

UK CARBON ECONOMY in the north-west of England

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Industrial past shows the way to a green future

Andrew Bounds asks whether nuclear energy and low carbon technology can form a base for the development of the region

There are few areas of the world with a history of energy production that compares with the north-west of England. It is a centre of the nuclear industry, it hosted some of the first wind turbines and it boasts several innovative low carbon technology spin-offs.

The region hopes to emulate the industrial achievements of the 18th century in a 21st century low carbon revolution.

Environmental goals and services generate £100 million annually. The region has drawn up a three-part strategy to support businesses to provide green products and services, to cut emissions and to meet the challenges of increased rainfall, flood risk and rising sea levels.

A glance at the figures shows how bold this will be. The region emitted 57.5m tonnes of carbon in 2007, 30 per cent down from 83.6m in 1990. Initial estimates suggest that a sixth, but transport emissions rose almost



Pointing the way: walkers and wind turbines share the South Pennines. Peel Energy plans more wind farms and is trialling carbon capture and storage technology

60 per cent from 10.55m tonnes to 14.5m by 2006. Government bodies including the Northwest Regional Development Agency, launched a mission in 2006 for the region to become a leader on climate change.

While local authorities can do a lot, UK government support can be vital. The region is home to a number of centres of excellence. Lancashire is seeking to be the first in the country to use tidal energy. Cheshire is one of the first to use low carbon communities in the country. Lancashire is leading on adapting to the impacts of climate change and Greater Manchester is pioneering low carbon building.

The region is host to the Energy Innovation Centre at Capenhurst, the National Nuclear Laboratory and the Energy Research Centre. The north-west has also been designated the national low carbon zone.

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Dalton Nuclear Institute at the University of Manchester, says "The north-west is in a great position in terms of the nuclear renaissance. The company has been broken up but the skills and know-how remain.

Liverpool, which processes uranium into fuel, remains in Capenhurst, where BNFL has a big presence. The university's study of the behaviour of graphite at high temperatures has enabled some low carbon technologies to remain open beyond their official closure dates. Westinghouse, the US nuclear company, sponsors a chair at the university.

Adrian Bull, head of stakeholder relations at Westinghouse UK, says: "That decision was taken in our head quarters in Pittsburgh. The chair is here in Manchester because Manchester is one of the leading centres of nuclear research." Mr Bull says that

Blackburn, Op 2

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Local opposition remains the largest stumbling block

Energy in its oldest
Supply is plentiful
but planning is a
bugbear, says
William Hall

The north-west is blessed with a substantial reservoir of energy source and has been largely overlooked - even the 6m to 7m tonnes of waste that is sent every year to the region's increasingly expensive landfill sites.

The region produces about 4m tonnes of municipal solid waste (MSW) and more than 7.5m tonnes of commercial and industrial waste (CAIW) a year, says Colin Drummond, chief executive of Viridor, a waste management company which, along with GWA, is planning to build a new plant to recycle 50 per cent of Greater Manchester's waste and slash the volume of waste going to landfill from 60 per cent to 45 per cent.

A global leader in R&D
1/2 of the UK's 45,000 skilled nuclear workforce
2 of Europe's most advanced tidal energy proposals
£10.6 billion annual turnover
One of the world's largest concentrations of nuclear facilities

untreated household waste. The fact will be transported by rail to a new cultural waste and power plant (CHP) at Runcorn, 30 miles away. When it is built, it will produce 1.2m tonnes a year of waste and 1.2m tonnes of electricity. The north-west has also been designated the national low carbon zone.

While Manchester is producing the most and power is treated waste for the first time in the region, Viridor and its partners will have to rely on waste supplies from other local authorities in Lancashire, Cheshire and Merseyside for Phase II. "If there is one thing that the north-west is not short of, it is waste," says Mr Drummond.

Viridor is not alone. Peel, the north-west based power and transport group, has won planning permission for a £25m power plant on the proposed Tinto Resource Recovery Park. It will use 600,000 tonnes of treated waste to fuel a 30MW CHP plant that will generate 10 per cent of the north-west's target for renewable energy.

Energy cost West
Complaints about
become a centre for
low carbon energy,
writes William Hall
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Northwest-based Drummond, the UK's sole producer of soda ash, is planning a £200m CAIW power station, in partnership with the UK's largest renewable energy firm, which has been given a 45,000 sq ft site in the north-west.

These plants will produce 100,000 tonnes of solar recovered fuel (SRF) whose calorific value is more than double that of coal.

However, this is about to change. While UK electricity production by wind power has grown sixfold over the past 10 years, its importance as a source of renewable energy is set to decline because of increasing European Union penalties on landfill and concerns about the greenhouse gas intensity of methane, which 21 times more potent than carbon dioxide.

Most of the energy recovered from waste in the north-west is produced from burning methane gas produced by anaerobic digestion plants, which will produce 400,000 tonnes of methane gas annually. The mechanical biological treatment (MBT) plants will produce 100,000 tonnes of solar recovered fuel (SRF) whose calorific value is more than double that of coal.

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Money for nothing: Viridor energy from waste plant

Low Carbon Economy | North-west England

A clever way to drive down costs

Case Study
Global
Andrew Bounds reports on the smart meter company

The smart meter is increasingly finding its way into homes across the country. After a slow burning start since its launch in 2007, it appears ready to take in on UK government plans to replace millions of electricity meters with "smart" ones that give constant reads of usage and allow consumers to control their energy use.

Tony Barnes, chief executive of the company founded in Darwen, Lancashire, says: "The market has reached tipping point and so have we. We have gone through the pilot phase."

That phrase had its financial moments and the company has yet to make a profit. Yet analysts think it will take off, as the

block pricing and estimated not read for 10 years.

Company energy brokers feared some cut into the business after discovering an invention at a trade show. The inventor had come up with a meter that measured and transmitted the rate of energy use. He was aiming at domestic customers who prepay. But Mr Kennedy saw an opportunity in business users.

The energy suppliers thought smart metering was a good idea.

Tony Barnes, Chief executive, Global

He spun the business out of Uniflow, his software company. While Mr Kennedy believed in the idea, it was not easy to convince others. Mr Barnes notes that "the energy suppliers thought it was a great idea, but it cost too much to install a smart meter. That made their accounts for 2007 not as bright when consumption

should be cheaper. The company presented the evidence to its supplier, which immediately cut its price by a third. "We saved £100 a year and we're not doing anything," says Mr Barnes. "That's a bit of a miracle."

With more businesses and businesses generating energy from renewable sources, the potential can only grow, says Mr Barnes. They could calculate how much they are generating and exporting to or from the national grid at any one time. They could then buy and sell electricity.

To win customers, Global prices the meters cheaply, at about £300. To make the meters, analysts estimate it needs to install 3,800 a month, a rate it began exceeding last year. It is now running at 4,000 meters a month. About 1,000 are installed - 1.6 per cent of total electricity consumption in the UK.

Objections of locals and low farms out to sea

Wind energy
Ed Crooks says skills and technologies will have to be developed for the demanding conditions offshore

Britain's wind power business is going through a revolution that is remaking the industry, as much development in the region as in its high profile centres.

With a possible total capacity of 4,200MW, the potential of the north-west is six times larger than the largest offshore wind farm now under construction: the first phase of the London Array in the Thames Estuary.

However, offshore wind development has run into local opposition. The proposed expansion of Barrow Bank from 25 turbines to 50 is provoking grumbling among residents. Much worse, however, has been the opposition to onshore wind projects. The Scout Moor wind farm in the north of England's largest onshore development, approved with just 28 turbines and a capacity of 60MW, faced fierce opposition before securing permission.

Even though it is a local realisation, it is used locally. The Cooperative Group, which runs the store that uses the energy, has raised more than £145,000 of finance, to fund the installation of solar panels bought shares. Steve Walsh, part of the team done by fitting a cavity and loft insulation in houses, says: "We've done a lot more and more radical measures to reduce our carbon footprint."

This puts the power in their hands. "People are looking at their investment and their community," Surplus proceeds will be given to community projects.

Nick Metcalfe, a health-care manager, says his wife were among those who invested. "We saw some of the early publicity on it," Walsh says. "We went to the bridge every day and it just became such a good idea and such an opportunity to invest in the community."

Another proposed 12-turbine site in nearby Oswaldtwistle has also sparked a protest campaign, even though Ecologic Centre, the developer, has cut the project from the original 24 turbines.

Scout Moor shows that if they can be built, onshore wind farms can be lucrative. Bob Holdings, the developer, sold 50 per cent of Scout Moor to BT Capital, a London-based private equity firm, that will specialise in renewable energy. For 60m, a price of about £2m per MW of capacity, which manages government property on investing in new onshore turbines might cost about half that, roughly £1m per megawatt.

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As a result, Britain's wind turbines are being forced into ever more demanding conditions and a whole new set of technologies and skills will have to be developed to keep up.

For the new generation of offshore wind turbine factories, the power. The usual catalyst is rate and expensive platinum. The Carbon Trust is working with Accl to find nuclear power and then through airport offering more energy. This needs a smart local balancing act - not generation - generation.

Metropolitan universities are part of the Sustainable Power Partnership and Supply (SPP) research consortium, backed by the government and businesses. The consortium will work to educate people about how technologies all fit together.

At it delivers power only when there is a breeze, wind will always need to be backed up by other forms of energy. Adrian Reek, a Manchester-based director of Altium, the investment bank, notes that "in the north-west, there are lots of energy combinations. It is not just about one technology, such as a big coal-fired power station. It is about having many things that other technologies can't do."

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Communities target means of production

Microgeneration
Small-scale projects may provide a big part of the solution, reports
Andrew Bounds

Across the north-west, a radical idea is taking hold: for people to use the means of energy production. The vehicle for doing this, the microgeneration, may be hundreds of years old, but proponents argue it is ideal for a new age of localised power generation.

The first initiative of its kind in England, the Horizon Co-operative combines the EIC Partnership, a consultancy and social housing management organisation, with the £80,000 to help buy an Ardenwood street in Manchester. The street is on a weir on the River Goyt. The 70kw plant generates enough power for all 70 homes. It is sent directly to a local realisation, it is used locally.

There are committed individuals who really support alternative energy

Steve Walsh, 42

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Powerful people coalition policy is to support a new wave of nuclear plants. Decades of decline have meant that expertise is becoming ever more scarce and, as demanded picks up, the rewards for anyone who has it are bound to rise

Well placed to benefit from policy change

Nuclear
Ed Crooks reports on a region with plenty of advantages

There is one sector in which the pre-eminence of the north-west as a centre for low carbon energy is unchallenged: nuclear power.

Home to about 20,000 skilled professionals about half the national nuclear workforce – and with one of Britain's longest established sites, at Sellafield in the region of that 2006 white paper is very close to the views of Chris Huhne, the former secretary, a Liberal Democrat cabinet minister in the ConLab coalition government.

Whatever his personal views, however, official coalition policy is to support the new wave of nuclear plants, creating a major opportunity for companies and

individuals with the relevant expertise. The decades of decline have meant that expertise is becoming ever more scarce and, as demand picks up, the rewards for anyone who has it are bound to rise. With largely foreign owned energy leading the programme, including EDF of France, E.ON and IBERDROLA of Germany, there will also be tremendous political pressure to use as much local content as possible. EDF, which hopes to have the first of new reactors on stream by the end of 2018, has already begun a process of trying to establish a British supply chain, rebuying capacity eroded by the long years of nuclear inactivity. In these conditions, the north-west should be a natural focus for the plans sketched out by European power groups, only one of which had aligned to Sellafield in Cumbria – is in the region. It has been selected as a model site for a first plant by a consortium of GDF Suez of

France, Iberdrola of Spain and the UK. IBERDROLA also has two possible sites in the county, at Kirkcubbin and Braystones, but there is not such an interest in the north-west as in the south-east. The north-west has a number of advantages. It is a region of high skilled labour, with a long history of engineering and manufacturing. It has a strong tradition of nuclear power, with a number of skilled professionals and a number of companies that have expertise in nuclear services, including nuclear engineering, nuclear fuel processing and waste management.

The north-west is in a great position in terms of nuclear resources. We have the skills and the universities, have real expertise in research, says Fred Ashby, executive director of the British Nuclear Fuels (BNFL) group, which is a major player in the nuclear industry.

The Nuclear Skills Passport is a totally innovative approach developed with employers to reveal the skills and training undertaken across the industry, with the aim of ensuring excellent nuclear skills. The passport is a record of training and qualifications that they can carry between employers. The passport is a record of training and qualifications that they can carry between employers to improve their workforce and to meet the needs of the industry. It is a record of training and qualifications that they can carry between employers to improve their workforce and to meet the needs of the industry.

It remains Europe's largest nuclear complex and was the site of Calder Hall, the world's first commercial nuclear power station. It still accounts for 40 per cent of the UK's nuclear facilities and 91 per cent of the area's gross added value. A £2m package of public and private sector investment aims over the next 20 years to transform the coast into a centre for

the Springfield fuel fabrication and uranium conversion plant west of Preston, owned by West-Indonesian, the US nuclear engineering group controlled by Toshiba of Japan. The NWDA estimates that the region is estimated to have a population of 100,000 and a £28bn economy, badly needs a boost. It has lagged behind the rest of the north-west for a long time. Sellafield's British Technology Centre, which conducts research into nuclear reactor operation, new build, fuel processing and decommissioning programmes. During the 1980s, about 11,000 jobs were lost in the Barrow-in-Furness naval shipyard. Now, the proposed decommissioning of parts of the Sellafield nuclear complex, the area's only other large employer, which attracts the loss of two-thirds of the area's 12,000 strong workforce over the next 10 years.

Rather than accept the inevitable shutdown of the region's nuclear industry, local interests have formed Britain's Energy Coast Masterplan, "a collective effort of several stakeholders in the public sector". The plan was launched in July 2016 by John Balfour, the then secretary of state for business, the Energy Secretary. The plan stretches from Sellafield in the north to Barrow-in-Furness in the south. The campaign considers Sellafield to be the area's biggest asset and believes that investment to offshore wind farms and tidal power.

The initiative could also play a role in the UK's response to the challenges of climate change and energy security. Locally, it has the potential to create 10,000 jobs and boost Cumbria's economic performance by £100m a year. Roger Liddle, a former adviser to Tony Blair who chairs Cumbria and Lancashire's regeneration agency, believes that the project is a "once in a generation opportunity".

West Cumbria is eager to be a centre of power

Britain's energy coast

William Hall says nuclear, wind and tidal resources can revitalise the economy

West Cumbria, which has a population of 100,000 and a £28bn economy, badly needs a boost. It has lagged behind the rest of the north-west for a long time. Sellafield's British Technology Centre, which conducts research into nuclear reactor operation, new build, fuel processing and decommissioning programmes. During the 1980s, about 11,000 jobs were lost in the Barrow-in-Furness naval shipyard. Now, the proposed decommissioning of parts of the Sellafield nuclear complex, the area's only other large employer, which attracts the loss of two-thirds of the area's 12,000 strong workforce over the next 10 years.

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nuclear research and a national hub for low carbon and renewable energy. Sellafield has been chosen as the home of a £28m National Nuclear Laboratory that is being managed by a consortium of Balfour, a US research institute, and Serco, a UK support services company. The University of Manchester's Dalton Nuclear Institute is an education facility linked to Sellafield's British Technology Centre, which conducts research into nuclear reactor operation, new build, fuel processing and decommissioning programmes. During the 1980s, about 11,000 jobs were lost in the Barrow-in-Furness naval shipyard. Now, the proposed decommissioning of parts of the Sellafield nuclear complex, the area's only other large employer, which attracts the loss of two-thirds of the area's 12,000 strong workforce over the next 10 years.

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Barrow-Furness: a regeneration campaign includes the construction of gas storage facilities costing £600m

submarine water for west Cumbria's resistance. The recovery from a low point of the world's first large scale grid-connected tidal turbine. The energy saving potential of LED lights based on light-emitting diodes (LEDs). The energy saving potential of LED lights based on light-emitting diodes (LEDs). The energy saving potential of LED lights based on light-emitting diodes (LEDs).

But West Cumbria is not a bad place to be these days. Demand for energy is expected to continue to rise, and the assets that make the area special – its nuclear facilities and its renewable wind and tidal power resources – are not going anywhere.

Ready for a role in the nuclear renaissance

Case Study
Sellafield
The plant has the skills to play an important role, writes Ed Crooks

Sellafield has long been a byword for the failure of Britain's nuclear industry. Plagued by technical problems, it has suffered a history of negative perceptions that dates back before it was rebranded in 1981, when it was known as Warrington.

Today, however, it has a better opportunity than ever before to put that history behind it. The north-west is increasingly committed to nuclear development in spite of the doubts of the Liberal Democrat members of the coalition government.

Sellafield has the location and the skills to play an important role in the country's nuclear renaissance.

Gregg McCill, deputy chairman of Nuclear Management Partners (NMP), the consortium that has been developed as part of a weapons reprocessing programme in the 1980s. Calder Hall, the world's first nuclear power station that started in 1956, is on the site. But it began life as a dual-use

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One area of progress is the mixed oxide (MOX) plant to make reactor fuel, a notorious failure that has been a problem for Sellafield since it was completed in 1997. The plant is still operating well below full capacity, but Mr McCill says its "efficiency and effectiveness have improved by 10 to 20 per cent".

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Abundant energy but cost to the environment is a stumbling block

Tidal
Andrew Bounds asks whether estuarine barriers are a viable solution

The north-west's first industrial revolution was built on coal, which was abundant in Lancashire. It is now being replaced by wind and water, two commodities that remain plentiful.

With four large estuaries in the region, engineers at the University of Liverpool think that building barrages across them could provide more than 1 per cent of the UK's electricity and a solution to the problem of how to increase the country's renewable energy capacity.

Most focus has been on the Severn estuary near Bristol in the south-west. Its tidal range is the second highest in the world and it also could provide 6 per cent of the UK's energy, though there are fears for its wetlands.

But the north-west could also benefit from a similar scheme: the Solway Firth on the border with Scotland. The estuary is 100 miles long and has a tidal range of 11 metres. It is also the UK's largest producer of biomass. Part of an economy bigger than that of its EU counterparts, the Northwest's low carbon and environmental goods and services sector operates on a truly international scale. To find out more visit englandnorthwest.co.uk

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French text: Le Havre's tidal barrage was built in the 1950s to see whether the idea would work. It has since been replaced by wind and water, two commodities that remain plentiful.

With four large estuaries in the region, engineers at the University of Liverpool think that building barrages across them could provide more than 1 per cent of the UK's electricity and a solution to the problem of how to increase the country's renewable energy capacity.

Most focus has been on the Severn estuary near Bristol in the south-west. Its tidal range is the second highest in the world and it also could provide 6 per cent of the UK's energy, though there are fears for its wetlands.

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LED cluster Cumbrian companies hope to light the way

There is a lot of focus about the need for smart factories round here, says Peter Barton founder of Uster-based Forge Europe, a small high-tech lighting company. But he feels strongly that reducing energy consumption, rather than building more wind farms, is a "much better way" to develop the UK's low carbon economy.

Forge Europe is one of a cluster of solid-state lighting companies that have sprung up in south Cumbria to exploit the energy saving benefits of solid-state lighting (SSL) based on light-emitting diodes (LEDs).

Marine current turbines are newer technology. They are driven by the water currents beneath the surface, offering a consistent energy supply.

Bendalls assisted with detailed design and completed all the manufacturing, assembly and in-house testing of the turbine. The turbine has been operating since 2001.

The NWDA has been involved in the manufacture of the top support structure and hydraulic lift mechanism. The turbine has a 1.5MW tidal turbine capacity and is the largest of its kind in the world.

One of the problems is that the political parties in Britain seem locked into the idea of energy efficiency equals "fit and finish". However, the tide is turning. The north-west is now being seen as a leader in the world of tidal power.

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