

NORTH LINCOLNSHIRE COUNCIL

CABINET

RENEWABLE ENERGY STRATEGY

1. OBJECT AND KEY POINTS IN THIS REPORT

- 1.1 To seek the approval of Cabinet to adopt a renewable energy strategy for the council. Once approved we will be required to build renewable energy options into all of our projects.
- 1.2 We have set ourselves a target of reducing our carbon footprint by 33% over the next few years.
- 1.3 To help us achieve this reduction we need to change the way we do things. One such change is to move towards producing our own electricity and heat from renewable sources like the sun.

2. BACKGROUND INFORMATION

- 2.1 The council has adopted a carbon management plan. This set a target of reducing our carbon footprint by 33% by 2014.
- 2.2 The government has set its own national targets to ensure that the country produces more energy from renewable sources. It wants 15% of all our energy to come from renewables by 2020.
- 2.3 The government recently increased its carbon reduction target to 50% by 2025. Renewable energy is one of the main ways that the government believes that we can achieve our carbon emissions reduction targets.
- 2.4 To ensure that opportunities for adopting renewable energy are taken up, the government has launched the Feed in Tariffs (FIT) and Renewable Heat Incentive (RHI). Both schemes offer a subsidy to those who produce their own renewable energy.

3. OPTIONS FOR CONSIDERATION

- 3.1 **Option 1** – That Cabinet approves the strategy (attached) and that all future developments include renewable energy.
- 3.2 **Option 2** – That Cabinet does not approve the strategy.

4. ANALYSIS OF OPTIONS

- 4.1 **Option 1** -This is the preferred option as it enables the council to further reduce its carbon footprint and therefore revenue costs whilst showing strong community leadership in the area of climate change.
- 4.2 It also enables us to contribute to the national targets for increasing the application of renewable energy technology and reducing our emissions locally.
- 4.3 At the same time, option 1 enables us to maximise our use of FIT and RHI income.
- 4.4 **Option 2** - Would potentially cause our carbon footprint and energy costs to rise and would not allow us to benefit from the FIT and RHI.

5. RESOURCE IMPLICATIONS (FINANCIAL, STAFFING, PROPERTY, IT)

5.1 Financial Implications

5.1.1 The approved capital programmes include RHI projects to a value of £400,000 and FIT projects to a value of £300,000. The use of these renewable technologies allows access to these renewables tariffs with between seven to ten year's payback. The tariffs from these projects would give the council an annual income of approximately £85,000.

5.1.2 The capital programme also includes projects specifically designed to reduce down carbon, which often include the use of renewable technologies. In 2010/11 this programme identified a further annual reduction of £112,000 from council revenue budgets with an extra £43,000 expected following the delivery of the 2011/12 programme.

5.1.3 The renewable energy strategy supports the work of these capital programmes and the savings they generate. The renewable energy strategy also supports our CO² reduction generally, which in turn will reduce our annual costs under the Carbon Reduction Commitment scheme.

5.2 Staffing Implications

5.2.1 There are no staffing implications arising from this report.

5.3 Property Implications

5.3.1 We propose applying renewable technologies to the council's building stock, thereby improving their environmental performance.

5.4 IT implications

5.4.1 There are no IT related implications.

6. OTHER IMPLICATIONS (STATUTORY, ENVIRONMENTAL, DIVERSITY, SECTION 17 - CRIME AND DISORDER, RISK AND OTHER)

6.1 Statutory –

6.1.1 The renewable energy strategy will ensure that we meet our statutory obligations arising from the Climate Change Act 2006.

6.2 Environmental

6.2.1 Climate change is seen as one of the greatest threats to face us. Reducing both our carbon emissions and our costs also makes an impact upon reducing the effects of climate change on our region.

6.3 Diversity

6.3.1 There are no diversity implications.

6.4 Section 17 – Crime and Disorder

6.4.1 There are no crime and disorder implications.

6.5 Risk and other implications

6.5.1 Risk assessments will be carried out on a scheme by scheme basis.

7. OUTCOMES OF CONSULTATION

7.1 Consultation involved key staff involved on development projects within the council. Changes were made to the strategy to reflect their comments.

8. RECOMMENDATIONS

8.1 That Cabinet approves the Renewable Energy Strategy.

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Date: 5 September 2011

Background Papers used in the preparation of this report:
North Lincolnshire Council Carbon Management Plan 2009.
UK Government Climate Change Act 2006.

**RENEWABLE ENERGY STRATEGY
For
North Lincolnshire Council**

Executive Summary

- During 2010/2011 our energy costs increased by 20%. Prices are set to continue to rise at high levels.
- The Council Carbon Management Plan (CMP) requires us to reduce carbon emissions by 33%. National Government targets of a 50% reduction by 2025 and 80% by 2050 require strong action beyond energy efficiency improvements.
- Government renewable energy tariffs provide adopters with a 10 -12% return on their investment.
- Means of supplying renewable energy to our buildings are therefore required.
- This strategy provides information on suitable Renewable Energy Technologies (RETs). It maps out the means of the council achieving an increase in the proportion of its energy requirement from these renewables. This will reduce our carbon emissions and provide greater price stability and in the long term. It will deliver lower energy costs than conventional energy supplies.

The table below summarises the recommendations that emerge from the strategy, which will enable the council to maximise the benefits of adopting renewable energy technologies across our building portfolio.

| | |
|------------------|---|
| Recommendation 1 | We should actively pursue fitting appropriate RETs across our property portfolio with the following hierarchy: <ul style="list-style-type: none"> • photovoltaics (PV); • biomass; • solar Hot water; • ground source heat pumps (GSHPs); and • small scale wind |
| Recommendation 2 | All new renewable electricity generation systems installed on the council's buildings should qualify for feed in tariffs (FIT) payments or equivalent. |
| Recommendation 3 | All new heating systems, including boiler replacements, should be renewable based. They should qualify for Renewable Heat Incentive (RHI) payments unless there are extenuating circumstances. |
| Recommendation 4 | We should identify possible funding opportunities to support schools within the North Lincolnshire area to adopt renewables. |

| | |
|------------------|---|
| Recommendation 5 | We should undertake a feasibility to assess the opportunities for an energy services company (ESCO) delivering RETs across our buildings. |
| Recommendation 6 | We should undertake a feasibility to assess the waste wood potential within our properties and activities. |
| Recommendation 7 | We should ensure that our Waste Management Strategy and our Renewable Energy Strategy are compatible with each other. |

1. Background and Context

1.1 National Coalition Government

In May 2010 with the formation of the National Coalition Government, Prime Minister David Cameron, pledged to lead the 'greenest government ever'. Since coming into office, the coalition government has:

- removed all restrictions on local authorities to sell electricity back to the grid, thus allowing them to utilise the 'Feed in Tariff' legislation;
- introduced the World's first RHI;
- put in place the most ambitious targets on greenhouse gases of any developed country. In May 2011, the government extended the carbon budget, setting targets of a 50% reduction in emissions by 2025 and an 80% reduction in emissions by 2050. These targets are dependent in part, through the adoption of renewable energy technologies across the UK;
- announced a national 'Green Deal' to improve the energy efficiency of housing across the UK. This includes RETs;
- produced a Microgeneration Strategy in June 2011 to identify potential barriers; and
- agreed to support the role of energy recovery from waste within the waste hierarchy and to improve understanding of this role.

1.2 Renewable Energy Tariffs

Under the enabling powers of the Energy Act 2008, renewable electricity FIT and renewable heat (RHI) tariffs were introduced in the UK in 2010 and 2011, respectively. These will:

- help the UK meet its national carbon emissions targets;
- contribute towards the UK's energy security;
- stimulate local and national economic development, providing jobs, training and investment opportunities;
- reward early adopters of RETs by providing a return of investment (ROI) of between 10 -12%; and
- provide adopters with a guaranteed income stream over the life of the tariff (up to 25 years).

The FIT and RHI are discussed in more detail in section 3.

1.3 Community Leadership

1.3.1 Much of this government policy places councils at the centre of climate policy delivery. With the introduction of the RHI, DECC have stated that they want the public sector to lead the way in the shift to renewables.

1.3.2 Our planning policy requires that larger commercial and industrial developments generate 20% of their annual predicted energy consumption through on site renewables.

1.4 Energy Costs

1.4.1 Energy costs have substantially increased in recent years and during 2010/11 alone we have seen our electricity unit rate costs increase by 20% and gas and oil costs have increased by 25%.

1.4.2 During this time, our biomass pellet costs have significantly reduced. Comparing delivered biomass pellet costs with heating oil and gas based on pence per kWh unit rate, heating oil is almost double the cost of the pellets and only slightly higher than gas.

1.4.3 According to Ofgem, the long term trend for traditional fossil fuel prices will be upwards. The UK is increasingly dependent on imported energy and the global energy supply is under pressure from increasing demand.

1.5 The Local Authority Carbon Management Plan (CMP)

1.5.1 The Local Authority CMP was implemented from 2009/10. This sets a target of 33% carbon dioxide emission reduction by 2015. A detailed strategy plan has been developed and implemented. Annual reviews ensure that continuous reduction towards the target is maintained.

1.5.2 The focus for the CMP is rightly on improvements to energy efficiency such as raising awareness amongst our employees. This ensures lights, computers and other electrical equipment are switched off when not in use. The ongoing programme also includes technical solutions to improve our energy efficiency.

1.5.3 Energy efficiency measures alone, cannot achieve the total changes needed. The 33% target can only be met by the rapid uptake of RETs.

1.6 Other Key Drivers

1.6.1 Planning

The Planning and Energy Act 2008, allows local authorities in England and Wales to impose reasonable requirements on new development to generate a proportion of its energy from local renewable and low carbon sources of energy. Planning Policy Statement PPS22 relates specifically to renewable energy.

1.6.2 Carbon Reduction Commitment Energy Efficiency Scheme (CRC)

In April 2010, the Government introduced the CRC scheme for high energy users. The CRC requires organisations in the scheme to purchase carbon emission 'allowances' annually from the Government.

These are to cover emissions associated mainly with electricity, gas and heating oil consumption. Transport fuel is specifically excluded from the CRC.

We qualified and completed registration in October 2010. Trading will commence in April 2012. Our CRC Footprint and first Annual Reports were submitted in July 2011. Our annual CRC emissions for the period 2010-2011 are 16,886 tonnes CO₂. This results in a purchase cost of carbon credits of £202,632.

The cost of allowances will be £12 per tonne of carbon dioxide. After the initial purchase period, these will be traded on the open market with values set by supply and demand.

2. Renewable Energy Resources

Renewable energy is energy which comes from natural resources such as sunlight, wind, rain, tides, biomass and geothermal heat, which are renewable i.e. naturally replenished.

This section introduces the various renewable sources that may be considered for our sites and buildings.

2.1 Photovoltaics (PV)

PV systems convert solar energy into electricity. PV comes in various forms such as panels, membrane and cladding. The panels should ideally be sited to maximise the solar harvest and must not be located in shaded areas. The optimum orientation is south facing but east/west facing systems will still obtain 80% of the potential yield. Other considerations include:

- Planning permission must be obtained for non domestic PV systems.
- Condition and load capability of the roof where panels will be located.
- Health and safety requirements of roof top working (e.g. edge protection)
- Electricity loading requirements e.g. 3.6kWh maximum per phase

The introduction of the FIT has made PV a very viable option due to the relative ease of installation and amount of suitable roof space available.

DEFRA have published figures on PV installations across the UK during 2010. Of the 727 PV installations completed within the Yorkshire and Humberside region, 98 (13%) were in North Lincolnshire generating 277kW. All the installed systems were domestic.

2.2 Small Scale Wind

Small scale wind turbines, typically of sizes up to 50 kW, are more appropriate for smaller sites including schools, council depots and other buildings. Wind turbines must be sited away from obstructions (buildings, trees etc) which adversely affect the wind flow. The following criteria must be noted prior to the

installation of wind turbines:

- A wind study should be undertaken for potential sites. Sites with an average wind speed of less than 5 metres per second will not be viable.
- Planning permission must be obtained for wind turbines
- Wind is intermittent and turbines will not always generate electricity.

2.3 Biomass

This provides the most readily available source of renewable heat. There is scope for the introduction of biomass boilers to replace oil or gas fired boilers.

For biomass boilers to classify under the RHI, they would need to be fuelled by either wood pellets or wood chips. Wood pellet systems are the preferred option for our buildings for the following reasons:

- Wood pellets have a higher energy density than wood chips and, as such, they require less storage and lower volumes means lower delivery costs.
- Fuel quality is key to the running of biomass boilers. The quality of the fuel supply is easier to guarantee with pellets.
- Pellet based systems are typically smaller and cheaper.

A maintenance regime should be established at the outset such as regularly cleaning ash and inspecting the fuel store. Other considerations include:

- Biomass boilers should ideally be sized to meet the building's base heating load.
- Systems will typically require a buffer tank to act as a thermal store of hot water between the boiler and the load side of the system.
- Installations must meet any necessary building control requirements (e.g. flue regulations)

2.3.1 Biomass Resource

We produce large quantities of waste wood from our Household Recycling Centres and tree maintenance. This is potentially a valuable commodity but further feasibility is needed to assess its use.

Waste streams are also a form of biomass. These can generate renewable energy from Anaerobic Digestion systems (AD).

2.3.2 Bio-Fuels

Biodiesel, bioethanol and biogas comes from planted crops or as a waste by-product. They are more suited to use as a transport fuel but can be used for heating systems in very limited applications. The RHI is not currently available for biodiesel and bioethanol.

2.4 Solar Hot Water

This is used to provide hot water or preheat space heating water for buildings via thermal stores. With a careful assessment of a site's hot water requirement, this technology can provide up to 50% of the annual hot water demand. Many of our buildings could potentially house hot water panels to provide domestic hot water supply.

As with PV systems, solar hot water panels should be ideally located facing south and planning permission must be obtained.

2.5 Heat Pumps and Geothermal Energy

This is most likely to take the form of ground source heat pumps (GSHPs) for space heating using under floor systems. This is best suited to new build projects (e.g. Westcliffe School) and should be seriously considered for all future school building projects.

Retrofitting ground source heat pumps is generally not practical as the existing heat delivery system may not be suitable.

GSHPs derive their heat either via the use of large areas of buried pipe or boreholes. The lack of suitable and available land will exclude many schemes.

Currently air source heat pumps (ASHPs) do not qualify under the RHI but may still be a viable option in specific instances.

2.6 Other Renewable Resources

Hydro, tidal and wave systems also generate renewable energy. These systems are not considered as feasible options for application at current council sites.

3. Renewable Energy Tariffs

3.1 Feed In Tariffs

The FIT for renewable electricity generation was introduced in April 2010. The main benefit is in the generation tariff. This is paid for every kilowatt hour of electricity produced. The amount paid is based on the type of technology and the size of the system as listed below.

The FIT scheme provides two further benefits: an additional payment for surplus energy exported to the grid (this is called the export tariff) and a saving on energy as purchased from the current electricity supplier.

| Listing of Generation Tariff levels up to March 2012 | | | |
|--|----------------|---------------------|--------------|
| Technology | Size | Tariff rate (p/kWh) | Life (Years) |
| Anaerobic digestion | ≤500kW | 12.1 | 20 years |
| | >500kW | 9.4 | 20 |
| Hydro | ≤15 kW | 20.9 | 20 |
| | >15 - 100kW | 18.7 | 20 |
| | >100kW - 2MW | 11.5 | 20 |
| | >2MW - 5MW | 4.7 | 20 |
| Solar PV | ≤4 kW new | 37.8 | 25 |
| | ≤4 kW retrofit | 43.3 | 25 |
| | >4-10kW | 37.8 | 25 |
| | >10 - 50kW | 32.9 | 25 |
| Wind | ≤1.5kW | 36.2 | 20 |
| | >1.5 - 15kW | 28.0 | 20 |
| | >15 - 100kW | 25.3 | 20 |
| | >100 - 500kW | 19.7 | 20 |
| | >500kW - 1.5MW | 9.9 | 20 |
| | >1.5MW - 5MW | 4.7 | 20 |

The tariffs are index-linked to the Retail Price Index.

3.1.1 Worked FIT example:

Project to install a 3.6kW PV on a south facing roof delivering an annual energy yield of 3,360kWh:

- Estimated capital cost = £15,000
- Generation FIT at 43.3p/kWh = £1,455
- Export FIT (50% deemed) at 3p/kWh = £50.40
- Used electricity FIT (50% deemed) at 10p/kWh = £168
- Total annual benefit = £1,673 with a simple payback of 9 years
- Annual carbon saving = 1.8 tonnes

3.2 Renewable Heat Incentive

The RHI for renewable heat generation was announced in March 2011. Phase 1 of the scheme only applies to non-domestic buildings. Residential systems become eligible in Phase 2 in 2012. The following tariffs have been published for the initial phase of the scheme:

| Tariff name | Eligible technology | Eligible sizes | Tariff rate (p/kWh) |
|---------------------|--|--|---------------------|
| Small biomass | Solid biomass; Residual Municipal Solid Waste (incl. CHP) | Less than 200 kWth | Tier 1: 7.6 |
| | | | Tier 2: 1.9 |
| Medium biomass | | 200 kWth and above; less than 1000 kWth | Tier 1: 4.7 |
| Large biomass | | 1000 kWth and above | Tier 2: 1.9 |
| Small ground source | Ground-source heat pumps; Water-source heat pumps; Deep geothermal | Less than 100 kWth | 2.6 |
| Large ground source | | 100 kWth and above | 4.3 |
| Solar thermal | Solar thermal | Less than 200 kWth | 3.0 |
| Bio methane | Bio methane injection & biogas combustion, except landfill gas | Bio methane all scales; biogas < 200 kWth | 8.5 |

All these tariffs are now fixed for a duration of 20 years and are index-linked to the RPI.

Unlike the FITs, the RHI will be paid for directly by the Treasury. There is a total of £860m available for the period until fiscal year 2014/15.

3.2.1 Worked RHI example

Project to replace an old oil boiler with a 150kW packaged biomass pellet. The boiler operates for an estimated annual 1,825 hours.

- Estimated capital cost = £98,000
- Tier 1 tariff = 150kW x 1,314hrs x £0.076 = £14,980
- Tier 2 tariff = 150kW x 511hrs x £0.019 = £1,456
- Total RHI Repayment = £16,436 with a simple payback of 6 years
- Current oil consumption of 37,000litres (389,000 kWh) at 55p/litre (5.2p/kWh)
- Total oil cost = £20,350
- Future biomass pellet consumption = 81 tonnes at £130/tonne delivered (2.7p/kWh)
- Total pellet cost = £10,530

- Net benefit (fuel + RHI) = £26,256 with a net simple payback of 3.7years
- Annual carbon saving = 85 tonnes
- Each year the Tier 1 tariff is paid until the system has operated up to 15% of the annual rated output, ie the equivalent of 1,314 hours at the rated capacity of the installation. For the rest of the output in the year, the Tier 2 tariff will apply.
- One litre of fuel oil = 10.27kWh
- One tonne of biomass pellets = 4800kWh

3.3 Microgeneration Certification Scheme (MCS)

To be able to claim the FIT and RHI, both the technology and the installer must be MCS accredited. An exception to this is for biomass boilers larger than 45kWh. Here, Ofgem will verify eligibility based on the required documentation provided by RHI applicants as part of the accreditation process.

4. Opportunities

4.1 Non School Buildings

Practical renewable energy supply for our current buildings comprises:

- Roof mounted solar PV and hot water.
- Replacement of oil natural gas boilers with biomass fuelled heating systems most likely using wood pellets.

4.2 North Lincolnshire Schools

Some of our Schools have been at the forefront in adopting RETs.

- Both Winterton School and Luddington and Garthorpe Primary School use biomass boilers.
- Baysgarth School is the first to install a PV array.
- New build projects will be utilising renewables to a very large extent.
- The majority of the new Westcliffe School's space heating load will be provided using ground source heat pumps. They will also have extensive PV arrays on their roof.
- The new Melior School will be heated almost entirely using biomass pellet fuelled boilers.

The council should identify possible funding opportunities to support schools within the North Lincolnshire area to adopt renewables. Options for this could include 'rent a roof' lease schemes with external bodies or external funding through National and European grants.

4.2.1 Roof Lease Schemes

Many schools are ideal locations for renewable technologies. The majority of our schools have the potential to host PV panels and solar

hot water.

Schools have been targeted by private companies seeking to sign up schools to roof lease deals. Here the school will usually surrender the FIT to the company installing the system. They typically receive no charge for the installation and receive the limited free electricity.

Currently the roof lease schemes are very one sided and do not offer much benefit to the Schools. However, we will keep such schemes under review and were they to become more financially attractive to the schools we would recommend their use. Presently however, they are not attractive for the schools and therefore we recommend that they should be avoided.

Other considerations:

- Schools who wish to install their own renewables must complete our Self Help Procedure.
- Schools have no authority to take up loans per the Scheme of Financing Schools section 3.6.

4.3 New build including BSF

All new build related to Council operations provides the opportunity to insist on increased levels of renewable energy supply. It is not unreasonable to demand 20% on site renewables for BSF and Primary Capital Grant schools for example with additional requirements for the maximum use of ground source heat and under-floor heating, particularly where biomass boilers are considered impractical due to fuel store and delivery requirements.

In addition new build will be required to comply with the Sustainable Construction Policy which provides another driver for renewable energy supply to be included.

4.4 Boiler Replacements

It is now no longer acceptable to simply replace an oil or natural gas boiler with another oil or gas boiler. All new heating systems should be renewable based unless justification can be made that there are extenuating circumstances. Any installed renewable heating system must satisfy the eligibility requirements of the RHI.

4.5 Energy services companies (ESCOs)

ESCOs provide an arms length energy service specialising in renewable energy technologies. We recommend that a feasibility be undertaken to assess the opportunities for establishing an ESCo dealing with the council's properties converted to renewable energy use. The benefits of an ESCo include:

- Creation of a bespoke company to deal with specific RETs. It can deliver

installation, management, maintenance and supply of renewable energy.

- It is a tool which provides a full solution providing efficiency savings and cost reductions. This can be achieved by reducing or removing operating problems and increasing the ease of maintenance.
- Provides an opportunity to deliver renewables into schools and community buildings where currently there are barriers to uptake.
- The ESCo can be run as a not for profit company.

5. Conclusion

We should actively pursue fitting appropriate RETs across our property portfolio with the following hierarchy:

- PV
- Biomass
- Solar Hot water
- GSHPs
- Small scale wind

All new renewable electricity generation systems installed on our buildings should qualify for FIT payments or equivalent.

All new heating systems, including boiler replacements, should be renewable based and qualify for RHI payments unless justification can be made that there are extenuating circumstances.

The council should identify possible funding opportunities to support schools within the North Lincolnshire area to adopt renewables.

The council should undertake a feasibility to assess the opportunities for establishing an ESCo delivering RETs across our properties.

We should undertake a feasibility to assess the waste wood potential within our properties and activities.