

A Strategic Action Plan for a Low Carbon National Park in the North East of England

2010-2015

Economic Development, Environmental Protection

Presented to One North East, November 2009

Contents

Foreword by the Chairman	3
Executive Summary the Director of Corporate Services	4
Strategic Fit with the Rural Development Programme for England	5
Northumberland National Park Management Plan	7
Instruments of Regional Development	8
Climate Change in National Policy	9
Strategic Fit to Sub-Regional Policy	10
Baseline Data: Establishing Climate Targets	11
Sustainable Development and Climate Change	12
Regional Green Jobs for the Future	14
Low Carbon Farming	16
Eco-Tourism	17
Low Carbon Communities	18
Insulation	19
Electric Transport	21
Biomass and Biofuels	22
Geothermal Heat Pumps	23
Air Source Heat Pumps	24
Hydro-Electricity	25
Solar Water Heating and Photovoltaic	26
Anaerobic Digestion	27
Wind Energy	28
Exemplar National Park Infrastructure	29
Land Ownership of Northumberland National Park	30
Monitoring and Dissemination Plan	31
Funding and Outputs	32
Conclusion	33
Appendix I: List of Indicative Partners	34
Appendix II: List of Potential Climate Change Funders	36
Appendix III: Indicative Work Plan	37

Foreword by the Chairman

Northumberland National Park is a special place. It is one of the jewels of the English landscape. An area rich in biodiversity and cultural heritage, and heralded as the most tranquil part of England. The Park is not, however, a quiet backwater. It is an important and valued asset of the North East region. It contributes significantly to the region's economy, green infrastructure, cultural traditions and the overall quality of life and health of Northumberland and the North East region



John R. Riddle
Chairman
Northumberland
National Park

The economic prosperity of communities living in and around the National Park, and often far beyond, is dependent on our progress, as we face ever increasingly global environmental, climate and economic challenges. The National Park Authority is aware of the need to look, work, influence and contribute beyond the boundaries of the Park.

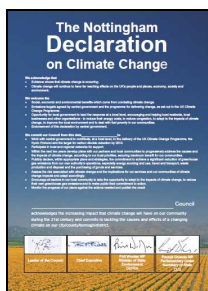


Fig 1. The Nottingham Declaration on Climate Change, signed by Northumberland National Park

In doing so, we aim to make a meaningful contribution to wider society whilst ensuring a sustainable future for local communities and thus the National Park. Our proposal is to tap the assets of the National Park to help stimulate the local, regional and national economy, through the structured development of 'A *Strategic Action Plan for a Low Carbon National Park in the North East of England*'. This builds on the overarching Vision set out in the National Park Management Plan to guide the National Park for the next 20 years. The investment programme proposed will not only achieve an economic impact but will do so in a truly sustainable way, which conserves and enhances this special asset for the use and enjoyment of future generations.

I signed Northumberland National Park Authority up to *The Nottingham Declaration on Climate Change* in 2007, because it was the right thing to do; climate change is happening, and the time to take action is now.

This programme of activity has been carefully developed to complement existing national, regional and local programmes and strategies and will build a lasting legacy of a sustainable, low carbon economy. A focussed rural approach will add a valuable new dimension to the North East region's drive to lead the way in designing, manufacturing and deploying new technology solution to address Climate Change. We are capable of making an immediate impact at a time of great need, and it is both necessary and relevant response to the vision of a low-carbon region enabled by renewable energy. Our regional approach can be tested in Northumberland, and then replicated in any rural area through the UK. I commend it for your consideration.



Fig 2. The North East Declaration on Climate Change

Executive Summary by the Director of Corporate Services

Northumberland National Park is a carbon credit area and has been successful in piloting a number of innovative approaches to renewable energy in partnership with local businesses and communities. Our partners view this as an advantageous position from which to launch a full-scale regionally important and nationally significant programme to rapidly accelerate the production micro-renewable energy production and energy efficiency. Our aspiration is one of the two key aims in the newly adopted National Park Management Plan: the other is to raise skills to enable people to make a good living from better managing the environment. Hence, this nationally unique programme aims to maximise the economic and environmental impact from a step-change growth in micro-renewable energy. Northumberland National Park is ideally placed to be a 'test-bed' for new technologies. For instance, nowhere else in the region, or indeed the UK, is adjacent to a source of biomass as significant as Kielder Forest. The fundamental approach we will adopt will be based on business enterprise, innovation and skills development.



**Stuart Evans,
Director of
Corporate
Services,
Northumberland
National Park**

This exciting programme of low carbon activities will take place over the next five years. Our aim is to meet the Government's 2020 target by 2015, so we'll then be in a position to assist the region to also meet the 2020 target. We plan to inspire and influence people in the whole of the North-East so that as a region we are leading the way in renewable energy. The programme will allow us to test and create new markets with location specific micro-renewable energy solutions, while developing new business opportunities by growing the market and strengthening the supply chain. We want to reduce the cost of businesses operating in the deepest rural areas of England, using a sustainable, low carbon business model. Above all, we will create a learning and development infrastructure that positions the North-East at the forefront of the green economy, leaving a lasting legacy in terms of low carbon energy production.

A Strategic Action Plan for a Low Carbon National Park in the North East of England begins by considering the strategic fit with the most obvious funder, the Rural Development Programme for England. The objectives will be placed in terms of local, sub-regional, regional, and the national context, which all reaffirm that action is required now. It will then consider the wider sustainable development agenda; how economic development can take place through the creation of green jobs and by working with our local farmers and businesses, how social development can take by working with and through our communities, and finally, how environmental development will be a factor throughout, by being an advocate for green technologies. For instance, the roll-out the electric vehicle initiative will be met with enthusiasm, in iconic and high profile areas of the National Park including Hadrian's Wall, the 'Centre of Britain' (at Haltwhistle), and England's most tranquil areas, at the North Tyne and Kielder, and the heart of the Cheviot Hills. The renewable energy measures will integrate with planning strategies, to maximise the benefits that they offer, while never compromising the special qualities of our Protected Area.

Experience has shown us that such an ambitious plan requires support. That is why we have identified a whole list of potential project partners from the private, public and voluntary sector, with similar aims as us, who can help to deliver the programme. We have many challenges not least the need to create streamlined solutions for the planning / official consents process and to join-up advice and funding streams at the local level for the benefit of businesses and communities.

Our aim is to show that England's more remote and protected rural area can lead the way and demonstrate the advantages of renewable energy technology to complement existing offers such as sustainable tourism and traditional farming and to address issues of disadvantage from the last technological age which leave many businesses with unreliable, polluting and costly energy source and many in our community are left in fuel poverty. Most of all we aim to ensure this programme is of such a significant scale to create strong demand to accelerate the employment, training and business opportunities in the North Energy offered by the move to a low carbon economy.

Strategic Fit with the Rural Development Programme for England

The Rural Development Programme for England (RDPE) is jointly funded by the European Union, through the European Agricultural Fund for Rural Development, and the Government. Regional Implementation Plans set out how the RDPE will be used in each of the England regions.

The development of *A Strategic Action Plan for a Low Carbon National Park in the North East of England* will primarily help deliver the five national themes of the Rural Development Programme:

1. Micro Businesses
2. Tourism Businesses
3. Sustainable Farming and Forestry including Diversification
4. Biofuels / Climate Change
5. Access and Recreation

The *Action Plan for a Low Carbon National Park* directly addresses many of the investment themes in the North East Implementation Plan for the Rural Development Programme England in the North East.

Challenges – Areas of need and opportunity identified by rural evidence base	Example outcomes
Micro Enterprise Development	<ul style="list-style-type: none"> • Create new businesses which design, manufacture and service micro-renewable energy solutions in the rural area • To provide practical training opportunities for people, businesses and learning institutions in renewable energy and energy efficiency aimed at strengthening the business product offer. • To work directly with rural estates at a landscape scale to assist in increased instances of diversification and making business more secure and profitable whilst, ensuring sympathetic historic and environmental development. • Supporting more micro enterprises to profit from the sustained use of region's environmental assets such as water and wood supply.
Natural & Cultural Assets	<ul style="list-style-type: none"> • Increased use of sustainable land management practices on farmland and woodland. • Support businesses which are essential to maintaining the fabric of the built and natural heritage • Create a more joined-up and streamlined planning and official consents process to balance protected of the current environment with the needs of businesses and communities to use renewable energy and thus safeguard the environment for the next generation
Tourism and Recreation	<ul style="list-style-type: none"> • Facilitating increased cohesion between attractions and facilities to enhance the integration of the North East sustainable tourism offer. • Increasing low carbon transport usage to access to the countryside. • Improving quality of eco-tourism service and facilities in rural tourism businesses. • To support activity-based tourism that promotes increased sustainable use of natural assets. • To encourage collaboration and networking between tourism businesses to create a critical mass for eco tourism. • Use high profile tourism destination's e.g. Hadrian's Wall to demonstrate to visitors that the North East Region is at the leading edge of deploying low carbon technology.
Sustainable Farming and Forestry	<ul style="list-style-type: none"> • Enhanced rural business productivity by reducing energy costs (often extremely high due to remoteness) and enabling the use of sustainable sources of energy. • Improved revenue streams back to primary producers and forest

Challenges – Areas of need and opportunity identified by rural evidence base	Example outcomes
	<p>managers by growing the biofuel market and creating opportunities for business to take advantage of the new feed-in tariffs for renewable energy.</p> <ul style="list-style-type: none"> • Stimulate the sharing of good practice and bespoke renewable energy solutions for upland areas of the North East.
Biofuels	<ul style="list-style-type: none"> • Developing networks and clusters to promote and increased use of bioenergy and to facilitate sustained market growth. • Provide site-specific technical advice for both individual business needs and estate and community scale solutions. • Facilitating increased knowledge sharing and skills development in the bioenergy sector. • Test and develop small-scale anaerobic digestion solutions suitable for the less intensive upland farming.
Sustainable Communities	<ul style="list-style-type: none"> • Create solutions, such as community-scale energy production to financially underpin key services and facilities in rural areas. • Facilitating community action through access to bespoke renewable energy support. • Encouraging increased collaboration and networking between community groups to learn from what works and where there are difficulties. • Working with community groups to develop skills and create sustainable models of operation and their effective rollout. • Supporting the creation and strengthening of social enterprises such as the local development trusts as deliverers of community services and increased economic activity. • Increased innovation in environmental protection and the use of natural resources for community benefit such as in using local sustainable wood supply to address fuel poverty.

Funding would be used to improve the competitiveness of the agricultural sector and to safeguard and enhance sustainable rural businesses across the region. It could help rural communities and business including farmers, growers and foresters invest in their long-term economic future.

Northumberland National Park Authority had a successful track record in working closely with rural communities and all types of rural businesses that we are in a position where we can affect a considerable and immediate change for rural communities and businesses.

Northumberland National Park Management Plan, 2009-2014

Regional partners largely developed the new Management Plan for Northumberland National Park. It has received strong public support. It set five Strategic Aims to help guide the Park and its communities towards a sustainable future:

- A Welcoming Park
- A Distinctive Place
- A Living, Working Landscape for Now and the Future
- Thriving Communities
- A Valued Asset

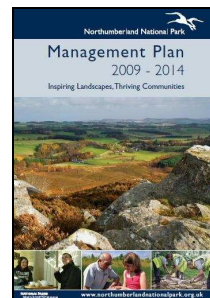


Fig 3. National Park Management Plan, 2009-2014

The most significant new challenges are for partners to work together to:

- 1. Ensure the area’s communities and businesses are able to exploit the advantages from renewable energy and move to become a low carbon rural area; and**
- 2. Create valuable learning and training opportunities in the Park for the region’s people, learning institutions and businesses. A key area includes the delivery of sustainable economic activity including moving towards a low carbon economy.**

For over half-a-century, Northumberland National Park has been cherished and enjoyed by millions. The National Park Authority works to protect and enhance its special qualities, helping people to understand and enjoy the National Park. There has been a growing awareness of the need for sustainable development, where environmental, social and economic gains complement, rather than conflict with each other. Since 1997 the National Park Authority has had a legal duty to seek to foster the social and economic well being of local communities in pursuing National Park purposes. Since then, the importance of a high quality environment in a competitive economy has become increasingly apparent; the significance of sustainable development is recognised by government and is reflected in both the Regional Economic Strategy and the Northumberland Sustainable Community Strategy.

We recognise the need and benefits of the National Park extend way beyond the landscape-defined boundary. Working with and through local businesses and communities is therefore critical to both maintaining and enhancing the National Park’s natural and cultural qualities and expanding opportunities for their wider understanding and enjoyment. Indeed businesses and communities themselves need to be thriving, vibrant and empowered to play an active role as custodians of this important national, regional and local resource. Northumberland National Park Authority is committed to leading the way in this approach, using the concept of ‘Action Area’ working beyond the boundary jointly with all business sectors and the communities.



Fig 4. Northumberland National Park

Instruments of Regional Development

“Protected areas... while originally meant to function as reserves for beautiful landscapes and endangered species, they later became connected with the idea of preserving whole ecosystems and their dynamics of natural processes relatively free of human impacts. **Today, many protected areas are undergoing change again: especially large protected areas are increasingly considered to function as instruments for regional development.** This perspective applies particularly to many peripheral rural areas throughout Europe that are faced with severe problems due to economic and socio-cultural disparities. **Expectations are high that protected areas could be used as laboratories for experimental projects or even as models for sustainable regional development, based on the endogenous resources and potentials of the region and their development via a specific protected areas policy.**”

Professor Ingo Mose, 2007
University of Oldenburg, Germany



Fig 5. Northumberland National Park influencing the North East's rural areas

A three-fold paradigm shift has occurred since the last Century:

- A move towards sustainable development
- The integration of conservation of natural and scarce resources into such fields as agriculture and forestry, hydraulic engineering, tourism and the development of settlements and infrastructure
- Bottom-up initiatives in rural areas are called for, and these need to be financial supported if the anticipated effects of the policies are to be realised and create a true sense of 'localism' – actions identified by local businesses and communities as important for their area's future being taken and delivered at the most local level.

In order to add value to the abundant quality of the North East, it is essential to have the broadest possible involvement of regional and local players, which in particular, includes the residents. The implementation of Europe-wide localism initiatives like LEADER exemplifies the possibilities of such bottom-up development strategies in different rural areas. If protected areas, like national parks, are to be seen as the motors for regional development, their goals are: a positive impact on the regional economy, for example through tourism, conservation activities; the marketing of high quality regional goods and the development of regional value-added chains; new jobs created, and existing jobs preserved; to diminish out-migration, particularly of young people; and conserving regional biodiversity.

Strategically the programme will:

- Create business clusters at a geographical area level, industry specific level e.g. farming and also at the so-called 'value chain level' e.g. linking sustainable farming and food with eco-tourism providers with low carbon transport solutions;
- Provide a framework and large active test bed for on-the-job learning e.g. apprenticeships in micro-renewable energy technology fields; and
- Produce a critical volume of diverse solutions to provide renewable energy from micro-scale generation – of a scale to have lasting impact and stimulate demand to promote new market opportunities.

Climate Change in National Policy

In July 2009 the Government published its Low Carbon Transition Plan that plots how the UK will meet the 34 percent cut in emissions on 1990 levels by 2020.

To hit this target the country needs by 2020 to have:

- More than 1.2 million people in green jobs.
- 7 million homes to have benefited from whole house makeovers, and more than 1.5 million households to have been supported to produce their own clean energy.
- Around 40 percent of electricity from low-carbon sources, from renewables, nuclear and clean coal.
- Gas imports reduced by 50 percent.
- The average new car emissions 40 percent less carbon than now.

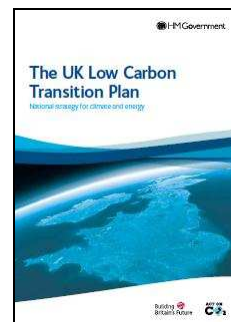


Fig 6. The UK Low Carbon Transition Plan

The North East region, the only region in England which exports more goods than it imports, it is a very difficult position as it's relatively high levels of industry means it has a huge distance to travel to reduce overall, emissions. We believe that combined industrial, urban and rural solutions are required for the North East. That is, for the North East region to augment its low carbon industrial plans (e.g. Teesside) and urban (e.g. south east Northumberland low carbon zone) with a flagship rural low carbon achievement zone based initially on Northumberland National Park.

Also in July 2009 the Government published its Renewable Energy Strategy. This strategy sets out how everyone has a role to play in promoting renewable energy, from individuals to communities to businesses alike.

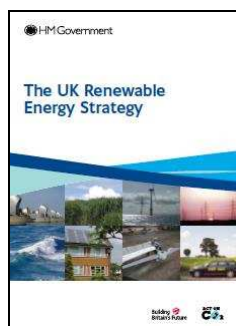


Fig 7. The UK Renewable Energy Strategy

Renewable energy is key to a low-carbon energy future. The UK needs to radically reduce greenhouse gas emissions, as well as diversify its energy sources. As part of this move to a low-carbon economy, a dramatic change in renewable energy use in electricity, heat and transport is needed. The UK has signed up to the European Union Renewable Energy Directive, which includes a UK target of 15 percent of energy from renewables by 2020. This target is equivalent to a seven-fold increase in UK renewable energy consumption from 2008 levels: the most challenging of any EU Member State. Meeting renewable energy targets is not just about preventing climate change and securing the UK's future energy supplies. Achieving these targets could provide £100 billion worth of investment opportunities and many jobs in the renewable energy sector by 2020.

The proposals set out in *A Strategic Action Plan for a Low Carbon National Park in the North East of England*, outline Northumberland National Park Authority's initial response to the challenges ahead, specifically in helping to meet the 2020 targets. The aspiration of regional partners and the public for Northumberland National Park to become a regional exemplar in renewable energy and related skills and employment / business opportunities is a challenge for all partners to delivery and not just the National Park Authority. Faced with challenging environmental and financial times, the work outlined in these projects will significantly reduce green house gas emissions within the Park, help underpin the sustainability of the Park's businesses and communities, address issues of fuel poverty and help create new 'green' jobs and retain jobs in the North East region, thus making a contribution to the vision for a low carbon enabled region.

Strategic Fit to Sub-Regional Policy

Northumberland National Park Authority fully endorses the Climate Change Action Plan for North East England and accepts that through its own activities and by working with partners and the communities of the National Park it will proactively seek to find solutions and take action, to adapt to and mitigate against climate change. In delivering on this area of work the key messages of the north east partnership will be adopted when communicating with key audiences.

Change: Business as usual is no longer an option.

Challenge: There are significant challenges ahead but we have the means to meet them.

Opportunity: Climate change presents significant opportunities.

Leadership: North East England leading the way.

Action: Policy needs to drive action.

Responsibility: We must all take responsibility and work together.

Inspiration: Behaviour and attitudes need to change.

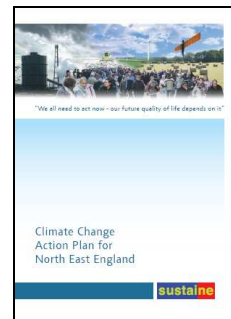


Fig 8. Climate Change Action Plan for North East England

Many of the key activities within the Action Plan are aligned with the key issues within Northumberland Strategic Partnership’s Strategic Framework for Climate Change Planning, ‘The Heat is On’.

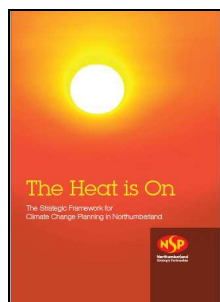


Fig 9. The Heat is On

This strategy aims to ‘encourage partners to put in place effective and timely measures at both corporate and community levels to address the causes and implications of climate change in Northumberland by mainstreaming climate change planning with their own core business’. Synergy exists with the ten priority areas for action and through partnership working, both organisations are able to co-ordinate delivery and add value to their work. This has been demonstrated in recent years through the setting up of the Northumberland Fire Group and the Northumberland Community Flooding Partnership.¹ The vision for Northumberland Strategic Partnership is based on the premise that they

essentially want all of Northumberland’s residents to be happier, feel more in control and be getting more out of their lives. This has to be achieved in a way that “narrows the gap” between our different communities. The aspirational scenario of life in Northumberland in 2025 assumes that this vision has been successfully delivered. Northumberland Strategic Partnership has outlined ten big things² derived from the work done on the current Sustainable Community Strategy that could be central to making Northumberland an even better place to live. Although *A Low Carbon Strategic Action Plan for the National Park in the North East of England* is very cross-cutting, it will particularly help to deliver four of ‘The Perfect 10 for Northumberland’, as shown over page.



Fig 10. Releasing the Strength of our Communities: A Sustainable Community Strategy for Northumberland to 2021 (2007)

References:

¹ Northumberland Fire Group, Source: www.ruraldevelopment.org.uk / Northumberland Flooding Partnership: www.northwoods.org.uk

² The Perfect 10 are: Population in Balance; Greater Housing Choice; Jobs Rich; Resilient People; Strong Community Spirit; Disadvantage Free; Healthy Living for All; Confident Young People; Climate Proofed; and Rural No Barrier. Source: www.nsp.org.uk

Jobs rich

With the county now recognised as the cutting edge location for low carbon industry, there are more quality jobs available offering a greater diversity of career paths for the workforce.

Disadvantage Free

The county is now experiencing its fullest employment since the heyday of the coal industry, with an extensive programme of vocational training the key to breaking the cycle of generational worklessness.

Climate-Proofed

The spectre of extreme weather events remains very real but the county has "adapted" to minimise their impact and to reduce our collective carbon footprint.

Rural No Barrier

Northumberland remains quintessentially rural and characterised by quality built and natural environments but accessibility to all our needs is now easy through innovative networking of services and communities.

Baseline Data: Establishing Climate Change Targets

Underpinning this Action Plan is the need to establish baseline data, from which progress can be measured. GIS software will be used to contribute to this 'live' database, so that every time a renewable energy initiative is installed, the positive low carbon impact can be recorded.



Partner organisations like the Energy Saving Trust and Warm Zone already have some information as to what work has taken place, and they are keen to co-operate with the baseline audit.



Sustainable Development and Climate Change

Climate Change and Energy is one of the four priority areas of sustainable development.³ From the uplands of the Lake District and Northumberland, to the lowland heath of the New Forest, and the waterways of the Broads – all the National Parks will be affected from increased risks of fire, flooding or erosion. The National Park Authorities are working hard to protect these unique areas. In February 2007, Northumberland National Park Authority signed the Nottingham Declaration on Climate Change to commit to making own operations carbon neutral by 2012. Dr. Elizabeth Stockdale, member of the Sustainable Development Fund Grants Panel, said, “Effective action in response to climate change requires dialogue between government, businesses, land managers, community and voluntary groups. By working in partnership at local, regional and national levels adaptation and mitigation can be achieved more effectively and more efficiently.”⁴ The Sustainable Development Fund is one mechanism that allows our communities and businesses to take action to reduce the carbon-footprint of the National Park. Since 2002, 33 projects have been funded that have helped to address climate change, worth £474,948. The schemes have been match funded by almost £2.5 million of cash from other sources. Many of the projects have installed more than one measure to help address climate change.

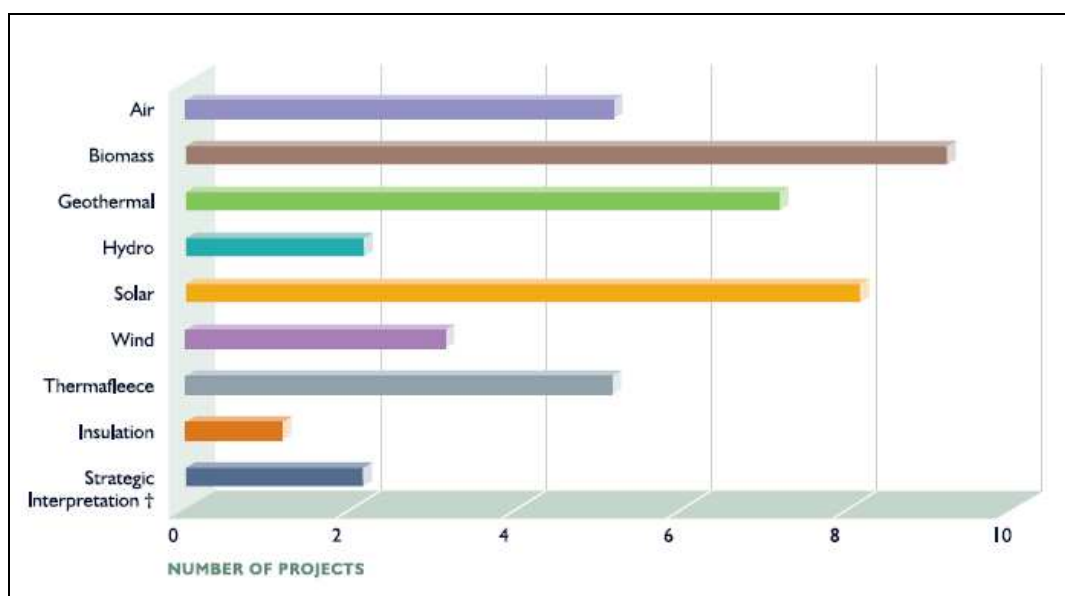


Fig 11. Number and types of renewable energy projects in and around Northumberland National Park, funded by the Sustainable Development Fund, since 2002

The investment in renewable energy technologies in Northumberland from Defra’s Sustainable Development Fund is the highest of any National Park in England. Our communities and businesses have enthusiastically engaged with the technologies, and the result is that all of our community halls are heated by renewable energy, and many of our tourism businesses are adapting to the new technologies, lowering their carbon footprint in the process. There is not just a moral, social and environmental argument for renewable energy, there’s a real business case. Reductions in energy bills will repay a significant investment in customers’ comfort in just a few years. However, the successes achieved to-date is just the tip of the iceberg. Further investment is needed in particular to support renewable energy on farms, and non-tourism local businesses, that help to make Northumberland National Park a vibrant place to live and work.

³ The other priority areas of sustainable development are: Sustainable Consumption and Production; Natural Resource Protection and Environmental Enhancement; and Sustainable Communities. Source: www.defra.gov.uk/sustainable

⁴ *Climate Change Action Plan*, 2008, Northumberland National Park Authority

† These projects are the Tynedale Renewable Energy Trail and Renewable Energy at Local Level

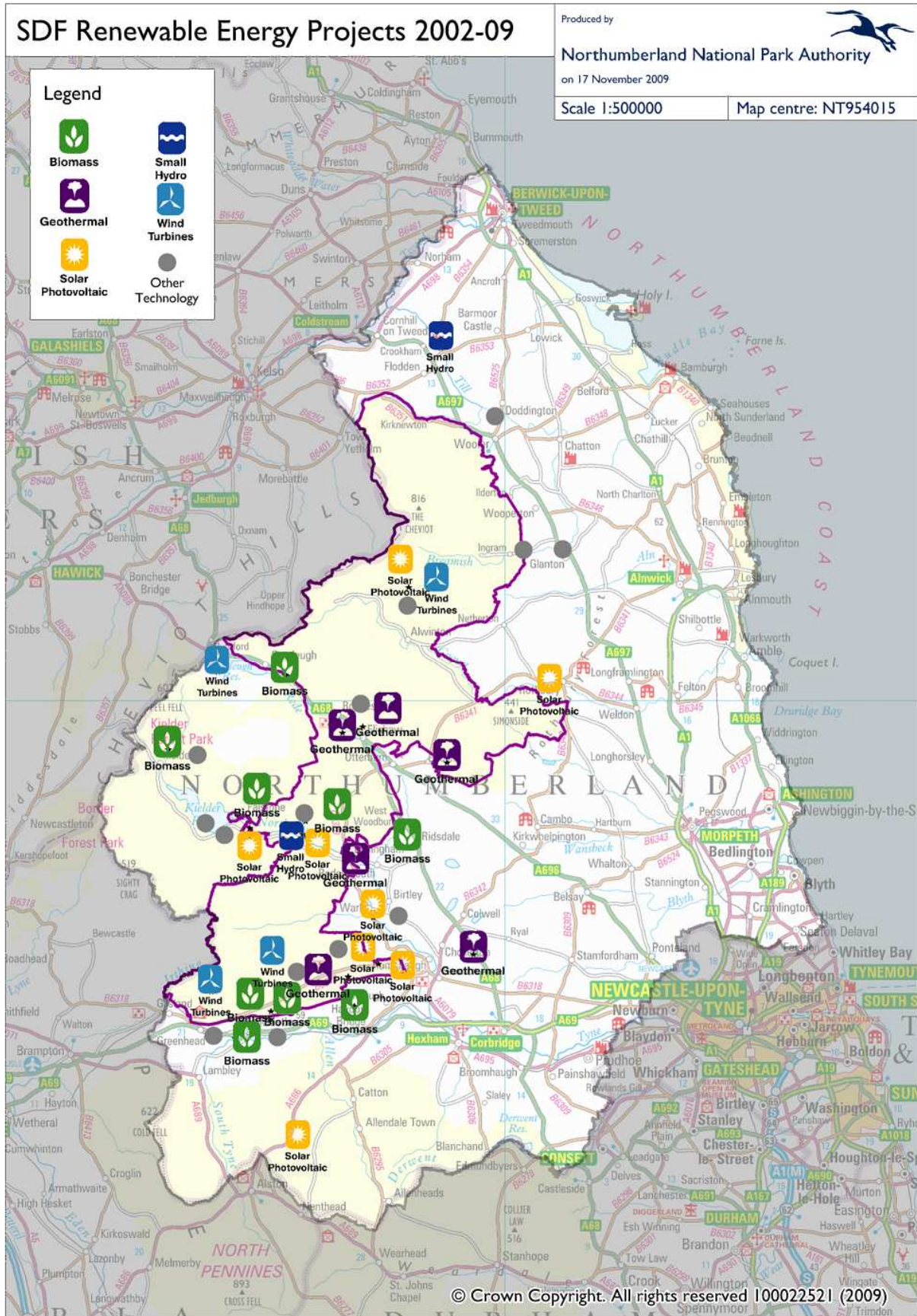


Fig 12. Sustainable Development Fund Renewable Energy Projects, 2002-2009

Regional Green Jobs for the Future

We know from the successful experience of our intermediate labour market initiative 'Traditional Skills, Traditional Boundaries' that training apprenticeships provided by the National Park Authority in the National Park are taken up by people from across the whole of the North East region. (See 'TBTS Intake' analysis on the following page). Surprisingly, we also found that nearly three-quarters of the apprentices went on to create their own micro-business. We are using this format to roll-out a farm apprenticeship scheme in early 2010 and we believe that a similar collaborate approach between the National Park Authority (employer and co-ordinator), local businesses (on-the-job training) and learning institutions (technical training and generic skills) will be successful for providing skilled workers in the micro-renewable energy sector.



Fig 13. A green job is being able to install solar panels

Until now, there has been much anecdotal evidence indicating that the pattern of employment is indeed changing - and that new jobs are beginning to emerge in favour of greener, cleaner and more sustainable occupations.

According to the United Nations Environment Program, a green job is "work in agricultural, manufacturing, research and development, administrative, and service activities that contribute(s) substantially to preserving or restoring environmental quality. Specifically, but not exclusively, this includes jobs that help to protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high efficiency strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution."

The need for regional green jobs is in large part as a result of climate change and the need to meet emission reduction targets under the United Nations climate convention. This has led to changing patterns of investment flows - flows into areas from renewable energy generation up to energy efficiency projects at the household and industrial level.

From a broad conceptual perspective, employment will be affected in at least four ways as the economy is oriented toward greater sustainability:

- In some cases, additional jobs will be created, as in the manufacturing of pollution-control devices added to existing production equipment.
- Some employment will be substituted, as in shifting from fossil fuels to renewables, or from truck manufacturing to green car manufacturing, or from land filling and waste incineration to recycling.
- Certain jobs may be eliminated without direct replacement, as when packaging materials are discouraged or banned and their production is discontinued.
- It would appear that many existing jobs (especially such as plumbers, electricians, metal workers, and construction workers) will simply be transformed and redefined as day-to-day skill sets, work methods, and profiles are greened.



Fig 14. A green job is being qualified to install geothermal heating pipes

Green jobs need to be decent work, i.e. good jobs which offer adequate wages, safe working conditions, job security, reasonable career prospects, and worker rights. People's livelihoods and sense of dignity are bound up tightly with their jobs. A job that is exploitative, harmful, fails to pay a living wage, and thus condemns workers to a life of poverty can hardly be hailed as green.



Fig 15. The origins of Traditional Boundaries Traditional Skills trainees, for the 2005-2009 period

Low Carbon Farming

One of the most appealing aspects of Northumberland National Park is its tranquillity. It is the most sparsely populated place in England, with some magnificent, untouched, landscapes. **Yet behind this idyllic scene of beauty, lies a remote and challenging environment for those trying to make a living from the upland landscape.** Many of the farms in the upper Coquet Valley are not connected to the electricity grid, and are still using dial-up connections to access the Internet. When compared to other rural areas in England, they are falling behind, which is expensive to the business, and detrimental to the environment and viability of the community.



Fig 16. A farm in the Coquet Valley

Over the next twelve months the farms project aims to address this problem for 22 properties in upper Coquetdale that have formed a partnership, supported by their landlord, the Ministry of Defence. They aim to incorporate a range of measures to improve their quality of life, lower the costs of fuel consumption, test new ways of working, and significantly reduce the carbon footprint of the area. A feasibility study is required to ascertain what technologies are going to work best in each location. Where possible, community-scale renewable energy measures will be incorporated, so that more than one building will benefit from the solutions installed.

This may involve a single wind turbine or small hydro electricity scheme, and could mean that excess heat from a building is piped to an adjacent property, rather than lost altogether. Although the solution will depend on a case-by-case study, what is evident is that there is a lot of local goodwill to work together to address the problems that the properties are facing. This energy must be harnessed as soon as possible, if the projects are going to be effective. The businesses are prepared to invest some of their money, at a significant short-term loss, into the scheme, if there is funding to help with the difference.

The properties in need of immediate support include: Linbriggs Farm; Linshiels Farm; Quickening Cote Farm Cottages; Shilmoor Farm; Batailshiel Haugh Bungalow; Bygate Hall Cottages; Barrowburn Farm; Windyhaugh Farm; Rowhope & Trows; Carlcroft Farm; Blindburn Farm; Fulhope Cottage; Alwinton Farm; Uswayford Farm; Great Ryle Farm; Low Bleakhope Farm; and Rye Hill Farm.



Fig 17. Sheep farming in the Coquet Valley

The move to support the properties with insulation, clean, renewable, energy sources, is vital for the Low Carbon National Park project and similar work will be rolled out to a further 50 farms across the Park in subsequent years.

Additionally, work will also commence to look into the day-to-day practices that need to be addressed. For instance, fuel supply on tractors is an ongoing issue, and whether community electrical charge points can be installed should be investigated. The recently approved Northumberland Uplands LEADER Upland Hydro-Scheme will also contribute to low carbon sheep farming. It will assess:

- The types of micro hydro technology available
- An on-site engineering evaluation for each farm so that a viability assessment can be made
- The potential for the micro hydro system to contribute to the on-farm carbon footprint reduction
- Collate, and write up of a final report to include the broader economic and environmental sustainability options
- Grant aid schemes that are available for the implementation phase

Eco-Tourism

Northumberland National Park is one of the three main visitor attractions of North East England as identified by the One North East Regional Marketing Strategy. Tourism is an important and growing business sector in and around the National Park and the revenue generated by the tourism industry contributes significantly to the rural economy and helping to sustain many local businesses, both directly and indirectly. However, the current tourism offer is limited. The National Park's tourism industry is comprised mostly of micro-businesses, the vast majority of these being accommodation providers. The limited product almost certainly reflects the expectations and needs a customer base dominated by day visitors. **There are significant opportunities to extend the visitor economy in the Park and this programme aims to seize these opportunities.**

There is considerable potential to develop and improve facilities and services that support cycle tourism and leisure cycling by day visitors in the National Park. As well as developing new self-guided cycle trails, the Authority is also supporting the implementation of 'cycle hubs' in two of its 'gateway' towns of Haltwhistle and Wooler. These 'hubs' will enhance the current tourism offer by providing high quality routes from the town centre with easy access to safe, traffic-free shared-use paths together with ample cyclist-friendly facilities, accommodation (accredited to the Cyclists Welcome Scheme), services and information. Working closely with businesses and community groups to implement this project will ensure that as many people as possible within the community benefit from the development of the hub, as well as the visiting cyclists who will enjoy the facilities and the welcome they receive.



Fig 18. Cycling in Kielder Forest

Another emerging mode of transport that could be linked to the cycle hub project as well the electric car network (see Electric Transport) is the provision of light electric vehicles, which could be hired out from businesses in the two market towns of Haltwhistle and Wooler. The innovative spirit of this venture could be extended to interpretation of the natural and cultural heritage of the area to users through the use of Global Positioning System-activated (GPS) Personal Digital Assistants (PDAs) installed on the e-vehicles for hire, or as downloads on individuals sat-navigation systems. New skills and training opportunities around these new electric-networks could include schemes for unemployed people to learn skills in bike and electric-vehicle maintenance, bike-hire and business management, marketing, visitor welcome, heritage interpretation and designing new GPS activated routes using information technology and web-based skills. Minor investments to make the Park more welcoming and attractive to all people in our society, by improving basic facilities and infrastructure and developing new tourism products are overdue and will reap immediate benefits to the health and well-being of the region and open new tourism markets even further. As an industry there is also a responsibility to convey the fragile nature of this resource and the need to care and look after it for future generations to enjoy.

Low Carbon Communities

The findings from the Big Energy Shift⁵ public dialogue suggested that households could benefit significantly from joined-up ‘packages’ of support, delivered locally in the community, to help them reduce home energy consumption and make deep cuts in their carbon emissions. Such packages could include, for example, smart meters, home energy audits, access to local demonstration homes, leadership from local schools, businesses and public buildings, and more hands-on support navigating advice and determining which energy efficiency measures and renewable technologies are right for them.

Northumberland National Park Authority believes that this type of integrated approach, involving technological solutions alongside community and household-level behaviour change, and delivered via new collaborations between local public, private and third sector organisations, will be critical to achieving the carbon emission cuts we need.



Fig 19. The wood chip store for the wood-fired district-heating scheme at Kielder

One of the challenges of the recession is how our communities will cope with the threat of fuel poverty. A fuel-poor household is one that cannot afford to keep adequately warm at reasonable cost. Community-scale initiatives, like that at Kielder, are one way of addressing fuel poverty on a larger scale, leaving a legacy for years to come. In the current climate, fuel poverty is when 10 percent or greater of a person’s income are used to heat their home.



The potential beneficiaries include households, community buildings, and businesses. No matter which type of community-scale initiative is adopted, the chances are that excess electricity can be sold back to grid at a profit, with the income retained in the sustainable community, and put to use for other initiatives they would like to undertake. Northumberland National Park is in a position where it can win over the hearts and minds of the communities, finding local champions to take these demonstration projects forward. Two of the locations already identified as potential low carbon communities are at Bryness and at Harbottle.

Fig 20. A community-owned wind turbine in Wales

Northumberland National Park fully supports the development of Community Interest Companies in rural areas, which have the desire to do business with primarily social objectives. Such social enterprises tackle a wide range of social and environmental issues and operate in all parts of the economy. By using business solutions to achieve public good, it is believed that social enterprises have a distinct and valuable role to play in helping create a strong, sustainable and socially inclusive economy.

⁵ www.bigenergyshift.org.uk

Insulation

Communities in Northumberland National Park suffer disproportionately from fuel poverty compared to the rest of the North East region. This is a combination of a number of factors including exposure to colder weather than urban and lower altitude areas; lack of affordable energy supply (e.g. natural gas in towns); lower wages than those who can commute to the city region; and low quality often private sector rented properties.

A key aspect of adapting to climate change is keeping the heat in our buildings. Insulation reduces unwanted heat loss or gain and can decrease the energy demands of heating and cooling systems. Principal areas to address would include loft and wall insulation, double or triple glazing and draft exclusion measures. How much insulation a house should have depends on building design, climate, energy costs, budget, and personal preference. Regional climates make for different requirements. Building codes specify only the bare minimum; insulating beyond what code requires is often recommended. The insulation strategy of a building needs to be based on a careful consideration of the mode of energy transfer and the direction and intensity in which it moves. This may alter throughout the day and from season to season. It is important to choose an appropriate design, the correct combination of materials and building techniques to suit the particular situation.

Northumberland National Park has supported six Thermafleece insulation projects, and one double-glazing project, since 2002. Wool is a natural fibre from a fully renewable resource; consequently the life cycle of the product has an ideal energy balance. Thermafleece is manufactured to a density of 25kg/m³ giving a K-value of 0.039 W/mK. Because of its ability to rapidly absorb and release water vapour, Thermafleece wool insulation helps to keep buildings cool in summer and warm in winter. It is also naturally breathable, controls condensation, and is energy efficient, durable and recyclable in future years.



Fig 21. Sheep and thermafleece



Fig 22. Thermafleece insulation

Most of the existing buildings in the region, especially those constructed before the 1970s, suffer from huge heat loss. Insulation compliments renewable energy technology. Although sheep's wool is often the most preferable option, it is more expensive than traditional forms of insulation. This is where intervention is required, to help bridge the gap between the sustainable option, and the conventional option. Properly insulating the buildings of the National Park is a sensible course of action to take. This includes community facilities, businesses, and farms.

Installing high efficiency or renewable energy based heating systems will be of little value if the precious heat leaves the building almost as soon as it arrives. The design standards and building fabric of our homes differ dramatically from those of our continental neighbours, especially Scandinavia, where building insulation standards are much higher. Before any form of renewable heating is contemplated, it is essential that the building be insulated to the highest level.



Fig 23. The Hytte at Bingfield has a grass roof. This provides insulation, helps to reduce rainwater run-off, and is also aesthetically pleasing. The holiday accommodation has a geothermal heat pump, and a Green Tourism Business Scheme Gold Award

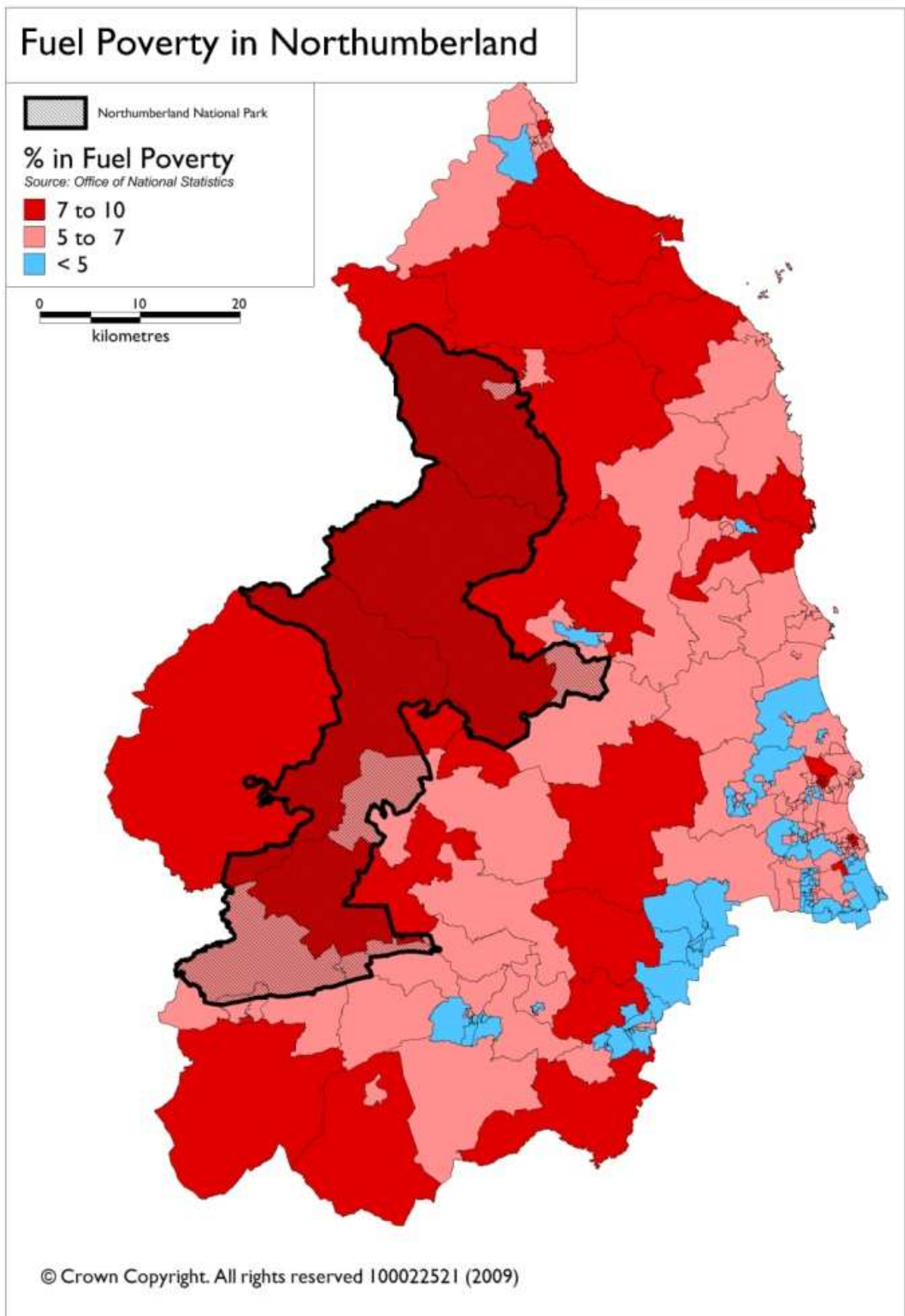


Fig 24. Fuel Poverty in Northumberland

Electric Transport

Most visitors to the National Park arrive by car. The National Park Authority is keen to support and provide alternative transport options to visitors, enabling them to access and enjoy the National Park in a more sustainable manner and by doing so, will hopefully lessen traffic, enhance the sense of tranquillity and reduce carbon emissions. **The early positioning of electronic car charging points in the iconic Hadrian's Wall area of the National Park will create an extremely high profile / eye-catching opportunity for the regional initiative and reassure electric cars users that rural areas can be accessed for leisure and business.**

The National Park Authority helped set up and still supports the award-winning Hadrian's Wall Bus service operating between Newcastle and Carlisle and carries more than 33,000 passengers a year. The service integrates with other bus services, local rail services and the Hadrian's Cycleway to provide a viable alternative to using the private car to access the countryside. Public transport initiatives include continued support of the Hadrian's Wall bus as well as further partnership working with the Tyne Valley Community Rail Partnership who are actively promoting access to the Park and better transport links via public information panels located at stations along the Newcastle to Carlisle railway. Associated with the low carbon transport theme the Authority has also identified an opportunity to improve accessibility of the Park.



Fig 25. Nissan Leaf is next generation of electric car



Fig 26. Charge point at One North East

Looking forward, the Authority is keen to promote the use of electric cars and bicycles, identifying the fact that they are not just for city use but can be used to explore the protected landscapes. No longer does driving have to be seen to be detrimental to the environment. In order to achieve this it is proposed that the necessary recharging infrastructure is rolled out across the Park, initially along Hadrian's Wall (phase 1) and then further afield to Rothbury and Wooler (phase 2). Supported with a marketing campaign and possible parking/charging incentives the Authority believes that such a scheme would be an important piece of the "electric car jigsaw" that Lord Adonis referred to at the launch of the north east's electric car charging network in October 2009.

Electric and plug-in hybrid cars are a vital part of the UK's low-carbon strategy. All the major car manufacturers have serious plans to develop these cars.



This is no longer an aspiration – it will soon be a reality. In October 2009 the Committee on Climate Change recommended that the UK needs two million electric cars on the road by 2020 to meet its greenhouse gas reduction targets. According to a study for the Department for Transport, widespread adoption of electric vehicles capable of a range of 50km (31 miles) or more could cut road transport carbon emissions in half. All-terrain off-road electric buggy such as a Trammer™ could be made available for hire at specific sites within the Park to enable those with a physical disability to go off-road and feel more independent and adventurous.

Fig 27. Map showing the proposed distribution of electric car charging points - phase one (red): phase two (green)

Biomass and Biofuels

Northumberland National Park Authority is keen to encourage biomass-heating systems as it offers both environmental and economic benefits. Biomass is a growing sector and offers significant potential for locally sourced heat generation in the area. Biomass has an advantage over intermittent renewable energy sources, such as wind and solar, as biomass can be stored and power generated when required. This makes it one of the most viable and reliable micro-renewable technologies. However, unlike other sources of renewable energy, biomass typically requires ongoing payments to be made for the fuel. Biomass is most effective when a local fuel source is used, thus reducing transport impacts ensuring that the carbon benefits from using biomass are not lessened by emissions created when transporting it, and also reducing the financial costs associated with transporting the fuel. Using a local source also results in local investment and employment. Bio-energy also has the potential to create and sustain jobs in rural areas.

Wood fuel is an environmentally sound renewable energy source. It is the principal natural resource for biomass in and around Northumberland National Park, and it exists in abundance. For instance, Kielder Forest and the large privately managed woodland areas offer huge potential. Development of the industry would bring un-managed and under managed woodlands and plantations into more efficient use. Compared to fossil fuel heating systems, biomass can reduce carbon emissions by more than 90 percent. Wood fuel has the lowest carbon impact of all the existing renewable energy technologies.



Fig 28. Wood felling at Kielder Forest

Much of the work in the development of wood fuel in the North East Region has been carried out by Northwoods through their 'ignite' training programme and through Newfuels, the wood fuel producer group established to provide vital supply chain advice.



Fig 29. Community saw cutter based at Saughy Rigg Farm, Bardon Mill

However, there is still work to be done, especially in promoting awareness of opportunities to supply to potential consumers. This may include working with communities, businesses and construction professionals; providing funding assistance for feasibility studies to support demand and consumption development; addressing localised issues of fuel poverty; providing assistance for demand implementation (e.g. funding the installation of biomass boilers); and further investigating community-heating schemes.

The Northumberland Uplands LEADER Local Development Strategy indicated an opportunity to grow the wood fuel sector locally. A pilot project has been supported that will look to unlock the economic potential of un-managed woodland and support small operators in the wood fuel sector across the Leader area. A number of complementary activities will take place, including direct technical training, one-to-one mentoring and a study tour to see wood fuel processing techniques in action. The project will be independently evaluated in order to share lessons across the country. Other regions have already expressed an interest in learning from the delivery of this project and the applicant will actively pursue these opportunities. NULogs supports existing and new firewood suppliers by providing them with technical assistance on harvesting, storing, processing and delivery; and also provides strong networking and marketing opportunities, as well as helping educate the public and woodland owners on the benefits of well-managed, productive local woodlands. A local brand is under development, and Northwoods (the Woodland Initiative of the North East) is working on providing an online map of suppliers of firewood and heating equipment.

Geothermal Heat Pumps

In the United Kingdom, the earth – a few meters below our feet – keeps a constant temperature of about 11- 12°C throughout the year as the ground stores heat from the sun during the summer months. Additionally heat radiating from the earth's core can be found at greater depths and can be tapped into where the mantle is shallowest. The easiest way to tap into geothermal heat sources is by using ground source heat pumps, a process that is widely used across Scandinavia with great success.

A heat pump works in the same way as a refrigerator, but in reverse. The collection system consists of a single deep borehole outside the building. Alternatively, where space permits, a looped array of pipes buried about 1.2 metres below the surface can be used. A mixture of water and an environmentally friendly anti-freeze solution are used as a process medium, circulating through the closed loop, absorbing thermal energy from the earth and carrying it to the heat pump. Heat pumps operate on the same principles as a domestic fridge: the cold is recycled and the heat retained and converted into high-grade heat to be released in the home through under floor heating, radiators and into the hot water tank.

Once a ground-source heat pump is installed, there are no external fans and no visible external equipment. The system is quiet in operation, very safe and requires little, if any, maintenance.



Fig 30. Geothermal heat-pump at Bellingham Town Hall

Projects within the Park already taking advantage of this renewable energy source include The Old Repeater Station at Grindon, Bellingham Town Hall, Elsdon Village Hall, The Hytte, Saughy Rigg Farm, and Stonehaugh Community Hall, amongst others.



Fig 31. Geothermal heating at Elsdon Village Hall

This technology is generally suited to accommodation providers and public buildings due to the high installation costs, but the introduction of the Renewable Heat Incentive payments from April 2011 may see certain larger households investing in this technology. The Authority needs to carry out a scoping exercise to ascertain the further potential for rolling this system across the Park. Ground source heat pumps tend to be reliable systems and offer an energy efficiency ratio of 1:5. One unit of energy running the heat pump realises five units of heat from the system.

Air-Source Heat Pumps

Air-source heat pumps are effective solutions to heating and cooling applications for all types of domestic, commercial and retail premises. This well proven technology has been in use for decades providing safe, reliable heating and cooling at affordable prices. **Where Heat Pumps are used for heating, they are capable of highly cost-efficient energy applications because they tap into a limitless supply of clean, pollution-free heat in the surrounding air, all that is paid for is the energy to transport that heat.** These days their efficiency is such that for every one unit of electricity used to run the heat pump five units of heat can be produced to heat a room.



Fig 32. Air-source heat pump at Turvelaws Farm Holiday Cottages, Wooler

As with many technologies that we use in every-day life, the basic principles of how a heat pump works are simple. All our surroundings, even a block of ice contains heat. The purpose of a heat pump is to absorb heat in one place where it is plentiful, then to transport and release it in another location where it can be used for space heating. Useful heat can be found in the air outdoors. Even on the coldest winter day's sufficient heat is present to warm our homes and offices.

The use of this technology is directly in line with the Government's renewable energy strategy as they can be run from electricity produced from renewable energy sources thus reduce the need to burn fossil fuels that produce green house gases. Northumberland National Park Authority is leading by example and installing twelve of these units into its information centres along with interpretation to explain the benefits to locals and visitors.

Where properties are connected to the national grid installation should be straightforward. For properties not connected then they can be utilised alongside renewable energy production such as hydro, wind or solar photovoltaic systems. There has been a limited take-up of this technology in and around the Park to-date, not surprisingly because multi fuel and biomass boilers are ideally suited to take advantage of the plentiful wood supply found locally on farms or in the numerous commercial forests.

With a move towards the electrification of our static and transport energy requirements air source heat pumps provide a practical solution for heating buildings using energy from a non carbon-producing source. This technology with an energy efficiency ratio of 5:1(5 units of heat produced for every one unit of electricity consumed) also has the potential to combat fuel poverty levels across the Park. With incomes below the regional average at £15,500 per annum, moving off oil and gas for heating will lessen the impact of future energy price rises. Because of the isolated rural location of many of the Park's properties there is a high dependence for heating of dwellings and business premises using oil or gas supplies (mains or tank). In order for Northumberland National Park and its communities to become a low carbon park then the take up of air-source heat pumps will play an important part in achieving this goal.

Hydro-Electricity

At 6Mw, Kielder Hydro is England's largest hydro electricity system and is located within Northumberland National Park. **Climate change and the renewable energy agenda have brought hydro generation back into fashion. It is seen as the most efficient and reliable means of renewable electricity production and the rivers and watercourses of the Park represent a valuable resource just waiting to be tapped.** The extent of this potential is one aspect that the Authority is presently investigating by looking at rainfall, river flow rates and elevation across the Park. Unlike other national parks, opportunity for high head schemes (100m+) are limited but the potential for medium to low head schemes does exist, both by restoring former mill sites as well as developing new projects both on a community and micro hydro scale (<5Kw).

With the development of new technology such as the Archimedes Screw, (River Dart Country Park Hydro 48Kw) sites with low head (1m) but high flow now have the potential to generate significant quantities of green electricity. Communities across the Park are beginning to wake up to this and current projects include Burnmouth Mill in the parish of Tarsset, the Uplands Hydro feasibility study (7 farm holdings in and around Alwinton) and the Wooler Weir study. The low carbon farms work mentioned earlier in this Action Plan will also look at the hydro opportunities in the upper Coquet valley on the MOD estate.

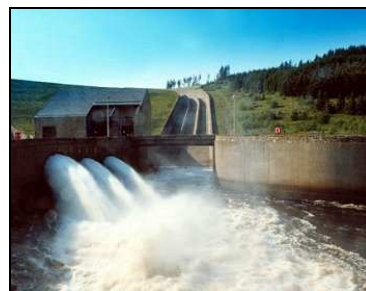


Fig 33. Kielder Hydro Plant

As can be seen from the Llangynidyr hydro scheme in the Brecon Beacons, (3.5Kw powering 4 households), micro hydro has the potential of significantly reducing CO₂ emissions for numerous farm holdings across the Park. With many upland farms being off grid and reliant on diesel generators for heating and electricity supply the introduction of Feed-In-Tariffs for hydro offers a realistic means by which to reduce their carbon footprints and move out of fuel poverty.



Fig 34. Llangynidyr Hydro Green Valleys Project

Community scale projects however are likely to be based on the larger river systems such as the North Tyne, Rede, Coquet and Till and are likely to take longer to develop as the consents needed from the Environment Agency and Natural England are likely to be more complex. If undertaken by a community group then they have the potential to be developed in such a way that would be able to provide a steady income for community projects on an ongoing basis as is the case with several of the schemes in the Green Valleys Projects.



Fig 35. River Dart Country Park Archimedes screw

Projects identified include realising the potential for hydro for the Catcleugh reservoir in upper Redesdale as well as numerous medium-to-low head schemes similar to Llangynidyr scheme - identified above. Project risks include the constraints placed on such schemes in the planning phase by partners at the Environment Agency and Natural England. Partnership working to fully realise the Park's hydro potential is an identified action.

Solar Water Heating and Photovoltaic

Despite the United Kingdom's reputation for changeable weather solar power technologies have a proven market and with the prediction of warmer dryer summers on the horizon then this potential is only likely to increase. In this section we look at the potential for increasing the take-up and number of solar thermal, photovoltaic (PV) and combined photovoltaic thermal (PVT) units across the National Park.

Planning permission is generally not needed for residential buildings and once purchased installation can be done in two to three weeks. **Investing in solar power technology is ideal for a quick win, especially since public perception of this technology is generally favourable.** Properties with south facing roofs have the potential to be able to meet the majority of both their annual heating and electrical needs with this technology. Larger arrays are also thought suitable for community buildings and business in and around the Park. Solar thermal has been around for some time now and take up in and around the National Park includes Carraw Farm, the Whiteburnshank Centre, Stonehaugh Community Hall and the Battlesteads Hotel.



Fig 36. Solar panels at the Battlesteads Hotel, Wark

Each of these facilities was grant-aided in order to get them established. **To-date, there has been limited take up of solar technology across the National Park by home owners, small and medium enterprises (SMEs) and community facilities alike. High costs are thought to be the principal cause for this.**



Fig 37. Solar panels at Carraw Farm, Bardon Mill

Generally manufactures will offer product guarantees of 20-25 years although given due care and attention many systems will still be effective for 45 years plus. Romag are one of the leading UK manufacturers of PV technology and are based in the northeast whilst specialist advice is at hand through partnerships such as PV northeast. With the imminent introduction of the Feed-In-Tariff as from 1st April 2010 and the Renewable Heat Incentive from April 2011 and a drop in the cost of units in recent years it is envisaged that this form of renewable technology will become increasingly attractive to home owners, landlords, SMEs and community facilities alike. Payback periods for PV look as if they could drop in line with other technologies with 5 to 7 years not being uncommon.

Increasingly, solar power has been used for non-domestic, ranging from PV powered microwave radio repeater stations on hilltops, to PV powered telephone kiosks. Smaller-scale applications can charge batteries for caravans, electric fences, or even street lighting. PV is widely regarded as best and least expensive means of providing many of the services that are lacking. With Romag well established and a new production plant being set up at the New and Renewable Energy Centre in Blyth, the North East is well served by manufactures of PV technology.



Fig 38. A pilot Green Column street lamp in Belfast. A 300 watt lamp is powered by lead acid batteries charged by PV and a small wind turbine

Anaerobic Digestion

Anaerobic digestion is a series of processes in which microorganisms break down biodegradable material in the absence of oxygen and is widely used to treat wastewater. As part of an integrated waste management system, anaerobic digestion reduces the emission of landfill gas into the atmosphere. **Anaerobic digestion is widely used as a renewable energy source because the process produces a methane and carbon dioxide rich biogas suitable for energy production helping replace fossil fuels.** Also, the nutrient-rich digestate can be used as fertiliser.



Fig 39. Cattle stocks best suit anaerobic digestion.

Almost any organic material can be processed with anaerobic digestion, including waste paper and cardboard (which is of too low a grade to recycle, e.g. because of food contamination), grass clippings, leftover food, industrial effluents, sewage and animal waste. Anaerobic digestion produces a biogas made up of around 60 percent methane and 40 percent carbon dioxide (CO₂). This can be burnt to generate heat or electricity or can be used as a vehicle fuel. If used to generate electricity the biogas needs to be scrubbed. It can then power the anaerobic digestion process or be added to the national grid and heat for homes.

As well as biogas, anaerobic digestion produces a solid and liquid residue called digestate that can be used as a soil conditioner to fertilise land. The amount of biogas and the quality of digestates obtained will vary according to the feedstock used. More gas will be produced if the feedstock is putrescible, which means it is more liable to decompose.



Sewage and manure yield less biogas, as the animal that produced it has already taken out some of the energy content. In the UK, anaerobic digestion has until recently been limited to small on-farm digesters, but is widely used across Europe.



Fig 40. Right: community support for anaerobic digestion. Left: an anaerobic processing unit. Anaerobic digestion can reduce green greenhouse gas emissions by capturing methane from the decomposition of organic materials, such as livestock manures and slurries, sewage sludge and food wastes

Denmark has a number of farm co-operative anaerobic digestion plants which produce electricity and district heating for local villages, biogas plants have been built in Sweden to produce vehicle fuel for fleets of town buses and Germany and Austria have several thousand on-farm digesters treating mixtures of manure, energy crops and restaurant waste, with the biogas used to produce electricity.

Anaerobic digestion provides an important opportunity to generate 100 percent renewable energy from biodegradable waste. Research clearly indicates the most sustainable way to treat our food waste is to have separate weekly collections for treatment by anaerobic digestion. Strong backing in the new Waste Strategy should mean that we start to fulfil this potential, with the widespread introduction of food waste collections and the construction of more anaerobic digestion plants across the UK.

Wind Energy

Harnessing wind as a renewable energy source involves converting the power within a moving air mass (wind) into rotating shaft power that in turn generates electricity. Modern wind turbines contain rotors fitted with aerodynamic blades, which utilise lift forces caused by the wind on the blades. In and around a National Park, there are siting and planning considerations to also take into account. Wind speed increases with height so it is best to have the turbine high on a mast or tower. Generally speaking the ideal siting is a smooth-top hill with a flat, clear exposure, free from excessive turbulence and obstructions such as large trees, houses or other buildings.

However, other areas may have a sufficient wind resource to make an installation worthwhile. In a protected area, wind turbines have a visual impact on the landscape; therefore small-scale wind power is often the more desirable, and appropriate, way of harnessing the potential. Stand-alone systems are often used as a source of power in remote locations where conventional methods of supply are expensive or impractical, for example where new power lines would be required. The wind turbines are generally connected to batteries, which are charged when spare energy is produced and provide power when needed, for instance during periods of low wind speeds. It is common to combine this with a diesel generator for use when additional power is required. A wind turbine can be connected to the local electricity grid and export any excess electricity produced to the grid, with the agreement of the network operator and an electricity supplier.



Fig 41. Wind turbine at Stonehaugh Community Hall. The placing must not be negatively affected by the vernacular design, as it was in this instance



Fig 42. Stand-alone wind turbine at the Whiteburnshank Centre, Kidland Forest

In periods of high wind, turbines may produce more power than is needed which allows excess electricity to be exported back to the grid. Conversely, when domestic demand is high extra electricity can be purchased from the grid through an electricity supply company. Wind turbines have proved to be very reliable and can have a design life of 25 years or more. Costs vary due to a range of factors such as size of turbine, the height of tower, length of cabling required and geographic location. A system to provide all the electricity for a medium sized detached house might cost in the region of £10,000-£20,000.

Funding is required to ascertain the best sites for wind generation, which fully meet the requirements of the Local Development Framework, are cost-effective, and are the most suitable form of renewable energy.

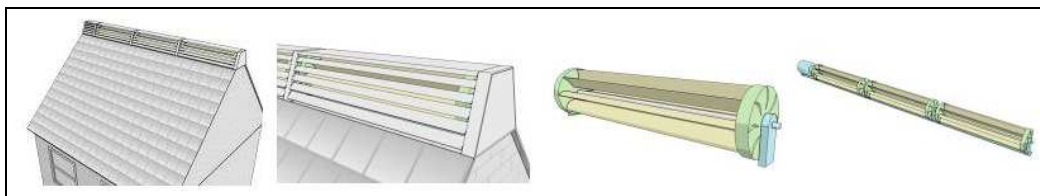


Fig 43. The prototype RidgeBlade wind turbine design

Research into new technologies, like the RidgeBlade design, is encouraging, and should be kept under consideration as wind turbines begin to fulfil their potential over the coming years.

Exemplar National Park Infrastructure

Northumberland National Park Authority manages a limited built estate comprising office headquarters in Hexham, three National Park Centres with outlying offices, tearoom facilities (leased to local businesses) and recreational sites across the National Park. **In order to lead by example the Authority has sought to invest in energy saving and renewable technology across its estate and in so doing promote the benefits of this work to visitors, local businesses and communities alike.** The work is ongoing but has already realised results in reducing the Authority's own carbon footprint as well as being recognised nationally by the Green Tourism Business Scheme with all three National Park Information Centres having attained the Gold award.

The Authority took a step change in its sustainable building management work with the redevelopment of the former schoolhouse in Falstone village in 2005. Refurbishment work saw insulation, a biomass boiler, photovoltaic panels and a grey water system incorporated into the building which has been successfully let as a tea room and community shop since. Double glazing and improved loft insulation has been rolled out across each of the staff occupied buildings along with the trailing of light tubes, LED lighting, solar powered security lights and the use of smart meters.



Fig 44. Once Brewed Visitor Centre, awarded a Gold Green Tourism Business Scheme certification

Carbon emissions monitoring for the 2008/09 period and feedback from the Green Tourism Business Scheme identified inappropriate energy consumption associated with heating within two of the National Park Centres. With the aid of a grant from the Regional Improvement and Efficiency Partnership, the nighttime storage heaters are being replaced with state of the art air source heat pumps thereby hoping to realise a 400 percent reduction in carbon emissions per annum in the future.



Fig 45. Falstone Old School Tea Rooms

Additional ongoing investment is required to install further photovoltaic and solar thermal units to increase renewable production as well as to take advantage of the Feed-In-Tariff and Renewable Heat Incentive schemes when they come on line in 2010 and 2011 respectively. The Authority is also looking to invest in the tourism product on Hadrian's Wall and create a visitor facilities that can be become carbon neutral tourist sites. The Authority wishes to see its own estate as well as the communities of the Park lead by example when it comes to climate change mitigation in order to realise a step-change in behavioural attitudes by 2020.

The National Park receives in the order of 1.5 million visitors each year, 10 percent of which call into one of the Information Centres. Through this captive audience and with direct dialogue with the communities of the National Park the Authority believes that the Park community can surpass the Government target of 15 percent of energy production coming from renewables and Northumberland National Park will become a Low Carbon Park. By using the National Park offices as 'test beds' for a low carbon energy generation, it will help to raise confidence with the technology for our local communities and businesses, so that they will know that their investment will work as they expect it to.

Land Ownership of Northumberland National Park

When looking at whom the Authority will work with in order to bring about a step change of attitudes towards climate change within the Park, the exercise is made somewhat simpler by the fact that much of the Park is owned or managed by relatively few landowners. The public estate within Northumberland National Park is extensive, (approximately 42 percent of the Park), and primarily comprises land managed by the Ministry of Defence and Forestry Commission. Also included in this category but with much smaller landholdings are Northumberland National Park Authority, Northumberland County Council (schools) and various parish council facilities. Private land ownership, especially in the north of the Park falls within several large estates such as The Northumberland Estates, Lilburn Estate and Collage Valley Estate. In the South there is the National Trust, Blenkinsopp Estate and to a lesser degree Northumbria Water. This infrastructure lends itself to both large-scale renewable schemes and also individual property improvements.

The Forestry Commission and Ministry of Defence have a key role to play in taking forward the delivery of some of the renewable energy schemes previously outlined, for example developing the bio-mass market and realising the hydro potential of their estates. Some work has already been undertaken such as:

- The Forestry Commission developed Kielder Bio-mass boiler – district-heating scheme.
- Developing biomass wood supply with Northwoods.
- MOD invested in wind turbine at Cottonshope Farm.
- Insulation and external cladding of 25 percent of MOD tenanted properties.

However there still remains a huge potential for reducing carbon emissions from the public estate and through partnership working. It is hoped that projects will be realised sooner rather than later.



Fig 46. Kielder Forest and Reservoir

Opportunity for future work on the public estate include:

- Moving off fossil fuel heating systems at Otterburn Camp and installing biomass boilers supplied by woodchip from the MOD and Forestry Commission estate.
- Exploring the hydro potential of Catcleugh Reservoir with Northumbria Water, feeding electricity into the national grid or direct to the village of Byrness and the upper Redesdale Community.
- Further addressing the insulation opportunities of the Otterburn Camp and also the traditional stone farmhouses on the MOD estate.
- Exploring the hydro and community scale wind turbine potential of both the Forestry and MOD estates.

In relation to private estates then, similar to working with a housing association, tenanted properties need to be addressed initially from the insulation perspective but with fed-in-tariffs coming on line in April 2010 then renewable energy systems do become a viable alternative for Landlords and tenants alike.

Monitoring and Dissemination

The monitoring the implementation of *A Strategic Action Plan for a Low Carbon National Park in the North East of England* is essential, in order to ensure that strategic policies are being satisfactorily implemented, and the carbon reduction targets are being met. Alongside this, successes and learning lessons can also be disseminated to other rural areas, allowing Northumberland National Park to lead by example. Any negative trends can also be accounted for and adjusted accordingly, as soon as they become apparent.

Monitoring

Northumberland National Park is in a unique position where it can readily galvanise the ‘hearts and minds’ of the local population. Those members of the public involved with the schemes will often be the first point of contact for monitoring activities, so it is crucial that they understand the importance of regular assessment. Indeed, local people are also the channels from which to raise awareness, encouraging the uptake of renewable energy activity.

The North East’s academic institutions are well placed to assist with the technical monitoring of the programme. Universities at Newcastle, Northumbria, Durham, Sunderland and Teesside are all embracing research into climate change, and are therefore well placed to provide independent analysis where necessary.



Fig 47. Narec (New and Renewable Energy Centre) is a national centre for the UK dedicated to accelerating the deployment and grid integration of renewable energy and low carbon generation technologies, utilising wind, wave, tidal, solar PV and thermal power

Other non-academic organisations, like Narec and North Energy Associates, could also offer expert advice on the monitoring of projects. Throughout the whole implementation, a ‘College in the Park’ is proposed to engage a train people with the installation and maintenance of green technologies.

Dissemination

Data dissemination is important because they help enhance the availability of timely and comprehensive statistics, which will contribute to the pursuit of a low carbon region. External marketing consultants could be employed to work with partners to maximise the opportunities that come from the programme.

Key regional beneficiaries of this work include:

- Leading edge renewable energy research, design and manufacture companies such as Narec, CPI and Future Transport Systems
- Bottom-up rural development bodies such as the LEADER groups in the Northumberland Uplands, Northumberland Coast and Lowlands, North Pennine Dales and East Durham;
- The other two protected areas in the North East region - North Pennines and the Northumberland Coast Areas of Outstanding Natural Beauty; and
- Learning institutions such as the regional universities and Northumberland College.

Funding and Outputs

Funding is required to pump-prime the investment, stimulate the regional economy to invest in a greener, more sustainable future.

Indicative Funding Package – A Low Carbon National Park

	Costs
Project Costs	£14,000,000
Project Management Costs	£750,000
Monitoring, Communication, Dissemination	£250,000
Total Costs	£15,000,000
Match Funding	£12,000,000
Funding Required via One North East	£3,000,000

Indicative Outputs

These outputs are estimated from past-experience.

Full-Time Jobs Created	50
Full-Time Jobs Safeguarded	400
Training Days in Renewable Energy and Energy Efficiency	2,500
New Low Carbon Business Created	25
Existing Business Adapted with Low Carbon Measures	200
Low Carbon Communities	5
Collective Capacity of Renewable Energy Created	3,000kW

Conclusion

Climate change has emerged as one of the most important issues facing our modern world and we are constantly informed that urgent, corrective control over the amount of greenhouse gases we produce needs to be exercised. In creating a low carbon national park, there is an opportunity to increase the levels of employment in the region, equipping local people with better skills for a more sustainable regional rural economy in the future

A Strategic Action Plan for a Low Carbon National Park in the North East of England will build on existing networks and working at the local level with businesses, land managers and local communities.

With the assistance of the One North East we can create the country's first rural low carbon zone, for which we can be proud. It will be a high profile 'shop-window' of achievements which show visitors to the Region and the local businesses and communities that the North East is leading the way in renewable energy solutions. There will be a very clear message that the low carbon economy brings social, environmental and economic benefits to the most rural and remote areas of the country

Appendix I: List of Indicative Partners

Enablers: Public Sector Partners

Alnwick Extended Services Partnerships
Business Link North East
Environment Agency
Forestry Commission
Government Office for the North East
JobCentre Plus
Learning Skills Council
Ministry of Defence
Natural England
Northumberland College
Northumberland County Council
Northumberland Fire & Rescue Services
Northumberland Tourism
One North East
Removing Barriers to Work Partnership

Deliverers: Parish Councils & Community Delivery Partnerships

Belford Parish Council
Bellingham Town Council
Branxton Parish Council
Brinkburn
Bryness Parish Council
Community Action Northumberland
Community Safety Partnership
Coquet Extended Services Partnership
Corsenside Parish Council
Elsdon Village Committee
Falstone Parish Council
Glendale Gateway Trust
Groundwork Northumberland
Hadrian's Wall Farmers Market
Haltwhistle Town Council
Haltwhistle Partnership
Kirknewton Parish Council
Kirkwhelpington Parish Council
North Tyne and Redesdale Community Partnership
Rochester Parish Council
Rothbury Town Council
Tasset 2050
Thirlwall Parish Council
Vindolanda Trust
Wark Parish Council
Wooler Town Council
Young Farmers

Delivery Partners: Land Owners

Hesleyside Estates
Lilburn Estates
National Trust Estates
Northumberland Estates

Information and Knowledge: Cross-Cutting Partners

Community Energy Solutions
ConFor
Core (Berwick)

CPI

Energy Saving Trust
Federation of Small Businesses
Future Transport Systems
Hadrian's Wall Heritage Ltd
National Farmers Union
National Park Farmers
National Park Residents
New and Renewable Energy Centre
North East Biomass Forum
North Energy Associates
North East Chamber of Commerce
Northumberland Uplands Local Action Group
Northwoods
ReNew
TNEI
Tyne Rivers Trust
Tyne Valley Community Rail Partnership
Tynedale Enterprise Project
Tynedale Virtual College
Warm Zone

Communication: Monitoring and Dissemination Partners

Durham University
Newcastle University
Northumbria University
Sunderland University
Teesside University

Appendix II: List of Potential Climate Change Match Funders

ACRE Rural Community Buildings Loan Fund
Architectural Heritage Fund
Awards for All
B&Q One Planet Living Awards
Biffaward Flagship Scheme
BIG Changing Spaces Community Sustainable Energy Programme
BIG Ecominds
BIG People's Millions
Biodiversity Action Grants Scheme
Bioenergy Capital Grants
Carbon Trust
CEMEX Community Fund
Charities Aid Foundation
Charles Haywood Foundation
Climate Change Challenge Competition
Commission for Architecture and the Built Environment Grants
Community Foundation Local Environmental Action Fund
DBERR Low Carbon Buildings Programme
Defra Darwin Initiative
Defra Energy Crops Scheme
Defra Hill Farm Allowance Scheme
E.ON Sustainability Energy Fund
Energy Saving Trust
English Heritage
ENTRUST Landfill Communities Fund
Esmée Fairbairn Foundation Biodiversity Strand
Forest Education Initiative
Forestry Commission
Future Friendly Awards
Garfield Weston Foundation
Heritage Lottery Fund
Intelligent Energy for Europe
INTERREG
J Paul Getty Jr Charitable Trust
Lankelly Chase Foundation
LIFE+
National Trust
Natural England
Northern Rock Foundation (2010 only)
Northumberland National Park
Northumbria Water
Private Investment
RDPE LEADER
Rufford Foundation
Sainsbury Family Charitable Trusts
Scottish Power Green Energy Trust
Shell Springboard
Sir James Knott Trust
SITA Greenprints Flagship Awards
Tubney Charitable Trust
Tudor Trust
Volvo Eco Adventure
Waste and Resource Action Programme
Waterloo Foundation
Woodward Charitable Trust

Authors

Please send all feedback to:

Richard Austin
Funding Officer
richard.austin@nnpa.org.uk
01434 611510

Robert Mayhew
Head of Programmes and Specialist Services
robert.mayhew@nnpa.org.uk
01434 611539

Stuart Evans
Director of Corporate Services
stuart.evans@nnpa.org.uk
01434 611527

Northumberland National Park Authority, Eastburn, South Park, Hexham, Northumberland. NE46 1BS.

A Strategic Action Plan for a Low Carbon National Park in the North East of England is a discussion document submitted to One North East and other partners for consideration.

Published: November 2009