COTSWOLD DISTRICT COUNCIL

Annex B - Business cases

The business case examines two sites owned by CDC; Trinity Road main office, and [redacted]

Financial modelling is based on tendered costs and an estimate of the amount of solar generated electricity consumed on site. Modelling based on the assumptions listed below gives the following high level viability indicators for both sites taken in aggregate:

District	Capital Costs (£)	ROI	Payback Years	NPV
CDC	268,471	9.3%	14.0	41,756

The summary results for each site individually are as follows:

Site Name	System size (kWp)	Tariff Modelled:	Risk Factor Applied to Tenants (%)	Capital Costs incl. Battery (£)	PV specific Investment cost (£kWp)	ROI (Target 8.2%)	Payback (yrs)	NPV (£)	Comparison to Target Revenue Return (Income) / Expense	RAG - (Confidence: consumption profile & spill)
[redacted]										
Trinity Road	158	Council (Mid)	0%	209,782	✓ 739	✓ 10.1%	✗ 13.0	✓ 79,000	✓ -£3,888	High

- Green ticks, yellow exclamation marks and red crosses are simply visual prompts for discussion, and represent indicative threshold levels within the modelled variables.

COTSWOLD DISTRICT COUNCIL

- The financial modelling assumes a project life of 20 years (it should be noted that solar panels are generally reckoned to have a useful life of 25-30 years). Replacement of inverters (that convert solar direct current electricity into mains alternating current) is assumed at 10 year intervals, and batteries (where relevant) at 20 year intervals.
- 'PV system size' is the size of the solar array measured in kiloWatts(peak) (kWp). For reference one kWp represents approximately 2.5 panels, or about 5 square metres area.

[redacted]

- For installation at Trinity Road, 'Tariff' relates to the avoided cost of purchased electricity, which is known approximately for the first year of operation (to the end of the current electricity supply contract) estimated to be 43p/kWh next year, and thereafter is assumed to follow the 'best guess' estimate of future electricity prices provided by an external professional consultancy firm.
- 'Tenant risk factor' is applied where some uncertainty exists over the volume of electricity a tenant is likely to consume, or where there may be other risks to project revenue, such as tenancy voids.
- 'Capital costs' are the full capital costs of all works at each site, as quoted by the winning tenderer. These capital costs are inclusive of any electricity storage battery, if the site is appropriate and if a battery is proposed by the tenderer.
- 'PV specific investment cost' is the overall project cost for the PV-only element (ie, ignoring any battery cost), divided by the size of the solar installation, presented as £ per kWp. This is an industry standard way of looking at installation cost, and can vary quite widely between sites depending on a number of factors including type of panels and inverter, installation size, the complexity of roof layouts, type of mounting system, ease of access and scaffolding, etc.
- 'Return on Investment (RoI)' is the overall % return on the capital cost over the project life. 8.2% target RoI is an indicative minimum level of return that Council finance officers have suggested projects should seek to achieve.
- 'Payback' is the simple payback period - i.e. the length of time in years it will take for the projected revenues to equal the original capital cost.
- 'NPV' is the Net Present Value of all the costs and revenues over the whole project life, with the value of future costs and revenues discounted by a factor taken from Treasury Green Book guidance. NPV is a way of presenting the value of a project that recognises that the value (or usefulness) of £1 in the hand today is greater than the usefulness of a promise of £1 in the future.

- ‘Comparison to Target Revenue’ Return shows whether the project generates more (in red text) annual revenue (on average) than the amount needed to meet the Council’s target return on investment, or less annual revenue (in black text).
- ‘Confidence level on consumption and spill’ is a subjective judgement, based on engagement with tenants, and access to and quality / completeness of electricity consumption data, which indicates the (current) level of confidence in the assumptions regarding how much solar generated electricity will be consumed on site (and therefore generate revenue for the Council), and how much may be ‘spilled’ back to the electricity grid (where for the tenanted property we have assumed no revenue in order to be conservative in this modelling, and for Trinity Road we have assumed 5p/kWh). ‘High’ confidence would indicate that detailed site consumption data (half-hourly data points for at least one year) has been available, and has been used by the proposed installer to demonstrate how much electricity will be consumed, per half hour, in a typical year. ‘Low’ confidence would indicate that the site consumption data is limited, and may comprise, eg, a single value for annual electricity consumption, meaning the estimate of likely on-site consumption will have higher uncertainty.

Use of the Cotswold Climate Investment

The financial model demonstrates the use of part of the £0.5m capital raised from the public to fully fund the PV / battery installations, through the Cotswold Climate Investment (CCI). Using this capital for this project is beneficial since the rate of interest paid to investors is relatively modest (2.1%) compared to the current rate at which councils may borrow from the Public Works Loan Board.

A particular characteristic of this financing should be noted. The CCI is a 5 year annuity investment, meaning that investors are paid back both principal and interest over the 5 years. The CCI has a further 4 years to run, and by the end of the four year period, investors will be completely repaid. This means that the repayment of the loan is higher than project income in the early years, which is shown in the cash flow graphs below, but from year 5 onwards the scheme is strongly cash generative. Therefore, whilst the overall project has a good return on investment, the payback periods are relatively long.

Individual site business case summaries are provided below:

COTSWOLD DISTRICT COUNCIL

Trinity Road - Solar Energy Storage - Financial Pro Forma & Benefit/

Inputs required		
	Demand +/-:	0%
	Select Tariff:	Council (Mid)
	Risk Factor +/-:	0%

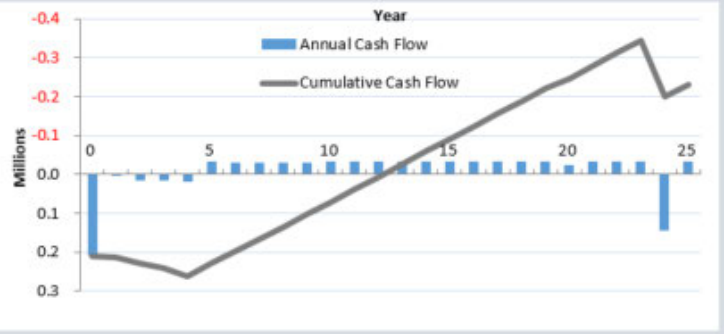
A. Model Inputs

Category	Item	Value	Unit
System Summary	PV System Size	158	kWp
	Storage System Size	89.6	kWh
	Storage System Size	0	N/A
Costs	PV System Cost	£202,726	
	Inverter	£7,056	
Grant Funding	Utility Incentives	£0	
Financing	Financing	Yes	"Yes"/"No"
	% Financed	100%	Grant/Internal funds utilised
	Term	20	
Certainty	Rate	4.0%	Over 19½ not over 20
PV Specs	Annual PV Production (yr 1)	134,942	kWh
	Annual PV Degradation Rate	0.5%	%
	PV Spill to grid	16.8%	%
Retail Billing	Tenant consumption rate	£0.43	£/kWh
Details	Grid export rate	£0.08	£/kWh
	Energy inflation	3.0%	%
Add'l Storage	Storage roundtrip efficiency	0.0%	
Specs	Storage useful life	0	N/A
Operating Costs	PV O&M costs	£0	£/kW
	Other costs	£0	PM Resource CDC
	O+M cost escalator	2.5%	%/yr
	Inverter as % of installed cost	3.4%	%
	Inverter life	20	yrs
	Inverter cost reduction	0.0%	Cost reduction of technology
Depreciation	Depreciation method	None	"None", "Straight Line"
	Depreciation basis	£209,782	
VAT Rate	VAT applicable?	5.0%	
	VAT-able?	Yes	"Yes"/"No"
Discount Rate	Discount rate for NPV calc.	3.5%	%

B. Model Outputs

Category	Item	Value	Unit
Direct Financial Benefits and Costs (from financial pro-forma model at right)			
Direct	**IRR**	**6.1%**	Rate where NPV = zero
Direct	**ROI**	**10.1%**	Total growth, Yield on capital invested.
Financial	**Simple Payback Years**	**13**	Years
Metrics	**NPV**	**£79,000**	Value of investment over period.
	Benefit/Cost Ratio	**0.4**	>1 = Good investment

Annual and Cumulative Cash Flows



Annual avoided emissions impacts:			
Average avoided monthly kWh		11,245	kWh/month
	Nitrogen Oxides	185	kg/yr
	Methane	88	kg/yr
	Carbon Dioxide	34,132	kg/yr
Annual avoided emissions equivalencies:			
Avoided	CO^2 avoidance	84,486	average passenger vehicle miles
emissions	CO^2 emissions	4.2	average home's annual electricity use
equivalencies	Carbon sequestered by	1,551	tree seedlings grown for 10 years

COTSWOLD
DISTRICT COUNCIL