

# [Finicial evaluation of techologies](https://assignbuster.com/finicial-evaluation-of-techologies/)

Analysis of two energy proposals Two electri supply technologies have the following characteristics:   Capital cost Annual operating cost Lifetime (years)   
Salvage value (/cost) ($)   
Annual electricity supplied (kWh)   
Technology A (a sustainable energy option)   
20 000   
500   
20   
2000   
25 000   
Technology B (a fossil fuel option)   
10 000   
3000   
10   
-2000   
25 000   
1. Calculate the simple payback period for technology A relative to technology B.   
Would a company that sets a two year maximum payback period for new investments spend the extra capital on technology A?   
Project A   
Project B   
Initial Investment   
$20, 000   
$10, 000   
Annual electricity supplied   
$ 6, 000   
$ 6, 000   
Less: Maintenance cost   
500   
3, 000   
Net annual benefit   
5, 500   
$ 3, 000   
Payback period   
3. 63 years   
3. 3 years   
\*Assume that the cost of electricity per kwh is 12cents –(In US)   
In simple calculations, Proj. B has a shorter time frame of return on investments which is 3. 3 years as compared with 3. 6 years of Proj. A. None of the projects fall within the required 2 years time frame.   
2. Calculate the internal rate of return for the additional investment in A compared to B over the assessment periods:   
a. 5 years   
b. 10 years   
c. 20 years   
Project A   
Initial investment   
Cash flows   
PV 5%   
NPV   
-20, 000   
5 yrs 0. 7815   
30000   
23, 445   
3, 445   
10 yrs. 0. 6139   
60, 000   
92, 085   
72, 085   
15 yrs. 0. 4810   
90, 000   
43, 290   
23, 290   
Project B   
Initial Investment   
Cash Flows   
PV 5%   
NPV   
-10, 000   
5 yrs 0. 7815   
30, 000   
23, 445   
13, 445   
10 yrs 0. 6139   
60, 000   
92, 085   
82, 085   
15 yrs. 0. 4810   
90, 000   
43, 290   
33, 290   
Both projects show positive PV and NPV at 5% rate of return. However TSech B has a higher PV and positive NPV. Between two positsive proposals, one that gives a higher value is acceptable.   
In each case state whether the company would invest the extra capital in technology A if its minimum required real internal rate of return is 10%. (Be careful to take account of all replacements and salvage values during each assessment period. But in the case of a technology that still has a useful lifetime remaining at the end of a period, do not seek to estimate its residual value; that is, only count the salvage value at the end of a lifetime.)   
Project A   
Cash flows   
PV 10%   
0. 6209   
NPV   
Initial cost   
20, 000   
5 YEARS   
30, 000   
Less: Depn.   
5, 000   
Net of cash flows   
25, 000   
15, 522. 5   
-4477. 50   
PROJECT B   
Initial Cost   
10, 000   
5 YEARS   
30, 000   
Less depreciation   
5, 000   
Net of cash flows   
25, 000`   
15, 522. 50   
5, 552. 50   
In both computation, Project B shows a higher positive NPV showing that “ B” is acceptable than “ A”. In this case, company should invest its excess capital to “ B” at 10% rate of return.   
3. Calculate the Present Worth (that is, the Net Present Value [NPV] of total costs) for each of the technologies for the real discount rates and periods of assessment as specified in the following tables (please present results in this format):   
Technology A   
Assessment period   
Discount rate   
  
  
  
(years)   
5%   
10%   
15%   
20%   
5   
0. 7815   
0. 6209   
0. 497   
0. 402   
10   
0. 6139   
0. 3855   
0. 247   
0. 162   
15   
0. 4810   
0. 2394   
0. 123   
0. 065   
20   
0. 3769   
0. 1486   
0. 061   
0. 026   
Technology B   
Assessment period   
Discount rate   
  
  
  
(years)   
5%   
10%   
15%   
20%   
5   
0. 7815   
0. 6209   
0. 497   
0. 402   
10   
0. 6139   
0. 3855   
0. 247   
0. 162   
15   
0. 4810   
0. 2394   
0. 123   
0. 065   
20   
0. 3769   
0. 1486   
0. 061   
0. 026   
Hence fill in the following table saying which technology would be selected for each of the cases on the basis of highest Present Worth (that is, NPV of lowest total cost):   
Project A   
Net Present Value   
Assessment   
Period   
5%   
10%   
15%   
20%   
-20, 000   
5   
3445   
-1, 373   
-5090   
-5090   
10   
17914   
3130   
-5180   
-5180   
15   
23, 290   
1546   
-8980   
-8980   
20   
25, 228   
-2168   
-12680   
-12680   
Project B   
Net Present Value   
Assessment   
Period   
5%   
10%   
15%   
20%   
5   
22445   
17627   
4910   
11060   
10   
26834   
13130   
4820   
8720   
15   
33290   
11545   
1070   
-4150   
20   
35228   
7832   
-2680   
-7000   
At different discount rates and number of years, NPV of Proj. B is higher than A.   
4. Using your answers to question 3, what are the lifecycle costs of both technologies over one lifecycle of technology A at (a) a 5% real discount rate; and (b) a 20% real discount rate. Which technology is preferred on this lifecycle cost basis in each case   
A   
B   
Initial investment   
20, 000   
10, 000   
PV of Operating cost   
3, 769   
4, 860   
Residual value   
2, 000   
0   
Total life cycle cost   
25, 769   
14, 860   
Initial cost of project   
20, 000   
10, 000, 00   
LCC   
5, 769   
4, 860   
Technology A has higher LCC than Tech. B and should be preferred.   
(a) Calculate the average unit cost of the power in present value terms (in cents/kWh) supplied by each technology over a period of 20 years at a discount rate of 5%. Hint: use the answers from question 3 again to find the NPV of total costs for each technology over 20 years and then divide this amount by the total electricity supplied over this period.   
NPV   
kW/h supplied   
Ave. Cost per unit   
Project A   
25, 228   
25, 000   
1. 10   
Project B   
35, 228   
25, 000   
1. 41   
5. Discuss briefly some of points emerging from this analysis of relevance to the financial comparison of sustainable energy supply options (in particular renewable) and current fossil-fuel technologies.   
New technologies are being developed to replace use of fossil fuels used for power generation. Studies about renewable energies are being done by the authorities if its cost will compensate its use against cost of fossil fuels. Fossil fuels like coal and gas are the most commonly used around the world for power generation.   
This study looked at the cost of technology from fossil fuel and that of sustainable energy. A comparison of both presented important points in terms of capital and cost.   
1. In terms of technology, the average cost per kWh is much higher in Technology B which is 1. 41 than 1. 10 of A which means fossil energy will be more costly to produce and will be a higher price to consumer to borne.   
2. Technology B gives a higher NPV than Technology A for the same 20 year period. A high positive value is an acceptable project proposition, and between two proposals, one having a higher value is considered.   
Annex   
1. Payback calculation using simple payback method.   
Payback A   
Payback B   
Initial investment   
20, 000   
10, 000   
Annual electricity supplied   
6, 000   
6, 000   
Less maintenance cost   
500   
3000   
Net annual benefit   
5, 500   
3000   
3. 63 yrs   
3. 3 yrs.   
\*Assume that the cost of electricity per kwh is 12cents –(In US)   
Formula used:   
Capital cost divided by net annual benefit   
2. Discount rate factors solving for PV and NPV   
Technology A   
Assessment period   
Discount rate   
  
  
  
(years)   
5%   
10%   
15%   
20%   
5   
0. 7815   
0. 6209   
0. 497   
0. 402   
10   
0. 6139   
0. 3855   
0. 247   
0. 162   
15   
0. 4810   
0. 2394   
0. 123   
0. 065   
20   
0. 3769   
0. 1486   
0. 061   
0. 026   
Assessment period   
Discount rate   
  
  
  
(years)   
5%   
10%   
15%   
20%   
5   
0. 7815   
0. 6209   
0. 497   
0. 402   
10   
0. 6139   
0. 3855   
0. 247   
0. 162   
15   
0. 4810   
0. 2394   
0. 123   
0. 065   
20   
0. 3769   
0. 1486   
0. 061   
0. 026   
5%   
Tech A   
Cash Flow   
PVFACTOR   
PV   
NPV   
  
20, 000   
  
  
  
  
5 yrs   
  
30, 000   
0. 7815   
23445   
3445   
10   
  
60000   
0. 6319   
37914   
17914   
15   
  
90000   
0. 481   
43290   
23, 290   
20   
  
120000   
. 0. 3769   
45228   
25, 228   
  
  
  
  
  
  
10%   
20000   
30, 000   
0. 6209   
18627   
-1, 373   
5   
  
60000   
0. 3855   
23130   
3130   
10   
  
90000   
0. 2394   
21546   
1546   
15   
  
120000   
0. 1486   
17832   
-2168   
20   
  
  
  
  
  
  
  
  
  
  
  
15%   
  
  
  
  
  
5   
20, 000   
30, 000   
0. 497   
14910   
-5090   
10   
  
60000   
0. 247   
14820   
-5180   
15   
  
90000   
0. 123   
11070%   
-8980   
11070   
20   
  
120, 000   
0. 061   
7320%   
-12680   
7320   
  
  
  
  
  
  
20%   
  
  
  
  
  
  
  
  
  
  
  
5   
  
30000   
0. 402   
4860   
3860   
10   
  
60000   
0. 162   
9720   
8720   
15   
  
90000%   
0. 065   
5850   
4850   
30   
  
120000   
0. 026   
3000   
-7000   
TECHNOLOGY B   
Tech B   
CASH FLOW   
FACTR   
PV   
NPV   
10, 000   
  
5%   
  
  
5   
30, 000   
0. 7815   
23445   
22445   
10   
60000   
0. 6139   
36834   
26834   
15   
90000   
0. 4810   
43290   
33290   
20   
120, 000   
0. 3769   
45228   
35228   
  
  
  
  
  
  
  
10%   
  
  
  
30, 000   
0. 6209   
18627   
17627   
  
60000   
0. 3855   
23130   
13130   
  
90000   
0. 2394   
21546   
11545   
  
120, 000   
0. 1486   
17832   
7832   
  
  
  
  
  
  
  
15%   
  
  
  
30, 000   
0. 497   
14910   
4910   
  
60000   
0. 247   
14820   
4820   
  
90000   
0. 123   
11070   
1070   
  
120, 000   
0. 061   
7320   
-2680   
  
  
  
  
  
  
  
20%   
  
  
  
30, 000   
0. 402   
12060   
11060   
  
60000   
0. 162   
9720   
8720   
  
90000   
0. 065   
5850   
-4150   
  
120, 000   
0. 026   
3000   
-7000