VALUING A PROJECT

PUE | LINK
SAVING ENERGY AND MAXIMIZING CAPACITY

A PUELink Special Training Module

Future Value

- Future Value is the value of a cash flow in the future
  - To calculate Future Value, you must make a projection
  - The Future Value should include escalators expected, such as inflation (CPI), commodity cost increases if known (energy cost), and other factors (industry competition reduces price by 3% / year, etc)

Time Value of Money

- You borrow money from the bank and buy a home
  - Borrow $300,000
  - Pay $450,000 back to the bank over the life of the loan
  - A dollar today is worth more than a dollar in the future

- A business issues a bond
  - They pay interest payments, bi-annually, of $500 on a $10,000 bond
  - When the bond reaches maturity, the $10,000 is repaid
  - The $500 bi-annual payments are the time value of money, also known as cost of capital (well mention this again later)

Present Value

- Present Value is the discounted value, in today's dollars, of a future cash flow
- To determine the Present Value of a Future Cash Flow, discount it by the discount rate (cost of capital / time value of money)

$$PV = \frac{C}{(1+i)^n}$$

- C = Future Value
- PV = Present Value
- I = Discount Rate
- n = Number of Periods (years, days, months, etc)

Discount a Cash Flow

Discount a $5000 future cash flow, 5 years away, with a 10% discount rate

$$PV = \frac{C}{(1+i)^n}$$

PV = $5000/(1+.10)^5

PV = $5000/(1.1)^5

PV = $5000 / 1.61

PV = $3106

If you can buy a future cash flow of $5000 for less than its present value of $3106 (based on your personal discount rate), you should do this. It will increase your value.

Net Present Value

Net Present Value

The sum of the period 0 values (the check you write today, for example) and the Present Value of all Future Cash Flows

	Project First Cost	$ 100,000.00									
	Project Rebate	$ 45,000.00									
	Estimated First Year Maintenance Savings	$ 3,500.00									
	Project Annual Savings	$ 37,000.00									
	Any additional annual savings or costs	$ (200.00)									
	Project Lifespan (10 or 15 years)	10									
Cash flows											
	Year	-	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
Outflow	CapEx	(100.00)										
Inflow	Rebates (Cash Inflow)		45.00									
	Maintenance Savings		3.50	3.59	3.68	3.77	3.86	3.96	4.06	4.16	4.26	4.37
	Additional Savings or costs		(0.20)	(0.21)	(0.21)	(0.22)	(0.22)	(0.23)	(0.23)	(0.24)	(0.24)	(0.25)
	Energy savings (Reduction in Cash Outflow)		37.00	37.93	38.87	39.84	40.84	41.86	42.91	43.98	45.08	46.21
	Net	(100.00)	85.30	41.31	42.34	43.40	44.48	45.60	46.74	47.90	49.10	50.33

Inflation Rate	3%	Assumption based on ten year treasury note
Discount Rate	10%	Assumption based on input from corporate finance on average cost of capital
NPV (in thousands)	$213	Calculation based on assumptions
IRR	58%	Calculation representing how much this project pays you back each year
Profitability Index	313%	Calculation useful among choosing projects which add the most value per dollar spend
NPV to first cost ratio	2.13	
Hurtle Rate for low risk projects	12%	Typical value for a minimum IRR for projects with low risk
Is project acceptable?	Yes	Pass fail test of IRR > Hurtle Rate

Net Present Value

- What is it good for?
  - If a project or investment has a positive Net Present Value, you should do it
  - In a world where you have a fixed budget (you cannot borrow more money), you should try to maximize Net Present Value
  - Choose products with a high Profitability Index, or the combination of projects that fit your budget with the highest Net Present Value
  - High Profitability Index means the project generates high Net Present Value relative to the capital you must deploy (most bang for buck)

Internal Rate of Return

- Internal Rate or Return (IRR) demonstrates project value as an percentage
  - Many have been predispositioned to understand Percentages
  - IRR tells you, as a percentage, how much the project pays you back per period
  - Think of this the same as a stock return
    - My Google stock made 20% last year!
    - You took the initial value, added 20%, and now have 120% of your starting value

Profitability Index

- Profitability Index compares the future value of cash flows to the cost (time 0 cash flows)
- PI = PV of future cash flows / First Cost
- Higher is better