

Energising the North

Mobilising the northern regions to deliver our low carbon energy future



**Moving Forward:
The Northern Way**

The North was at the forefront of the industrial revolution, we should now be leading the transformation to a low carbon economy.

With the pressing need to avert catastrophic climate change and ensure a secure and affordable energy supply, the North of England is now facing unprecedented opportunities in the energy sector.

The Northern Way is a unique partnership for economic development, bringing together the three northern Regional Development Agencies, alongside leaders from the city regions, business, local government and universities. Together, we have a clear and deliverable ambition for the North of England to become the low carbon powerhouse for the UK by:

- maximising low carbon energy generation;
- providing energy security and efficiency of supply; and – in the process –
- helping to boost the prosperity of the North of England as a whole.

Investment in energy infrastructure can contribute to increasing the productivity of the North. By developing the associated supply chain, jobs and business opportunities can be created in other sectors; exploiting the North's manufacturing and technology strengths.

The paper sets out the basis for that ambition. It is designed to stimulate partnership and debate, in advance of a more detailed publication in early 2010, which will set the Strategic Direction for the work of The Northern Way partnership in the energy field. Our work on energy builds on the successes and strengths of each of the three regions. It is focussed on areas where we can gain a greater competitive advantage by investing on a collaborative basis. The North was at the forefront of the industrial revolution, we should now be leading the transformation to a low carbon economy.

Overview

Over the next decade, a third of UK electricity generation capacity will be decommissioned and need replacing with low carbon sources. In addition to this, Copenhagen December 2009, The Climate Change Act 2008 and The Renewable Energy Directive (2009/28/EC) set stringent and legally binding targets for the path towards a low carbon economy.

The UK Low Carbon Transition Plan, published in July 2009, consolidates the government's policies on energy and emission reductions into a single strategy for meeting its emission targets to 2020.

The UK is committed to meeting a 34% reduction in greenhouse gas emissions by 2020 setting the path for the long term goal of an 80% reduction by 2050 on 1990 levels. A key step to delivering this

goal is obtaining 40% of our electricity from low carbon sources by 2020. This amounts to:

- over 30% of our electricity generated from renewable sources by 2020;
- an aspiration to construct up to four commercial-scale carbon capture and storage (CCS) demonstration sites; and
- the facilitation of new nuclear power stations.

As power and heavy industry account for 50% of the overall required emission cuts, the need to convert to a low carbon economy presents enormous opportunities to develop and commercialise new energy generation technologies. This will create vast market opportunities driving economic growth and providing employment. In theory, the need to replace a huge proportion of energy infrastructure coupled with the UK's liberalised energy market should be instigating a surge in investment in energy generation; however this is not the case. Economic uncertainty, delays in the planning and regulatory system, stringent emission targets and the availability of finance and skills can deter developers. The northern RDAs will assist by supporting and enabling the market to meet these future challenges. Across the North, RDAs are planning to invest over £120 million in the energy sector in their current planning period. The Northern Way will complement this by fostering greater collaboration, particularly in the research and development of new and emerging technologies, in areas where working together generates the best outcomes.

Energy Assets of the North

The North of England has a strong and diverse energy sector with industrial, academic and supply chain strengths coupled with natural resources to exploit. It hosts some of the most significant energy assets in the UK including major coal, gas and nuclear power plants and is also home to the largest onshore wind farm and biomass power station in England. The strengths of the North of England are centred around:

- the accessibility and range of natural resources and suitable geography e.g. wind, wave, tidal, coastline, estuaries, CCS geology, civil nuclear geology and port infrastructure;
- the existence of specialist industrial and academic expertise e.g. civil nuclear, renewable energy technologies (offshore wind, wave, tidal and biomass), ultra-low carbon vehicles, carbon finance and markets, CCS and energy management; and
- current and proposed demonstration programmes e.g. Northern Wind Innovation Programme, CCS, Carbon Abatement Technologies, Tidal Power, Centre for Nuclear Energy Technology, Renewable Oils Institute and Low Carbon Vehicle Development Centre.



Proposed Areas of Work

Achieving the targets as set out in national and international legislation will require a transformational change in the entire energy sector and involve a five-fold decrease in emissions by 2050. This is an unprecedented challenge across all sectors that will need major intervention by Government and the Private Sector. The Northern Way will focus on a small number of priorities, which we can only exploit through a forward-looking public policy and the three regions working together. The potential areas of work have been selected as they complement the North of England's national and regional strengths. The specific activities (chosen from the list below) where we work together will be limited in number, but have substance and magnitude. We will seek to maximise a small number of large scale opportunities based on short, medium and long term priorities.

Low Carbon Generation

- **New Nuclear Build** – The world is undergoing a nuclear renaissance creating significant market opportunities. The UK market alone is set to see an investment of over £30 billion over the next 20 years. Estimates from the Nuclear Industry Association based on a new nuclear build programme of 10GW phased over 20 years would provide approximately 3,750 jobs during construction and provide 5,200 jobs over the estimated 60 year lifetime. The Government has conducted an extensive exercise to identify potentially suitable sites for new nuclear power station deployment by 2025 and 5 out of the 10 sites are located in the North of England. In addition, England's Northwest has been chosen as a Low Carbon Economic Area (LCEA), based on the region's unique assets and capabilities within the field of nuclear energy and a new Nuclear Advanced Manufacturing Research Centre (NAMRC) is to be based in South Yorkshire. The NAMRC will be led by the University of Sheffield in partnership with the University of Manchester and with Rolls-Royce as the lead industrial partner.
- **Offshore Wind** – The UK Government has stated its intent to bring online up to 33GW of offshore wind generating capacity by 2020. The scale of the proposed investment is immense and creates a huge opportunity for the North of England considering the proximity of the Crown Estate round three sites. Analysis undertaken for The Northern Way with regards to the supply chain has highlighted, at a minimum, the expected development of the industry with no change is likely to result in about £700 million of GVA and 3,000 jobs by 2020, and with intervention this figure will be significantly higher.
- **Carbon Capture and Storage (CCS)** – The capture and storage of CO₂ in geological structures is fast emerging as a potential method of decarbonising power generation from fossil fuels. CCS has not yet been demonstrated end-to-end at large scale on a

power station so there are many barriers to overcome thus providing significant opportunities for the North of England.

- **Marine Power** – With unsurpassed marine resource, marine power offers a tremendous opportunity for the North of England.

Carbon Reduction in Industry and Business

- Reducing carbon emissions in industry and business is a key priority for the North of England. Evidence shows that there are opportunities to substantially reduce emissions from the manufacturing and business practices of large companies located in the region.

Ultra-Low Carbon Vehicles

- **Electric Vehicles** – The North East is host to the UK's first LCEA focussed on ultra low carbon vehicles thus providing the North of England with the prospect to lead the way in the low carbon revolution.

Infrastructure

- **Grid** – Limits on the capacity of the national grid, and its ability to connect up new generation capacity, are emerging as one of the most important barriers. It is imperative that this issue is addressed.
- **Smart Grid** – The future development of decentralised energy and active networks as a contributor to the decarbonising of energy supply will be very important, particularly in high density mixed-use metropolitan areas.

Low Carbon Skills

- There is likely to be a significant skills shortfall within the energy sector and in particular the renewable energy sector. This shortage has been identified as a key issue affecting the whole of the UK, but has particular implications for the North of England.



Technology & Research Strengths

Renewable Energy Generation Technologies

The North of England is well placed to take advantage of the projected increased demand in this sector and sees renewable energy as a growth area which can stimulate recovery from the current economic downturn. The region has the capabilities in terms of skilled workforce and infrastructure (both knowledge and physical). Examples of current activity include:

- **Narec** – New and Renewable Energy Centre – this is a national centre for the UK dedicated in accelerating the deployment and grid integration of renewable energy and low carbon generation technologies, utilising wind, wave, tidal, solar PV and thermal power.
- **Joule Centre for Energy Research** – working in sustainable energy technologies and energy systems increasing research capabilities.
- **EnviroLink Northwest** – aids the development and growth of the energy and environmental technologies and services sector.
- **LIFE at the Advanced Manufacturing Park (AMP)** – dedicated business accelerator focused exclusively on fostering new low carbon energy technologies.
- **Environmental Energy Technology Centre (EETC)** – an incubator building to support businesses entering the emerging low carbon energy technologies market.
- **The Centre for Low Carbon Futures** – supporting commercialisation of applied research and helping low carbon energy businesses to exploit new market opportunities.

Energy Infrastructure & Supply

The North of England has tremendous strengths in low carbon generation, energy distribution technologies and associated supply chains. This includes a leading international civil nuclear sector (predominantly based in the Northwest) and opportunities for the design and demonstration of CCS Technology (in Yorkshire and the Humber and the North East). The North also has the advantage that our large scale emitters are located in close proximity to large scale carbon sinks. Examples of current activity include:

- **Energy Innovation Centre** – an incubation unit dedicated to turning new ideas into commercially successful technologies and businesses.
- **The N8 Energy Research Centre** – a powerful collaboration of the energy research capabilities of the eight research intensive universities across the North.
- **Dalton Nuclear Institute** – working in the nuclear research and education.
- **National Nuclear Laboratory** – a nuclear technology services provider supplying tailored solutions across the sector.
- **John Tyndall Nuclear Research Institute** – working predominantly in the areas of nuclear, science technology and engineering.
- **CO₂ Sense Yorkshire** – Yorkshire Forward's free business consultancy dedicated to helping cut carbon emissions.
- **NAMTEC** – National Materials Technology specialising in advanced materials and providing technical information and advice to metals and manufacturing companies.
- **CPI** – The Centre for Process Innovation is a leading driver of innovation in the UK's process sector.

The Northern Way Strategic Direction for Energy

The scope and purpose of the Northern Way Strategic Direction for Energy is to highlight The Northern Way's role in:

- setting the strategic energy policy framework across the North with the overall aspiration to becoming the low carbon power house for the UK;
- promoting the energy assets of the North as an international energy gateway for inward investment to the UK;
- supporting investment to accelerate the growth of those energy sub-sectors and their supply chains in which the North already as an existing strength;
- encouraging greater collaboration between the North's research base to accelerate innovation and commercialisation of emerging energy technologies; and
- undertaking feasibility studies and analysis across the North to fill gaps in knowledge and inform future policy development.

A Northern Way energy advisory group is currently being formed to provide technical advice to The Northern Way in identifying strategic priorities for the development of the energy sector in the North of England. This group will be made up of leading northern academics and industry representatives.

A Brief History of The Northern Way Energy Work

Over the last 12 months, The Northern Way through the Innovation Programme has developed a programme of strategic, focused investments to exploit our world class knowledge and research to stimulate high value manufacturing and build world class business. The areas of this programme associated with energy include:

Northern Wind Innovation Programme (NWIP)

NWIP is a two year project funded through The Northern Way Partnership and delivered by Narec and EnviroLink Northwest. The programme aims to create supply chain intelligence networks across the North to accelerate the development of key capabilities required for the manufacture and installation of offshore wind turbines.

Carbon Abatement Technologies Demonstration Programme (CAT)

CAT is a two year programme funded through the Technology Strategy Board (TSB) in partnership with The Northern Way and the Department of Energy and Climate Change's (DECC) Environmental Transformation Fund. The programme aims to develop specific aspects of CAT, overcoming technical barriers and enabling innovation to position the North to capture market share within international supply chains.

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