A Renewable Energy Strategy For Moray

This document sets out a strategy for developing and promoting the use of Renewable Energy in Moray. Its aims and priorities are shared by both The Moray Council and HIE Moray. Most importantly this document will enable both organisations to work more closely together, ensuring that best value is obtained from the resources available.

This strategy covers renewable energy generation in the following sectors:

- Electricity
- Heat
- Fuel

This document will be reviewed and adapted on a yearly basis as the sector develops.

1. Why Have a Renewables Strategy?

1.1 European, UK Government and Scottish Executive policy

Renewable energy policy derives from the UK "Climate Change Programme".

The term Climate Change is commonly interchangeable with "global warming" and "the greenhouse effect". It refers to the build up of man made gases in the atmosphere that trap the sun's heat, causing changes in weather patterns on a global scale. The effects include changes in rainfall patterns, sea level rise, potential droughts, habitat loss, and heat stress. The greenhouse gas of most concern is carbon dioxide. Renewable energy helps to reduce the amount of carbon dioxide released into the atmosphere.

A legally binding target has been adopted of reducing greenhouse gas emissions by 12.5% below 1990 levels by 2008-2012 as the UK's contribution to the European target of an 8% reduction. The UK has also set a domestic goal of a 20% reduction in carbon dioxide emissions by 2010. Energy efficiency is expected to make an important contribution, but the over consumption of energy continues to grow. There are therefore 3 significant pressures to develop renewable energy:

- Climate change forcing the reduction of fossil fuel generation of electricity
- Existing electricity generation plants being 'retired'
- Continuing rising levels of demand.

The European Commission has adopted a target that 12% of total energy consumption should come from renewable sources by 2010. The UK government has set a target of increasing the proportion of electricity supplied from renewable sources from less than 3% in 2002 to 10% by 2010. The UK has been slow to develop renewable energy and is starting from a lower base than most other European countries, however a recent White Paper suggests the UK should achieve 20% by 2020.

The Scottish Executive is committed to a policy which places Scotland in the vanguard of a new sustainable energy industry that could bring with it considerable economic benefit.

As such the Scottish Executive has set an ambitious target of 18% of all Scotland's electricity to be produced from renewable energy sources by 2010, and up to 40% by 2020. However a significant omission from this important policy and from similar policies throughout the UK, is specific reference to targets and measures to promote and expand the

production of heat from renewable sources. In 2006 The Scottish Executive intends to produce a renewables heat strategy, which will include similarly ambitious targets for its generation.

The UK Department of Transport announced in November 2005, that by 2010, five percent of road fuel must originate from renewable sources. The inclusion will begin from 2008 and will be phased in until the 5% inclusion rate is reached in 2010.

1.2 The Economic Opportunities of Renewables

Rising energy costs are having a major impact on business and domestic users. Principally these costs are tied to fossil fuels and their increasing scarcity. The UK has historically been an exporter of energy, coal and then oil and gas, however, within the next decade, the UK may become a net importer of energy. Renewable energy sources provide an opportunity to move away from fossil fuel dependence, reduce the net energy deficiency, and achieve a more stable energy price.

The Future Generation Group (a sub group of the Forum for Renewable Energy Development in Scotland - FREDS) reported in 2005 that there is a need for a better understanding of the potential economic impacts and have recommended that the Scottish Executive looks into the feasibility of commissioning further work to look at how Scotland can maximise economic benefits from all of the technologies, taking account of existing work and the recommendations of the other FREDS groups.

1.3 National Planning Policy

“Making it work Together – A Programme for Government” (September 1999), indicated that revised planning guidance on the location of renewable energy developments would be prepared, recognising the planning system’s important role in providing a framework for promoting renewable energy development.

The Scottish Executive is currently reviewing NPPG 6 and, to ensure that the “40% by 2020” target is delivered in the most sustainable way possible, expects planning authorities to make positive provisions for renewable energy developments by;

- Supporting the fullest possible range of renewable energy technologies, with particular priority being given to how policies can best facilitate the development of growing and new technologies
- Guiding development to the most appropriate sites

- Ensuring that the environmental economic and social benefits for the local communities are fully exploited; and
- Supporting Scotland's economic growth

While at the same time

- Meeting international & national statutory obligations to protect designated areas, species and habitats of natural heritage interest and historic environment from inappropriate forms of development; and
- Minimising impacts on local landscapes and communities, tourism, aviation and recreational interests.

The National Planning Policy Guidance 6 (NPPG 6) will be reissued as the Scottish Planning Policy (SPP6). The Executive's Planning Advice Note "Renewable Energy Technologies" (PAN45), revised in 2002 provides supplementary advice on issues to be taken into consideration, such as visual intrusion, noise, local ecology and traffic impacts.

Each local authority is expected to play its part in contributing to the targets of securing reductions in fossil fuel use, and in carbon emissions. The consultation on the review of NPPG 6 proposes regional targets for renewable energy generation (i.e. number of Megawatts (MW) of electricity produced) in which Moray would be a part of the Highlands and Islands contribution to the national total.

1.4 Neighbouring Local Authority Policies

The Highland Council has produced a draft strategy whose aims generally are in accordance with National Planning Policies. The Highland Council is considering setting capacity targets (in MW) over the period to 2020.

Aberdeenshire Council's Strategy differs from the Highland Council's, on that it is based on encouraging communities to work towards generating their own energy requirements using renewable energy technologies.

Aberdeen City Council has set up Aberdeen Renewable Energy Group (AREG), whose objective is to exploit Aberdeen's role as the UK's leading energy centre and capture renewable energy. AREG's mission is "to lead the energy race for Scotland and the UK by capitalising on the local industrial energy base, the implementation of local renewable energy projects, lobbying for renewable energy developments, promoting and supporting local capabilities and connecting its members with worldwide market information, networks and opportunities." (AREG leaflet 2006) The Moray Council is an associate member of this group.

2 What is Renewable Energy?

Renewable Energy is obtained from sources that are essentially inexhaustible, unlike for example, fossil fuels, of which there is finite supply. Renewable sources of energy include wind, solar, geothermal, marine, hydro, hydrogen, as well as energy derived from burning biofuels (particularly wood) and waste. A brief description of the main different types follows:

2.1 Wind

Wind turbines use the force of the wind to turn aerodynamic blades that turn a rotor, which creates electricity.

Power from wind is proportional to the cube of the wind speed therefore relatively minor variations in wind speed can result in large changes in potential output.

Individual turbines vary in size and power output from a few hundred watts to 2 – 3 MW. Users range from very small turbines supplying energy for battery charging systems, to turbines grouped on wind farms supplying electricity to the national grid.

2.2 Solar Thermal Heating Systems / Photovoltaic

Solar water heating systems gather energy radiated by the sun and convert it into heat in the form of hot water. Solar water heating systems, work alongside a conventional water heater to provide hot water.

Photovoltaic systems use energy from the sun to create electricity to run appliances and lighting.

There is growing interest in this technology from community groups, developers and domestic users. The potential for this technology is mostly small-scale applications.

2.3 Ground Source Heat pumps (Geothermal)

A ground source heat pump is an electrically powered system that taps the natural heat stored in the earth to heat a building.

Ground source heating systems transfers heat from the ground into a building by using a ground loop to extract heat and connected to a heat pump inside the home. A heat pump is a device which transforms energy from low to high temperature using the refrigeration cycle. A

Ground Source heat system is 3 to 4 times as energy efficient as most efficient gas or oil burners.

2.4 Marine Energy

Tidal – Tidal streams are caused by the familiar rise and fall of the tides, which occur twice a day around the UK coast. As water flows in and out of estuaries, it carries energy. The amount of energy it is possible to extract depends on the speed of the flowing stream and the area intercepted. This is similar to wind power extraction, but because water is much denser than air, an equivalent amount of power can be extracted over smaller areas and at slower velocities.

Waves – Wave energy occurs in the movement of water near the surface of the sea. Waves are formed by winds blowing over the sea surface, and the water acts as a carrier for the energy. The amount of energy in waves depends on their height and period (time between successive peaks).

2.5 Hydro

Hydropower systems convert potential energy stored in water held at height to kinetic energy to turn a turbine to produce electricity.

Micro hydro plants vary in size and power output, from a few hundred watts (possibly for use with batteries) for domestic schemes, to a minimum 25 KW for commercial schemes. A good hydro scheme can generate a steady, more reliable electricity supply than other renewable technologies at a lower cost.

2.6 Fuel Cell (Hydrogen)

Hydrogen can be used to provide electricity and heat either through use in a fuel cell or through combustion. A fuel cell is a device similar to a continuously recharged battery, which generates electricity by combining hydrogen with oxygen from the air. Therefore, as it is possible to produce hydrogen from biomass and wastes and by the electrolysis of water, (using electricity from renewable energy), hydrogen has significant potential as the basis of an energy system with low carbon dioxide emissions; it can be used as a fuel for road transport, for heat and power generation, and for energy storage.

2.7 Bio Energy

Bio – Energy is an energy process, which utilises fuels derived from recently living plants or animal matter. It can be broken down as follows:

- Direct combustion of forestry products, agricultural residues, and biomass crops;
- Production of bio-fuels from oil rich crops and/or termination of organic material;
- Secondary production of energy or fuels from wastes such as animal slurry or organic refuse for example through digestion or distillation.

2.8 Waste to Energy

Energy from Waste (EFW) comprises a range of processes usually associated with municipal waste (but also used for industrial waste) where the waste is burned, gasified or digested at a high temperature. Energy is recovered from these processes (usually in the form of heat) and is reclaimed to produce steam and/or generate electricity.

The degradation of waste within a landfill produces methane gas, which is toxic, but which in sufficient quantities, can be used as a fuel.

3 Energy Efficiency

Energy efficiency aims to reduce both use of resources and damage to the environment due to energy generation and consumption.

About 20% of Scotland's total energy is wasted every year, representing £1.3 billion in resources lost to the economy, (nearly enough energy to supply the annual heating, cooking and lighting needs of every home in Scotland) (Scottish Executive Energy efficiency Strategy news release December 2004)

The Scottish Executive has outlined plans for an energy efficiency strategy, which aims to create a more joined up approach for energy efficiency interventions.

The Moray Council has put in place an Energy Policy and Strategy and now employs an Energy Officer to promote the efficient use and management of energy in all its buildings. The policy also aims to raise awareness of energy efficiency initiatives with both public and private sector partners.

The Council now records the annual carbon emissions from its energy consumption and is putting in place various projects to reduce these emissions. By using the Central Energy Efficiency Fund last year the Council has reduced its Carbon Dioxide emissions per year by 218 tonnes.

The Council is also working with the Energy Saving Trust in delivering energy awareness courses to all staff, for application both at home and in the workplace.

4 Where are we now?

With the notable exception of energy produced from wind farms there has been a slow uptake of renewable energy technologies in Moray due to a number of constraints, some of which act at local, and some at national level. Issues which need to be resolved in order for renewable energy to flourish in Moray, are covered under the following headings:

4.1 Constraints

Renewable technologies are currently less developed than comparable fossil fuel systems, resulting in less confidence to invest in the significant capital often required.

Grid upgrade – Most areas of the electricity transmission and distribution network in the North of Scotland, require extensive capital investment to upgrade them to be capable of handling increased power generation.

Heating networks – There are no existing community heating networks in Moray to which renewable energy heat sources can be connected. This is a particular barrier to the economies of biomass or waste as a fuel, which produces heat through incineration.

Energy Storage – Technologies for electrical storage, if less expensive and more widely available, could help improve the viability of intermittent, small-scale renewable energy generators by smoothing supply and making output more predictable.

Capital - A further important constraint lies in the perceived risk associated with investing in renewable energy technologies, which is generally higher than competing conventional technologies.

- Capital markets generally perceive the deployment of emerging technologies as involving more risk than established technologies. The higher the perceived risk, the higher the required rate of return demanded on capital

- The high front-end, or financing requirements of many renewable energy technologies often present cost recovery risks for which capital markets demand a premium.

4.2 Draft Moray Development Plan

The Council has introduced two new policies on renewable energy namely ER1 and ER2 to the draft Moray Development Plan. These are designed to both promote and control renewable developments.

The policies are:

4.2.1 ER1: Renewable Energy Proposals

Moray offers the potential for renewable energy proposals and this policy provides a range of criteria to consider applications against. The policy conforms to NPPG6 – Renewable Energy Developments, PAN45 Renewable Energy Technologies, and the Council's Environmental Charter.

Proposals for Renewable Energy will be acceptable provided:

1. *They are compatible with policies to safeguard and enhance the built and natural environment;*
2. *They do not lead to the permanent loss or permanent damage to, prime agricultural land;*
3. *They are compatible with tourism/recreational facilities, they do not interfere with aircraft activity;*
4. *They do not result in an unacceptable impact in terms of visual intrusion, landscape character, noise, electro-magnetic disturbance, pollution, traffic generation or damage to the local ecology.*
5. *They do not result in an unacceptable cumulative impact.*

Proposals are required to provide "decommissioning arrangements" to illustrate how the site will be reinstated if and when the plant ceases to operate. This may be enforced through a Section 75 agreement.

Commercial wind energy developments should be located within a Preferred Search Area identified in the Wind Energy Policy Guidance and meet the above criteria.

Within the "Unlikely" areas, identified in the Wind Energy Policy Guidance, there is a presumption against commercial wind energy developments. Wind energy developments within these areas will be limited to community and domestic scale schemes.

4.2.2 Policy ER2: Renewable Energy Requirements in New Developments

This policy aims to promote the use of small-scale renewable energy technology at a domestic level. This could be provided through a variety of methods including solar panels or domestic scale wind turbines.
Proposals for new development of over 10 houses or 500 square metres must include provision for renewable energy generation, unless it can be satisfactorily demonstrated that such a provision would be technically or economically unfeasible. The location of renewable energy generated should not detract from the amenity, appearance or character of the site.

The Council's Structure Plan also refers to "promoting opportunities for the sensitive development of renewable energy and promoting renewable energy in new development".

The two new policies will lead to a standard, consistent list of sustainable development objectives that developers will have to consider before they can obtain planning permission.

4.3 Current Installations and Projects

4.3.1 Wind

There has been considerable interest in wind energy development in Moray and the Council has approved Wind Energy Policy Guidance, which identifies preferred search areas for applications for large, medium and small wind-farms. The current wind-farms granted consent in Moray are:

Paul's Hill Wind Farm	77 Mw
Cairn Uish Wind Farm	56 Mw
*Drummuir Wind Farm	42 Mw
Findhorn Wind Park	1 Mw
**Berryburn Wind Farm	78 Mw
Total	**284 Mw**

* The Drummuir Wind Farm was granted planning consent following a Public Inquiry. The decision is subject to a legal challenge by The Moray Council.

** The Council have not objected to a proposal for a Wind Farm at Berryburn. A decision on the proposal is expected from the Scottish Executive during 2006.

4.3.2 Bio Energy

Actual bio-energy/wood fuel installations are currently very limited. While rural domestic properties use wood burning appliances, total demand is hard to quantify.

The Crown Estates office in Tomintoul has commissioned a 28Kw wood chip boiler to heat their premises.

Moray, Aberdeenshire, Fife, Angus, Highland and Perth & Kinross Councils, and Highlands & Islands and Scottish Enterprise, jointly commissioned a study into the Economic Evaluation of Biodiesel production from Oilseed Rape grown in the North and East of Scotland. The two principal recommendations were:

- To support the development of a medium scale plant in Scotland
- To support pilot studies into small-scale biodiesel schemes.

4.3.3 Waste to Energy

The Moray Council has recently awarded a contract for the generation of electricity utilising landfill gas at its site at Nether Dallachy. It is anticipated that around 0.8MW will be generated long term.

4.3.4 Solar

The following Community projects have taken the opportunity of installing solar systems, to heat water in their buildings:-

Findhorn Community
Richmond Memorial Hall
Speyside Dolphin Centre
Abbeyfield House – Forres
Dufftown Memorial Hall

5. Potential resources

The principal energy resources of Moray are detailed below. More work will be required to accurately quantify these resources. As technology develops, other resources may become more significant.

5.1 Bio Energy

With its large timber resource Moray is well placed to exploit biomass energy. The forest area in Moray is 64,352 ha; (28% of the total land area) twice the Scottish average and two and half times the UK average. Moray has an annual timber harvest of over 260,000 tonnes forecast to rise by around 30% by 2020.

To quote the Scottish Executive's Review of NPPG 6 "biomass is arguably the form of renewable energy generation most compatible with secure supply. It is considerably less subject to unpredictability and intermittency of supply, and can operate at a load factor of 80% or more, as compared to circa 30% for wind. It also offers most in terms of employment and local economic impact, of all the technologies".

The Biomass Energy Group (BEG) which was established by the Forum for Renewable Energy Development in Scotland (FREDS) in January 2004 has concluded, "that a biomass industry in Scotland has the potential to supply as much as 450 MW of electricity from the wood fuel resource while employing over 2000 people and stimulating other sectors of the Scottish Economy" (Promoting and Accelerating the Market Penetration of Biomass Technology in Scotland).

Moray also has 4.5% of Scotland's arable land with potential to grow energy crops. In addition, wastes from animal slurry can be used to generate energy, and Moray has over 350,000 head of livestock.

A modest percentage of these resources could support a viable bio-energy sector.

5.2 Wind

Development of this renewable energy source for commercial purposes within the current Wind Energy Policy guidelines can continue, but the cumulative impact of windfarms on the landscape, and the current constraints of the grid system mean that it is unlikely that there will be significant further large-scale projects. There is, of course, potential for domestic and community scale developments.

5.3 Waste to Energy

Moray has a total domestic waste arising of 78,300 tonnes, forecast to rise, to around 105,000 tonnes by 2020. Currently the Council is involved in a Strategic review of waste with Highland, Aberdeenshire, and Aberdeen City Councils. A proportion of the combined domestic waste of the four Council areas, may be incinerated, producing both heat and power; one of these plants may be in Moray.

5.4 Conclusions

Moray has taken significant strides in accommodating commercial wind farms as a source of renewable energy.

It would appear to also have significant potential to develop biomass sources – particularly timber – to generate commercial heat and power at an appropriate scale.

It may also be in a position to recover heat and energy commercially from incineration of waste.

There is considerable potential for uptake of small scale solar, wind, fuel cell (hydrogen), and bio, energy within the community of Moray, but, as yet, there is a lack of confidence in the costings, installation and maintenance of systems.

However, with increasing awareness of renewable energy and harnessing of its resources it is possible that Moray could achieve the equivalent of self-sufficiency in energy consumption.

6. Vision

That Moray produces equivalent electricity from renewable energy sources to match at least its own demand levels, by 2020 (i.e. 100% as against the national target of 40%) and in the process achieves maximum economic, social and environmental benefits from the promotion of all sources of renewable energy for both the global environment and local communities.

7. Strategic Aims

To achieve that Vision; the following four point strategy is put forward to underpin the attached Action Plan.

7.1 Develop Local Workforce Skills

- Support the development of an appropriately skilled renewable energy workforce, using training initiatives that raise the skills level in this sector.

Action 1

7.2 Develop Public Awareness

- Improve public understanding of renewable energy and its potential through awareness raising events and promotion of information sources.

Action 2

7.3 Develop Supply chains

- Facilitate and support links between potential suppliers and users of biomass energy.

Action 3

7.4 Promote Renewable Energy in the Community

- Promote more use of renewables, alongside increased energy efficiency, within Community Planning Partners' own property portfolio

Action 4

- Examine potential of using biofuel in the Council's vehicle fleet.

Action 5

- Where appropriate provide financial support for pilot projects in bio fuels and biomass.

Action 6 and 7

- Put in place planning policies which require all new developments to consider renewable energy installations

Action 8

- Put in place planning guidelines for domestic and community and commercial scale projects

Action 9

These Strategic Aims are addressed in the Action Plan (2006 to 2010), which suggests potential methods of addressing the Action, the likely lead body and indicators of impact. The Action Plan will be reviewed annually.

Strategy		Action	Actions Framework			Indicators of Compact/Impact
			Potential Methods	Lead Body	Timescale	
Develop local workforce skills	1	Facilitate training for workforce in 'Renewables' installations and maintenance.	Speak to employers/college. Examine opportunities for appropriate Qualifications and for in-service training.	HIE Moray	2006/2007	Number attending Training and Number of trained Employees in businesses in Moray.
Develop Public Awareness	2	Raise knowledge of sources of advice, information and support.	Signposting of information sources, awareness raising seminars/events and networking events.	HIE Moray Moray Council	2006	Number of events and number of people attending.
Develop supply chains	3	Facilitate links between suppliers and users of Biomass	Investigate supply chain for wood chip and processed wood fuel.	HIE Moray	2006	Links between suppliers, and end-users of biomass fuel. created
	4	Install 'Renewables' technology systems wherever feasible in public sector and community buildings.	Require contracts for all significant public building to demonstrate an option of renewable energy source of heating/power.	Moray Council HIE Moray	2006/2010	Number of installations within the public sector property portfolio.
	5	Encourage the use of bio-fuels	Pilot use of biofuels in Moray Council vehicles	Moray Council	2007	Reduced emissions/cost savings.
	6	Support a bio fuels project	Private/public partnership	HIE Moray/ Moray Council	2006/2009	Project completion.
	7	Support bio-mass projects.	Private/public partnership	HIE Moray/ Moray Council	2006/2009	Project completion.

	8	Approve planning policies (through the replacement of the Development Plan) for the control of RE installations and for the promotion of RE in new development.	Through consultations process of the Development Plan	Moray Council	2006	Planning policies approved in the new Moray Development Plan
	9	Produce Guidelines for developers and planning applicants for installation of RE systems.	Produce draft for consultation, then final approval.	Moray Council	2006	Guidelines approved by Council

Bibliography

1) Draft Moray Development Plan Review – The Moray Council
2) Wind Energy Policy Guidance – The Moray Council
3) Biomass Energy Report – HIE Moray – NIFES Consulting UKE – 754/MNM 2005
4) Economic Evaluation of Bio-diesel Production from oil seed rape grown in the North and East of Scotland – Scottish Agricultural College – October 2005
5) Wood fuel for warmth – The Sustainable Development Commission – June 2005
6) Securing a Renewable Future – The Scottish Executive – Astron B29409 3/03
7) Promoting & Accelerating the Market Penetration of Bio Mass Technology in Scotland – FREDS Biomass Energy Group report – Astron B38433 01/05
8) Draft – New Renewable Energy Planning Guidance SPPG – The Scottish Executive Planning Division.
9) Scotland's Renewable Energy Potential – realising the 2020 target – Future Generation Group Report 2005 – Scottish Executive – Astron B42033 6/05
10) Draft Highland Renewable Strategy – Highland Council September 2005
11) The Renewable Energy Strategy - Aberdeenshire Council December 2004
12) Economic Evaluation of the Forest Sector in Moray – CJC Consulting May 05

Additional Information

Highlands and Islands Community Energy Company – www.hie.co.uk/community-energy
Highlands and Islands Renewable Team – www.hie.co.uk/renewables
Highland Birchwood's – www.highbirchwoods.co.uk
Carbon Trust – www.carbontrust.co.uk
Energy Saving Trust – www.est.org.uk
The Scottish Executive Climate Change Team – www.scotland.gov/environment
Scottish Renewable Forum – www.scottishrenewables.com
Moray Agricultural Information handouts – The Moray Council – www.moray.gov.uk
Forestry Commission – www.forestry.gov.uk