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ice
Institution of Civil Engineers

THE STATE OF THE NATION BRIEFING

SOUTH EAST ENGLAND INFRASTRUCTURE 2010

THE STATE OF THE NATION
INFRASTRUCTURE 2010

South East England's infrastructure is at its limit. Sources of funding are scarce and there are a number of urgent challenges to address – including an historic underinvestment in infrastructure, a growing population and the transition to a low carbon economy.

UK OVERVIEW

Infrastructure is vital to our nation. It is a complex and interdependent system which provides us with the energy, transport, water and other essentials that are the basis of our civilised society and our economic well-being.

This complex system of infrastructure is fragile and affects our nation's resilience, as has been demonstrated in recent times by the impact of flooding, the severe winter and volcanic ash.

In the last generation we have grown more and more reliant on our infrastructure, and both the OECD and HM Treasury have acknowledged infrastructure investment has a positive effect on economic growth.

That is why this independent assessment of the state of our nation's infrastructure is so important. We investigate the condition, capacity, resilience and funding of the various components of our infrastructure: energy, transport, water, flood risk management and waste.

We also found that several issues have a dramatic effect on all infrastructure sectors. The sustainability of infrastructure affects its ability to drive a low carbon economy. And recurring problems with funding, skills and regulation hinder the delivery and performance of infrastructure.

The nation that neglects its infrastructure neglects its future. But the nation that respects its infrastructure respects its people, and provides for their sustainable future.

SOUTH EAST ENGLAND OVERVIEW

This report provides government with an independent appraisal of the state of the region's waste, water, energy and transport infrastructure, and recommendations for priority actions at the start of the new government.

The score given to South East England's infrastructure overall was C, meaning that all sectors of infrastructure require attention. There is no excess capacity resulting in deficiencies at peak periods and more so if there are even minor incidents. Flood risk management and waste scored lower and are considered to be 'at risk'.

The limitations of our regional infrastructure are, perhaps, most visible to the public on our road and rail networks – and when floods cause severe damage to homes and businesses. However, we also face major challenges for our future water supplies and in dealing with waste. While not so immediately visible to the public, they are just as vital to our way of life, and need proper attention.

ICE has received and considered submissions and oral evidence from over one hundred different engineering organisations and individuals based across the region during the writing of the report.

GRADE

C

REQUIRES ATTENTION

WASTE

GRADE

D

C	CONDITION AND CAPACITY	REQUIRES ATTENTION
D	STRATEGIC LEAD	AT RISK
C	RESILIENCE	REQUIRES ATTENTION
D	SUSTAINABILITY	AT RISK
E	IMPACT OF SIGNIFICANT CUTS	UNFIT FOR PURPOSE

KEY RECOMMENDATIONS

Use planning powers to closely link waste management, energy and climate change policies, especially when planning for new development

Strong leadership is needed from local authorities, who are best placed to engage with communities, to encourage a shift to resource management and reduce opposition to new infrastructure

Strategic landfill capacity remains essential for the medium term security and resilience of waste management in South East England and should be increased

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SOUTH EAST ENGLAND WASTE AND RESOURCE MANAGEMENT

THINK OF WASTE IN TERMS OF RESOURCE MANAGEMENT RATHER THAN RUBBISH DISPOSAL

The first priority for policy makers should be to encourage improved design to reduce waste arising from products and processes and influence consumer choices. Any 'waste' that is then produced should be first reused, then recycled so it is treated as a resource rather than as rubbish.

Material left over from these processes has a huge potential as a source of energy, much of which qualifies as renewable, thus contributing to national targets in this area. Local authorities should link planning powers to align waste management, energy and climate change policies, especially when planning for new development.

LOCAL AUTHORITIES CAN PROVIDE THE NECESSARY LEADERSHIP

Local authorities in South East England have a key role in shifting thinking from waste disposal to resource management. Leadership is needed because strategies for the management of different waste streams are often developed separately, with no integrated vision.

Local authorities are well placed to work with public and private stakeholders to reach consensus on the needs of their area. This can reduce opposition to facilities, and give industry the confidence to invest in new technologies and infrastructure. Local authorities should also ensure that waste infrastructure provision is factored into planning for large new developments.

Some local authorities are taking a lead in these areas, but more need to follow to ensure that industry is given the confidence to invest in new facilities.

WE RISK RUNNING OUT OF LANDFILL

A range of new facilities for composting, recycling and recovering energy from waste are being developed in South East England in response to the EU Landfill Directive. In the medium term however, strategic landfill capacity remains essential for the security and resilience of waste management in South East England. ICE calls for an increase in strategic landfill capacity in the region until new infrastructure comes on line, especially given other regions' dependence on the South East for their own waste management and disposal.

CASE STUDY: PATHWAY TO ZERO WASTE

Much public attention is given to recycling and reducing municipal waste, but construction and demolition and commercial and industrial waste make up as much as 80% of the waste stream.

Pathway to Zero Waste (PTZW)[1] is working to reduce the amount of construction and demolition waste sent to landfill in South East England by 50% against 2008 levels by 2011, which will result in the diversion of 2.7 million tonnes of material.

One example of good practice they highlight is railway bridge widening for the Reading Station Area Redevelopment, where design choices helped save 2,443 tonnes of material, the equivalent of 121 wagon loads avoiding landfill, and created 12,000 tonnes of recycled material for other construction projects.

CASE STUDY: COMMUNITY OPPOSITION TO RECYCLING FACILITIES IN WEST SUSSEX

For waste companies and infrastructure developers, gaining planning approval to build new waste facilities can be a long, challenging and costly process. Proposals by Focus Environmental Services to deliver a new waste transfer station and recycling centre near the village of Small Dole in West Sussex have been met with opposition by the local community and a decision has still not been reached almost a year on.

The proposed facility will recycle 75,000 tonnes of construction waste a year, including plasterboard, gypsum, plastic and timber – materials that would otherwise end up in nearby landfill sites. The need for strong public consultation is clear, but local and regional authorities need to ensure that industry is supported in delivering the next phase of strategic waste infrastructure. This includes reducing opposition to new infrastructure through education programmes and could even involve community incentives.

1. PTZW (Pathway To Zero Waste) is a partnership founded by SEEDA (South East England Development Agency), the Environment Agency and WRAP (Waste & Resources Action Programme).

ENERGY

SOUTH EAST ENGLAND ENERGY

SECURITY OF SUPPLY

There is a danger of demand outstripping energy supply in the years ahead, unless government takes prompt action to prevent future shortfalls. Security of supply, affordability and sustainability should be at the top of the agenda. This means utilising all forms of generation – including nuclear, renewables, energy from waste and applying carbon capture and storage to coal and gas power generation. South East England's energy mix needs to be diverse to deliver affordable, secure and sustainable energy going forward.

REDUCING DEMAND

Reducing demand and improving efficiency should be central in our response to the challenges of increasing energy costs and risks to supply.

The use of heat accounts for nearly 50% of energy demand in the UK[2]. We could significantly improve efficiency by making greater use of heat capture from power stations or Combined Heat and Power (CHP) schemes such as the Southampton district energy scheme.

However, infrastructure projects alone are not the whole story. We need to improve the efficiency of our buildings and make it easier for people to see their energy use and costs with new smart meters. 'Street-by-street' retrofitting of existing housing stock is a priority and will create opportunities for job creation and the up-skilling of whole communities.

LOW CARBON ECONOMY

In addition to affordability and security, we need to make the transition to a low carbon economy – and to see that transition as an opportunity rather than a threat.

Much of the UK's electricity generation capacity is nearing the end of its life and hence investment in new electricity infrastructure is urgently needed. Government needs to create a framework in which the energy industry will invest in low carbon energy supplies and at a level that reflects major changes in future energy demand, for example in electric cars and trains. It is vital that government's intended changes to the planning system are managed in a way that does not stifle investment in new infrastructure.

We should use infrastructure investment and business support to encourage green skills and industries to develop and grow, for example to support offshore wind farms around Kent and the Isle of Wight.

ACCEPTANCE AND ACTION

Achieving energy security, at affordable prices and with reduced carbon emissions will not be easy. Whilst all levels of government have an important role in facilitating this transition, they will only be able to do so much. Business and public must begin to accept the trade-offs, make the best choices available and embrace new technologies.

Energy efficiency will save money as well as energy. This will become increasingly important as the full costs of carbon emissions – and the low carbon alternatives – are reflected in energy prices. However, delivering the transition to the low carbon economy, on both the supply and demand sides, will create markets for new products and jobs. This will maintain and enhance quality of life and keep the region economically competitive.

CASE STUDY: MAKING THE TRANSITION TO LOW CARBON TRANSPORT

Milton Keynes is one of nine locations across the UK participating in a pilot project funded by the Energy Technologies Institute aimed at making it easier for thousands of people to use electric and hybrid electric vehicles. The project will evaluate consumers' attitudes towards plug-in vehicles and supporting infrastructure, to help identify the route towards a mass market for electric vehicles.

CASE STUDY: USING ENERGY MORE EFFICIENTLY

Southampton district heating network provides heating and cooling to the Civic Centre, residential properties, several large office buildings, a hospital, a health clinic, a university, a large shopping centre, a supermarket, several hotels, BBC television studios, and a swimming and diving complex, among others. It saves over 12,000 tonnes of carbon emissions per year and is 85% efficient.

GRADE

C

CONDITION AND CAPACITY REQUIRES ATTENTION	C
STRATEGIC LEAD AT RISK	D
RESILIENCE REQUIRES ATTENTION	C
SUSTAINABILITY AT RISK	D
IMPACT OF SIGNIFICANT CUTS AT RISK	D

KEY RECOMMENDATIONS

South East England's energy mix must deliver a secure and affordable supply for all

Demand reduction measures should be prioritised – including retrofitting of existing housing stock and smart metering

Government policy, regulation and support must encourage the development of low carbon energy infrastructure and green industries in South East England

2. 'Why Waste Heat?', May 2009, Institution of Civil Engineers

TRANSPORT

GRADE

C

C	CONDITION AND CAPACITY	REQUIRES ATTENTION
C	STRATEGIC LEAD	REQUIRES ATTENTION
C	RESILIENCE	REQUIRES ATTENTION
D	SUSTAINABILITY	AT RISK
C	IMPACT OF SIGNIFICANT CUTS	REQUIRES ATTENTION

KEY RECOMMENDATIONS

Manage and develop network capacity, both at the local and national level

Encourage a shift to low carbon transport

SOUTH EAST ENGLAND TRANSPORT

ICE set out three priorities for South East England's transport network in its State of the Nation: Transport report (2008):

1. Protect and sustain our international and inter-regional gateways
2. Create more opportunity for people to use public transport and to work closer to home
3. Help people understand the real costs of different journeys

While the financial and political landscape has changed dramatically since 2008, we believe these themes and priorities remain valid for South East England. We have developed them further in the context of the overall network capacity and the low carbon economy.

MANAGE AND DEVELOP NETWORK CAPACITY

Congestion on roads, railways, airports and ports is a key challenge for the South East. Our ability to meet this challenge affects not only businesses and people living in South East England but also London and the rest of the UK. There is no quick fix, particularly in a time of severe financial constraints and we need to adopt a range of responses:

- **Maintain and use our existing assets well**
  The damage to the region's roads this winter illustrates how important it is to maintain our transport infrastructure, just to keep the current level of service. In some areas, we may be able to get more from existing assets, for example through the use of motorway hard-shoulders to increase capacity at peak times.
- **Reduce demand where practicable**
  ICE believes that demand management through road-pricing would benefit the economy, and that we need to explore options in the UK outside of the major cities. As well as freeing up capacity at peak times, it can encourage a shift to more environmentally-friendly forms of transport.
- **Encourage greater use of public transport**
  For local and regional journeys in South East England, the private car remains the transport mode of choice. Buses, park-and-ride schemes, and local rail services need to be made more attractive.
- **Improve interchanges to get the most out of our transport assets**
  One way to get more from our existing assets is to improve the interchanges between local, regional and national transport networks so that it is easier to make a complete journey using different transport modes.

IMPROVE INTERCHANGES TO INCREASE PASSENGER CHOICE

The number of rail passengers in Ashford is forecast to grow by over 30% over the next ten years, as a result of High Speed 1 rail services. Can lessons be learnt from London, where travel information and multi-mode tickets allow passengers to get the most out of the network?

- **Invest in new capacity so the economy can grow**
  Some parts of the network will need to expand, for example, port traffic, which is forecast to nearly double by 2030. The national road and rail networks supporting that traffic need to be developed at the same time.

LOW CARBON TRANSPORT

Transport is responsible for over a quarter of the UK's carbon emissions. We see the need for a shift to low carbon modes of transport both through new technology – from more efficient vehicles through to electrified railways and cars backed up by low carbon electricity supplies – and through changes in travel – which can be supported by improved public transport, better interchanges, and the real cost of journeys being more apparent.

SWITCHING TO LOW CARBON TRANSPORT

The £1 billion electrification of the Great Western mainline removes the need for diesel locomotives, but to achieve its potential it must be powered by a decarbonised electricity supply.

WATER AND WASTEWATER

SOUTH EAST ENGLAND IS A WATER STRESSED AREA

South East England is one of the most populous and economically active regions in the UK, but it is also severely water stressed. Those stresses will increase unless action is taken, both because of population increases (the 2009 Regional Spatial Strategy called for over 660,000 new dwellings over the next 20 years) and the impact of climate change, which is expected to reduce groundwater yields and summer river flows. At the same time, the Water Framework Directive means that abstraction licenses and effluent discharge permits granted by the Environment Agency will become much more restrictive.

SHORT TERM PRICE CONTROL OR LONG TERM SUSTAINABILITY?

A long-term view does exist. Water companies are required to produce water resources management plans which set out their plans for maintaining water resources for the next 25 years, taking account of the supply/demand balance over that period and identifying the least cost option to address any deficits. The financial regime for the water companies to take these plans forward is set by Ofwat's five-year price determinations.

There is concern that short-term price control has been winning out over the long-term sustainability of supply. Much of this debate hinges on the balance between demand reduction measures versus investment in new water infrastructure such as reservoirs. It also affects the industry's ability to undertake preventative maintenance.

WE NEED TO REDUCE DEMAND

Water conservation should be a priority for a water-stressed area such as South East England and can reduce the need for costly new infrastructure. The government estimates that the average person's water use will need to drop from 150 litres of water per day to 130 litres[3].

Where economically viable, compulsory metering is considered by customers as the fairest way of paying for water and is a powerful way of encouraging users to value water and use it more efficiently. Experience suggests metered houses reduce their consumption by 10%.

And wide-spread metering is viable. The National Metering Trials of the Isle of Wight found it economically viable to meter 93% of properties. Folkestone & Dover Water Company has been granted permission to apply compulsory metering and, with funding from Ofwat, aim to achieve 96% penetration. Southern Water is also rolling out water metering to its customers.

ENSURE SECURITY OF SUPPLY

Many in the water industry are worried that demand management measures alone will not solve our future water supply needs and hence they look for a 'twin track approach' of developing new resources such as reservoirs alongside demand management options.

The principal concern is that if the demand does not fall sufficiently, there won't be enough water and there won't be time to develop the reservoirs or other alternatives. Major construction projects require considerable planning. As such, security of supply needs to be a central factor when making long-term investment decisions.

Planning for any new infrastructure should look at needs across the region, and ICE welcomes the fact that water companies in the South East do work together to look at water resources, even though there is not a formal requirement for them to do so.

GRADE

C

CONDITION AND CAPACITY REQUIRES ATTENTION	C
STRATEGIC LEAD REQUIRES ATTENTION	C
RESILIENCE ADEQUATE FOR NOW	B
SUSTAINABILITY REQUIRES ATTENTION	C
IMPACT OF SIGNIFICANT CUTS REQUIRES ATTENTION	C

KEY RECOMMENDATIONS

The regulatory regime needs to take more account of long-term issues such as climate change and population growth, and not just short-term price control

Compulsory metering should be implemented where economically viable, to help reduce demand for scarce supplies

Investment in new infrastructure is needed to ensure the long-term security of water supplies in the region

CASE STUDY: UPPER THAMES RESERVOIR

Thames Water believes that a strategic regional resource is required to guarantee water supply to customers in Swindon, Oxfordshire and London. Their preferred long-term option is to build a reservoir in Oxfordshire by 2026.

Plans are constantly evolving as a result of the depth and duration of the economic recession, new climate change scenarios, and the possibility of reductions in existing abstraction licences on environmental grounds.

The most recent assessments indicate that a reservoir with a capacity of 100 million cubic metres by 2026 in needed. The situation is being monitored and reviewed annually.

3. 'Future Water - the government's water strategy for England' Defra, February 2008.

FLOOD RISK MANAGEMENT

GRADE

D

D	**CONDITION AND CAPACITY** AT RISK
C	**STRATEGIC LEAD** REQUIRES ATTENTION
D	**RESILIENCE** AT RISK
D	**SUSTAINABILITY** AT RISK
B	**IMPACT OF SIGNIFICANT CUTS** ADEQUATE FOR NOW

KEY RECOMMENDATIONS

Act on the Pitt Review findings, so that we put the lessons of the 2007 floods in to practice

Local authorities need to organise and invest so that they have the right people and resources in place to deliver effective flood risk solutions for their communities

We need to create more resilient communities that take action to protect themselves over and above the level provided by flood defences and government agencies

FLOOD RISK IN SOUTH EAST ENGLAND

Over 200,000 properties in South East England are at risk from coastal and river flooding. Climate change will increase river and surface water volumes in future – putting pressure on already stretched rivers, sewerage and drainage systems, especially in urban areas such as South Hampshire and the Thames Gateway. It will also put more pressure on coastal defences with increasing sea-levels and storm surge events. Changes in rainfall patterns suggest the risk of groundwater flooding will increase as well.

FUNDING AND SKILLS

The Pitt Review in response to the 2007 floods outlines a comprehensive range of actions needed to improve the nation's flood resilience. ICE is in broad agreement with the Review's findings and welcomed the appointment of the Environment Agency as the body with overall strategic responsibility for managing flood risk.

There needs to be a combination of long-term investment in flood defences, better design of urban landscapes and use of the natural environment to manage potential flood events. However, we have concerns about funding and skills in this highly specialised area, particularly for local authorities. These resources must be in place otherwise they will not be able to deliver effective flood risk solutions to their communities.

Funding is essential but also, where expertise is in short supply, practical solutions need to be found to bring in the right skills and experience. The East Kent Engineering Services Partnership provides one model for sharing resources across administrative boundaries, as demonstrated in the flood defences built at Warden Bay on the Isle of Sheppey in 2008.

RESILIENT COMMUNITIES

Flooding events in Oxford and Portsmouth in 2008 were yet another reminder of the devastating effect a period of intense localised rainfall can have on an area. They also illustrate that it is impractical – and prohibitively expensive – to expand drainage capacity and flood defences to anticipate every conceivable event.

Communities would be safer and more resilient if they recognised that, since flood risk cannot be removed entirely, they can take practical steps to protect themselves and to recover from floods more quickly.

Steps can be taken to protect individual households, to improve urban drainage, and to use local volunteers to improve flood warnings within communities. We also need to recognise that buildings can be designed to recover quickly from flood events – and that simply replacing like with like after flood damage does not make sense.

These insights need to be taken on board by local authorities, local communities and individuals if high-risk areas are to deal more effectively with flooding events.

CASE STUDY: PROPERTY LEVEL FLOOD PROTECTION IN BUCKINGHAM

Buckingham has a history of flooding but, as for many rural communities, small-scale flood defence schemes are not given priority for funding. In response, Aylesbury Vale District Council has used the government's Flood Protection Grant scheme to help up to 57 households buy and install flood protection for their properties. The work is expected to be completed by the end of September 2010 and will give the local community better security and control.

CASE STUDY: RESILIENT COMMUNITIES IN LEWES

Lewes suffered very serious flooding in October 2000, with over 600 homes and 200 businesses affected. The Environment Agency and local authorities have worked hard to improve flood defences, but have also been working with local people to improve community resilience. Initiatives include a Flood Warden Network set up in 2001; public agencies working together with local groups to tackle surface water drainage problems; and grants to improve flood resilience for homes in areas unlikely to see upgraded hard defences.

THE STATE OF THE NATION:
INFRASTRUCTURE 2010

ABOUT ICE

The Institution of Civil Engineers (ICE) is a global membership organisation that promotes and advances civil engineering around the world. ICE is a leading source of professional expertise in transport, water supply and treatment, flood management, waste resource management and energy. Established in 1818, it has over 80,000 members throughout the world, including over 60,000 in the UK. ICE's vision is to place civil engineers at the heart of society, delivering sustainable development through knowledge, skills and professional expertise.

ABOUT THIS REPORT

State of the Nation reports have been compiled each year since 2000 by panels of experts drawn from the various fields of expertise across ICE's membership. Their aim is to stimulate debate and to highlight the actions that we believe are needed to improve the state of the nation's infrastructure and associated services.

This regional report has been compiled by analysing and assessing the state of infrastructure in South East England through a series of workshops that produced evidence based on the views and experience of the participants.

The reports are issued to a wide range of stakeholders, including politicians, civil servants, local authorities, trade, regulatory and consumer bodies, as well as the media. ICE has published several State of the Nation reports each focused on a specific issue which will affect the delivery of effective infrastructure for the UK. Since 2008 ICE has published reports focused on defending critical infrastructure, low carbon infrastructure, transport and capacity and skills. These are available at ice.org.uk/stateofthenation

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The findings of this report are based on the collective input of all the workshop participants. The results do not reflect individual opinion or the views of their companies.

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THE STATE OF THE NATION INFRASTRUCTURE 2010

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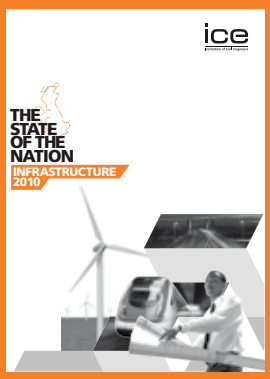

THE GRADES

A B C D E

FIT FOR THE FUTURE
Infrastructure is well-maintained and in good condition. There is excess capacity to cope with major incidents. There is clear strategic leadership with good plans to develop the sector to meet the needs of the next five years.

ADEQUATE FOR NOW
Infrastructure is in acceptable condition with a reasonable maintenance regime. It can meet current demand and deal with minor incidents across the network. However, investment will be needed to meet needs in the next five years.

REQUIRES ATTENTION
Infrastructure is infrequently maintained and requires attention. There is no excess capacity resulting in deficiencies at peak periods and if there are even minor incidents. Significant investment is required to improve it to meet needs in the next five years.

AT RISK
Infrastructure condition is below standard and poorly maintained. There is frequently a lack of capacity to meet demand and it is not resilient. In the absence of significant investment there may be an impact on the national economy.

UNFIT FOR PURPOSE
Infrastructure is in unacceptable condition with little maintenance. There is insufficient capacity and resilience is of serious concern. The state of the infrastructure is impacting on the national economy.

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