		£m								
	Other 2 (specify)		£m								
	Other 3 (specify)		£m								
	Total societal net benefits		**£m**	**0.78**	**1.55**	**1.55**	**1.55**	**1.55**	**1.55**	**1.55**	**1.55**
	Net benefits		**£m**	**(3.33)**	**1.18**	**1.21**	**1.25**	**1.28**	**1.32**	**1.35**	**1.39**
	Discount factor	=1/[(1+SRTP)^n]		0.97	0.93	0.90	0.87	0.84	0.81	0.79	0.76
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.99	0.97	0.96	0.94	0.93	0.91	0.90	0.89
	Discounted net benefits		£m	(3.22)	1.10	1.09	1.08	1.07	1.06	1.05	(0.24)
	Cumulative discounted net benefits		**£m**	**(3.22)**	**(2.12)**	**(1.03)**	**0.06**	**1.14**	**2.21**	**3.27**	**4.33**

				RIIO-ED2							
				9	10	11	12	13	14	15	16
				2024	2025	2026	2027	2028	2029	2030	2031
Investment	Refurbishment		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total investment		£m	-	-	-	-	-	-	-	-
Avoided DNO costs	Worst Served Customers	Avoided EGS2 failures	£m								
	Trouble Call / faults	Overtime savings	£m								
	Trouble Call / faults	Avoided annual maintenance cost	£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total avoided DNO costs		£m	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-	-	-	-	-
	Capitalisation rates	(2)	%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	(3)=(1)x(2)	£m	-	-	-	-	-	-	-	-
	Investment to be expensed	(4)=(1)-(3)	£m	-	-	-	-	-	-	-	-
	Depreciation	$(5)=\Sigma(3)_t$	£m	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
	Cost of Capital	$(6)=wg[(6^{t-1})+(5^{t-1})]x$WACC	£m	(0.19)	(0.19)	(0.18)	(0.18)	(0.17)	(0.16)	(0.16)	(0.15)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(0.33)**	**(0.32)**	**(0.32)**	**(0.31)**	**(0.31)**	**(0.30)**	**(0.30)**	**(0.29)**
Societal benefits (£m) i.e. costs avoided	Losses		£m	-	-	-	-	-	-	-	-
	CO2e associated with losses		£m	-	-	-	-	-	-	-	-
	Customer interruptions (CI)		£m	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-
	Other 1 (specify)		£m								
	Other 2 (specify)		£m								
	Other 3 (specify)		£m								
	Total societal net benefits		**£m**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Net benefits		**£m**	**(0.33)**	**(0.32)**	**(0.32)**	**(0.31)**	**(0.31)**	**(0.30)**	**(0.30)**	**(0.29)**
	Discount factor	=1/[(1+SRTP)^n]		0.73	0.71	0.68	0.66	0.64	0.62	0.60	0.58
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.87	0.86	0.85	0.84	0.82	0.81	0.80	0.79
	Discounted net benefits		£m	(0.24)	(0.23)	(0.22)	(0.21)	(0.20)	(0.19)	(0.18)	(0.17)
	Cumulative discounted net benefits		**£m**	**4.08**	**3.85**	**3.64**	**3.43**	**3.23**	**3.05**	**2.87**	**2.70**

				RIIO-ED3							
				17	18	19	20	21	22	23	24
				2032	2033	2034	2035	2036	2037	2038	2039
Investment	Refurbishment		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total investment		£m	-	-	-	-	-	-	-	-
Avoided DNO costs	Worst Served Customers	Avoided EGS2 failures	£m								
	Trouble Call / faults	Overtime savings	£m								
	Trouble Call / faults	Avoided annual maintenance cost	£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total avoided DNO costs		£m	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-	-	-	-	-
	Capitalisation rates	(2)	%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	(3)=(1)x(2)	£m	-	-	-	-	-	-	-	-
	Investment to be expensed	(4)=(1)-(3)	£m	-	-	-	-	-	-	-	-
	Depreciation	$(5)=\Sigma(3)_t$	£m	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
	Cost of Capital	$(6)=wg[(6^{t-1})+(5^{t-1})]x$WACC	£m	(0.15)	(0.14)	(0.14)	(0.13)	(0.13)	(0.12)	(0.12)	(0.11)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(0.29)**	**(0.28)**	**(0.28)**	**(0.27)**	**(0.26)**	**(0.26)**	**(0.25)**	**(0.25)**
Societal benefits (£m) i.e. costs avoided	Losses		£m	-	-	-	-	-	-	-	-
	CO2e associated with losses		£m	-	-	-	-	-	-	-	-
	Customer interruptions (CI)		£m	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-
	Other 1 (specify)		£m								
	Other 2 (specify)		£m								
	Other 3 (specify)		£m								
	Total societal net benefits		**£m**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Net benefits		**£m**	**(0.29)**	**(0.28)**	**(0.28)**	**(0.27)**	**(0.26)**	**(0.26)**	**(0.25)**	**(0.25)**
	Discount factor	=1/[(1+SRTP)^n]		0.56	0.54	0.52	0.50	0.49	0.47	0.45	0.44
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.78	0.76	0.75	0.74	0.73	0.72	0.71	0.70
	Discounted net benefits		£m	(0.16)	(0.15)	(0.14)	(0.14)	(0.13)	(0.12)	(0.12)	(0.11)
	Cumulative discounted net benefits		**£m**	**2.54**	**2.39**	**2.25**	**2.11**	**1.98**	**1.86**	**1.75**	**1.64**

				RIIO-ED4							
				25	26	27	28	29	30	31	32
				2040	2041	2042	2043	2044	2045	2046	2047
Investment	Refurbishment		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total investment		£m	-	-	-	-	-	-	-	-
Avoided DNO costs	Worst Served Customers	Avoided EGS2 failures	£m								
	Trouble Call / faults	Overtime savings	£m								
	Trouble Call / faults	Avoided annual maintenance cost	£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total avoided DNO costs		£m	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-	-	-	-	-
	Capitalisation rates	(2)	%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	(3)=(1)x(2)	£m	-	-	-	-	-	-	-	-
	Investment to be expensed	(4)=(1)-(3)	£m	-	-	-	-	-	-	-	-
	Depreciation	$(5)=\Sigma(3)_t$	£m	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
	Cost of Capital	$(6)=wg[(6^{t-1})+(5^{t-1})]x$WACC	£m	(0.11)	(0.10)	(0.09)	(0.09)	(0.08)	(0.08)	(0.07)	(0.07)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(0.24)**	**(0.24)**	**(0.23)**	**(0.23)**	**(0.22)**	**(0.22)**	**(0.21)**	**(0.21)**
Societal benefits (£m) i.e. costs avoided	Losses		£m	-	-	-	-	-	-	-	-
	CO2e associated with losses		£m	-	-	-	-	-	-	-	-
	Customer interruptions (CI)		£m	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-
	Other 1 (specify)		£m								
	Other 2 (specify)		£m								
	Other 3 (specify)		£m								
	Total societal net benefits		**£m**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Net benefits		**£m**	**(0.24)**	**(0.24)**	**(0.23)**	**(0.23)**	**(0.22)**	**(0.22)**	**(0.21)**	**(0.21)**
	Discount factor	=1/[(1+SRTP)^n]		0.42	0.41	0.40	0.38	0.37	0.36	0.40	0.39
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.69	0.68	0.67	0.66	0.65	0.64	0.63	0.62
	Discounted net benefits		£m	(0.10)	(0.10)	(0.09)	(0.09)	(0.08)	(0.08)	(0.08)	(0.08)
	Cumulative discounted net benefits		**£m**	**1.53**	**1.44**	**1.34**	**1.26**	**1.18**	**1.10**	**1.02**	**0.94**

				RIIO-ED5							
				33	34	35	36	37	38	39	40
				2048	2049	2050	2051	2052	2053	2054	2055
Investment	Refurbishment		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total investment		£m	-	-	-	-	-	-	-	-
Avoided DNO costs	Worst Served Customers	Avoided EGS2 failures	£m								
	Trouble Call / faults	Overtime savings	£m								
	Trouble Call / faults	Avoided annual maintenance cost	£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total avoided DNO costs		£m	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-	-	-	-	-
	Capitalisation rates	(2)	%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	(3)=(1)x(2)	£m	-	-	-	-	-	-	-	-
	Investment to be expensed	(4)=(1)-(3)	£m	-	-	-	-	-	-	-	-
	Depreciation	$(5)=\Sigma(3)_t$	£m	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
	Cost of Capital	$(6)=wg[(6^{t-1})+(5^{t-1})]x$WACC	£m	(0.06)	(0.06)	(0.05)	(0.05)	(0.04)	(0.04)	(0.03)	(0.02)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(0.20)**	**(0.19)**	**(0.19)**	**(0.18)**	**(0.18)**	**(0.17)**	**(0.17)**	**(0.16)**
Societal benefits (£m) i.e. costs avoided	Losses		£m	-	-	-	-	-	-	-	-
	CO2e associated with losses		£m	-	-	-	-	-	-	-	-
	Customer interruptions (CI)		£m	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-
	Other 1 (specify)		£m								
	Other 2 (specify)		£m								
	Other 3 (specify)		£m								
	Total societal net benefits		**£m**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Net benefits		**£m**	**(0.20)**	**(0.19)**	**(0.19)**	**(0.18)**	**(0.18)**	**(0.17)**	**(0.17)**	**(0.16)**
	Discount factor	=1/[(1+SRTP)^n]		0.38	0.37	0.36	0.35	0.33	0.33	0.32	0.31
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55
	Discounted net benefits		£m	(0.08)	(0.07)	(0.07)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)
	Cumulative discounted net benefits		**£m**	**0.86**	**0.79**	**0.72**	**0.66**	**0.60**	**0.54**	**0.49**	**0.44**

				RIIO-ED6							
				41	42	43	44	45	46	47	48
				2056	2057	2058	2059	2060	2061	2062	2063
Investment	Refurbishment		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total investment		£m	-	-	-	-	-			
Avoided DNO costs	Worst Served Customers	Avoided EGS2 failures	£m								
	Trouble Call / faults	Overtime savings	£m								
	Trouble Call / faults	Avoided annual maintenance cost	£m								
	Please specify		£m								
	Please specify		£m								
	Please specify		£m								
	Total avoided DNO costs		£m	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-	-	-	-	-
	Capitalisation rates	(2)	%	70.0%	70.0%	70.0%	70.0%	70.0%			
	Capitalised investment	(3)=(1)x(2)	£m	-	-	-	-	-			
	Investment to be expensed	(4)=(1)-(3)	£m	-	-	-	-	-			
	Depreciation	$(5)=\Sigma(3)_t$	£m	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	0.07	0.06
	Cost of Capital	$(6)=wg[(6^{t-1})+(5^{t-1})]x$WACC	£m	(0.02)	(0.01)	(0.01)	(0.00)	0.00	0.01	0.01	0.01
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(0.16)**	**(0.15)**	**(0.15)**	**(0.14)**	**(0.14)**	**(0.13)**	**0.07**	**0.06**
Societal benefits (£m) i.e. costs avoided	Losses		£m	-	-	-	-	-	-	-	-
	CO2e associated with losses		£m	-	-	-	-	-	-	-	-
	Customer interruptions (CI)		£m	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-
	Other 1 (specify)		£m								
	Other 2 (specify)		£m								
	Other 3 (specify)		£m								
	Total societal net benefits		**£m**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Net benefits		**£m**	**(0.16)**	**(0.15)**	**(0.15)**	**(0.14)**	**(0.14)**	**(0.13)**	**0.07**	**0.06**
	Discount factor	=1/[(1+SRTP)^n]		0.30	0.29	0.28	0.27	0.26	0.26	0.25	0.24
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.54	0.54	0.53	0.52	0.51	0.50	0.50	0.49
	Discounted net benefits		£m	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	0.02	0.02
	Cumulative discounted net benefits		**£m**	**0.39**	**0.35**	**0.31**	**0.27**	**0.23**	**0.20**	**0.22**	**0.23**

				RIIO-ED7			
				49	50	51	52
				2064	2065	2066	2067
Investment	Refurbishment		£m				
	Please specify		£m				
	Please specify		£m				
	Please specify		£m				
	Please specify		£m				
	Total investment		£m				
Avoided DNO costs	Worst Served Customers	Avoided EGS2 failures	£m				
	Trouble Call / faults	Overtime savings	£m				
	Trouble Call / faults	Avoided annual maintenance cost	£m				
	Please specify		£m				
	Please specify		£m				
	Please specify		£m				
	Total avoided DNO costs		£m	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	-	-	-
	Capitalisation rates	(2)	%				
	Capitalised investment	(3)=(1)x(2)	£m				
	Investment to be expensed	(4)=(1)-(3)	£m				
	Depreciation	$(5)=\Sigma(3)_t$	£m	0.05	0.04	0.03	0.02
	Cost of Capital	$(6)=wg[(6^{t-1})+(5^{t-1})]x$WACC	£m	0.00	0.00	0.00	0.00
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**0.05**	**0.04**	**0.03**	**0.02**
Societal benefits (£m) i.e. costs avoided	Losses		£m	-	-	-	-
	CO2e associated with losses		£m	-	-	-	-
	Customer interruptions (CI)		£m	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-
	Fatality		£m	-	-	-	-
	Major injury		£m	-	-	-	-
	Oil leakage		£m	-	-	-	-
	Other 1 (specify)		£m				
	Other 2 (specify)		£m				
	Other 3 (specify)		£m				
	Total societal net benefits		**£m**	**-**	**-**	**-**	**-**
	Net benefits		**£m**	**0.05**	**0.04**	**0.03**	**0.02**
	Discount factor	=1/[(1+SRTP)^n]		0.23	0.23	0.22	0.22
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.48	0.48	0.47	0.46
	Discounted net benefits		£m	0.01	0.01	0.01	0.00
	Cumulative discounted net benefits		**£m**	**0.25**	**0.26**	**0.26**	**0.27**

Non-DNO (eg societal) benefits

Enter values as increments (delta) relative to your reference scenario. If this is your reference scenario enter 0. Reductions are entered as positive numbers and increases as negative numbers.

| | | | | | | | |

Guidance for CBA spreadsheet model

Tab	Instructions
Option summary	Provide a description of the stated aim / investment decision contained within this CBA analysis workbook, along with a list of options considered to me Also include here the short list of options contained within this workbook which have been fully costed and specify which option has been adopted follo business plan submission.
Fixed data	Enter pre-tax WACC and prices consistent with your business plan
Baseline scenario	Enter costs and benefits associated with the baseline scenario. The baseline scenario represents status quo; that is the cost of business as usual in the a intervention. Where business as usual is not an option i.e. an investment intervention of some kind is required DNOs should chose the option with the lowest investi scenario
Working baseline	Show any calculation used to derive the values in your baseline scenario
Option 1	Enter costs and benefits *over and above the baseline scenario* i.e. the marginal or incremental costs / benefits of the option being considered. Enter capitalisation rates consistent with your business plan.
Working 1	Show any calculation used to derive the values in your CBA

Colour code:

User populated cells
Fixed data
Summation formula
Other formula

The user should populate the light blue cells. All other cells are either fixed or auto-populated.

Enter costs / benefits in 2012/13 prices (£m).
Costs should be entered as negative values.
Benefits (i.e. avoided costs) should be entered a positive values.

Costs entered should correspond to values set out in company business plans i.e. should exclude RPEs and include ongoing efficiencies consistent with assumptions contained in your business plan submis

Copy *Option 1 worksheet & workings 1* for each CBA option and label these *option 2 & workings 2* etc.

Where a 'do minimum option' exists, Option 1 should represent your 'do minimum' or 'reference scenario' e.g. do nothing, ongoing maintenance of existing asset or the option which requires the minim

Use the relevant *Workings worksheet* to demonstrate any calculation/information that can support the costs and benefits you have entered for each option. This is free fill and provides you with an oppo believe will assist Ofgem in evaluating/understanding your CBA.

Please highlight your chosen option by colouring the worksheet tab yellow.

Purpose of CBA: describe the primary driver of the investment decision

Savings from investment in the pro-active use of PFT to locate fluid cable leaks (i.e. a programme of fluid exchange)

If investment is to replace an existing asset / asset class, please state the condition of the asset / asset class (HI / CI etc.)

List below all options considered to meet the stated aim

Options considered / project name	Comment

List below the short list of those options which have been costed within this CBA workbook

Option no.	Options considered	Decision	Comment	For the chosen option only, provide detail of where CBA expenditure included in this CBA is reported in the BPDT pack. e.g. LV swtichgear BPDT CV3 rows 15 to 22.	NPVs based on payback periods				
					16 years	24 years	32 years	45 years	DNO view
1	PFT fluid exchange	Adopted			£0.05	£0.05	£0.05	£0.05	
2					£0.00	£0.00	£0.00	£0.00	
3					£0.00	£0.00	£0.00	£0.00	
4									
5									

If more options are costed, please copy *Option 1* and *workings 1* worksheets and add detail to the short list table above.

Parameters

pre-tax WACC	3.9%	*enter DNO specific pre-tax WACC figure*
Discount Rate <= 30 years	3.5%	
Discount Rate > 30 years	3.0%	
Discount rate for safety	1.5%	
Assumed Asset Life (Years)	45	

RPI INDICES

Using yearly averages (April to March)

Index		Convert to
		2012/13
Convert from	2003/04	1.3409
	2004/05	1.3004
	2005/06	1.2670
	2006/07	1.2214
	2007/08	1.1730
	2008/09	1.1392
	2009/10	1.1340
	2010/11	1.0924
	2011/12	1.0309

Prices

Losses (£/MWh)	*(48.43)*
CI (£s per interruption)	*(12.47)*
CML (£s per minute lost)	*(0.26)*
Cost per fatality (£m)[1]	*(1.79)*
Cost per major injury (£m)[1]	*(0.03)*
Cost per litre oil (£/litre)	*(36)*
Electricity GHG conversion factor (tonnes per MWh)[3]	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
2012/13 prices	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067
Traded carbon price (£/t 2010/11)[2]	6.76	7.10	7.55	8.03	8.55	13.26	21.97	28.68	35.39	42.10	48.81	55.52	62.23	68.94	75.65	81.00	88.00	95.00	102.00	109.00	116.00	122.00	129.00	136.00	143.00	150.00	157.00	164.00	171.00	178.00	184.00	191.00	198.00	205.00	212.00	220.00	227.00	234.00	241.00	248.00	256.00	262.00	269.00	276.00	282.00	287.00	292.00	297.00	301.00	305.00	309.00	312.00
traded carbon price (£/t 2012/13 prices)	7.30	7.67	8.16	8.68	9.24	16.49	23.74	30.98	38.23	45.48	52.73	59.98	67.23	74.48	81.73	87.51	95.07	102.63	110.20	117.76	125.32	131.80	139.37	146.93	154.49	162.05	169.62	177.18	184.74	192.30	198.79	206.35	213.91	221.47	229.04	237.68	245.24	252.80	260.37	267.93	276.57	283.05	290.62	298.18	304.66	310.06	315.47	320.87	325.19	329.51	333.83	337.07
CI	0.503	0.488	0.474	0.459	0.445	0.430	0.416	0.401	0.387	0.372	0.358	0.343	0.329	0.314	0.300	0.285	0.271	0.256	0.242	0.227	0.213	0.198	0.184	0.169	0.155	0.140	0.126	0.111	0.097	0.082	0.068	0.053	0.039	0.024	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010

[1] https://www.gov.uk/carbon-valuation.
[2] http://www.hse.gov.uk/risk/theory/alarpcheck.htm
[3] http://www.defra.gov.uk/publications/2012/05/30/pb13773-2012-ghg-conversion/.

note: 2016 to 2030 DECC's updated traded sector carbon values published Oct 2012, 2031 onwards based on DECC carbon values published Oct 2011.
note: HSE values as at Q2 2003
note: figures taken from 2012 Guideline to Defra / DECC's GHG conversion factors for company reporting, 'new 2010' factor annex 3 table 3(c).

☑ Exclude societal benefits

CBA Option 1 **PFT fluid cable leak location**

Term (years from first out flow)	NPV (£m)
16	£0.05
24	£0.05
32	£0.05
45	£0.05

first year of investment out flow: 1

				RIIO-ED1								RIIO-ED2								RIIO-ED3							
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
		Calculation	Units	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Investment	Refurbishment	PFT fluid exchange (Average cost/cct)	£m	(0.06)																							
	Trouble Call / faults	PFT survey (£30k each)	£m		(0.03)				(0.03)				(0.03)				(0.03)						(0.03)				
	Please specify		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Total investment		£m	(0.06)	(0.03)	-	-	-	(0.03)	-	-	-	(0.03)	-	-	-	(0.03)	-	-	-	-	-	(0.03)	-	-	-	-
Avoided DNO costs	Inspections & Maintenance		£m																								
	Asset Replacement		£m																								
	Trouble Call / faults	Dig & freeze (£33k average)	£m		0.033				0.033				0.033				0.033						0.03				
	Please specify		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Total avoided DNO costs		£m	-	0.03	-	-	-	0.03	-	-	-	0.03	-	-	-	0.03	-	-	-	-	-	0.03	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	(0.06)	0.00	-	-	-	0.00	-	-	-	0.00	-	-	-	0.00	-	-	-	-	-	0.00	-	-	-	-
	Capitalisation rates	(2)	%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	(3)=(1)x(2)	£m	(0.04)	0.00	-	-	-	0.00	-	-	-	0.00	-	-	-	0.00	-	-	-	-	-	0.00	-	-	-	-
	Investment to be expensed	(4)=(1)-(3)	£m	(0.02)	0.00	-	-	-	0.00	-	-	-	0.00	-	-	-	0.00	-	-	-	-	-	0.00	-	-	-	-
	Depreciation	(5)=∑(5)$_{-1}$	£m	-	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	Cost of Capital	(6)=avg((6^{-1}),(6^{70}))xWACC	£m	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(0.02)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
Societal benefits (£m) i.e. costs avoided	Losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CO2e associated with losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer interruptions (CI)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	0.027	-	-	-	0.027	-	-	-	0.027	-	-	-	0.027	-	-	-	-	-	0.03	-	-	-	-
	Other 1 (specify)		£m																								
	Other 2 (specify)		£m																								
	Other 3 (specify)		£m																								
	Total societal net benefits		**£m**	**-**	**0.03**	**-**	**-**	**-**	**0.03**	**-**	**-**	**-**	**0.03**	**-**	**-**	**-**	**0.03**	**-**	**-**	**-**	**-**	**-**	**0.03**	**-**	**-**	**-**	**-**
	Net benefits		**£m**	**(0.02)**	**0.03**	**(0.00)**	**(0.00)**	**(0.00)**	**0.03**	**(0.00)**	**(0.00)**	**(0.00)**	**0.03**	**(0.00)**	**(0.00)**	**(0.00)**	**0.03**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**0.03**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
	Discount factor	=1/[(1+SRTP)^n]		0.97	0.93	0.90	0.87	0.84	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.64	0.62	0.60	0.58	0.56	0.54	0.52	0.50	0.49	0.47	0.45	0.44
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.99	0.97	0.96	0.94	0.93	0.91	0.90	0.89	0.87	0.86	0.85	0.84	0.82	0.81	0.80	0.79	0.78	0.76	0.75	0.74	0.73	0.72	0.71	0.70
	Discounted net benefits		£m	(0.02)	0.02	(0.00)	(0.00)	(0.00)	0.02	(0.00)	(0.00)	(0.00)	0.02	(0.00)	(0.00)	(0.00)	0.02	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	0.01	(0.00)	(0.00)	(0.00)	(0.00)
	Cumulative discounted net benefits		**£m**	**(0.02)**	**0.01**	**0.00**	**0.00**	**0.00**	**0.02**	**0.02**	**0.02**	**0.02**	**0.04**	**0.03**	**0.03**	**0.03**	**0.05**	**0.05**	**0.05**	**0.05**	**0.04**	**0.04**	**0.06**	**0.06**	**0.06**	**0.06**	**0.05**

			RIIO-ED4																								
			25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
		Calculation	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064
Investment	Refurbishment	PFT fluid exchange (Average cost/cct)																									
	Trouble Call / faults	PFT survey (£30k each)																									
	Please specify																										
	Please specify																										
	Please specify																										
	Total investment		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Avoided DNO costs	Inspections & Maintenance																										
	Asset Replacement																										
	Trouble Call / faults	Dig & freeze (£33k average)																									
	Please specify																										
	Please specify																										
	Please specify																										
	Total avoided DNO costs		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits																									
	Capitalisation rates	(2)	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%				
	Capitalised investment	(3)=(1)x(2)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Investment to be expensed	(4)=(1)-(3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	Depreciation	(5)=∑(5)$_{-1}$	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	0.00	0.00	0.00
	Cost of Capital	(6)=avg((6^{-1}),(6^{70}))xWACC	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	0.00	0.00	0.00	0.00	0.00	0.00
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**0.00**	**0.00**	**0.00**
Societal benefits (£m) i.e. costs avoided	Losses		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CO2e associated with losses		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer interruptions (CI)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fatality		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major injury		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oil leakage		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other 1 (specify)																										
	Other 2 (specify)																										
	Other 3 (specify)																										
	Total societal net benefits		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Net benefits		**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**0.00**	**0.00**	**0.00**
	Discount factor	=1/[(1+SRTP)^n]	0.42	0.41	0.40	0.38	0.37	0.36	0.40	0.39	0.38	0.37	0.36	0.35	0.33	0.33	0.32	0.31	0.30	0.29	0.28	0.27	0.26	0.26	0.25	0.24	0.23
	Discount factor (safety)	=1/[(1+PTPR)^n]	0.69	0.68	0.67	0.66	0.65	0.64	0.63	0.62	0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55	0.54	0.54	0.53	0.52	0.51	0.50	0.50	0.49	0.48
	Discounted net benefits		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	0.00	0.00	0.00
	Cumulative discounted net benefits		**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**

			RIIO-ED6								RIIO-ED7			
			50	51	52									
		Calculation	2065	2066	2067									
Investment	Refurbishment	PFT fluid exchange (Average cost/cct)												
	Trouble Call / faults	PFT survey (£30k each)												
	Please specify													
	Please specify													
	Please specify													
	Total investment													
Avoided DNO costs	Inspections & Maintenance													
	Asset Replacement													
	Trouble Call / faults	Dig & freeze (£33k average)												
	Please specify													
	Please specify													
	Please specify													
	Total avoided DNO costs		-	-	-									
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	-	-	-									
	Capitalisation rates	(2)												
	Capitalised investment	(3)=(1)x(2)												
	Investment to be expensed	(4)=(1)-(3)												
	Depreciation	(5)=∑(5)$_{-1}$	0.00	0.00	0.00									
	Cost of Capital	(6)=avg((6^{-1}),(6^{70}))xWACC	0.00	0.00	0.00									
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**0.00**	**0.00**	**0.00**									
Societal benefits (£m) i.e. costs avoided	Losses		-	-	-									
	CO2e associated with losses		-	-	-									
	Customer interruptions (CI)		-	-	-									
	Customer minutes lost (CML)		-	-	-									
	Other GHG emissions (CO2e) i.e. not associated with losses		-	-	-									
	Fatality		-	-	-									
	Major injury		-	-	-									
	Oil leakage		-	-	-									
	Other 1 (specify)													
	Other 2 (specify)													
	Other 3 (specify)													
	Total societal net benefits		**-**	**-**	**-**									
	Net benefits		**0.00**	**0.00**	**0.00**									
	Discount factor	=1/[(1+SRTP)^n]	0.23	0.22	0.22									
	Discount factor (safety)	=1/[(1+PTPR)^n]	0.48	0.47	0.46									
	Discounted net benefits		0.00	0.00	0.00									
	Cumulative discounted net benefits		**0.05**	**0.05**	**0.05**									

Non-DNO (eg societal) benefits

Enter values as increments (delta) relative to your reference scenario. If this is your reference scenario enter 0. Reductions are entered as positive numbers and increases as negative numbers.

Societal net benefits (impact relative to business as usual scenario)	Reduced losses	MWh																									
	Reduced emissions associated with losses	tCO2e	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Reduced number of customers interrupted	no.																									
	Reduced customer minutes lost	Mins																									
	Reduced emissions (not associated with losses)[1]	tCO2e																									
	Reduced probability of fatality[2]	%																									
	Reduced probability of major injury[2]	%																									
	Reduced oil leakage	Litres		750.00				750.00				750.00				750.00											

[1] Includes all GHG not associated with losses e.g. SF6 converted to tCO2e using Defra conversion factors
http://www.defra.gov.uk/publications/2012/05/30/pb13773-2012-ghg-conversion/
Where losses are entered in terms of MWh, the CO2e associated with those losses will be calculated based on an assumed GHG conversion factor. The tCO2e are monetised using DECC traded carbon values.
All other GHG emissions not associated with losses should be entered in row 90 to avoid double counting.

[2] http://www.hse.gov.uk/risk/theory/alarpcheck.htm

Guidance for CBA spreadsheet model

Tab	Instructions
Option summary	Provide a description of the stated aim / investment decision contained within this CBA analysis workbook, along with a list of options considered to me Also include here the short list of options contained within this workbook which have been fully costed and specify which option has been adopted follo business plan submission.
Fixed data	Enter pre-tax WACC and prices consistent with your business plan
Baseline scenario	Enter costs and benefits associated with the baseline scenario. The baseline scenario represents status quo; that is the cost of business as usual in the a intervention. Where business as usual is not an option i.e. an investment intervention of some kind is required DNOs should chose the option with the lowest investi scenario
Working baseline	Show any calculation used to derive the values in your baseline scenario
Option 1	Enter costs and benefits *over and above the baseline scenario* i.e. the marginal or incremental costs / benefits of the option being considered. Enter capitalisation rates consistent with your business plan.
Working 1	Show any calculation used to derive the values in your CBA

Colour code:

User populated cells
Fixed data
Summation formula
Other formula

The user should populate the light blue cells. All other cells are either fixed or auto-populated.

Enter costs / benefits in 2012/13 prices (£m).
Costs should be entered as negative values.
Benefits (i.e. avoided costs) should be entered a positive values.

Costs entered should correspond to values set out in company business plans i.e. should exclude RPEs and include ongoing efficiencies consistent with assumptions contained in your business plan submis

Copy *Option 1 worksheet & workings 1* for each CBA option and label these *option 2 & workings 2* etc.

Where a 'do minimum option' exists, Option 1 should represent your 'do minimum' or 'reference scenario' e.g. do nothing, ongoing maintenance of existing asset or the option which requires the minim

Use the relevant *Workings worksheet* to demonstrate any calculation/information that can support the costs and benefits you have entered for each option. This is free fill and provides you with an oppo believe will assist Ofgem in evaluating/understanding your CBA.

Please highlight your chosen option by colouring the worksheet tab yellow.

Purpose of CBA: describe the primary driver of the investment decision

Vehicle Telematics

If investment is to replace an existing asset / asset class, please state the condition of the asset / asset class (HI / CI etc.)

List below all options considered to meet the stated aim

Options considered / project name	Comment

List below the short list of those options which have been costed within this CBA workbook

Option no.	Options considered	Decision	Comment	For the chosen option only, provide detail of where CBA expenditure included in this CBA is reported in the BPDT pack. e.g. LV swtichgear BPDT CV3 rows 15 to 22.	NPVs based on payback periods				
					16 years	24 years	32 years	45 years	DNO view
1	Telematics	Adopted			£0.49	£0.62	£0.71	£0.80	
2					£0.00	£0.00	£0.00	£0.00	
3					£0.00	£0.00	£0.00	£0.00	
4									
5									

If more options are costed, please copy *Option 1* and *workings 1* worksheets and add detail to the short list table above.

Parameters

pre-tax WACC	3.9%	*enter DNO specific pre-tax WACC figure*
Discount Rate <= 30 years	3.5%	
Discount Rate > 30 years	3.0%	
Discount rate for safety	1.5%	
Assumed Asset Life (Years)	45	

RPI INDICES

Using yearly averages (April to March)

Index		Convert to
		2012/13
Convert from	2003/04	1.3409
	2004/05	1.3004
	2005/06	1.2670
	2006/07	1.2214
	2007/08	1.1730
	2008/09	1.1392
	2009/10	1.1340
	2010/11	1.0804
	2011/12	1.0309
	2012/13	1.0000

Prices

| | | |

CBA Option 1 **Vehicle Telematics**

Term (years from first out flow)	NPV (£m)
16	£0.49
24	£0.62
32	£0.71
45	£0.80

first year of investment out flow: 1

			Units	RIIO-ED1								RIIO-ED2							
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
				2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Investment	Vehicles & Transport		£m	(0.29)	(0.30)														
	Please specify		£m																
	Please specify		£m																
	Please specify		£m																
	Please specify		£m																
	Total investment		£m	(0.29)	(0.30)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Avoided DNO costs	Vehicles & Transport	Fuel cost savings	£m		0.07	0.14	0.14	0.14	0.14	0.14	0.14								
	Vehicles & Transport	Accident / Claims reductions	£m		0.05	0.09	0.09	0.09	0.09	0.09	0.09								
	Trouble Call / faults		£m																
	Please specify		£m																
	Please specify		£m																
	Please specify		£m																
	Total avoided DNO costs		£m	-	0.12	0.24	0.24	0.24	0.24	0.24	0.24	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	(0.29)	(0.18)	0.24	0.24	0.24	0.24	0.24	0.24	-	-	-	-	-	-	-	-
	Capitalisation rates	(2)	%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	(3)=(1)x(2)	£m	(0.20)	(0.13)	0.16	0.16	0.16	0.16	0.16	0.16	-	-	-	-	-	-	-	-
	Investment to be expensed	(4)=(1)-(3)	£m	(0.09)	(0.05)	0.07	0.07	0.07	0.07	0.07	0.07	-	-	-	-	-	-	-	-
	Depreciation	(5)=∑(5)$_{t}$	£m	-	(0.00)	(0.01)	(0.00)	(0.00)	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Cost of Capital	(6)=avg[(6^{n-1}),(6^{n})]xWACC	£m	(0.00)	(0.01)	(0.01)	(0.00)	0.00	0.01	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**(0.09)**	**(0.07)**	**0.05**	**0.06**	**0.07**	**0.08**	**0.09**	**0.10**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**
Societal benefits (£m) i.e. costs avoided	Losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CO2e associated with losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer interruptions (CI)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CO2 reductions associated with fleet vehicles		£m	0.004	0.004	0.005	0.005	0.005	0.010	0.014	0.018								
	Other 2 (specify)		£m																
	Other 3 (specify)		£m																
	Total societal net benefits		**£m**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	-	-	-	-	-	-	-	-
	Net benefits		**£m**	**(0.09)**	**(0.07)**	**0.06**	**0.07**	**0.08**	**0.09**	**0.11**	**0.12**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**
	Discount factor	=1/[(1+SRTP)^n]		0.97	0.93	0.90	0.87	0.84	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.64	0.62	0.60	0.58
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.99	0.97	0.96	0.94	0.93	0.91	0.90	0.89	0.87	0.86	0.85	0.84	0.82	0.81	0.80	0.79
	Discounted net benefits		£m	(0.08)	(0.06)	0.05	0.06	0.07	0.08	0.09	0.09	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02
	Cumulative discounted net benefits		**£m**	**(0.08)**	**(0.14)**	**(0.09)**	**(0.03)**	**0.04**	**0.11**	**0.20**	**0.29**	**0.32**	**0.35**	**0.37**	**0.40**	**0.42**	**0.45**	**0.47**	**0.49**

		RIIO-ED3										RIIO-ED4										RIIO-ED5										RIIO-ED6										RIIO-ED7			
		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
		2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067
Investment	Vehicles & Transport																																				
	Please specify																																				
	Please specify																																				
	Please specify																																				
	Please specify																																				
	Total investment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
Avoided DNO costs	Vehicles & Transport																																				
	Vehicles & Transport																																				
	Trouble Call / faults																																				
	Please specify																																				
	Please specify																																				
	Please specify																																				
	Total avoided DNO costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Capitalisation rates	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%							
	Capitalised investment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
	Investment to be expensed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
	Depreciation	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01
	Cost of Capital	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Net DNO benefits	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.01**	**0.01**	**0.01**
Societal benefits (£m) i.e. costs avoided	Losses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CO2e associated with losses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer interruptions (CI)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fatality	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major injury	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oil leakage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CO2 reductions associated with fleet vehicles																																				
	Other 2 (specify)																																				
	Other 3 (specify)																																				
	Total societal net benefits	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Net benefits	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.03**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.02**	**0.01**	**0.01**	**0.01**
	Discount factor	0.56	0.54	0.52	0.50	0.49	0.47	0.45	0.44	0.42	0.41	0.40	0.38	0.37	0.36	0.40	0.39	0.38	0.37	0.36	0.35	0.33	0.33	0.32	0.31	0.30	0.29	0.28	0.27	0.26	0.26	0.25	0.24	0.23	0.23	0.22	0.22
	Discount factor (safety)	0.78	0.76	0.75	0.74	0.73	0.72	0.71	0.70	0.69	0.68	0.67	0.66	0.65	0.64	0.63	0.62	0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55	0.54	0.54	0.53	0.52	0.51	0.50	0.50	0.49	0.48	0.48	0.47	0.46
	Discounted net benefits	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00
	Cumulative discounted net benefits	**0.51**	**0.53**	**0.54**	**0.56**	**0.58**	**0.59**	**0.61**	**0.62**	**0.63**	**0.65**	**0.66**	**0.67**	**0.68**	**0.69**	**0.70**	**0.71**	**0.72**	**0.73**	**0.74**	**0.75**	**0.75**	**0.76**	**0.77**	**0.78**	**0.78**	**0.79**	**0.79**	**0.80**	**0.80**	**0.81**	**0.82**	**0.82**	**0.83**	**0.83**	**0.83**	**0.83**

Non-DNO (eg societal) benefits

Enter values as increments (delta) relative to your reference scenario. If this is your reference scenario enter 0. Reductions are entered as positive numbers and increases as negative numbers.

Societal net benefits (impact relative to business as usual scenario)	Reduced losses	MWh																																			
	Reduced emissions associated with losses	tCO2e	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Reduced number of customers interrupted	no.																																			
	Reduced customer minutes lost	Mins																																			
	Reduced emissions (not associated with losses)[1]	tCO2e																																			
	Reduced probability of fatality[2]	%																																			
	Reduced probability of major injury[2]	%																																			
	Reduced oil leakage	Litres																																			

[1] Includes all GHG not associated with losses e.g. SF6 converted to tCO2e using Defra conversion factors
http://www.defra.gov.uk/publications/2012/05/30/pb13773-2012-ghg-conversion/
Where losses are entered in terms of MWh, the CO2e associated with those losses will be calculated based on an assumed GHG conversion factor. The tCO2e are monetised using DECC traded carbon values.
All other GHG emissions not associated with losses should be entered in row 90 to avoid double counting.

[2] http://www.hse.gov.uk/risk/theory/alarpcheck.htm

Guidance for CBA spreadsheet model

Tab	Instructions
Option summary	Provide a description of the stated aim / investment decision contained within this CBA analysis workbook, along with a list of options considered to meet the aim. Also include here the short list of options contained within this workbook which have been fully costed and specify which option has been adopted following CBA and included in your business plan submission.
Fixed data	Enter pre-tax WACC and prices consistent with your business plan
Baseline scenario	Enter costs and benefits associated with the baseline scenario. The baseline scenario represents status quo; that is the cost of business as usual in the absence of any investment intervention. Where business as usual is not an option i.e. an investment intervention of some kind is required DNOs should chose the option with the lowest investment to represent the baseline scenario.
Working baseline	Show any calculation used to derive the values in your baseline scenario
Option 1	Enter costs and benefits *over and above the baseline scenario* i.e. the marginal or incremental costs / benefits of the option being considered. Enter capitalisation rates consistent with your business plan.
Working 1	Show any calculation used to derive the values in your CBA

Colour code:

User populated cells
Fixed data
Summation formula
Other formula

The user should populate the light blue cells. All other cells are either fixed or auto-populated.

Enter costs / benefits in 2012/13 prices (£m).

Costs should be entered as negative values.

Benefits (i.e. avoided costs) should be entered a positive values.

Costs entered should correspond to values set out in company business plans i.e. should exclude RPEs and include ongoing efficiencies consistent with assumptions contained in your business plan submission.

Copy *Option 1 worksheet* & *workings 1* for each CBA option and label these *option* 2 & *workings* 2 etc.

Where a 'do minimum option' exists, Option 1 should represent your 'do minimum' or 'reference scenario' e.g. do nothing, ongoing maintenance of existing asset or the option which requires the minimum investment .

Use the relevant *Workings worksheet* to demonstrate any calculation/information that can support the costs and benefits you have entered for each option. This is free fill and provides you with an opportunity to show additional underlying data you believe will assist Ofgem in evaluating/understanding your CBA.

Please highlight your chosen option by colouring the worksheet tab yellow.

Purpose of CBA: describe the stated aim of the investment decision

To determine the cost/benefit of undertaking regeneration of power transformer insualting oil to extend the serviceable life of the transformer.

If investment is to replace an existing asset / asset class, please state the condition of the asset / asset class (HI / CI etc.)

The HI of the identified subset of power transformers ranges from HI2 to HI4.

List below all options considered to meet the stated aim

Options considered	Comment
Oil regeneration undertaken	This is the only option that meets the stated aim.

List below the short list of those options which have been costed within this CBA workbook

Option no.	Options considered	Decision	Comment	Spend area (from Table C1) (relevant only to adopted option)	NPVs based on payback periods				
					16 years	24 years	32 years	45 years	DNO view
1	No oil regeneration undertaken				-£8.03	-£13.15	-£16.71	-£20.50	
2	Oil regeneration undertaken		This is the selected option.	CV9	-£1.44	-£5.15	-£10.73	-£15.59	
3									
4									
5									

If more options are costed, please copy *Option 1* and *workings 1* worksheets and add detail to the short list table above.

Parameters

Discount Rate +/- 25 basis	0.0%
Discount Rate (% Inflation)	2.0%
Discount Rate (% Inflation)	2.0%
Assumed Asset Life (Years)	20

RPI INDICES

(Source: Retail prices index (Nov) on Nov-20)

Year	RPI
Concern from	2012-13
	2013-14
	2014-15
	2015-16
	2016-17
	2017-18
	2018-19
	2019-20
	2020-21
	2021-22
	2022-23

Prices

Traded carbon price (£/t 2012/13)[1]
traded carbon price (£/t 2012/13 prices)
Exchange rate (£/€/$)
CO (Scope1 emissions)
CO (Scope2 emissions)
Carbon factor (kg/m³)
Concrete mass intensity (km³)
Concrete fee (£/t CO2e)
Electricity GHG conversion factor (tonnes per MWh)[2]

[1] https://www.ieta.org/resources/Resources/Weekly-Carbon-Market-Report/Weekly%20Carbon%20Market%20Report%20-%20Issue%20Date%20-%20Jan%2031%2C%202020.pdf

[2] https://www.ofgem.gov.uk/ofgem-publications/40543/fuel-mix-disclosure-table-2018.xlsx

[3] https://www.ukcorporatehydrogenfuelcell.com/wp-content/uploads/2020/02/Hydrogen-Strategy-Final-Report.pdf

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Year 31	Year 32	Year 33	Year 34	Year 35	Year 36	Year 37	Year 38	Year 39	Year 40	Year 41	Year 42	Year 43	Year 44	Year 45	Year 46	Year 47	Year 48	Year 49	Year 50	Year 51	Year 52
	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00
	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00
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note: 2012 to 2020 DECC's updated traded series - series values published Oct 2012. 2021 onwards based on DECC series values published Oct 2011.

note: FBS values as at Oct 2020

note: Source values Oct 2012 Guidelines on DoFs / DECC's GHG conversion factors for company reporting. Year 2020 factor across 3 data 3rd

CBA Option 2 - Option 2 | **Oil regeneration undertaken**

Term (years from first out flow)	NPV (£m)
16	-£1.44
24	-£5.15
32	-£10.73
45	-£15.59

first year of investment out flow 2

			RIIO-ED1								RIIO-ED2								RIIO-ED3							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
		Calculation	Units	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Investment	Asset Replacement		£m																						(2.10)	(6.30)	(6.30)
	Legal & Safety		£m																								
	Refurbishment		£m		(0.15)	(0.45)	(0.45)	(0.45)	(0.45)	(0.40)																
	Please specify		£m																								
	Please specify		£m																								
	Total investment		£m	-	(0.15)	(0.45)	(0.45)	(0.45)	(0.45)	(0.40)	-	-	-	-	-	-	-	-	-	-	-	-	-	(2.10)	(6.30)	(6.30)
Avoided DNO costs	Inspections & Maintenance		£m																								
	Asset Replacement		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Please specify		£m																								
	Total avoided DNO costs		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	£m	-	(0.15)	(0.45)	(0.45)	(0.45)	(0.45)	(0.40)	-	-	-	-	-	-	-	-	-	-	-	-	-	(2.10)	(6.30)	(6.30)
	Capitalisation rates	(2)	%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%
	Capitalised investment	(3)=(1)x(2)	£m	-	(0.11)	(0.32)	(0.32)	(0.32)	(0.32)	(0.28)	-	-	-	-	-	-	-	-	-	-	-	-	-	(1.47)	(4.41)	(4.41)
	Investment to be expensed	(4)=(1)-(3)	£m	-	(0.05)	(0.14)	(0.14)	(0.14)	(0.14)	(0.12)	-	-	-	-	-	-	-	-	-	-	-	-	-	(0.63)	(1.89)	(1.89)
	Depreciation	(5)=∑(5)$_t$	£m	-	-	(0.00)	(0.01)	(0.02)	(0.02)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.07)	(0.17)
	Cost of Capital	(6)=wa((6*)$_t$,(6**))x WACC	£m	-	(0.00)	(0.01)	(0.02)	(0.04)	(0.05)	(0.06)	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.07)	(0.20)	(0.38)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**£m**	**-**	**(0.05)**	**(0.15)**	**(0.17)**	**(0.19)**	**(0.21)**	**(0.21)**	**(0.10)**	**(0.10)**	**(0.10)**	**(0.10)**	**(0.10)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.74)**	**(2.16)**	**(2.44)**
Societal benefits (£m) i.e. costs avoided	Losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CO2e associated with losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer interruptions (CI)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fatality		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major injury		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oil leakage		£m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other 1 (specify)		£m																								
	Other 2 (specify)		£m																								
	Other 3 (specify)		£m																								
	Total societal net benefits		**£m**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Net benefits		**£m**	**-**	**(0.05)**	**(0.15)**	**(0.17)**	**(0.19)**	**(0.21)**	**(0.21)**	**(0.10)**	**(0.10)**	**(0.10)**	**(0.10)**	**(0.10)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.09)**	**(0.08)**	**(0.08)**	**(0.08)**	**(0.74)**	**(2.16)**	**(2.44)**
	Discount factor	=1/[(1+SRTP)^n]		0.97	0.93	0.90	0.87	0.84	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.64	0.62	0.60	0.58	0.56	0.54	0.52	0.50	0.49	0.47	0.45	0.44
	Discount factor (safety)	=1/[(1+PTPR)^n]		0.99	0.97	0.96	0.94	0.93	0.91	0.90	0.89	0.87	0.86	0.85	0.84	0.82	0.81	0.80	0.79	0.78	0.76	0.75	0.74	0.73	0.72	0.71	0.70
	Discounted net benefits		£m	-	(0.04)	(0.13)	(0.15)	(0.16)	(0.17)	(0.17)	(0.08)	(0.07)	(0.07)	(0.07)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.35)	(0.98)	(1.07)
	Cumulative discounted net benefits		**£m**	**-**	**(0.04)**	**(0.18)**	**(0.32)**	**(0.48)**	**(0.65)**	**(0.82)**	**(0.90)**	**(0.97)**	**(1.04)**	**(1.11)**	**(1.17)**	**(1.23)**	**(1.29)**	**(1.34)**	**(1.39)**	**(1.44)**	**(1.49)**	**(1.53)**	**(1.57)**	**(1.61)**	**(1.96)**	**(2.94)**	**(4.01)**

			RIIO-ED4								RIIO-ED5								RIIO-ED6								RIIO-ED7			
			25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
		Calculation	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067
Investment	Asset Replacement		(6.30)	(6.30)	(5.10)																									
	Legal & Safety																													
	Refurbishment																													
	Please specify																													
	Please specify																													
	Total investment		(6.30)	(6.30)	(5.10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
Avoided DNO costs	Inspections & Maintenance																													
	Asset Replacement																													
	Please specify																													
	Please specify																													
	Please specify																													
	Please specify																													
	Total avoided DNO costs		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total DNO net benefits before capitalisation	(1) = investment + DNO benefits	(6.30)	(6.30)	(5.10)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				-	-	-	-
	Capitalisation rates	(2)	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%							
	Capitalised investment	(3)=(1)x(2)	(4.41)	(4.41)	(3.57)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
	Investment to be expensed	(4)=(1)-(3)	(1.89)	(1.89)	(1.53)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
	Depreciation	(5)=∑(5)$_t$	(0.27)	(0.36)	(0.46)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.54)	(0.53)	(0.52)	(0.52)	(0.51)
	Cost of Capital	(6)=wa((6*)$_t$,(6**))x WACC	(0.56)	(0.73)	(0.88)	(0.94)	(0.91)	(0.89)	(0.87)	(0.84)	(0.82)	(0.80)	(0.78)	(0.75)	(0.73)	(0.71)	(0.68)	(0.66)	(0.64)	(0.62)	(0.59)	(0.57)	(0.55)	(0.52)	(0.50)	(0.48)	(0.46)	(0.43)	(0.41)	(0.39)
	Total Net DNO benefits	**(7)=(4)+(5)+(6)**	**(2.71)**	**(2.98)**	**(2.87)**	**(1.48)**	**(1.45)**	**(1.43)**	**(1.41)**	**(1.38)**	**(1.36)**	**(1.34)**	**(1.32)**	**(1.29)**	**(1.27)**	**(1.25)**	**(1.22)**	**(1.20)**	**(1.18)**	**(1.16)**	**(1.13)**	**(1.11)**	**(1.09)**	**(1.06)**	**(1.04)**	**(1.02)**	**(0.99)**	**(0.96)**	**(0.93)**	**(0.90)**
Societal benefits (£m) i.e. costs avoided	Losses		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CO2e associated with losses		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer interruptions (CI)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Customer minutes lost (CML)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other GHG emissions (CO2e) i.e. not associated with losses		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fatality		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Major injury		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oil leakage		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other 1 (specify)																													
	Other 2 (specify)																													
	Other 3 (specify)																													
	Total societal net benefits		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Net benefits		**(2.71)**	**(2.98)**	**(2.87)**	**(1.48)**	**(1.45)**	**(1.43)**	**(1.41)**	**(1.38)**	**(1.36)**	**(1.34)**	**(1.32)**	**(1.29)**	**(1.27)**	**(1.25)**	**(1.22)**	**(1.20)**	**(1.18)**	**(1.16)**	**(1.13)**	**(1.11)**	**(1.09)**	**(1.06)**	**(1.04)**	**(1.02)**	**(0.99)**	**(0.96)**	**(0.93)**	**(0.90)**
	Discount factor	=1/[(1+SRTP)^n]	0.42	0.41	0.40	0.38	0.37	0.36	0.40	0.39	0.38	0.37	0.36	0.35	0.33	0.33	0.32	0.31	0.30	0.29	0.28	0.27	0.26	0.26	0.25	0.24	0.23	0.23	0.22	0.22
	Discount factor (safety)	=1/[(1+PTPR)^n]	0.69	0.68	0.67	0.66	0.65	0.64	0.63	0.62	0.61	0.60	0.59	0.59	0.58	0.57	0.56	0.55	0.54	0.54	0.53	0.52	0.51	0.50	0.50	0.49	0.48	0.48	0.47	0.46
	Discounted net benefits		(1.15)	(1.22)	(1.13)	(0.56)	(0.54)	(0.51)	(0.56)	(0.54)	(0.51)	(0.49)	(0.47)	(0.45)	(0.43)	(0.41)	(0.39)	(0.37)	(0.35)	(0.33)	(0.32)	(0.30)	(0.29)	(0.27)	(0.26)	(0.25)	(0.23)	(0.22)	(0.21)	(0.19)
	Cumulative discounted net benefits		**(5.15)**	**(6.37)**	**(7.51)**	**(8.07)**	**(8.61)**	**(9.12)**	**(9.68)**	**(10.22)**	**(10.73)**	**(11.22)**	**(11.69)**	**(12.14)**	**(12.56)**	**(12.97)**	**(13.35)**	**(13.72)**	**(14.07)**	**(14.41)**	**(14.72)**	**(15.03)**	**(15.31)**	**(15.59)**	**(15.85)**	**(16.09)**	**(16.32)**	**(16.54)**	**(16.75)**	**(16.94)**

Non-DNO (eg societal) benefits

Enter values as increments (delta) relative to your reference scenario. If this is your reference scenario enter 0. Reductions are entered as positive numbers and increases as negative numbers.

Societal net benefits (impact relative to business as usual scenario)	Reduced losses	MWh																												
	Reduced emissions associated with losses	tCO2e	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Reduced number of customers interrupted	no.																												
	Reduced customer minutes lost	Mins																												
	Reduced emissions (not associated with losses)[1]	tCO2e																												
	Reduced probability of fatality[2]	%																												
	Reduced probability of major injury[2]	%																												
	Reduced oil leakage	Litres																												

[1] Includes all GHG not associated with losses e.g. SF6 converted to tCO2e using Defra conversion factors
http://www.defra.gov.uk/publications/2012/05/30/pb13773-2012-ghg-conversions/.
Where losses are entered in terms of MWh, the CO2e associated with those losses will be calculated based on an assumed GHG conversion factor. The tCO2e are monetised using DECC traded carbon values.
All other GHG emissions not associated with losses should be entered in row 90 to avoid double counting.

[2] http://www.hse.gov.uk/risk/theory/alarpcheck.htm