FACTSHEET 7
THE MAIN STEPS OF A SCHEME

Harnessing a renewable source of energy involves a series of important steps and tasks, beginning with the team that has to be set up to run the scheme and ending with the installations that have to be decommissioned.

TIMING OF THE DEVELOPMENT

The development process is often iterative, requiring some aspects to be reworked. The timing and order of particular phases will vary due to particular project circumstances, some will overlap and indeed some may be bypassed altogether, particularly for small schemes. The time required to measure the available renewable resource and to secure contracts is often substantial for larger schemes.

FORMATION OF A CORE TEAM

The first step is to create a core team, which will take responsibility for taking the scheme forward. A meeting of interested parties to decide upon a development principle and to formulate an initial business plan will be helpful. Few groups, however, will be able to provide the necessary expertise and experience to develop a project fully without engaging expert input at some stage.

AWARENESS RAISING

Even at this early stage it is advisable to raise awareness about the proposed ideas locally and to consult with communities near to potential sites. Identifying and engaging potential partners at an early stage often helps to increase the momentum, for a scheme.
Discussions with local communities can help to identify and even make available sites, which had not been anticipated. Even where this does not occur, involving local people at this stage and encouraging local investment in a scheme can be important for engendering public support.

SITE SEARCH

Before committing significant funds to a full feasibility study for a particular site, it is often wise to undertake prefeasibility work to identify various potential sites. This could be undertaken in part or solely by the core group, depending on available expertise, using approximate data. A group may be eager to promote a specific technology and will look for an appropriate site, or may alternatively consider which technology is more appropriate to a particular site. Sites for small-scale hydropower, for example are very limited, which solar power projects can generally be included in may places, particularly on new buildings.

At this stage, it will also be important to:

- obtain a rough approximation of how good the renewable energy resource is at potential sites
- undertake initial consultations to determine who owns the land at a particular site,
- speak to the relevant planning officer and determine the planning authority's reactions/requirements,
- identify any locally sensitive features (e.g. historic monuments) or designated areas which could restrict development,
- consider the reaction of local environmental and conservation groups,
- investigate possible networking and partnership opportunities,
- estimate the level of noise at the nearest habitation,
- consider how accessible the site is, and
- for a scheme which may need to be connected to the electricity grid, consider how close a site is to a suitable connection point on the grid. Early discussions held with the grid company to determine feasibility and to outline connection costs will also be helpful.

LAND NEGOTIATION

Once a potential site has been chosen, negotiations over land use can be entered into to allow for proper measurement of the resource.

MEASUREMENT OF THE RESOURCE

The installed capacity and energy yield at a particular location will vary considerably, depending on local site conditions. Renewable energy sources which depend upon weather may require monitoring over a period of up to a year, as well as requiring research into past weather data. Conducting the appropriate hydrological, or wind speed surveys, normally requires the services of experienced professionals who will also be able to verify any preliminary work which may already have been done at the site selection stage. Resource management activities are often highly visible and it is usually beneficial to ensure that local communities are made aware of the nature of the investigations before measuring equipment is installed.

FEASIBILITY OF A SCHEME

Once the potential resource at a site has been measured, a full feasibility study can be undertaken. This will take into account the technical feasibility, potential market for the energy and funding opportunities to give an indication of the viability of a scheme and determine whether it is worth investing further resources.
It is advisable to have professional input into the feasibility study as it may be used by planning authorities, financiers and others when making their decisions about the project.

A feasibility study will involve an investigation of planning, legal and environmental considerations. Early attention will need to be paid to the requirements for planning consent – many soundly conceived projects fall through due to problems related to planning, permits and consents. To help avoid this, a checklist could be prepared which describes all of the necessary permits and consents needed for the development, and a plan developed describing how these permits and consent will be obtained. In most cases it will be advantageous to have further contact with the planning authorities at this stage and it may be beneficial to get advice from an external planning consultant. An environmental statement for the project may also be required.

Another key component of the feasibility study will be to estimate the energy output and analyse its sensitivity to variations, including seasonal weather conditions. An energy demand study will also be required, assessing both on-site power demand and the likelihood of securing an offsite energy sales agreement. Once the likely demand and the resource has been established, the size of the proposed system can be considered to give an idea of the scheme design. An economic assessment, taking in to account system costs and income generation, will now be possible. At this point, further consideration of the business structure and its legal status (E.g. co-operative partnership, joint venture with a utility company) will also be needed. Preliminary discussions with potential financial partners and bankers will enable an outline financial appraisal to be completed.

DETAILED ASSESSMENT

Once a site has been chosen, following a favourable feasibility study, a detailed assessment of viability will be needed along with a detailed business plan. These include details of such things as a description of the overall development process (stages, timing, funding), the impacts of the construction phase (lorry access, noise), estimates of costs (construction, operation and maintenance) and the implications of operation (maintenance, dealing with emergencies).

For all but very small schemes a full design study will need to be conducted by consultants. This will involve, for example, specification and design of the system, selection of appropriate equipment, design of any grid connection, foundations and access roads. There are a number of technical regulations and standards with which private generators have to comply if they are to be connected to the grid. An assessment of operating and maintenance requirements will also be needed.

A revision of financial calculations is essential at this stage to determine the financial requirements that need to be secured and the insurance requirements. Further consultation with interested parties and energy purchases will be needed, along with a decision about the nature of ownership and control of the development.

An outline planning application can be discussed with planning, regulatory and consenting authorities. For large schemes an Environmental Impact Assessment may be required at this point to assess potential environmental effects. It is advisable to share this information with local communities as early as possible.

SECURING COMMITMENT

It is vital to secure commitment from stakeholders before committing further. This will include all lenders, landowners, shareholders, the operators, insurance companies, energy purchasers/users and suppliers.

PLANNING APPLICATION

When the site has been shown to be suitable and viable for development, and when consultation at the local level has resulted in a definite plan for all aspects of the project, a formal planning application can be made.

CHOOSING THE LEGAL STRUCTURE

Before appointing contractors and suppliers, a formalised legal structure for the project needs to be established, involving:

- site lease agreements,
- loan agreements,
- electricity connection agreements
- fuel and waste supply contracts
- electricity/heat sales contracts
- operating and maintenance agreements
- engineering procurement and construction agreements,
- shareholders agreements, and
- insurance agreements.

It is now time to finalise all legal and financial matters, to raise equity and secure debt finance.

CONSTRUCTION

Once all agreements have been reached, planning approved, investments secured and design finalised, construction of the project can begin.

OPERATION AND MAINTENANCE

Operation will require ongoing project management. Repayment of loans and/or dividends to community investors will also require administrative support. And after decades of operation, it may be financially beneficial to undertake a major refurbishment of the plant.

DECOMMISSIONING

Decommissioning should always be considered in the detailed design phase.

SOME PITFALLS TO AVOID WHEN DEVELOPING A SCHEME

PITFALLS TO AVOID	HOW TO AVOID THEM
Lack of professional advice, especially at the planning stage.	Hire a recognised independent consultant, at least for the feasibility study, before embarking on the construction phase.
A short-term view means poor choices in the beginning (poor assessment of expected energy savings and often poor selection of material), resulting in low efficiency and additional expenditure to solve the problem.	Make sure the site study and characteristics of the scheme are at a sufficiently advanced stage to proceed to the construction phase.
Poorly drafted contracts for construction and the supply of equipment.	Use standard contracts; clearly define project cost and operating responsibilities, with the consent and written agreement of each of the parties concerned.

FACTSHEET 9
INVOLVING THE LOCAL COMMUNITY

As with any type of development, it is important that a renewable energy scheme is sited in a way that minimises the impact upon people living locally as well as upon the environment.

CREATING COMMUNITY BENEFIT

Solely concentrating upon cost reduction and the cheapest sites for renewables can lead to conflict, particularly in environmentally sensitive areas. In some regions there is concern, for example, over the visual impact of wind farms on scenic landscapes, over the ecological impact of hydropower schemes, and over the impacts of monoculture energy crops on biodiversity. Insensitive siting and development of environmentally damaging renewable energy schemes is likely to be detrimental not only to the local environment, but also to the prospects for continued public support for renewable energy in general.

Any new type of development in an area is likely to rouse interest and sometimes concern about the potential impact. Consultation with local people during the planning and development stage of a renewable energy scheme and encouraging local investment in it, can be key to engendering public support for the initiative. Informing and involving local communities at an early stage may help to feel secure:

- a feeling of community ownership
- less public opposition
- speedier development
- ideas for improved location, layout and design, and
- local funding.

Local communities expect prompt and honest communication, particularly where there may be concern about a new type of development about which they know very little. In many instances, developers decide to keep proposals confidential until late into the process. There have been many instances where the first knowledge a community has of a potential wind power scheme in an area for example, is when they have seen a wind anemometer mast on a nearby hill. This has often led to an initial negative reaction towards the proposal, one that has been hard to change.

Acting quickly to involve a community in a venture can help to provide a sense of satisfaction and support for the scheme. A range of awareness-raising and confidence-building activities can be used to facilitate community involvement, including:

- informing the community of the possible benefits and impacts of a proposed renewable energy scheme,
- consulting with the community about a scheme,
- providing opportunities for the community to influence how a scheme is developed,
- offering local job opportunities, for example, in the operation of a scheme,
- facilitating some form of control over a scheme
- offering people the opportunity to invest in a scheme and receive a financial return, and
- enabling complete community ownership.

There is often a desire by local people for some form of benefit to be derived from a scheme. For example, to receive a discount in their electricity bills or to be able to part-own the scheme. Community ownership, which is well established in Denmark and elsewhere, is a particularly effective way of providing benefits to the local community and gaining their support. There are several methods of ownership which could be considered, including:

- general share ownership without restriction,
- general share ownership linked to energy consumption, and
- targeted share ownership (e.g. local people of specific interest groups).

Establishing community ownership, however, usually requires a considerable time commitment from individuals within the community. Also investment in the project carries a degree of risk, as with any other business venture. It may also be difficult for a community to raise adequate money.

COMMUNITY INVOLVEMENT AT CERTAIN STAGES OF THE PROCESS

Site search – Few people are usually involved at this stage, but if support can be generated then a real sense of ownership and belonging towards the project can be generated,

Planning consent – This is usually the time when the views of statutory consults are sought.

Environmental Impact Assessment (EIAs) – This is a mandatory part of the process for some larger schemes and on a voluntary basis for smaller schemes. EIAs can help define communities of impact and lay down clear parameters for subsequent decisions and remedial actions. Few communities are ready to contribute positively to such procedures, mainly because they are unaware of their content and value.

Detailed Design – Getting involved at this late stage is not likely to be very fruitful as most of the decisions about the scheme will already have been made and the changes sought may not be technically possible.

FACTSHEET 10
COSTS AND FUNDING OPPORTUNITIES

The cost of many types of renewable energy schemes has fallen significantly over the last decade. There are now many situations where renewable sources of energy are now competitive or even the cheapest source of power. In many other situations, however, renewable energy is till more expensive than other sources of energy, partly because the true cost of other alternatives are not taken into account. The search for funding is therefore crucial, and programmes providing financial aid do exist.

COSTING A DEVELOPMENT

There are several key questions which will need to be answered in order to determine the economic viability of a renewable energy scheme. These include:

- How much will the development cost to construct?
- How will the electricity be sold and at what price?
- How is the project to be financed?
- What will the financial returns on the investment be?

The principle costs involved in developing a renewable energy scheme include:

- Costs of any preliminary studies (including initial design and resource measurements),
- Costs incurred in obtaining planning permission
- Purchase price of the equipment,
- Infrastructure costs (cables, access roads, foundations),
- Costs of connection to the local electricity distribution system where appropriate
- Installation, delivery and commissioning charges,
- Project management costs,
- Charges for additional warranties
- Fees for the arrangement of finance and provision of capital, and
- Legal fees

Annual outgoings usually include:

- Operation and maintenance costs,
- Metering costs and standing charges
- Insurance costs
- Local taxes
- Payment to landowners
- Servicing of borrowed capital, and
- Repayment of cost of installations.

Some costs of a development will be incurred regardless of whether a project goes ahead or not. These costs are unlikely to be covered by borrowing, although subsequent development costs might be. Even if the results are positive and a project goes ahead, the costs are not normally recoverable in any form of grant or subsidy – they can only be recovered from the long-term profits of operation.

Typical sunk costs include:

- Project identification
- Pre-feasibility study, feasibility study, negotiations and contracting, and
- Site monitoring investigations.

The cost of a feasibility study carried out by an independent consultant depends on its scope and on the specific characteristics of the site. In the early stages of a project however, advisers (particularly financial advisers) will often work largely on a contingency basis (i.e. if the project does not go ahead there will be no, or a very much reduced, fee).

ASSESSING THE RISKS

Defining the risk at the outset of a project will enable parties to minimise risks before the project actually starts. It is very important to identify the different risks which appear at different stages of a project and apportion them to an appropriate party. The most common risks include:

- Unreliable energy source,
- Problems with technology,
- Delays in construction,
- Poor operation of the equipment,
- The market for the energy,
- Financial arrangements
- Political and legal changes, and
- Environmental impacts.

Apportioning the risk to the party most able to reduce that risk is usually the most effective strategy at reducing insurance costs. For example, the supplier and installation contractor is usually required to insure against delays in construction. Risks that are usually borne by the sponsors include operative risks and project management. Innovative technology might not be reliable, making it important to secure guarantees from the equipment supplier. It should be stressed however, that the level of risk involved in a mature renewable energy technology is not necessarily any different to that of other types of development.

FUNDING

Most renewable energy projects are highly capital intensive and will require the developer to raise large amounts of finance well in advance of the start of operations. It is unlikely that 100% funding will be available from equity and so some level of debt finance will need to be obtained in most cases. It may be difficult, however, for small projects in particular to attract the attention of lenders and investors. The process of arranging finance is very time consuming and is typically greatly underestimated by developers.

Although every project is different, there are generally five routes through which finance can be obtained:

- Use of personal reserves except for the smallest of renewable energy projects, however, it is unlikely that sufficient personal or company reserves would be available to meet the total cost of the project,
- Grant obtained to support a new or emerging technology, use of bank loans secured against parts of the developer's assets,
- Co-development of a project with a financially strong joint venture partner, and
- Limited recourse project financing, whereby bank loans are secured largely against future cash flows rather than just physical assets.

Securing contracts for the sale of the power produced is the cornerstone of a renewable energy project. Most renewable energy schemes provide an intermittent or irregular energy supply, resulting in a fluctuating cash flow. This is not a significant problem in most cases, but needs to be fully appreciated by the parties involved. For a biomass project, lenders will usually wish to see evidence that long-term supply contracts have been agreed ensuring that sufficient fuel supplies are available for a period which comfortably exceeds that of the financing, ideally by a margin of 2-3 years. With most schemes being in rural areas, grid connection costs are often critical and may be a major item of expenditure.

EUROPEAN FUNDS

The main European Union programmes which support renewable energy development are:

ALTENER:
This programme, managed by DirectorateGeneral XVII (Energy) of the European Commission, aims to promote the increased use of renewable energy in Europe. It is a "software" rather than hardware programme, providing support for: pilot actions to create or extend infrastructure for renewable energy development; promotion and dissemination measure; targeted actions to facilitate market penetration and encourage investment; and monitoring and support actions.

Funding is not generally available for an individual renewable energy scheme. Transnational co-operation is essential.
Contact: *europa.eu.int/en/comm/dg17/altener.htm*

5th Framework Programme for Research, Technological Development and Demonstration 1998-2002:
This provides funding for RTD projects and will not therefore be an appropriate source of funds in most rural development contexts. All projects require trans-national co operation and should involve technology, which is pre-competitive. Up to 35% of the cost of demonstration projects is available (and 50% for research and development projects). This new programme replaces the **THERMIE** and **JOULE** programmes, which were operated under the Fourth Framework Programme.

Other Community Mechanisms:
Other Community programmes are concerned with biomass, including FAIR which aims to promote research in agriculture and forestry (including biomass projects), and LIFE, which focuses on the environmental impact of a range of activities (including agriculture and forestry). Other EU programmes, which may be relevant are SAVE (energy efficiency) and SYNERGY (better international energy co-operation). Some rural development Objective 1 and Objective 5b funding has also been used for renewable energy projects

National Measures

There are a large number of national and local sources of financial support for renewable energy at the national level. Further information can be obtained from the relevant national information centres . Regulations aimed at stimulating the renewable energy industry vary widely from region to region.

FACTSHEET 11
A CHECKLIST FOR IMPLEMENTING AN ENERGY SCHEME

FORMATION OF A CORE TEAM

AWARENESS RAISING

SITE SEARCH

LAND NEGOTIATION

MEASUREMENT OF THE RESOURCE

FEASIBILITY

DETAILED ASSESSMENT

SECURING COMMITMENT

PLANNING APPLICATION

LEGAL STRUCTURE

CONSTRUCTION

OPERATION AND MAINTENANCE

DECOMMISSIONING