

Wind Turbine

Blue cells with borders indicate input data. Other cells are plain text or the results of formulas.

Initial Data

Variable	Value	Name or Formula
Capacity, kW	1,000	cap
Capital cost, \$/kW	1,000	costkw
Useful life, years	20	life
Maintenance cost, \$	20,000	maint
Interest rate	15%	intrate
Electricity price, \$/kWh	0.07	price

Intermediate Calculations

Construction cost, \$	1,000,000	capcost = cap*costkw
Hours per year	8,760	hours = 365*24

Revenue Scenarios

	Low	Middle	High	
Capacity factor, %	20%	25%	30%	capfac
Effective capacity, kW	200	250	300	effcap = cap*capfac
Generation, kWh per year	1,752,000	2,190,000	2,628,000	kwh = effcap*hours
Annual revenue, \$	122,640	153,300	183,960	rev = kwh*price

Annual Operating Profit

Revenue, \$	122,640	153,300	183,960	= rev
Maintenance cost, \$	20,000	20,000	20,000	= maint
Profit, \$	102,640	133,300	163,960	= rev - maint

Cash Flows Under Each Scenario

Year	Low	Middle	High	
0	-1,000,000	-1,000,000	-1,000,000	= capcost
1	102,640	133,300	163,960	= annual profit
2	102,640	133,300	163,960	
3	102,640	133,300	163,960	
4	102,640	133,300	163,960	
5	102,640	133,300	163,960	
6	102,640	133,300	163,960	
7	102,640	133,300	163,960	
8	102,640	133,300	163,960	
9	102,640	133,300	163,960	
10	102,640	133,300	163,960	
11	102,640	133,300	163,960	
12	102,640	133,300	163,960	
13	102,640	133,300	163,960	
14	102,640	133,300	163,960	
15	102,640	133,300	163,960	
16	102,640	133,300	163,960	
17	102,640	133,300	163,960	
18	102,640	133,300	163,960	
19	102,640	133,300	163,960	
20	102,640	133,300	163,960	

Present Values of Each Payment

Year	Low	Middle	High	
0	-1,000,000	-1,000,000	-1,000,000	= payment/(1+intrate)^year
1	89,252	115,913	142,574	
2	77,611	100,794	123,977	
3	67,487	87,647	107,806	
4	58,685	76,215	93,745	
5	51,030	66,274	81,517	
6	44,374	57,629	70,884	
7	38,586	50,112	61,639	
8	33,553	43,576	53,599	
9	29,177	37,892	46,608	
10	25,371	32,950	40,528	
11	22,062	28,652	35,242	
12	19,184	24,915	30,645	
13	16,682	21,665	26,648	
14	14,506	18,839	23,172	
15	12,614	16,382	20,150	
16	10,969	14,245	17,522	
17	9,538	12,387	15,236	
18	8,294	10,771	13,249	
19	7,212	9,366	11,521	
20	6,271	8,145	10,018	
NPV, \$	-357,542	-165,631	26,280	= sum of above
Conclusion	unprofitable	unprofitable	profitable	