



Underwater solar panels in Aotearoa New Zealand: An economic analysis Supplementary Material

Debt sizing

Silicon solar cells	PSC	Gainp	Gainp late scenario
10,0 MW	10,0 MW	10,0 MW	10,0 MW
20,0% %	39,4% %	52,5% %	52,5% %
\$10,70 per KW-Year	\$14,00 per KW-Year	\$83,25 per KW-Year	\$23,40 per KW-Year
\$80,00 per MWh	\$80,00 per MWh	\$80,00 per MWh	\$80,00 per MWh
2,0% %	2,0% %	2,0% %	2,0% %
2,0% %	2,0% %	2,0% %	2,0% %
1,30x Ratio	1,30x Ratio	1,30x Ratio	1,30x Ratio
8,0% %	8,0% %	8,0% %	8,0% %
8 760 Hours	8 760 Hours	8 760 Hours	8 760 Hours
1 000 NZD	1 000 NZD	1 000 NZD	1 000 NZD
\$2 140,00 per KW	\$2 800,00 per KW	\$16 650,00 per KW	\$4 680,00 per KW
21 400,000 NZD 000	28 000,000 Hours	166 500,000 NZD 000	46 800,000 NZD 000
9%	9%	9%	9%
114,61 \$/MWh	76,12 \$/MWh	339,69 \$/MWh	95,48 \$/MWh

OSC	Cdte	Counterfactual : LPV farm
10,0 MW	10,0 MW	10,0 kW
23,1% %	21,6% %	20,0% %
\$19,35 per KW-Year	\$13,10 per KW-Year	\$1,50 per KW-Year
\$80,00 per MWh	\$80,00 per MWh	\$80,00 per MWh
2,0% %	2,0% %	2,0% %
2,0% %	2,0% %	2,0% %
1,30x Ratio	1,30x Ratio	1,30x Ratio
8,0% %	8,0% %	8,0% %
8 760 Hours	8 760 Hours	8 760 Hours
1 000 NZD	1 000 NZD	1 000 NZD
\$3 870,00 per KW	\$2 620,00 per KW	\$1 980,00 per KW
38 700,000 NZD 000	26 200,000 NZD 000	19 800,000 NZD 000
9%	9%	9%
179,44 \$/MWh	129,92 \$/MWh	101,24 \$/MWh

Parameters used for each material evaluated for the debt sizing

Sponsor Returns with First-lien Debt Only										
Pro Forma										
Period	0	1	2	3	26	27	28	29	30	
Degradation factor		2,50%	0,60%	0,60%	0,60%	0,60%	0,60%	0,60%	0,60%	
Electricity Production		17 520	17 520	17 520	17 520	17 520	17 520	17 520	17 520	
Actual electricity production		17082,00	16979,51	16877,63	14695,97	14607,80	14520,15	14433,03	14346,43	
PPA Escalation Factor		1,00	1,02	1,04	1,64	1,67	1,71	1,74	1,78	
Inflation Factor		1,00	1,02	1,04	1,64	1,67	1,71	1,74	1,78	
PPA Rate		\$80,00	\$81,60	\$83,23	\$131,25	\$133,87	\$136,55	\$139,28	\$142,07	
Electricity Revenue		1 367	1 386	1 405	1 929	1 956	1 983	2 010	2 038	
Plus : Cow farming		-	-	-	-	-	-	-	-	
Less : Operating Expense		(107)	(109)	(111)	(176)	(179)	(183)	(186)	(190)	
EBITDA		1 260	1 276	1 293	1 753	1 777	1 800	1 824	1 848	
Cash Flow Available for Debt Service (CFADS)		1 260	1 276	1 293	1 753	1 777	1 800	1 824	1 848	
Mandatory Debt Service (Sizing) - P50		969	982	995	1 623	1 645	1 667	1 689	1 712	
Mandatory Debt Service (Sizing) - P99		576	584	591	789	799	809	819	829	
Mandatory Debt Service (Sizing) - Minimum		576	584	591	789	799	809	819	829	
Beginning Principal		7 319	7 328	7 331	3 223	2 692	2 109	1 469	768	
Less: Interest Expense		(585)	(586)	(586)	(258)	(215)	(169)	(118)	(61)	
Less: Amortization		9	3	(5)	(531)	(583)	(640)	(701)	(768)	
Ending Principal		7 319	7 328	7 331	2 692	2 109	1 469	768	(0)	
Total Debt Service		576	584	591	789	799	809	819	829	
Actual DSCR		2,19x	2,19x	2,19x	2,22x	2,22x	2,23x	2,23x	2,23x	
Equity Cash Flows	(14 081)	683	693	702	964	978	991	1 005	1 019	
Cumulative Equity Cash Flows	(14 081)	(13 398)	(12 705)	(12 003)	5 640	6 617	7 609	8 614	9 633	
Breakeven Year Calculation	-100,00%	-95,15%	-75,26%	-56,89%	2,49%	2,76%	3,00%	3,22%	3,42%	
Pre-Tax Equity IRR	3,42%									
Equity Breakeven Period	19,95	years								
Equity MOIC	1,68x									
Debt WAL	23,15	years								
Equity / debt ratio	192%									



Sponsor returns with first-lien debt only for the silicon solar cells

Sensitivity analysis

LPV		Silicon		PSC		CdTe		GaInP		OSC	
Capex +/- 5%											
Change	LCOE	Variation	LCOE	Variation	LCOE	Variation	LCOE	Variation	LCOE	Variation	LCOE
0%	101,2433	0%	114,607	0%	76,118	0%	129,919	0%	339,688	0%	179,442
-5%	96,22397	-5%	108,876	-5%	73,2092	-5%	124,613	-5%	337,505	-5%	174,481
5%	106,2627	5%	120,337	5%	79,0268	5%	135,225	5%	341,871	5%	184,404
Efficiency +/- 5%											
Change	LCOE	Variation	LCOE	Variation	LCOE	Variation	LCOE	Variation	LCOE	Variation	LCOE
0%	101,2433	0%	114,607	0%	76,118	0%	129,919	0%	339,688	0%	179,442
-5%	106,5719	-5%	120,638	-5%	80,1242	-5%	136,757	-5%	357,567	-5%	188,887
5%	96,42222	5%	109,149	5%	72,4934	5%	123,733	5%	323,513	5%	170,897