EmPOWERing Communities

A Guide to Renewable Energy for Community Facilities

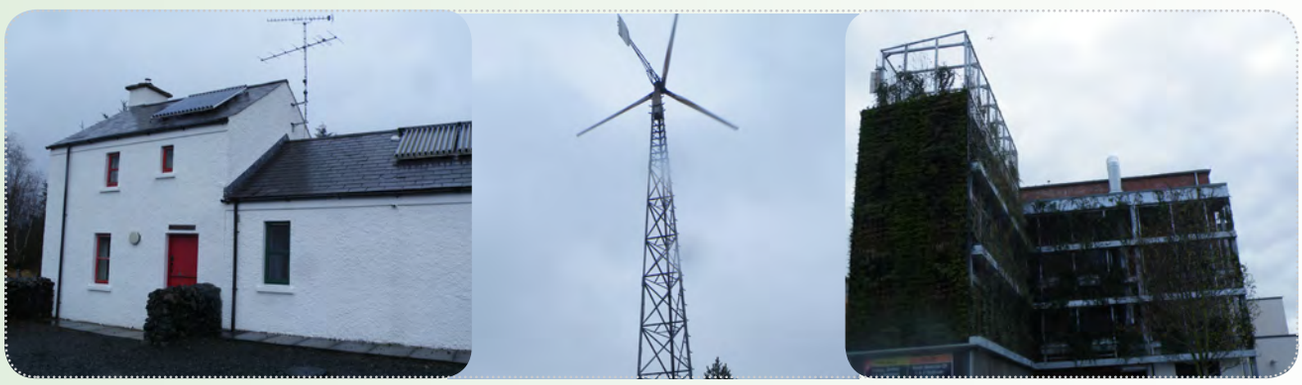
April 2013

Contents

Introduction

Over recent years community groups have become increasingly interested in renewable energy as a way of reducing energy bills and becoming more sustainable.

This publication is a starting point for community groups thinking about undertaking their own renewable energy project. It sets out information about some of the different technologies available and how these have been used by community groups in the region. Not all renewable energy technologies are covered in this case study guide and there are many other excellent examples throughout the region and elsewhere. Some further sources of information are included at the end of this guide. This section also includes sources of information about financial incentives available and about grid connection.



Renewable Energy Technologies

Solar Panels:

Solar Thermal

Solar thermal energy is usually generated by concentrating solar energy to heat a fluid and produce steam that is used to power a generator. It is most suitable if there is a high demand for hot water in your building e.g. for showers, and if your building has a south (or southeast to southwest) facing roof. At least 3-4 m^2 of roof area is normally required. During the summer months the solar system may meet all of your hot water requirements and during the winter months it preheats the water therefore contributing to both central heating and hot water. These systems usually have a 25 year lifetime and require little or no maintenance.

There are two main types of solar thermal panels:

• Flat plate: (usually around £2500–3000 installed for 4 m^2 system)
• Evacuated tubes: (usually around £3000–4500 for 3 m^2)

Solar PV (Photovoltaic)

Photovoltaic (PV) panels convert daylight into electricity and are most suitable if your building has a south facing roof (or southeast to southwest). The roof should be free from shading and there should be a demand for electricity in the building during daylight hours. As solar photovoltaic panels harness the light from the sun rather than its heat, they can continue to work even when the sky is overcast, so are viable in Northern Ireland. There are different types of solar PV available:

- Mono-crystalline, single silicon crystal and can last 25 years
- Poly-crystalline, multiple silicon crystals, less expensive than mono-crystalline and can last as long
- Thin film, silicon layer placed directly onto the glass, can be less efficient but are getting better.

Electricity generated from solar PV can easily be incorporated into new or existing power supplies or exported to the grid. To qualify for Renewable Obligation Certificate (ROCs) payments, all new schemes must be installed by Microgeneration Certification Scheme (MCS) approved installers.

Solar PV requires very little maintenance and usually comes with a 5-10 year warranty. Installation is relatively quick, typically taking about 2-3 days.

Heat pumps:

Heat pumps extract heat from the ground, water or air and transfer this heat, usually into a water heating system. Heat pump systems can require more maintenance than an oil heating system. At present the Renewable Heat Incentive payments are only available for ground source heat pumps. Heat pumps usually produce water at temperatures of around 40 – 55 °C so will be most effective where the water is needed in this temperature range. They can also be used alongside an immersion heater to reduce the amount of electricity required.

Heat pump installers can assess whether ground conditions are suitable to install a ground source heat pump. There are two main types of ground source heat pump – those that can be installed one -two metres below the ground and those that require deep bore holes 150 metres or more. These are more expensive but also more effective. They are likely to be most cost effective where building work is being carried out.

Air source heat pumps absorb heat from the outside air and can get heat from the air even when temperatures reach as low as -15°C. Air to water systems can be used to heat radiators while air to air systems can provide heat using fans.

Wind turbines and wind farms:

A key factor in determining whether a site is suitable for a wind turbine is whether there is a sufficient wind resource. The average annual wind speed is the critical factor in determining the feasibility of a wind turbine. You should check that it is six metres per second or higher. The wind speed database provides information about wind speeds across Northern Ireland:

www.actionrenewables.org/resources/windmap/

Planning permission will be required for all wind turbines or wind farms. (See section on planning permission below for more details). Other factors to take into consideration include grid connection and when the building work will take place (not all times of the year will be suitable for building). An indication of cost is provided below.

Wind Turbine Rating (kW)	Typically fully installed costs 2008 (£1000)	Cost per kW installed (£1000)
2.5kW	10-12	4.4
6kW	18-22	3.3
10kW	25-30	2.7
20kW	40-50	2.2
50kW	70-80	1.8

Source: McCrea, A, Renewable Energy: a user's guide

Community Wind Energy Schemes

The Fermanagh Trust's report, Maximising Community Outcomes from Wind Energy Developments, highlights the growing interest in community ownership of wind farm developments and the potential for this to contribute to the long-term sustainable future of communities. A number of different models of community

ownership exist including: full ownership; part ownership; community/developer joint venture; and the co-operative model.

Four community clusters in Ballymena (Bann Maine West, Ballymena East, Ballymena South and North Ballymena Clusters), supported by Ballymena Council have joined together to investigate the possibility of buying and running community owned wind turbines in the area. Rather than seeking funding for individual projects, they have formed a partnership to investigate this possibility which would create a sustainable annual profit that can then be put back into the community. A feasibility study has been completed.

Plans are also underway by the Drumlin Wind Energy Co-operative for the first community owned wind co-op in Northern Ireland. It plans to build and operate up to five 250 kW wind turbines.

Biomass:

Biomass heating can be used to heat radiators and hot water and is particularly suitable for buildings which are off the gas network and therefore dependent on oil. Wood burning devices fall into one of two types: domestic stoves and boilers and commercial wood-burning furnaces. There is lots of choice in manufacturers and designs. They can directly replace an oil, coal or gas boiler although it is more usual to install with an existing fossil fuel system. For small community venues, pellet boilers in the size range of 15 - 50 kWth are easy to run with very little maintenance. Medium-sized plants (200 kWth - 10 MWth), perhaps burning wood chips and mature wood from forestry are more common for buildings like offices, hotels and similar sized buildings.

A wood pellet boiler is one of the most popular types of biomass heating system. Wood pellets are made from compressed sawdust usually produced as a by product of saw milling. The regular and small size permit automatic feeding. The annual costs of running a pellet boiler are significantly lower than the costs of running an oil boiler. Wood pellets are readily available across Northern Ireland but you should consider if there is enough space at your premises to provide dry storage.

Wood chip burners use shredded wood which is cheaper than wood pellets but requires a larger fuel store. A typical wood chip set up includes a boiler, accumulator tank, controls and a fuel store. Chips are relayed to the boiler automatically. These systems can be integrated with existing heating systems. There are now a number of premises using wood chip for heat including leisure centres, schools and council offices. Wood Chip boilers are highly efficient (80-90%) and fully automatic.

Important issues to consider for both wood chip and wood pellet boilers include:

- The quality of the wood chip or pellets;
- Fuel delivery and storage; and
- Fuel supply.

Wood fuel requires a lot more storage space than fossil fuels. Wood pellets will require three times, and wood chips 10 to 12 times the storage volume of oil to provide similar amounts of heat. A suitable area close to the intended site of the biomass boiler is needed. For a domestic house or small community centre a fuel store of at least 5-6 m^3 is recommended. Delivery is required approximately once or twice a year for pellets and four to six times for wood chips. A fuel store must be well designed and kept in good condition to protect it from moisture and prevent clogging. The ash pans of both stoves and boilers will require emptying, typically once per month for stoves and once every three months for boilers.

Planning Permission

Is planning permission required?

Some improvements and building works require planning permission while others do not. On 30 April 2013 planning regulations will change so that planning permission is not required for some renewable energy installations on community buildings including solar photo voltaic panels, solar thermal panels, ground water source heat pumps and boiler house extensions. You should check the regulations carefully before you begin your project, as in some cases planning permission will still be required.

If you plan to extend your premises or make external alterations other than those mentioned above you are likely to require planning permission. If you are only altering the internal layout of your building, you will not normally need planning permission (unless the work that you carry out involves a change of use of the building).

If your building is listed you will need to apply to DoE Planning for Listed Building Consent even when you do not need planning permission for the works involved. Listed Building Consent is normally required if the work that you intend to undertake will affect the building's special historic or architectural character.

How to make a planning application

If you need planning permission, you will need to obtain a planning application pack from DoE Planning. It contains a checklist explaining what you need to send with the application, the relevant forms and information on application fees. A pack can be obtained online at www.planningni.gov.uk and from your local planning office. You can contact your local planning offices by dialling 0300 200 7830. Application forms for Listed Building Consent and Advertisement Consent can also be obtained from DoE Planning. You will normally be expected to submit the following information with your planning application:

- Scale drawings
- Site location plan (scale 1:1250 or 1:2500)
- Block plan/Site layout plan (scale 1:500)
- Relevant application form: usually a "P1" form and additional "P1W" form for wind turbines
- Relevant fee (see below)

Seven copies of all plans and drawings are usually required. For renewable energy proposals, an environmental statement should be submitted setting out the environmental and social benefits and how these have been minimised. For larger applications, additional information may be required depending on the size and scale of the proposal and the impact that it is likely to have on the landscape, biodiversity etc. This might include, for example a noise impact assessment, archaeological impact assessment, landscape character and visual assessment or Environmental Impact Assessment.

You should seek the help of an architect or some other experienced person in applying for planning permission.

Fees

Currently, the fee for most renewable energy proposals is based on calculating the area of the site and is £352 for each 0.01 hectares up to a

maximum of £11,500 (0.1 hectares is roughly a quarter of an acre). There is also an additional flat fee of £10,496 if an EIA is submitted with the planning application. Currently as a community or voluntary organisation, you may be eligible for reduced fees of half the normal planning application fee. However, these fees are subject to change. A recent consultation paper (Review of Planning Fees and Funding, Consultation on Proposed Changes to Planning Fees, April 2013) proposes that there would be no fee for some planning applications by not-for-profit organisations. You should check the DoE Planning website for the most up to date fee information. The online fee calculator on the DoE Planning website will help you to calculate the fee for your proposal:

http://epicapps.planningni.gov.uk/FeeCalculator/

How will my planning application be assessed?

Most planning applications for renewables will be processed by your local planning office, with larger scale proposals processed by Planning Headquarters. The minimum time that this can take is two to three months, but if the application is more complex it can take much longer.

DoE Planning will carry out a site visit and consult relevant agencies about your application. The Northern Ireland Environment Agency (NIEA) is a key consultee for most renewable applications and will be consulted on potential effects on archaeology, protected sites, habitats, ecologically sensitive species and biodiversity (birds and bats). Depending on the type of application consultation may be carried out with, for example, Rivers Agency, Loughs Agency, NIEA's Water Management Unit, Land and Resource Management Unit, Natural Heritage or Built Heritage Departments. Roads Service may also be consulted, for example, in relation to access arrangements. Although the local council planning committee is consulted on planning applications, DoE Planning takes the final decision.

In reaching a decision as to whether to approve or refuse a planning application, DoE Planning will take into account the relevant area plan and planning polices, comments from statutory agencies consulted, any objections to the proposal and any other material considerations.

Planning Policy Statement 18 – Renewable Energy

Planning Policy Statement 18 (PPS 18) is the planning policy most relevant to renewable energy proposals. It sets out regional planning policies for all renewable energy developments. PPS 18 aims to facilitate renewable energy facilities in appropriate locations. The objectives of the policy are:

- to ensure that the environmental, landscape, visual and amenity impacts of renewable energy development are adequately addressed;
- to ensure adequate protection of the region's built and natural, and cultural heritage features; and
- to facilitate the integration of renewable energy technology into the design, siting and layout of new development and promote greater application of the principles of Passive Solar Design.

Policy RE1: Renewable Energy Development of PPS 18 states that DoE Planning will support renewable energy proposals unless there are unacceptable adverse effects which are not outweighed by the local and wider environmental, economic and social benefits of the development. Examples of the benefits of renewable energy are given as: a clean, secure energy supply; reductions in greenhouse gases and other polluting emissions; and contributing to meeting the region's target for use of renewable energy sources.

For more details see our Guide to PPS 18 at:

http://tinyurl.com/PPS18Guide

Building Control

Even if planning permission is not required, you may require Building Control approval which is a separate consent. Building Control is based at your local council offices and is responsible for ensuring that building regulations are enforced. The regulations include requirements on health, structural stability, fire safety, energy conservation and accessibility. Examples of works that require building control approval are provided in the table opposite.

If your building is listed, the Northern Ireland Environment Agency publication, "NIEA Guidance Booklet on Building Regulations and Energy Efficiency" provides useful information in relation to the Building Regulations for listed buildings. This is available on the Northern Ireland Environment Agency website: www.ni-environment.gov.uk.

Making an Application for Building Control Approval

If Building Control approval is required, you must lodge an application along with full plans to your local Building Control office prior to starting any work. You can be prosecuted for failing to do this. A full plans application requires you or your agent (e.g. your architect) to complete an application form and to provide the following:

- Two copies of plans, sections, construction details and a further two sets of plans showing compliance with fire safety regulations (these will be forwarded to the Fire and Rescue Service by Building Control);
- A site location plan and a block plan showing boundaries and adjacent buildings; and
- A plan fee accompanied by an itemised and realistic estimate of cost.

You should ensure that you get assistance from an experienced person who has a good working knowledge of building regulations.

Building Control Fees

A fee calculator can be found on the Building Control website, you need to know the estimated cost of the works in order to work out the fees. For example the full fee for building works costing £30,000.00 excluding VAT is currently £380.00 and the full fee for building works costing £60,000.00 excluding VAT is currently £620.00. The fee is paid in two stages to Building Control:

a Plan Fee (25% of the full fee) - this is deposited with your application form and drawings; and an Inspection Fee (75% of the full fee) - this is payable after the initial inspection by Building Control when work has started. It is a one-off payment and covers all inspections carried out until completion.

Timescale for Building Control Applications

When you lodge the application Building Control will assess it for compliance with the regulations within 28 days and either issue a Plan Stage approval or notify you of any required amendments. It will assess your amendments within 14 days. You will then receive a Plan Stage Approval Notice and a set of stamped approved drawings.

Completion Certificate

Once works have started on site Building Control surveyors carry out on-site inspections at various stages of construction. Upon satisfactory completion of the works a Completion Certificate is issued. This Certificate gives the date of the final inspection carried out and states that, as far as can be reasonably ascertained, the work carried out conforms to the Building Regulations. As the final part of the process, a Completion Certificate is forwarded to you following a satisfactory final inspection. The Completion Certificate verifies that a property complies with legal guidelines and has been subject to Building Regulations inspections carried out by independent and impartial professionals.

Further Information about Building Control

Further information (contact details of your local council Building Control office, application forms and the fee calculator) can be found on Building Control's website www.buildingcontrol-ni.com.

Type of Work	**Planning Permission Required?**	**Building Control Approval Required?**
External Alterations	Yes	Yes,in most cases
Installing solar panels	Not normally required	Yes
New external boiler house	Yes	Yes
Installing a wind turbine	Yes	Yes
Alterations to internal layout of building	Not normally required	Yes, in most cases
Rewiring	No	Yes
Installing or upgrading cavity wall insulation	No	Yes
Installing or upgrading roof insulation	No	Yes
Dry lining walls	No	Yes
Installing central heating	No, unless external alterations are required	Yes
Installing a new boiler (not like for like)	No, unless external alterations are required	Yes
Installing timers, thermostats or other controls for heat and light systems	No	Yes

Case Study:
Eglinton Community Hall

Project Description

- Three solar thermal panels installed
- March 2010

Benefits

Eglinton Community installed thermal solar panels on their building in March 2010. In their experience, the solar panels have been easy to run and maintain. They also found that the installation process was not disruptive and most of the work was carried out within the roof space.

They find that the solar panels pre-heat water to about 50°C in the summer time and up to 20°C in the winter. This heats the water for the showers and pre-heats the water for their heating system. Despite a big increase in the use of the hall over the past three years, their bills have not significantly increased.

Process

The group considered a number of options but decided that solar thermal panels would be the best choice for them as the hot water could be used to run their showers and to heat hot water for the heating system. They had also considered solar pv, but discovered that given the orientation of their building and the size of their roof, as well as the relatively high demand for hot water (e.g. for showers) solar thermal would be the best option. The funding package at the time for the solar panels was made up of grants from the Low Carbon Building Programme, Big Lottery Fund Awards for All and Northern Ireland Electricity Smart Grant.

Challenges

The group had initially planned on installing roof mounted solar panels. However, Building Control had concerns about the height of the roof and how suitable this would be. The group appointed a structural engineer to complete a report on the roof which recommended integrated rather than roof mounted solar panels. The funding application had to be re-costed to take account of the extra cost involved in installing integrated rather than roof mounted solar panels. The cost of the structural engineer's report also had to be taken into account, however as a result the solar panels installed were more suitable for the building and location.

Although overall the group found the project manageable, some challenges included finding a contractor from the select list provided by one of the funders; managing requirements for three different funders and costing the VAT for the project – in many cases for energy efficiency measures this is 5%.

The group received advice from Northern Ireland Electricity and from the Energy Saving Trust. For example, they needed technical support to calculate the level of CO2 emissions that would be reduced and the number of kilowatt hours of energy that would be generated.

Tips for Other Groups

The group have found the solar thermal panels beneficial in reducing their energy bills. They would advise other community groups to look at their electricity usage and where savings could be made. For example, after examining their electricity bill the group found that vending machines in the building were using a significant amount of electricity. After removing these, they saw a significant reduction in their bills.

Future Plans

Eglinton Community Limited successfully applied to the Big Lottery Fund's Energy Efficient Venues Programme for an energy audit of their building to see where further improvements could be made. They also used this grant to top up insulation in their roof space from 100 millimetres to 300 millimetres, in line with current building regulations.

The group are currently planning to overhaul the older part of their building to make it more energy efficient and more comfortable for users. This part of the building was completed in 2002 and is used by a number of different groups e.g. for dance, arts and crafts, keep fit, boxing and karate clubs, senior citizens and disability sport. It can be difficult to control the temperature in this part of the building. Improvements will include installing energy efficient lighting, sky tunnels to provide better lighting in parts of the building, a new condensing boiler and a full heat recovery and ventilation system.

Further details and information on the project can be found by contacting Debbie Caulfield, Eglinton Community Hall:

eglintoncommunity@yahoo.co.uk

Case Study:
Playtrail / Eco Base

Background

The Playtrail is a partnership project with the Western Education and Library Board (WELB) that aims to provide an inclusive approach to play and provide increased training and employment opportunities for young adults with learning disabilities. The Playtrail has developed the Eco Base, an environmental educational building used to promote sustainable development and living. The Eco Base is a traditional straw bale construction, utilising roof slates manufactured from recycled rubber and including a rain water harvesting system.

Project Description

- 24 PV Solar Panels installed on south facing roof of Eco Base sustainable building;
- This 3.5 kW solar PV system was installed at the end of the Eco Base new build project.

Benefits

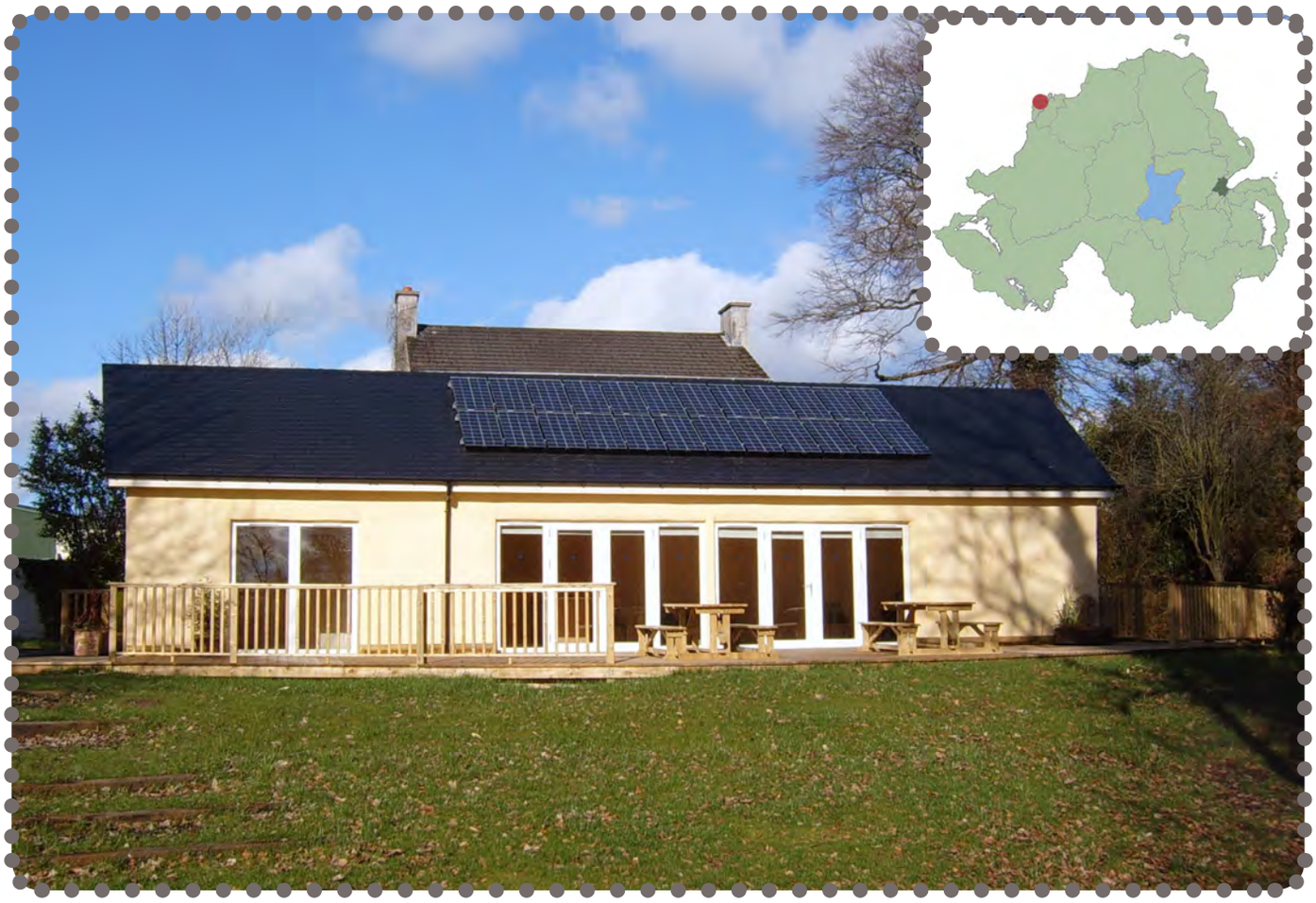
The solar panels meet the electricity costs for the Eco Base building (around £400 per annum). Mark Roberts, Director of the Playtrail says that the solar panels mean that the Eco Base building pays for itself.

The installation of solar panels complements the environmental ethos of the Eco Base sustainable building and are used as an educational tool. Mark finds that the very visible solar array normally catches people's eye and makes them start thinking about the other sustainable aspects of the building as well. A large display panel outside the building provides information about the solar panels and the other eco friendly measures used in the building including recycled rubber tiles, water harvesting and the straw bale construction. Visitors can then see these in action in the building itself. There is also an information panel inside the building which provides information about the energy generated and savings. This gets people thinking about how they could use similar techniques and technologies in their own buildings.

Process

The Eco Base decided on solar pv panels after exploring a number of options. They found that their south facing roof was suitable for the panels and also considered solar thermal panels but found that the building would not use enough hot water to make these worthwhile. Funding at the time came from the Low Carbon Buildings Programme Phase 2, with top up funding from Northern Ireland Electricity's Smart Programme.

The Playtrail found the process of installing the solar panels straightforward, working with the solar panel installers. They had no problems in securing planning permission or building control and no significant issues during installation. As the panels were installed at the end of the Eco Base building project, there was only a small element of retrofitting involved.



Challenges

Mark advises that before installing solar panels groups should consider whether the amount of money that will be saved over the lifetime of the panels (usually 25 years) will outweigh the initial costs of buying and installing these. In the case of the Eco Base the solar panels cover the cost of the building's small electricity bill. However if funding had not been available for the solar panels, in this case, they may not have paid for themselves over their lifetime. In many cases, solar thermal panels may be a better option for community groups, particularly where they use a large amount of hot water.

Tips for Other Groups

Mark advises groups thinking about carrying out building work that they should also think about how to reduce their running costs through renewables and energy efficiency measures. In the current climate, funding to cover these costs is becoming increasingly scarce.

Further details and information on the project can be found on:

www.playtrail.com
www.facebook.com/theplaytrail

Case Study:
Flaxmill Centre

Background

Drumduff and Drumnakilly Community Association was formed in 1992 to cater for the social, recreational and educational needs of this rural area located about eight miles from Omagh. The Flaxmill Centre offers a flexible local community space accommodating computer training, health and fitness related activities and a variety of activities for a wide range of ages including Parent and Toddler Group, Youth Club, Silver Circle and all ages in between.

Project Description

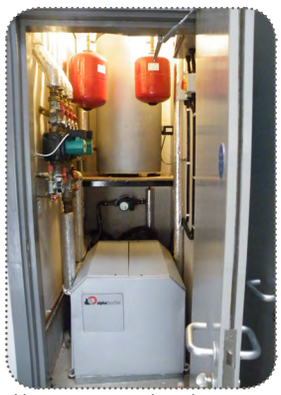
- New community centre opened 2007
- Ground source heat pump
- Wind turbine
- Highly insulated
- Automated lighting sensors

Ground Source Heat Pump

Area where geo-thermal pipes located, outside community centre

The Community Association find the ground source heat pump works well to heat the building and that the cost compares well to what they might expect to pay to run heat the centre using oil.

They found installation of the system straightforward. A shallow system of horizontal pipes was installed in waste ground to the back of the community centre. The heated water is brought inside the building at a temperature of 11 degrees and then brought up to temperature to heat the building. Under floor heating was installed throughout the building as ground source heat pumps are not compatible with traditional radiators. The initial cost of the system at the time was around £10-11,000 and funding came from Clear Skies and the Energy Savings Trust.



Heat pump and tanks located in internal storeroom.

There have been no significant problems with the system. Recently the group had to replace one of the condensers for the heat pump which was quite expensive. The system is maintained as it is needed, which can mean additional costs which are hard to predict.

Operation of the heating system requires some planning in advance, for example, adjusting the heating a couple of days in advance depending on the activities planned that week.

Wind Turbine

The Community Association decided to install a wind turbine to help meet the electricity needs of the building and of the ground source heat pump. Separate funding was obtained for a 20 kilowatt turbine which was installed at the end of 2007.

Since the centre has opened:

- 66,000 kilowatt hours of electricity (around 1,000 kwh per month) has been generated by the turbine;
- around 35,000 kilowatt hours of this (around 500 a month) has been exported; and
- 11, 4000 kilowatt hours (around 1727 a month)

has been imported.

Wind turbine cabinets, located in internal storeroom.

Based on these figures, around 20% of the electricity that the centre uses each month is generated by the wind turbine. There are times when additional electricity is needed on top of what is generated by the wind turbine so electricity is imported from the grid. There are also times when the wind turbine generates excess electricity that is not being used in the community centre and this is exported to the grid. It is more beneficial for the Community Association to use the electricity generated by the wind turbine themselves rather than exporting it as the cost of a unit of electricity imported from the grid is higher than the amount paid per unit of electricity exported. In addition ROC payments are received for every kilowatt of energy produced (whether they use these themselves or export them to the grid). The Community Association currently receive 8.82 pence per kilowatt produced, but this value changes every year.

Kathleen Ward advises groups to consider the ongoing cost of insuring the wind turbine against any damage which might be caused by it. The area around the wind turbine had to be secured for insurance purposes, which was an additional cost. She also advises groups to consider ongoing maintenance costs. At the Flaxmill Centre, this costs about £400-500 per year. A maintenance contract for four years was included as part of their funding.

Planning permission for the wind turbine took longer to secure than the group expected. Although funding was in place for the wind turbine, this had to be extended until planning

permission was secured. Amended drawings had to be submitted showing the wind turbine closer to the community centre to meet planning requirements which had additional cost as well as making the process longer. Kathleen recommends getting planning permission as far in advance as possible to avoid delays.

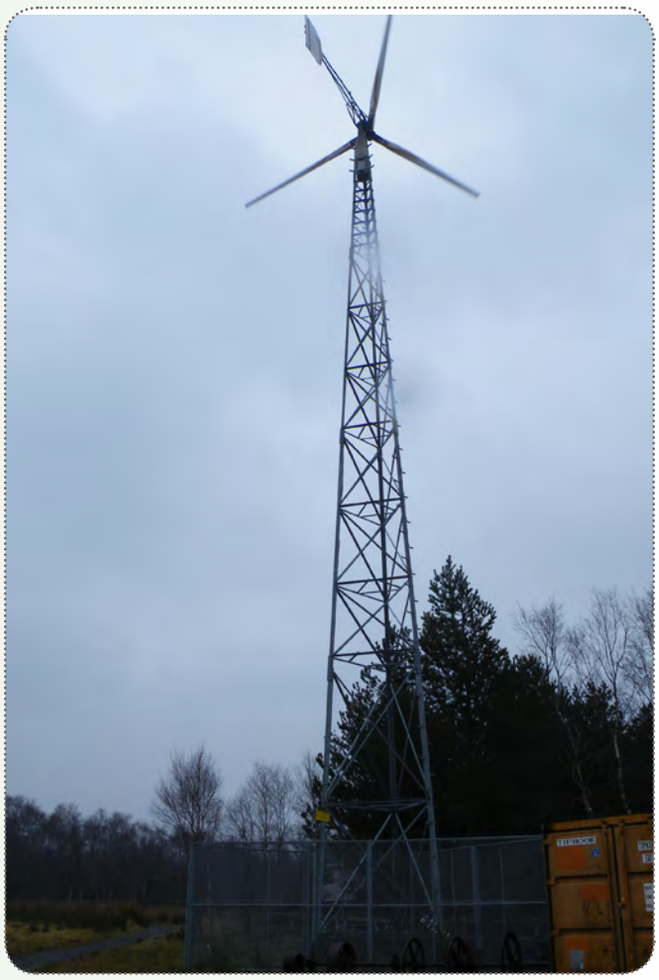
The Community Association have been advised that there is a fault with the model that in future problems are likely to occur. Work can be carried out to prevent this fault occurring but is likely to cost £1,400-1,500 which the group had not foreseen. Kathleen also says that during the recent bad weather over the last two years there was very little wind so little electricity was generated.

Tips for Other Groups

Kathleen advises that if groups can source the funding, these technologies are worthwhile. She would advise groups to have all their documentation in place before applying for funding and to apply early for planning permission if this is required. She says that a feasibility study can be useful to make the case for installing renewables, but these can be costly. The Community Association is considering installing a larger wind turbine which they think might be more beneficial.

For further details and information on the project contact Kathleen Ward, Drumduff and Drumnakilly Community Association:

flaxmillcentre@googlemail.com



Wind turbine and secured area around it.

Case Study:
Transition Town, Whitehead

Background

Transition Town entered the Power NI Big Energy Savings Challenge in 2011/2012 and was successful along with six other groups in the region in securing funding to make energy savings in their community. The group decided to use the money to make improvements to the community centre in Whitehead, a cross community facility which is well used by many different groups in the town. Facilities in the Whitehead Community Centre, formerly a cinema, include meeting rooms, a large hall, and kitchen and conference room.

Project Description

Solar thermal panels installed on existing Whitehead Community Centre

Benefits

In combination with energy efficiency measures, the solar panels save energy and money for the Community Centre which is widely used by all sections of the community. The solar panels meet the hot water needs of the community centre, mainly from the small kitchen which is used every day by the crèche and children's nursery.

Jim Kitchen from Transition Town Whitehead says that the solar panels were good value for money. They found prices to be competitive and as a result had money left over from the funding they received which they used to distribute draught proofing and low energy light bulbs to local people.

Process

Transition Town was awarded £7,500 to use over a year to benefit the local community and decided to spend this money on improving the energy efficiency of the community centre by installing double glazing and timing devices. Wall and roof insulation were also installed using money from the Big Lottery Fund's Energy Efficient Venues Programme. Jim recommends that groups think about energy efficiency measures like these in addition to considering renewables.

A further £7,500 was also awarded to the group which they spent on a Kingspan system of solar thermal panels. Solar thermal panels were chosen as they made the best use of the money available to the group and were suited to the centre's south facing roof and this project fitted in well with the ethos of the Transition Town organisation.

Challenges

Jim says installation of the panels and getting statutory permissions were all straightforward. They worked with Power NI who helped with the technical aspects of the proposal. The existing small water cylinder had to be replaced by a larger, fully insulated hot water cylinder.

Tips for Other Groups

Jim would encourage other community groups to undertake similar projects. He says that there are gains to be had including social, financial and not least environmental benefits. However, the cost of renewable energy projects can be beyond the resources of many groups and funding is required.

Further details and information on the project can be found by contacting
Jim Kitchen, Transition Town Whitehead - transitiontownwhitehead@me.com

Case Study:
Skainos Centre

Project Description

- £20.6 million project opened 2013
- New development to replace old East Belfast Mission building
- Total floor area of the project is 10,675 $m^{2.}$

The Skainos Centre is a multi use building which includes retail, day care, seminar rooms, café and kitchen, offices, a community hall, dance studio, church and residential units. It utilises environmentally sensitive innovations to lower energy emissions and consumption. These include:

- A biomass boiler for heating and hot water;
- Solar thermal panels;
- A vertical garden; and
- A natural ventilation strategy.

Funding for the Skainos Project came from a variety of sources:

- SEUPB PEACE III Programme - £6.1 m;
- Department for Social Development - £5.4 m;
- International Fund for Ireland - £2.9 m;
- East Belfast Mission - £1.4 m; and
- The DSD committed an additional £4.2 m through Oaklee Housing Association for social housing on the site.

Benefits

A number of messages are incorporated into the design of the project. Enamel panels on the exterior of the building represent important events from the past. The overall message of the building represents the future and is about nature conservation and reducing the impact of the building on the environment, particularly in its urban setting. The renewable technologies used all fit with the sustainable message of the building.

Redevelopment of this brown field site has helped to regenerate the area and provides a shared community space. The building provides reasonably priced modern accommodation with low utility costs for a number of organisations in the area which all contribute to the sustainable regeneration of East Belfast. Other benefits for tenants include shared procurement of services, synergy between projects and joint collaboration on projects, with any profits from the building recycled back to fund community collaboration within the building.

Community consultation was carried out throughout the development of the project. The community's comments were taken on board and helped to shape the scheme e.g. the location of the main auditorium / Church came about as a result of community input. This process helped to build trust and a sense of ownership of the project. Working with a number of local artists also helped to create a sense of ownership of the project and enriched the building. For example, local artists worked on the panels outside the building, glass roundels in the church space and bog oak handles throughout the building. A local artist created over 400 ceramic bolts which show significant dates and which were inserted in the round holes formed during the making of the concrete of the building.

Solar Panels

Solar water heating panels were installed on most pitched roofs and heat up the domestic water to around 60 - 70% of the required temperature. The boiler then brings the water up to the full operating temperature. There are a number of hot water tanks at separate locations which makes the system more effective.

Solar Photovoltaic panels producing 20 kVA of electricity and costing around £200,000 were designed for the roof of the Skainos Centre. Unfortunately funding has not yet been made available for these panels however all infrastructure including cabling and supporting structure has been installed at a cost of £20,000 to minimise any future installation works, calculations were made to ensure that the payback for these solar panels would be viable, taking into account ROC payments.

Biomass System

The Biomass system provides heating and contributes to the hot water system. There were some unexpected issues with the operation of the system. When the fire alarm went off, this shut down the boiler, causing problems. The system had to be reprogrammed to deal with this scenario and has only recently become fully operational.

The district heating system is supplied to all tenants at 10% less than marketplace rates and energy reports are provided so they can keep check on how much energy they use. The central heating system is metered for each of the apartments and premises which means that they are charged for what they use, making tenants less inclined to waste heat. (Some centralised heating systems are charged on a per square metre basis). Residents also have a bill card

which can be topped up in most supermarkets.

Vertical Garden and Sedum Roofs

The vertical garden or green wall is planted with plants specially chosen to attract and sustain local wildlife e.g. plants with berries to attract birds. 60 bird boxes have been built into the walls and roof gardens of the scheme as well as bat boxes. Nial says that bird boxes in particular are cheap and easy to install. 35 of the bird boxes have been built into the red brick walls of the main square and are for swifts, an endangered species that used to nest in the eaves of buildings but whose homes are disappearing.

There are also a number of sedum roofs at the centre. Sedum is a Scandinavian drought tolerant plant. A mixture of sedum and wildflowers were planted on the roof which is specially designed to trap and retain rain water to irrigate the plants, the system is relatively maintenance free. These plants bring back an environment that has been lost from this urban area and supports micro-beasts which in turn support birds and other wildlife.

Both the green wall and sedum roofs have a significant impact, through creating habitats for wildlife and by having a positive impact on people using the centre. For example, Age Concern's premises overlook one of the largest sedum roofs. This has a positive impact on the older people using the centre – overlooking birds, insects and other wildlife. The hostel is actively involved in the maintenance of the various garden areas. A community garden consisting of raised vegetable beds will provide further integrated activities with the benefit of food for the on site café. The community garden will be completed in May 2013.

Use of Materials

Exposed concrete was used in the building. This, together with automated opening vents, helps maintain a constant internal temperature throughout the year.

The production of concrete is a very energy intensive process. In making the decision to use concrete the cost of production has to be weighed up against the benefits for the lifetime of the project to ensure that the environmental and financial payback is worthwhile. Concrete in Skainos has been used only for primary, permanent, structures allowing other internal walls to be light weight and removable should the building use dictate change to the internal layout. The maximum benefit of concrete is in the exposed ceilings where it has a large surface area to help maintain a constant temperature.

Energy Use

The energy use predicted for the building is:

- Predicted Electricity Consumption: 67 kwh/m^2
- Predicted Fossil Fuel Consumption: 12 kWh/m^2
- Predicted Renewable Energy Generation: 107 kWh/m^2
- Predicted Water Use (m^3 per person/year): 11.3 m^3
- Predicted Water usage from grey water or rain water: 3%

Actual figures for energy use will be made available on the Skainos Centre website (www.skainos.org/) when the building has been up and running for longer.

Tips for Other Groups

Nial O Neill from Donnelly O Neill Architects advises community groups that it is important to have someone available who is familiar with the system and who can make sure that it is running as it should.

Nial encourages other community groups to think about their projects in a holistic way, not just about the building but about the impacts on the whole environment.

For further details and information on the project or to arrange a tour of the building contact:

Nial O Neill, Donnelly O Neill Architects,
nial@d-on.co.uk

Case Study:
Ards Community Centre

Project Description

Renovation of existing listed building and installation of solar photovoltaic panels.

Background

Ards Community Network supports community development and voluntary activity throughout the Ards Borough. In 2012 work took place to create a modern, energy efficient one stop shop for a wide range of local community organisations in Newtownards. Funding for this project came from DSD's Modernisation Fund. The building originally consisted of three terraced houses. The front façade has been restored while the south facing façade of the building to the rear has been completely redesigned to let in natural light and to make the most of the views from this side of the building. Inside, the double and triple height spaces let in light.

Benefits

These alterations and improvements bring an old listed building into use and make it sustainable by providing facilities and services shared by all. Although the building is listed it was possible to incorporate a number of energy efficient measures into the project. Insulated dry lining to the external walls meant that it was possible to provide a high level of insulation. Double glazed secondary glazing was installed. These measures as well as the installation of solar Photovoltaic (PV) panels and a building management system all help to reduce running costs of the building and improve its energy efficiency. This building has also been future proofed - for example, there are plans to eventually install a recording studio to help local musicians. The infrastructure for this project has already been installed. This means that in the long term the cost and disturbance of installing this equipment including installing wiring into existing walls will be less.

Challenges

As the building is listed the Northern Ireland Environment Agency (NIEA) was consulted on many aspects of the work. NIEA had concerns about the visual impact of the solar panels on the listed building. In order to overcome these concerns, the architects for the project supplied photomontages to demonstrate that there would be minimal visual impact.

Tips for Other Groups

The Ards Community Network Building has a building management system which manages the temperature of the building. Nial O Neill from Donnelly O Neill Architects recommends that groups thinking of installing a building management system or other technologies should have someone available who is familiar with the system and who can make sure that it is running as it should. He advises that groups without the appropriate skills enter into a facilities management contract to ensure the system is operating at maximum efficiency, this will save money in the long term.

For further details and information on the project contact:
Nial O Neill, Donnelly O Neill Architects,
nial@d-on.co.uk

Case Study:
An Creagán

Background

An Creagán, established in 1994, is a community based social enterprise located in the Sperrins Area of Outstanding Natural Beauty. It provides some essential services for the rural community and has become a hub for tourism, hospitality, environmental education, healthy lifestyle promotion, community arts, culture and heritage. There are a wide range of facilities at the site including a restaurant and conference centre, shop, play area, community garden and eight self catering cottages. As part of their strategic plan, An Creagán aims to become "Energy Plus" rated which fits with the environmental ethos of the organisation and contributes to the sustainability of the centre.

Project Description

- Eight self catering cottages with solar thermal panels and a wood pellet burner (stoves).
- Installed in 2008
- Wind turbine (now removed)

Benefits

Pellet burner stove inside cottage

John Donaghy, Manager of An Creagán says that the stoves have been a success. They are fairly low maintenance, easy to clean and economical as well as being easier to light than a fire.

Whereas a number of fuels are required for a fire (coal, fire lighters, kindling etc) the stoves only require pellets to run.

These are stored in a specially constructed and insulated store and carried to the burner. Each burner has a hopper at the back which automatically feeds the pellets into the stove. Pellets are sourced from Baclas and three tonnes are delivered every six to nine months. Storage and transporting the pellets to the burners are straightforward.

There has been mixed success with the solar thermal panels at An Creagán. Water is used at peak times, whereas solar thermal is more suitable where water use is more constant. John advises groups to get references from people who have already installed solar panels as there are so many different models on the market and as in this case some may be more efficient than others. For example, the solar panel on one of the cottages was installed as a pilot and is a different model to those on the other cottages. This panel supplied all the hot water needed by a guest staying in the cottage last summer for two weeks whereas the other solar panels would not be capable of doing this.

Process

The wood pellet burners and solar panels were installed following an energy audit of the site which made recommendations about improvements that could be made. There were no issues in securing planning permission or building control for these and no issues with installation.

There are plans to install a pellet burner district heating system at An Creagán in the future and building control approval has already been secured for this. John advises that building

control will require detailed information about the project.

Planning permission was also granted for a wind turbine at An Creagán. Originally a planning application was submitted for a 50 kilo watt turbine but when the group went out to tender, the best option turned out to be an 80 kilowatt turbine. This meant that they had to re-apply for planning permission due to the increase in size.

Challenges

An Creagán also installed an 80 kilo watt wind turbine in 2009. Unfortunately, this wind turbine never operated to an acceptable standard and has now been removed. An Creagan lost a considerable amount of money on the project, around £130,000. John puts this down to a number of factors including a poor quality and inexperienced service and insufficient support from funders. John warns that in the current economic climate, a lot of people are getting into the renewables business with little or no experience and learning as they go, often at the expense of the customer. He advises groups considering renewable technologies to thoroughly research the companies involved and to get help from someone with expertise that they can trust. He says groups should check the ability of the company to install the equipment and make sure that insurance is carried through right to the end of the project. In addition support from funders is vital for community organisations.

In relation to the solar panels, both the installer and the supplier have gone out of business so there was no after sales service. The solar panels have been serviced but it has been difficult to source new water pumps required.

Tips for Other Groups

John notes that many community groups are interested in renewables and that there needs to be advice available for these groups and that they need to be taken seriously by funders and departments.

Invest NI, for example, offers a service where an expert is appointed to look at the energy costs of an organisation and the possibilities to reduce these. However this is only available to organisation with energy costs of more than £30,000 so small community businesses do not have that support.

For medium to large scale turbines, a partnership approach may be advisable, partnering with someone else who has expertise and will take responsibility if something goes wrong.

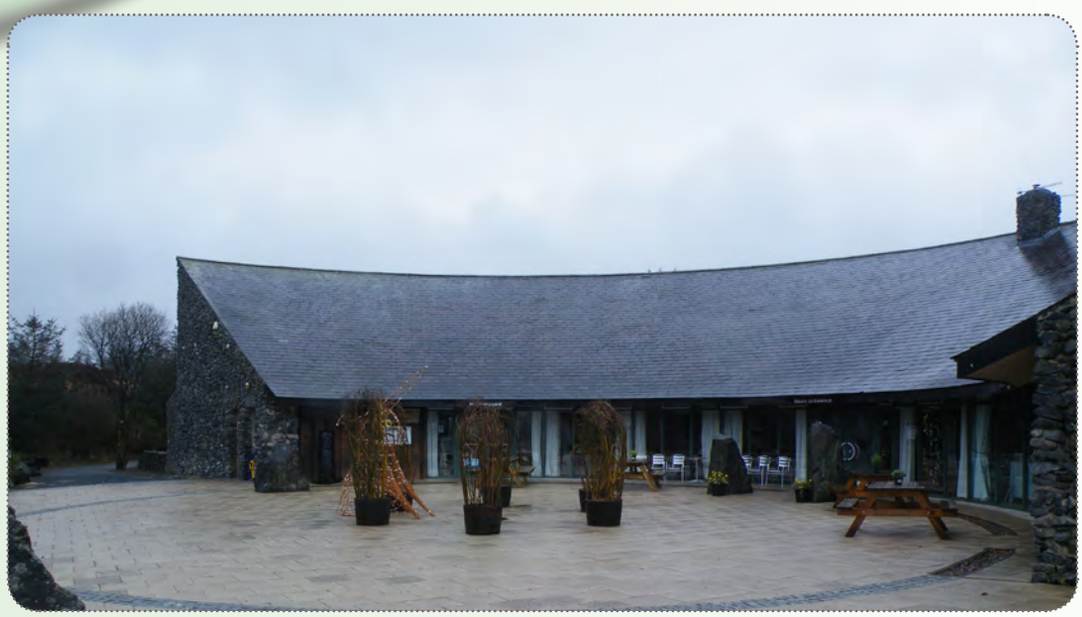
He also notes that there should be some sort of security in place so that in the event that a company walks away from a project, there is something to fall back on.

Future Plans

An Creagán is a large site and a good demonstration site for renewables.
They are considering installing solar PV panels and are also investigating the possibility of installing a pellet burner district heating system. They are considering a number of different options including sole ownership and a partnership approach and are trying to source funding. They are working with Invest NI.

For further details and information on the project contact:

John Donaghy, Manager, An Creagán
john@ancreagan.com



Case Study:

Washing Bay Community Centre

Project Description

- Washing Bay Community Centre, Western Shore of Lough Neagh
- 2 kilowatt wind turbine installed in 2006
- 10 solar thermal panels (generating 2 kilowatts of solar power) installed in 2007.

Benefits

Thermomax flat plate solar panels were installed on the community centre in 2007. The group have found that they work very well. However, the community centre does not use large amounts of hot water. As a result, they sometimes produce excess hot water. They are currently looking at ways to make use of this, for example, one proposal is to pipe the excess hot water to the local football club nearby.

Obtaining planning permission and building control for the solar panels and the wind turbine were all straightforward with no significant issues.

Challenges

Conor Corr, Network Development Manager for Cookstown and Western Shores Area Network highlighted one barrier to smaller community groups in relation to installing renewable technologies that produce more than 6.5 kW of energy. Washing Bay Community Centre plan to increase the number of solar panels on the roof to 30 panels which will produce 6.5 kW of energy. Funding was acquired through the Big Lottery Fund's Energy Efficient Venues Programme. However, if they also retain the wind turbine this will exceed the capacity of their existing grid connection. Although it will be possible for the group to produce more than 6.5 kW of energy using both the proposed solar panels and the existing wind turbine, Conor says that they will probably end up turning off the wind turbine due to the capacity of the existing grid connection. It is also not possible to redirect the excess energy generated to other uses e.g. to heating radiators. He says that in his experience this is typical of problems experienced by small groups.

NIE's advice is that where there is an existing grid connection, (either "single phase" which can accommodate up to 6.5 kW or "three phase" which can accommodate up to 20kW) a grid connection can be made with no grid charges, provided NIE requirements are met. However, if there is no existing grid connection or an upgrade is required, an application must be made to NIE who will provide a quotation for the cost of providing this. The higher the amount of generation proposed, the higher the grid connection costs will be. In some instances the costs associated with grid connection, particularly connecting small scale generation (more than 20 kW) can be significant, with some applicants deciding not to proceed.

In addition, Conor highlighted some aspects of the Renewable Obligation Certificate scheme (ROCs) that may act as a deterrent for groups. Once renewable energy generators sign up to the ROCs scheme they are issued with ROCS for every MWh of eligible energy generated. The number of ROCs issued per MWh depends on the type and size of renewable technology and when it first became accredited under the scheme. Therefore, if you upgrade your system you still receive the ROC value that was in place from when you first registered, not the new ROC value.

Tips for Other Groups

Conor advises groups considering wind energy to carefully consider whether the payback from the wind turbine would be enough to recoup the initial cost and to make the project viable. He advises that in some cases the payback may be 20 years or more and may only be viable if funding is available.

He says that joining the Power NI tariff scheme has also helped them to save money. Under the scheme electricity is charged at a cheaper rate in the evening and at night when they use it the most. He would advise other community groups to look into this.

Further details and information on the project can be found by contacting:
Conor Corr, Network Development Manager,
Cookstown and Western Shores Area Network,

conorcorr@aol.com

Learning from the Case Studies

Community groups who took part in the case study guide were asked if they would have any advice for other groups thinking of undertaking similar projects. Some of the key recommendations were:

- Consider energy efficiency measures such as insulation, efficient modern heating systems or use energy saving appliances. These kinds of measures can also help reduce bills and the amount of energy lost from a building.

- Getting the right tariff from your energy provider can also help save money. If you look at energy usage in your building there may be other areas where you can save money e.g. by switching off vending machines.

- Consider the "payback" over the lifetime of the project. Will the money saved outweigh the initial costs involved? Incentives like the Renewables Obligation Certificate (ROC) scheme or Renewable Heat Incentive (RHI) should be taken into account as well as any potential funding that could be obtained.

- There may be on-going maintenance and insurance costs as well as one off costs such as repairs or replacing a part which are harder to predict.

- Many of the groups would recommend entering into a maintenance contract to ensure that there is someone available with expertise to ensure that the technology is working as it should.

- Although the process of getting planning permission for most renewable energy technologies is usually straightforward, in the case of wind turbines this can often take longer and be more costly. Groups should seek advice about this as soon as possible.

- In addition, the cost of connecting to the grid can vary depending on the nature of the proposal and existing grid capacity. This process should be investigated well in advance.

- Research the company who will be providing and installing the technology and get references to make sure that they can deliver the project. Make sure that appropriate insurance is in place in case anything goes wrong.

- In new build projects other factors to consider might include the use of sustainable building materials and encouraging biodiversity.

Further Information

Building Control

Building Control NI	www.buildingcontrol-ni.com/site/default.asp?secid=home Contact details: http://tinyurl.com/cwtmhtz Fees: www.buildingcontrol-ni.com/sections/default.asp?secid=quote

Case Studies

Community Energy Scotland	www.communityenergyscotland.org.uk/
Energy Saving Community	www.energysavingcommunity.co.uk/
Rural Network NI	Community Renewable Energy in Ireland Policy Paper: http://tinyurl.com/bsdmc36 Future Proof Your Village Guide: www.ruralnetworkni.org.uk/FlipBook/FutureproofYourVillage/

Community Benefit

Fermanagh Trust	www.fermanaghtrust.org/ hwww.fermanaghtrust.org/cms/uploads/1/Wind_REPORT.pdf

Energy Efficiency

Bryson Energy	www.brysonenergy.org/
Energy Savings Trust	www.energysavingtrust.org.uk/northernireland/Organisations
Power NI	http://powerni.co.uk/saving-energy/

Environmental Considerations

Bat Conservation Trust	www.bats.org.uk/
RSPB	www.rspb.org.uk/northernireland/
Northern Ireland Environment Agency	Biodiversity Enquiries: 028 9056 9605 Wildlife Team: 028 905 69605 Development Management: www.doeni.gov.uk/niea/land- home/plan.htm Water Management Unit: www.doeni.gov.uk/niea/water-home/development_management.htm Water abstraction licences: http://tinyurl.com/bskqkac

General Advice/Information about Renewables

Action Renewables	www.actionrenewables.org/
Bryson Energy	www.brysonenergy.org/
Energy Savings Trust	www.energysavingtrust.org.uk/northernireland/Organisations
Power NI	powerni.co.uk/saving-energy/renewables/
Energy Saving Community	www.energysavingcommunity.co.uk/

Grid Connection

Northern Ireland Electricity	www.nie.co.uk/Connections/Generation-connections

Incentives

NI Direct	Renewable Heat Incentive: http://tinyurl.com/a4w7a3b
OFGEM	Renewable Heat Incentive: www.ofgem.gov.uk/e-serve/RHI/ni/Pages/index.aspx
Power NI	Renewable Obligation Certificates (ROCs): www.powerni.co.uk/saving-energy/renewables/sell-your-electricity/

Installers

MCS Installer List	www.microgenerationcertification.org/consumers/installer-search

Planning Permission

Community Places	www.communityplaces.info
DoE Planning	www.planningni.gov.uk/ Fees Calculator: http://epicapps.planningni.gov.uk/FeeCalculator/ Forms: www.planningni.gov.uk/index/advice/fees_forms.htm Planning Policy Statement 18 (and guidance): http://tinyurl.com/d2dhko6 Information on renewable application decisions and numbers: http://tinyurl.com/cmvvxfg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