

# Flintshire County Council

## Renewable Energy 10 year Action Plan

### Background

Renewable Energy is now an integral and growing part of both the County and Country's energy mix, with key National and E.U. targets promoting this uptake. The U.K has a target to reduce greenhouse gas emissions by 34% by the year 2020 against 1990 levels, with a legally binding target of achieving 15% of the U.K's energy demand from renewable energy systems over the same period.

In 2007 Flintshire committed to reducing its own emissions by 60% by 2021, a challenging but achievable target provided all elements of the Carbon Reduction Strategy are followed. Having invested in energy efficiency measure for some years now, the last part of the strategy (Renewable energy) needs to come to the fore.

Our achievements thus far are a reduction of close to 20% in emissions since 2007, Asset rationalisation and large scale renewable energy systems are now the two primary areas that stand to make the difference of either attaining or failing to achieve our 60% reduction goal.

Flintshire County Council is therefore committed to doing its fair share to reduce Carbon Emissions to help achieve National targets and help in reducing the risks of fossil fuel price volatility and therefore revenue cost and Carbon Tax implications to the Authority itself.

Such energy systems do not rely on finite resources such as fossil fuels, with their primary characteristic being that they don't contribute to Climate Change.

It is of course recognised that Carbon savings will also come from alternative sources, such as the continued improvement of building efficiency, decarbonising the national grid and in future lower carbon transportation.

From a financial perspective Energy costs have for many years risen significantly above annual inflation rates with current Government and Energy industry forecasts suggesting this trend will continue for the foreseeable future, giving additional revenue cost burdens to Local Authorities and businesses alike.

In order to ensure maximum financial and environmental benefit is obtained from the development of renewable energy schemes it is vital that Energy Efficiency is not forgotten. Every Kwh that is wasted is one that did not need to be generated or paid for in the first place. Flintshire County Council therefore remain committed to using energy as efficiently as it can, reducing its carbon footprint and promoting energy efficiency at every opportunity.

## **Purpose of the renewable energy action plan**

### **To:**

- To help develop the renewable energy industry locally to support the growth of sustainable jobs.
- Generate low carbon Electricity and or heat that can be used on site/sleeved, or private wired to FCC sites, and housing tenants.
- Develop green (low carbon) and sustainable methods of energy generation.
- Reduce reliance on imported energy sources.
- Reduce risks associated with rising energy prices.
- Consider in the medium to long term the opportunities to sell generated energy to third parties and the Fuel Pool at competitive rates.
- Investigate opportunities to create Energy from waste.
- Promote the sensitive development of renewable energy schemes across the County (principally but not exclusively brownfield sites).
- Set generation targets for various stages of the plan

## **Key Challenges to the successful delivery of renewable Energy schemes.**

The Key challenges that need to be addressed have been identified as:

- Improving awareness, information, and support at all levels
- Submitting successful planning applications for renewable energy systems
- Landscape and built environment constraints
- Financial issues
- Sufficient resources to achieve the objectives
- Lack of local expertise
- Electricity grid supply constraints
- Public acceptance of the Council's plans

All the above challenges will need to be addressed as this action plan is developed, with input required from the public and community groups to make this a Flintshire wide plan, that could be replicated in part by interested groups, communities and residents across the County.

## Partnering

In order to maximise the use of biomass, by combining resources or managing woodlands, it may be beneficial to consider loose partnering arrangements with Local Landowners, Registered Biomass suppliers, Local businesses, Renewable energy installers and other presently undefined/identified partners that complement the objectives of this plan.

## Funding.

Presently there are a variety of options open to Flintshire County Council in terms of obtaining capital funding for renewable energy projects, these include:

- Green Investment Bank,
- Prudential borrowing,
- Joint Venture partners.
- Pension funds
- Crowd funding or public offerings

Therefore, as renewable energy schemes are identified and developed sufficiently to determine their viability, funding opportunities will also be investigated and the options appraised on their merits prior to being submitted to Cabinet for approval/rejection.

For such scheme's to justify submission to Cabinet, they will be required to show a positive net benefit on investment, irrespective of the funding mechanism. They will in effect be "spend to save" schemes'.

## Action Plan

## Introduction

### 1.1 What is renewable energy?

**"Renewable Energy sources are those which are continuously and sustainably available in our environment"**

**Extract from "New and Renewable Energy – Prospects for the 21<sup>st</sup> Century" DTI**

**Renewable energy sources do not rely on finite resources, and produce significantly lower levels of environmental pollutants than conventional sources of energy: in particular, they generally release no net greenhouse gas emissions in operation.**

## **Technologies**

**For the purpose of this action plan, the following technologies are included under the definition of renewable energy:**

- **Anaerobic digestion**
- **Biomass (wood pellet/wood chip from sustainable sources)**
- **Solar Thermal**
- **Solar Photo voltaic**
- **Wave Energy**
- **Tidal Energy, including flood alleviation schemes that mitigate against flooding and generate power**

## **Energy from Waste**

Energy from organic waste is regarded as renewable energy by Government Policy and is included as an option to help deliver the County's renewable energy target.

However this action plan does not include specific policies/actions on this energy resource as it is covered as part of **the sustainable waste management strategy**.

## **Biomass**

### **Background Information**

This Plan aims to address the barriers to the development of renewable energy in the County (Flintshire), whilst promoting the sustainable and appropriate use of renewable resources".

Wood biomass is already an established renewable energy source in Britain (+3000ha established) with a potential for further technical development and a large capacity to expand its market share.

In addition, utilising wood as biomass has the flexibility to meet the needs of reasonably small scale units, community heating projects and large industrial schemes, whilst inflicting the minimum impact on the wider environment.

More detailed information on the planting, growing, harvesting and potential yields are detailed in appendix 1.(attached)

## **1.2 Aim of this Action Plan**

The Flintshire County Council Energy Action Plan aims to address the barriers to the development of renewable energy in the County, and will promote the sustainable and appropriate use of renewable resources.

The plan outlines actions that will help deliver a Flintshire renewable energy target, but also deals with many other issues such as renewable heat generation, economic opportunities from renewable energy as well as encouraging community energy initiatives.

The purpose of this action plan is therefore to seek to identify suitable sites within the Councils ownership, for development of as wide a range of renewable energy systems, and to develop them where a financial and or environmental/amenity benefit can be identified.

As identified in the background information (shown on page 1) this action plan is intended to address the issues around renewable energy generation, and therefore does not deal specifically with increasing the efficiency of fossil fuel use. However in order to maximise the benefit of renewable energy, this plan needs to be integrated with enhanced energy efficiency. It is therefore important that the development of renewable energy systems and energy efficiency principles, work hand in hand to form part of a future sustainable energy strategy.

## **1.3 Why do we need a Renewable Energy Action Plan**

### **Environmental impact of energy**

The majority of energy used in the U.K is generated from fossil fuels, though there has been an increase in “green” or renewable electricity generation in the past 5 years following the introduction of Feed In Tariff’s and more recently the Renewable Heat Incentive. It is generally accepted that our reliance on fossil fuels is not sustainable in the long term, and therefore much greater use of renewable energy will be needed in future. Not only is there a significant risk of environmental degradation, but also because the U.K. is heavily and unsustainably reliant on imports it is susceptible to security of supply issues.

## Climate Change

Probably the most important environmental impact of fossil fuel use is the emission of carbon dioxide into the atmosphere leading to the enhanced greenhouse effect and Climate change. This is regarded internationally as the single most serious environmental issue facing mankind.

The international community is endeavouring to gain agreement to reduce carbon emissions to levels that will prevent global temperature change exceeding +2 degrees centigrade. Reducing carbon emissions is therefore critical to addressing this issue and will require an international agreement to reduce the use of fossil fuels and set a track to a more sustainable future. This can be achieved through a combination of improved energy efficiency and the development of national and local renewable energy systems.

## The Councils Role

FCC is the local authority for the area, with a range of different legal duties upon it. These include economic development, proper stewardship of public monies and obtaining value for money. The Council is the community leader, as well as being a landowner, an employer, a regulatory body and a service provider. It is therefore important that it leads by example and ensures that it is maximising the value from its own assets, creating job opportunities for local people and reducing its own costs. All of these benefits can be achieved from this plan.

## Phase 1, - Renewable energy action plan

### Years 1 and 2 Actions

Action	Description	Resource
RE1	Identify potential generation sites (eg landfill sites and other known brownfield sites)--- Tender and appraise submitted costs vs ROI. Report to Cabinet for approval rejection.	Energy Unit, GIS team, Valuation and estates
RE2	Identify all FCC land holdings with potential to develop renewable energy systems.	Energy Unit, GIS team, Valuation and estates

<b>RE3</b>	Appraise opportunities to extend /install Photo Voltaic panels, (P.V.) on and or within Primary and Secondary Schools grounds.	Energy Unit, GIS team, Valuation and estates and Education dir.
<b>RE4</b>	Undertake desktop assessments of generation /sustainable potential e.g. P.V. , hydro, tidal and wind	Energy Unit, private sector and Drainage
<b>RE5</b>	Undertake desktop assessments of Flintshire C.C. land holdings to determine suitable areas of land to plant trees to enhance the Environment and provide a future sustainable wood (biomass) supply. (please refer to Appendix 1 for further information)	Coed Cymru, Forestry Officer, Energy Unit, GIS team, Valuation and Estates
<b>RE6</b>	Undertake public consultation exercise, consider and develop further actions from feedback for inclusion within a future updated version of this plan	Energy Unit, Communications team
<b>RE7</b>	Develop plan to consider feasibility of creating wood chipping facility	Street scene

## Phase 2, Renewable Energy Action Plan

### Years 3 to 5

<b>RE8</b>	Progress additional identified sites, where funding and payback periods are confirmed	Energy Unit
<b>RE9</b>	Set out the phase 2 Development Programme for additional sites as identified from desktop exercises and local knowledge.	Energy Unit
<b>RE10</b>	Develop planting programme on all suitable identified land (accessing grants as available)	Coed Cymru/Forestry

## Phase 3, Renewable Energy Action Plan

Years 6 to 10

<b>RE11</b>	Develop woodland management strategy to create a mix of specimen and harvestable timber.	<b>Coed Cymru, Forestry Officer</b>
<b>RE12</b>	Become registered sustainable biomass supplier(Aspirational)	
<b>RE13</b>	Become Energy/ heat supplier...Aspirational	

### Conclusion:

The issue of climate change will not be solved by FCC alone. However, it can plan its part in the necessary work to combat climate change and stop global warming. Whilst these are lofty aspirations, much of the required work is more down to earth and local. It involves the better utilisation of the Council's assets, both land and buildings, and the generation of income to protect public services at the same time. Renewable energy is a useful way in which these aims can be realised.

This Ten Year Plan will enable the Council to deliver its part of this work.



# Appendix 1

## Wood Biomass from Short Rotation Coppice (SRC)

Short rotation coppice (SRC) is an energy crop which consists of densely planted (15,000 stems per ha) high yielding varieties of willow or poplar. Crop yields vary between 7 and 12 dry tonnes per ha (21m<sup>3</sup> to 36m<sup>3</sup>) and are dependent on soil fertility, moisture availability and aspect/shelter. Mineral soils are required for growing willow and poplar with loams, clay loams and heavy clays suitable and pH values between 5.5 – 7.5 with excessive slopes and uneven ground being unsuitable.

The establishment of SRC plantations has much in common with agriculture or horticulture crops as well as forestry practices, hence the acceptance by the farming community to consider propagating SRC. Trees are planted in windrows and are reminiscent of fields of maize and are harvested by Terrain Chipping Harvesting Systems.

Sustainable managed SRC provides a source of renewable energy with virtually no net carbon emissions. Harvesting cycles are in the order of 2 to 5 years, following the establishment period of 2 years.

SRC can remain productive for a period of 30 years, after which old coppice stools are replaced with maiden trees. Due to the inherent silvics of salicaceae (willow and poplar), very little soil improvement is required. Nevertheless, applications of suitable fertilisers are applied, post harvesting, January-April.

Crops are harvested by purpose built harvesting machines or foragers (harvested, chipped and trawling). Chips are then bunkered within a wood chip store, turned and dried to approximately 30% moisture content and burned as and when required. Dried salicaceae wood chip has a density of 200kg – 400kg per m<sup>3</sup> or a volume conversion of 2.5m<sup>3</sup> – 5.0m<sup>3</sup> per tonne. Thus, large commercial plantations of wood biomass should be established near or in close proximity of suitably engineered road systems.

Although commercial plantations of SRC can be perceived as being too uniform a monoculture, which can impact negatively on the vernacular landscape (reminiscent of maize), visual impacts are nominally offset by the environmental and ecological benefits of planting copious amounts of willow and poplar.

### Flintshire Perspective

Production of biomass should be considered as a long term commitment with each project subject to a detailed plan and sufficient advice and support given.

Conversion of agricultural land from farming to biomass production will be subject to bureaucratic protocol with change of use and notification necessary. In addition, the officers considerations to maintain agricultural activities and therefore food production being paramount, only Grade 4 Agricultural Land has been considered in this briefing note.

Flintshire, although perceived as being largely industrial and urban by nature, has a significant and vibrant agricultural sector. Of its 43,610 ha of landmass, Flintshire has approximately 10,330 ha (23.7%) of its land classified as Grade 4 Agricultural Land.

Flintshire CC being a major land owner within the county has approximately 43 farm holdings evenly distributed throughout the county, with approximately 136.6 ha of agricultural land classified as Grade 4.

## **Conclusion**

Taking into consideration land availability, both public and private, it appears that Flintshire has capacity to allocate a proportion of its agricultural land to the production of wood biomass, although excessive gradients will be a limiting factor.

Although financial appraisals regarding the profitability SRC are vague, enterprise margins of £116/ha/year are expected (2008) with estimated 11% to 19% IRR on heating generation ventures, taking into consideration RHI assistance (2009).