



Wind Module

Toolkit Structure

The Local Energy Renewables Toolkit is intended to be used as a reference by community groups and community based businesses. This module is one part of a series of documents forming the **Local Energy Renewables Toolkit** and is designed to cover all sizes of project, although the scale and complexity of multi MW projects may require more detailed evaluation than smaller projects.

Other modules that may also be of particular interest to those reading this module are as follows.

- establishing a community group
- project finance
- procurement
- securing the site
- planning
- grid connection
- the Feed-in-Tariff

This toolkit builds on the work completed for the Scottish Government's Community and Renewable Energy Scheme (CARES) by Local Energy Scotland and Ricardo-AEA.

Module Structure

This module is structured in four parts to act as a guide and reference document for Community Groups in the development of a wind energy project in Wales.

Wind energy context

Wind energy development statistics in Wales.

Project Overview

A brief introduction to the typical ways to develop a wind project and step by step summary.

Project Steps, Phases and Breakpoints

A more detailed look at each stage of a project, showing a logical progression with defined break points.

Further Information

Appropriate links, definitions and references to other information, collated for quick reference.

Wind Energy Context

In the majority of cases income from wind generation comes from both government incentives and electricity wholly or partly sold into the electricity grid. The main income stream for community scale wind schemes is the UK Government Feed in Tariff (FIT) and it is unlikely that any sub-5MW wind energy development in the recent past will have proceeded without receiving this support.

When developing your project if you need more information on the FIT you will find it in the separate **Community Renewables Toolkit FIT module**. Analysis of recent FIT applications gives an accurate picture of market activity. Community projects up to 5MW in capacity are eligible to apply for FIT support. There is more information on the FIT listed in the Further Information Section.

Ofgem’s FIT database of installations includes data on the Distribution Network Operator (DNO) that has connected the wind power installation to their networks. Extracting the data on schemes connected to DNOs gives an estimate of the total number of installations in Wales, where the DNOs are:

- Western Power Distribution, covering Wales; and
- Scottish Power Energy Networks, covering North Wales.

If you want further information on the various DNOs and their geographical reach this is contained in the **Local Energy Renewables toolkit Grid Connection module**.

Figure 1 shows the size profile of the wind schemes under 50 kW connected to DNOs in Wales, and Figure 2 shows schemes over 50 kW. The data is published quarterly by Ofgem and these charts relate to data published to the last quarter of 2014.

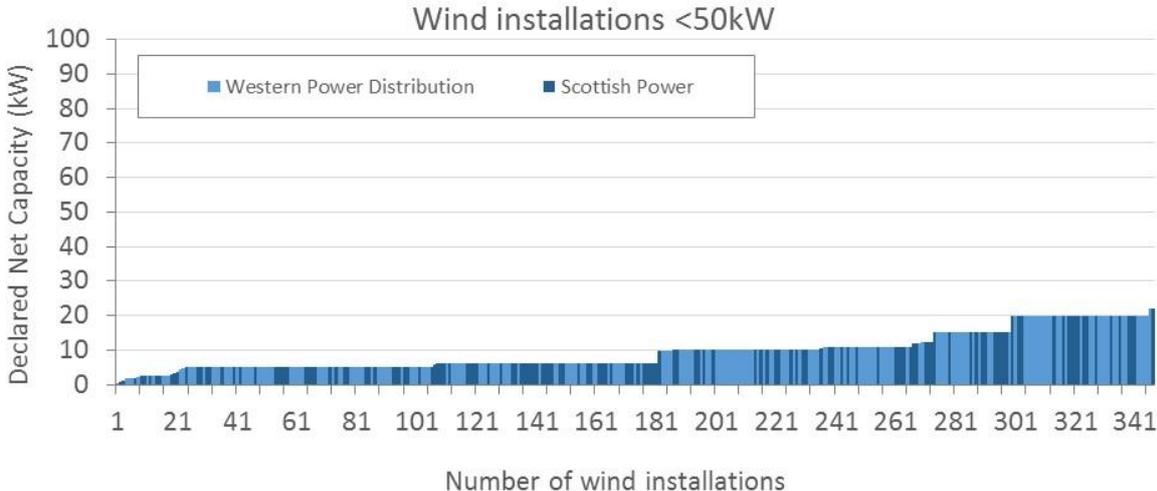


Figure 1: Wind development =<50kW registered for Feed in Tariff

This data for schemes of 50 kW and under shows strong clusters at 5KW, 6KW, 10KW, 11KW, and to a lesser extent 15KW and 20 kW. There are a limited number of wind turbine models and sizes available as all wind turbines at this scale must be certified under the Microgeneration Certification Scheme (MCS). Hence these clusters show the sizes available for single or multiple wind turbine schemes (e.g. clusters at 10kW are either 10kW wind turbines or 2 x 5kW etc.)

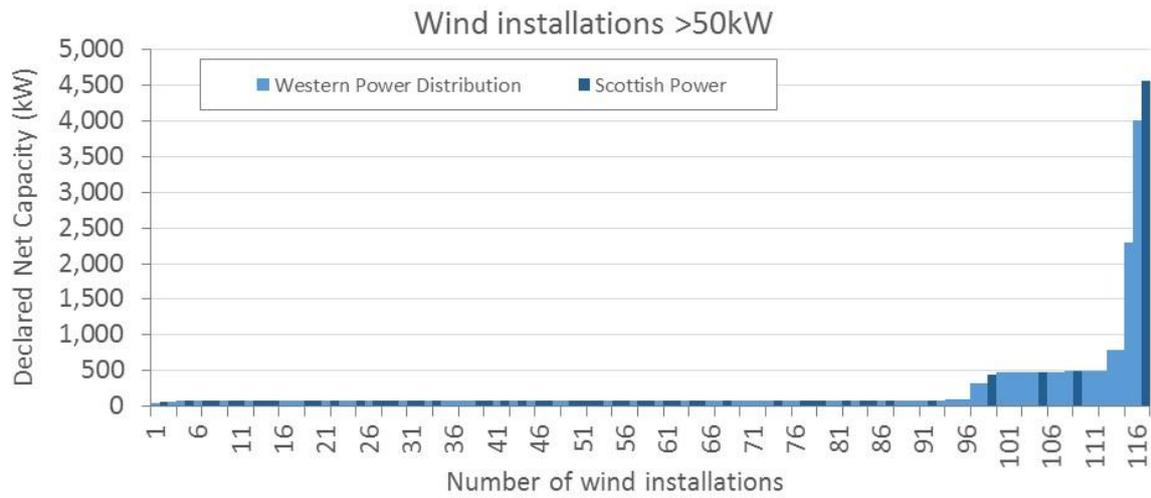


Figure 2: Wind development >50kW registered for Feed in Tariff

Figure 2 shows all installations greater than 50kW. The majority of these installations have a total installed capacity of 79.5KW, with a strong cluster of schemes at 480KW, and relatively few schemes above 500 kW. This is strongly correlated to the banding of tariffs between FIT thresholds.

Project Overview

Wind energy development options

There are a variety of development models that involve community groups to a greater or lesser degree and generally, as the level of involvement and control increases, so too do the risks and rewards. The range of involvement extends from taking on the full development of a project, to simply receiving benefit payments from another developer.

Allowing a wind developer to lead the project and take it through to completion offers the community group less risk, no cost and little work, however, the financial reward is likely to be relatively low compared to the same project being led by the community group.

As the benefits of engaging and sharing with the local community have been shown to create more successful projects, commercial developers are also creating different development models. Many of these are based on some form of partnership with a community group, possibly in a shared ownership or joint venture arrangement.

Table 1 below sets out the five main options open to a community group wishing to be involved in a wind energy project. It identifies the role of parties involved, where the main risks lie and the potential benefits.

Overview of activities

Although the level of involvement in a project will depend on the role assumed by the community group, it is valuable to have an understanding of the overall process in whichever role a community group has.

This module illustrates the progression of activities through a series of phases, up to defined break points. These break points are designed to review progress against a number of key challenges and confirm that a project is viable and thus worth progressing to the next phase. These challenges include:

- Obtaining planning permission
- Obtaining a suitable and affordable grid connection
- Securing rights to use the land and gaining suitable access to the land
- Finding sources of funding at each stage of the development

Technical Development Officers are in place across Wales to help groups develop their projects and access Local Energy funding. Table 2 below outlines the steps in developing a wind energy project irrespective of scale and who is leading the development.

Table 1 - Wind energy development options The table below gives general descriptions of five approaches to project development that may be applicable to Community Groups.

Model	Option	Description	Community Group Role	Third party Role	Community Group Risks	Community Group Benefits	Comments
1	community group leads and owns the project throughout	The community group identifies, develops and operates the project	As full developer	None	community group bears all of the technical, commercial and financial risks	The community group gains all income from the project and remains in total control of the process and outcome	For the community group to retain all financial and other benefits it must act as developer and take responsibility for all project risks. The community group may also become responsible for making community benefit payments to others.
2	community group in partnership with another party (Joint Venture)	community group identifies the project but shares further costs & risks	To undertake agreed tasks within the project development process	To undertake agreed tasks within the project development process	Risks are shared between partners & are usually limited to project costs	The community group gains a share of income & control, which remain in the proportions agreed with the other party	Depending on the detail and legal options taken, this can give the community group control of the project and can make the process of development easier. The transfer of benefits from the project will be agreed as part of the Joint Venture partnership agreement.
3	community group Initiates then hands over to a developer	community group identifies the project, gains rights to the site & seeks a developer to take the project forward	Site selection and initial viability then support for the project to make it a success	To confirm viability and take the project forward to operation	Work to identify an appropriate site usually involves more time than money, minimising risk	With rights to use the site the community group can negotiate more favourable outcomes in terms of ownership of the project	community group controlling the development site should generate higher benefits than those without control, however the bulk of income will reside with the developer
4	Developer leads & offers sale to Community Group (Shared Ownership)	Wind developer leads the project and sells a percentage or the entire project to the Community Group	Initial support for the project to make it a success then raises funds for purchase	Provides development skills and sources initial project finance	Reduced risk as community group would take ownership of an asset or project shown to be viable	Low risk route to long term asset ownership of a project	Potentially an attractive option where the project has been initiated by a developer. Purchasing generally increases the capital cost and may also impact on the income period. Community Groups considering this option should focus on obtaining legal and financial support
5	Wind developer leads and owns the project throughout	Wind developer leads the project & offers the community group an annual payment	Initial support for the project to make it a success	As full developer	None	Community Benefit payments vary between projects but £5,000 / MW installed is considered good practice	Community Benefit payments to Community Groups will generally be a fraction of the income available from a project.

Table 2 - Overview of activities The table below summarises a logical progression for developing a wind energy project

Phase 1		Developing the idea		
Step 1 Develop the Vision	A key initial step in wind energy development is to define why you want to undertake the project			1 to 4 months
Step 2 Seek Advice	Wind energy developments have already been undertaken by groups or businesses like yours			
Step 3 Communicate	Wind energy has the potential to be highly contentious so it is important to undertake early consultation with local residents & the wider community			
Step 4 Find a site	Sites can be assessed against key factors to identify if there is potential for a viable wind project. Ability to secure use for 25 years is also vital			
Step 5 Initial Scoping	Very roughly gauge site potential. There are a number of web based tools which allow you to quickly review the potential viability of a given site			
Break Point 1		Is there a reason to develop?		
Phase 2		Assess potential sites		
Step 6 Establish a legal entity	A community may need to be established as a formally constituted body or legal entity. A business may choose to operate under the business name			1 to 4 months
Step 7 Secure initial funds	Identify funding options to support pre-feasibility work. Appropriately constituted community groups can apply for an Local Energy Preparatory Stage Grant, which supports the project throughout the development stage, up to construction.			
Step 8 Pre-feasibility study	A more detailed scoping study, usually by a paid consultant, to assess the site(s) identified and the technology options suitable			
Step 9 Financial viability check	More detailed accounting of estimated expenditure and income should be carried out. There is an Local Energy Renewables financial model that can be used for this purpose.			
Break Point 2		Does the project have potential?		
Phase 3		Evaluate the project		
Step 10 Secure the site	The site is the key to viability so it is important to secure it by a legally binding agreement (an options agreement) before incurring further development costs			6 to 12 months
Step 11 Full feasibility study	Building on the scoping study this more detailed study is carried out to identify all the site constraints and confirm potential turbines models appropriate for the site			
Step 12 Confirm grid available	Based on feasibility study information, check grid availability at the preferred locations. Technical Development Officers can provide some guidance on this.			
Step 13 Pre-planning consultation	Meet with the local planning representatives and discuss your project, their relevant policies and any requirements they may place on an application			
Step 14 Neighbour notification	Notify all properties likely to be affected by the development about the proposed project and where possible ask for views and feedback			
Break Point 3		Can the challenges be overcome?		

Phase 4		Develop the project		
Step 15 Fix the project size		You should now have a scale of development in mind and the feasibility study, planning consultation and grid enquiry should have helped to fix this		6 to 18 months
Step 16 Financial viability check		Confirm the project remains financially viable. The Local Energy Renewables financial model can be populated with more detailed figures and various scenarios tested.		
Step 17 Planning application		Usually through paid consultants and including a variety of reports, surveys & visualisations, prepare and submit a Planning Application for the project		
Step 18 Grid application		Make a formal grid application to the appropriate DNO		
Step 19 Identify funding sources		Investigate routes to achieve capital funding, including Local Energy Capital Grant and Capital Loan funding. The most appropriate should be selected at this point as this will influence some future activities.		
Step 20 Develop full financial model		Complete a business plan and detailed financial appraisal with full project costs and projected project lifetime incomes to take to potential funders		
Break Point 4		Confirm consents, grid and financial viability		
Phase 5		Getting Financial Close		
Step 21 Identify & contact suppliers		With consents and agreements in place the turbine supply, construction, operations and maintenance contracts can be formalised and programmed		1 to 4 months
Step 22 Secure bridge funds		Identify if further funding is required (usually for deposits) prior to financial close.		
Step 23 FIT pre-accreditation		Timing of FIT pre-accreditation is critical to getting the best possible tariff for a project by balancing anticipated construction times with tariff reduction.		
Step 24 Financial Close		This is the point at which the funder assesses the project through a due diligence process and, if acceptable, agrees to release funds for construction		
Break Point 5		Is the project ready to construct?		
Phase 6		Completing the Project		
Step 25 Construction		Post Financial Close, confirm all orders and contracts and the process of wind turbine delivery, erection and connection can take place		1 to 12 months
Step 26 Community benefit		Where appropriate enter into a community benefit agreement to secure index linked community benefit payments for the life of the project		20 to 25 years
Step 27 Operation		Ensure management is in place for the life of the project for collecting and distributing income and meeting operating, financial and other liabilities		
Step 28 Decommissioning		Wind projects must plan for removal of the construction at the end of the productive life (generally 20 to 25 years).		

Phase 1 **Developing the idea**

Step 1 Develop the Vision

It is important you are clear about the reason for undertaking, or participating in, a wind development project. For example, this may be to gain income for use within the community or to become more energy self sufficient to offset rising energy prices. You may have environmental drivers to reduce carbon emissions. It is important that you fully understand and define your own drivers so that project viability and outcomes can be tested against your objectives.

For communities, an excellent way to identify needs can be through the development of a 'Community Action Plan', the production of which will allow the development of a strategic plan and allow local democracy to define and respond to local community objectives and opportunities. It also provides a robust mandate for the distribution of funds when a community related venture begins to provide revenue. A strategic plan provides overall direction on the long path from where things are now to where we hope they will be. Community work can be greatly enhanced by a clear vision, a mission statement, objectives, strategies, and an action plan.

Businesses can also benefit from the development of their own action plan, as this helps link business needs and objectives with the potential to develop a wind energy project.

The main points to consider in an action plan are:

1. What are the needs in your community/business and what evidence of these needs is there?
2. What potential, realistic changes can you envisage?
3. What actions & activities need to be undertaken to meet the needs and implement the changes?
4. What are the costs of the actions?
5. What are the short and long term priorities?

Eligible community groups can receive support through Local Energy to develop a community action plan. A number of examples of action plans produced by community groups have been referenced in Further Information.

Step 2 Seek Advice

It is sensible to seek the advice and experience of those that have started from a similar position and are well placed to offer help and guidance. By seeking this input from the outset you will be able to build on the success (and failures) of others when taking your project forward.

Early liaison with your local Technical Development Officer can highlight opportunities for knowledge transfer between organisations and potential meetings or project visits.

Organisations such as the CSE, PlanLoCal, Development Trusts' Association Wales and the Energy Saving Trust may also provide further support, such as case studies to facilitate the identification of suitable projects to approach & to gain their insight.

Consider completing a skills assessment of those persons that can be involved in the project during the development stages as the need to buy in consultancy support will clearly add to the cost of the project. The **Local Energy Renewables Toolkit Establishing a community group module** describes the range of skills that could be beneficial.

Importantly, look for advice in relation to an appropriate scale of wind project to suit the project objectives.

Step 3 Communicate

To ensure the best outcome for the project, establish clear communication within the local community, neighbouring communities and other stakeholders early in the project. Community engagement should begin as early as possible in the development process. Initial consultation is best carried out from project conception. However, it is important to continue engagement throughout all stages of the development process, particularly once there is some level of detail around the potential size, outputs and benefits of a development (i.e. following a project feasibility study). More information on community engagement can be found in the Toolkit section '**Establishing a Community Group**'.

Experience shows that this communication must be open and honest about what is being planned and must include good opportunities to receive and respond to feedback. This also avoids any misinformation being generated and to allow the vision for the project and the benefits from it to be fully explained. Eligible community groups can apply for an Local Energy Preparatory Stage Grant to support communication of this nature.

If strong opposition remains after this process it may make it harder and more costly to obtain planning permission and may cause lasting social impacts within your community.

There are a range of guidance documents available for engaging with the community referenced later in this module.

Step 4 Find a site

There are six important points to consider when identifying a suitable site.

- Wind resource
- Planning constraints
- Grid connection
- Lease agreement
- Radar interference
- Access to site

Further, the Scottish Government also provides a Renewable Handbook, highlighting a number of key factors to consider when determining the suitability of a particular location for siting a wind turbine. The same issues will apply in Wales, and the handbook be referenced in addition to this module.

Wind Resource

Correct wind turbine location is essential for project viability and a major determinant of this is wind speed. For a rule-of-thumb guide for MW scale turbines communityplanning.net suggest a wind speed of 6.4m/second (measured 45m above the ground) can lead to a financially viable project & for smaller turbines on lower towers, 5m/second or more at a hub height of 10 m may be needed. However, sites with lower wind speeds can still be viable for a given circumstance or for smaller wind turbines and conversely, if a site has these wind speeds, it is not certain to be viable.

In these initial stages of project development wind monitoring is not practical so other 'virtual' means of wind speed assessment are available that do not require masts to be erected.

Planning constraints

Most planning authorities have published Planning Policy Guidance covering wind energy projects and this should be your first port of call for background information. In addition many planning departments welcome early informal discussions with wind energy developers about their plans. If turbines have been proposed, or built in the area, the Local Authority web site will contain details of the planning application, the objections and any restrictions on

the development of wind. This can be a valuable source of local information. While results from this background research can never guarantee that planning consent will be granted on any given site, it may help to identify where there may be serious barriers and the basis for this. The **Local Energy Renewables toolkit Planning module** provides additional guidance.

Designated areas such as Sites of Special Scientific Interest (SSSI), Areas of National Outstanding Beauty (ANOB) and National Parks have significant planning restrictions associated with them and will require additional consultation and are more likely to require an Environmental Impact Assessment (EIA) for wind energy development than in other locations.

Grid Connection

A grid connection will be required for most projects and can be available at an early date in some areas whilst restricted in capacity for a long period of time in others. Grid connection can be a significant issue across parts of the Wales, especially if large amounts of electricity are being generated (>50kW export capacity). If a connection point is available then the further it is from the turbine, the higher the cost of connection will be. Early discussion with the DNO may give broad cost of connection, subject to detailed connection studies. This is covered in more detail in the **Local Energy toolkit Grid Connection module**.

Lease agreement

To develop a wind project on a site will require a lease for the lifetime of the project (usually 25 years). Identify site owners through the land registry and make an initial approach to confirm their willingness in general terms to make the site available. The Securing your Site module contains further guidance on this which can be reviewed when you have identified a site.

Radar Interference

Wind turbines can potentially interfere with aviation radar and are a particular concern for military installations. While civil aviation radar locations are known, the military does not publish this information. Renewable UK provides guidance on how to check that a proposed site will not be objected to at the planning stage (see Further Information). Lower height turbines are less likely to be a problem unless they are close to and in line of sight with aviation radar. It is sometimes possible to 'blank' the impact of wind turbines that are being used if your identified site is in a restricted area. This requires working with the air traffic control service to patch the affected radar so that the area affected by the wind turbine is infilled with data from other radar systems.

Access to site

Larger scale turbines have blades and tower sections that can be many meters long requiring long vehicles to deliver them. This can be a problem if roads have acute bends or have narrow sections. The turbine nacelle can also be many tonnes in weight, so roads and bridges on route to the site must be capable of bearing this weight. If the turbine site is away from a suitable road or track then consideration must be given as to how delivery to the erection site is to be achieved. If this is an issue it must be identified, especially if the cost of making a temporary track must be included in the project development cost. Local council transport officers and local transport contractors can be good sources of information about access. Full access surveys will be completed as part of the detailed project development later in the process.

Step 5 Initial scoping

Having identified a potential site (or sites) consideration of the commercial viability of the project should begin. In the first instance web tools can be used to provide an initial

assessment of viability. There are many different tools available to do this, some of which are referenced in Further Information later in this module.

As a general rule of thumb, at this point in the development of the project a site generating an estimated payback of 6 years or less has the potential to be viable. Local Energy can provide support at this stage to help determine if the project seems viable.

Break point 1 Is there a reason to develop?

The development process in Phase 1 is intended to identify the need for a project, helps gauge local support and looks to find potential sites. There is good reason to develop a wind energy project and no reason for it to be stopped at this stage if there are clear benefits to developing the project and a site can be found that is:

- Likely to have a good wind speed regime (subject to confirmation)
- Available to purchase, or where access can be secured on a long lease (25yrs)
- Accessible for turbine installation and maintenance
- Close to a point of grid connection
- Unlikely to cause unacceptable impacts on local people
- Potentially able to gain planning permission

There are two actions that are useful throughout the entire ongoing project development, which you may choose to start now.

- 1) In order to prepare for investment, you must keep a detailed record of the following information, as it will be required for discussions with lenders: Project Documentation, Legal Documentation, Financial Documentation and Community Documentation. The Local Energy Technical Development Officer can assist at this stage.**
- 2) Project Development plan – a project development plan detailing key tasks, responsibilities and schedule for completion can help you meet the important deadlines that influence the success of your project. CSE provides guidance on how to manage your project.**

Phase 2 **Assess potential sites**

Step 6 **Establish a legal entity**

In order to make funding applications, establish banking facilities, secure a site, and enter into contracts or joint venture arrangements, to pay bills and to receive income there should be a recognised legal entity taking the project forward.

For community groups that are not already constituted, this means an appropriate formally constituted body or legal framework, usually where the constitution provides some protection against personal liabilities and potentially including appropriate insurance. The **Local Energy Toolkit Establishing a community group module** contains more information on establishing a legal entity.

The form of legal entity taking on the project can influence the range of finance options available and could be critical in securing the one most suited to the project objectives. Further information on finance options can be found in the **Local Energy Renewables Toolkit Finance module**, and a review at this stage may support consideration of the appropriate legal entity to progress the potential wind project.

It is important that legal advice from a solicitor who has experience of completing this type of work is obtained at this stage.

Step 7 **Secure development stage funding**

If project funding has not been identified already, then it will almost certainly be required from this stage on.

There are many ways to source funding, however community groups, community groups, third sector organisations and charities may be eligible to apply to Local Energy grant. Development costs for sub 50kW wind schemes can be less than £10,000 but for larger developments are rarely less than £20,000 and can go up to £150,000. These costs may well be higher if a scheme is complex – particularly if an EIA is required.

Step 8 **Pre-feasibility Study**

This is a scoping study that is intended to identify suitable sites for development and is commonly out sourced to a professional. For small scale developments (<50kW), a turbine supplier may provide some level of this professional support at a reduced cost.

The study may look at several sites, and for each site investigate the potential scale and cost of the development. It will also look at each of the key constraints and identify which would be critical to enable the project to be developed on that site.

The subsequent report at the end of the study should indicate for each site:

- a. Annual energy yield and estimated income.
- b. Environmental constraints.
- c. Initial estimates of capital, operations and maintenance cost.
- d. Screening and scoping opinion from local planning authority which will detail key constraints that need to be addressed.

Scoping Opinion

The aim of a scoping exercise is to assist the developer in identifying the key environmental issues surrounding their proposal. To obtain the most relevant and valuable responses to a scoping report it is recommended that developers engage with the statutory consultees and the local community as soon as possible.

Procuring this study in a competitive process ensures value for money and allows for a review of the consultant's experience and skills prior to engagement. Further details on the

process for procuring these services can be found in the **Local Energy Renewables Toolkit Procurement module**, and on the PlanLoCal website.

Step 9 Financial viability check

Some financial information will normally be provide as part of the pre-feasibility study, but a slightly more detailed review of project viability is recommended. There are wind resource tools that can be utilised to compare potential generation and therefore help verify potential income. The **Local Energy Renewables financial model** can be populated with initial information on potential sites to compare overall benefit.

This viability check should be considered along with any other key constraints noted in the pre-feasibility study against the question in break point 2.

Break point 2 Does the project have potential?

If it is considered possible to overcome the identified constraints and the project seems to be financially viable on one or more sites, the project can continue to Phase 3.

As looking at more than one site in detail can be costly, it is recommended that site ownership is reviewed and one preferred site is pursued in the first instance.

Phase 3 Evaluate the Project

Step 10 Secure the site

Securing the site requires you to enter into a legal agreement with the site owner that guarantees tenure over the site for the full life of the project (usually 25 years). It is likely that this will involve some kind of payment to be made. Whilst this is not an essential step to complete before continuing the development of the site, costs that are incurred prior to agreement are at risk.

See the **Securing the Site** module for more details. If parties do not want to enter an options agreement at this stage, an exclusivity agreement should be signed before further development work is undertaken.

Step 11 Full Feasibility Study

Building on the pre-feasibility work, a detailed feasibility study is now required to assess a number of factors in developing a wind project on the selected site, including:

- availability of wind resource, direction, speed and turbulence
- local electricity grid connection point options on 11/33kV network
- potential electricity grid connection constraints
- designated sites (eg SSSIs), protected species and any locally valued habitats and species
- archaeology concerns
- communication links (such as radar, telecoms, impact on MOD radar and low flying, civil aviation, mobile phone masts, radio communication links)
- turbine selection
- visual impact, including cumulative impact, and landscape impact
- construction issues

Potential lenders will want to see a professionally detailed assessment of each of these factors and it is the norm to engage with specialist consultants to complete the necessary studies. See the **Local Energy Toolkit Renewables Procurement module** for further guidance.

Step 12 Confirm grid availability

Ensure the information on connecting to the grid is up to date. Feasibility studies can take extended periods of time and any grid information gathered at the beginning of the process may change. The Technical Development Officers may be able to support grid enquiries to the local DNO. It needs to be remembered that capacity within the grid is an issue as well as the local connection feasibility and cost. Many parts of the grid in Wales are constrained making it increasingly difficult to connect anything but the smallest of generators.

Solutions to overcoming grid constraints can be investigated, usually by marrying a local load with the local generation, and in some cases other funding can be applied to support this.

In general however, having sufficient grid capacity and a suitable connection date to suit the predicted construction of the wind project remain the most favourable conditions in which to develop.

Step 13 Pre-planning consultation

Early engagement with the local planning department is essential to minimise planning risk and wasted costs. If a meeting has not already take place through the feasibility work to discuss the scale and nature of the project, on the preferred site, then this must be

undertaken now. The feasibility study should have indicated the main issues relating to the site, however an open discussion with the planning authority will give a clearer picture as to the potential to gain consent. Whilst there is no way of providing absolute certainty, projects taken through to the next phase of development should be reasonably confident that there is a prospect of planning consent for the project, at the scale intended.

Step 14 Neighbour notification

As a separate notification to that required when making a planning application, it is good practice to contact all residents that you feel may be impacted by the installation. This allows the views of those most affected to be taken into consideration in the next stages of development. When you need to complete this task, additional guidance is available in Further Information.

Break point 3 Can the challenges be overcome?

Frank and impartial assessment of the project should be carried out against the main challenges:

- Is the site tenure secure?
- Does the feasibility study show a viable project?
- What is the level of local support and objection to the project?
- Is there potential to get planning consent at the scale anticipated?
- Is it likely a suitable grid connection can be made?

If the potential remains, then the project can be taken to the next phase.

Phase 4 **Develop the project**

Step 15 **Fix the project size**

The size of the project should now be determined for taking through the subsequent process of final appraisal. The pre-feasibility study will have identified a number of options. The detailed feasibility study will have evaluated each option and identified the most appropriate. You will be able to make an informed decision as to the most appropriate scale of project in line with the restrictions of planning policy, guidance on suitable turbines to suit the wind resource and local consultation.

Step 16 **Financial viability check**

Carry out a further financial modelling exercise with the detail provided through the feasibility study. The **Local Energy Renewables financial model** can be populated with these more accurate figures and a series of scenarios tested. Testing against income or expenditure changes, against lending rates and terms can determine financial viability in varying circumstances. A potential lender will expect to see a number of scenarios modelled. The Technical development officers can support testing the financial viability of a project with this model.

Step 17 **Planning application**

There are a number of applications to be made to secure the appropriate permissions and (in some instances) confirm project development costs. Given the time involved (often 6 to 12 months), making a planning application is often the first step after securing the site, as no project can secure finance without this consent.

Most planning authorities have developed local Planning Policy Guidance which describes what they expect developers of wind projects at all scales to deliver as part of the planning process. This will identify what is required as part of the planning application and the costs of submitting a planning application. This planning application can be submitted by the community group itself, or for more complex applications through the use of a planning consultant. Further information is available in the **Local Energy Renewables Toolkit Planning module**.

Step 18 **Grid application**

Although earlier enquiries should have indicated that a grid connection was possible, securing a grid connection will require a formal application and, within a set timeframe, a deposit to be paid to the DNO. The **Local Energy Renewables Toolkit Grid Connection module** provides guidance on obtaining a grid connection.

When you have a grid connection, planning permission and the right to develop, you can apply for FIT accreditation (or pre-accreditation) through the ROO-FIT process as outlined in the **Local Energy Renewables toolkit FIT module**.

Step 19 **Identify funding sources**

Some work should now be put into finding a suitable route and funder to support the capital costs of the project. Specific examples of project funding through the Local Energy funding programme are the Capital Grants and loans. The Technical Development Officers may be able to support applications to the Local Energy funding, and discussions with funders.

There are many finance options available including traditional loan finance, partnership with a developer, establishment of a co-operative (facilitating the sales of shares) and more. Each of these has different attributes and requirements (interest rates, target investment types, loan conditions).

The **Local Energy Renewables Toolkit Project Finance module** gives guidance on the types of finance, whether for development, construction or bridging loans that may be available to a project and potential sources of that finance.

Advice from an Independent Financial Adviser is essential to ensure all the options are evaluated as there are many potential sources of funding each with their own advantages and disadvantages. PlanloCal and CSE's The Source have further information on funding providers.

As with all commercial processes, obtaining a number of different quotes for services will enable a comparison to be made and the most appropriate provider can be selected for the community needs.

Step 20 Develop full financial model

The financial viability of any project depends on the cost of borrowing the money required to buy the turbine, civil works, balance of plant and the cost of installation relative to the income after operating costs. The schedule of incurred costs and the length of time to install and commission the project all influence the financial viability of the project. The **Local Energy Renewables Project Finance Model** is available to download and use to complete a financial appraisal of your project and the **Local Energy Renewables Financial Model** guidance document provides indicative costs taken from a number of different market studies.

In order to complete the financial appraisal as accurately as possible, the capital costs of the turbine, installation, connection and other capital works such as grid connection, civil works and installation should be defined as accurately as possible. The detailed feasibility study should outline all the potential costs associated with your project and provide an indication of the scale of these costs, however quotes will need to be obtained to confirm the final costs. Operational costs such as maintenance, ground rent and insurance must be determined and other ongoing expenditure such as community benefit payments must be accounted for.

An energy yield assessment will translate into potential income, however this is subject to probability. The output from an energy assessment will be the predicted long term energy yield, also called the central estimate or the P50 estimate. This estimate has a 50 % chance the result will be lower and a 50 % chance the result will be higher than the predicted long term energy yield. Further detailed energy yield analysis can provide a P90 estimate (a 90% likelihood that the energy yield will be exceeded) and it is this estimate that funders prefer to use.

A potential lender will also want to see a full business plan for the duration of operation of the wind turbine with a detailed cash flow and balance sheet that includes repayment of loans provided. The **Local Energy Renewables Project Finance Model** provides this facility and there is more detail on this in the **Local Energy Renewables Toolkit Project Finance module** and the **Local Energy Renewables finance model guidance**.

Break point 4 Confirm consents, grid and financial viability

The outcome from Phase 4 of the development process should show that all the following are in place:

- Planning consent granted
- Grid connection secure
- Energy yield predicted
- Income predicted
- Financial viability confirmed
- Funding options investigated.

If consents are in place and the project appears financially viable, then the project can progress. If at this stage the scheme looks unviable it should be stopped, or re-designed.

Phase 5 Getting Financial Close

Step 21 Identify and contact suppliers

The process of finalising suppliers of equipment and services will need to be completed. It is good practice to seek competitive tenders for all services, and it is recommended a construction phase project manager be appointed in the same way if one is not already in place.

For schemes under 50kW, the wind turbine and installers must be approved under the Microgeneration Certification Scheme (MCS).

There are a number of contracts that need to be agreed with suppliers:

- Construction phase project management
- Wind turbine Installation (Engineering Procurement and Commissioning)
- Operation and maintenance
- Power Purchase Agreements
- Financial and legal advice (financial advice, lease and contract advice)

Step 22 Secure bridge funds

The timing, process and completion of the procurement process will be dictated by the route to capital drawdown which in turn is linked to the means by which the project will be funded. Suppliers of key pieces of equipment such as transformers and turbines may require deposits to secure delivery of these items. The long lead time on these items needs to be considered, and often requires further funds to be secured, prior to Financial Close. It is important to develop a programme, with cash flow, to anticipate the need for funding in advance. The **Local Energy Renewables Finance Model** is a good place to start.

Step 23 FIT Pre-accreditation

Pre-accreditation is a means by which you can fix the feed in tariff you will receive for your project before you have completed construction. This provides some certainty on the revenue you can expect for your project. A prerequisite for pre-accreditation is that you have a confirmed grid connection (deposit paid) and planning permission. Once pre-accredited you have a limited time to install and commission your turbine. The **Local Energy Renewables Toolkit Feed in Tariff module** provides further information on this process.

Step 24 Financial Close

Using the detailed financial appraisal previously completed with the **Local Energy Renewables Project Finance Model**, or another finance model, which has been verified by an accountant, it should be possible to secure finance through your chosen route.

Your finance providers will complete a full due diligence of the project, which includes a detailed analysis of potential project performance, all associated costs, warranties and liabilities.

In order to discuss with potential lenders, you must keep a detailed record of all project, legal, financial and community documentation. The lender may also require a significant financial floating bond be set up to pay the banks costs irrespective of the result, positive or otherwise of the due diligence process.

Financial close is the point at which all contracts are signed and funds are transferred between your lender and all your suppliers. Prior to this point your suppliers are likely to have requested deposits for all materials and services. At financial close the balance of payment is made.

This can be a busy period, so it is important to ensure that the relevant people with delegated responsibility are available to sign off any legal agreements.

Break point 5 Is the project ready to construct?

Provided all consents, grid connection, contracts, FIT pre-accreditation and funding is in place the project should be ready to construct.

A professional team of managers and suppliers should be responsible for taking the project through to commissioning. If any member of this team is not yet in place they should be appointed prior to moving into phase 6.

Phase 6 **Completing the project**

Step 25 Construction

Once all of the permits and permissions are in place and all relevant planning constraints have been addressed, construction can commence and the wind turbine(s) installed and grid connected. It is good practice to appoint an appropriately qualified engineer or project manager to oversee construction and commissioning to ensure that the project performs to specification. This is especially important for larger projects.

CDM application

If your construction project is longer than 30 days or involves more than 500 person days of construction work, the Health and Safety Executive (HSE) has to be notified (see Further Information).

Your appointed project manager, civil contractor or turbine supplier may manage this for you, but as the client, you need to:

- Check competence and resources of all appointees
- Ensure there are suitable management arrangements for the project welfare facilities
- Allow sufficient time and resources for all stages
- Provide pre-construction information to designers and contractors

This is ultimately your responsibility under the CDM regulations.

Step 26 Community Benefit

Community Groups providing or receiving community benefit should enter into a binding agreement with the appropriate party, stating the terms and conditions of payments.

Step 27 Operation

The income from the project will need to be managed carefully. The funder will expect there to be cash held to cover fixed costs such as interest and loan repayments, O&M contracts and land rent. In addition the funder will expect additional cash to be held to cover loan payments during periods when the wind turbine has not generated as much electricity as expected, for example if there are any faults with the wind turbine or the energy produced is lower than average. There are example financial covenants included within **the Local Energy Renewables Toolkit Finance Model**, however different lenders are likely to have different requirements.

Only after these costs have been met can the project distribute the remaining income.

Proper management will need to be in place for the life of the project to oversee the process of collecting and distributing income and managing liabilities. It is also important that the performance of the wind turbine(s) are regularly monitored as large fluctuations in output might indicate a technical problems and this in turn will reduce income, leading to reduced financial returns.

The **Local Energy Renewables Toolkit Establishing a community group module** provides further guidance on dispersing any income generated for the community group.

Step 28 Decommissioning

The planning consent may include a condition stating

the requirements for decommissioning the turbine. The costs for removing the wind turbine and the requirements to remove foundations or other equipment need to be estimated.

There may be some scrap value in the equipment, but this is unlikely to cover the entire cost of decommissioning. So the project should set aside income to build up a fund to cover decommissioning costs.

Further Information

Local Energy Renewables Toolkit

This, and the other **Local Energy Renewables Toolkit Modules** referred to.

Wind Energy Context

- The National Farmers' Union (NFU) provides specific guidance for farmers interested in wind energy generation - <http://www.nfuonline.com/membership/farmer-grower/member-services/farm-energy-service/business-guides/>
- Ofgem's FIT database includes data on the distribution network operator (DNO) that has connected the wind turbine to their system - <https://www.ofgem.gov.uk/environmental-programmes/feed-tariff-fit-scheme/feed-tariff-reports/fit-update-reports>
- Local Energy Scotland have produced a range of documents on joint ownership, which are also applicable to the rest of the UK - <http://localenergyscotland.org/resources-advice/joint-ventures/>

Project Overview

Wind Energy development Options

To contact the Welsh Technical Development Officers, see the Energy Savings Trust Website:

- <http://www.energysavingtrust.org.uk/organisations/content/ynnir-fro-community-programme>
- <http://www.energysavingtrust.org.uk/organisations/sites/default/files/Development%20Officers%20Bin%20Wales.pdf>

The Centre for Sustainable Energy (CSE) and PlanLoCal provide information and advice for organisations and community groups to collaboratively progress renewable energy projects and is a useful place to start for those wishing to invest.

- Centre for Sustainable Development <http://www.cse.org.uk>
- PlanLoCal <http://www.planlocal.org.uk>

The **Local Energy Renewables toolkit Establishing a Community Module** provides guidance on investing in projects being developed by a commercial developer.

Step 1 Develop the Vision

Community group actions plans can be found on the following organisation websites:

- PlanLoCal <http://www.planlocal.org.uk/>
- The Source, Centre for Sustainable Energy <http://www.cse.org.uk/thesource>
- Energy Savings Trust <http://www.energysavingtrust.org.uk/organisations/content/communities>

To find out if you are eligible for the Local Energy Preparatory Stage Grant, see here the EST website: <http://www.energysavingtrust.org.uk/organisations/content/ynnir-fro-community-programme>

Step 2 Seek Advice

The organisations mentioned in Step 1 may maintain case studies to facilitate the identification of suitable groups to approach to gain their insight.

Step 3 Communicate

The organisations mentioned in Step 1 may provide a range of guidance documents available for engaging with the community including

- PlanLoCal's:
 - Understanding community engagement: <http://www.planlocal.org.uk/pages/getting-people-involved/running-a-community-consultation>
 - Running a community consultation: <http://www.planlocal.org.uk/pages/getting-people-involved/running-a-community-consultation>
 - And CSE's the Source: <http://www.cse.org.uk/thesource/browse/consulting-and-involving-the-community-5>

Step 4 Find a site

The Scottish Governments' Renewable Energy Handbook outlines the technologies that have been employed by community groups, the principles of how each technology works and the key issues regarding installation and operation as well as environmental impacts. These are also applicable the UK more widely - <http://www.localenergyscotland.org/funding-resources/resources-advice/renewables-handbook/>

Wind Resource

Wind resource "rule of thumb" guidance

- MW scale - <http://www.communityplanning.net/pub-film/pdf/Community-ledWindPower.pdf>
- Smaller scale - <http://www.goodenergy.co.uk/generate/choosing-your-technology/home-generation/wind-turbines/wind-turbine-faqs>

To determine the wind speed at different locations, the following tools may be useful.

- Virtual met mast assessments of wind speeds are available that do not require masts to be erected. These can be cheaper than completing an onsite assessment and completed in less time, although will be less accurate- www.vortex.es
- The government has published a wind speed database for the UK which provides wind speeds across the UK to can also be used determine the wind speed within 100k square. See - here <http://tools.decc.gov.uk/en/windspeed/default.aspx>

Planning Constraints

There will be a number of possible constraints on your project which you will need to identify:

- Find out if you need planning permission through the http://www.planningportal.gov.uk/wps/portal/genpub_LocalInformation?docRef=LocalInformation&scope=202&langid=0
- Renewable UK provides guidance on how to identify areas where radar may be a constraint - see <http://www.renewableuk.com/en/our-work/aviation-and-radar/>).

The Planning Practice Guidance provides tools for planning with and aim to conserve and enhance the historical environment, and heritage related applications. Government's planning guidance <http://planningguidance.planningportal.gov.uk/blog/guidance/conserving-and-enhancing-the-historic-environment/>

Further information may be found in the **Local Energy Renewables toolkit Planning module**.

Grid Connection

Local Energy Renewables toolkit **Grid Connection module**.

Step 5 Initial scoping

There are a number of web tools available for determining the viability of a project which would be appropriate to use at this stage of the project development.

Different tools use different data sources for wind speed data and estimated energy yield. One tool produced by a turbine manufacturer to determine the financial viability uses published wind speed data to estimate yield and compares this with current FIT support levels for a given annual energy demand - www.endurancewindpower.co.uk/wind-power-payback-estimator.html

There are other examples available - www.renewablesfirst.co.uk/wind-learning-centre/what-would-the-return-on-investment-be-from-a-farm-wind-turbine-2/

Is there a reason to develop?

CSE provides guidance on how to manage your project - <http://www.cse.org.uk/thesource/browse/managing-projects-finances-and-legal-issues-7/managing-your-project-8>

Step 6 Establish a legal entity

The **Local Energy Renewables Toolkit Establishing a community group module** contains more information on establishing the legal entity. It is important that legal advice from a solicitor who has experience of completing this work is obtained at this stage. This solicitor will be required at various stages throughout the project to support all legal and contractual activities, of which there will be many.

Further information is in the **Local Energy Renewables Toolkit Project Finance module**.

Step 7 Secure initial funding

Further information is in the **Local Energy Renewables Toolkit Project Finance module**.

Step 8 Pre-feasibility Study

A Pre-feasibility study will help identify sites that have the potential to be viable. Local Energy Preparatory Stage Grant provides grant funding to help towards the start-up costs of feasibility studies, community consultation and other preparatory costs. Up to £30,000 is available for community groups to fund non-capital aspects of a project.

For guidance on procurement, see:

- **Local Energy Renewables Toolkit Procurement module**
- PlanLoCal – Contracts, agreement and tendering - http://www.planlocal.org.uk/media/transfer/doc/planlocal_ee_5_contracts_agreements_tendering.pdf

A number of different sources can be used to obtain indicative project costs. These include:

- The **Local Energy Renewables Toolkit Financial Model** guidance document provides indicative costs taken from a number of different market studies
- The Local Government Association which provides sample costs for a range of turbines – see http://www.local.gov.uk/web/guest/home/-/journal_content/56/10171/3510194/ARTICLE-TEMPLATE
- Some private developers provide costs for a number of specific example turbines - see <http://www.renewablesfirst.co.uk/wind-learning-centre/how-much-do-a-farm-wind-turbines-cost-small-wind-farms-cost/>

Step 9 Financial viability check

Local Energy Renewables Project Finance module (Step 7).

Step 10 Secure the site

See the Securing the Site module for more details and for a set of example draft agreements

Local Energy Renewables Toolkit Securing the Site Module.

Step 11 Full Feasibility Study

Evidence on pre-planning costs to develop a wind project

<http://www.publications.parliament.uk/pa/cm201314/cmselect/cmenergy/180/18007.htm>

PlanLoCal provides guidance on contracts, agreement and tendering for the feasibility study.

http://www.planlocal.org.uk/media/transfer/doc/planlocal_ee_5_contracts_agreements_tendering.pdf

Once it is clear that there is a viable project, it may be prudent to employ a project manager dedicated to developing the project. **Local Energy Renewables Toolkit Procurement module** (Step 8) provides guidance on this.

Step 12 Confirm grid availability

Local Energy Renewables Toolkit Grid Connection Module.

Step 14 Neighbour notification

See PlanLoCal and CSE's the Source Communication guidance (Step 3).

Step 15 Fix the project size

The outputs from your Detailed Feasibility and Design Study will have identified the optimum size of project. This will align with the planning application and grid connection applications that have been submitted.

Step 16 Financial viability check

Local Energy Renewables Toolkit Project Finance module (Step 7).

Step 17 Planning application

The key applications to complete when developing your project are:

- Planning – see **Local Energy Renewables Toolkit Planning Module**
- Grid connection – see **Local Energy Renewables Toolkit Grid Connection Module**
- Feed in tariff pre-accreditation – see **Local Energy Renewables Toolkit FIT Module**

If you have employed a project manager they will be able to complete this for you.

Step 18 Grid application

Local Energy Renewables Toolkit Grid Connection Module.

Step 19 Identify funding sources

For application forms and contact details for advice in supporting a Local Energy grant and loan applications: <http://www.energysavingtrust.org.uk/organisations/content/ynnir-fro-community-programme>

For sources of funding and guidance on financing, see:

- **Local Energy Renewables Toolkit Sources Project Finance Module** (Step 7).
- Robert Owen - Community Energy Development Fund <https://rocbf.co.uk/CEDF>

- CSE's The Source - <http://www.cse.org.uk/thesource/browse/managing-projects-finance-and-legal-issues-7/financing-your-project-9>
- PlanLoCal - <http://www.planlocal.org.uk/pages/renewable-energy/funding-and-finance-2>
- The Energy Savings Trust also provides useful information on available funding sources: <http://www.energysavingtrust.org.uk/organisations/content/finding-funding-wales>

Step 20 Develop full financial model

When finalising the costs and income of the project, it is important to ensure they are completely accurate with enough detail for a bank to make a lending decision. Indicative costs will no longer be accurate enough.

This may require professional financial support. See Step 9 for CSE and PlanLoCal resources.

Also refer to **Local Energy Renewables Toolkit Sources Project Finance Module** (Step 7) and the **Local Energy Renewables Toolkit Financial Model** (Step 8).

Step 21 Identify and contact suppliers

For schemes under 50kW, the wind turbine and installers must be approved under the Microgeneration Certification Scheme (MCS). They provide a searchable list of approved wind turbine installers as do EST:

- MCS: <http://www.microgenerationcertification.org/consumers/installer-search>
- EST: <http://www.energysavingtrust.org.uk/domestic/content/installing-renewables>

Larger wind turbine suppliers are listed on many websites including:

- WindPower: <http://www.wind-power-program.com/>
- The Renewable Energy Centre: <http://www.therenewableenergycentre.co.uk/wind-power/large-scale-wind-turbine-suppliers/>

Step 22 Secure bridge funds

See the CSE and PlanLoCal guidance on sources of funding (Step 9).

Step 24 Financial Close

CSE and PlanLoCal guidance and advice on the Financial Close stage (Step 9).

Step 25 Construction

Construction, design and management regulations. Further guidance can be found on the HSE website at <http://www.hse.gov.uk/construction/cdm.htm>.

Step 26 Operation

You may wish to consider employing a project manager at initial stages, whose commitment will taper off as technical professionals are able to care for the operation and maintenance of the project. See the **Local Energy Renewables Toolkit Financial Model**.

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