A Low Carbon Route Map

Guidance for communities applying to the Climate Challenge Fund

Feasibility Studies

It's our future

natural scotland
SCOTTISH GOVERNMENT

Foreword

All over Scotland and beyond, people are working together in communities to reduce CO2 emissions. These are early days and there is still much to learn about what works – and lots of new approaches and ideas to be tried and explored. Any community thinking of developing carbon reduction projects will be at the forefront of the journey to a low carbon society. This means that while there is much to learn from others' successes (and occasional failures), some of this is uncharted territory in which you'll be pioneers.

The Route Maps aim to help you and your community develop projects that are relevant, engaging and have maximum chance of success. Most of the Route Maps cover four areas to help you start your community's low carbon journey:

Surveying the landscape: Before starting any new journey it's important to learn as much as possible about what lies ahead. Here you'll find an introduction to the topic, relevant carbon emissions, and how they can be reduced.

Choosing your particular route: There are many ways communities can reduce CO2, and many different routes to success. Here you'll find information to help you think through different approaches and to choose ones that are right for your community, and, ideally, not only reduce CO2 but have other benefits as well.

Planning your journey: Here you'll find advice to help you make the detailed plans for your journey – and how to keep track of where you are so you know if you're making progress.

Signposts: To sources of further information and advice.

There are currently six Low Carbon Route Maps covering Project Planning, Energy, Travel, Food, Community Buildings, and Feasibility Studies.

Two warnings:

- The Route Maps don't replace the detailed Climate Challenge Fund guidance on completing an application – read that as well
- Not all the measures mentioned are eligible for funding from the Climate Challenge Fund – but they help present the bigger picture. You may want to include them in a project with funding from other sources as well.

Every community is different; the aim of the Route Maps is not to tell anyone the 'best' way to do any project (because there is no one 'best' way) but to help you develop projects that work for your community.

Good luck – enjoy the journey!

The *Low Carbon Route Maps* have been researched, written and designed by Footprint Consulting Ltd; Environmental and Resource Economics Limited; and Alan Speedie Associates Ltd for the Climate Challenge Fund, July 2009.

Surveying the landscape

Introduction

The purpose of a feasibility study is to assess whether or not the project you are thinking about is feasible – will it work? A feasibility study will allow you to show other people that you have thought through the potential options, identified the risks and pitfalls associated with the project and identified the appropriate sources and scale of technology to use.

All projects, whether concerned with transport or the construction of wind turbines require some form of feasibility study. The bigger and the more complex your project the more you should expect to put into developing a feasibility study.

In this Route Map we outline what is required in a feasibility study. This will allow you to prepare the study yourself or help you to manage and direct a consultant carrying out a feasibility study (or parts of it) on your behalf. Before you decide how to tackle the feasibility study it is a good opportunity to ask other members of your group or community about their skills and how they might contribute.

If your group doesn't currently have the skills to tackle a feasibility study perhaps you can explore ways of bringing in other people who have some of the skills you need. Local accountants or lawyers, for example, might be prepared to give some of their time for free. Retired people often have skills and experience that they can bring to projects and, what's more, they may have good networks of contacts who can help in other ways.

However you decide to proceed, the more you understand of the process the better equipped you will be to produce a thorough feasibility study.

Should we use a consultant?

The decision to use a consultant, or not, is a difficult one. Consultants can bring a much wider range of experience to bear on your project but of course they cost money to employ. It is sometimes possible to raise funds or receive grants in order to employ consultants. Whether you do or not, it is essential that your feasibility study is specific to your community and to your project and the instructions to your consultant (usually called "the brief") are complete and clear. If not, you can be left with incomplete or unclear feasibility studies. You should always ask for a formal proposal based on your brief and you should interview likely consultants before deciding on which to use. During the interview you can establish what specific experience and skills the consultant brings and the issues they foresee in undertaking the work. You should also try and ensure you get a consultant with whom you feel comfortable.

Below is a short checklist of things you may want to establish with a potential contractor for your feasibility study. You should add to this list depending upon the specifics of your project.
Checklist for selecting consultants:

- Do they understand your project?
- Do they have experience of feasibility studies?
- Do they have experience of your kind of feasibility study?
- Do they know the local area and the local constraints / issues?

- Do they understand the financial constraints?
- Do they bring a knowledge of funding sources?
- Do they have the time to undertake this work for you?

You should ask for and follow up references from potential consultants.

Purpose of a feasibility study

Think of your feasibility study as serving a number of important functions;

- It should tell you whether or not your proposal can be delivered;
- It should be useful in persuading stakeholders that your proposal can be delivered;
- It should provide a guide to the steps you need to take to deliver your project.

You should not rule out the possibility that after undertaking a feasibility study you realise that the project you initially proposed is not feasible because the CO2 emissions savings are insufficient, the costs are too great or the technology is not as effective as you had hoped.

Obviously you should explore alternatives but in cases where a feasibility study shows that there is little to be gained in embarking on a significant new project it's either time for a fundamental re-think, or to decide to abandon the project.

Example: A church with several associated buildings and community facilities was concerned about the increasing costs of gas to fire their four gas central heating boilers and commissioned a feasibility study to investigate the renewables options. After a detailed study of the costs and benefits of heat pumps and wood chip or wood pellet boiler it was found that there were CO2 savings from each of the options explored, but the capital costs would take more than 15 years to be paid back by cost savings.

The feasibility study that you put together might be used by funding partners to assess whether or not they wish to invest in your project. You must paint a very clear picture of the existing setup and how your project will impact on that picture.

In general terms, people with money to make your project happen can give either grants or loans. Typically grants are gifts given on the basis of the outcomes that will be achieved. Outcomes include reduced CO2 emissions but may also include community or social benefits, employment or improved services. It is important that you design your feasibility study with illustrating these outcomes in mind. You will need to ensure that you clearly articulate the situation as it would be without the project you propose (known as the baseline) and use this as the point of comparison with the project. Loans are provided by people who expect to be paid back whether this is a commercial loan or a 'soft' loan from public funds.

If you are commissioning someone else to undertake the feasibility study it will help if you can give them an idea of the kinds of funds that you anticipate attracting.

Content of a typical feasibility study

There is some flexibility in the content and emphasis you place on different aspects of your feasibility study but you might expect to cover at least the following sections:

- Establishing the need
- Exploring of options
- Understanding the constraints
- Identifying the preferred option
- Detailed costs and funding proposals
- CO2 savings of proposed project.

Broadly, you are trying to paint a picture that explains your situation now, what can be done about it and how you propose to go about meeting the need or embracing the opportunity represented by your project. It is an opportunity to instill confidence in stakeholders and to demonstrate to them that you have thought through the issues that are likely to impact on your success or failure.

Establishing the need

You are proposing a project because it will be beneficial in some way. Some communities may be disadvantaged by their location or social conditions, the project might alleviate these, perhaps by reducing costs or providing services. Other projects will be motivated by the opportunity that exists, perhaps based on a local natural resource like wind or forestry. This section of the feasibility study should set out clearly why such a project is appropriate in your area.

You might expect this section to include:

- Description of the community: who are the people making this proposal? Why are these the right people to be making it? Is the project supported in the community? Will the supporters still be there after the initial excitement has worn off?
- Maps: showing where you are relative to other facilities / communities; showing areas of resource availability (nearby wood, a fast flowing river etc). Depending on the complexity of your project you might want to make considerable use of maps to illustrate aspects of your project.
- Description of existing infrastructure. You will do this by addressing questions like: does your project rely upon connection to the electricity grid? Where is the nearest connection point? What are local travel conditions like? Are alternative facilities available nearby?

Use this section to provide context for your project. You may wish to make use of your local knowledge to undertake much of this work yourself even if a consultant is undertaking the rest of the project for you.

Exploring the options

Exploring your options in a systematic manner demonstrates to potential funders and other stakeholders that you have thought about the range of options and selected the most suitable one for your circumstances.

You need to answer the questions like these:

- Given the context and needs you have described above, what are the possible options available for meeting those needs or taking advantage of that opportunity?
- As well as the proposal you had in mind when you started, what else might exploit the opportunity or meet the need you have identified?
- What is the most appropriate scale for the project? What if it were a little bigger (more turbines or bigger installation)? What if it were smaller?

Anyone looking at your completed feasibility study will know that there are options. Demonstrating that you have explored a range of them shows that you understand what you are doing and can help to establish your credibility with potential funders or partners.

This section of your feasibility study might particularly benefit from an experienced consultant who has a knowledge of a number of technologies and funding streams.

Understanding the constraints

Constraints are those things that might limit your ability to achieve your project. These might be: environmental, technical, political or planning constraints. It is important that you set out all possible external constraints on your project and demonstrate that you have thought about how they impact on it.

Very few projects do not face obstacles to their implementation. Exploring constraints in a feasibility study allows you to identify those that your project will have to address, and allows you to make plans to overcome them. This might be achieved by a change in technology or a change in location. It might require you to plan for mitigation measures, or require a negotiation with a regulator before your project can go ahead.

Understanding constraints is about giving you information you need to decide on how to take your project forward.

Example: A community in the west of Scotland has access to a large stock of waste from forest workings and waste wood from demolitions. The group is conducting a feasibility study to explore options for a combined heat and power plant. Having explored the options, the group discovered some important constraints. Any plant with the capacity of processing more than 10 tonnes of waste per day will require a PPC (Pollution Prevention and Control) license from SEPA. They further discover that if the plant takes waste demolition wood it will need to comply with the more onerous standards of the Waste Incineration Directive. The group decided that they needed to know more about the duties and cost implications of these regulations before reaching a conclusion. They also decided to try and enlist the help of someone experienced in environmental regulation to help them with their feasibility study.

In the sections that follow we highlight some of the major constraints you might experience in making your project happen. You should also refer to the Energy and Community Buildings Route Maps which provide additional details on different types of project.

Environmental constraints

Your project may depend upon nature perhaps sunlight, rainfall or wind. What do you know about the prevailing conditions in your area? If you have a specific site in mind for a wind-farm for example, how do you know that it gets sufficient wind and how do you know that it does not get too much? Many turbines are designed with a certain maximum wind speed at which they can generate electricity.

What are the local flora and fauna? And how might they be impacted by your proposal? For example, peaty soils that are allowed to dry out can release many tonnes of CO2 (potentially exceeding the amount saved by replacing electricity produced by burning coal). Local bird populations might be particularly vulnerable to colliding with wind turbines in the area you propose to use. Anglers, canoeists or others might be dependant on conditions in the river you propose to use for generating hydropower.

It will often be a good idea to consult with local environmental stakeholders. Their local knowledge can mean the difference between a well-sited proposal and one that causes problems for someone else.

Some proposals will need planning permission and yet others will need to comply with European or other regulations for environmental licenses. Most agencies such as the Scottish Environment Protection Agency (SEPA) and Scottish Natural Heritage (SNH) will be amenable to pre-application discussions. Most planning authorities have staff who can advise and environmental organisations such as the Royal Society for the Protection of Birds (RSPB) will normally be helpful if approached in an open and friendly manner.

Technical constraints

If you have a particular piece of equipment such as a wind turbine or biomass boiler in mind you should establish very clearly the operating parameters of the equipment. Wind turbines, for example, may not operate at certain wind speeds. Biomass boilers may have an upper-limit on moisture content – does your locally sourced wood meet this standard? An anaerobic digestion facility for waste food might tolerate relatively high levels of packaging and plastic contamination but might be seriously impaired if there were contamination from batteries.

Prospective suppliers should provide you with technical information about operating parameters for their equipment and they should answer your questions fully. However, they may not volunteer information if you fail to ask about something. You may also wish to establish clearly with suppliers what warranties they provide and you need to know what happens if the system does not perform as anticipated. Will the supplier come and help you set the system up to get the performance they promised?

If your plan involves supplying electricity to equipment or the grid how does the supply perform under different conditions and will interruptions of supply or other interruption create a problem. If so, how might any problems be overcome?

The technical constraints section helps you to understand and demonstrate your understanding of technical issues that might stand in the way of achieving your project. Identifying constraints at this stage, while you still have time to modify your plans, is far better than identifying them later on in the process.

Planning constraints

It is important if you are involved in a project that will require planning permission that you are aware of the planning rules in your area. Most areas have both a structure plan and a local plan. These set out many of the specific planning constraints and policies that will be applied in an area and you should ensure you identify where your proposal fits within these plans.

There are Planning Advice Notes issued by the Scottish Government that ensure a degree of consistency between planning authorities. The most relevant, PAN 45, concerns Renewable Energy Technologies and it along with all of the others can be downloaded from the Scottish Government web pages – see Signposts below.

In most cases the Local Authority Planning Department will provide some assistance, particularly to community based groups, and additionally, local elected representatives can help to navigate planning issues.

There are consultants that specialise in working with planning authorities, and you may want to consider using a consultant where there are particular difficulties in this area.

Examples of constraints

Wind turbine projects, retro-fitting and new eco building projects face particular types of constraints and the following lists, while not exhaustive, should provide some ideas about the kinds of constraints you are likely to face. The Energy and Community Buildings Route Maps provide additional information that you will find helpful.

Wind turbine projects

Be aware of the potential for each of the following specific constraints:

Environmental

- Is the area that you wish to build in a protected area? Does it have a designation such as SSSI (Site of Special Scientific Interest) these are protected by SNH who must be consulted about developments .
- What would the visual impact of your proposal be? Is the site designated as a National Scenic Area (12.7% of Scotland is designated as NSA)?
- What are the wind resources of your proposed site?
- Wind Turbines can cause interference with Air Traffic Control, therefore National Air Traffic Services (NATS) are a statutory consultee on all wind turbine projects.

- What is the impact on the local wildlife population, in particular birds?
- Explore what will happen to the soil in the area (including during construction when a construction road might be needed), carbon rich / peaty soils can release significant amounts of CO2 if disturbed.

Technological

- If you wish to build your turbine in an area where it might affect air traffic control radar then investigate particular forms of turbine that have a lower than normal radar signature.
- If you wish to sell power to the grid you will have to ensure that you have an access point to the National Grid.
- As well as interfering with radar signals, wind turbines can also interfere with television signals. You may need to consider how to minimise this.

Eco-refurbishment of an existing building

Some of the factors that must be taken into account on this type of project are similar to those that must be taken into account when looking at wind power projects. The environmental constraints involved in retro-fitting an existing building may be particular to the building involved in your project. See also the Community Buildings Route Map.

Environmental

- Is the building 'a listed building'? This may impact on the overall cost of the project. Make sure you are aware of any conditions and highlight them in the feasibility study.
- Is the building in a conservation area? If so you should be aware of the guidelines that are to be followed.
- Does the building you are working on contain asbestos? If it does, then the cost of removal and disposal should be included in your feasibility study.

Technological

- New energy saving technologies may not work effectively in older buildings that might have thicker stone walls and higher ceilings.

Planning

- Eco buildings with 'novel' materials might be unfamiliar to local planning staff, who may even be sceptical. You may wish to find out what has been approved locally. You may also need to make a very strong case and be willing to challenge decisions through the planning appeals process.

A new green building

See also the Community Buildings Route Map.

Environmental

- When planning your new building you will need to take into account the impact that your new building will have on the existing environment.

- Is there any risk of contamination in the land you are using? Could there be abandoned mine workings? You will need to be aware what you are building on. This may require you to undertake a full survey of your site.

Technological

- How might the techniques or materials you are using interact? You need to be aware of how the different elements of the building will interact.
- What are the order and delivery times for building elements? Can you build these into work plans?

Planning

- There may be restrictions on your site, for example, the height or footprint of your building may be constrained.
- See the note above on Eco-Build retro-fit about the use of 'novel' materials.

You should include all possible constraints on your project in your feasibility study. The points above are a guide to what it may necessary to include in projects of particular types.

Identifying the preferred option

You should identify a range of other options that you considered before explaining why these options were not developed further. For example, if you are advocating a new build, explain why this is being done rather than retro-fitting an old building. If you are advocating a wind turbine, explain why this is the preferred option rather than other forms of micro-generation.

You might like to construct a table for each of the options listing 'pros and cons' with each which might look something like this:

> *Option 1 (example) Wood pellet boiler under-floor heating in community hall and recreation centre.*
>
> *(Give a short description)*
>
> *A wood pellet boiler with a maximum output of 32 kW is proposed to provide heating for a boiler to feed into a new under floor heating system in the community centre and the existing system in the recreation centre replacing a now aged diesel oil boiler.*

Pro	Con
Local supplies of suitable wood pellets	Variable costs of pellets
Reduced greenhouse gas emissions	Takes 3 months to install and commission
Increased level of comfort for community centre	Requires floors to be lifted
Etc.	Etc.

It should then be clear which option is best suited to your local needs and situation. A full description of how the project will work and the proposed timescales should be set out. A Gantt chart is a popular way of doing this:

Steps	October	November	December	January	February	March	Notes
1							
2							Order pipe during November
3							

Obviously your project will have many more steps and may well take longer. You might want to set it out with the paper landscape and perhaps separate sheets for each year (if your project lasts more than a year). Experienced project managers use these kinds of charts to identify critical points in projects and keep track of progress as a project develops.

Detailed costs and funding proposals

This is probably the section of the feasibility that causes the most concern for community organisations. A feasibility study is not a business plan in the traditional sense, but you should make the financial information as business-like as you can. It is important to take a steady methodical approach to detailed costing. The purpose of this section is to make certain that you know how much you need, when you will need it and how much you need to raise.

Some funding organisations provide their own format for costing information and if you already know who you will be approaching for funds you should make sure you (or your consultant) set things out in a way that will make filling in funding forms easy. You should, however, make sure that your feasibility study is helpful to a wide range of stakeholders, not just one particular funder.

Depending on the nature of your project there are a variety of sources of useful information on costing. For example, banks provide guides for small businesses and even though you may not think of yourself as a business these apply equally to anyone carrying out work. At the very least, you should use a standard spreadsheet tool on a computer to help with this process. You can use a single page of a spreadsheet or several depending upon what works well for you. If you have a delivery partner they may well be able to help with this aspect of your study.

If you use a consultant for this you still need to make sure that you understand what this information tells you. Make sure it is part of the consultant's brief to explain it to you, and if you are unclear about anything do not be afraid to ask questions.

Example

The following worked example takes you step by step through a process to complete this section for a relatively straightforward wind turbine development (the values are entirely fictional).

Step one: calculate your capital costs

List all of the equipment and things that you need to pay for in building your project, their cost, when they are required (or when you will need to pay for them) and how long they will last.

Item	Cost	Needed	lifespan
Access road	12,345	Feb 2009	36 months
Turbines	67,891	March 2010	15 years
Transformer	23,456	May 2010	10 years
Etc			

You can see right away that the timescale over which you calculate your costs will have an impact on the total. These costs are essentially the capital costs of your proposal – these are the bits of equipment that you hope will be working away to generate the benefit over time. If the construction spans several years you can add up the total and quite easily show how much is needed in each of the years of construction.

In addition you will have ongoing running costs, known as revenue or recurring costs.

Step two: calculate your running costs

Running costs are those costs that you need to incur in paying staff and running an office where they will work. If you have costs of materials and are producing something for sale that adds a little to the complexity of the spreadsheet. Just as you did above make a list of everything that you need to spend money on in the course of a year. A typical list might look like this:

Rent	10,000
Rates	5,000
Power	5,000
Phone	2,000
Insurance	5,000
Travel	2,000
Advertising	5,000
Post	1,000
Stationery	1,000
Audit / accountant	1,000
Printing	1,000
Bank charges	0
Salaries	140,000
Payroll cost	14,000
Employers NI Pension	28,000
Total	220,000

If you don't know how much something will be, ask for a quote. Things most often forgotten are advertising costs (if you have to recruit staff), legal expenses (which will be required if you take on a lease on a property or parcel of land), accountancy fees to provide annual audits, and employer's costs such as employer's national insurance.

Your project may have other ongoing expenses. Make sure that you identify all of the likely costs, even if you can only estimate some of them at this stage.

In a similar way to the capital requirements, these costs might be spread out over the course of time (in this case through the year). In the example above, the salaries might be paid monthly but the printing might be done at the start of the year and the audit at the end of the year.

Step three: identify your sources of income

Next, you need to list your sources of income, and it is probably easiest to do this in terms of grants, loans and trading income. Identify who will pay how much, when will it be paid and how long it is expected to last (which may relate to the length of the project or the life of an asset bought). Your list might look something like this:

Income		amount	Duration
Grants			
	The ABC Trust	200,000	
	Scottish Government	5	
Loans			
	Big Bank	100,000	repay over 10 yrs at 1,000 per month
Trading Income			
	electricity sales to grid	500	
	Renewables Obligation Certs	500	

Of course you may not know the sources of funds at this stage of your project – indeed your feasibility study might specifically address the question of funding sources and help you to identify gaps in funding that your project faces.

Step four: Predict when money will come into and flow out of your project

You will almost certainly want to put these different elements together into a cash flow forecast which tracks the flow of funds into and out of the project over time.

Set up rows for the various cost and income sources already identified using your spreadsheet system. Next create columns for each month. In the appropriate spreadsheet cell add in the amount of money for each item for each month. Your sheet might now look something like this (to save space we will only show January, February and December):

		January	February…	December	Total for year
Capital costs					
	Access road		12,345		
	Turbines				
	Transformer				
Revenue Costs					
	Rent	£ 833.33	£ 833.33	£ 833.33	
	Rates	£ 500.00	£ 500.00	£ 500.00	
	Power	£ 416.67	£ 416.67	£ 416.67	
	Phone	£ 166.67	£ 166.67	£ 166.67	
	Insurance	£ 10,000.00		£ -	
	Travel	£ 166.67	£ 166.67	£ 166.67	
	Advertising	£ 2,000.00	£ -	£ 833.33	
	Post	£ 83.33	£ 83.33	£ 83.33	
	Stationery	£ 400.00	£ 400.00	£ 400.00	
	Audit / accountant		£ -	£ -	
	Printing		£ 400.00	£ 400.00	
	Bank charges	£ -	£ -	£ -	
	Salaries	£ 11,666.67	£ 11,666.67	£11,666.67	
	Payroll cost	£ 1,166.67	£ 1,166.67	£ 1,166.67	
	Employers NI Pension	£ 2,333.33	£ 2,333.33	£ 2,333.33	
Total Costs		£ 29,733.33	£30,478.33	£29,733.33	
Income					
Grants					
	The ABC Trust	£100,000.00			
	Scottish Government	£ 1.00	£ 1.00	£ 1.00	
Loans					
	Big Bank				
Income					
	Electricity sales to grid			£ 12.00	
	Renewables Obligation Certs			£ 40.00	
Total Income		£100,001.00	£ 1.00	£ 53.00	

Even if your project will cover its costs over a year or several years you still need to forecast the cash flow to ensure that funds will be available when bills fall due. Using the spreadsheet you created above, you need to add an extra set of rows that track the cash position.

Your first new row (a) will be cash in hand or carried forward, this will be the money in the bank at the start and in future periods it will be the balance from the previous month.

The second row (b) will be the difference between income and expenditure in that month (income minus expenditure).

The third row (c) will add the amount carried forward (in row a) to the difference in the month (row b) giving the new balance at the end of the period (this value is then used as the amount in row a for the next month). It will look a little like this...

		January	February	…	December
Cash flow					
row a	cash in hand or carried forward		£70,267.67	…	£18,000.00
row b	Income – Expenditure	£70,267.67	-£30,477.33	…	-£18,080.33
row c	New balance	£70,267.67	£39,790.33	…	-£80.33

In this example, January shows a positive balance (£70,267.67) which is the amount carried forward for February. In February expenditure exceeds income (by £30,477.33) but because there was money left over from January there is still a positive balance at the end of the month. By December the amount carried forward from November (£180,000) is a little less than the income minus expenditure figure and December ends with a negative balance (-£80.33) this means that the project will either require an overdraft facility or some expenditure will have to be postponed until additional funds are received.

The financial aspect of feasibility studies may seem daunting and you can get help to do this. Whether or not you use a consultant you should remember that your group will be responsible for managing the finances of your project. This responsibility will last long after any consultant has gone so you should ensure that you have systems in place to keep on top of the finances. Assessment criteria for some charitable funds includes assessments of financial systems and competence.

CO2 savings of proposed project

An important element of any sustainable project, whether food, transport or energy is whether or not it actually reduces emissions of CO_2. When calculating the CO2 saved after the completion of your project you should compare these emissions with what the emissions would have been if you and your community had continued as before. The general formula to use is as follows:

Emissions by existing system – emissions from new system = emissions saved.

It is also possible to calculate the carbon footprint of a piece of equipment using the formula below:

CO_2 Emissions= (Energy Consumption (kWh)(Time used in hours)*GHG Conversion Factor*

For more detail, see the relevant Route Maps.

Embodied CO2

Embodied energy is a measure of the energy used in the manufacture of equipment that you use – it can include the energy required to extract the minerals used in production, manufacture and installation. The calculations of CO2 emissions from grid electricity do not include the

embodied energy (and therefore CO2) in the construction of power stations so unless your technology is particularly energy intense in production the convention is that it should be ignored. It may also be very difficult to find out what the embodied energy / CO2 of your equipment is but it is a good question to ask your supplier. If you can establish the embodied energy you might like to calculate how long it will take to repay the embodied CO2 emissions in your project with the CO2 savings your project will deliver. The procedure is simple – divide the embodied CO2 by the annual CO2 savings and the result is the number of years your equipment needs to operate before the CO2 is 'repaid'.

Outstanding issues

If there are outstanding issues when your feasibility study is completed, you should probably include a final section on 'outstanding issues'. This is fairly self-explanatory, but if you have asked a consultant to prepare your feasibility study you should ensure that they do this so that you understand any limitations on their advice. If, for example, you are still waiting for a decision from a regulator or planner then it is important that this is set out in a way that allows you to plan for the different possible outcomes.

If there is an outstanding issue about something like land contamination you might need to raise additional funds to have this work carried out before a decision can be taken on proceeding.

If you are using a consultant you may ask them (within reason) to be available once the issue is resolved to ensure the study remains valid.

Signposts

Carbon accounting

The Environmental Association for Universities and Colleges
http://www.eauc.org.uk

'*Act on CO2*'
http://campaigns.direct.gov.uk/actonco2/home.html

The Carbon Hub – This site gives an overview of what emissions should be included in carbon accounting and what is meant by terms such as 'scope 1 emissions'
https://www.thecarbonhub.com/company/methodology

DEFRA GHG Conversion Factors 2008
http://www.defra.gov.uk/environment/business/reporting/pdf/ghg-cf-guidelines-annexes2008.pdf

The Department for Energy and Climate Change
http://www.decc.gov.uk/

CISCO - Embedded Carbon
http://blogs.cisco.com/green/comments/how_much_would_you_pay_to_know_the_embedded_carbon_footprint_of_a_product/

Learn About Carbon - Embodied carbon
http://www.learnaboutcarbon.net/faq/why-embedded-carbon-important

Post note: Carbon Footprint of Electricity Generation
http://www.parliament.uk/documents/upload/postpn268.pdf

Planning

The Scottish Government Planning Advice Notes – especially PAN 45
http://www.scotland.gov.uk/Topics/Built-Environment/planning/publications/pans

Scope

Examples of renewables see the Energy Route Map

Managenergy (EC Directorate-General for Energy and Transport) renewable energy – 'Feasibility Study in - Aberdeen'
http://www.managenergy.net/products/R353.htm

Tiree Community Renewable Energy Feasibility Study
http://www.tireerenewableenergy.co.uk/index.php?option=com_content&task=view&id=16&Itemid=36