

EAST MIDLANDS

INFRASTRUCTURE 2014



The East Midlands transport, flooding, water, energy and waste infrastructure is a complex and interdependent system which is critical to society and an essential enabler for a dynamic economy. This network faces significant challenges relating to condition, capacity, resilience and funding.

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.

TRANSPORT

Travel around major city conurbations in the region results in significant peak-time congestion, whilst in rural areas safety and accessibility issues cause concern.

The estimated economic cost of congestion to the East Midlands, without intervention, is forecast to rise to £2.5 billion per year by 2025.¹

The East Midlands lacks an overarching transportation strategy as well as effective institutional structures for 'larger than local' decision making. The LEPs have yet to fill the strategic planning void and in some cases are under resourced and/or lack the necessary scale to identify, develop and support larger than local investments.

The ongoing devolution through LEPs, Local Transport Bodies and City Deals should be extended to the formation of powerful Combined Authorities within, and across, the East Midlands. A Combined Authority would bring the strategic overview needed to plan and secure funding for the wider infrastructure necessary to realise the growth potential offered by HS2.

STRATEGIC ROAD NETWORK (SRN)

The capacity of the region's SRN has improved over the past decade, particularly on north-south corridors.

Recommendations from our last State of the Nation Infrastructure report (2010) including the widening of the M1, the dualling of the A46 (Widmerpool to Newark), widening of the A453 between the M1 and Nottingham, and the M1 J28- 35 Smart Motorway, have been implemented or are under construction. Others, such as the Eastern Lincoln bypass, are progressing.

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STRATEGIC TRANSPORT GRADE B
LOCAL TRANSPORT GRADE D

RECOMMENDATIONS

Prioritise investment in the region's strategic transport corridors, particularly improving East–West links in and through the region.

Formation of Combined Authorities, within the East Midlands, charged with delivering an integrated transport strategy at a sub-regional level.

Improve sustainable alternatives to the private car, including improved public transport and better integration with land use and regeneration policy.

Further east–west improvements are needed to reduce congestion, improve safety and support economic growth. The region's strategic investment corridors² need effective transport networks to enable and stimulate economic growth. These corridors include:

- Linking the economic growth opportunities of the Northamptonshire Arc with the Haven Ports and West Midlands.
- Linking the economic and housing growth in the Three Cities and the Eastern Triangle with the Humber Ports and West Midlands.
- Linking the Three Cities and East Midlands Airport with the Sheffield City Region, London and West Midlands.
- Linking key growth opportunities along the A5 (including MIRA Enterprise Zone) and Northamptonshire Arc.



Some of the improvements needed in these corridors are identified in the National Infrastructure Plan (NIP), but better planning is required to achieve effective prioritisation and delivery.

LOCAL ROAD NETWORK

As a major contributor to manufacturing, food and agricultural production, the region needs an efficient and resilient local road network.

Lincolnshire haulage operators report that urban traffic holdups affect their ability to plan journeys around drivers' hours regulations, and that reliable journey times across local networks are often just as critical as strategic route journey times³.

There has been a general decline in the condition of the local road network over recent years⁴, and our main urban areas have suffered from increased levels of congestion⁵ and pollution. Deterioration in local roads affects motorists and reduces the quality of the neighbourhood street-scene. Some local authorities have established effective asset management regimes whilst others have been slow to do so. A reactive approach to pothole repair pervades rather than properly funded, whole-life maintenance regimes.

RAIL INFRASTRUCTURE

Despite the age of many rail assets, recent track and structures renewal programmes have improved the condition of the network. There is, however, a backlog of drainage improvements that may create further flooding issues as climate change leads to more extreme weather.

The performance of inter-city and cross country rail in the East Midlands has improved including recent upgrades on the Midland Main Line (MML). The reduced disruption that will accrue through further planned renewal and upgrade works is also welcomed.

There remains an urgent need to improve the east-west axis, including Nottingham to Birmingham, and the Castle Line (Lincoln-Newark-Nottingham) where programme advances would enable existing rolling stock to run at their designed speed. The MML electrification, including new rolling stock and, in the longer term HS2, are welcome additions to the network.

INTEGRATED TRANSPORT

Investment in bus and rail integration, and park and ride, notably with the Mansfield Passenger Transport Interchange, and station improvements

at Loughborough and Corby, represent positive steps for integrated transportation. Fully integrated ticketing should also be implemented to gain further benefit from investment and to encourage greater use of public transport.

The announcement of Nottingham Express Transit (NET) Phase 2 in 2012, recognised the success of integrating light rail with award winning bus operations.⁶ This will help reduce congestion and CO2 emissions. A re-examination of the Greater Nottingham Rail Study would complement the NET routes to reduce commuter traffic further.

Greater support must be given to cycling and walking, and to reviewing rural and semi-rural bus services. Transport authorities must increase their efforts to initiate behaviour change by making sustainable transport more attractive and safer.

Leicestershire County Council is promoting several sustainable transportation schemes including walking/cycling facilities, public transport provision and travel planning promotions. Current areas include Loughborough and Coalville, on three year rolling programmes, with a £4.5M sustainable funded scheme planned for Hinckley.

FLOOD MANAGEMENT

The East Midlands' flood defences generally performed well during the December 2013 North Sea storm surge, the highest since 1953, although a breach at Boston caused flooding to 579 homes.⁷

The social and economic issues affecting communities at risk of flooding, particularly on the East Coast, needs to be revisited. The impact of flooding at Boston illustrates problems with funding and mechanisms for justifying investment. At the time of the flood, proposals for a barrier for the tidal River Haven had been delayed. The scheme provides an engineering solution to improve the protection of 15,000 residential properties and 700 businesses.⁸

Since the last State of the Nation report there has been significant flood defence investment, or plans are in place, for a number of the region's towns and cities. The Nottingham flood alleviation scheme, opened in 2012, now protects 16,000 homes and businesses. There are proposals in Leicester to invest £15million to protect some 4500 properties from flooding from the River Soar and its urban tributaries and from surface water flooding. In Derby, where many of the flood defences are nearing the end of their design life, work is programmed to improve river flow by removing pinch points that cause high river

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FLOOD MANAGEMENT

RECOMMENDATIONS

The Environment Agency and Lead Local Flood Authorities should implement a holistic approach to flood management, which includes land use planning, upstream catchment measures, flood defences and increased infrastructure and buildings flood resilience.

Government should provide the longer term certainty needed to improve flood resilience by committing to a long term capital and maintenance programme for Flood Management which protects funding beyond the current 5 year plan.

The importance of agricultural land should be considered as part of the overall economic assessment of flood management projects.

levels and building some replacement defences.⁹ Agricultural production on low lying land in Lincolnshire is of significant value to the UK economy. The land drainage pumping equipment on the North Lincolnshire network, some of which dates back to 1935, requires significance maintenance to prevent the risk of failure and flooding.

Overall government funding levels have been reduced and there remains an insufficient allocation to meet current capital investment needs and necessary routine annual maintenance. In principle partnership funding should increase financial resilience, but there is currently relatively little private capital emerging. One successful example is the £8.7m Lower Dove flood scheme, completed in October 2013, which provides protection to 1,600 residential and commercial properties. Nestlé, which operates in Hatton made a £1.65m contribution and the reduced risk of flooding has enabled it to expand and create around 300 jobs.¹⁰

The Flood and Water Management Act 2010 placed greater responsibilities with local authorities. In Lincolnshire a successful partnership of all Risk Management Authorities is emerging. However, many Lead Local Flood Authorities (LLFA) have problems from lack of funding, manpower resources, skills and experience. There is evidence that this is improving, assisted by Defra and the Environment Agency (EA) capacity building and skills initiative, although further work in this area is urgently required.

3. Greater Lincolnshire LEP transport workshop - March 2013 4. Department for Transport statistics, Road Condition Statistics Table RDC0131 Percentage of unclassified roads where maintenance should be considered, in England, 2007/08 to 2012/13 5. Department for Transport statistics, Congestion & Reliability Statistics Table CGN0206a Average vehicle speeds during the weekday morning peak on locally managed 'A' roads by local authority in England: annual averages from 2006/07 6. National Transport Awards 2013 7. New Civil Engineer, 06.02.2014 8. New Civil Engineer, 06.02.2014



LLFAs are also facing resourcing issues as they become statutory SuDS Approving Bodies (SABs). The method and process of charging communities benefiting from adopted SuDS systems is still to be finalised and requires clarity and certainty.

Climate change and population growth are undoubtedly placing pressure on flood defences, however, new or upgraded flood infrastructure is also a means of unlocking growth at a local or LEP level. There needs to be a coordinated and innovative approach to flood risk management that includes traditional flood defences but also individual property protection, river management, attenuation of runoff and SuDS. These in turn need to achieve a balance between property, businesses, farming and environmental interests.

WATER

The water and wastewater infrastructure in the East Midlands has benefited from significant investment, but there is still more to be done to address key issues.

Eastern areas of the region are some of the driest in the country and predicted warmer, drier summers will result in an increased strain on water resources. Further demand will result from the proposed increase in new housing, particularly in growth areas, such as parts of Northamptonshire.

The East Midlands' regional water companies (Anglian Water and Severn Trent Water) face different challenges in relation to water resources, but the reduction of leakage is common to both of their strategies. They have a similar approach to demand management through customer

awareness campaigns, with some success. ICE believes more needs to be done and considers that the effective management of water consumption can be best achieved through the widespread adoption of water metering.

Deterioration within the Severn Trent network results in an overall average increase in leakage of around 3%. ¹¹ The AMP6 (Asset Management Programme) is likely to see an increased focus on asset renewal and maintenance, rather than capital investment in major projects and infrastructure, it is therefore imperative that the investment in renewal/maintenance of critical deteriorating assets supports effective water resource management.

Carbon saving is incorporated into the business plans of both water companies, and carbon footprint calculations are undertaken on most schemes. The Government's Green Construction Board (GGCB) is actively supported by Anglian Water, with a main board director currently Chairman of the GGCB Infrastructure Group. ICE supports this initiative which is central to the design process, to ensure consistency and effectiveness in all investment and procurement decisions.

Further work on improving resilience is ongoing, including the notable example of Severn Trent's upgrading of the Derwent Valley Aqueduct. However, improvements to the resilience of small sewage treatment works may be hampered by the fact that performance data on these sites is not routinely collected.

It is pleasing to note that there is a move to a risk based system for sewer replacement, though the policy remains 'fix on failure' for highway drains and culverts. The heavy and prolonged winter rainfall has inevitably resulted in an increase in storm overflow discharge and sewer flooding and the EA and the water companies need to address this issue.

ENERGY

The East Midlands currently remains a net exporter of electricity with the generation sector, and its supply chain, contributing significantly to the region's economy. The electricity supply industry is generally robust and provides a consistent and reliable product to its many and varied customers.

The Industrial Emissions Directive will take effect in 2016, placing a further cap on the emission of oxides of nitrogen and sulphur from electricity

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ENERGY

RECOMMENDATIONS

Enact the secondary legislation to implement Electricity Market Reform (EMR) by the end of this Parliament to establish long-term investor confidence.

Continued investment in regional renewable energy generation capacity and skills to increase diversity of mix and security of supply.

generation stations. The cap will significantly reduce coal-fired electricity generation, which accounts for 35-40% of total UK supply.¹²

In the East Midlands three coal-fired stations will be affected by this; Cottam, West Burton and Ratcliffe-on-Soar. At the Ratcliffe power station installation of selective catalytic reduction abatement technology, to reduce nitrous oxide (NOx), is designed to extend its life into the 2030's. Without investment other stations are likely to go out of service over the next 5 to 10 years.

There has been a significant engineering economy based around service provision to these stations and this will decline as they retire from service.

Gas and wind powered generation will be most likely to replace the coal-fired generation. There has been growth in renewable energy in the region, though this still only accounts for 6% of the UK's renewable energy generation capacity.¹³ East Midlands Councils study in 2011 estimated a potential capacity in the region of 9.8GWh by 2030.¹⁴ On-shore wind has the greatest technical resource potential although heat pumps, solar PV and solar thermal also have significant potential.

Currently the East Midlands has some 730 MW of wind energy generating capacity with 170 MW under construction and a further 130 MW consented.¹⁵ Combined Heat and Power (CHP) in the region is around 4% of UK installed schemes for both electricity and heat.¹⁶

Parts of the East Midlands separate the northern UK generation zones from the southern demand centres and high levels of power are transferred through the region. The capability of the East

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WATER

RECOMMENDATIONS

The recently established National Water Resources Group should be tasked with creating an integrated and strategic roadmap to ensure future water security including both demand and supply side measures.

Ensure that Total Expenditure (TOTEX) approaches and the use of soft engineering, such as catchment management, are fully incentivised through the economic regulatory system. Water and sewerage companies should ensure that they use these new approaches to deliver resilient and sustainable infrastructure.

9. Environment Agency Capital Schemes 2014.2015 ¹⁰. <http://www.environment-agency.gov.uk/homeandleisure/floods/142168.aspx> ¹¹. Severn Trent Water - A Response to the Climate Change Act's Adaptation Reporting Power, January 2011 ¹². The UK Energy in Brief 2013, published by National Statistics ¹³. <http://www.renewableuk.com/en/renewable-energy/wind-energy/uk-wind-energy-database/index.cfm> ¹⁴. <http://www.emcouncils.gov.uk/write/Emids-low-carbon-energy-opportunities-Final-Report-07-2011-update.pdf>



Midlands electricity transmission systems are sensitive to the changes in generation backgrounds and are restricted by voltage limitations. These vary throughout the year, but should remain well above the required transfer level until 2015. The boundary becomes non-compliant from 2018 onwards but completion of the Hornsea-Walpole offshore High Voltage Direct Current transmission network connection would provide the required additional capability.¹⁷

Generally the electricity regional distribution network is performing well, with Western Power Distribution East Midlands recording just one failure, in 2013, against Ofgem's national customer guarantee service standards, and four failures against the standards relating to connection performance.¹⁸ As the UK energy mix evolves there will be growing pressures on the Electricity Grid to cater for changes in location of and intermittency of energy generation.

The University of Nottingham and Loughborough University are active in Energy Research. Nottingham has recently received £14.3M in funding for a new research centre and Loughborough academics are embarking on a £1M research project into solar energy. These institutions, along with Birmingham University, make up the Midlands Energy Consortium. The Midlands Energy Consortium hosts the Energy Technologies Institute (ETI), which is a public-private partnership, established to speed up the deployment of new low-carbon energy technologies in support of the UK's energy and climate change goals.

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WASTE

RECOMMENDATIONS

A move from waste to resource management and a circular economy should be at the centre of policy.

Government must now focus on creating a policy, regulatory and commercial environment that encourages private investment in infrastructure serving all of the UK's waste streams. At the centre of this should be improved waste data in the commercial and industrial (C&I) sector.

WASTE

The dismantling of the majority of regional bodies has inevitably stopped the development of an over-arching East Midlands waste and resource management strategy. ICE supports the view that the majority of waste should be treated as a potential resource which can make a real contribution to the economy and efficiency of the region and as such calls on all parties to re-engage across sectors with this focus.

The historic lack of appropriate data makes it difficult to assess future capacity needs which present risks to investment in new waste infrastructure. The roll out of the Electronic Duty of Care (EDOC) system, from January 2014, offers an alternative to long standing paper based systems of non-hazardous waste transfer notes, modernising the way data is collected in the UK. As its use expands it is expected to significantly enhance the ability to extract quality data for businesses, regulators and government.

While municipal waste is one of the smaller waste streams by volume, circa 10% or 2.2 million tonnes¹⁹ in the East Midlands, its high visibility with residents makes how waste authorities deal with it particularly important.

Recycling rates for municipal household waste in the region have increased from 13.9% in 2000/1 to 46.8% in 2012/13 (national average of 43.2%), with the waste going to landfill reducing from 78% to 38% (national average 33.8%) and incineration with Energy from Waste increasing from 7% to 13.8% (national 21.8%).²⁰

A consistent approach to recycling streams between councils is required across the region as the current inconsistencies create dissatisfaction among householders. Some areas do not collect plastic whereas others do, but then not collect paper, cardboard or glass. This sends a confusing message to the public and is detrimental to recycling rates.

Construction and demolition waste remains the highest proportion of total waste. With reduced landfill capacity the need remains for the construction/civil engineering industry to increase avoidance and reuse of materials. This has improved over the past few years where resource efficiency can reduce overall costs, even with continuing increases in transport, management and landfill tax.

CASE STUDIES

LINCOLNSHIRE'S ENERGY FROM WASTE



Lincolshire's Energy from Waste (EfW) facility is an excellent example of how to deliver a large, complex and contentious scheme on time and within budget (11MWe and 10MWt). This was achieved by Lincolnshire County Council taking an unusual approach to the treatment of risk, risks that the industry normally transfers to the private sector including:

- land purchase
- choice of technology
- funding
- and planning permission

Together with the construction of four waste transfer stations, this £145m project now reduces the need for expensive landfill and creates opportunities for the Combined Heat and Power enabled EfW facility to offer heat and energy to surrounding homes and businesses.

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

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