

Interim Guidance to the Economic Regulated Sectors

Water, Energy, Transport and Communication

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INTRODUCTION

In the response to the *Pitt Review* (Recommendation 53) the Government supported the aim of the recommendation that guidance should be issued to economic regulators to encourage resilience building by operators of critical infrastructure.

This document builds upon this initial guidance for regulators and outlines the 2010 state-of-play within these sectors. It highlights innovation and best practice among and between the utility sectors. Significant best practice has evolved since the floods in 2007.

The Government issued initial guidance to regulators in the form of an initial minimum standard for resilience. This was set out in the *Strategic Framework and Policy Statement* consultation document that was issued in July 2009 for discussion across Government, regulators and industry groups, prior to wider consultation in November 2009. It stated that relevant critical infrastructure sites should be resilient to an annual probability rate of flooding from all sources, as proposed in the *Pitt Review*. It was further agreed that this standard should be tested and reviewed, not least for its engineering feasibility and economic impact, on both the operators' business models and customers' bills. The Government suggested that formal reviews of the resilience of critical infrastructure sites should be undertaken

periodically in future to ensure that they remain robust against the predicted effects of climate change.

Considerations for the economic regulated sectors are outlined in the document, as well as a more detailed mapping of the evolving legislative framework. The *Civil Contingencies Act 2004*, the *Climate Change Act 2008*, the *Planning Act 2008* and their impact on the regulated sectors is reviewed. Additionally, each of the four sectors' resilience actions-to-date and best practice are outlined. The considerations outlined in this document will be the basis of discussion during the development of the Government's policy on resilience.

The document is intended to allow best practice lessons to be learned among and between the utility sectors, allowing regulators and essential asset owners to benefit from considering alternative approaches to similar challenges.

Aim

This guidance builds upon the general guidance set out within the *Strategic Framework and Policy Statement* (SFPS)¹. A consultation was carried out with stakeholders in order to assess the impact and enable the development of more considered and appropriate guidance. Additional meetings and interviews were conducted with lead departments, regulators, industry associations and some individual

¹ Strategic Framework and Policy Statement on Improving the Resilience of Critical Infrastructure to Disruption from Natural Hazards (Consultation Version) November , 2009.

companies. Notably, many of the advances in resilience identified were achieved through a collaborative approach.

In response, this document provides detailed interim guidance to the economic regulated sectors, not solely the regulators. This guidance is in the form of eight considerations. The use of the term “**considerations**” is intentional given that there is no blanket set of regulatory powers or duties across the regulated sectors: some of the considerations are related to regulators while some belong squarely with industry. Taken together these considerations provide a basis for a joint approach to resilience building.

While the regulators may not have a statutory power to implement some of the considerations, they do have a persuasive power and leadership role within their respective sectors, above and beyond pure regulatory action. Additionally, access to a wide stakeholder network provides the basis to facilitate the discussion on how the considerations’ objectives can best be achieved, and by whom. These considerations contribute to “fostering a collective responsibility for enhancing resilience” as recommended in the Pitt Review. The considerations cover issues which could be addressed quickly and do not require wholesale change or regulation to achieve their objectives.

Scope

This interim guidance document addresses resilience work undertaken in the four regulated utility sectors: water, energy, communications and transport.

The “economic regulators” are interpreted for the purpose of this guidance as being one of six organisations: Ofgem for Energy; Ofwat for Water; Postcomm for Postal Services; Ofcom for Telecommunications and Broadcasting; Office of the Rail Regulator for Railways; and the Civil Aviation Authority for air traffic and airports.

While economic regulators work within the four sectors, some elements within each sector are not covered by economic regulation. These include areas such as highways and petroleum which have direct relations through an executive agency such as the Highways Agency or the Health and Safety Executive (HSE) and / or by the Competition Commission. This provisional guidance reflects the existing regulatory organisational framework.

This Interim Guidance for Economic Regulated Sectors covers only four of the nine CNI sectors. To complete coverage of all CNI sectors two additional documents will be produced in the form of “Best Practice and Existing Standard” reports. These documents will cover the Public Services (Emergency Services, Central Government and Health) and also the Economic Services (Food and Finance) due respectively in May 2010 and July 2010.

CONSIDERATIONS

Since 2007, regulators have acted within existing structures and legal frameworks to achieve significant results in building both physical resilience in critical infrastructure and general response capacity. While current progress is related to flood response, the wider benefits of the flood vulnerability review extend to other potential natural hazards as identified by the National Risk Register².

Eight considerations have been identified for the economic regulated sectors. They are based upon best practice examples from across all the utility sectors. Examples and further detail are to be found in the full body of the document.

Action

The consideration points are for joint development between industry, regulators, lead government departments and the Cabinet Office. The objectives of each consideration should be addressed and a joint response submitted from each regulated sector by July 2010.

This response will detail how each consideration has been, is, or could be integrated into the sectors' activities. It would outline whether action is deemed appropriate, any estimated financial costs and which body within the stakeholder network is best suited to lead on each consideration. Other mechanisms by which the consideration objectives may be achieved, including statutory or formal guidance, may also be suggested. The output of this response will inform the scope of the "National Resilience Plan".

Sector considerations

1. Reporting on resilience

As society increasingly becomes risk averse and prioritises security of supply and resilience, consideration should be given to the incorporation of a specific resilience section in annual reports.

2. Vulnerable site monitoring schemes

Consideration should be given to establishing a vulnerable site monitoring scheme in each sector.

3. Business Continuity Management (BS25999)

Consideration should be given on the best means to drive up adoption of BS2599 or equivalent standards.

² National Risk Register, www.cabinetoffice.gov.uk/ukresilience.aspx

4. Inconsistent standards

Consideration needs to be given to the validity of common standards for resilience across each sector.

5. Formalising innovative funding initiatives

Consideration should be given to research initiatives across other regulated sectors as well as tied into existing science programmes.

6. Improving resilience business cases

While commercial sensitivity needs to be respected, consideration should be given to means to raise the quality of cost benefit analysis in resilience funding programmes.

7. Exemption clauses in service standards

Consideration should be given to the appropriateness of exemption clauses without specific limitations or context in service and performance standards.

8. Data impact on financing redundancy

Consideration should be given to how the intrinsic difference between low level outage data and low probability / high impact could be addressed to enable more resilience investment.

Background

Flood defence has progressed significantly since 2007. Where previously the physical defence of a site was the sole point of reference for resilience, a broader interpretation of service and network resilience exists across some sectors. This

change has been driven by a combination of industry, regulatory and legislative action taken in the last three years. Taken together, these actions have altered the working relationships, priorities and capacities of the regulated sectors to prepare for, operate during and recover from flood and natural hazards.

Importantly, industry has worked together with government and the regulator to complete Sector Resilience Plans. These cover risk assessment of sites across the United Kingdom including Critical National Infrastructure (CNI) sites. In some sectors, site specific plans identifying further resilience work have been completed and requests for adaptation work are ongoing. This is funded through existing capital expenditure or through periodic price control rounds.

Flood protection to a 0.5% annual probability is increasingly being adopted across the utilities sectors as a standard. This standard was initially suggested by the *Pitt Review, 2007*. The *Strategic Framework and Policy Statement* put out for consultation in October 2009 also presented the 0.5% annual probability event standard as an interim minimum standard for CNI. This standard is actively supported by many regulators and already reflected in resilience project submissions in the current pricing reviews. While an event-based standard is easily understood, it may not be suited to all assets in all sectors for all hazard events. In developing resilience policy, the focus will be on service/performance obligations as

standard for regulators and industry to supplement event-based standards.

GENERAL LEGISLATION

Duties and obligations under which the economic regulators operate are not static. In this respect, new and existing actions need to be taken into account before additional obligations and duties are considered. The Government response to Pitt Recommendation 53 stated this position was to be taken. Therefore the overarching legislative framework and its ongoing evolution need to be placed in context before the need, scope and appetite for additional duties are considered.

There are three main areas currently in development which extend resilience duties to the economic regulators in the utility sectors. The main areas are *the Civil Contingencies Act (2004)*, the *Adapting to Climate Change Act (2008)*, and the *Planning Act (2008)*.

Civil Contingencies Act 2004

The *Civil Contingencies Act (2004)* provides a structure for co-operation and information sharing for emergency planning between Category 1 responders (emergency services, local authorities, Health Protection Agency and Environment Agency) and the Category 2 responders within the four regulated utility sectors. Under the Act, Category 1 responders have four core duties: risk assessment, business continuity management, emergency planning, and warning and informing the public. Category 2 responders have a duty to co-operate and share information to support Category 1 responders in fulfilling their duties. The principal mechanism for multi-agency co-operation under the CCA is the Local Resilience Forum³ (LRF), established to ensure effective delivery of the above duties in a multi-agency environment. LRF activities include, among others, supporting the preparation of multi-agency plans, protocols and agreements and co-ordination of exercises and other training events.

At present, the *Civil Contingencies Act* is mid-way through an enhancement programme in which three relevant areas are being reviewed: increasing utilities' representation and information sharing, encouraging adoption of business continuity, and reviewing the current categorisation of responders.

³ Civil Contingencies Act 2004 (Contingency Planning Regulations 2005 4 (2) (b) and 4 (3))

Utilities are often represented on an LRF. The Act requires Category 1 responders to meet through the LRF at least every six months⁴. Category 2 utility responders may be invited to attend and, in this case, need to make arrangements to be effectively represented. There are examples of LRFs and utilities providers working closely together⁵ but there is inconsistency in representation and involvement which may undermine the systematic objectives of the Act. Options to address this issue are being considered in the Civil Contingencies Act Enhancement Programme.

Under the Act, business continuity is a key duty⁶ of Category 1 responders. There is no matching obligation on Category 2 utility providers⁷. A duty for Category 2 responders to have emergency plans in place was supported in *Pitt Review* Recommendation 54 and is again being considered.

Pitt specifically mentioned BS 25999 or an “equivalent standard”. While BS 25999 is taken as a reference standard and is acknowledged and accepted as best practice in industry, some sectors have developed more specific industry standards. These would equate to Pitt’s “equivalent standard”. Whether BS 25999 based or an equivalent, a common approach based on established standards is an essential element in building parity-of-esteem and confidence between different categories of responders.

Responder categorisation has been static since 2004. Changes to the categorisation within the Act or the extension of the duties and/or the categories will be considered as part of the enhancement programme.

Even if the categorisation has been static, new Category 2 responders have been added to the list since 2004. As part of future-proofing of the Act, the enhancement programme will identify any other essential service providers who either are not currently categorised as responders, or who may need a new categorisation to cover their functions.

Climate Change Act 2008

The *Climate Change Act (2008)* established new responsibilities for the water, energy and transport sectors and some involvement of the telecommunications sector. This grouping maps to the economically regulated utilities. The Act placed legally-binding obligations to report on carbon reduction as well as adaptation to long term climate change and its associated hazards.

The Adapting to Climate Change Programme (ACC) managed by the Department for Environment, Food and Rural Affairs (Defra), is a cross-government programme, associated with the Act and put in place to monitor and evaluate adaptation planning within the sectors over a 50 year timeframe.

The *Climate Change Act* established new powers for the government to ensure that organisations in key sectors are aware of, and prepared for, the impacts of the changing

⁴ Civil Contingencies Act 2004, Regulations 2005 4(4)

⁵ Government Office East Midlands is holding a “Meet the Utilities” workshop on March 8 2010.

⁶ Chapter 2, Emergency Preparedness

⁷ Civil Contingencies Act 2004 s.2 (1) (c)

climate and is a key lever for the ACC programme. The adaptation reporting power within the *Climate Change Act 2008* gives the Secretary of State the power to direct public bodies and utilities companies, as “statutory undertakers”, to produce reports. There is no specified end point for the assessment of risk, and factors need to be considered that go beyond individual sector resilience.

Between July and November 2010, Defra will be directing organisations to report on how they intend to adapt to climate change and how this will be monitored and reported. Organisations to be directed cover the water, energy and the transport sectors. Defra will be inviting organisations in the information and communication technologies sector to report.

This adaptation work is broader than the work done by the Cabinet Office on sectoral resilience planning. The adaptation reporting powers provide a broader assessment of how future climates will change the demand and supply of essential services, and the challenges in ensuring service in the long-term.

Resilience information is a part of the information needed under the *Climate Change Act 2004*. The Cabinet Office is working with Defra to join-up information requests on emergency preparedness and sector resilience with the requests under the programme.

Notably, the ACC programme adds a secondary line of reporting directly to Defra

on climate change actions, alongside that due to the lead government department on resilience.

Planning Act 2008

The *Planning Act (2008)* has led to a revised methodology for major infrastructure projects in the utilities sectors of energy, transport and water. The act covers “nationally significant” projects. The *Planning Act* provides for safety and resilience assessment in the initial considerations for new infrastructure investment.

In each of the three sectors identified in the Planning Act 2008, a series of National Policy Statements (NPSs) have been, or will be, produced. Together, they form an overarching framework in which the water, energy and transport networks’ long-term development must be viewed.

Currently, there is a suite of six NPSs in the area of energy, covering fossil fuels, renewables, gas and oil infrastructure, electricity networks and nuclear power. Co-ordinated by Department of Energy and Climate Change (DECC), these statements have been published and are part of an ongoing national consultation.

In the short-term, within the transport sector, there are three national policy statements managed by the Department for Transport (DfT). The Ports NPS is already published and the remaining two transport NPSs are to be given a deadline for publication.

In the mid-term, three water NPSs are managed by Defra. Their publication is scheduled for between the end of 2010 and into 2011. The water NPS will be framed by the extensive work already undertaken in response to the Pitt Review.

NPSs state that the entire lifespan of a facility is to be considered in the planning phase. This ensures adequate consideration for an all hazard adaptation programme. The NPSs include an “operational continuity obligation” as part of the initial planning assessment to ensure that essential infrastructure is designed to remain operational during floods.

To harmonise the planning process and to highlight interconnectivity of new “nationally significant” projects for the utilities sector, a new body, the Infrastructure Planning Commission (IPC), has been established. The IPC has direct relationships with government departments and has entered into a policy discussion with the Centre for the Protection of National Infrastructure (CPNI).

Furthermore, *Planning Policy Statement 25: Development and Flood Risk* (PPS 25), published in December 2006, introduced a risk assessment and sequential approach to development and flood risk. Wherever possible, construction on flood plains is avoided. If, in exceptional circumstances, it is decided that infrastructure must be built on a flood plain, mitigation actions must be included in the initial planning and cost analysis. The water industry is currently excluded from *PPS25* but discussion is

underway with Defra to address this omission.

PPS25 is changing how essential services and infrastructure are located and designed. For example, the Tilbury Substation supplies hundreds of thousands of people on the flood plain around the Thames. However, due to the need for proximity of infrastructure to the serviced area, the substation *had* to be built on a flood plain. The mitigation plan required the entire substation to be built on stilts seven metres above ground level at an additional cost of seven million pounds. The cost of compliance was integrated in the operating costs by the asset owner.

REGULATED SECTORS

Water

The water sector has been at the forefront of developing and assessing resilience strategies to secure supply and service standards. Ofwat is the sole economic regulator covering England and Wales. Nevertheless, a proactive tripartite management approach has been taken to drive resilience since 2007. This approach has used existing regulation and industry guidance, adapting them when necessary to achieve higher standards of resilience.

There is no explicit wording within a single act which outlines a duty to build resilience in the water sector; however, there is an implicit obligation within the *Water Industry Act (1991)* and a clear service obligation in the *Security and Emergency Management Direction (SEMD) (1998)*. The *SEMD* outlines an enforced duty of water service irrespective of the type of natural hazard occurring. Compliance with this obligation forms the basis of resilience work within the water sector.

Security and Emergency Measures Direction (SEMD) (1998) is the main guidance for planning for “any event” in regards to security of supply and service in the water sector.

SEMD operates in a similar way to other business continuity standards such as British Standards Institute Business Continuity Standard 25999, but is specifically honed to the needs of the water industry. Unlike, BS25999 SEMD compliance is annually assessed and audited externally by Defra-appointed certification teams. This ensures emergency response and continuity of service plans are up-to-date.

While the direction itself has remained unchanged since 1998, the accompanying guidance which drives business continuity has been updated five times. This flexibility within the regulatory framework allows Ofwat and the lead department to update, amend or alter industry duties.

In the development of resilience as a service standard, the SEMD sets a benchmark. This planning includes preparation for each company’s operational “worst –case scenarios” and mitigation for such events. Regardless of the hazard, the SEMD includes a service level which defines 10 litres-per-head-per-day as the minimum requirement to meet obligations. This rises to 20 litres-per-head-per-day when the event exceeds 5 days in duration.

While the Water Industry Act and the SEMD form the backbone for addressing resilience, there have been a series of developments from 2007 onward which have contributed to the establishment of a wider resilience agenda within the sector. Importantly, the newly proposed *Flood and Water Management Bill 2009*, will affect the water

sector. A specific duty will be assigned to local authorities and the Environment Agency to be responsible for pluvial flooding mapping and management. Additional legislation is being developed to allocate separate and additional duties to water companies themselves. This is being developed through co-operation between Defra, Ofwat and the industry.

Social and Environmental Guidance to Ofwat was issued by Defra in February 2008. This required all companies to consider the vulnerability and resilience of critical assets and networks necessary to provide essential services to their clients.

In June 2008, *Ofwat issued Asset Resilience to Flood Hazards: Development of an Analytical Framework*. This gives specific interpretation of the need to use existing Environment Agency mapping on flood risk management to formulate a proportionate response. The information provided in this document makes it easier for water companies to assess their resilience needs and to draw down funding for development from the regulator.

In September 2009, Defra published a consultation on competition within the water sector: the *Cave Review*. The review accepts that there are structural issues in the water sector which need innovative regulation to drive-up competition and may, by default, increase resilience.

In addition, pre-existing Security Advice Notes and baseline standards were utilised

by all water companies in the formulation of their request for funding for resilience work during the Price Control Review which concluded in December 2009.

This collaborative approach in the lead-up to the Periodic Pricing Review of 2009 led to the approval of £414 million funding for resilience actions over the next five years. This will be spent on actions on critical infrastructure and essential services aligned with resilience objectives. Additionally, a further £400 million was included to increase SEMD resilience measures and benefits the entire water sector.

Any work deemed necessary, but which falls outside the current five year plan, may be allowed by Ofwat. Items such as these would be covered by Ofwat's established change protocol procedure.

Building upon the experience of the Periodic Pricing Review of 2009, in 2010 Ofwat will publish a selection of climate change good practice cases: funded real-life case studies of resilience projects. They will highlight best practice in impact assessment, mitigation planning and cost benefit analysis. This will serve to raise the standard and detail of resilience proposals submitted to Ofwat.

Industry itself has organised proactively by negotiating a protocol for emergency sharing of equipment between water companies. This is brokered by the main industry trade body, Water UK. It supplements existing individual company resilience plans and offers a more holistic approach to the water sector as a

networked utility and not as a group of stand alone operators.

Energy

The energy sector was significantly affected by the summer 2007 floods and substantial work has been completed in the last two years to improve sector resilience. This has been managed within existing frameworks of co-operation and funding.

There is a mixed regulatory environment in the energy sector. While energy generation and supply are competitive markets and not price regulated, transmission and distribution networks are regulated as natural monopolies. The oil sector is not economically regulated. This mixed regulatory framework may strengthen the need for a collaborative approach to building resilience.

The primary responsibilities of the energy regulators Ofgem are to protect customers. Based upon the *Gas Act (1986)*, the *Electricity Act (1989)* and the related *Utilities Act (2000)*, the view of consumer interest reflects price, the need to invest in infrastructure and to secure a diverse and viable long-term energy supply. Aligned to the objectives of the *Climate Change Act*, Ofgem has a sustainable development responsibility and a duty to consider the long term, which is based upon the *Energy Act 2008*.

Ofgem has accordingly been able to secure a continued and marked increase in general

standards, leading to higher resilience. The proportion of customers experiencing power cuts, and the duration of those power cuts, has decreased by over 30% since privatisation. However, no specific resilience duty is fixed.

Nonetheless, Ofgem's regulatory regime is not definitively fixed. Duties have been already been extended five times in the last ten years and will be extended further as part of the proposed *Energy Bill*. The Department of Energy and Climate Change (DECC) view this as a broadening of "the interest of the consumer" to provide a more balanced view of Ofgem's obligations. This long-term view will more explicitly include security and resilience as being in the interest of the current and future consumer base..

The price control framework which Ofgem administers is currently in revision through the RPI-X@20 project. The project looks at incentivisation and whether if twenty years after its initial introduction, the framework is suited to current and future challenges. To ensure the next Transmission Price Control review benefits from any recommended changes, it has been delayed by one year⁸. This ensures benefits of any new models of incentivisation were aligned to pricing cycles.

The energy sector has formalised its tripartite relationship. The Energy Emergencies Executive Committee (E3C) brings together industry, regulator, DECC and other interested bodies on a structured basis. E3C

⁸ *Approach and Timetable Options for the Next Transmission Price Control Review (TPRC5)* 130/09, 28 October 2009, Ofgem, London.

has a remit which extends beyond flooding to other hazards and general resilience issues. A sub-committee structure allows in-depth assessment, discussion and monitoring of threats to the industry.

Resilience research in the energy sector is supported by Ofgem. There was a marked downturn in innovation spending across the privatised utilities sectors in the initial stages of privatisation. To address this issue, Ofgem allows up to 0.5% of annual regulated revenue to be spent through an “Innovating Funding Initiative” (IFI). Research and development under the IFI programme has increased.

As part of the industry response to the challenge of flooding, *Engineering Technical Report on Resilience of Flooding of Grid and Primary Substations (ETR 138)* was developed by the Energy Networks Association (ENA) in conjunction with industry. The report outlined a risk-based approach to flooding as well as methods to improve resilience of services based on a cost/benefit analysis for each key site.

The Technical Report model of joint development of standards, as piloted by the ENA to address flood hazards to electricity infrastructure, will be rolled out as the model for addressing other energy sectors and other hazards.

The E3C tripartite agreement has led to high standards of events-based resilience. Under this, high impact grid substations are protected to a 0.1% annual probability of

flooding while primary substations are protected to 1% annual probability standard, unless a company determines an alternative based upon cost/benefit analysis. This includes the capacity to reconnect or provide an alternative energy supply to consumers.

As a result of *ETR 138*, both existing and new infrastructure has benefited from resilience investment. Based upon historical precedent, existing sites, including Carlisle and Gloucester, have been fitted with permanent defences. New infrastructure at Tilbury and Exeter has been constructed above the level of potential flood waters, in line with *PPS25*.

Research and co-operation among the UK energy sector and other government bodies is ongoing. Included are the Environment Agency trials for a “Flood Hazard Warning for Infrastructure”, designed to alert infrastructure sites in advance of an event. This allows adequate time to begin exercise of site-specific emergency plans.

Funding for the necessary work is made available through a series of Ofgem five year price control reviews similar to the Ofwat periodic price reviews. The next Transmission Price Control Review will begin in 2012 and will also benefit from the work done in the all hazards planning, impacting the submission to Ofgem.

There is flexibility and adaptability built into the regulatory approach to resilience planning and funding. Any resilience work which becomes necessary within the price

control period may be added on an “exceptional” basis, or ‘logged-up’ to the next five year price review. This may well be the case for the proposed *Flood and Water Management Bill* which will provide additional data on surface flooding from the Environment Agency and the Scottish Environmental Protection Agency (SEPA).

To ensure that the standards defined by *ETR 138* and any similar technical reports are properly implemented and monitored, Ofgem is considering a vulnerable sites monitoring system for the industry as a whole. This will build upon the idea of the energy sector as a holistic networked system, recognising that optimal operation with limited redundancy and capacity within a section of the system can lead to assets previously thought to be resilient to be put under pressure. This may only be possible to manage at a national level.

Transport

Transport is economically regulated in two areas: rail and aviation. There are clear differences from other regulated utilities as transport regulators have both economic, consumer and a safety obligation. The Secretary of State for Transport is responsible for the security and resilience of UK transport systems.

The UK transport network is based on a national network of interdependent local networks and has a limited number of individual assets that it relies upon as Critical National Infrastructure. While there is inbuilt

resilience due to a multiplicity of transport modes and points of access, natural hazards can adversely impact on a range of regional transport networks with the potential to disrupt key national transportation corridors.

Rail: There is a four-party relationship managing the rail sub-sector nationally⁹. This relationship is between the Department for Transport (DfT), the Office of the Rail Regulator (ORR), the infrastructure provider Network Rail, and the train operating companies themselves. The ORR is the independent safety and economic regulator for Britain’s railway. The existing list of ORR duties is extensive.

The ORR has permitted up to £28.5 billion to be spent on modernisation in the pricing cycle up until 2014. This will address issues related to performance, safety and overcrowding contributing to the building of improved services and general resilience in this sector. Nevertheless, there is no specific allocation of funding for improved resilience.

Moreover, a number of railway safety regulations were replaced in 2006 by the *Railway Safety Regulations (ROGS)*¹⁰. They consolidated previous legislation and provided common safety methods and targets, attainment criteria and a monitoring regime. They covered both safety of the person and the safe operation of the transport system, aligned to the wide scope of ORR’s responsibilities.

⁹ There are a few exceptions, such as Transport for Scotland which has responsibility for the majority of rail powers in Scotland, as does transport for London in London and Mersey travel on Merseyside
¹⁰ Railways and other Guided Transport Systems Safety Regulations 2006/ 599

The railway network is becoming increasingly electrified as part of Network Rail's rolling programme to convert many routes from diesel to electric trains. The UK compares unfavourably with other EU countries in relation to rates of electrification, with over 60% of lines still running diesel trains¹¹. The government announced in April 2009 that an electrification plan is to be developed¹². This will cover the Great Western Rail and projects in the North-West. The planned investment aligns with national objectives for building resilience to climate change as part of meeting the *Climate Change Act* requirements. Additional high speed lines have also been announced running north/south.

Measurement of resilience is currently mapped through service and performance targets. This tracks punctuality and reliability, as well as delays. The system allocates responsibility and associated penalties to infrastructure providers or franchise holders. It also allows invocation of "emergency timetables" in event of hazards during which normal timetables are no longer valid. Statistics during an emergency period are "effectively" outside performance measurements.

The rail sector has a formalised process for reviewing response to hazards. The recommendations from all reviews are tracked to completion via a Strategy Schemes Document. This document lists

improvements to be made, based upon the outcome of the review.

In 2004, the rail sector established the Safety Management Information System (SMIS). Over 60 organisations use this to report and monitor safety issues related to rail. It provides a solid grounding for further co-ordination based upon established communication channels and procedures.

Aviation: The aviation sector is primarily regulated by the Civil Aviation Authority (CAA). The CAA's responsibilities cover economic, safety, consumer and technical airspace policy. The CAA also regulates the National Air Traffic Services (NATS) economic activities as a public-private partnership between government and industry.

The aviation sector has not, as yet, found it necessary to produce a detailed strategy, assessment and mitigation plan for flooding as part of a risk register for hazards. However, one must remember that the "lived experience" of natural hazards is different within each sector. The engagement levels from the aviation sector are expected to be higher once the all-hazards approach begins in March 2010. This will address Storms & Gales (NRR 2.2) and Heavy Snow / Low Temp (NRR 2.5) which could both be expected to impact on the aviation sector more heavily than flooding.

DfT plans to engage further with stakeholders in this sector to establish a clearer understanding of the current level of

¹¹ *European Transport: Core Statistics, in Rail Transport and the Environment Report* Union Internationale de Chemins de Fer, 2009 p 29

¹² *New industry, New Jobs, Building Britain's Future*. April 2009.

resilience and provide a list of future actions to be undertaken to improve resilience against natural hazards.

Communications

The regulated communication sector encompasses telecommunications and postal services. Telecommunication includes fixed line, mobile and broadcast and is regulated through Ofcom. Postal services are managed through Postcomm which regulates the previously nationalised mail service.

Ofcom's sector is highly competitive and lightly regulated. Technology and competition are the primary drivers for the telecommunication sector due to the convergence of content and technologies. The government has not proscribed standards as in general the emergency plan for the communications sector is owned by the industry. Nonetheless, providers of public telephony do have a basic responsibility to make arrangements for provision of rapid restoration of communications services in disasters.

While the emergency plan is owned by the telecommunication industry, there is scope for a monitoring function for the regulator. The proposed *Digital Economy Bill* extends resilience duties, managed by Ofcom, to the telecommunications sector. The Bill, as proposed, includes duties for industry to report on its risk assessment and emergency planning. In addition, its emergency plans must be tested and participation in joint national exercises will be required.

Notably, resilience work in telecommunications has been driven by explosions and fire incidents rather than flooding. The response to these specific challenges has led to reassessment of cabling locations and alternative back-up capacity therefore different from the drivers of flood and weather events, common to other sectors. Most recently, the Cumbria floods of 2010 highlighted pinch-points and cross dependencies which have begun a new level of discussion.

The Electronic Communications–Resilience and Response Group (EC-RRG) includes many larger telecom providers and the main infrastructure providers. It is the organisation which addresses resilience and emergency management issues in order to meet existing duties. The EC-RRG encompasses Category 2 telecoms responders who set out the management of natural hazard emergencies, priority customers, and priority services through the general *Telecoms Emergency Plan*. This plan is exercised regularly and updated as needed.

An element of the group's response planning rests on mobile emergency centres. These are deployable at short notice to maintain the connectivity of the communication network during hazard events. Additionally, all telecom key infrastructures have alternative power supplies for up to three days to ensure continued operation even if the energy sector is severely impacted.

In the event of a multi-regional hazard of national scope, co-ordination is managed

through the National Emergency Alert for Telecoms (NEAT) involving both the Department for Business Innovation and Skills (BIS), and Government Command Centres.

Large-scale investment is changing the UK's fixed line sector. Copper cables are being replaced by fibre optics. Competition and new infrastructure investment will, by default, drive increased network capacity, availability and resilience. Already around half of the country is covered by fibre optic cables. While half of the country is serviced by older copper networks there is a solid and sustainable business case for upgrading to cable which will, by default, support resilience actions.

The postal service is inherently resilient to natural hazards. There is a wide and dispersed network of collection points, points of presence, mail centres, satellite hubs and delivery offices. At short notice these facilities can be deployed to compensate for disruptions within the network. While service metrics are in place for postal services, during local natural hazards, delivery disruptions are inevitable as homes and business are themselves often uninhabited or underwater.

Postal services' vulnerabilities to natural hazards are based on high levels of dependence on the road, rail and air networks. Given the physical nature of postal points-of-presence and the national coverage of the network there is a high level of dependency on energy supplies and

telecommunications infrastructure. Dependencies mapping provides visibility of these network linkages across sectors.

CONCLUSIONS

Since 2007 the utility sectors have begun addressing resilience by using the existing organisational and legislative frameworks available to them. There has been notable action taken in regard to flooding. The primacy of flooding work is understandable. In economic terms the top three natural hazard disasters between 1990 and 2009 (excluding Cumbria) were flood events. Their combined cost was estimated at over £7 billion¹³. The remaining seven hazard events in the top ten were severe wind storms, which had a combined cost of less than 50% of the flood total.

“Regulation, is not necessarily the only or even the main resource for driving resilience but it must be considered. Importantly, if required, the legislative framework under which the utilities work is amenable to change through regulation or direction. The principal regulations or directions associated with the utilities acts¹⁴ are made under the “negative” procedure and can be amended in the same way. Where directions are issued, these can be made by the relevant Secretary

of State after consultation with affected parties. Moreover, the regulations themselves are put into context by the associated guidance. This guidance is under constant review by the lead departments in consultation with interested parties. There is flexibility within the secondary legislative system which can reflect evolving priorities and assist in adaptation to change.

Co-operation and information sharing has been the greatest contributor to resilience work over the last three years. Flood resilience has centred on co-operation and information sharing to develop new standards and communicate responsibility and expectation of service. This work has enhanced the ability of the utility sectors to work together to addressing other natural hazards. The tripartite development of technical reports and joint standards which has shaped resilience planning for flooding will be a model for future co-operation.

On a response and recovery level, the Civil Contingencies Act 2004 has provided open communication channels between local Category 1 and 2 Responders. The LRFs have facilitated the sharing of industry and local government knowledge and expertise. The contacts made and relationships developed have proved invaluable in responding to natural hazards in a more co-ordinated manner. The Cumbria floods of November 2009 demonstrated a step-change in how industry and local responders co-operated. This has been supported in the response to the national consultation, but also confirmed through regional and industry

¹³ Source: EM-DAT: The OFDA/CRED International Disaster. Top 10 Natural disasters reported 1990- 2009 in the UK. Database based on 10+ people reported killed and 100+ affected

¹⁴ The Gas Standards of Performance 2008, The Electricity safety, Quality and Continuity Regulations 2002, The Security and Emergency Measure Direction 1998, The Railways and Other Guided Transport Systems (Safety) Regulations 2006 and the Electronic Communications Code(Conditions and Restrictions) Regulation 2003

workshops conducted by the Cabinet Office and the lead government departments.

Each of the considerations outlined in this document is a product of open consultation. The considerations outlined in this document do not constitute a definitive list. They are a starting point for discussion. The level of engagement and response has varied between sectors and between economic regulators and industry and therefore adjustments are to be expected.

These considerations are intended to facilitate discussion to inform policy development among the regulated sectors and their stakeholders. Evidence will be gathered in support or against these considerations. Those considerations deemed to be of value will be subject to a regulatory impact assessment.

The considerations may, or may not, be of use to other sectors of national infrastructure. These points will be discussed in the two proceeding best practice and existing standards reports due in May and July 2010.

DETAILED CONSIDERATIONS

1. Reporting on resilience

Each of the regulated sectors has a well-established culture of annual reporting. Every member, commercial, regulator or government department within regulated sectors provides public account of its financial and operational status. The content of such annual reports has historically changed to reflect societal priorities and concerns. Topics such as diversity and environment are now considered obligatory when 20 years ago this was not the case. As society increasingly becomes risk averse and prioritises security of supply and resilience, consideration should be given to the incorporation of a specific resilience section in annual reports.

2. Vulnerable site monitoring schemes

Building upon good practice in the energy sector, vulnerable site monitoring schemes may be adopted across the sector. This would audit investment made through the Periodic Price Reviews / Control Periods to ensure that resilience actions were “fit for purpose” and remained operational. Vulnerable site monitoring provides a common basis for future development of interdependencies and mapping.

Consideration should be given to establishing of a vulnerable site monitoring scheme in each sector.

3. Business Continuity Management (BS25999)

Interdependency between the utility sectors becomes increasingly apparent in the event of a natural hazard. There is a need to establish parity-of-esteem within and between utility sectors and among local responders. By promoting nationally and internationally recognised standards which may be externally audited and certified, regulators can contribute to building confidence in all stakeholders’ capacities to prepare for and respond to emergencies. Consideration should be given on the best means to drive up adoption of BS25999 or equivalent standards.

4. Inconsistent standards

Within each sector, varied and inconsistent standards are evident between companies. This could be considered as detrimental to the holistic integrity of a network. Some sites supplying essential services to 300,000 people are protected to 1% annual probability of disruption while sites supplying only 50,000 people benefit from higher standards. There is no clarification of this variation, the financial justification or if this is based solely on a higher risk appetite within a company. Networked utilities are interdependent and inconsistency in application of standards can be detrimental to overall planning. Consideration needs to be given to the

validity of common standards for resilience across each sector.

5. Formalising innovative funding initiatives

Technology can respond to some of the resilience challenges facing utility sectors. Work needs to be done to realise the full potential of technology in achieving national and sector resilience objectives. However, there has been decreasing investment in innovation within the regulated utility sectors. Ofgem responded to this issue by developing an “Innovative Funding Initiative” (IFI) allowing up to 0.5% of annual regulated revenue to be spent on research and development. Additionally, annual awards managed or delegated by the regulator(s) or could highlight and showcase successful innovation. Consideration should be given to similar initiatives across other sectors as well as linked into existing science programmes.

6. Improving resilience business cases

The quality of proposed resilience projects submitted to the regulators and the standards of resilience applied vary even within a single sector. In efforts to improve the quality, content and detail of resilience proposals, Ofwat is publishing a good practice in climate change review in March 2010. This allows successful projects with effective cost / benefit analysis to be highlighted. While commercial sensitivity needs to be respected, consideration should be given to means to raise the quality of cost benefits analysis in resilience funding programmes.

7. Exemption clauses in service standards

Many sectors already cover resilience as part of a service standard rather than an issue of physical security alone. In response to an open consultation, 93% of respondents supported the development of existing service standards. Given the UK’s geographic position, some level of meteorological hazard is regularly anticipated and foreseeable. Wide exemption clauses could weaken the value of standards and performance measurement systems. Consideration should be given to the appropriateness of exemption clauses without specific limitations or context.

8. Data impact on financing resilience

The calculation of investment in resilience and redundancy is dependant upon existing information. The bulk of historic data is based on small scale, low level outages and service disruptions. Many natural hazards are low probability/high impact events which cut off whole areas for prolonged periods. The UK does not have enough large scale natural hazards to impact historical data; therefore investment planning might be underestimating the importance of resilience provision and government support¹⁵. Consideration should be given to how the intrinsic difference between natural hazards and existent low level outage data could be addressed to support investment and prevention planning.

¹⁵ Viscusi & Zeckhauser, "National survey evidence on disasters and relief: risk beliefs, self-interest, and compassion" *Journal of Risk and Uncertainty* 33, 2006, 13-36

