



North East England

Energy for Growth

Offshore Energy and Subsea Technologies | Regional Energy | Demonstration and Innovation

nelep.co.uk

North East
Local Enterprise Partnership





Andrew Jamieson,
Chief Executive of the Offshore
Renewable Energy Catapult

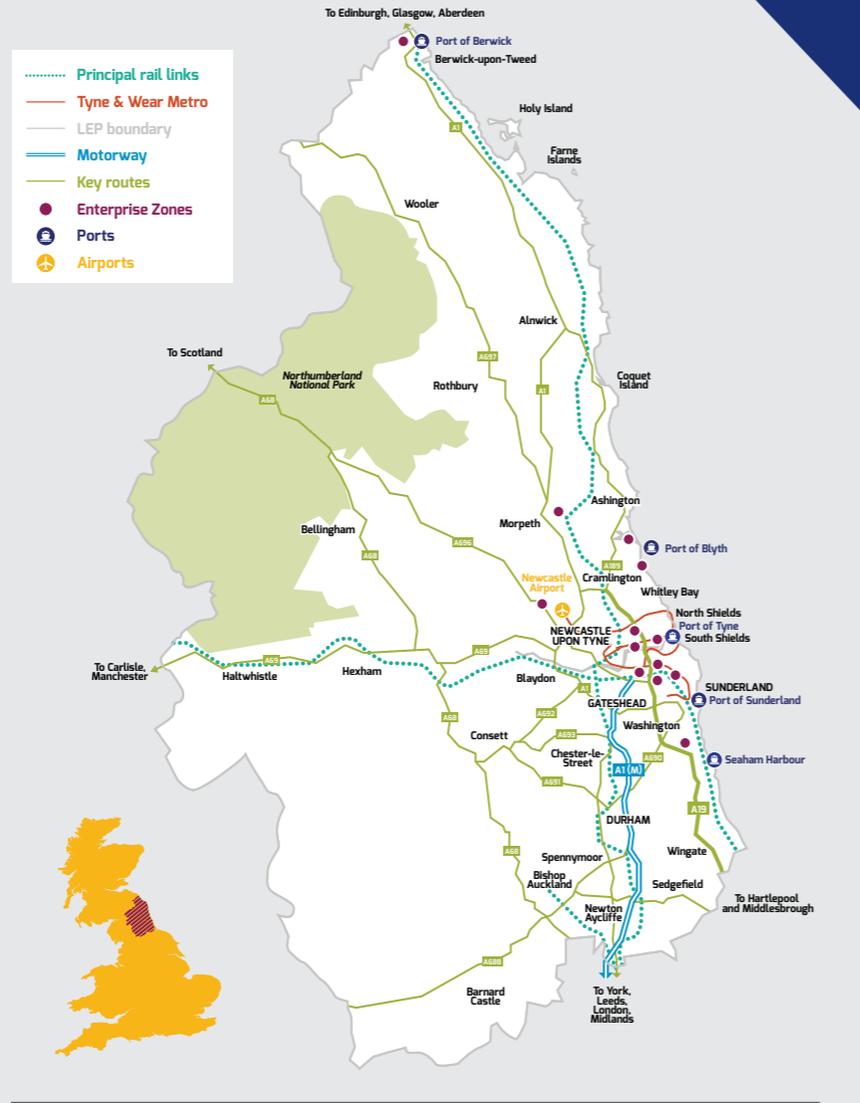


With world-leading innovation and research, a strong local supply chain, long established skills base and outstanding infrastructure, the North East can justifiably lay claim to being at the very heart of the UK's clean energy revolution.

It could not be better placed to capitalise on the huge ambition and future growth in offshore wind.



North East Local Enterprise area



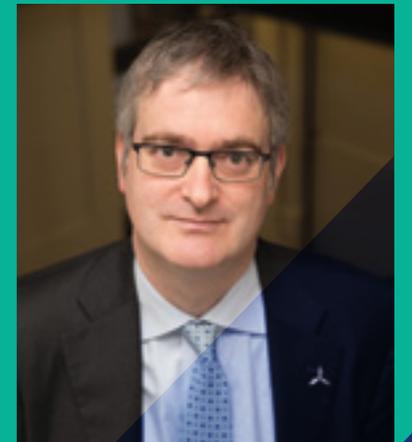
Contents

Introduction	02
What the data tells us	03
The North East energy sector	
Offshore Energy and Subsea Technologies	04
Regional Energy	06
Demonstration and Innovation	08
Research and Education	10
A supportive place to do business	12



The North East is reaping its share of the enormous economic benefits of onshore and offshore wind, which are helping to revitalise the region.

Companies based here are operating at the cutting edge - designing, building and delivering innovative technology for British wind energy projects as well as winning contracts to export our expertise globally. With a massive expansion in offshore wind capacity, clean energy offers a long-term opportunity for the North East.



Hugh McNeal,
Chief Executive, RenewableUK

Introduction

North East England has an innovative energy community, delivering on national energy objectives by providing regional economic opportunities.

The energy agenda is a crucial focus for the shift to clean growth and also presents wider social and environmental opportunities for the region. With rapid technological innovation, a growing population, and a changing climate, the way we generate and use energy must respond. New solutions that provide clean, secure and accessible energy will drive economic growth and deliver more and better jobs for the region.

Energy in the North East

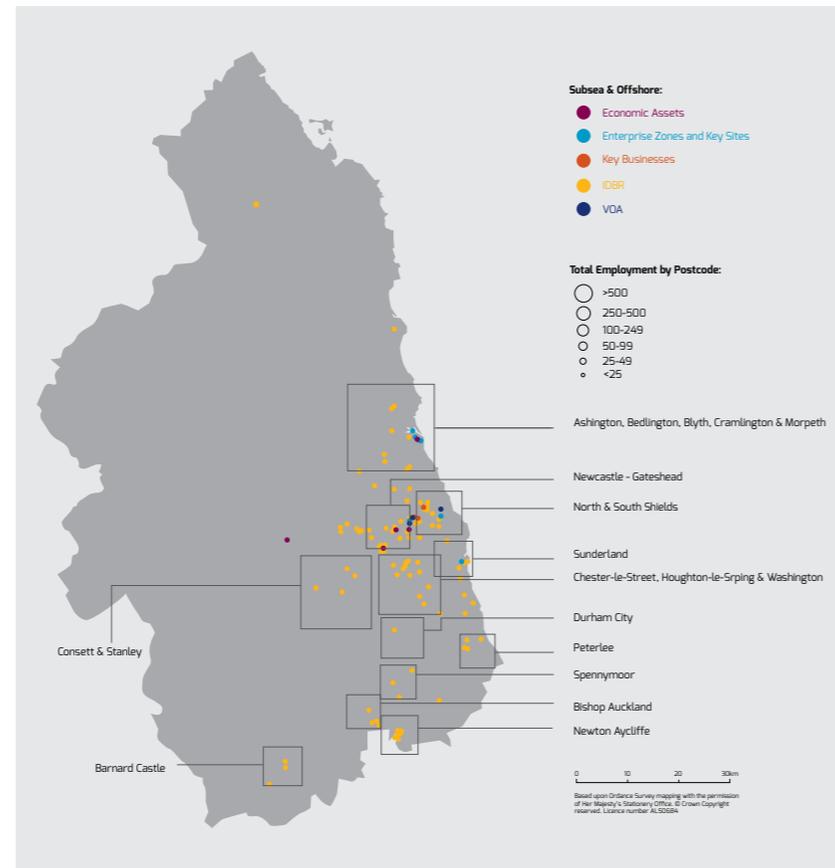
The energy sector is central to the North East's economy, with a range of organisations creating wealth, skills, and jobs in the region.

The energy sector in the North East grew by 64% between 2010 and 2017, with 5,515 related companies in the region.

Our focus on energy presents huge opportunities to drive and support economic growth. North East organisations are responding to national clean growth challenges and opportunities through innovation, investment and development of skills.

What does the energy sector look like?

The map below shows the clustering of North East offshore energy and subsea technology businesses by employment numbers.



What the data tells us:

Offshore Energy and Subsea Technologies

The North East is the leading location in England in the wind energy, oil and gas sectors.

North East subsea sector

50 supply chain companies

Supporting 15,000 jobs

North East subsea sector

57% employment = engineering and technical consulting

Generates combined turnover in excess of £1.5 billion

Regional Energy

In 2016, Northumberland generated the second highest amount of electricity from onshore wind, and had the greatest hydro generation capacity of any local authority in England and Wales.

Sunderland, County Durham and Northumberland were in the top six UK local authorities for total number of Solar PV sites.

Total energy consumption +38,300 GWh per year.

38% domestic sector

31% transport

31% industrial and commercial sector

13.54% households in fuel poverty

11.09% is the national average

Annual electricity consumption per domestic meter is below the national average in all local authority areas. Annual domestic gas consumption is above average in all local authority areas except one.

Research Funding and Education

North East universities in the top 20 for research publications:

Offshore wind
Durham 3rd, Northumbria 19th

Oil and Gas
Newcastle 7th, Durham 11th

Energy secured most funding from the UK Research Councils and Innovate UK of any subject area.

79 PROJECTS RECEIVING £46.2M

(2007-2017 - North East and Tees Valley LEP areas)

The North East (including Tees Valley) also secured a larger proportion of available funding than if funding was distributed evenly across the country.

Offshore Energy and Subsea Technologies

The North East has a long established capability in offshore energy, with organisations servicing various aspects of the global offshore renewables and oil and gas sectors. The region boasts world-class expertise in subsea engineering, robotics, planning and development, as well as design and fabrication of components such as pipelines, umbilicals and wind turbine foundations.

Local businesses such as Soil Machine Dynamics (SMD) and BEL Valves have world-class reputations and companies from other parts of the UK and overseas, such as Baker Hughes and Fabricom, have chosen to invest in the North East.

This North East cluster is of strategic importance in the global offshore energy and subsea sectors, winning work internationally and maximising the export potential of UK expertise, including:

- Remotely operated vehicles (ROV's) from Wallsend-based SMD, with capabilities for both sea salvage and oil and gas operations, delivering projects from Scotland to Shanghai.
- Newton Aycliffe-based Tekmar, a global market leader in offshore cable protection, has supplied systems and services across Europe, and for projects in the USA and Asia Pacific region.
- Stocksfield-based Royal IHC Limited, the UK arm of Dutch parent company Royal IHC, designed its 80-metre J-lay system in the North East. The system is capable of installing pipelines with the equivalent mass of 2,000 cars, while dealing with demanding conditions at sea, and following testing at Port of Blyth is ready to tackle large and challenging projects across the world.

With a long history of collaboration, innovation and entrepreneurship, the North East cluster has a key role to play in delivering a transformative national industrial strategy, offshore wind sector deal, and clean growth for UK industry. With excellent access from the North East to key oil and gas fields, and wind farm development sites such as Dogger Bank, Hornsea, and Firth of Forth, the North East offshore energy and subsea cluster continues to be a distinctive area of opportunity for the regional economy.

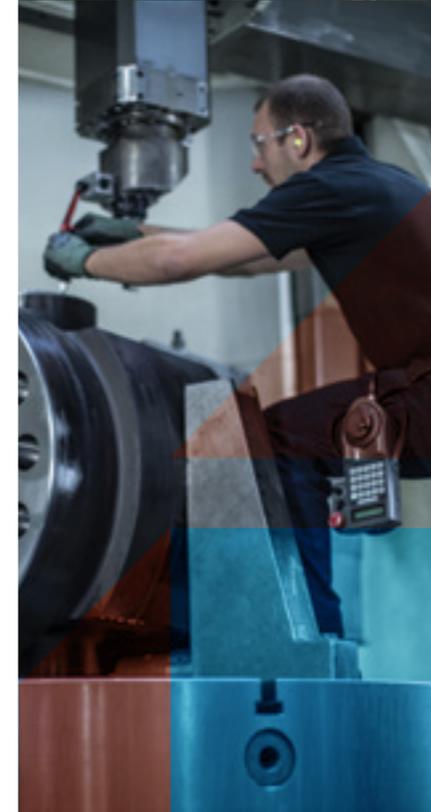
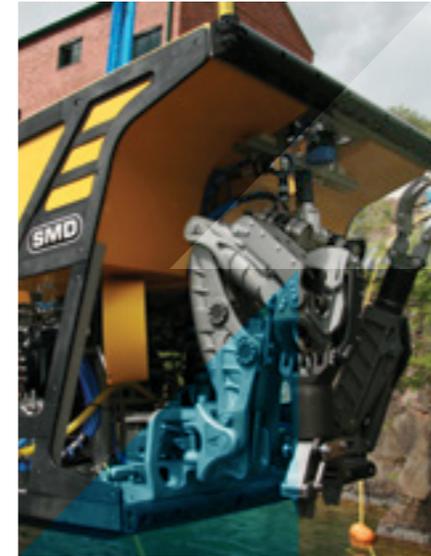
A comprehensive infrastructure and service offer around three ports provides the capacity to continually develop the regional offer as global offshore energy opportunities continue to emerge, such as new offshore wind developments and oil and gas decommissioning. Easy access to development land and the connectivity to do business across the globe presents an attractive inward investment opportunity for UK and international companies.

Supply chain and business development support is available from Energi Coast and Subsea North East, helping members win work in the offshore renewables and subsea sectors respectively.

Working in partnership:

Offshore energy and subsea technology steering group

Facilitated by the North East Local Enterprise Partnership, an offshore energy and subsea working group brings together cross-sector partners to identify and deliver cluster opportunities which support growth and employment. These partners include universities, supply chain businesses, ports, centres of innovation and public sector organisations.



In the spotlight

An inward investment opportunity

North East Enterprise Zones

Enterprise Zones are designated sites across England that provide tax breaks and Government support in strategic areas that will help grow the regional economy.

The North East has Enterprise Zone sites alongside the river Tyne, river Wear, and at Port of Blyth supporting offshore energy and subsea businesses. Sites have direct access to port and quayside facilities, laydown and loading space, and manufacturing and fabrication space. Sites include Port of Tyne, Neptune Yard, Swan Hunters, East Sleekburn, Bates and Wimbourne Quay, Commissioners Quay and Dun Cow Quay.

The Enterprise Zone sites present exceptional accessibility and benefits for offshore energy and subsea technology business locating in the North East.

Energy Central

Energy Central is a premier deep-water East Coast energy base, across the Blyth Estuary. It is a unique partnership between the Port of Blyth and Advance Northumberland, the Northumberland property investment, estate management and development company.

Energy Central brings together strategic land development sites, investment packages, the port's expertise in managing offshore energy projects, an extensive supply chain capability and access to a ready made skills base. It also neighbours the Offshore Renewable Energy Catapult Centre.


400ha development land


3 ports


3 rivers


30 development sites,
many with enterprise
zones status

North East assets of national significance are delivering innovative regional energy projects, with unique opportunities to help address national challenges in low carbon transport, power and heat. A range of regional partners across the public and private sectors, and world class researchers are continually working to capitalise on this potential.

Local energy projects

The North East has a higher proportion of consumption within the domestic sector (38%) compared to the UK overall (32%). Rates of fuel poverty (14%) are also higher than England overall (11%).

This makes the region an important location for deployment of effective domestic energy efficiency and community energy programmes and an ideal test bed for new ideas.

Natural assets in the North East present considerable opportunities for generation of renewable energy. In 2016, Northumberland generated the second highest amount of electricity from onshore wind, and had the greatest hydro generation capacity of any local authority area within England and Wales.

Geothermal resources, associated with granite bodies in the North Pennines and abandoned flooded mines in Durham and Northumberland, provide the opportunity to de-risk and commercialise solutions to utilise this low carbon heat.

Within its three cities and across its wider communities, the North East also has great potential for heat networks. The award-winning Gateshead

District Energy Centre, described as “truly visionary” by the Association for Decentralised Energy, has already paved the way for other schemes locally and nationally. A regional pipeline of projects valued at over £280 million is under active development.

Low carbon transport and energy systems

Infrastructure providers Northern Power Grid and Northern Gas Networks are investing and collaborating in the region to address emerging challenges. Through collaborative projects exploring future energy systems, and delivering breakthroughs in the decarbonisation of heat and energy storage.

Regional businesses are also providing thought leadership and delivering innovative solutions to accelerate the transition to low carbon transport and smart energy systems. Examples include:

- The Nissan manufacturing plant in Sunderland is home to the Nissan LEAF
- AVID Technology, based in Killingworth, designs and manufactures electrified powertrain components and systems for heavy-duty and high performance hybrid and full electric vehicles
- Sunderland-based Hyperdrive Innovation utilises market leading lithium-ion battery technology to deliver solutions to challenging applications for electric vehicles and battery storage systems
- Based on the Newcastle Helix site, Connected Energy is accelerating new approaches to grid-load management with its British designed battery storage systems and energy optimisation expertise.



Our North East energy strategy

Through the Department for Business, Energy and Industrial Strategy (BEIS) local energy programme, the North East Local Enterprise Partnership is leading creation of a regional energy strategy. In partnership with cross-sector stakeholders, this strategy will identify regional energy strengths, opportunities, and a pipeline of strategic projects to support through delivery.

In the spotlight

Gateshead Energy Centre

Gateshead Council opened the Gateshead Energy Centre in March 2017, to provide heat and power to a district energy network across the town centre and the Gateshead Quays area.

This £25 million project generates both heat and power for sale directly to customers via a new 4km underground network of heat pipes and 5.5km of high voltage ‘private-wire’ electricity cables.

The scheme is currently supplying public buildings and homes managed by the Gateshead Housing Company, and plans are in place to extend the network to supply commercial developments and more housing estates in the future. The scheme was originally planned around public buildings as this provided a secure long term demand for both heat and power.

Contractual arrangements with customers mean they are signed up for longer term deals (up to 20 years), and in return receive a minimum discount of 5% on the prevailing market rate for their heat and power costs.

The scheme has flexibility built in, with backup heat provided through conventional gas boilers if the 4MW of CHP is not available to run. Further flexibility was installed late 2017, connecting the site to a 3MW battery to enable electricity storage and several grid services for National Grid, including capacity market, back-up generation and frequency response.

Demonstration and Innovation

As the UK seeks to enable clean economic growth, respond to new consumer demands and meet emerging energy challenges, it is crucial that new energy technologies and solutions are effectively de-risked and commercialised. The North East is home to a suite of energy demonstration and innovation assets, acting as a hub to help enable this transition.

Offshore Energy and Subsea Technologies

The £150 million Offshore Renewable Energy Catapult's National Renewable Energy Centre in Blyth, houses world-leading test, validation and demonstration facilities. These facilities specialise in testing wind, wave and tidal energy generation technology, including testing of 100m wind turbine blades, and the only UK centre for testing of offshore cables. Clients and partners include multi-national businesses, investors, local authorities, SME's, start-ups and universities.

Further adding to the offshore energy demonstration and innovation offer, Tyne Subsea is a

purpose built hyperbaric testing, certification and research facility. Unique chambers allow testing of deep water equipment in a range of pressure ratings, orientations and temperatures. A local partnership between British Engines and Newcastle University, Tyne Subsea combines a heritage in subsea engineering with access to leading research. It places the North East at the forefront of innovation for offshore energy technology in hazardous environments.

Energy systems

The UK's largest smart grid project, the Smart Grid Lab integrates a £2 million energy storage test bed with a full scale smart grid on the Newcastle Helix site. This allows simulation of distribution networks under future scenarios in a real-time network simulator, to understand how smart grids will help meet future energy challenges. The facilities are the result of a partnership between Newcastle University and industrial partners Northern Powergrid and Siemens, demonstrating the region's pedigree in engaging industry

with state of the art laboratory facilities.

The Integrated Transport Electricity and Gas Research Laboratory (InTEGREL), in Gateshead, is the UK's first full scale integrated energy systems R&D facility. InTEGREL, led by Northern Gas Networks working with Northern Powergrid and Newcastle University, provides a space for industry, academia, SME's and government to explore and test new energy technologies and processes.

Through fully integrating transport, electricity and gas systems, the site gives the North East a leading role in de-risking and commercialising emerging energy systems solutions.

When fully complete InTEGREL will host a battery storage and research lab, domestic appliances and smart system demonstration homes, as well as hydrogen and compressed national gas refuelling stations for vehicles.



In the spotlight

National Centre for Energy Systems Integration (CESI)

CESI is a £20 million multi-institutional, multi-discipline industrial research consortium investigating the future energy challenges for the UK. Led by Newcastle University and partnering with other UK Universities such as Durham, the research undertaken by CESI encompasses the whole energy system. This includes heating, cooling, electricity and transport, taking into account energy generation, distribution and demand as well as policy, economics and regulatory matters.

The Centre develops and investigates novel future energy scenarios. The researchers utilise innovative demonstrator buildings, networks and facilities to test, validate and improve our understanding of the value of taking a flexible whole systems approach to energy. Its energy system demonstrators include the Newcastle Helix urban development, of office space, energy efficient home, as well as University buildings within the heart of the City. Researchers also investigate rural energy systems at Cockle Park Farm, near Morpeth, Northumberland, that houses an Anaerobic Digester using waste from farming to produce biogas to fuel an integrated combined heat and power system for the farm. CESI are also lead research partners in the InTEGREL facility in Gateshead.

Research and Education

The North East's energy sector is supported by an extensive research and education base, keeping the region at the forefront of the energy agenda and providing a pipeline of skills.

Newcastle University

Energy is one of the largest areas of teaching and research for Newcastle University and it is one of the largest marine technology groups in the world.

Newcastle University leads the National Centre for Energy Systems Integration and the National Centre for Subsea and Offshore Engineering.

Its Blyth Marine Station hosts the Emerson Cavitation Tunnel and facilities for studying coatings, fouling and hydrodynamics. Its teaching includes degree apprenticeships in power engineering, a large suite of undergraduate engineering degrees, and master's courses including Offshore Engineering and Renewable Energy.

Newcastle University is a global principal partner with engineering and technology giant Siemens and has strong relationships with many companies including Tyne Subsea, BEL Valves, Reece Group, and SMD.

Northumbria University

Ranked in the top 300 for engineering and technology in the Times Higher Education's World University subject rankings 2018, Northumbria University offers courses in Electrical Power Engineering (MSc), Renewable and Sustainable Energy Technologies (MSc), and has an expanding degree apprenticeship programme. It has established links with major energy companies in the region, and has delivered a bespoke master's course for a global oil company.

Durham University

Durham University through its Energy Institute is one of the key national research centres for renewable energy. There is an emphasis of science and society that provides Durham with a unique socio-technical approach to energy research and teaching. Durham offers a series of related master's courses along with a Centre for Doctoral Training in Energy, offering significant interaction with both local and international companies.

In the spotlight

Durham Energy Institute (DEI)

DEI supports and produces cutting-edge energy research, drawing upon the expertise of world-leading researchers across Durham University's departments in science, social science and humanities.

The DEI, now recognised as an internationally leading institution, was founded on the recognition that solving energy challenges requires collaboration across the boundaries of conventional disciplines. Approaching research in a new way, across departments, enables the DEI to address challenges and develop a range of unique expertise in areas such as wind, solar and geothermal energy, biofuels, smart energy systems, and carbon capture and storage. The DEI is helping to shape the thinking of both national policy makers and industry.

DEI geothermal energy research has been discussed in parliamentary debates, and strategic partnerships between with energy sector organisations such as Ørsted are linking new research directly with industry needs. More widely, the DEI is bringing international collaborators to the North East from countries such as India, Malaysia, and Mexico to develop new approaches on topics such as organic energy research.

The institute emphasises a 'Science and Society' approach to energy, tackling societal aspects of energy alongside developing new energy technologies.



Newcastle College

Based on the North bank of the Tyne the Newcastle College Energy Academy provides a centre of innovation, training and development for the energy sector. The academy delivers qualifications from level two through to degree level in energy technologies, manufacturing and maintenance as well as apprenticeships. Courses include a level two and three in Welding and Fabrication, level three in Renewable and Subsea Engineering and Foundation degrees (FdEng) in Renewable Energy Technology and Subsea Engineering. The Energy Academy have successfully developed a Maintenance and Operation Engineering Technician apprenticeship for the wind energy and subsea sectors.

Gateshead College

Zero Carbon Futures, a subsidiary of Gateshead College, was set up in 2011 as an independent consultancy specialising in low carbon vehicle technologies. The company develops electric vehicle infrastructure, and has managed a range of projects to increase electric vehicle uptake. Its ultimate aim is to research and develop new and emerging technologies, as low carbon vehicles move into the mainstream and become a major part of our transport system.

A supportive place to do business

The North East offers a mature business support eco-system, brought together by the North East Growth Hub.

The North East Growth Hub provides access to business support and access to finance to businesses in all parts of the North East economy, with dedicated scaleup support for those that have the potential to grow rapidly.



Online

Growth Hub Online provides targeted access to business support and finance to people wanting to start, grow or improve a business. Growth Hub Online also provides access to over 220 sources of business advice and support from across the region and from UK programmes.

northeastgrowthhub.co.uk



Launched in January 2018, Scaleup North East aims to increase the density of North East scaleup businesses, by supporting existing

scaleups to continue to grow and ones with high growth potential to realise their full potential. The support is flexible and tailored to the needs of the business. Scaleup partners, who have a track record in scaling businesses themselves, work with businesses to define growth objectives and mentor business leaders to take the right action at the right time.

scaleupnortheast.co.uk



Supply Chain North East helps businesses identify opportunities they might not otherwise know exist to help them grow. Market experts work with businesses to identify new customers, new markets and supply chains that they may never have previously considered. The programme provides access to the specialist support and resources required to unlock doors, adopt new technology and adhere to new quality standards and requirements.

supplychainnortheast.co.uk

The North East Fund

The North East Fund is a suite of five loan, equity and mezzanine funds specifically created to provide finance for North East SME's.

Over a period of three years from 2018, the £120 million fund will invest in over 600 businesses, creating jobs, securing further private sector investment, generating economic growth and creating future legacy funds. The fund's stakeholders include the European Regional Development Fund, the European Investment Bank and the existing regional legacy funds, managed by North East Access to Finance. Locally based fund managers will manage the five funds, which are:

- Innovation Fund
- Venture Fund
- Capital Development Fund
- Growth Capital Fund
- Small Loan Fund.

northeastfund.org



Invest North East England

Acting as a single point of contact, Invest North East England (INEE) is the North East Combined Authority's strategic inward investment body.

INEE works closely with the North East Local Enterprise Partnership and local authorities, and has access to an extensive partnership network of support agencies, sector specialists, universities, colleges, knowledge networks and business organisations throughout the North East of England region.

investnortheastengland.co.uk

invest | north east
england



Guy Currey,
Director of Invest North East England



North East England has for many years had a well-deserved worldwide reputation for excellence in oil and gas, subsea technology, marine engineering and offshore renewables.

Today we're seeing that our passion for innovation combined with outstanding facilities, business networks, and the infrastructure supported by our rivers and ports are coming together to make North East England the gateway to global opportunities for the Offshore Energy and Subsea Technologies sector and the location of choice for leaders in the field.



Find out more

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