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

		Calculation	Units	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
				RIIO-ED1								RIIO-ED2								RIIO-ED3
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
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)			
	Please specify		£m																	
	Please specify		£m																	
	Please specify		£m																	
	Total investment		£m	(0.06)	(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			
	Please specify		£m																	
	Please specify		£m																	
	Please specify		£m																	
	Total avoided DNO costs		£m	-	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	-	-	-
	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%
	Capitalised investment	(3)=(1)x(2)	£m	(0.04)	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	-	-	-
	Depreciation	(5)=∑(5)$_t$	£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)
	Cost of Capital	(6)=avg[(6^{cl}),(6^{op})]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)
	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)**
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	-	-	-
	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**	**-**	**-**	**-**
	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)**
	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
	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
	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)
	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**
	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			

	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
								RIIO-ED4								RIIO-ED5	
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Refurbishment																	
Trouble Call / faults			(0.03)														
Please specify																	
Please specify																	
Please specify																	
Total investment	-	-	(0.03)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Inspections & Maintenance																	
Asset Replacement																	
Trouble Call / faults			0.03														
Please specify																	
Please specify																	
Please specify																	
Total avoided DNO costs	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total DNO net benefits before capitalisation	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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%
Capitalised investment	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Investment to be expensed	-	-	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Depreciation	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(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	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(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	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
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	-	-	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other 1 (specify)																	
Other 2 (specify)																	
Other 3 (specify)																	
Total societal net benefits	**-**	**-**	**0.03**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Net benefits	**(0.00)**	**(0.00)**	**0.03**	**(0.00)**	**(0.00)**	**(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	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
Discount factor (safety)	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
Discounted net benefits	(0.00)	(0.00)	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)
Cumulative discounted net benefits	**0.04**	**0.04**	**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**	**0.05**	**0.05**
Reduced losses																	
Reduced emissions associated with losses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reduced number of customers interrupted																	
Reduced customer minutes lost																	
Reduced emissions (not associated with losses)[1]																	
Reduced probability of fatality[2]																	
Reduced probability of major injury[2]																	
Reduced oil leakage			750.00														

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067
							RIIO-ED6								RIIO-ED7			
	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Refurbishment																		
Trouble Call / faults																		
Please specify																		
Please specify																		
Please specify																		
Total investment	-	-	-	-	-	-	-	-	-	-	-							
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%	70.0%	70.0%	70.0%							
Capitalised investment	-	-	-	-	-	-	-	-	-	-	-							
Investment to be expensed	-	-	-	-	-	-	-	-	-	-	-							
Depreciation	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(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	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(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	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
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**
Discount factor	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)	0.59	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	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(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**
Reduced losses																		
Reduced emissions associated with losses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reduced number of customers interrupted																		
Reduced customer minutes lost																		
Reduced emissions (not associated with losses)[1]																		
Reduced probability of fatality[2]																		
Reduced probability of major injury[2]																		
Reduced oil leakage																		

[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