
Undertaking U-13:

To provide a spreadsheet showing the positive rate of return calculated for CEDIF investors.

Response U-13:

See workbook "Undertaking U-13.xlsx". This spreadsheet contains two examples, on separate sheets. Both examples are based on a 1.5 MW turbine, as used in Synapse's computations, rather than the 2 MW turbine Mr. Livingston assumes. A 2 MW turbine would probably have somewhat lower capital costs per kW than Synapse's 1.5 MW turbine, even though Mr. Livingston assumes that the capital cost of his 2 MW turbine without reserves would be the same as Synapse estimate with reserves.

Wherever Mr. Livingston specified an input (capital costs, operating costs, reserves, funding of reserves, cost of outside equity), the spreadsheet uses 75% of Mr. Livingston's input. For inputs not specified by Mr. Livingston (tax depreciation, income tax rate), the spreadsheet uses Synapse's values, scaled as necessary to the costs specified by Mr. Livingston. The 20% income tax rate is roughly the average tax rate in the Synapse model; the actual tax rate varies with income.

One example assumes (as Mr. Livingston does) that the CEDIF can raise $1 million, and the other assumes (also consistent with another interpretation of Mr. Livingston's exhibit) that the CEDIF can only raise half the equity required for the project. Since Mr. Livingston seemed to deny in the hearing that his exhibit represented a situation with 50% of the equity supplied by an outside high-cost investor, it is difficult to be sure which example better represents his thinking.

The spreadsheets thus accept Mr. Livingston's estimates of the inputs, and simply correct the errors in the analysis structure: his assumption that reserves must be amortized over the life of the debt, his failure to reflect taxes on the project, and his failure to reflect tax credits to CEDIF investors.

If the CEDIF can raise $1 million for the project, as Mr. Livingston assumes, the internal rate of return to the CEDIF, after paying the outside investor a 20% return, would be 8.2%. Including the tax credits on their personal returns, the CEDIF investors would see a return of 18.2%, of which only the 8.2% would be taxable for provincial purposes.

If the CEDIF can only raise 50% of the project equity, the internal rate of return would be about 2% to the CEDIF and 9% for investors, with only 2% fully taxable. This return may not be adequate, but it is the result of much more pessimistic assumptions than Synapse's, including higher capital costs, tripled reserve costs, six-fold higher O&M, and a large amount of outside financing at 20%.

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Inputs

	Synapse	Livingston	Used in Example	
Capacity	1.5	2	1.5	MW
Capacity Factor	31%	31%	31%	
Energy	4,073.4	5,431.2	4,073.4	MWh
Rate	$142.1	$142.1	$142.1	/MWh
Reserves	$177,919	$700,000	$525,000	
Reserve rate		8%	8%	
Debt Rate	8%	8%	8%	
Debt (excluding reserves)	$1,711,081	$3,000,000	$2,250,000	
Debt Payments	$114,072	$350,489	$262,866	
O&M, property tax, etc.	$17,671	$149,500	$112,125	
$/kW excluding reserves	$2,401	$2,500	$2,500	
Project Cost Exc reserves	$3,601,640	$5,000,000	$3,750,000	
Total Equity	$1,890,559	$2,000,000	$1,500,000	
CEDIF Equity	-	$1,000,000	$1,000,000	
External Equity	-	$1,000,000	$500,000	
External Equity Rate	-	20%	20%	
External Equity Payment	-	$200,000	$100,000	
Depreciable Plant	$2,436,750	not specified	$2,537,125	
Income Tax Rate	20%	not specified	20%	

Cash Flows

									outside	Cash Flows			from Synapse App J
	Revenue	debt	reserve	O&M	taxable inc	taxes	tax depr	net	equity payment	CEDIF	Tax Credit	Investor	tax dep
										($1,000,000)	$350,000	($650,000)	
1	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$126,856	$256,327	$100,000	$156,327		$156,327	($609,188)
2	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$190,284	$319,755	$100,000	$219,755		$219,755	($913,781)
3	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$95,142	$224,613	$100,000	$124,613		$124,613	($456,891)
4	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$47,571	$177,042	$100,000	$77,042		$77,042	($228,445)
5	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$23,786	$153,256	$100,000	$53,256		$53,256	($114,223)
6	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$11,893	$141,364	$100,000	$41,364	$200,000	$241,364	($57,111)
7	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$5,946	$135,417	$100,000	$35,417		$35,417	($28,556)
8	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$2,973	$132,444	$100,000	$32,444		$32,444	($14,278)
9	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$1,487	$130,958	$100,000	$30,958		$30,958	($7,139)
10	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$743	$130,214	$100,000	$30,214		$30,214	($3,569)
11	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$372	$129,843	$100,000	$29,843	$100,000	$129,843	($1,785)
12	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$186	$129,657	$100,000	$29,657		$29,657	($892)
13	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$93	$129,564	$100,000	$29,564		$29,564	($446)
14	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$46	$129,517	$100,000	$29,517		$29,517	($223)
15	$578,830	($262,866)	($42,000)	($112,125)	$161,839	($32,368)	$23	$129,494	$100,000	$29,494		$29,494	($112)
16	$578,830			($112,125)	$466,705	($93,341)	$12	$373,376	$100,000	$273,376		$273,376	($56)
17	$578,830			($112,125)	$466,705	($93,341)	$6	$373,370	$100,000	$273,370		$273,370	($28)
18	$578,830			($112,125)	$466,705	($93,341)	$3	$373,367	$100,000	$273,367		$273,367	($14)
19	$578,830			($112,125)	$466,705	($93,341)	$1	$373,366	$100,000	$273,366		$273,366	($7)
20	$578,830			($112,125)	$466,705	($93,341)	$1	$373,365	$100,000	$273,365		$273,365	($3)
									IRR	8.2%		18.2%	