

NORTH EAST

INFRASTRUCTURE 2014



Infrastructure has a vital role to play in supporting the North East economy, providing us with energy, water and waste management, transporting people and goods into and around the region, and protecting people and property from flooding.

UK OVERVIEW

Infrastructure is vital to society – our quality of life depends on it functioning effectively and our reliance becomes painfully evident when infrastructure systems fail.

The UK's ability to compete in the global race and to generate and sustain economic growth with appropriate quality of life depends on infrastructure networks that provide predictable energy generation and distribution, water supply, waste management and the transportation of people and essential goods into and around the UK by rail, road, sea and air.

State of the Nation is ICE's flagship report on the current state of the UK's infrastructure. The 2014 State of the Nation Infrastructure report assesses the performance, capacity and condition of the UK's economic infrastructure networks, and determines the actions required in order to improve and enhance performance, and importantly, to ensure that our infrastructure is resilient when faced with the many challenges ahead – from climate change to population growth.

This report provides an overview of the condition and performance of the North East's infrastructure networks.

ICE North East represents over 2,000 civil engineers who live and work in the region. As a professional body and learned society, we aim to influence public infrastructure policy, to achieve a sustainable future, promote civil engineering to the public and encourage innovation and excellence in the profession.

LOCAL TRANSPORT

Despite recent falls in passenger numbers, public transport patronage in the North East is amongst the highest in the country, and local transport networks are generally in fair condition.

Local bus services retain an important role in the region's local transport network. The proposed Tyne and Wear Quality Contract Scheme (QCS) would represent the first such initiative in the country, bringing together local authorities and bus operators in an effort to improve standards and increase passenger numbers. This aims to mirror the successes seen in London and Belfast, where a regulated bus market has helped to deliver service improvements and increased patronage.

The Tyne and Wear Metro carried 37 million passengers in 2012/13¹. A major improvement project is underway to provide new track, refurbished rolling stock and introduce smart ticketing.

Active travel options, such as cycling and walking, can replace short car journeys and deliver wider health and well-being benefits. Fewer people in the North East walk or cycle at least once a month compared with the national average, and more needs to be done to increase active travel across the region. Investment is required to improve street environments, provide

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LOCAL TRANSPORT: REQUIRES ATTENTION

ICE NE RECOMMENDS MEASURES TO:

- Increase the share of journeys made by public transport, promoting active travel options – such as walking or cycling – for shorter trips
- Improve the condition of local roads to reduce pothole claims and related damage
- Increase cross-boundary cooperation in major local transport projects

dedicated road space for walking and cycling and reduce traffic and vehicle speeds.

The condition of local roads remains a cause for concern. Whilst recent data shows that the condition of North East roads has remained largely stable², estimates suggest that it could take up to 11 years to clear the region's maintenance backlog³.

The latest information available indicates that per capita spend on transport projects in the region has remained at around 75% of the national average, and less than half of that spent in Scotland⁴.

North East local authorities are increasingly exploring ways of pooling resources to deliver a cross-boundary approach to transport projects. The Tees Valley Local Enterprise Partnership (LEP) has brought together five local authorities to deliver a programme of local transport improvements in the south while, to the north, the Department for Transport (DfT) has devolved similar responsibilities to the North East Local Transport Body (NELTB).



The East Coast Mainline Newcastle Central Station



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STRATEGIC TRANSPORT: REQUIRES ATTENTION

BUILDING ON OUR 2013 STATE OF THE NATION TRANSPORT REPORT, ICE NE RECOMMENDS ACTIONS TO:

Improve the capacity, condition and resilience of strategic road and rail connections

Strengthen the North East's connections with markets by addressing issues relating to airport capacity and Air Passenger Duty, and improving surface access to the region's ports

Develop a new appraisal methodology which facilitates comparison of different types of scheme and addresses the rebalancing of economic growth across the UK

STRATEGIC TRANSPORT

The region's strategic transport routes fulfil a vital social and economic function but, in recent years, their resilience has been tested as adverse weather events have left the region inaccessible⁹. Whilst we enjoy some excellent strategic road and rail links to the south, links to the north and west are not of a comparable standard and urgently require upgrading. Key intra-regional links also require investment.

ICE NE welcomes the work that is underway to upgrade the A1 in Yorkshire⁶, which will complete the region's much needed motorway link to the south. However, both this route and the A19 experience significant levels of congestion, and whilst the Highways Agency's pinch-point programme will alleviate the worst of that, further interventions will be required in the longer term. Improvements to the A1 north, A66 and A69 west are required to support the regional economy, but under current scheme appraisal criteria, are unlikely to secure the necessary funding.

The East Coast Mainline (ECML) rail service to London and Scotland is currently out to tender, with the proposed franchise period of eight or nine years providing the successful bidder with the flexibility to invest in improving services. This will support the Government's investment over the next five year funding period to deliver new rolling stock, reduce journey times and increase capacity⁷.

ICE NE believes that continued investment in our existing rail network will be essential for the region to maximise the benefits of the proposed HS2 line and enable local and regional services to be aligned with

the network. Network Rail's 'Northern Hub'⁸ proposals will reduce journey times between major northern cities while the business case for reopening the Leamside line – to help alleviate local congestion – is currently being appraised⁹.

Good aviation links underpin the region's continued growth in an increasingly global marketplace¹⁰. Capacity constraints at Heathrow limit the scope to improve both regional and international connectivity, and Air Passenger Duty (APD) has also been identified as a blocker to improving regional connectivity.

The North East has a thriving ports sector, facilitating the movement of goods and supporting local industry. The ports have benefitted from significant private investment in recent years; however improved road and rail links would enable the region to capture the wider economic benefits of this industry.

WASTE MANAGEMENT

The North East's 12 unitary local authorities are organised into three Waste Planning Authorities. In 2011/12 the region generated 1.3 m tonnes of municipal solid waste (MSW), down from 1.5 m tonnes per annum 10 years earlier¹¹.

Although welcome, this trend is more likely to be due to the economic downturn than any conscious effort to reduce waste¹².

In 2012/13 the region recycled or composted 38% of its waste, compared with the English average of 42%. However, it has reduced landfilling to 31% – below the 34% English average. The diversion from landfill was mainly due to increased energy from waste (EfW) recovery – 30% compared to the national average of 22%¹³.

The recently announced closure of the Houghton le Spring site will decrease regional landfill capacity by 250,000 tpa¹⁴, or over half of the MSW the North East sent to landfill in 2012/13. However, this reduction will be more than balanced by new EfW plants planned and opening.

EfW is becoming an important industrial sector in the region, and the proportion of waste processed through EfW has doubled in the past five years¹⁵.

When all of the planned EfW facilities are operational, the combined capacity in the North East will be around 1.5m tpa of waste, exceeding the total production of MSW in the region. While much of the 'extra' waste will be sourced from the larger commercial and industrial (C&I) sector, the amounts involved are difficult to predict as C&I data are

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WASTE MANAGEMENT: ADEQUATE FOR NOW

OVER THE NEXT FIVE YEARS, ICE NE RECOMMENDS ACTIONS TO:

Continue reducing the amount of waste sent to landfill and improving recycling and composting rates

Ensure that a move from waste to resource management and the development of a circular economy are at the centre of government policy

Support the growth of the region's Energy from Waste (EfW) industry by improving the availability and reliability of waste data in the commercial and industrial (C&I) sector

inaccurate and outdated. If the North East is to make the most of this opportunity there is a real need for robust C&I waste data to inform planning by both the Waste Planning Authorities and the private sector.

CASE STUDY

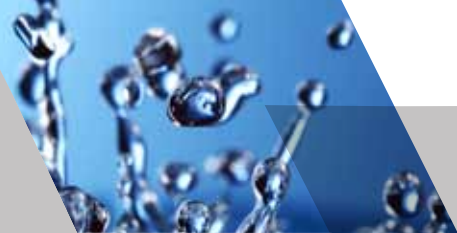
TEESSIDE'S ENERGY FROM WASTE



Two companies, SITA and Air Products, have come to dominate EfW in the region. SITA have operated an EfW plant at Haverton Hill near Billingham since 2009 (pictured above), generating up to 29MW of electricity processing MSW from across the Tees Valley. This year, the company opened a second, 21MW plant adjacent to the existing facility. This increased processing from 390,000 to 600,000 tpa, with the additional waste collected from Gateshead, South Tyneside and Sunderland¹⁶, and bringing the EfW recovery rate to 46%.

More plants are planned, with SITA proposing a third facility, processing 200,000 tpa and generating up to 35 MW of combined heat and power¹⁷. In addition, Air Products are currently building two innovative plasma gasification plants at Seal Sands, to process 700,000 tpa¹⁸. The first Air Products plant is due to open in 2015.

9. Sunderland Echo (19 April 2014) Plans on track to reopen Leamside railway line 10. York Aviation (2012) The Economic Impact of Newcastle International Airport 11. Defra (2013) Local Authority Collected Waste Statistics - tables for November 2012 Statistics Release 12. Defra (2013) Forecasting 2020 Waste Arisings and Treatment Capacity: Revised February 2013 Report 13. Ibid 14. Urban Mines (2012) Model of Waste Arisings and Waste Management Capacity For the North East of England Waste Planning Authorities 15. Ibid 16. SITA (2014) 'Proposed new process line at North East Energy Recovery Centre' 17. Ibid 18. Air Products (2014) 'Air Products' Tees Valley Renewable Energy Facility'



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ENERGY: REQUIRES ATTENTION

ICE NE RECOMMENDS ACTIONS OVER THE NEXT FIVE YEARS THAT:

Complete the process of Electricity Market Reform (EMR) to enable investment in secure, affordable, low carbon energy supplies

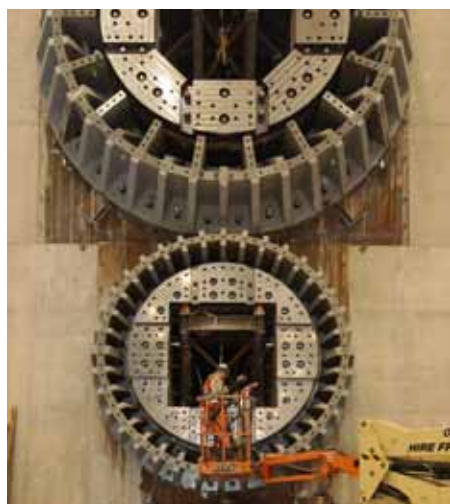
Deliver a clear decarbonisation target for 2030, setting the UK on a pathway to meeting its 2050 commitments

Promote actions to reduce overall energy demand and improve energy efficiency

ENERGY

A significant proportion of the UK's existing energy infrastructure is expected to be taken offline in the coming decade – including here in the North East – as part of the transition to a secure, affordable and low carbon energy future. The Energy Act 2013 has provided the clearest signal yet of the Government's intent to attract the private investment needed to support this aim.

The region has embraced the transition to decarbonised energy generation and is delivering a range of innovative low carbon developments. The Offshore Renewable Energy Catapult's National Renewable Energy Centre (Narec) in Blyth, for example, is a national research and test centre for renewable energy technologies, and the region is making excellent progress in the development of an energy from waste (EfW) industry.



©Narec 2014 – Narec's 100m blade test facility

However, political uncertainties and the lack of a clear decarbonisation target have been identified as barriers to the continued development of renewables beyond 2020 and have resulted in the cancellation of a number of projects, including the proposed North Blyth biomass plant. Uncertainty also surrounds investment in Carbon Capture and Storage (CCS) which has the potential to reduce carbon emissions significantly by over 5m tonnes per annum (tpa) from Teesside industries alone. By identifying a clear decarbonisation pathway to 2030 and beyond, Government can provide Narec and others with the confidence to invest in the research, development and testing of new technologies.

Coal, which was once a key component of the region's generating capacity, has been largely superseded by other technologies, and Government has recently announced support for the conversion of Lynemouth power station from a coal to biomass facility¹⁹. This will enable the plant to comply with European emissions regulations beyond 2015, ensuring that generation can continue, and help to mitigate concerns over falling capacity margins. The relatively low profitability of gas generation has resulted in the closure of the Teesside gas plant – once the largest in Europe – which had been operating at reduced capacity since 2011²⁰.

In 2013, around half (1.18GW) of installed generating capacity (2.2GW) in the region came from the Hartlepool nuclear power station²¹. This will continue generating electricity until at least 2019 and is one of eight sites identified by the Government in proposals to deliver a new generation of nuclear power stations in the UK.

The majority of the North East's electricity distribution network was installed over half a century ago and is coming to the end of its expected lifespan. Northern Powergrid is planning to spend up to £4bn over the next ten years to improve resilience and enable new sources of generation to be connected to the network²².

In the longer-term, the move towards electricity for powering transport and the adoption of domestic heat pumps will be required if we are to meet our long-term decarbonisation targets. This reinforces the need to focus on initiatives that reduce our overall energy demand for existing uses, and improve efficiency.

Electricity is not the only important source of energy for NE industry, and support is also required for industrial heat distribution networks, which have the potential to reduce carbon emissions further, but require significant up-front investment.

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WATER: ADEQUATE FOR NOW

ICE NE RECOMMENDS CONTINUED ACTION TO:

Implement catchment management schemes to manage resources holistically

Manage demand through the installation of domestic water meters

Reduce leakage and improve water quality through a structured renewal and repair programme

WATER

Northumbrian Water Limited (NWL) supplies water and sewerage services to 11 of 12 local authority areas in the region (with Hartlepool served by Anglian Water). NWL has 16,965km water mains and 29,724km sewers, across an area of 9,422km².

Climate change, population growth and a requirement to meet sustainability standards set out in legislation are arguably the greatest challenges facing water security across England. In the North East, water scarcity is currently less of a concern than elsewhere, however in the future, other pressures will have to be factored into the approach to water resource management.

According to Defra's Climate Change Risk Assessment, the number of catchments with sustainable abstraction levels within the Northumbria river basin may reduce by a third by the 2020s. Defra and the Welsh government are currently consulting on changes to abstraction licences in England and Wales, and this may impact on the availability of water for abstraction. Catchment management techniques bring together a range of water abstractors and users to manage water resources holistically, and a number of catchment management schemes are underway in the region²³. We look forward to the results of this approach to water resource management.

We should also use a range of techniques to reduce the quantity of water flowing into sewers. In addition to flood and water management benefits, this would also reduce the volume of water requiring treatment, cutting costs and carbon emissions and potentially improving water quality.

Alongside these management techniques, demand management is also required. Metering, which is now extensive in some areas, is an effective way

19. Department for Energy and Climate Change (DECC) (23 April 2014) Government unveils eight major new renewables projects, supporting 8,500 green jobs 20. Reuters (18 October 2013) GDF Suez to demolish UK Teesside gas-fired power plant 21. DECC (2013) Digest of United Kingdom Energy Statistics (DUKES) 22. Northern Powergrid - Your Powergrid: Business Plan 2013-2015 23 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/204231/pb13934-water-environment-catchment-based-approach.pdf



Kielder Water – the biggest man-made lake in Northern Europe



Littlehaven Promenade and Seawall, South Shields, South Tyneside

to enable water consumers to manage their use, and water companies to understand how water is being used. ICE recommends that metering, complemented by social and discretionary tariffs, should be universally applied throughout the UK, implemented over time and on a regional basis according to the extent of water stress.

Real time data and abstraction figures provide regulators with a better understanding of water use from all sectors. Increased metering and technological developments will enable NWL to achieve further reductions in leakage, which should be reflected in its Water Resource Management Plans. NWL is undertaking a capital investment programme to replace iron mains. This will help to alleviate discoloration and tackle leakage, which has been reduced by over 13% in three years, to 136Mld in 2013 (the lowest level ever achieved).

FLOOD MANAGEMENT

The autumn and winter of 2013/14 saw extreme coastal surges, storms and rainfall, causing extensive flooding and other damage. The National Severe Weather Warning Service (NSWWS) managed by the Met Office provided early warning for those operating infrastructure. Collaboration between the Environment Agency (EA) and the Met Office in the Flood Forecasting Centre enabled the EA and emergency responders to plan and manage these extreme events effectively²⁴.

These events not only highlighted our increasing exposure to extreme weather events, they also showcased the ability of the region's sea defences to withstand the extreme weather events for

which they were designed. While areas further south suffered significant flooding, the coastal communities of the North East remained largely unaffected, and whilst a breach in flood defences at Greattham threatened critical industry on Teesside, it was handled successfully by the EA. Compared with similar events 60 years previously, damage from flooding was minimal.

Despite this progress we must remain vigilant to the risks from flooding. In autumn 2012, the North East suffered significant rainfall in a short period of time that damaged property, disrupted the rail network and impacted on multiple communities. The interdependencies between flood management and transport networks should be at the forefront of resilience planning so that the economy and society are not affected unnecessarily.

As the climate changes, both river flow and sea levels may be impacted. The Defra Climate Change Risk Assessment suggest that by the 2020s the peak river flow in the Northumbria and Tweed river basins (covering all our major rivers) will increase by approximately 10%. In the North East, sea levels are predicted to rise by approximately 66mm by the 2020s and by 168mm by the 2050s²⁵. More intense rain storms are causing flash surface water flooding. Continued monitoring and assessment of risk is required.

A holistic approach to flood management using active measures (physical defences), passive measures (multifunctional green space to act as water storage, planting of grass and trees), emergency management measures (flood warnings and emergency management plans), and improved resilience to speed recovery after flood events can help to manage these challenges going forward.

The decline in maintenance investment in England is of concern to ICE. In 2014/15 maintenance grants from the EA will be 22% lower than they were in 2010/11. This has an impact on the range of maintenance activities that EA, LLFAs and Internal Drainage Boards can undertake, such as dredging, clearing culverts and inspecting flood and coastal defences.

KEY TO NORTH EAST GRADES

- A** FIT FOR THE FUTURE
- B** ADEQUATE FOR NOW
- C** REQUIRES ATTENTION
- D** AT RISK
- E** UNFIT FOR PURPOSE

View the full report online at ice.org.uk/stateofthenation

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FLOOD MANAGEMENT

ICE NE RECOMMENDS ACTIONS TO:

Agree standards of resilience required to maintain and operate infrastructure networks, particularly during extreme weather events

Develop a holistic approach to flood management with clear lines of responsibility, to speed recovery after flood events occur and help to manage future challenges

Address the imbalance between funding for maintenance and capital investment, providing clear ring-fenced funding for surface water flood risk management

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