



# MAKING THE BUSINESS CASE FOR AN ENERGY EFFICIENCY PROJECT

How to win over the board and influence people.



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# Introduction

This guide will help you ensure that your projects for cutting energy costs get a fair hearing and the best possible chance of implementation.

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People in your position – energy or environmental managers, facilities managers and works engineers – have always found it hard to compete for funding because historically their projects were in a ‘discretionary’ category. These projects have not been seen as essential to the survival of the business; nor are they usually mandatory from a legal or regulatory perspective.

They also tend to be smaller scale than other projects being dealt with by your board of directors or other decision makers, diminishing their perceived importance. Furthermore, these projects can be technical (or even unique in the board’s experience), which increases their perceived riskiness and makes rejection a comfortable choice.

The advice which follows should enable you to overcome these challenges. It is based in part on interviews with people who hold, or have held, senior executive positions in substantial organisations, and the authors are grateful for their time and assistance. We begin by asking fundamental questions about who makes the decisions and what they are looking for, and then work logically through the steps of gathering data and evidence, building the case (including considerations of finance and risk), drafting the proposal, presenting it, and then maintaining momentum. Explanations of key financial evaluation techniques have been put into an appendix for the benefit of those who are not already familiar with them.

Last, a word about the scope and philosophy of this guide. It is not just about how to do a financial appraisal of a capital project and present a proposal to your board. It talks about energy efficiency ‘projects’ in the widest sense: an example might be a change of policy to limit the choice of company cars provided for employees. Second, it views ‘making a business case’ as a long-term continuous process, and not an isolated event.

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# What are decision makers looking for?

Your proposition will have the best chance of acceptance if it offers the decision makers something they want and is presented in a way they can understand.

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Your board of directors (or trustees, council members or other equivalent decision makers, as the case may be) will be interested in cost reduction or – subject to internal criteria – improved environmental performance or enhanced corporate reputation. The project or organisational change for which you are trying to make a business case must, therefore, offer a compelling financial return and, if possible, worthwhile additional benefits.

But just as important as what you present is how you present it. As we will repeat at greater length later, you should present a concise, clear proposal culminating in a single recommendation or request. It should be supported by an appropriate analysis of the costs, benefits, risks and implementation timetable.

Proposals for energy saving projects are often at a disadvantage compared with other candidates for capital investment. 'Capital' investment means one-off expenditure on plant, machinery and buildings or public relations and marketing campaigns to generate income in the future.

This is distinct from 'revenue' expenditure representing wages, fuel, materials, maintenance and other ongoing annual costs.

And that is one hurdle: in some organisations, it may be institutionally difficult to recognise and account for revenue savings arising from capital expenditure. A more important hurdle is that energy-saving capital projects are discretionary. They are not essential for sustaining or growing the business (like production machinery), nor for necessary regulatory compliance.

These obstacles are compounded by the fact that energy projects are perceived as risky. It does not matter that a marketing campaign might actually entail more risk; your energy efficiency project is unfamiliar territory, somewhat technical, and may be relatively small in scale. The safe option is to reject it.

Later on we provide guidance on overcoming these disadvantages, but it must be stressed that even the most solid business case could fail to get support if it is badly argued and presented.

### Key point

Your senior decision makers want sound projects, and you can deliver them.

### Typical pitfalls

- Using unexplained jargon or ambiguous terms.
- Failing to address any issues of relevance to the board.
- Failing to consider other options.
- Failing to identify and deal with risk factors.
- Not using the appropriate financial appraisal method.
- Giving a rambling presentation.
- Not giving a single clear recommendation.

# Who makes the decisions?

Different decisions may be made at different levels, and it is not always just senior managers who need to be convinced.

A board of directors will only expect to discuss major capital schemes, and low-cost or no-cost proposals would only need their scrutiny if they were in any way contentious or sensitive (imagine for example the implications of changing the policy on company cars to limit employees' choice).

Otherwise, most large organisations with a deep management 'tree' structure will delegate decision making on energy saving projects to an intermediate level of management. This eliminates the vulnerability that the same projects might suffer if decided at a senior level.

On the other hand, in small organisations (or large ones with relatively flat structures) you could be making your pitch to people who normally have much bigger issues to think about, and who are less likely to have a detailed understanding of your area of work.

Either way, you need to think about the person or people you are trying to influence: what are they interested in? What are their motivations? In what format do they require information? Can you engage them in the process early to aid their understanding and secure their support?

Finally, do not forget that it is not only senior management whose support you need. You may need 'buy-in' from colleagues or the workforce at large. If your idea implies any change for them, they may well have an effective veto through their ability to resist or even disrupt implementation in subtle ways. So be prepared to make the case to them as well.

## Questions to ask yourself

- Who are you trying to influence?
- What are they interested in?
- What are their motivations?
- How do you need to present information to them?
- Can you engage their interest early on?

## Key point

You need to understand the audience of decision makers and their key challenges (eg. production targets, cost containment) in order to influence them effectively.

# Establish influence and reputation

Life will be a lot easier if you can develop and maintain a reputation for sound ideas, and engage the help of someone who moves in the circles you're trying to influence.

## Find an ally

It can make a big difference if you can enlist the support of someone at an appropriate level who can be your ally and sponsor. In a small organisation this might be a board member whom you know to be interested in energy and the environment. In a large company it might be a department head or senior management representative.

This person will fulfil a number of valuable functions. They will help you to understand the perspective of the decision makers you are trying to influence. They will also have a wider appreciation of related business issues that need to be taken into account.

Most importantly, they can act as an advocate for your recommendations not only on the day the decision is taken, but in the crucial phase beforehand when other senior interested parties need to be sounded out, consulted and reassured.

## Build a record for success

Reputation is a key factor. Putting forward a case for investment or change is always much easier if you have become known for promoting sensible and effective ideas for saving money, or energy. This is one reason for portraying 'making a business case' as a continuous process rather than a discrete event. Each success is your foothold on the next opportunity. If you are consistently successful you could find senior management start asking you for project ideas, rather than you having to take the initiative.

A sensible strategy, then, is to start with an initiative that is easy to get approval for (or costs nothing and is easy to implement). Record and publicise the results. Meanwhile, start looking for further, more substantial opportunities that will need more funding, or endorsement at a

higher level of management, and pick one that you can guarantee will succeed. You cannot afford to select anything but a winner at this point because you will be asking the organisation to back it; the result must be positive if your reputation is going to benefit.

### What your sponsor can do for you

- Help you understand the decision makers' perspectives.
- Steer you away from options compromised by factors you are not privy to.
- Be your ambassador during the development of the project proposal.
- Act as an advocate in the presentation.

Good reputations are hard to win and quickly lost; likewise the support of your senior management sponsor.

Try to follow these principles:

- Evaluate projects diligently and never promote something you are unsure of.
- Never make exaggerated claims.
- Try to leave yourself headroom to deliver more than you promised.
- When you get approval for something, implement it without delay and do everything you can to ensure its success.
- Make sure people know what you have achieved, and keep it all on record.
- Keep up with the news. You want to be seen as the person in the organisation that knows about the world energy situation, the state of relevant regulations, the outlook for prices and so on. Let your superiors treat you as an authority on the subject.

Last, do not be shy about involving your senior management sponsor throughout the process of identifying and developing projects. One of the senior executives we interviewed described a case where a site's engineers had invited him to visit and discuss some outline plans for a major energy project. He said it inclined him to give the project active support because he "knew how hard they had worked on it".

### Key point

Develop and defend your reputation.



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# Building the case

It is essential to prepare thoroughly by collecting the most reliable data and evidence you can obtain, and subjecting your proposition to rigorous evaluation.

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The financial case for your proposal rests on the balance between projected costs and savings. How these are analysed and presented is covered in an appendix, but clearly the argument will only be as sound as the evidence on which it is based.

## Direct financial benefits

In this section we emphasise the development of the financial case and treat any non-financial benefits as bonuses.

We will deal first with the expected savings in energy consumption. Here, the energy manager is usually on safe territory, as in many cases it is possible to estimate the effects of a proposed change with reasonable certainty. This is particularly true where an effective monitoring and targeting scheme is in use or where a sufficiently detailed energy audit has been conducted.

## Verify your numbers

Where estimates of savings may have been furnished by equipment suppliers, it is reasonable to expect that their figures will be optimistic, and you should verify their estimate using an appropriate degree of diligence. At least find out what assumptions were made, and substitute your own if you consider them questionable.

If necessary, get references from other customers who can vouch for the technology. However, bear in mind that not all customers monitor results objectively, and of those that do, only a minority would want it to be known that they had made a bad decision. Indeed, people have been known to give endorsements to products based on completely fraudulent claims. In important cases, commission an independent assessment.

**Your business case must identify and discuss all the possible downside risks, in order to show your directors that they have been considered and are containable or controllable.**

Where the savings have been estimated by an independent consultant in the first place (as part of an energy audit, for example), some probing questions will be in order. Remind the consultant that there could be a claim against his or her professional indemnity insurance (regardless of disclaimers) if they have failed to exercise sufficient care in the calculation of savings.

Exaggerating the savings could lead to a project with a seriously disappointing outcome. This not only wastes resources, it will damage your reputation and make future progress more difficult.

In some circumstances you might want to consider initially making a proposal for a pilot project only. Results from that could then be used to back up the case for wider replication throughout your organisation. Ask the board to commit to the full programme subject to a stated objective target being reached in the pilot.

### Obtain forward estimates

Bearing in mind that savings are usually estimated in energy terms, you will need to obtain forward estimates of prices in order to express the estimate in financial terms. These are frequently available from sources such as Eskom, the Department of Energy, or energy market intelligence service provider. You can also glean what intelligence you can from specialist energy journals and general business press, and form your own view.

Discuss your assessment with your senior management sponsor and get his or her backing for your position. This is important, because even if he or she has no particular view on the subject, there may be one or more board members whose opinions do not coincide with yours, and who may consider themselves greater experts than you on market futures.

However wrong you may consider their positions, the case you put forward must accommodate them. If not, they may challenge your assumptions during your presentation and scupper it.

### How to build your case

- Know the residual life of affected assets
- Evaluate the project cost
- Evaluate the requirements of other projects
- Calculate the cost and energy savings
- Estimate the project life
- Identify sources of funding
- Work out a project timetable
- Calculate the internal rate of return and the net present value
- Carry out risk analyses
- Consult other interested parties
- Find any available precedents, case studies or technology references
- Identify any non-financial benefits

## Additional benefits

Energy saving projects will often yield additional benefits, some of which could even have significant financial value in their own right.

For example:

- A new lighting installation might be cheaper to maintain, thanks to increased intervals between lamp replacements.
- The soft-start effect of a variable speed drive can increase the life of both the motor and mechanical drive train by reducing electrical stresses and mechanical shocks. This extends the mean time between failures and consequent business interruption.
- Any control which reduces idle running will also extend the life of equipment.
- For a site operating near the physical limits of its supply connections, reducing peak demand could remove the need for capital expenditure on supply reinforcement when the business is expanding.
- Carbon emissions reduction

Non-financial benefits have sometimes been identified as unexpected bonuses after energy projects have been implemented.

Examples include:

- Reduced noise in ventilation systems after converting fans to variable-speed operation.
- Increased maintenance intervals as a result of monitoring energy consumption of equipment, where deteriorating performance indicates wear and tear.
- Improved comfort and reduced staff turnover in commercial kitchens after training and awareness campaigns showed the benefits of not leaving cooking equipment running unnecessarily.
- Enhanced reputation and public relations advantage.

It is worthwhile considering whether there are likely to be any such benefits complementing the financial returns expected from the projects you are promoting.

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## Implementation costs

This is another case where an equipment supplier's view is likely to be optimistic and a consultant may be unable to give a reliable estimate.

It is risky to rely on a supplier's estimate of project costs. First, the salesman has targets to reach and (except in the case of a small company) is relatively insulated from the consequences of over-selling. Second, even the most candid salesman does not have access to all the facts, and has to make assumptions about matters such as how difficult it will be to install the proposed equipment, or even just to gain access.

A single supplier's estimate, even when tested with some probing questions and moderated with more realistic assumptions, will rarely do more than help you decide if the project is worthwhile evaluating further. So what are the options at this point?

### Gather intelligence

If possible, talk to other customers with similar installations and ask what their experience was. What were the factors that increased their costs? There will usually be some. If you cannot get this information from other customers, quiz the supplier about what the cost risk factors are, and apply your own common sense and experience. For instance, if the cost of installing cabling is a major unknown, you or your colleagues may have some experience from other unrelated projects at the site in question.

Armed with a view of the likely spread of project costs, you can now do a preliminary evaluation of the project, repeating the analysis with different assumptions to yield a sensitivity analysis. If you are very lucky, your project will prove viable under all reasonable scenarios, making it safe to proceed with the proposal.

More usually, you will find that firm quotations really are necessary before you can decide to take the idea further. This could present a difficulty as getting reliable quotations will mean preparing specifications, schedules and design drawings. Normally such activities are part of the energy manager's brief, and the fee costs can be absorbed by existing budgets. If not, you will first have to make a business case for the design and tendering exercise.

Fortunately, approval for a preliminary study can usually be sanctioned at a lower level of management, and your hand will be strengthened by having the results of your sensitivity analysis to indicate the probability of a viable outcome.

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**If your proposal is not entirely justifiable on financial grounds alone, show how it helps to fulfil a concrete objective that the organisation has previously set itself.**

## Financing

If you are contemplating a capital project and do not already know how it would be financed, find out. Your senior management sponsor or financial controller may be able to help. In some organisations there are formal capital budgeting rounds, and this may dictate when your project could commence as you may not be able to access the current year's allocation. Other organisations have a more flexible approach and some may even have ring-fenced funds earmarked for this class of work.

Some projects may not entail capital expenditure. However, they may be affordable out of revenue expenditure because they recover their costs very quickly. Energy training and awareness campaigns usually fall into this category. In such circumstances, you will need to approach the person who holds the budget for fuel and electricity to agree a way forward. Timing is important: the work will need to be completed early in the budget year.

Whatever the circumstances in your case, you need to be prepared to answer questions about how the project would be financed, and about the criteria used to evaluate it.

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**Your analysis should also discuss the risks attached to *not* proceeding with the project.**



## Risk

An energy saving project may be unfamiliar territory to the board members considering your proposal. In their minds, therefore, it will entail a high level of perceived risk and will start at a disadvantage compared with projects related to regulatory compliance and to developing or protecting the core business.

Your business case must therefore identify and discuss all the possible downside risks, in order to show your directors that they have been considered and are containable or controllable.

### Technical risk

This will be one of the hardest to deal with, especially if the proposed project is the first of its kind that your company has undertaken. Put simply, will it yield the savings that you claim? In extreme cases, there may be a risk of the technology not functioning at all. For instance, the corrosive nature of exhaust air from a swimming pool could damage a heat-recovery unit, and sulphur in the methane from a sewage treatment works could damage the engine of a combined heat and power system. This is where specific product endorsements from the same type of user are indispensable.

### Cost risk

This is the possibility that either the capital cost or the ongoing running costs end up higher than you have budgeted for. You need to ensure that estimates and quotations are as reliable as possible.

### Operational risks

Could the project in any way compromise output? For instance, it may require a shutdown of facilities or processes. Questions to ask would then include:

- What would happen if the works overran?
- Might the work clash with other shutdown projects?
- Are the necessary personnel going to be available?

Once installed, could the new equipment adversely affect product quality, or the reliability or availability of key services? Consider the implications of there being teething problems with the technology, and whether the new equipment's maintenance requirements could potentially impact your operations. Most importantly, think about the effect of the workforce being unfamiliar with, or hostile to, the new equipment.

### Market risks

Consider what energy prices might do relative to other costs. What about interest rates? If you are a technical professional you may well feel uncomfortable dealing with these kinds of issue, but they must be faced because your board members will probably have expertise (or opinions) on such subjects. This is another area where your senior management sponsor may be able to advise you.

### Circumstantial risks

Extraneous factors could affect the viability of your project. This might include plans for:

- Closure or relocation of the business.
- Redundancies or outsourcing.
- Takeover of the business.
- Change of product mix.
- Entering into an energy services contract.

To you, many of these eventualities may be unforeseeable. However, your senior management sponsor may be well aware of them and although they may be confidential, he or she could indicate whether certain 'hypothetical' scenarios should be included in your sensitivity analysis.

### Key point

Be diligent about evaluating projects because you cannot afford to back a dud.

Impending closure or disposal is a very common objection to energy saving investment, but it deserves special consideration as in some cases a capital project could have some residual value to a new owner.

Finally, your analysis should also discuss the risks attached to not proceeding with the project. In particular, consider the regulatory risks posed by impending legislation, and perhaps reputational risk.

### Energy Efficiency Financing

Investing in energy efficient equipment makes sound business and environmental sense. A number of different financing options are available depending on the solution required. To find out more about these options, get in touch with our advice line at [info@psee.org.za](mailto:info@psee.org.za) or 0861 123 624.



# Drafting the proposal

Your written proposal needs to make it easy for people to see at a glance what you want from them and why; but it will also need to give sufficient detail to satisfy the needs of the diligent critics among them.

## Understand your audience

The board or other decision makers that you want to influence will undoubtedly have their own preoccupations and objectives. You need to find out what these are, so that you can align your business case with their goals. This will help you avoid situations that either conflict with their objectives or create potential problems (real or imagined).

Remember that you will not only have to satisfy corporate objectives, but perhaps individual ambitions as well. This is partly why it is so important to have an ally in the form of a senior management sponsor.

Perhaps the most important question you should ask yourself as you prepare your proposal and presentation is: "What do I have to say, that the board members want to hear?" That will define your opening gambit.

## Brevity, clarity, certainty

The senior executives consulted agree that a written proposal must have, on the first page, the complete story in simple terms. Details are not relevant here: they can follow in the body of the document.

Generally speaking, at board meetings in any substantial organisation, the agenda will be accompanied by a thick stack of papers. You must make it easy for members to absorb your message quickly, and entice those who are interested (and have the time) to read on. Do not expect everyone to have read the paperwork before the meeting.

The body of the proposal must be written in a clear and logical style. If, as is likely, the project is technical in nature it will be very helpful to include a layman's explanation of the technology in question before going on to say how you propose to apply it. Structuring the written proposal well means not only that your target audience will be able to follow it, but more importantly, you will be able to direct them quickly to the appropriate tables, diagrams and so on during the presentation.

### Fact

Reducing energy usage means lower carbon emissions. That's great news for the environment.

Ask your senior management sponsor for examples of past proposals that he or she would regard as exemplary.

Ideally, you should give just one clear recommendation that the board can endorse. There may be alternatives (in which case it is a good idea to show that you have considered them), but if you leave the board with options to choose between, you have not done your preparation properly.

Remember that you are more expert than they in energy management, and they will accept that. You may react to this by saying that the decision could be influenced by circumstances or factors that you are not privy to. While this is true, consulting your ally on the board will help you to eliminate the less favourable options.

#### Tips from senior management



Citing what competitors are doing can be seen as disloyal, unless you keep it positive ('we can do better')



**John O'Keefe**

Former Director of Thames Television and ex Managing Director of Limehouse Studios

### Keep it real

There is a danger when promoting energy saving initiatives of making the proposition too abstract. This will be particularly true if the financial case is weak and you are playing the 'corporate social responsibility' card and relying on carbon emissions reductions. It is tempting to exploit current media interest in climate change and to present these global or moral concerns as drivers for action; however, this is a hazardous tactic.

If your proposal is not entirely justifiable on financial grounds alone, our advice is to show how it helps to fulfil a concrete objective that the organisation has previously set itself. In other words, show that it helps the board to keep a promise they have already made. This is one of the reasons for developing and adopting a corporate energy policy. It is a statement of intent that enables certain types of decision to be made quickly because the issues have been debated already.

### Typical objections

Before presenting your proposal, think how you would deal with these common objections:

#### **We are not convinced because...**

- ...the problem is not clear
- ...we don't understand your solution
- ...there is no evidence it would work
- ...we disagree with your assumptions.

#### **We like the project, but...**

- ...installing it sounds like it would be disruptive
- ...we are not sure how long we are going to retain this building/process/equipment
- ...the workforce would not accept it
- ...we do not have any money available to fund the project
- ...the necessary staff resources are needed for other work
- ...one of us has got a better idea
- ...why haven't you done anything about this issue before?

## Watch your language

Inconsiderate use of jargon, acronyms and specialist technical terminology is one of the main reasons for proposals being rejected at board level. So when framing your written proposal, or when presenting it in person, be careful to define or explain any specialist technical terms that you use. Better still, avoid using them if they are not essential to the argument.

Avoid using emotive terms, and be wary of adverse comparisons with your competitors, which may be seen as disloyal. If you need to make such comparisons be positive: not “we are lagging behind” but “we can do better than them”.

It is important to bear in mind that few, if any, of the decision makers will have specialist knowledge of energy management. That may be true even of a technical director, whose expertise is far more likely to relate to the organisation’s core business than to energy systems. Another more subtle aspect to the language barrier is that some of the ordinary words you use (‘asset’, or ‘target’, for instance) will mean different things to different people. Use more concrete and specific terms if possible.

Where possible, use diagrams rather than tables of numbers. Include relevant visual material like plans and photographs, which will make the document more attractive and easier to follow. It may be that some of the people you are trying to influence are not even familiar with the site you are talking about, and having a picture of it will help to make your proposal more concrete in their minds.

Unless you express your ideas in language the board can understand, the most sympathetic of them may give up the struggle to interpret the argument behind your recommendations and opt for the safe response: rejection.

## Key point

Start with a concise summary and put the detail in appendices.

“  
Ask yourself: what does the board want to hear, that I want to tell them?”

**Billy Davidson**

Group Property Director, Vodafone

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# Presenting the proposal

However well-written your proposal, its chances could be diminished if you do not present it in a convincing way.

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This section assumes that you will be presenting the business case in person. That tends to be preferable because you will be the best person to defend your proposal in depth if board members challenge it or ask searching questions. If, however, you cannot be there yourself, we fall back on our earlier advice to find a senior management sponsor. Consult and involve them throughout the development of the proposal, so that they can be an effective and committed advocate on your behalf.

If you have a technical background you face two issues. One is that you may not be accustomed to making what is, in effect, an internal sales pitch. The other is that you will always be tempted to focus on technical detail. So let us start with some pointers on making an effective pitch.

## **Be prepared**

First, before you even get to the presentation, prepare thoroughly: know the salient facts about the project and be prepared to defend it in depth. Try to anticipate questions (perhaps with help from your senior management sponsor). Find out how long you have been allocated. Rehearse, not necessarily word for word, but at least the key 'waymarks'.

Second, be very wary of using computer-projected presentations. They are easy to do badly, and inexperienced users forget that you cannot maintain eye contact when turning to read from the screen. There is also no worse way to start than fiddling with cables and equipment.

Do you think that you need a presentation in order to show tables, figures and charts? If so, consider the simple alternative of putting them in the supporting paperwork, which you can refer to during your presentation. Board members could well feel more comfortable being able to study them at their own pace rather than trying to keep up with a slideshow.

See if there are any relevant 'props' you can use, such as a model or a sample piece of kit. It is far easier to sell something physical than an abstract concept. For example, to promote a controls project, hand around an example of some key component.

## **Key point**

Be brief and to the point, but don't assume that everyone has read your written proposal.

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**Smile, be confident, be respectful and don't be arrogant.**

**On the day**

Then when the day comes and you are standing in front of the board:

- Be sure that everyone can see you comfortably: in all but the smallest meetings, stand rather than sit.
- Introduce yourself briefly.
- Set the scene with a clear statement identifying the corporate goal that you are addressing, and in simple summary, what you propose the organisation should do.
- Explain that your presentation is only a summary and that all the facts, assumptions and background details are in the written proposal.
- If necessary, give some technical background in the simplest possible terms.
- Elaborate on the proposed course of action.
- Focus on the objective, which is to get agreement to your recommended course of action. Don't get distracted and forget to come to the point.
- Restate your recommendation.
- Answer questions.
- If you do not get a clear decision, ask for one.
- Stop when you get the decision. Resist the temptation to keep talking.
- Thank your audience and leave.

Throughout your presentation try to keep making eye contact with everyone in turn. Smile, be confident, be respectful and don't be arrogant.

**Tips from senior management**

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Graphs and diagrams are better than tables of numbers. Use photos, plant layout plans or even mock-ups to help people see what you are proposing”

**Sandy Mason**

Engineering Manager for international brewing company



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# Maintaining momentum

Implementing the proposed project and monitoring its success are as much part of the process as getting approval in the first place.

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If you get the decision you wanted, be prepared to act on it straight away. If you let an approval lapse you will damage your hard won reputation and perhaps alienate your senior management sponsor if you have one. The result will be that you find it harder to argue for future projects.

When the project has been completed, monitor it to verify the savings that are achieved. This is important in two respects. First, you need evidence with which to bolster your reputation (and that of your sponsor), to vindicate the board's original decision to support your idea, and perhaps to justify replicating the project elsewhere.

Second, there is always a risk that the project does not work, in which case you need to know about it so that you can put it right. For example, improved automatic controls may need proper commissioning or tuning to have their full effect.

Again, with your hard-won reputation in mind, make sure that you publicise your successes and keep a list of them for use in the future. Make use of intranet pages, staff newsletters

and other internal communication channels to keep everyone in the picture and to elicit feedback.

Give credit where it is due – acknowledge any support you have had from colleagues or members of the workforce. A note of thanks goes a long way. Be prepared to concede credit to your senior management sponsor if that seems to be what they want. Their support could be your key to getting further backing.

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**Make sure that you publicise your successes and keep a list of them for use in the future.**

Finally, be ready with your next brilliant idea. Always have a few in the pipeline, as the board may start asking you to come up with further projects. In some organisations they can be a valuable way of using budget surpluses near the end of the financial year. But remember: only back winners.

### Key point

Treat the whole exercise as part of a continuous process, not an isolated event.



# Appendix A: Financial appraisal methods

Most energy saving projects incur up-front costs and yield annual savings.

If the money for the project is borrowed, the savings need to exceed the cost of interest payments. If the money comes from reserves, the savings need to exceed the income that could have been earned by depositing the money in the bank or investing it elsewhere – for example, in a competing project that also offers cost savings or increased revenue.

## Simple payback

[Table A1](#) provides two hypothetical (and simplistic) scenarios which illustrate the subtle difficulties of choosing between projects. Project X will save R75,000 a year for three years, while Project Y saves only R67,500 but will last five years. Both projects cost R150,000 to implement.

The most familiar way of evaluating and expressing the cost effectiveness of projects is the ‘simple payback period’ (SPP). Dividing the project’s cost by the annual savings tells us how long it will take to recoup the initial outlay. We can see here, for example, that Project X has an SPP of  $150,000/75,000 = 2.0$  years, while Project Y achieves an SPP of  $150,000/67,500 = 2.2$  years.

On those grounds, Project X seems preferable. Yet the net return from Project Y is R187,500 over its lifetime compared with only R75,000 for Project X, making Project Y preferable. Clearly, simple payback is not telling us the whole story.

Another of the drawbacks of simple payback is that it tells us nothing about the absolute value of the proposal: replacing a filament lamp with a compact fluorescent would give a stunningly

short SPP, but will only have a negligible impact on your organisation’s energy use.

A further, more subtle, objection is that quoting the payback period is a slightly weak proposition. To say “this project will pay back its costs in two years” is not quite as powerful as saying “this project will repay its cost every two years”. The latter wording stresses the continuity of future savings and sounds like a positive choice. The former wording is slightly defensive and unconsciously suggests that the benefit is short-lived (“don’t worry, you will get your money back, but only after two years”).

SPP gives us a rough-and-ready way to compare alternative projects, but most importantly, it is not the method used for evaluating investment choices in financially-savvy organisations.

Table A1 Two competing projects

Project X	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Cost of project	-R150,000						-R150,000
Savings		R75,000	R75,000	R75,000			R225,000
Cash flow	-R150,000	R75,000	R75,000	R75,000	-	-	R75,000
Project Y	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Cost of project	-R150,000						-R150,000
Savings		R67,500	R67,500	R67,500	R67,500	R67,500	R337,500
Cash flow	-R150,000	R67,500	R67,500	R67,500	R67,500	R67,500	R187,500

## Discounted cash flow

To capture the value of continued savings in the future, and to show how the proposed project compares with other possible investments, most accountants would use an assessment method based on discounted cash flow (DCF).

In DCF calculations, all the project's current and future costs and savings are aggregated into a

single lifetime figure, but with due allowance made for the fact that cash flows in the far future have less weight than those in the near future.

This example illustrates how we weigh up the relative values of cash received in the future. Let us assume that you can earn 5% interest on money in the bank. Now suppose that you are

offered a choice of three cash gifts on condition that you don't spend the money until five years from now. You can have:

R11,752.89 today; or  
 R12,340.54 in a year's time; or  
 R15,000 in five years' time.

Which should you choose? The answer is that give or take a few cents, it does not matter. To invest R11,752.89 for five years or R12,340.54 for four years, both yield R15,000 at 5% compound interest, meaning that the payment of R15,000 in five years' time is equivalent to R11,752.89 received today. Accountants call the R11,752.89 the present value of the R15,000 in question, and the 5% the discount rate.

The higher the discount rate, the lower the present value. Table A2 shows the present value of R15,000 in five years' time, at various discount rates.

We can also compare the present values of a certain cash sum paid at different points in the future, but at a particular discount rate. Table A3 shows the present value of R15,000 payable in the future at a 10% discount rate.

Table A2

Discount rate	Present value of R15,000 five years in the future
5%	R11,752.89
10%	R9,313.82
20%	R6,028.16

Table A3

Years	Present value of R15,000
0	R15,000
1	R13,636.36
2	R12,396.69
3	R11,269.72
4	R10,245.20
5	R9,313.82

## Applying discount factors to the assessment

### Net present value

Let us return to Projects X and Y introduced earlier and evaluate them using discounted cash flow. For the purposes of illustration, we will use a discount rate of 10%. [Table A4](#) is the same as Table A1, but 'cash flow' has been relabelled 'simple cash flow' and two additional rows have been added. One is the discount factors, which are the ratios between the present and future values in each future year (you can see these same ratios in Table A3 left).

The other additional row is the discounted values of the future cash flows in each year. In each case, this is the simple cash flow multiplied by the discount factor for that year. Looking at the right-hand columns in Table A4 you will notice that Project X, which yielded a net return of R75,000 in terms of simple cash flow, yields a net return of R36,514 in terms of discounted cash flow. This is called its net present value (NPV) because it is the sum of all the expenditure and income, discounted to present values. Project Y, meanwhile, has an NPV of R105,878.

This gives us a much clearer picture of which project to choose. Doing project Y is the equivalent of a cash gift of R105,878, while Project X is only worth R36,514.

In fact (if we could find the finance) both projects are worth pursuing as both have NPVs greater than zero. But this conclusion does not hold good if the discount rate is much higher.

Table A4 Discounted cash flow analysis at 10% discount rate

Project X	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Totals
Cost of project	-R150,000						-R150,000
Savings		R75,000	R75,000	R75,000			R225,000
Simple cash flow	-R150,000	R75,000	R75,000	R75,000	-	-	R75,000
Discount factor	1	0.909	0.826	0.751	0.683	0.621	
Discounted cash flow	-R150,000	R68,182	R61,983	R56,349	-	-	R36,514
Project Y	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Cost of project	-R150,000						-R150,000
Savings		R67,500	R67,500	R67,500	R67,500	R67,500	R337,500
Simple cash flow	-R150,000	R67,500	R67,500	R67,500	R67,500	R67,500	R187,500
Discount factor	1	0.909	0.826	0.751	0.683	0.621	
Discounted cash flow	-R150,000	R61,364	R55,785	R50,714	R46,103	R41,912	R105,878

Table A5 compares the projects at a discount rate of 25%, under which circumstances only Project Y is viable, because Project X gives a negative NPV:

Your organisation will probably have a policy about what discount rate to use in assessments. High rates make it harder to pass the test, and are sometimes used as insurance against risk.

Find out what the discount rate used by your organisation is. You may also want to seek guidance as to whether a project specific discount rate could be applied. This may allow a more favourable assessment of the project.

### Internal rate of return

Project X was viable at a 10% discount rate but not at 25%. The discount rate at which it just fails (yielding an NPV of zero) works out at 23.4%.

This is called its internal rate of return (IRR).

There is no analytical method of calculating IRR; traditionally it was done by trial and error or by

using graphs. However, spreadsheet programs provide an IRR function which makes life easy. The IRR for Project Y, incidentally, is 34.9%.

The example of Project Y is telling. It has a simple payback period of 2.2 years, and for many organisations it would fail the typical

hurdle of one or two-year payback applied to energy projects. But when one realises that it gives a 34.9% internal rate of return, it sounds – and is – much more compelling. What other investment would give a better return?

Table A5 Discounted cash flow analysis at 25% discount rate

Project X	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Totals
Cost of project	-R150,000						-R150,000
Savings		R75,000	R75,000	R75,000			R225,000
Simple cash flow	-R150,000	R75,000	R75,000	R75,000	-	-	R75,000
Discount factor	1	0.8	0.64	0.512	0.41	0.328	
Discounted cash flow	-R150,000	R60,000	R48,000	R38,400			-R3,600
Project Y	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Cost of project	-R150,000						-R150,000
Savings		R67,500	R67,500	R67,500	R67,500	R67,500	R337,500
Simple cash flow	-R150,000	R67,500	R67,500	R67,500	R67,500	R67,500	R187,500
Discount factor	1	0.8	0.64	0.512	0.41	0.328	
Discounted cash flow	-R150,000	R54,000	R43,200	R34,560	R27,648	R22,118	R31,526

### More complex scenarios

The 'Project X and Y' examples were deliberately simplistic. Real life analyses may be more complex. For example:

- There may be ongoing running costs. For example, a heat recovery system that saves gas might require electrical power. Possible maintenance costs are another consideration.
- Depending upon the project's timing, there may be some savings in Year 0.

- Savings may vary from year to year, notably because of real inflation of energy prices relative to other commodities.
- It may be the organisation's policy to account explicitly for tax costs.

Where necessary, the DCF table can be elaborated by adding rows for specific cost items, or to separate savings for gas and electricity (for example) if their prices relative to each other are expected to vary.

Table A6 illustrates a more complex case. First, some savings are expected in the year of implementation. Then, as well as the capital expenditure, there are annual maintenance charges (lower in year 1 but higher in year 3). Finally, the technology incurs additional electrical costs which, like the savings in gas costs, have been assumed to inflate at 20% relative to general inflation.

However, the (literal) bottom line is always the same. Each year's net cash flow is calculated and discounted.

Table A6 Illustration of a more complex case

Project Z	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Totals
Cost of project	-R150,000						-R150,000
Maintenance		-R7,500	-R11,250	-R22,500	-R11,250	-R11,250	-R63,750
Electrical power	-R1,500	-R3,750	-R4,500	-R5,400	-R6,480	-R7,770	-R29,400
Savings	R30,000	R75,000	R90,000	R108,000	R129,600	R155,520	R588,120
Simple cash flow	-R121,500	R63,750	R74,250	R80,100	R111,870	R136,500	R344,970
Discount factor	1	0.811	0.657	0.533	0.432	0.35	
Discounted cash flow	-R121,500	R51,701	R48,782	R42,693	R48,328	R47,775	R117,780

## Risk cover and sensitivity analysis

Different organisations apply different criteria in terms of the discount rate they apply to discretionary capital projects (which is the same thing as the threshold for the IRR they expect). In theory, the discount rate should just be the cost of capital (interest charged on borrowings, or foregone on alternative investments), but usually it is much higher. Why is this? Usually it is to cover the organisation against risk. Another hedge against risk is to set a short time horizon for evaluation, for example limiting the analysis to five years even if the project has a much longer life.

However, do not be tempted to evaluate a project regardless of risk on the grounds that your corporate assessment criteria would filter it out. It may be so risky that it could ultimately fail even after clearing a high threshold. It is preferable to carry out a sensitivity analysis, which with the aid of a spreadsheet is not too onerous.

The first step is to decide what factors are subject to significant uncertainty. These will almost certainly include:

- The implementation cost.
- Maintenance or other additional running costs.
- Savings achieved (in unit terms).
- Energy prices relative to other inflation indices.
- Project life.

Next, consider what the likely range of each of these factors is. Using your spreadsheet model, try the worst and best case assumption for each uncertain item and note the resulting IRRs. If any one of the worst case assumptions gives an unacceptably low IRR, there is a chance that your project will fail.

With a little trial and error you can establish the point at which the project fails (for example, the percentage cost over-run which gives zero NPV). If you consider the risk of that eventuality being too great, you should abandon the project.

However, all may not be lost. We know that IRR thresholds are usually set high to provide a measure of risk cover, so your argument might go like this: "If project costs over-run by  $x\%$ , the project would fail to meet the company's IRR criterion. However, we think there is only a one in  $x$  chance of this happening and the worst case scenario still gives an IRR of  $z\%$ ".

## Taxation, inflation and depreciation

### Taxation

All other things being equal, if you can claim the entire cost of your project against tax in the first year, the effect of taxation is neutral: the internal rate of return is identical on the pre-tax and post-tax cash flow.

You will be able to write down the whole expenditure against tax to the first year if:

You treat it as revenue expenditure (maintenance, for example) rather than capital.

It falls within the Annual Investment Allowance (AIA) introduced in the 2008 budget.

It qualifies for the Enhanced Capital Allowance scheme.

The tax effect is neutral because it is proportional to the income and expenditure in each year.

If you are not able to claim the project cost against tax in the first year you will only be able to claim for 20% each year on a reducing-balance basis. Postponing the tax benefit has a significant impact: at a 15% discount rate over eight years and assuming 28% corporation tax, the net present value will be reduced by about 10% of the original investment cost. The loss of value turns out to be independent of the level and profile of savings, and projects with simple payback periods of about five years can go from positive to negative NPV in such a case.

Fortunately, the adverse impact would be similar for all projects evaluated against the same criteria, which is why nearly all assessments are done on pre-tax figures.

### Inflation

This is also usually assumed to affect all competing projects equally, and therefore is not normally accounted for. However, there is a strong argument for assuming underlying real inflation of energy prices relative to other commodities.

The effect of this is to increase the future value of each kWh saved, and there are two ways to account for this. One is to show savings increasing in annual value as time goes by. The other is to reduce the discount rate, which is arithmetically the same thing if you expect a fixed annual percentage rise in real energy costs.

Of the two methods, the first is preferable because it does not involve apparently changing the assessment criteria. It is also clearer, especially if you wish to show a sensitivity analysis, making different assumptions about the future of energy prices.

### Depreciation

This never needs to be taken into account, because it is not a cash flow. It merely records the loss of value of an asset as it ages. Depreciation only has an effect if the evaluation is carried on a post-tax basis (because it affects year-by-year tax liabilities). Even then its effect is indirect: it is the tax amounts themselves that need to be accounted for, not the depreciation. However, in practice, post-tax analysis is unusual. Pre-tax analysis is easier and the more common option.

# Appendix B: Action checklist

## Action checklist



[Download](#)

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# Plug into energy efficiency with PSEE

The Private Sector Energy Efficiency (PSEE) project aims to improve energy efficiency in industrial and commercial sectors across South Africa. PSEE offers a variety of services to help companies plug in to energy efficiency:

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➤ [www.psee.org.za/Services/Large-Companies](http://www.psee.org.za/Services/Large-Companies)

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The Private Sector Energy Efficiency (PSEE) project aims to improve energy efficiency in commercial and industrial companies in South Africa through the provision of various services to assist companies in identifying and implementing energy saving measures. The PSEE project is implemented by the National Business Initiative (NBI), supported by the Department of Energy, and funded by the UK Department for International Development (DFID).

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