



# Evaluating Proposals Financially

## Introduction

Once a cash flow statement for a proposal in a form suitable for the calculation of profitability has been prepared, proposal evaluation methods which are in very common use can be applied to compare different proposals or evaluate a single proposal. These methods are:

- (a) the payback period method
- (b) the average gross annual rate of return method
- (c) the average net annual rate of return method
- (d) discounted cash flow methods.

Each of these methods has its own particular advantages, but in the case of methods (a) to (c) particularly, they also have significant limitations. Methods (a), (b) and (c) have one serious limitation in common – all three ignore the effect of time and interest rates on the value of money. All three methods assume that the impact of cash outflows occurring early in a project is no greater than outflows of the same value occurring in later years and conversely that inflows received in later years are worth as much as the same inflows received immediately.

This is clearly unrealistic. Because of the tendency for all currencies to depreciate over time, i.e. for their purchasing power to decline, every £1 received today or in the immediate future is worth more in real terms than each £1 received some years in the future. Every £1 of cost incurred early in a project has a greater impact than every £1 of cost deferred to a later date.

The effect of interest *is* incorporated into discounted cash flow methods, which gives these distinct advantages over the first three.

## The payback period method

This is the simplest of all the methods. It is also the one which produces the *least* meaningful results and yet it is by far the most commonly used! All this method does is calculate how long it takes to recover the initial project investment out of the subsequent net cash flows, i.e. how long it takes for a project to recoup the initial capital outlay.

As a simple example, an organization invests £20 000 in a proposal for which the estimate states that the positive net cash flow *each year* (i.e. the excess of cash inflows over cash outflows) will be £5000. So the organization can expect to recover its initial investment in

$$\frac{\text{£}20\,000}{\text{£}5\,000} = 4 \text{ years}$$

It's as easy as that.

Even if the net cash flow varies year by year, it is just as simple to calculate the payback period. Look at this next example which we will call *Proposal A*:

Initial investment (£100 000)	Expected pattern of net cash flows (all positive):
Year 1	£45 000
Year 2	£35 000
Year 3	£20 000
Year 4	£20 000
Year 5	£15 000

It obviously takes exactly three years to recover the initial investment.

There are three important points to be borne in mind when using this method of proposal evaluation:

- 1 The cash flows should be calculated after tax. The reason is that this method is based on the recovery of the project investment out of *net* project income and it is only what is left out of one's income after the tax authorities have taken their share that is available for use.
- 2 Exclude depreciation charges from revenue costs. Again, this is because this method is looking for the complete reimbursement of the total project investment (including capital expenditure on fixed assets). If depreciation costs are included with your proposal's cash outflows, these would be recovered twice over. (See the paper entitled *Depreciation Costs* in this file for a discussion of methods of depreciation.)
- 3 Until the payback point is reached, there is an outstanding (but decreasing) balance of funds being used to finance the investment and therefore incurring financing costs (either real or notional depending where the funds come from). If it is possible to calculate what these financing costs are, they should be included as revenue costs (cash outflows) in the cash flow statement.

The chief advantage in using the payback period method is that it is easy to understand and to calculate.

There are also serious limitations:

- It completely ignores positive net cash flows received after the payback point. (In some proposals these later cash flows are the most significant – for example, investors in the Channel Tunnel project know that it will be many years before cash flows from passenger revenue will start to produce a return on their investment.)
- The method looks *entirely* at cash flow and completely ignores profitability or return on investment.
- The method assumes that all money is of equal value no matter when it is spent or received (though if financing costs are incorporated in a cash flow statement this partly relieves this criticism).
- If a short payback period is required this method will miss many worthwhile longer-term proposals.
- Many organizations use the payback period method by itself and look for payback periods of two, or at the outside three, years. As a result many worthwhile (but longer-term) proposals which would give a high rate of return on investment never get accepted. If you must use this method, then use one of the 'rate of return' methods as *well* to get a second point of view.

## The average gross annual rate of return method

This method concerns itself entirely with profitability and completely ignores the pattern of cash flows and the payback period! This at least brings it into line with the usual object of proposal evaluation.

The method calculates the *average* proceeds (positive net cash flow) *per year* over the life of a project and expresses this average as a percentage return per year on the project investment. This can be demonstrated by looking again at Proposal A to invest £100 000 described above:

The initial project investment (I) = £100 000

The total positive net cash flow (NCF) over the five years of the project life (L) = £135 000

$$\text{Annual average proceeds (AAP)} = \frac{\text{NCF}}{L}$$

$$= \frac{£135\,000}{5}$$

$$\text{AAP} = £27\,000$$

$$\text{Return on initial investment} = \frac{\text{AAP}}{I} = \frac{27\,000}{100\,000} \times 100 = 27\%$$

In comparing proposals we may find that the payback period and the annual rate of return methods give us completely opposite results, hence the recommendation never to use either of these methods alone. Use both and then decide what is your main objective – is it quick payback or high rate of return in the longer term?

Having arrived at the average gross annual rate of return for a proposal, compare that rate with the financing cost rate which you believe you will have to pay on the funds needed to finance the proposal. If the rate of return exceeds the financing cost rate, go ahead. If it does not, either try to find a cheaper source of finance or refrain from implementing the proposal.

With this method you could, if you wished, include depreciation costs on fixed assets as cash outflows in the cash flow statement, but the normal way to allow for the writing-off of fixed asset values is to use instead the average net annual rate of return method described below.

## The average net annual rate of return method

This is no more than a variation of the average gross annual rate of return method but it assumes full recovery of the whole proposal investment (including fixed asset costs) out of net cash flows *before* calculating the rate of return on the investment. Because of this, the average annual rate of return is expressed as a percentage of the *average* capital employed instead of as a percentage of the original investment.

This can be illustrated using two examples:

### *Proposal A*

Initial proposal investment = £100 000

Total positive net cash flow over life of proposal (five years) = £135 000

*Surplus* total net cash flow (NCF) after recovery of initial investment = £35 000

Average net cash flow (ANCF) per year (over five years)

$$\begin{aligned} &= \frac{\text{NCF}}{L} \\ &= \frac{\text{£35 000}}{5} = \text{£7 000} \end{aligned}$$

This is then divided by the average capital employed (ACE) which in this case is calculated on the basis of an initial outlay of £100 000 and a final outlay of zero, i.e. ACE = £50 000.

Average *net* annual rate of return =

$$\begin{aligned} \text{ANCF} &= \text{£7 000} \div \text{£50 000} \times 100\% \\ &= 14\% \text{ a year} \end{aligned}$$

*Proposal B*

Initial proposal investment = £100 000

Total positive net cash flows over life (five years) of proposal = £160 000

*Surplus* total net cash flow after recovery of initial investment = £60 000

Average net cash flow per year =

$$\frac{\text{£60 000}}{5} = \text{£12 000 per annum}$$

Average *net* annual rate of return =

$$\text{£12 000} \div \text{£50 000} \times 100\% = 24\% \text{ a year}$$

If you use the average *net* annual rate of return method as described above then make sure there are no depreciation costs in the cash flow statement, otherwise you will be trying to recover fixed asset expenditure twice over.

Both the average annual rate of return methods suffer from the same disadvantage: namely that cash flows over the life of a proposal are 'smoothed out' as a result of averaging – the *pattern* of the cash flows is completely ignored.

In both these methods, the cash flows used are those *before* taking the effects of corporation tax into consideration. The reason is to allow comparison of the results (the rates of return) with the expected financing cost rates on the funds needed to finance the proposal. These financing cost rates (which depend upon where the funds come from) will probably be *gross* rates, i.e. before tax is taken into consideration. It is, of course, essential to compare like with like!

## Discounted cash flow methods

The methods discussed so far provide limited and sometimes conflicting measures of proposal viability. Though simple to use, they have significant limitations.

We now move to discounted cash flow techniques and two important methods:

- (a) the net present value (NPV) method
- (b) the internal rate of return (IRR) method.

However, before looking at them in detail, it is necessary to remember that the more familiar reverse process to discounting is *compounding*.

## Compounding

If you deposit a certain amount of money in a place where it will attract interest, such as a building society, the total amount of money, if left there, will build up by a constant factor every year. To take a simple example, consider what happens if you invest £1 in a building society offering 10% p.a. interest. The amount after year 1 is £1 + (10/100 × £1) = £1.10.

This is equivalent to multiplying the original £1 by a factor of 1.1. Repeated every year, provided there are no withdrawals and assuming constant interest rates, the money builds up as follows:

Year 0	£1.00
Year 1	£1.10
Year 2	£1.21
Year 3	£1.33

In a similar way, a company starts with a sum of money, say £100 000, which it will invest in plant, the hiring of a work force, etc. The sale of its goods and services will (one hopes) more than repay the initial investment costs. In other words the cash flows from these sales should be equal to or exceed the interest that would have been earned had the company simply put its money on deposit. If the company has an *internal rate of return* (rate of compounding) of 10%, the value of this project will look like this:

Year 0	£100 000
Year 1	£110 000
Year 2	£121 000
Year 3	£133 000

If a finance house provided a £100 000 loan with an interest rate of 10% to finance the proposal, the proposal would just about be viable, but there will be no net profit to hand over to shareholders. If the project were to be terminated after one year, the amount of money owed to the finance house would exactly match the value of the project at that time. If terminated after two years, the company would owe £12 100 and so on.

## Discounting

The principle of discounting is that the reasoning behind compounding can be reversed. Going back to the building society example and assuming an interest rate of 10%, we could say that if we were to be promised £1.33 in three years' time, this would be equivalent to being paid £1 now, for, with that £1, we could obtain £1.33 in three years' time through suitable investment. Using the 10% discount rate, values of £1.10 in a year's time, £1.21 in two years' time and £1.33 in three years' time have a *present value* of £1.

Similarly, the present value of £1 in one year's time would be  $£1/1.10 = £0.9091$ , or just under 91 pence. The *present values* of *future* money for different rates of interest can be set out in a discount table, and Table 1 below does this for a future, mythical £1.

[Looking at the discount table and the first entry in the 10% column in particular, you can see straight away that £1 received in a year's time has, as calculated previously, a present value of £0.9091. The present value reduces as the future period is increased; thus the present value of £1 to be received in five years' time is only £0.6209. For present values of future receipts other than £1, simply multiply by the required factor, e.g. the present value of £5000 in five years' time at 10% interest rate is  $£(0.6209 \times 5000) = £3104.50$ .

**TABLE 1 Discount table**

<i>n</i>	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264	0.8116	0.7972	0.7831	0.7695	0.7561	0.7432
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513	0.7312	0.7118	0.6931	0.6750	0.6575	0.6407
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830	0.6587	0.6355	0.6133	0.5921	0.5718	0.5523
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209	0.5935	0.5674	0.5428	0.5194	0.4972	0.4761
6	0.9420	0.8880	0.8375	0.7903	0.7462	0.7050	0.6663	0.6302	0.5963	0.5645	0.5346	0.5066	0.4803	0.4556	0.4323	0.4104
7	0.9327	0.8706	0.8131	0.7599	0.7107	0.6651	0.6227	0.5835	0.5470	0.5132	0.4817	0.4523	0.4251	0.3996	0.3759	0.3538
8	0.9235	0.8535	0.7894	0.7307	0.6768	0.6274	0.5820	0.5403	0.5019	0.4665	0.4339	0.4039	0.3762	0.3506	0.3269	0.3050
9	0.9143	0.8368	0.7664	0.7026	0.6446	0.5919	0.5439	0.5002	0.4604	0.4241	0.3909	0.3606	0.3329	0.3075	0.2843	0.2630
10	0.9053	0.8203	0.7441	0.6756	0.6139	0.5584	0.5083	0.4632	0.4224	0.3855	0.3522	0.3220	0.2946	0.2697	0.2472	0.2267
11	0.8963	0.8043	0.7224	0.6496	0.5847	0.5268	0.4751	0.4289	0.3875	0.3505	0.3173	0.2875	0.2607	0.2366	0.2149	0.1954
12	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.4440	0.3971	0.3555	0.3186	0.2858	0.2567	0.2307	0.2076	0.1869	0.1685
13	0.8787	0.7730	0.6810	0.6006	0.5303	0.4688	0.4150	0.3677	0.3262	0.2897	0.2575	0.2292	0.2042	0.1821	0.1625	0.1452
14	0.8700	0.7579	0.6611	0.5775	0.5051	0.4423	0.3878	0.3405	0.2992	0.2633	0.2320	0.2046	0.1807	0.1597	0.1413	0.1252
15	0.8613	0.7430	0.6419	0.5553	0.4810	0.4173	0.3624	0.3152	0.2745	0.2394	0.2090	0.1827	0.1599	0.1401	0.1229	0.1079
<i>n</i>	17%	18%	19%	20%	21%	22%	23%	24%	25%	26%	27%	28%	29%	30%	31%	32%
1	0.8547	0.8475	0.8403	0.8333	0.8264	0.8197	0.8130	0.8065	0.8000	0.7937	0.7874	0.7813	0.7752	0.7692	0.7634	0.7576
2	0.7305	0.7182	0.7062	0.6944	0.6830	0.6719	0.6610	0.6504	0.6400	0.6299	0.6200	0.6104	0.6009	0.5917	0.5827	0.5739
3	0.6244	0.6086	0.5934	0.5787	0.5645	0.5507	0.5374	0.5245	0.5120	0.4999	0.4882	0.4768	0.4658	0.4552	0.4448	0.4348
4	0.5337	0.5158	0.4987	0.4823	0.4665	0.4514	0.4369	0.4230	0.4096	0.3968	0.3844	0.3725	0.3611	0.3501	0.3396	0.3294
5	0.4561	0.4371	0.4190	0.4019	0.3855	0.3700	0.3552	0.3411	0.3277	0.3149	0.3027	0.2910	0.2799	0.2693	0.2592	0.2495
6	0.3898	0.3704	0.3521	0.3349	0.3186	0.3033	0.2888	0.2751	0.2621	0.2499	0.2383	0.2274	0.2170	0.2072	0.1979	0.1890
7	0.3332	0.3139	0.2959	0.2791	0.2633	0.2486	0.2348	0.2218	0.2097	0.1983	0.1877	0.1776	0.1682	0.1594	0.1510	0.1432
8	0.2848	0.2660	0.2487	0.2326	0.2176	0.2038	0.1909	0.1789	0.1678	0.1574	0.1478	0.1388	0.1304	0.1226	0.1153	0.1085
9	0.2434	0.2255	0.2090	0.1938	0.1799	0.1670	0.1552	0.1443	0.1342	0.1249	0.1164	0.1084	0.1011	0.0943	0.0880	0.0822
10	0.2080	0.1911	0.1756	0.1615	0.1486	0.1369	0.1262	0.1164	0.1074	0.0992	0.0916	0.0847	0.0784	0.0725	0.0672	0.0623
11	0.1778	0.1619	0.1476	0.1346	0.1228	0.1122	0.1026	0.0938	0.0859	0.0787	0.0721	0.0662	0.0607	0.0558	0.0513	0.0472
12	0.1520	0.1372	0.1240	0.1122	0.1015	0.0920	0.0834	0.0757	0.0687	0.0625	0.0568	0.0517	0.0471	0.0429	0.0392	0.0357
13	0.1299	0.1163	0.1042	0.0935	0.0839	0.0754	0.0678	0.0610	0.0550	0.0496	0.0447	0.0404	0.0365	0.0330	0.0299	0.0271
14	0.1110	0.0985	0.0876	0.0779	0.0693	0.0618	0.0551	0.0492	0.0440	0.0393	0.0352	0.0316	0.0283	0.0254	0.0228	0.0205
15	0.0949	0.0835	0.0736	0.0649	0.0573	0.0507	0.0448	0.0397	0.0352	0.0312	0.0277	0.0247	0.0219	0.0195	0.0174	0.0155

*n* = Number of years

The idea of present value can be applied to both inflows and outflows. As an example of outflow, assume that in five years' time you have to meet a bill of £1. You can meet it by investing £0.62 now (at 10% interest). The outflow of £1 in five years' time can be equated to an outflow of £0.62 now, or that the present value is -£0.62 (the minus indicates the direction of cash flow). As an example of an inflow, suppose that you were to receive £1 in five years' time. You would be justified in regarding the present value of this amount as +£0.62, since you could match this future receipt by investing £0.62 now.

A manufacturing company can regard its future inflows and outflows from a project in the same way. If its IRR (internal rate of return) is 10%, then an anticipated fuel bill of £5000 in year 5 of the project, for instance, should be discounted and called a cash flow with a PV (present value) of  $-\text{£}(0.6209 \times 5000) = -\text{£}3104.50$ , because, in order to meet this outflow, £3104.50 can be invested now in the company's production resources to meet this bill. Similarly, an income of £5000 through the sale of finished goods in five years' time can be equated to an investment of £3104.50 now. Such a future receipt will have a PV of +£3104.50.

Of course, the argument applied to a single future payment or receipt also applies to the stream of revenues and costs encountered by the firm in the course of a project.

The net discounted sum of such streams is called the *net present value* (NPV). (There are tables showing cumulative discounting factors for costs/revenues expected to have the same values for the life of a project.)

Earlier we considered a proposal with an IRR of 10%, the company in question obtaining loans from the money market at 10% interest rate. As pointed out, such a proposal will not make a profit, i.e. its NPV will be zero. If the performance of the firm could be enhanced, then a positive NPV would appear, which represents the PV of money available as dividends for shareholders, or which can be retained for use in other proposals.

For investment purposes, then, the *decision rule* is that only proposals which show a positive NPV should be accepted.

## Net present value (NPV) method

We will now show you how this method works by applying it to the proposal described earlier. The net cash flows (NCFs) for that proposal were as follows:

For the purpose of this example we will stay with the 10% discount rate.

From our reference table, we must now find the discounting factors relative to 10% per year (compounded) for the years 1 through 5. We will not apply a discount factor to cash flows in year 0; year 0 is regarded as being the outset of the proposal and for all practical purposes to be the present-day value of that cash flow.

The discounting factors we need are those in the reference table in the column headed 10%. These discount factors are now applied to the yearly net cash flows of the proposal to establish the total net present value (NPV) of those cash flows.

This result means that after allowing for financing costs at 10% per year compounded, this proposal will more than pay for the initial investment. It is financially viable. If two or more alternative proposals were being evaluated, the one which had the highest total NPV would probably be selected. If, at the end of calculations, a proposal shows a *negative* total NPV, it means that the rate of return generated by that proposal is less than the rate required, and so that proposal would not be implemented unless there were some overriding non-financial reason for doing so.

Year	Net cash flow (£)	
0	(100 000)	Negative
1	45 000	Positive
2	35 000	Positive
3	20 000	Positive
4	20 000	Positive
5	15 000	Positive

Year	Net cash flow (£)	Discount factors	NPV (£)
0	(100 000)	1.0000	(100 000)
1	45 000	0.9091	40 909
2	35 000	0.8264	28 924
3	20 000	0.7513	15 026
4	20 000	0.6830	13 660
5	15 000	0.6209	9 313
Total net present value of proposal net cash flows			7 832

The only difficult part of the NPV calculation is establishing the financing cost rate (or the required rate of return) for the proposal. Companies often are not sure exactly what will be the financing cost of the funds needed for the investment, especially when a mix of sources of funds is involved. To overcome this difficulty, you should find the IRR implied by the cash flow – this calculates what rate of return a proposal will generate and management can then decide whether this rate is adequate for their purposes.

### Internal rate of return (IRR) method

This is really the NPV method in reverse. Exactly the same data and the reference table of discount factors are needed, but it is not necessary to *predetermine* the required rate of return from the proposal. The IRR method calculates the rate of return to be obtained from the proposal, based on the assumption that the discounted values of future net cash flows will exactly pay for the initial investment. For our sample proposal, therefore, start with the following table:

Year	Net cash flow (£)	Discount factors	NPV (£)
0	(100 000)	1.0000	(100 000)
1	45 000	?	?
2	35 000	?	?
3	20 000	?	?
4	20 000	?	?
5	15 000	?	?
NPV of proposal net cash flows			= £ zero

In other words, what discount rate will give discount factors which reduce the values of the positive net cash flows in years 1 through 5 to exactly £100 000 in total?

The answer is found by trial and error using progressively higher discount rates until the NPV is reduced to zero, or nearly zero. In the example above, the IRR works out to 14%, as shown below.



Year	Net cash flow (£)	Discount factors	NPV (£)
0	(100 000)	1.0000	(100 000)
1	45 000	0.8772	39 474
2	35 000	0.7695	26 933
3	20 000	0.6750	13 500
4	20 000	0.5921	11 842
5	15 000	0.5194	7 791
NPV of proposal net cash flows			(460)

This means that our sample proposal is worth implementing if management will accept a rate of return of less than 14% per annum (which they might well do if, for example, it were possible to finance the proposal from funds costing, say, 12% per annum).

The IRR method is not infallible, and it is not always possible to judge the relative viability of proposals by ranking their IRRs. It is much better to rank proposals by their NPVs under a given rate of interest, if this is possible.

# Appendix

## Checklist of costs

### 1 Land and building costs

- Purchase, site clearance, provision of access and workroads
- Alterations, extensions, civil engineering work
- Provision of services and associated control systems:
  - Air conditioning
  - Heating
  - Lighting
  - Plumbing
  - Air, gas and fluids supply
  - Waste disposal and general drainage
- Partitioning, insulation (for noise, heat, vibration and draughts), decoration, floor covering and treatment
- Fixtures and fittings, furnishings
- Fire prevention, e.g. sprinkler systems
- Environmental controls
- Use of temporary premises
- Security systems
- Disposal costs:
  - Dilapidations
  - Renovations
  - Book value write-offs
  - Site clearance
- Professional charges:
  - Agents' fees and costs
  - Solicitors' fees and costs
  - Architects' fees and costs
  - Consultants' fees and costs
- Hire of special equipment
- Depreciation costs
- Rent and rates

### 2 Plant and machinery costs

- Purchase or leasing costs
- Site preparation, civil engineering work

- Provision of services, associated processes
- Installation costs
- Dismantling, renovation, relocation
- Hire of special equipment
- Retooling
- Maintenance charges
- Depreciation costs
- Machine utilization and downtime
- Professional charges
- Provision of safety systems
- Insulation, i.e. noise, vibration, heat, etc.
- NBV write-offs in event of disposal

### 3 Working capital costs

- Increased inventory values:
  - Raw materials
  - Consumables
  - Components
  - Assemblies
  - Finished stocks
- Inventory write-offs
- Increased work-in-progress levels, debtor levels
- Increase in provision for bad and doubtful debts
- Stockholding and financing charges
- Space requirements, fixtures and fittings for inventory and work-in-progress
- Transport and/or relocation of inventories

### 4 Personnel costs

- Redundancy payments
- Payment in lieu of notice
- Retention incentive payments
- Productivity bonus payments
- Overtime payments
- Shift and working conditions premium payments

- Salary and wage costs and related overheads
- Changes to remuneration systems
- Changes in working practices
- Use of contract labour
- Use of temporary staff
- Replacement costs
- Relocation costs
- Training costs
- Travelling and accommodation charges
- Special clothing
- Time recording systems
- Design work
- Patenting of new products
- Transport and other costs arising from geographic changes
- Insurances
- Trade subscription
- Stationery
- Communications systems
- Professional fees and costs
- Taxation charges
- Commission payments and royalties
- Costs of raising capital
- Increased production lead-times

## **5 Business disruption/ protection costs**

- Temporary build-up of inventories
- Extended supply/manufacturing lead-times
- Increased work-in-progress
- Use of alternative sourcing
- Loss of sales during changeover
- Narrowing of profit margins
- Reduced customer service levels
- Fall in process yields and/or productivity
- Materials wastage
- Shortfall of skills availability
- Publicity measures
- Security measures

## **6 Other potential cost factors**

- Market research work
- Feasibility studies, pilot studies
- Project planning and control
- Transitional control systems
- Changes to management and administrative systems and procedures
- Promotion and publicity costs

## **Checklist of savings**

### **1 Land and buildings**

- Sale of land and buildings
- Vacation of land and buildings (i.e. saving of rent and rates)
- Subletting of land and buildings
- Reduction in services costs (heating, lighting, etc.)
- Reduction of maintenance costs
- Better utilization

### **2 Plant and machinery**

- Sale of plant and machinery
- Reduction of power and other services requirements
- Improved machine utilization
- Reduced maintenance costs
- Increased working life, i.e. lower depreciation
- Termination or reduction of leased items and leasing charges
- Improved handling methods
- Use of less expensive plant and machinery
- Reduction in space needed for plant and machinery

### **3 Working capital**

- Reduced inventory values
- Reduction of work-in-progress levels
- Reduced debtor levels, decrease in incidence of bad and doubtful debts
- Reduction of space and equipment requirements for inventories
- Reduced financing charges
- Improved credit terms from suppliers
- Disposal of surplus stocks

### **4 Materials**

- Reduction in usage of direct materials
- Reduction in usage of indirect materials
- Reduction of wastage

### **5 Personnel**

- Reduction of manning levels
- Improved productivity
- Reduction of overtime
- Reduction of lost time
- Improved working conditions

### **6 Other**

- Increases in sales and/or profit margins
- Grants, subsidies
- Increased tax allowances
- Improved process yields
- Reduced packing and transport costs
- Improved quality, fewer rejects
- Insurances, savings on premiums
- Trade subscriptions
- Reduced stationery costs
- Better communications, reduced communications costs
- Geographic factors
- Savings of scale
- Marketing and sales considerations
- Improved environmental control, reduction of pollution, etc.