

A More Realistic Project Valuation



Let's build something you can really use!

Step 6: Calculate the Cash Flow from Operations...

$$\text{Cash Flows from Operations} = \text{EBIT} + \text{Depreciation} - \text{Taxes}$$

*Operating
Income*



*Add Back Depreciation
(a non-cash expense)*

*Taxes
Paid*

	Year							
	1	2	3	4	5	6	7	8
Operating Income (EBIT):	-\$19,320	\$79,080	\$285,080	\$250,080	\$278,560	\$208,640	\$138,560	\$104,320
+ Depreciation Expense	\$114,320	\$195,920	\$139,920	\$99,920	\$71,440	\$71,360	\$71,440	\$35,680
- Taxes (@ 21%)	-\$4,057	\$16,607	\$59,867	\$52,517	\$58,498	\$43,814	\$29,098	\$21,907
Cash Flows from Operations	\$99,057	\$258,393	\$365,133	\$297,483	\$291,502	\$236,186	\$180,902	\$118,093

Step 7: Consider the Change in Net Working Capital...

The Change in Net Working Capital...

$$\Delta \text{NWC} = \text{NWC (End of Year)} - \text{NWC (End of Previous Year)}$$

Recall:

an increase in NWC requires cash = cash outflow!

a decrease in NWC generates cash = cash inflow!

$$\text{Cash Flow} = - \Delta \text{NWC}$$

Inventory (Initial): \$20,000

Inventory (thereafter): 15% of sales

Step 7: Consider the Change in Net Working Capital...

	Year								
	0	1	2	3	4	5	6	7	8
Revenues:		\$450,000	\$750,000	\$900,000	\$845,000	\$780,000	\$650,000	\$520,000	\$390,000
NWC (15% of Revenues)	\$20,000	\$67,500	\$112,500	\$135,000	\$126,750	\$117,000	\$97,500	\$78,000	\$58,500
Δ NWC	\$20,000	\$47,500	\$45,000	\$22,500	-\$8,250	-\$9,750	-\$19,500	-\$19,500	-\$19,500
Cash Flows from Δ NWC	-\$20,000	-\$47,500	-\$45,000	-\$22,500	\$8,250	\$9,750	\$19,500	\$19,500	\$19,500

During Year 1, you add \$47,500 in inventory, giving you an EoY Inventory Value = \$67,500.

To do this, you had to spend \$47,500...therefore you have a cash outflow of \$47,00 during Year 1.

Step 7: Consider the Change in Net Working Capital...

	Year								
	0	1	2	3	4	5	6	7	8
Revenues:		\$450,000	\$750,000	\$900,000	\$845,000	\$780,000	\$650,000	\$520,000	\$390,000
NWC (15% of Revenues)	\$20,000	\$67,500	\$112,500	\$135,000	\$126,750	\$117,000	\$97,500	\$78,000	\$58,500
Δ NWC	\$20,000	\$47,500	\$45,000	\$22,500	-\$8,250	-\$9,750	-\$19,500	-\$19,500	-\$19,500
Cash Flows from Δ NWC	-\$20,000	-\$47,500	-\$45,000	-\$22,500	\$8,250	\$9,750	\$19,500	\$19,500	\$19,500

Notice that at the end of the project, we have \$58,500 left in inventory, which we will likely sell.

The Δ NWC is reduced another \$58,500, adding another \$58,500 in positive cash flow.

"NWC Recovery"

Step 7: Consider the Change in Net Working Capital...

	Year								
	0	1	2	3	4	5	6	7	8
Revenues:		\$450,000	\$750,000	\$900,000	\$845,000	\$780,000	\$650,000	\$520,000	\$390,000
NWC (15% of Revenues)	\$20,000	\$67,500	\$112,500	\$135,000	\$126,750	\$117,000	\$97,500	\$78,000	\$58,500
NWC Recovery									\$58,500
Δ NWC	\$20,000	\$47,500	\$45,000	\$22,500	-\$8,250	-\$9,750	-\$19,500	-\$19,500	-\$78,000
Cash Flows from Δ NWC	-\$20,000	-\$47,500	-\$45,000	-\$22,500	\$8,250	\$9,750	\$19,500	\$19,500	\$78,000

Almost there...

- Cash flows from Operations – Check!
- Cash flows from Changes in Net Working Capital - Check!
- Now the easy part...

Step 9: Consider the CAPEX...

We have only two things to think about with our equipment investment:

1. It's initial cost at time = 0
2. It's salvage value at time = 8 years

#1 is easy – it cost \$800,000 when we bought it at the beginning of the project.

#2 is almost as easy – its salvage value is estimated to be 20% of the original cost, or \$160,000 at the end of the 8th year.

One last twist...

Step 9: Consider the CAPEX...

At the end of 8 years, the “Book Value” of the equipment is \$0.

Yet we plan on selling it for \$160,000

Recall, the IRS loves it when you make money on assets when you sell them: you have to pay tax on the difference between what you sold it for and the book value. (Depreciation Recapture!)

How much do we actually end up with from the sale?

$$\begin{aligned}\text{After Tax Cash Flow from Sale} &= \$160,000 (1 - 0.21) \\ &= \$126,400\end{aligned}$$

Step 10: Determine the Cash Flows from CAPEX...

	Year								
	0	1	2	3	4	5	6	7	8
Equipment Cash Outlay	-\$800,000								
After Tax Salvage Value									+\$126,400
Cash flow from CAPEX	-\$800,000								+\$126,400

The last step is to put it all together...

Step 11: Put it all together – The Cash Flow Statement...

	Year								
	0	1	2	3	4	5	6	7	8
Cash Flow from Operations		\$99,057	\$258,393	\$365,133	\$297,483	\$291,502	\$236,186	\$180,902	\$118,093
Cash Flow from Δ NWC	-\$20,000	-\$47,500	-\$45,000	-\$22,500	\$8,250	\$9,750	\$19,500	\$19,500	\$78,000
Cash flow from CAPEX	-\$800,000								\$126,400
Total Cash Flow	-\$820,000	\$51,557	\$213,393	\$342,633	\$305,733	\$301,252	\$255,686	\$200,402	\$322,493

Now we have everything we need to determine the NPV, IRR and the Payback Period!

Step 12: Perform your Project Valuation...

Thin-Film Solar PV Project Valuation

Finally, we determined this project is quite a good one!

	A	B	C	D	E	F	G	project is quite a good one!		
1	Thin-Film Solar PV Example									
2										
3	Discount rate:	15%								
4										
5		Year								
6		0	1	2	3	4	5	6	7	8
7	Cash Flows from Operations	\$0	\$99,057	\$258,393	\$365,133	\$297,483	\$291,502	\$236,186	\$180,902	\$118,093
8	Cash Flows from ΔNWC	-\$20,000	-\$47,500	-\$45,000	-\$22,500	\$8,250	\$9,750	\$19,500	\$19,500	\$78,000
9	Cash Flows from CAPEX	-\$800,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$126,400
10	Total Project Cash Flow:	-\$820,000	\$51,557	\$213,393	\$342,633	\$305,733	\$301,252	\$255,686	\$200,402	\$322,493
11										
12	Cumulative Cash Flows:	-\$820,000	-\$768,443	-\$555,050	-\$212,416	\$93,317	\$394,569	\$650,255	\$850,657	\$1,173,150
13										
14	PV (Year 1-8):	\$1,047,357	=NPV(B3,C10:J10)							
15	Initial Investment:	\$820,000	=B10							
16	NPV:	\$227,357	=B14-B15							
17	IRR:	21.9%	=IRR(B10:J10)							
18	Payback Period (years):	3.69	=3 + (-E12 / F10)							

Time for a Celebration!



Main Takeaways...

Project valuation begins with the project's Cash Flow Statement, which contains three components:

1. Create the Pro Forma Income Statement, then determine the After-Tax Cash Flows from Operations.
2. Evaluate how NWC changes from one year to the next, keeping the signs straight (the hardest part!). Don't forget NWC Recovery. Determine the Cash Flows from Δ NWC.
3. Determine the Cash Flows from Capital Spending, the CAPEX and any salvage value (and associated tax implications).

Then calculate the project's Net Present Value, Internal Rate of Return, and Payback Period.

While it seems cumbersome, once you do this a few times you'll have the spreadsheets set up and be able to do them in your sleep!

Next Time...

The Final Course in Finance for Technical Managers



Financial Forecasting and Reporting

Credits & References

Slide 1: Making a plan by allvision, Adobe Stock (197977054.jpeg).

Slide 12: Group of creative designer dancing in office with relax feeling and glad about good success news of project at modern office, by weedezn, Adobe Stock (295738852.jpeg).

Slide 14: Business composition. Financial analysis - income statement, business plan by Leonid, Adobe Stock (284925719.jpeg).