

Renewable Energy Development in Shetland: Strategy and Action Plan

18 August 2009

Table of Contents

1	Strategy Document	1
2	Action Plan.....	18
	Appendix A	26
	Appendix B	29

1 Strategy

Introduction

Our goal is to use renewable energy to enhance the quality of life in Shetland for future generations. The partners in this strategy believe that the opportunities for renewable energy development in Shetland offer our community a rare opportunity to reduce our fragility and create a positive step-change in our economy. Furthermore, renewable energy development can secure significant community and environmental benefits in addition to the economic benefits which could be created.

Our vision, objectives and proposed actions have been shaped by those already active in renewable energy in Shetland and key public sector partners.

Rationale for Development

The rationale for pursuing renewable energy as a route to future community sustainability is centred on:

- the quality of our natural resource;
- the need to diversify our economy; and
- our community's high dependence on, and vulnerability to, non-renewable fossil fuel.

Shetland's peripheral location means that opportunities for economic diversification and growth are rare. However, our natural resources have repeatedly given our islands a competitive advantage and encouraged economic activity to locate here. Our location at the heart of rich fishing grounds means that the fishing industry has been a cornerstone of the Shetland economy, the oil and gas industry came along and transformed Shetland in the 1970s and aquaculture activity expanded in voes around Shetland in the 1980s. These industries are successful because of our natural environment.

However, our economy is fragile, there is a limited economic base and our key industries all operate in a global market place. We have been fortunate in recent years that as our industry sectors experience cycles of success and downturn, one sector's success has tended to compensate for another's downturn. However, our ability to balance our economy in this way is largely based on luck as our industries are influenced by global conditions and our community has little control over their economic well-being. The challenges we continually face are evidenced in the population decline we are experiencing.

Renewable energy offers us a rare opportunity to diversify and develop our economy and importantly because it is 'renewable' it offers our community a sustainable economic opportunity.

In addition, and unusually, the development of renewable energy activity in Shetland will provide us with more than just the economic opportunities of new business activity and employment, and the associated spin-off benefits. Development of renewable energy can also offer us substantial community and environmental benefits.

Renewable energy development, if appropriately targeted, offers significant additional value because of its potential to reduce the threat to our community from rising oil

and gas prices. Characteristics which make us vulnerable include our dependence on ferries and air travel for passengers and freight within and external to the islands; our dispersed population and therefore our dependence on cars; our high cost of living; and our need for relatively intensive heating in our climate, all combine, along with many other factors to make our community one of the most vulnerable to price rises for finite fossil fuels. This vulnerability is already visible in the high incidence of fuel poverty within our community which energy efficiency measures can also help to address.

Furthermore, renewable energy offers environmental benefits, in particular the reduction of carbon emissions and the positive contribution we can make to climate change, for which we all have a responsibility. As our natural environment, including our climate, is our economic strength we must do what we can to support it.

We believe that the development of renewable energy activity in Shetland offers a unique opportunity to achieve a mix of economic, community and environmental benefits that would be extremely difficult, if not impossible, to achieve as effectively through any other route. The extent of the benefits we could achieve, and the threat to our community of doing nothing, combine to form our rationale for pursuing development.

Working Together

This strategy reminds us that the development of renewable energy in Shetland, and all its potential benefits, is an opportunity not a certainty. Shetland offers many advantages through the quality of its resource, its infrastructure and the skills of its residents. But there are challenges and costs associated with pursuing the benefits we want to achieve. This is why we have created underpinning principles for the strategy and action plan which state that the development of renewable energy in Shetland should be undertaken with community support and with due consideration to the protection of our environment.

Our strategy explores the potential opportunities, the direction we wish to take and the barriers we may have to overcome if our vision is to be achieved. As partners in the future of renewable energy in Shetland we hope that you are inspired to investigate how renewable energy can improve the quality of life in your community so that we can work together to achieve our vision.

<Signatories from the Strategic Board>

Our Vision

Our overarching aim is:

‘ to enhance the quality of life in Shetland for future generations by achieving the optimum value from the renewable resources we have available in and around the islands.’

This strategy provides guidance on how we intend to achieve sustainable benefits from harnessing our resources for renewable energy development.

Defining Success

Several recurring themes were raised throughout our discussions about what the development of renewable energy should achieve for Shetland in the long-term. As a result of these discussions we have summarised the characteristics of a future Shetland that, if realised, will indicate that we have achieved success from our development of renewable energy:

- Shetland’s quality of life is high, and is sustainable for future generations;
- Our vulnerability to the price of finite fossil fuels is low and we are substantially energy self-sufficient;
- Innovative and high quality jobs exist in, and in support of, renewable energy activity;
- Our peripheral communities are rejuvenated;
- Shetland’s reputation for good environmental stewardship is widely recognised; and
- The outstanding quality of our resource is contributing towards Scottish, UK and European targets for carbon reduction.

Defining Renewable Energy

It is important to clarify what we mean by ‘renewable energy’. Our definition of renewable energy is:

Renewable energy is energy generated from sources which are either naturally (e.g. wind, sun, tidal, biomass) or readily replenished (e.g. waste materials), and which therefore can be considered, on timescales of decades or more, to be sustainable.

For clarity our definition of renewable energy includes waste to energy schemes because waste can be expected to be available for some time and incineration of waste is considered to be a suitable environmental option for Shetland.

In Appendix A we have set out the range of renewable resources which could fall within this definition. The table within the Appendix also shows how these resources could be utilised in Shetland for energy generation, how the energy could be distributed and who the potential consumers could be.

The Renewable Energy Industry in Shetland

Before we establish what we need to do to achieve our vision we must first understand where we are starting from. In this section of the strategy we explore the renewable energy generation activity which already exists in Shetland. This is followed by consideration of the characteristics of Shetland which influence the scale and nature of the renewable energy activity which takes place.

Current Activity

Figures estimated for 2006 show that there is 14MW of renewable energy capacity in Shetland¹. However, there is a discrepancy in the figures available due to an error in the figures for the Lerwick District Heating Scheme, which means Shetland's current renewable energy capacity may be 10.3MW rather than 14MW. If this revised figure is correct then 61% of the total is represented by the Lerwick District Heating Scheme, which is powered by energy from waste, and 36% is represented by the Burradale wind farm. Burradale wind farm is the only renewable energy project in Shetland that generates electricity for the local electricity network. The electricity from Burradale is sold to Scottish and Southern Energy (SSE) and is estimated to provide on average 7-8% of Shetland's electricity needs (excluding Sullom Voe Terminal).

The remainder of the capacity (3%) is used largely for heating although in some small islands there are 'off-grid' schemes which provide electricity for the small resident populations. Examples of the type of projects include:

- community schemes which are largely wind based and are generating off-grid electricity;
- small solar projects;
- individual domestic property schemes which are either wind for heat or heat pump systems; and
- schemes in public buildings which are largely wind based systems for heating.

Our Strengths and Weaknesses

The discussions held regarding the development of this strategy revealed a wide range of strengths and weaknesses related to the development of renewable energy in Shetland. The characteristics which are considered to have the greatest influence over how successful we can be in achieving our vision are summarised below.

¹ Source: Shetland in Statistics 2008

Shetland's Strengths and Weaknesses in relation to Renewable Energy Development

Strengths	Weaknesses
<ul style="list-style-type: none"> • Outstanding renewable energy resources which can enhance the viability of projects • Strong desire to capture future benefits from renewable energy for the good of the community at large • Determination and skill of individuals already active in renewable energy in Shetland • Strong infrastructure which could support development, for example piers, roads and colleges • Access to public finance • Transferrable and high quality skills within the local economy, for example marine engineering. 	<ul style="list-style-type: none"> • The lack of an electricity distribution network into which renewable energy projects can connect • Limited local demand for additional generation • Strong competition for renewable energy investment from other locations • Shetland's natural environment is important and some areas would be sensitive and unsuitable for certain types of renewable energy schemes • A disproportionate vulnerability to fluctuations in the price of non-renewable fuel which reflects Shetland's remote location and dispersed population (which is actually a strength in relation to the attractiveness of renewable energy alternatives)

Building on our Strengths

Shetland demonstrates a number of strengths which support renewable energy development, some of which are hard for others to replicate. The quality of the resource in and around Shetland has been estimated at 10,500 gigawatt hours per annum (GWh/y). However, this level of resource is unlikely to be available in reality due to the unacceptable level of development which would be required to harness it. An estimate based on much more conservative levels of development suggests an available resource of 2,200 GWh/y².

The quality of the resource means that renewable energy offers the prospect of a new industry being created on Shetland that would generate jobs and strengthen skills among local people. It could also create diversification opportunities for existing firms operating in the marine and engineering sectors in addition to creating demand to which new firms could be formed to respond. If more renewable energy activity can be supported in the short-term, Shetland's image as a Renewable Energy location could strengthen and as a result we could build on the determination and skills of individuals already active in Shetland and attract further investment for hydrogen and marine technologies.

The quality of the resource means that there is scope for Shetland to become self-sufficient for electricity production. With a focus on green energy solutions, development of renewable energy could be coupled with links to the construction industry whereby future buildings on Shetland are built to a much higher energy conservation standard. This is believed to be critical - while Shetland's wind resource

² Renewable Energy Resource Assessment for Orkney and Shetland – Full Report and Management Briefing, Rev 2, July 2005, Aquatera Ltd. Commissioned by Orkney Enterprise and Shetland Enterprise

is an asset for generating heat, its ability to chill premises rapidly is also a liability. Reducing fuel poverty on the island must be a priority.

Furthermore, the community dividend from oil and gas activity has been substantial. This has the benefit of providing access to financial resources to support renewable energy development. Those involved in the development of this strategy believe that harnessing renewable energy will replace declining dividends from the oil and gas industry and benefit the community at large.

Overcoming our Weaknesses

Investments in Renewable Energy projects are generally long-term (20-25 years), and often involve relatively high levels of debt finance. Investors appraise projects according to their long-term return and may compare them to other (non renewable) investment paths. In the case of Shetland, the local electricity distribution network is currently at capacity (a development of less than 250 kW is believed to be possible). Without improvements to the capacity of the network the scale of potential new renewable energy projects will remain limited. Furthermore it is expected that constructing a case for expanding the local distribution system on the basis of existing and projected demand levels on the island would be challenging.

The lack of a link to the UK National Grid and limitations within the existing local network are significant infrastructure constraints. There will be opportunities to develop renewable energy projects 'off-grid' but the attractiveness of Shetland as a location for investment is diminished without a grid connection.

To overcome this constraint and create a step-change in the opportunities for renewable energy development in Shetland we either have to significantly increase demand for electricity within Shetland (avoiding energy inefficiency), perhaps by replacing other forms of fuel with electricity or replacing other forms of fuel with alternative clean energy technologies that do not require an improved electricity network; or find a way to export our product, just as we do in our main industries of oil and gas, fisheries and aquaculture.

Our Objectives for the Future

The underlying rationale for pursuing renewable energy in Shetland is that its development offers a rare opportunity to achieve a unique combination of economic, community and environmental benefits which improve the overall quality of life in Shetland.

By using this strategy as our guide, we will make sure that wherever possible our support for development ensures that we obtain the optimum economic, community and environmental benefits from our investment.

Based on our vision, we have developed objectives for renewable energy development in Shetland. These objectives, stated below, will be used to guide the prioritisation of renewable energy initiatives within the islands. The same objectives will also be used to gauge our success as we progress our action plan.

Our objectives are to:

- 1. Develop sustainable, economic and effective solutions which significantly reduce the volume of non-renewable fossil fuels required to power Shetland.**
- 2. Create employment, income and new skills in Shetland by stimulating new economic activity linked to the presence of renewable energy resources in the islands.**
- 3. Ensure there are direct benefits, in addition to employment, income and new skills, to the community from renewable energy development in Shetland.**
- 4. Enable peripheral communities to use renewable energy as a way to enhance the viability of their community and community facilities.**
- 5. Stimulate awareness of the importance of renewable energy and the need to reduce carbon emissions; and develop skills in energy efficiency and renewable energy alternatives.**

Principles of Development

However, we must achieve these objectives in the context of our vision for a high quality of life in Shetland. Therefore, we are setting the following principles which should be pursued in all of the activities we support:

- support or engagement from the community in our activities; and
- protection of the special qualities and characteristics of Shetland's natural and historic environment.

Our objectives, and the actions which could support Shetland to achieve success, are explored further in the remainder of this strategy and in the accompanying action plan.

Achieving Our Objectives

As stated, our overarching aim is to enhance the quality of life in Shetland for generations to come by achieving the optimum value from the renewable resources that are available in and around the islands.

Our community already has recent experience of pursuing community benefits from new industries in the islands. The lessons we have learned mean that we are well placed to secure optimum value from another new and emerging industry in our community.

Under each of our objectives, we set out the direction we want to go and the nature of activity we wish to target. The objective should remain robust and meaningful regardless of changing conditions. However, as we achieve success, as technology develops and our circumstances change, the priorities within each objective are flexible and can be adapted to changing conditions.

While the future of the electricity grid in Shetland is uncertain, this strategy and the associated action plan are based on the assumption that improvements to the local electricity network are feasible and that both private and public sector investment can be attracted to Shetland.

Objective One: Develop sustainable, economic and effective solutions which significantly reduce the volume of non-renewable fossil fuels required to power Shetland.

The long-term benefit of objective one will be an improvement in Shetland's energy security through a reduction in the islands dependence on, and hence vulnerability to non-renewable fossil fuels and fluctuating global prices.

There are two routes to achieving this objective and we will pursue both. The first is through improved energy efficiency which should lead to reduced consumption; and the second is by replacing non-renewable fossil fuels with renewable energy alternatives.

The Carbon Management Strategy (CMS) currently being developed by Shetland Islands Council will provide the detail on how the Council will reduce its consumption of non-renewable fossil fuels in line with this objective. It is hoped that success under CMS will encourage wider community engagement and wider adoption of successful solutions.

The priorities for Shetland under this objective are summarised below.

Energy Efficiency

The partners in the project will pro-actively encourage the adoption of energy efficient practices. There is a risk that this only leads to improved levels of comfort but its purpose is to reduce energy consumption in Shetland. This can be an important step in achieving our objective to reduce the volume of non-renewable fossil fuels consumed in Shetland.

One key area of activity will be to engage Shetland's public bodies and the construction industry in our objective and encourage energy efficient construction in new public buildings. By choosing to lead though example, and encouraging new skills and knowledge to develop within the construction industry in Shetland, we can promote the wider adoption of greater energy efficiency throughout Shetland.

Carbon Replacement

Perhaps the more ambitious priority area under Objective One is to replace the consumption of non-renewable fossil fuels with the consumption of energy from renewable resources.

Shetland uses a wide range of non-renewable fuels, both for onshore and offshore activities. Some of these applications will be more readily adapted to renewable sources of energy than others. For example, the gas oil used for heating households already has proven renewable energy alternatives, however, the renewable alternative to the diesel required to power our ferries and private and commercial vessels, is not so apparent. However, technology will continue to develop, particularly as the financial rationale for using fossil fuels diminishes as prices rise. This will continually force innovation and Shetland should be at the front in adopting new alternatives. The high degree of vulnerability within our community from rising fossil fuel prices, and the quality of our natural resource, means that renewable alternatives are likely to become viable in our community before they become viable elsewhere.

Our priority will be to encourage innovation, identify the options already available to Shetland and investigate how adoption of renewable energy alternatives can be stimulated.

Objective Two: Create employment, income and new skills in Shetland by stimulating new economic activity linked to the presence of renewable energy resources in the islands.

The long-term benefit of objective two will be diverse and successful local businesses and inward investment in Shetland which supports skilled employment locally.

The strategy process had identified three main routes by which we could achieve this objective. However, achieving success under this objective, more so than perhaps any of the other objectives, is likely to be closely linked to the development of the local grid and its connection to the national grid. Without key pieces of infrastructure it is expected to be difficult to attract new private investment in renewable energy to Shetland.

The three areas under which we propose to pursue development in order to achieve this objective are: new business investment in renewable energy generation; investment in renewable energy research and development activities; and new business investment which takes advantage of access to renewable energy.

Stimulate interest in renewable energy generation in Shetland

Preparatory work can be undertaken now to prepare Shetland for the opportunities that could be created by an interconnector. The interconnector proposed is being constructed to support one specific project. However, it is widely anticipated that there will be capacity for additional generation within Shetland. It is considered important that Shetland clearly states the nature of additional development that it may want to secure so that it can prioritise the different opportunities that could present themselves if the interconnector is constructed, and have the ability to sift out those that do not fit with long-term development plans. All of the objectives within this strategy should assist this task and future developments should be prioritised which provide the optimum value in terms of economy, community and environmental impacts. Any preparatory analysis of future opportunities may include specific consideration of Objective Four, enhancing the viability of peripheral communities.

Stimulate interest and pursue renewable energy R&D activity in Shetland

There is a strong belief that Shetland offers distinct advantages as a test location for prototypes and as an 'extreme conditions' test-site. The attraction of research and development activity to Shetland offers spin-off benefits through the location of knowledge based jobs within the islands. Shetland's ability to attract investment will be greater if there is a potential to connect a test project to the electricity network. However, there is expected to be some 'off-grid' opportunities and preparatory work can be undertaken now to prepare Shetland for the opportunities which could offer the greatest potential success.

Promote Shetland as a location for low cost or 'green' energy solutions for business

Industry in Shetland is often disadvantaged in comparison to other locations. This is directly linked to our peripherality, often because of the cost of transport, whether raw materials are being imported or products are being exported, and the restricted access to labour and markets. If Shetland can off-set this disadvantage through lower cost or green energy solutions there may be substantial benefits in promoting Shetland to businesses or industries that are energy intensive and may not be particularly dependent on high volumes of goods being transported. Actions under this objective could therefore target businesses which are not directly involved in renewable energy generation or development but may benefit significantly from access to renewable energy resources. Similar to the previous two priority areas under this objective, the opportunity to achieve this is expected to be enhanced by improved electricity grid access.

If one or more of these three priorities can be achieved it will also provide opportunities for substantial spin-off benefits in the local economy. When considering a proposed development it will be important to understand how its legacy could support wider business development and growth in ancillary businesses and services.

Objective Three: Ensure there are direct benefits, in addition to employment, income and new skills, to the community from renewable energy development in Shetland.

Objective two is focused on the direct generation of economic benefits. The focus of objective three is to ensure that the long-term aim of enhancing the quality of life is also pursued by activity which directly targets wider social benefits.

The strategy process made it very clear that the pursuit of renewable energy was desirable not only from an economic perspective but from a community perspective. This objective aims to ensure that every opportunity is taken to maximise additional community benefits from the development of the renewable energy industry in Shetland.

Areas of particular interest under this objective are initiatives that can be developed to:

- protect individuals and businesses in Shetland from future price rises for finite fossil fuels;
- provide a return on investment which can be invested in energy efficiency activities;
- provide a return on investment which can be invested in wider community services and facilities; and

- ensure that developers adopt sustainable development principles and that communities directly affected by development achieve direct economic or environmental benefits.

Objective Four: Enable peripheral communities to use renewable energy as a way to enhance the viability of the community and community facilities.

To the peripheral communities within Shetland, and indeed Shetland itself, the development of renewable energy technologies provides an opportunity to create long-term benefits by enhancing community sustainability.

Shetland is experiencing population decline, with projections for further decline in the next 20 years. In addition, within Shetland there is population out-migration from Shetland's more peripheral communities and population drift towards the main employment centre of Lerwick.

Renewable energy developments could offer new economic activity and opportunities to enhance community viability in areas where there are limited opportunities for economic diversification. Examples of the types of opportunities which might be prioritised under this objective include developments which:

- provide a direct financial return to community development trusts which could in turn be used to support community development activities;
- create employment opportunities in peripheral locations; and
- reduce the fragility of community facilities and services and rejuvenate them, as already experienced in some community halls.

Objective Five: Stimulate awareness of the importance of renewable energy and the need to reduce carbon emissions; and develop skills in energy efficiency and renewable energy alternatives.

The long-term benefit of objective five will be to create a community that is known for, and exports, its expertise; and where clean energy technology is embedded in everyday life, both at work and home.

Our ability to achieve any of our objectives is dependent on having people in Shetland who can deliver renewable energy projects. This requires awareness raising, knowledge transfer and skills development.

One of Shetland's many strengths is that there are already several companies actively engaged in new and innovative renewable energy projects. However, to progress our ambitions for improved energy efficiency and increased uptake of renewable energy alternatives, the enthusiasm of the individuals within these companies must be shared in the wider community.

There are a number of ways in which awareness raising and skills development can be achieved. Potential areas of focus include:

- demonstration projects which could be promoted to both Shetlanders and a wider audience;
- links between businesses and colleges;
- investment in skills development in colleges, although this will require a suitable local outlet for the skills of significant scale to warrant investment in new courses; and

- curriculum enhancements to develop renewable energy and carbon reduction knowledge.

Good Governance

To achieve our vision and our objectives for renewable energy development the strategic process and action plan will require robust governance. We must ensure that we not only pursue activities that fit with our objectives, but that we do so in view of our overarching aim about the quality of life in Shetland and the development principles which have been set for community involvement and good environmental stewardship.

The characteristics which will ensure good governance for our strategy and action plan are:

- we will create a strategic and operational structure which will take responsibility for the strategy and the prioritisation of activity through robust project appraisal mechanisms;
- we will ensure community involvement in the management of the strategy;
- we will ensure that our activities support and enhance our reputation for good environmental stewardship;
- we will ensure our activities fit with local plans and, where appropriate, with national strategies for renewable energy; and
- we will monitor progress against our objectives to assess whether our activities are supporting the desired change.

We describe how we will achieve each of these characteristics in more detail below.

Strategic and Operational Structure

It is proposed that two groups are formed to oversee and drive forward the effective implementation of the strategy:

- a Strategic Board; and
- a Management Group.

Strategic Board

A Strategic Board will be assembled to engage a relevant cross-section of representatives. The selection of these representatives will be designed to provide input from the Community, the Commercial Sectors, the Public Sector, national Government and the research community. The role of the Board will be to provide appropriate strategic direction for the implementation of the strategy over a period of up to five years.

The Board will meet twice per annum. At its first meeting, it will approve the action plan and associated milestones prepared by the Management Group and whether a weighting system should be applied to the objectives. This will be used to measure progress over the lifetime of the strategy. Furthermore it can identify when actual or proposed activity diverts from the initial plan and agreement can be sought from the Board on the rationale behind any diversion.

In essence the Board's role will be to provide direction and guidance.

Management Group

The Management Group is proposed to represent members of local organisations (both public and private) which have day-to-day responsibility for implementing elements of the action plan.

The representatives will be selected on the basis of their decision-making authority within their respective organisations. The group are expected to meet monthly to ensure effective implementation of the action plan. It is also proposed that this management group undertakes a prioritisation exercise to establish, in agreement with the Board, the first steps to be pursued.

In essence, the Group's role will be to sustain their organisations' commitment to implement the project and ensure that the necessary resources are made available for its effective implementation.

Community Involvement

Community engagement and ownership of the future direction of renewable energy in Shetland is a principle which underpins the implementation of this strategy and action plan. It is proposed that this will be achieved through two routes:

- community representation on the Strategic Board; and
- a transparent management process for the strategy which provides opportunities for feedback from community members.

Environmental Stewardship

As stated in our Principles of Development, we will ensure that renewable energy generation projects are developed in a sustainable way. It is important to protect the special qualities and characteristics of Shetland's natural environment, biodiversity, historic environment, landscapes and seascapes

It is essential that a renewable energy strategy of this kind, that could have significant implications for the environment, is tested on its potential environmental effects and its capacity to support sustainable development.

Sustainable Development

The aims for sustainable development in Scotland were set out in "Choosing our Future – Scotland's Sustainable Development Strategy"³. The main thrust of the strategy is enshrined in four key goals:

- the well being of Scotland's people;
- supporting thriving communities;
- Scotland's global contribution; and
- protecting Scotland's natural heritage and resources

³ Choosing our Future – Scotland's Sustainable Development Strategy", Scottish Executive (now Government), December 2005

The Scottish Government in 2007⁴ further developed these into five strategic objectives and it is important to ensure that our strategy and subsequent actions are in line with the sustainable development goals and the Scottish Government Strategic Objectives (Figure 1)

Figure 1: Scottish Government Strategic Objectives

1	Wealthier and Fairer – Enable businesses and people to increase their wealth and more people to share fairly in that wealth.
2	Healthier – Help people to sustain and improve their health, especially in disadvantaged communities, ensuring better, local and faster access to health care.
3	Safer and Stronger – Help local communities to flourish, becoming stronger, safer places to live, offering improved opportunities and a better quality of life.
4	Expand opportunities for Scots to succeed from nurture through to lifelong learning ensuring higher more widely shared achievements.
5	Improve Scotland’s natural and built environment and the sustainable use and enjoyment of it.

Strategic Environmental Assessment

The Environmental Assessment (Scotland) Act 2005 is the statutory mechanism by which the requirements of the European Directive 2001/42/EC – “On the assessment of the effects of certain plans and programmes on the environment” (known as the Strategic Environmental Assessment or SEA Directive) are now delivered in Scotland. The purpose of the SEA Directive is twofold. Firstly it aims to provide for a high level of protection of the environment and secondly ensure that environmental considerations are taken into account in the preparation and adoption of plans. This should promote sustainable development as part of the planning process.

Although there is no legal requirement for undertaking a formal SEA of this Renewable Energy Strategy (since it is not a formal planning document produced by the Shetland Islands Council as supplementary planning guidance) it will nevertheless inform future economic planning in Shetland. The Strategy will have significant implications for the environment and so it is considered essential that the Strategy is screened against SEA objectives developed by the Council at the earliest opportunity to ensure that environment is considered in a more formal way throughout the strategy development process and the associated action plan.

A preliminary SEA appraisal of the strategic objectives of this plan is summarised in Appendix B.

Fit with Local Plans National Renewable Energy Strategies

SIC is in the process of developing its Interim Planning Policy for Windfarms which is due to go for consultation in Autumn 09 and which will apply to developments of up to 20MW capacity. Future developments will be required to conform to this policy when it is operational. For larger developments, the Scottish Government’s SPP6 applies. The application of both policies will incorporate a broad areas search to identify the least constraints (in land use terms) for each proposal under consideration.

⁴ Principles and Priorities: The Government's Programme for Scotland

In parallel to both FPP6 and the Council's Interim Planning Policy for Windfarms, the Marine Spatial Plan governs the development of marine based resources.

We will also pursue our strategy in line with appropriate national renewable energy strategies. However, at this time we are awaiting publication of key strategic documents. Once these have been published we will review our strategy to ensure that we fit, where appropriate, with national ambitions. In summary the key strategies are expected to be:

Renewable Energy Strategy (UK, BERR/DECC)

Consulted on in 2008, formal publication expected 'this spring'.

The UK Government has already announced that part of the strategy will include a Renewable Heat Incentive from 2011, and a feed-in tariff for small generators (i.e. fixed price for electricity sold to the grid) from 2010.

Renewables Action Plan (Scotland)

The Scottish Government consultation on the Renewable Energy Framework closed in December 2008. Scotland's Renewables Action Plan is due for publication in Summer 2009. It is intended to be aligned with the UK Renewable Energy Strategy.

Heat and Energy Saving Strategy (UK, DECC)

Consultation on this strategy formally closed 8 May, extended to 15 May. A response to the consultation is likely in early autumn.

Energy Efficiency Action Plan (Scotland)

The Scottish Government intends to develop its Energy Efficiency Action Plan throughout 2009, with a view to publishing the plan by the end of the year.

Monitoring Progress

Our strategy makes clear that there are opportunities for transformational change as a result of renewable energy development but that there are also challenges to be overcome. When resources, both time and finance, are being invested in the strategy and action plan it is important to understand the degree of success achieved from our investment. Monitoring the success of different activities is crucial and this should be done at an individual project level. However, the following indicators should help to understand the changes occurring at a macro level in Shetland as a result of measures to support renewable energy and energy efficiency.

1. MW capacity of renewable energy activities in Shetland.
2. Total energy consumption per head of population.
3. Volume of imported fossil fuel per head of population.
4. Renewable electricity production as a fraction of total electricity consumption within Shetland.
5. Number of households in fuel poverty.

6. Population out-migration from peripheral communities.

For some of these indicators data is already available, but in general there is limited information upon which a valuable baseline analysis can be constructed. It will be an early ambition of the strategy board to establish what baseline data can be efficiently and effectively collected for Shetland and how often it can be updated.

By pursuing good governance in the management, implementation and monitoring of the strategy we will significantly enhance our likelihood of success.

2 Action Plan

Please turn over to see the proposed content of the action plan.

The action plan which follows has been created to support the strategy for renewable energy development in Shetland. The plan contains a wide range of potential actions which have been suggested by consultees or as a result of the analysis undertaken in the preparation of the strategy. These actions are not presented in any order of priority at this stage.

The plan also contains a framework to assist decision-makers to assess the expected impact of different actions. The framework specifies, under each of the five strategic objectives, the nature of the impacts that could be expected to assist Shetland achieve its strategic goals. Alongside this there is a scale which allows an assessment to allocate a 'score' to an action under each objective. It is proposed that the Strategic Board for the strategy agrees whether each objective should be given an equal weighting or whether one or more of the objectives demand a higher weighting than the others. The main benefit of using this framework is to improve understanding of the expected impacts of a project which will mean that decision-makers and project sponsors will be able to assess how well a proposed project meets the objectives of the strategy. This will help decision-makers to prioritise projects. Other benefits include it could influence project sponsors to alter the design of a project to better meet the ambitions for renewable energy development in Shetland; and it creates a transparent decision-making process which enables those not directly involved in decision-making to understand how projects are prioritised.

Following appraisal against the framework a list of prioritised actions should be created and each prioritised action should be considered against the underpinning Principles of Development regarding community involvement and environmental protection to ensure that these overarching goals are also addressed.

It is proposed that once the Management Team is formed that the Team jointly assesses each action against the framework. This will support the Team to buy-in to both the prioritised actions and the decision-making process. This prioritised action plan and the final version of the strategy could be presented to the first meeting of the Strategy Board.

The action plan which follows the appraisal framework is divided into the five strategic objectives to show which objective a proposed action targets. Each action is explored under a number of headings which include:

- a unique reference number which links the action to an objective;
- a description of the activity proposed;
- a description of the main benefits expected;
- potential risk perceived for the activity;
- potential project sponsors, which identifies who might be interested in getting involved in a particular activity. With the exception of SSE no other potential private sector sponsors are mentioned;
- a broad estimate of the potential cost of each activity (no specific scoping work has been done therefore actual costs could vary significantly);
- a column which specifies whether the action is expected to make a contribution to any of the other strategic objectives; and
- an initial appraisal of how important improved grid access is likely to be to the success of the proposed activity.

Framework to Appraise Potential Actions and their Expected Impacts against Objectives

Objective	Impact Appraisal Criteria by Objective	Potential Scale of Impact			
		-	✓	✓✓	✓✓✓
1	Extent to which activity could lead to innovative solutions to the challenges faced, a reduction in the volume of carbon emissions and/or a reduction in the volume of, and therefore dependency on, fuel imported into Shetland.	No net impact expected on carbon emissions or the volume of fuel imported. No new innovation is proposed.	Expected to lead to a small reduction in carbon emitted (<1%) and/or a small reduction in one type of fuel which is imported (<3%).	Expected to lead to noticeable reductions in carbon emissions (1% to 3%) and/or a noticeable reduction in one type of fuel which is imported (3% to 5%) and/or develops an innovative solution which could have practical applications.	Expected to lead to significant reductions carbon emissions (3%+) and/or a significant reduction in one type of fuel which is imported (5%+) and/or develops an innovative solution which could be widely adopted.
2	Extent to which activity will affect the economic development of Shetland as a whole. This could be linked to employment and new business activity in renewable energy activities or commercial activities which benefit from access to renewable energy.	Employment and business activity could displace current activity but no net impact is expected for Shetland as whole.	Expected to create a small number of jobs (<10) for a period of 5 years or more within energy industry or ancillary businesses and services. and/or Temporary construction employment is expected (<30 jobs, 30 FT year equivalents) which local firms benefit from.	Expected to create some jobs (10-20) for a period of 5 years or more within the energy industry or ancillary businesses and services. and/or Temporary construction employment is expected (30+ jobs, 30 FT year equivalents) which local firms can benefit from.	Expected to create a significant number of jobs (20+) for a period of 5 years or more within the energy industry or ancillary businesses and services. and/or a small number of new high quality jobs (5+) are created for a period of at least 2 years which bring new skills to Shetland.
3	Extent to which activity could lead to a reduction in fuel poverty and improve overall comfort and well-being within the community.	No net change in the levels of fuel poverty is expected and there is unlikely to be any improvement in the services available to the community.	There is expected to be little change in the levels of fuel poverty but there are some improvements in the sustainability of services available throughout Shetland.	There is expected to be a noticeable reduction in fuel poverty and/or there should be improvements in quality and range of services available throughout Shetland which improve overall health and well-being.	There is expected to be a substantial reduction in fuel poverty and/or there should be substantial and sustainable improvements in the services available throughout Shetland which improve overall health and well-being.
4	Extent to which activity could support the more fragile communities within Shetland to enhance their sustainability through renewable energy activities.	There is no impact expected on the more fragile communities within Shetland.	Renewable energy activities are expected to improve the sustainability of existing facilities and services in the more fragile communities around Shetland.	Additional wealth is expected to be generated in the more fragile communities around Shetland from renewable energy activities. This wealth supports local facilities and services and improves the overall quality of life for existing residents.	Additional wealth <u>and</u> local employment is expected to be created in the more fragile communities around Shetland from renewable energy activities. This attracts and/or retains population.
5	Extent to which activity is expected to create new skills or raise awareness that could lead to increased renewable energy activity and/or improved energy efficiency.	There is no impact expected on the skills or knowledge within Shetland. There is no promotion of renewable energy development.	A small number of individuals benefit from knowledge transfer.	New knowledge or skills is developed which supports sustainable change in energy efficiency practices. The project raises awareness within Shetland and elsewhere of the benefits of renewable energy activities.	Local businesses benefit from new skills which improves uptake of energy efficiency measures and renewable energy alternatives. The project promotes a powerful renewable energy image of Shetland.

Objective One: Develop sustainable, economic and effective solutions which significantly reduce the volume of non-renewable fossil fuels required to power Shetland.

Ref	Activity	Potential Benefits	Potential Risk	Potential Sponsors	Potential Cost	Other Objectives Met	Importance of Grid Improvement
1-1	Investigate renewable transport fuel options for road transport and sea based vessels within Shetland. Within this review(s), establish the fuel price increase necessary in order to make the next best option economic. [A related project is already underway investigating road transport fuel options]	Could reduce the use of finite fossil fuels in transport, retain money within the Shetland economy and achieve 'first-mover' image benefits. This project could also build on the hydrogen research already undertaken in Shetland.	Limited risk as it is an investigative review. The price of fuel in the intervening period is likely to influence the economics and the willingness to engage.	ZetTrans, SREF, HIE, SCT, SIC, Carbon Trust, SSE (for electric vehicles)	Less than £50,000 for initial investigation and scoping of a pilot project if justified. Pilot cost unknown but likely to be significant.	2,3,5	Low / Critical (Likely to be critical if only economic solution is electric)
1-2	Identify the local applications where hydrogen technology would provide a competitive option in comparison to alternative energy sources and support an innovative pilot project.	The project could be designed to maximise local benefit and create a test project which could demonstrate wider global applications. Will build on research activity and knowledge already in Shetland and create local demand for further research.	Other technologies may beat hydrogen to widespread adoption. Development costs may be prohibitive.	SREF, HIE, UHI, SIC, Carbon Trust	Less than £50,000 to scope the project. Pilot cost unknown but likely to be significant.	2,3,5	Low
1-3	Undertake an analysis of fossil fuel based energy use across Shetland and identify opportunities for reduction or replacement with renewable alternatives and the conditions required for success (such as fossil fuel price increase).	Enables Shetland to set realistic and relevant CO2 reduction targets and show contribution to National and EU emissions.	No risks identified.	SREF, HIE, SIC, UHI	Less than £50,000	5	Low / Critical (Likely to be critical if only economic solution is electric)
1-4	Undertake a technical study of wind (and other renewable) penetration on existing Shetland electricity system. Incorporate a review of the possible use of deferrable electric heating demand and electric vehicle charging to improve control of electricity system.	Could allow greater penetration of renewable energy on the existing electricity system.	SSE is not able to invest in such a study until the outcome of the Viking Energy project is clear. The required technical information may be unavailable from SSE for confidentiality reasons.	SREF, SSE, Carbon Trust	£30,000-£80,000	2,4	Low

Ref	Activity	Potential Benefits	Potential Risk	Potential Sponsors	Potential Cost	Other Objectives Met	Importance of Grid Improvement
1-5	Appraise the economic costs and benefits of providing large scale heat from wind (or other renewable) via a district heating system, versus direct electric heating by wind.	Will identify the best renewable heating option for Shetland which can then be compared against conventional options for heating in Shetland.	Limited risks as it is an investigative review	SREF, SCT, SIC	Less than £50,000	4	Low
1-6	Investigate and develop a pathway as to how Shetland, or communities within Shetland, could develop as a zero carbon community.	Identify whether it is feasible to pursue Shetland as a 'carbon-neutral' location. Provide assistance to communities to develop their own carbon neutral strategy.	No risks identified.	SREF, SIC, HIE, SG	Less than £50,000	3,4,5	? Depends on pathways available
1-7	Promote the measures pursued by the SIC Carbon Management Strategy to the wider public.	Learn lessons, adopt proven solutions for Shetland's climate.	No risks identified.	SIC	Less than £10,000	2,3,4,5	Low
1-8	Promote dialogue between developers and environmental agencies.	May give developers early advice and information regarding the potential impact of specific projects.	No risks identified.	Environmental Agencies, Developers and SRET	Effort required not finance. May result in cost savings.	5	Low

Objective Two: Create employment, income and new skills in Shetland by stimulating new economic activity linked to the presence of renewable energy resources in the islands.

Ref	Activity	Potential Benefits	Potential Risk	Potential Sponsors	Potential Cost	Other Objectives Met	Importance of Grid Improvement
2-1	Develop mechanisms to support research and development in Shetland and ensure R&D linkages to future renewable energy projects.	Builds on existing R&D activity and enhances opportunities to create linkages between firms, colleges and research institutions. Could lever in research funds from elsewhere and attract high value jobs.	The spend does not lead to new developments and that the research staff leave creating no legacy benefits. Fit with planning policy.	SREF, SIC, HIE, UHI, DECC, EU	Less than £250,000 locally. Aim to lever in £2 million.	1,4	Low / Critical (Likely to be critical for R&D focused on electricity generation)
2-2	Investigate potential for marine research and development (a scoping project has recently been funded).	Could extract further value from Shetland's high quality marine infrastructure and services. May help to identify technologies best suited to Shetland.	Findings may not identify a sufficiently unique strength to overcome other disadvantages of operating in Shetland, for example transport costs and in particular an insufficient electricity network.	HIE, SIC, EU, NAFC	Less than £50,000		High / Critical

Ref	Activity	Potential Benefits	Potential Risk	Potential Sponsors	Potential Cost	Other Objectives Met	Importance of Grid Improvement
2-3	Develop a renewable energy network of contacts throughout Europe and create a coherent promotional message for Shetland. Specifically target higher education institutions (could review success of Heriot Watt link to Orkney)	Use these contacts to understand the needs of developers and how and where Shetland may offer advantages or a unique selling point.	No risks identified.	SIC, HIE, SEGEC, SREF, UHI	Less than £10,000	5	Low (May be 'High' or 'Critical' for any follow-on activities)
2-4	Investigate potential for onshore wind test site for 'extreme conditions' testing.	Promote a coherent message about the strength of Shetland's resource. Could be attractive to manufacturers as tests would be completed more quickly in Shetland's operating environment; if close to a port transport difficulties could be reduced; and they could use 'Shetland rated' as an approval mark.	Would need to resolve grid connection issue but potential that it is technically possible to run it isolated from the grid as there may be advantages in testing controlled disturbances on a mock grid. May require significant investment and demand could be variable and inconsistent.	SIC, SSE, SREF, HIE	Less than £50,000 for investigation		High
2-5	Develop a legacy plan for large-scale renewable energy projects to ensure potential spin-off benefits are maximised	Identifies a coherent approach to pursuing spin-off benefits such as waste heat projects, test-sites, energy efficiency investment, micro-renewable investment, pilot project investment from community return on investment	No risks identified.	SIC, Developers, HIE	Effort required rather than finance. Legacy actions may require finance.		Critical
2-6	Develop a programme of support to assist local construction firms to visit demonstration projects and develop new skills which can be applied locally and will help them to bid for any renewable energy projects.	Increase the value of projects to the local community	Lack of local critical mass to respond Fit with local planning policy	SIC, HIE (NoSIG)	Less than £20,000		Low
2-7	Investigate economics of fertiliser production on Shetland using electricity from renewable production and use this to reduce the impact on the electricity system	To protect the agricultural industry from future oil price rises and the knock-on impact to the cost of fertiliser and to retain money in the local economy.	Economics of fertiliser production may strongly favour large centralised plants	Carbon Trust, SREF, Agricultural industry	Less than £50,000 for investigation	3,5	Low / Medium

Objective Three: Ensure there are direct benefits, in addition to employment, income and new skills, to the community from renewable energy development in Shetland.

	Activity	Potential Benefits	Potential Risk	Potential Sponsors	Potential Cost	Other Objectives Met	Importance of Grid Improvement
3-1	Investigate the economics of wind to heat for individual buildings with reference to the latest technology and current ROC mechanisms	Research could identify specific opportunities that are suited to Shetland, could create net income through ROC mechanism and could help to address fuel poverty.	No obvious risk	SIC, SCT, Carbon Trust	Less than £30,000 for investigation	1,2,4,5	Low
3-2	Evaluate success of existing wind to heat installations	Objective assessment showing benefits of wind to heat on Shetland	Availability of operating data	SIC	Less than £20,000	4,5	Low
3-3	Consider technical options for making use of waste heat from a HVDC converter station, should future large scale Renewable Energy projects be implemented	This may improve the economics of a district heating scheme, for example in Scalloway, or other agricultural or horticultural activities.	No obvious risk	SSE, Carbon Trust, SIC	Less than £50,000 for investigation	1	Critical
3-4	Encourage households affected by fuel poverty to take-up support to improve energy efficiency adoption. Consider providing top-up support if access to finance is a clear barrier. Consider investment as a legacy requirement of future large-scale Renewable Energy projects.	To improve comfort levels, reduce energy consumption and reduce fuel poverty.	The benefit may be taken as improved levels of comfort, with no reduction in consumption.	SCT, SIC, SSE, Energy Saving Trust	£2 million pilot	5	Low

Objective Four: Enable peripheral communities to use renewable energy as a way to enhance the viability of their community and community facilities.

	Activity	Potential Benefits	Potential Threats	Potential Sponsors	Potential Cost	Other Objectives Met	Importance of Grid Improvement
4-1	Create a transparent support programme which assists settlement based renewable energy developments.	To encourage communities to build their own development capacity and create sustainable benefits. If grid improvements are achieved this could generate a substantial income for a local development company.	Fit with planning policy	SIC, GES, HIE	Depends on how many community projects can be supported	1	Low / Critical (Will be 'Critical' for electricity generating projects)

	Activity	Potential Benefits	Potential Threats	Potential Sponsors	Potential Cost	Other Objectives Met	Importance of Grid Improvement
4-2	Support professional assistance to community projects including project management and planning advice.	To maximise the impact of community project implementation. To minimise the barriers encountered by groups putting forward projects.	No obvious risk	CES, SIC, HIE	Less than £50,000	1,3	Low
4-3	Engage in Scottish and UK energy policy making	Ensure that national policy takes into account the need of peripheral communities such as Shetland and the more fragile communities within Shetland	Other factors more influential	SIC, HIE, SREF, CES	Effort rather than cost	1,2,3,5	Low

Objective Five: Stimulate awareness of the importance of renewable energy and the need to reduce carbon emissions; and develop skills in energy efficiency and renewable energy alternatives.

	Activity	Potential Benefits	Potential Risk	Potential Sponsors	Potential Cost	Other Objectives Met	Importance of Grid Improvement
5-1	Encourage inclusion of Renewable Energy projects in the school curriculum locally to increase focus on energy efficiency, and carbon reduction.	Increased awareness, interest and ultimately cultural change.	Success will depend on capacity/willingness to introduce or expand subject within curriculum.	SREF, SIC, HIE (STEM)	Less than £10,000	-	Low
5-2	Evaluate the success of existing building-specific Renewable Energy schemes that are implemented	To inform future investment	None identified.	HHA, SIC			Low
5-3	Incentivise the use of the highest standards of energy efficiency in construction practices. Standards could be set and demonstrated in new public buildings and new Housing Association or Council Housing. Consider investment as a legacy requirement of future large-scale Renewable Energy projects.	Creation of new skills within construction industry. Reduction in risk of fuel poverty. Public sector sending a clear message to the community about the way forward.	The public sector may not be willing to invest in energy efficiency standards which exceed current requirements.	SIC, NHS, HHA, SREF	Dependent on scale and nature of new projects.	1,2,3	Low (unless investment is dependent on generation of additional community funds)
5-4	Identify expertise that could be developed through further or higher education courses or post-graduate research	Development of new skills and knowledge	New course development will be dependent on sufficient demand from industry	UHI, HIE, SDS	Less than £50,000	1,2,3,4	Low

Appendix A

Please see over for a table specifying options for the utilisation, distribution and use of renewable energy resources in Shetland.

Appendix A: Options for the Utilisation, Distribution and Use of Renewable Resources in Shetland

Resource	Technology	Form of Energy Consumed	Options for Distribution and Transmission	Potential Consumer
Wind	Wind turbines	• Electricity	• Existing electricity network • Subsea cable to the mainland	• Shetland based households, commercial and public buildings and transport • Mainland customers
			• Direct installation at buildings (micro-generation)	• Individual buildings, which may or may not also be connected to the existing electricity distribution system
		• Heat	• District heating system (i.e. wind turbines directly providing electricity to heat water in the system)	• Individual buildings within range of district heating system
			• Electric heating in buildings via the existing electricity network ⁵	• Shetland based households and commercial and public buildings
			• Direct installation at buildings, for electric heating only (micro-generation)	• Individual buildings
		• Hydrogen ⁶	• Storage medium for export to any destination	• Individual buildings • Transport (road vehicles, ferries)
Offshore Wind, Wave and Tidal	Various technologies (all electricity generating)	• Electricity	• Existing electricity network • Subsea cable to the mainland	• Shetland based households, commercial and public buildings and transport • Mainland customers
			• Heat	• District heating system (i.e. directly providing electricity to heat water in the system)
		• Hydrogen	• Electric heating in buildings via the existing electricity network ⁷	• Shetland based households and commercial and public buildings
			• Storage medium for export to any destination	• Individual buildings • Transport (road vehicles, ferries)

⁵ Potential to provide lower cost heating, controlled by the provider to match the varying output of the wind turbines, which could potentially be sold cheaper than fuel oil. It is not clear which heating solution is most economic: investigation of this is included in the Action Plan. With an interconnector, there may be a complex optimisation which could result in installation of greater wind capacity than the interconnector capacity. It may be most economic to export all output wherever possible, and any output which cannot be exported due to interconnector capacity is used to provide electric heating on Shetland.

⁶ It is likely that the most beneficial application of hydrogen will be where there is no distribution network for electricity.

⁷ As for note 5.

Appendix A: Options for the Utilisation, Distribution and Use of Renewable Resources in Shetland (continued)

Resource	Technology	Form of Energy Consumed	Method of Distribution	Potential Consumer
Heat pumps	Ground source, air source, sea source	<ul style="list-style-type: none"> Heat 	<ul style="list-style-type: none"> Direct installation in buildings (the electricity required to drive the heat pumps is supplied by the existing electricity network) 	<ul style="list-style-type: none"> Individual buildings
Biomass (e.g. peat ⁸ , wood, other energy crops)	Combustion	<ul style="list-style-type: none"> Electricity 	<ul style="list-style-type: none"> Existing electricity network 	<ul style="list-style-type: none"> Shetland based households, commercial and public buildings and transport
		<ul style="list-style-type: none"> Heat 	<ul style="list-style-type: none"> District heating system 	<ul style="list-style-type: none"> Individual buildings within range of district heating system
			<ul style="list-style-type: none"> Fuel for sale 	<ul style="list-style-type: none"> Used as currently in individual houses (e.g. in the same way that peat and wood is used)
Waste (possibly combined with biomass)	Combustion / Bio-digestion	<ul style="list-style-type: none"> Electricity 	<ul style="list-style-type: none"> Existing electricity network 	<ul style="list-style-type: none"> Shetland based households, commercial and public buildings and transport
		<ul style="list-style-type: none"> Heat 	<ul style="list-style-type: none"> District heating system 	<ul style="list-style-type: none"> Individual buildings within range of district heating system
Solar	Solar thermal panels, passive solar design	<ul style="list-style-type: none"> Electricity⁹ 	<ul style="list-style-type: none"> Direct installation on buildings, bus shelters etc 	<ul style="list-style-type: none"> All buildings, especially where only small amounts of electricity are required
	Photovoltaic devices	<ul style="list-style-type: none"> Heat 	<ul style="list-style-type: none"> Direct installation or incorporation in buildings 	<ul style="list-style-type: none"> Shetland based households and commercial and public buildings

Notes:

This table categorises the major renewable energy technologies relevant to Shetland. There are many other potential technologies available, but these are considered to be further from commercial availability or of less relevance to Shetland. For example, hydro-electricity is a well-established technology with stable costs: it is excluded here as the hydro resource in Shetland is very small. There may be a small number of sites on Shetland where hydro could be justified, and exclusion from this table should not rule this or any other opportunities out.

⁸ Any major exploitation of peat would have to be closely controlled to ensure sustainability and avoid degradation of the remaining peatland.

⁹ Photovoltaic devices are likely to be the best economic option where only small amounts of electricity are required and there is no grid access.

Appendix B: SEA Appraisal

Introduction

This appendix reports the screening undertaken of the strategic objectives within the Renewable Energy Strategy for Shetland.

The methodology used was based on screening the strategic objectives against a set of SEA Objectives that had previously been developed for wider use by the Shetland Islands Council. The SEA Objectives were developed by the Council during a programme of workshops facilitated by Natural Capital which were part of a programme of SEA training provided to Council officers.

A screening system was developed and used based on the following scale of effects.

Table B-1: Assessment Key

✓✓	Clear strong positive effects
✓	Broadly supportive
0	Neutral or no discernible effect
✖	Likely negative effect
?✖	Uncertain possible negative effect
?✓	Uncertain possible positive effect

The screening is summarised in the following table which lists the policies and presents the findings of the screening in relation to each of the SEA Objectives.

To carry out the screening process, a set of questions based on key criteria that relate to the SEA Objectives was established to aid in the decision making process for assessing whether the policies would impact on the SEA Objective. The SEA Objectives used together with the supporting questions are summarised in the following table.

Table B-2: SEA Appraisal Framework

SEA Topic	SEA Objectives	SEA Questions
Biodiversity (Flora and Fauna)	1. To further the conservation of biodiversity	<ul style="list-style-type: none"> • Does it impact on plants and animals? • Does it conserve and protect biodiversity? • Does it contribute to the aims of the Local Biodiversity Action Plan? • Does it contribute to public awareness and understanding about biodiversity?
Population	2. To improve the quality of life for people and communities across Shetland	<ul style="list-style-type: none"> • Does it contribute towards improving quality of life for people and communities across Shetland?
Human Health	3. To improve the quality of health in Shetland	<ul style="list-style-type: none"> • Does it contribute towards improving the quality of health associated with the environment (Air quality, water quality, noise and vibration)? • Does it contribute to the goal of creating active, healthy lifestyles for Shetland islanders? • Does it contribute towards improving access to health and care services for all Shetland islanders?
Soil	4. To protect Shetland's soil resources and use them in a sustainable manner	<ul style="list-style-type: none"> • Does it protect Shetland's soil resources? • Does it encourage the use of them in a sustainable manner?
Water	5. To protect and enhance freshwater and marine water quality 6. To ensure that Shetland's water resources are used effectively and sustainably	<ul style="list-style-type: none"> • Does it protect and enhance freshwater and marine water quality? • Does it ensure that Shetland's water resources are used effectively and sustainably? • Does it protect the integrity of the physical aspect of the water environment? • Does it promote a sustainable drainage infrastructure?
Air	7. To protect Shetland's air quality	<ul style="list-style-type: none"> • Does it pose any risks to air quality? • Does it encourage activities that could contribute to lowering air quality?
Climatic Factors	8. To reduce greenhouse gas emissions in and to contribute to Scotland's 80% CO ₂ reduction target 9. To adapt to the predicted effects of climate change	<ul style="list-style-type: none"> • Does it help in reducing greenhouse gas emissions? • Does it take account of the predicted effects of climate change, and adapt appropriately? • Is the risk or likelihood of flooding of any property, planned or existing, increased? • Will it put other assets at risk from flooding? • Will it ensure that people and property are protected from flooding?

Table B-2: SEA Appraisal Framework (continued)

SEA Topic	SEA Objectives	SEA Questions
Material Assets	10. To promote the sustainable use of Shetland's natural resources	<ul style="list-style-type: none"> • Does the plan or programme encourage the sustainable use of natural resources? • Will it lead to a reduction in the use of natural resources? • Does it encourage the use of local or imported materials? • Will it promote or enable greater use of recycling?
Cultural Heritage	11. To conserve and protect the historic environment 12. To conserve and promote the distinctive cultural heritage	<ul style="list-style-type: none"> • Does it impact on the historic environment? • Does it conserve and protect the historic environment? • Does it help in raising public awareness and understanding of cultural heritage and how the public influence the continuing development of cultural heritage? • Does it conserve and enhance cherished aspects of local cultural heritage? • Does it contribute to local character, customs and traditions? • Will it affect the setting of any listed buildings, historic sites or culturally important sites?
Landscape	13. To protect the special qualities and characteristics of Shetland's landscapes and seascapes 14. To improve those landscapes and seascapes that are degraded	<ul style="list-style-type: none"> • Does it consider all landscape and seascape implications? • Does it contribute to landscape and seascape protection? • Does it enhance degraded landscapes and seascapes?

Table B-3: SEA Appraisal – Objective 1

Strategic Objectives for Renewable Energy Development in Shetland	Shetland Islands Council – SEA Objectives													
	1. To further the conservation of biodiversity	2. To improve the quality of life for people and communities across Shetland	3. To improve the quality of health in Shetland	4. To protect Shetland's soil resources and use them in a sustainable manner	5. To protect and enhance freshwater and marine water quality	6. To ensure that Shetland's water resources are used effectively and sustainably	7. To protect Shetland's air quality	8. To reduce greenhouse gas emissions in Shetland and to contribute to Scotland's 80% CO ₂ reduction target	9. To adapt to the predicted effects of climate change	10. To promote the sustainable use of Shetland's natural resources	11. To conserve and protect the historic environment	12. To conserve and promote the distinctive cultural heritage	13. To protect the special qualities and characteristics of Shetland's landscapes and seascapes	14. To improve those landscapes and seascapes that are degraded
Objective 1: Develop sustainable, economic and effective solutions which significantly reduce the volume of non-renewable fossil fuels required to power Shetland	?✓x	✓	✓	?✓x	?✓x	?✓	✓	✓✓	✓	✓	?✓x	?✓x	?✓x	?✓x
<p>This strategic objective is broadly supportive of SEA Objectives 2 and 3 that relate to improving the quality of life and health of people and communities across Shetland since it aims to develop economic and effective solutions for reducing fossil fuel use and promoting renewable resources (both which should impact positively on quality of life and health). Economic and effective solutions should generate economic benefits for Shetland that in turn should support improvements in quality of life for local communities. The objective has clear and strong positive effects on SEA Objective 8, to reduce greenhouse gas emissions, since its main thrust is to reduce the reliance of Shetland on fossil fuels for all of its power/energy requirements which are more or less the prime sources of CO₂ emissions. The objective is also broadly supportive of protecting Shetland's air quality since negative effects on air quality tend to be caused by burning fossil fuels – as fuel for cars, or oil for housing and businesses, or from remote power stations supplying the electricity (with associated sulphur and nitrous oxide emissions). For several of the SEA objectives there are uncertain effects that could be positive or negative (e.g. SEA Objectives 1, 4, 5, 6, 8, 11-14) depending on how the 'economic solutions' are realised. Any large-scale renewable energy development (e.g. onshore or offshore windfarms, wave or tidal) has the potential to impact on the environment depending on the location and the proximity of sensitive receptors. Mitigation is however available to make sure that significant effects on biodiversity, historic environment, cultural heritage, landscape and seascape are avoided and/or prevented and in certain circumstances can be compensated for. As long as the Strategy includes principles that would make sure that there was no risk of future developments being 'unsustainable' or creating negative residual effects then the uncertainty could be removed and the assumption would be that there would be no negative effects on the above SEA Objectives.</p>														

Table B-4: SEA Appraisal – Objective 2

Strategic Objectives for Renewable Energy Development in Shetland	Shetland Islands Council – SEA Objectives													
	1. To further the conservation of biodiversity	2. To improve the quality of life for people and communities across Shetland	3. To improve the quality of health in Shetland	4. To protect Shetland's soil resources and use them in a sustainable manner	5. To protect and enhance freshwater and marine water quality	6. To ensure that Shetland's water resources are used effectively and sustainably	7. To protect Shetland's air quality	8. To reduce greenhouse gas emissions in Shetland and to contribute to Scotland's 80% CO ₂ reduction target	9. To adapt to the predicted effects of climate change	10. To promote the sustainable use of Shetland's natural resources	11. To conserve and protect the historic environment	12. To conserve and promote the distinctive cultural heritage	13. To protect the special qualities and characteristics of Shetland's landscapes and seascapes	14. To improve those landscapes and seascapes that are degraded
Objective 2: Create employment, income and new skills in Shetland by stimulating new economic activity linked to the presence of renewable energy resources in the islands	?✓ x	✓✓	✓	?✓ x	?✓ x	?✓ x	?✓ x	?✓ x	?✓ x	?✓ x	?✓ x	?✓ x	?✓ x	?✓ x
<p>This strategic objective is supportive of SEA Objectives 2 and 3 that relate to improving the quality of life and health of people and communities across Shetland since it aims to create employment, income and new skills opportunities by stimulating new economic activity in the islands linked to the presence of renewable energy sources. Such activity should generate positive effects on the quality of life for Shetlanders with opportunities to build in community benefits, access opportunities, essential services etc which could all benefit health as well. For the rest of the SEA objectives there are uncertain effects that could be positive or negative depending on what kind of developments create employment opportunities and how the economic activity manifests itself. Renewable energy developments may encourage 'spin-off' related industrial developments but these too have the potential to impact on the environment depending on the location of this 'new economic activity' or development, and the proximity of sensitive receptors. Mitigation is however available to make sure that significant effects on biodiversity, historic environment, cultural heritage, landscape and seascape are avoided and/or prevented in any new business development. As long as the Strategy includes principles that would make sure that there was no risk of future developments being 'unsustainable' or creating negative residual effects then the uncertainty could be removed and the assumption would be that there would be no negative effects on the above SEA Objectives.</p>														

Table B-5: SEA Appraisal – Objective 3

Strategic Objectives for Renewable Energy Development in Shetland	Shetland Islands Council – SEA Objectives													
	1. To further the conservation of biodiversity	2. To improve the quality of life for people and communities across Shetland	3. To improve the quality of health in Shetland	4. To protect Shetland's soil resources and use them in a sustainable manner	5. To protect and enhance freshwater and marine water quality	6. To ensure that Shetland's water resources are used effectively and sustainably	7. To protect Shetland's air quality	8. To reduce greenhouse gas emissions in Shetland and to contribute to Scotland's 80% CO ₂ reduction target	9. To adapt to the predicted effects of climate change	10. To promote the sustainable use of Shetland's natural resources	11. To conserve and protect the historic environment	12. To conserve and promote the distinctive cultural heritage	13. To protect the special qualities and characteristics of Shetland's landscapes and seascapes	14. To improve those landscapes and seascapes that are degraded
Objective 3: Ensure there are direct benefits, in addition to employment, income and new skills, to the community from renewable energy generation in Shetland	0	✓✓	✓	0	0	0	✓	✓✓	✓	✓✓	0	0	0	0
<p>This strategic objective should be very supportive of SEA Objectives 2 and 3 that relate to improving the quality of life and health of people and communities across Shetland since it aims to ensure that there are other direct benefits to the community from renewable energy generation that aren't just related to employment, income and skills generation. Such benefits could relate to initiatives that would encourage more sustainable or active travel, improved access to essential services, reduced flood risks, regeneration of degraded environments, etc. This objective offers positive support to protecting air quality (SEA Objective 7). Because of its main thrust in promoting renewable energy generation in Shetland, it is strongly supportive of SEA Objectives 8 (reducing greenhouse gas emissions) and 10 (the promotion of the sustainable use of Shetlands natural resources). For the rest of the SEA Objectives the effect is considered to be neutral with no clearly discernible effect since the objective is concerned with ensuring that community benefits arise from renewable energy developments rather than with the physical nature of the development itself.</p>														

Table B-6: SEA Appraisal – Objective 4

Strategic Objectives for Renewable Energy Development in Shetland	Shetland Islands Council – SEA Objectives													
	1. To further the conservation of biodiversity	2. To improve the quality of life for people and communities across Shetland	3. To improve the quality of health in Shetland	4. To protect Shetland's soil resources and use them in a sustainable manner	5. To protect and enhance freshwater and marine water quality	6. To ensure that Shetland's water resources are used effectively and sustainably	7. To protect Shetland's air quality	8. To reduce greenhouse gas emissions in Shetland and to contribute to Scotland's 80% CO ₂ reduction target	9. To adapt to the predicted effects of climate change	10. To promote the sustainable use of Shetland's natural resources	11. To conserve and protect the historic environment	12. To conserve and promote the distinctive cultural heritage	13. To protect the special qualities and characteristics of Shetland's landscapes and seascapes	14. To improve those landscapes and seascapes that are degraded
	0	✓✓	✓✓	0	0	0	0	✓✓	✓	✓✓	0	0	0	0
Objective 4: Enable peripheral communities to use renewable energy as a way to enhance the viability of their community and community facilities	<p>This strategic objective should be very supportive of SEA Objectives 2 and 3 that relate to improving the quality of life and health of people and communities across Shetland, since it aims to ensure that peripheral communities are able to use renewable energy as a way of enhancing the viability of their community and community facilities. The means of enhancing the viability of peripheral communities and their community facilities could relate to initiatives that would encourage more access by public transport, improved access to essential services, reduced flood risks, regeneration of degraded environments, etc. This objective is also strongly supportive of SEA Objectives 8 (reducing greenhouse gas emissions) and 10 (the promotion of the sustainable use of Shetlands natural resources).</p> <p>For the rest of the SEA Objectives the effect is considered to be neutral with no clearly discernible effect since the objective is more of a strategic one that aims to enable peripheral communities to take advantage of renewable energy that is generated rather than being about specific projects</p>													

Table B-7: SEA Appraisal – Objective 5

Strategic Objectives for Renewable Energy Development in Shetland	Shetland Islands Council – SEA Objectives													
	1. To further the conservation of biodiversity	2. To improve the quality of life for people and communities across Shetland	3. To improve the quality of health in Shetland	4. To protect Shetland's soil resources and use them in a sustainable manner	5. To protect and enhance freshwater and marine water quality	6. To ensure that Shetland's water resources are used effectively and sustainably	7. To protect Shetland's air quality	8. To reduce greenhouse gas emissions in Shetland and to contribute to Scotland's 80% CO ₂ reduction target	9. To adapt to the predicted effects of climate change	10. To promote the sustainable use of Shetland's natural resources	11. To conserve and protect the historic environment	12. To conserve and promote the distinctive cultural heritage	13. To protect the special qualities and characteristics of Shetland's landscapes and seascapes	14. To improve those landscapes and seascapes that are degraded
Objective 5: Stimulate awareness of the importance of renewable energy and the need to reduce carbon emissions; and develop skills in energy efficiency and renewable energy alternatives	0	✓✓	✓	0	0	0	✓	✓✓	✓	✓✓	0	0	0	0
<p>This strategic objective is strongly supportive of SEA Objective 2 that relates to improving the quality of life of people and communities across Shetland since it aims to develop a knowledge and skills base in energy efficiency and renewable energy alternatives that will benefit local communities. The benefits are likely to relate to improvements to home energy management and the support for micro-generation that will arise from this knowledge and skills development. Because of its main thrust in promoting energy efficiency, reducing carbon emissions and promoting renewable energy within the community, it is strongly supportive of SEA Objectives 8 (reducing greenhouse gas emissions) and 10 (the promotion of the sustainable use of Shetlands natural resources).</p> <p>For the rest of the SEA Objectives the effect is considered to be neutral with no clearly discernible effect since the objective is more strategic (knowledge and skills building) than practical (e.g. constructing a windfarm).</p>														

Environmental Implications

Positive Implications

In general terms the Strategy does not generate any negative environmental effects as long as the overarching environmental stewardship principle is applied. Several of the Strategic Objectives have strong positive effects on areas such as population, health and climatic factors. In other areas the effects are either broadly supportive (as with air) or neutral (as with biodiversity).

Overall, in environmental terms, the Strategy aims to:

- encourage the replacement of non-renewable fossil fuels as the prime source of energy by renewable energy;
- encourage more sustainable practices in the delivery of renewable energy projects;
- emphasise the importance of the protection of the natural and historic environment;
- recognise the importance the contribution of the sector can make to mitigating the effects of climate change (reducing carbon emissions) and making sure that there is adaptation to its effects in the future.

The objectives attempt to address:

Climatic Factors

Through:

- seeking to encourage the application of sustainable development principles (that will include addressing the use of fossil fuels, energy efficiency, the role of renewables and climate change issues) through the vision and objectives within the Strategy;
- supporting and influencing skills development and the sharing of good practice.

Use of Natural resources and Material Assets

Through:

- seeking to encourage the application of sustainable development principles (that will include making better and more efficient use of natural resources);
- supporting and influencing developers to adopt sustainable development principles;
- supporting and influencing skills development and the sharing of good practice.

Population and Health

Through:

- seeking to encourage the knock-on environmental and social benefits of renewable energy generation;
- encouraging developers to adopt sustainable development principles;
- supporting and influencing skills development and the sharing of good practice;

- ensuring that local people are involved in decision making where appropriate.

Air

Through:

- seeking to encourage the application of best practice principles in exploiting renewable energy options;
- encouraging developers to adopt sustainable development principles;
- supporting and influencing skills development and the sharing of good practice.

Soil

Through:

- seeking to encourage the application of best practice principles in exploiting renewable energy options;
- encouraging developers to adopt sustainable development principles;
- supporting and influencing skills development and the sharing of good practice.

Water

Through:

- seeking to encourage the application of best practice principles in exploiting renewable energy options;
- encouraging developers to adopt sustainable development principles;
- supporting and influencing skills development and the sharing of good practice.

Landscape, Biodiversity and Cultural Heritage

Through:

- seeking to encourage the application of sustainable development principles (that will include a recognition of the importance of biodiversity, landscape and cultural heritage and the implementation of measures such as assessing the landscape and ecological value of potential renewable energy sites, assessing archaeological remains and historic features and implementing measures for their preservation and recording, etc) through the environmental stewardship principles;
- seeking to encourage the application of best practice principles in exploiting renewable energy options;
- encouraging developers to adopt sustainable development principles;
- supporting and influencing skills development and the sharing of good practice.

Indirect Environmental Implications

Notwithstanding the above positive elements it is likely that there will be some environmental implications arising from any new renewable energy developments that ultimately will come on stream as a consequence of this Strategy. Some issues are almost inevitable, and would arise as a result of any new development and these include:

- emissions of greenhouse gases from energy use and traffic both during construction and operational activities;
- an increased burden on air quality from emissions generated by plant and equipment as well as traffic associated with any developments;
- an increased burden on water supply and water treatment relating to installations;
- additional waste generation arising from operational activities.

Other issues are highly dependent on the nature, scale and location of particular developments. It is not inconceivable that some future developments might have implications for biodiversity (for example damage to habitats, disturbance of species and loss or damage to particular flora and fauna), landscape and historic character (including visual impact, effects on landscape and historic features) and transport impacts (increasing numbers and therefore emissions and potential congestion problems).

Although SIC can influence developers to adopt sustainable development principles and best practice in avoiding and/or mitigating any of these effects it has no direct control over the operation of individual sites. It is assumed that some of the above implications would be picked up more specifically by controls exerted by other agencies such as Scottish Natural Heritage (SNH), Scottish Environment Protection Agency (SEPA), Historic Scotland and the Shetland Amenity Trust.