EDF Energy Networks

Planning for the future of our networks

Consultation Document

FOREWORD FROM VINCENT DE RIVAZ, CHIEF EXECUTIVE OFFICER, EDF ENERGY

This is both an exciting and challenging time to be working in the power industry. Today the world faces a major energy challenge - that of meeting growing demand within the context of climate constraints and a depletion of resources. If we want to provide our eight million customers with secure, safe, reliable supplies, reduce our carbon emissions, protect the environment and ensure affordable, sustainable energy, then we need to develop long-term investment plans and a suitable regulatory framework with our regulator, Ofgem. During the negotiation of DPCR5, I intend to put safety for our people at the heart of our vision for both capital investment and operating expenses.

Our industry is facing sweeping changes which will bring significant technological developments, new sources of energy generation and new legislative constraints linked to climate change. As a company we are rising to the serious challenges these changes pose to the way we do business. We are now in the process of preparing our submission detailing our future investment needs for the next price control review period covering 2010 to 2015. We are seeking your views on our plans as Ofgem's decision will be pivotal to our ability to prepare to meet these exceptional future environmental and technological challenges.

We have a particular responsibility to the country's economic well-being. The three licensed distribution networks we run are in the South East of England - the powerhouse of the UK economy. There has been a significant increase in economic growth across our regions and the energy demand on our networks has increased correspondingly. We do not expect

Vincent de Rivaz at the launch of our Zero Harm safety programme

this trend to change in the long term as our customers will continue to rely on us to meet their energy needs now and into the future.

Our job encompasses so much more than ensuring power at the flick of a switch. We are also responsible for maintaining and modernising those parts of our networks that are coming to the end of their useful life. Significant levels of investment will be required to replace ageing assets and accommodate new capacity, particularly renewable distributed generation. We believe our customers have a right to reliable power supplies delivered at a fair price and we strive to maintain a competitive edge. This will remain central to our business plans but, as we move to a lower carbon economy, the prices paid by customers will need to reflect the new investment in the energy infrastructure essential to meet the needs of the 21st Century. Building a sustainable network infrastructure is crucial, and how we do this is central to our future strategy and to this consultation process. There are a number of technical uncertainties about the way distribution networks will operate in the future. Many of these emerging technologies are still in the research and development stage but it is vital that we begin to invest now to pave the way for their deployment on our networks.

It is both a privilege and a responsibility to provide such an essential service to our customers and to society and, with your help, we want to ensure that our investment plans are designed to meet your energy requirements and priorities and ensure that our future funding level reflects the need to create fully-modernised, resilient distribution networks. You know how issues such as climate change, electricity sources, reliability, safety and customer service will affect your business or constituency, so I encourage you to take part in this consultation. I welcome your views on any aspect of this report or, indeed, anything you think we may have omitted. Make your comments, via our website www.edfenergy.com/dpcr5, and I can assure you that our final submission to Ofgem in early 2009 will take your views into account.

Vincent de Rivaz
Chief Executive Officer
EDF Energy

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A glossary is available on the consultation website at www.edfenergy.com/dpcr5

Sections 1 to 3

In the pages that follow we describe how EDF Energy Networks delivers power to your homes and businesses and explain why your views on the future of our networks are so important.

1. ABOUT EDF ENERGY AND OUR NETWORKS

EDF Energy is one of the UK's largest energy companies. We provide power to a quarter of the UK's population via our electricity distribution networks in London, the South East and the East of England. We supply gas and electricity to more than five million customers and generate about five gigawatts of energy from our coal and gas power stations, as well as combined heat and power plants and windfarms. The company is also a key player in national infrastructure projects including the management of private electricity networks serving four London airports and the Channel Tunnel Rail Link, the country's first new railway in 100 years. We employ nearly 13,000 people at locations across the UK. EDF Energy is a core part of the EDF Group, one of Europe's largest power companies.

Beddington grid - an example of our grid assets

Did you know...?

EDF Energy provides three services to our customers, namely energy generation, energy distribution and energy supply. This consultation document deals solely with the distribution side of our business which is managed by EDF Energy Networks.

Key Financial Data for 2007 (£m)	EPN	LPN	SPN
Turnover	414.5	304.3	218.8
Operating Costs	174.3	124.0	99.7
Capital Investment	230.7	140.5	126.4
Profit after Tax	150.7	118.3	78.6

Figure 1: EDF Energy Networks key financial data

As a Distribution Network Operator (DNO), EDF Energy Networks owns, operates and manages three of the 14 distribution networks in the UK. Our licensed distribution networks are in London, the South East and the East of England, also known respectively as LPN, SPN and EPN. We are the largest electricity distribution network owner in the UK covering an area of approximately 30,000km², extending from The Wash in the East to Littlehampton on the Sussex coast. More than eight million connected customers depend on us for their power.

What we do

We take electricity at very high voltages from the National Grid and transform it down to voltages suitable for commercial and domestic use. Our job is to deliver electricity to our customers and to get the lights back on in the event of a power failure. Figure 2 illustrates the end-to-end process of how electricity is generated, distributed and supplied to customers. Power plants around the country generate electricity which is then transformed into useable power voltages by the National Grid. We take power from the National Grid and distribute it, via our networks, to connected customers who in turn pay their chosen supplier for the power they receive. The supply companies pay the distribution network operators, us, to distribute the power.

We are also responsible for maintaining and modernising our networks, parts of which are coming to the end of their useful life.

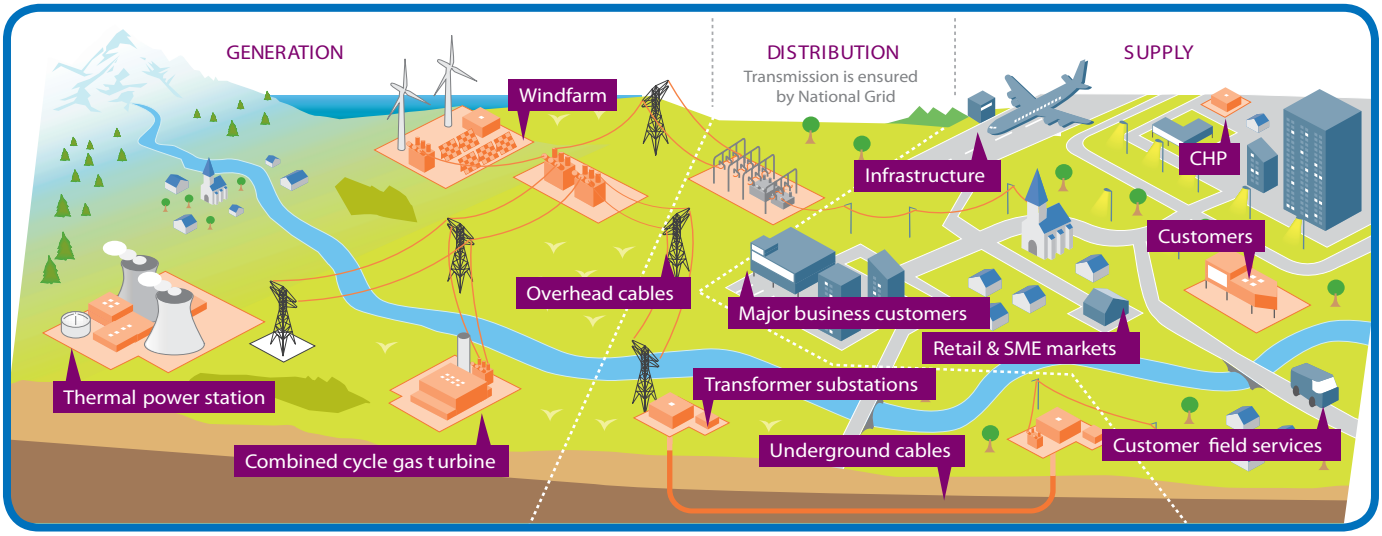

Figure 2: EDF Energy's electricity end-to-end process

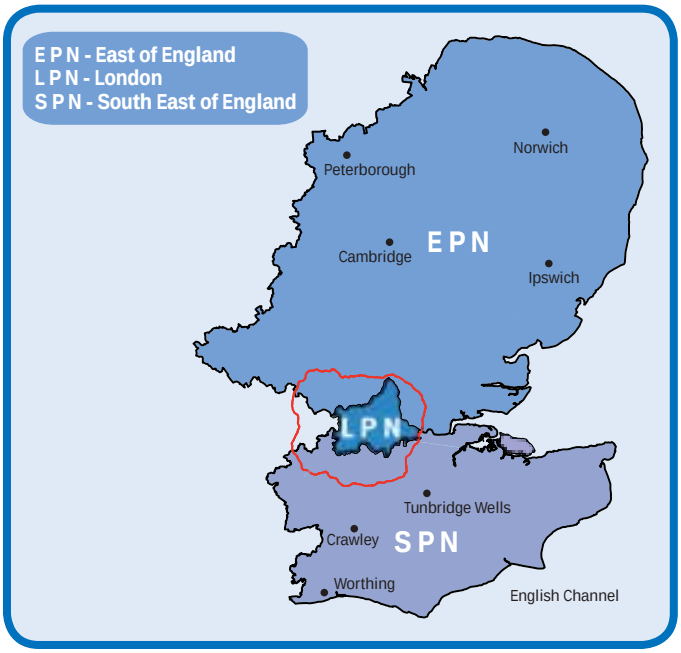

Figure 3: Regions in which EDF Energy Networks operates

Regulation and structure of the industry

DNOs are natural monopolies as there is no realistic means of introducing competition because of the cost of replacing all of the fixed network infrastructure. It would not be economic to duplicate the existing network infrastructure for purely competitive reasons. In this sector, therefore, Ofgem protects customers' interests by regulating the companies through five-year price control periods, which include curbs on expenditure as well as incentives to be efficient and innovative. The review process for the next price control period, which will determine the amount of money we can invest in our networks between 2010 and 2015, has now begun.

Network operators have two distinct types of customers. The first are retail electricity suppliers, who pay DNOs for use of system for the transporting of electricity along their networks, and then pass these costs on to all connected customers as part of the final single bill. As part of the regulatory framework, Ofgem has formally separated electricity retail supply businesses from DNOs. EDF Energy does have a retail electricity business but we have stringent arrangements in place for the separation of our supply and distribution businesses. The second type of customer is anybody who wishes to make a new connection to our network and is charged a connection fee.

The Challenge of London 2012

EDF Energy is proud to be a tier one sponsor of the London 2012 Olympic Games and Paralympic Games. In addition, we were the first sustainability partner to be announced for London 2012. In this capacity we will help to ensure that London 2012 is a truly sustainable event, uniting people and business to address climate change.

EDF Energy Networks is committed to providing an infrastructure which is fit for purpose and relevant in the 21st Century. As part of this process, we are undergrounding overhead power lines crossing the Olympic site. EDF Energy will be supplying renewable electricity for the Olympic and Paralympic Games and we will provide a low carbon fuel solution for the Torch and the Cauldron, the most iconic symbols of the Games.

Safety

As part of our desire as an organisation to move to an environment of zero harm, our Networks Branch has launched a review of the way that we carry out our work and the way that we interact with the network – the Zero Harm programme. We have five clear and simple principles of safety for our staff which provides an effective way of working while mitigating against the risks inherent in working with electricity. Although not formally a feature of the distribution price review process, this examination of our future working practices, including a reassessment of how we work on the 'live' network, could impact on the way that we are able to deliver work for you. It could also affect how we meet your expectations in terms of customer interruptions and connections to our network.

Some of our stakeholders discussing street works at our Street works café event

Our key challenges

The electricity industry is facing sweeping changes which, over the next 15 years, will bring significant technological developments, new sources of energy generation and new legislative constraints linked to climate change. If society wants to keep the lights on, protect the environment and ensure affordable, sustainable energy then we need to gain consensus on our long-term business plans. One of the key challenges we face is inherent in the regions that we serve. In the areas in which we operate, especially in London, demands on electricity supply are greater than in other parts of the country owing to the high level of business operations and transport links in and out of the capital. In addition, we need to plan for events that will be hosted by the city in the future, most notably the 2012 Olympic Games, which will require a large increase in capacity for new facilities, transport links, homes and other developments.

In the 18 years since privatisation, the regulatory focus has been on creating a leaner, more efficient electricity industry. This has been successful and we now believe the focus for the next 20 years needs to be on substantial investment to replace ageing assets and develop a resilient, modern

and flexible network to meet the country's future energy needs.

For more information on our EDF Energy Networks branch, please go to www.edfenergy.com/products-services/networks/about-networks/index.shtml

Your involvement and input can make a difference

The future economic growth of a region is linked to our ability to provide a secure and resilient service and to meet the increasing demand for electricity. The needs of industry, property developers and the regulatory obligations on our network have to be balanced with an awareness of the environmental impact of what we do and the impact of climate change. As a regulated industry we are required to operate and maintain the network efficiently. We are seeking your comments to ensure we take into account all of your requirements and priorities and ensure that our future funding level reflects the need to create a fully-modernised, resilient distribution network in the regions we serve.

You know the energy issues that affect, or will affect, your business or constituency, and how factors such as climate change, electricity sources, reliability, safety, price, customer service and traffic disruption will impact you in the future. This is your opportunity to let us know how we can serve you best while building a sustainable future.

Important details and dates for the consultation process

In line with best practice, the consultation period will run for 90 days starting on 1 July and running until 28 September 2008. In addition to the responses we receive from you via our on-line consultation document, we will be hosting regional workshops throughout London, the South East and the East of England, highlighting the issues most pertinent to those areas of the country.

Each region will have different views on the energy issues we are presenting to you in this paper and we want to offer you the forum to engage with us and discuss these themes. Workshops will be held in September and we will be in touch with you to secure your vital participation at these events.

Have your say - www.edfenergy.com/dpcr5

As part of the preparation for the next price review, our regulator Ofgem has asked all distribution network operators to consult with their major energy customers and interested parties. We welcome this opportunity to engage with you in an informed and frank debate on the main issues facing our industry.

To ensure that your opinions on our investment plans are incorporated in the review process, we hope you will respond to this consultation online. You are free to comment generally on our plans but you will also see a number of 'have your say' boxes where we are seeking your views on specific questions. The feedback we receive from you will help us to shape our approach relating to the future of your electricity distribution network. We will acknowledge each response and will ensure it is considered as we prepare our submission to Ofgem.

This consultation document outlines the main issues facing the energy sector which will have a direct impact on you, our customer. The areas we cover in Section 5 set out our core investment plans for our three networks. This is work that we must do to comply with the terms of our regulatory licence. Sections 6 to 10 describe additional work we would like to undertake to create a more efficient and resilient network and we are seeking your feedback on these proposals. The issues covered in these latter sections have been raised by our key customers during our regular engagement with them.

The timeline in Figure 4 illustrates the key dates and steps in this consultation process. Please make a note of these and get in touch with us via www.edfenergy.com/dprc5 or call us on 020 8683 6602 for more details.

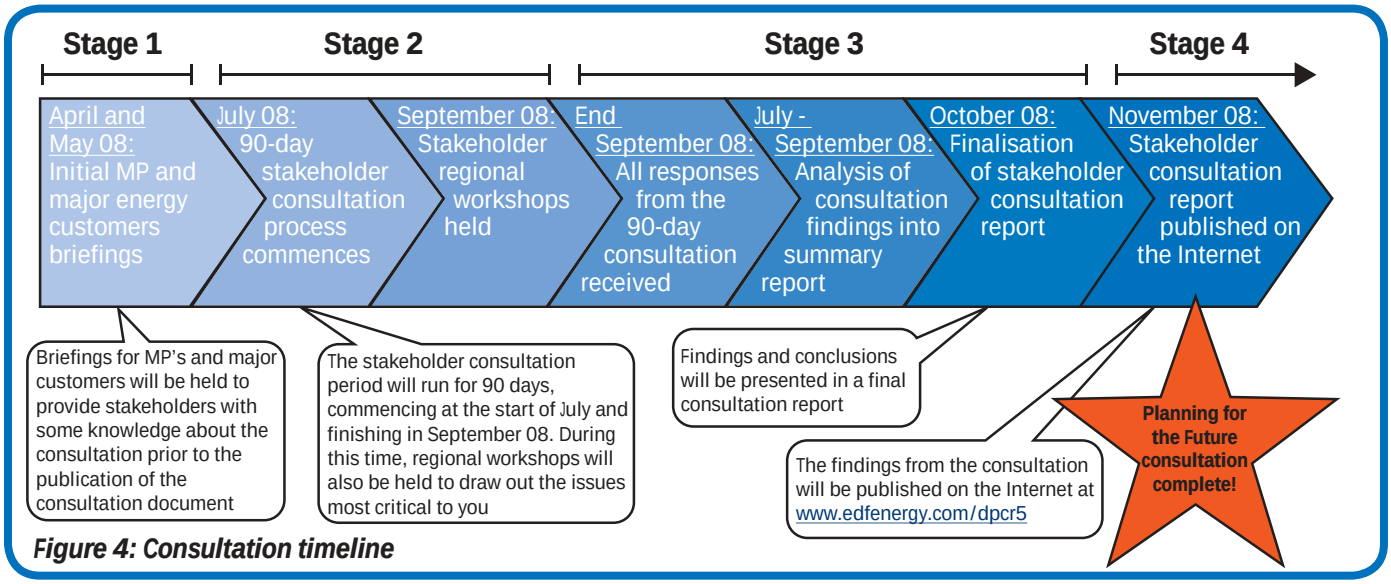

Figure 4: Consultation timeline

2. OFGEM'S SURVEY OF OUR CUSTOMERS

Central to the distribution price control process is an understanding of what service improvements customers want and the value that they place on them. To gain a greater insight into domestic and small business customers' preferences Ofgem is undertaking its own survey looking at Willingness to Pay. This information will be used by Ofgem to help them determine the level of investment that they allow DNOs for future service improvements.

For clarity, EDF Energy Networks' consultation is primarily targeted at large consumers on the distribution network (annual demand approximately greater than 1 MWh) and representative organisations. Therefore, this consultation document should be read in conjunction with the Ofgem Willingness to Pay survey.

The Ofgem survey builds on similar work carried out at the last price control review and is divided into two distinct stages: a qualitative survey followed by quantitative research.

The overall aims of the qualitative survey are to:

- Understand customers' expectations regarding DNO service
- Explore current experiences and satisfaction with quality of service in order to understand key priorities and areas that customers value
- Explore both awareness and understanding of the guaranteed standards of performance
- Provide context and direction for the quantitative study

The overall goals of the quantitative research are to:

- Provide a measurement of customer opinions
- Quantify customer service priorities
- Provide data on willingness to pay for service improvements

The qualitative survey has been completed and the final report is available on the Ofgem website at www.ofgem.gov.uk/Networks/ElecDist/QualofServ/Documents1/1704rep03.pdf. This phase of the research suggested that customers question the need to pay more for a service that they are broadly happy with. Most customers said that reliability had improved over the past three to five years.

However, Ofgem intends to probe customers' willingness to pay for quality of supply improvements more thoroughly in its quantitative research, which will be published later this year. Until this work is complete, the views from the qualitative survey should be treated with care as they may not be representative of all customers' views.

3. HOW WE HAVE ENGAGED WITH OUR STAKEHOLDERS UP TO NOW

At EDF Energy Networks we see robust engagement with our customers as an essential component of our business practice. The extensive dialogue we carry out with a wide range of groups and organisations representing our customers helps us improve our business performance. For example, we engage with MPs and government ministers who are at the forefront of the UK energy policy debate. We also listen to the challenges encountered by our major energy customers, with whom we regularly discuss our current performance to ensure we understand their electricity needs and any associated issues.

A view of Westminster, where we engage with MPs on energy issues

We have developed relationships with our major customers in each of the regions we serve. We discuss regional development plans and work together to ensure power is available for new developments and is upgraded in areas which have older electricity assets in place.

Prior to this current consultation process we have held targeted discussions with many key customers in an attempt to understand the issues they face. In 2006 we appointed a group of leading experts to provide a healthy, independent challenge to the development of our business approach and strategy. The Stakeholder Advisory Panel includes eminent individuals with broad experience in business, community relations and the environment.

We work closely with key social and environmental non-governmental organisations on sustainability issues and see them as vital partners in helping us deliver our services. For example, we work closely with the British Red Cross and the Women's Royal Voluntary Service (WRVS) to provide support and hot food to vulnerable customers during a prolonged power failure.

This consultation process aims to extend our engagement with you so that we can gain an even deeper understanding of the issues that will matter to you in the future. This will aid us in our work to improve our electricity network in order to provide a reliable, safe and sustainable service for all of our customers.

OUR ENGAGEMENT WITH YOU

In line with our business ambitions, we work closely with a range of customers on the issues that are important to them.

Customer experience

One of our call centre representatives at work

During the past five years we have taken steps to improve our customer service. We are the only DNO to have won Ofgem's Discretionary Reward Scheme for two consecutive years. Our success has been due to the work we have done with our vulnerable customers, improved customer communications and corporate social responsibility schemes. We conducted a survey, entitled 'Voice of the Customer', which asked our customers what service they would expect to receive during and after a power cut. This included focus groups in all three of our network areas and a telephone survey. The information we gathered underpins our current plans for future improvements to our customer service. At EDF Energy Networks every customer enquiry or complaint is seen as a learning tool and is recorded and discussed. The lessons we learn from it will inform our future dealings with customers.

New or existing customers connecting to our network

To understand our customers' views on the connection service we provide, we have appointed regional account managers. We hold regular meetings with customers, including local authorities, transport bodies, construction companies, environmentally-interested parties and other utility services. A range of issues are discussed around plans, future opportunities and current risks.

Supply chain

At the heart of our business method is a collaborative approach to managing relationships with our contractors. This has improved our ability to successfully adapt to the long-term challenges in our business. We have already started to engage with our major suppliers in planning for this price review period. Strategic development meetings have been held to gauge their views on key areas of our investment plans and to ensure that they can provide the necessary resources. As part of Our Social Commitments, which we announced earlier this year, we are working to ensure that by 2012 all of the

contractors we use will be signed up to the UN Global Compact, which underlines our support for ethical business practices.

Skills

We are fully committed to addressing the skills gap affecting our industry and we are working with many organisations to help develop the necessary training and skills essential to the power sector. We work with a cross-section of organisations such as schools, universities, research groups and educational organisations, including the Royal Academy of Engineering, the Institution of Engineering and Technology and the Energy Networks Association.

In addition, we chair the Power Sector Strategy Skills Group (PSSSG), which is a key group within the industry and is supported by Energy and Utility Skills. We also chair a sub-group of the PSSSG which aims to make our sector more attractive to potential employees and address the strategic skills issues across the industry. We work with Energy and Utility Skills on several initiatives, such as the development of a new Engineering Diploma for school pupils, which will help to promote an early interest in working in our industry.

Environment

We all want to ensure that we preserve our natural habitat as much as we can and EDF Energy Networks works closely with environmental agencies to try to minimise our impact on the environment. We are replacing overhead lines with underground cables in Areas of Outstanding Natural Beauty (AONB) and National Parks within our network boundaries. Since 2005, regional steering groups have been created to oversee these undergrounding schemes in the East and South East of England. These groups are chaired by Natural England and the Protected Areas (Broads Authority and AONBs), with input from all of their constituent local government agencies at county, district and borough level. We also have extensive partnership arrangements with county Wildlife Trusts, the RSPB, water companies, parish councils, English Heritage, the National Trust and volunteer groups.

We are also aware of the impact of noise from our equipment on the local environment. All of our new buildings are designed to minimise noise levels and we are retrospectively installing noise mitigation devices to existing buildings and plant.

Public safety, sustainability and street works

Our public safety team works with our customers and anyone working on, or near, our networks to reduce accidents and incidents of third party damage. This includes providing maps detailing the position of our underground cables to anyone digging in the public highway, safety sessions with schoolchildren and talks and advice for leisure groups, including hang-gliders and anglers. At a strategic level, we are a member of the Energy Networks Association National Public Safety Task Force.

One of our engineers at work maintaining your network

This year EDF Energy Networks has launched a new Zero Harm initiative to ensure our employees work to protect your safety, and their own, at all times when they are working on our regional assets.

We own and maintain 127,000km of underground electricity cables and, inevitably, there are times when we have to dig these up for maintenance or carry out emergency repairs. We aim to reduce the impact of our street works on local businesses, motorists and pedestrians and liaise closely with the 52 local authorities operating in our regions and with our sub-contractors in order to do so. Our desire to improve these relationships has led us to establish market-leading, pioneering partnerships with local authorities that highlight best practice for notifying councils of our intended works and working to fill the holes in the roads as swiftly as possible.

We take the views of our stakeholders seriously and host frequent meetings

YOUR INITIAL VIEWS THAT HAVE HELPED INFORM THIS CONSULTATION

We welcome the opportunity to engage with our key customers. Before the publication of this consultation document, our Stakeholder Advisory Panel chaired a briefing for our major energy customers, where the panel members provided independent opinion and insight on the energy issues on the table. Those in attendance included members of the governing bodies or trade associations which represent the views of a large proportion of our customer organisations, government departments and groups with whom we have regular contact.

In addition to this key stakeholder briefing, we held face-to-face meetings with politically-interested parties and we hosted an MP drop-in centre at the House of Commons to allow MPs to voice their opinions on the real issues facing the energy sector. More than 320 MPs were invited and the collective views that emerged from these events and our ongoing engagement can be found in the 'Initial views raised' text box.

Initial views raised

- Reliability of power and network resilience if unpredictable events occur
- The effects of increasing energy demands on reliability
- Sustainability of power and sources of electricity over the next 20 years
- The reduction of our carbon footprint and promotion of distributed electricity generation
- The role of renewable and nuclear energy sources in the future
- Value for money
- The focus of future investment in the network
- Protecting our Areas of Outstanding Natural Beauty

Before these various meetings were held, we produced and distributed a briefing paper detailing the background to the consultation called 'EDF Energy - Delivering Power to You'. It focused on the changing face of energy in the UK and set the context for this consultation, which offers our customers the opportunity to influence the industry debate on the future of our electricity network. The issues highlighted in 'Delivering Power to You' arose from our ongoing engagement with our key customers and the feedback we receive from them.

A SUMMARY OF THE VIEWS EXPRESSED

This consultation process is an extension of our consultative approach - we wish to obtain your views to assist us in shaping our strategy and to help determine where to invest in our networks in the future.

Having considered the views expressed at regular meetings, forums, and the briefing sessions with our major energy customers, we have produced this consultation document which covers a number of issues on the energy challenges we face. These are presented to you in the following sections of this document:

- Providing a safe, secure and efficient network for our customers in the long term
- Planning for uncertain events
- Protecting the future of the UK economy – ensuring there is sufficient capacity in our network to meet increasing demand
- Building for a sustainable future – minimising our impact on the environment
- Providing good value for money
- Investing for the future – smart networks and distributed generation

You will find a number of consultation questions embedded in these sections. While we welcome comments on the whole consultation document, it is these questions that we would ask you to focus your feedback on.

Have your say - www.edfenergy.com/dpcr5

1. Do you have any general comments you would like to make about our Planning for the Future document?

One of the forums we use to generate discussion on street works is our Street Works Café

Section 4

This section addresses the impact of the wider business environment on our networks and the key planning assumptions we have made while drawing up our future investment plans.

4. BUSINESS ENVIRONMENT AND KEY PLANNING ASSUMPTIONS

THE FUTURE BUSINESS ENVIRONMENT

The wider business environment will clearly have a significant impact on the need for investment in electricity networks. Expected levels of economic growth, which typically have a direct effect on electricity demand, will continue to be an important factor in our investment decisions. However, in addition to economic growth, the need to invest in our networks is increasingly influenced by government policy decisions on environmental issues, for example decisions to promote an increase in energy efficiency or an increase in the use of electric vehicles.

In order to predict and assess the impact on our networks, we have worked hard with our stakeholders to develop a balanced view on the challenges facing our industry. This section provides a summary of the likely effects and the underpinning assumptions we have developed to model the future of our networks. Having undertaken this assessment, we are in no doubt that the rapidly-evolving nature of the energy industry will require network owners and operators to change the way in which they think about investment and even the way in which they operate their networks. We welcome Ofgem's long-term review of the regulatory environment but question whether sufficient incentives will be provided in the 2010-15 regulatory price review to encourage network operators to make the required transition. In our opinion, the regulator now needs to take a longer-term, more strategic view than previously.

An example of local power generation on a church roof

KEY ISSUES TAKEN INTO CONSIDERATION

Economic growth

Our core business scenario is one of continued economic prosperity. The main detailed assumptions are contained in Appendix 1. We acknowledge the possibility that the current economic instability caused by the recent uncertainty in the credit markets may result in a more pronounced downturn in economic activity. However, we still believe that it is too early in the economic cycle to accurately interpret whether the overall impact on economic growth will be shallow or deep, or even whether long-term growth in the South East of England will be significantly affected. Three further UK economic growth scenarios have been considered while developing our view of the growth of distribution networks, and these are high sustainability, regulatory change and low European economic growth.

Energy efficiency (demand side management)

Reducing the amount of energy we use is often a very cost-effective way to cut carbon emissions and can potentially reduce the requirement to invest in networks. We believe that significant scope remains for improvement in energy efficiency, both in the domestic and business sectors, and we support government policies such as the Carbon Emissions Reduction Target (CERT), that target energy efficiency improvements. These policies should deliver a noticeable reduction in energy demand but, in the medium-term, the most significant impact will be on gas consumption as customers install measures such as cavity wall insulation. There is likely to be a much smaller effect on electricity usage where achieving any significant reduction would require a major change in customer behaviour.

In the future we believe that electricity smart metering represents a good opportunity to reduce overall electricity consumption and demand peaks, possibly offsetting some requirement for network reinforcement. The extent of the impact will depend on how many customers smart metering is rolled out to, when the roll-out commences and in what time frame it is completed. Our analysis assumes that smart metering will begin to have a limited effect on electricity consumption from the point of its introduction.

Distributed electricity generation

The term distributed generation (DG) is generally understood to refer to all types of electricity generation sources that are connected to the distribution, rather than the transmission, network. This includes generation located on the same site as the customers it serves, such as a combined heat and power plant, or micro generation, but it also includes any other form of electricity generation connected to the distribution network, such as windfarms or small thermal power stations. Distributed generation can help to reduce the overall carbon impact as 'local' generation reduces the amount of electricity lost in the distribution and transmission process. However, in some circumstances the relative inefficiency of the generating plant can more than offset the gain in reduced electrical losses. The impact that DG has on the distribution network will vary depending on its location and the type of technology used. In some cases an increasing penetration of DG in certain areas may reduce the requirement to invest in parts of our distribution network.

Expected penetration of distributed generation

Local DG technologies are likely to become more widespread in coming years and will be driven by financial support mechanisms that favour local generation. For example, under the banded Renewable Obligation, micro wind and solar photovoltaic schemes receive double the subsidy that would be paid to larger onshore windfarms.

In addition, planning requirements increasingly insist that developers generate a proportion of their development's energy requirements locally. In particular, the Government has proposed that zero carbon homes will become the

standard for all new housing from 2016. While the exact definition of zero-carbon is not yet agreed, it is possible that the final definition will require all new homes to generate a proportion of their electricity demand on-site.

However, in reality, we are not convinced that a DG revolution will emerge, nor are we convinced that it is required. In our view, while we agree that DG will contribute towards achieving the UK's energy goals, it will not deliver the whole solution. We believe that the future success of the energy sector requires a diverse mix of both decentralised generation and large-scale, low-carbon, centralised electricity generation connected at transmission, including nuclear, coal with carbon capture and storage, plus offshore and onshore windfarms.

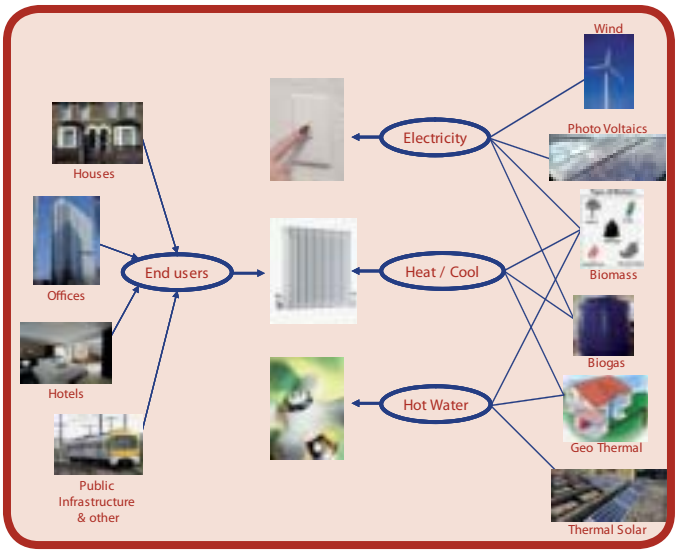

Figure 5: Distributed Generation – energy optimisation

We will continue to work with the Government to create realistic expectations for DG. In particular we will oppose any definition of a zero-carbon building that requires all electricity demand to be generated on-site and believe that, once the true costs of on-site generation become better known, the Government is unlikely to pursue such a requirement.

In conclusion, our considered opinion is that DG will contribute approximately 0.25 per cent of the total power requirements for distribution in 2010, growing to between one and two per cent by 2020. This is likely to result in small savings through the avoidance of some network reinforcement. It should be noted that as the amount of DG increases, part, if not all, of this benefit will be eroded as networks will require upgrading to allow DNOs to actively manage the network and provide balancing services, as National Grid does for the transmission network.

Low-carbon heat

Around 81 per cent of the UK's heat demand is met by using natural gas. Other fuel sources include oil, electricity and a small amount of renewable sources. Renewable sources account for less than one per cent of heat demand. Since nearly all heating fuels are fossil fuels, the heat sector currently has a significant impact on total UK carbon emissions (49 per cent of UK emissions in 2005, according to BERR's Heat Call for Evidence 2008). Therefore, even with almost complete decarbonisation of the electricity sector and significant effort in the transport sector, we believe that the UK will need to reduce emissions from heat by at least 50 per cent by 2050. A significant reduction in the amount of heat we use and radical changes to the way we generate our heat, for both new and existing developments, will be required to meet this target.

Several low-carbon heating technologies are available. We see these technologies as falling into three categories: low-carbon electricity, with or without heat pumps; renewable heat, including solar thermal, biomass, and from waste; and gas-fired Combined Heat and Power (CHP). While we do see a role for all of the solutions identified, in the longer-term low-carbon electricity is likely to provide the only practical means of replacing gas heating on a mass scale in domestic and commercial properties. Renewable technologies, such as solar thermal, biomass and heat from waste, will make a contribution to emissions reductions. However, there are a variety of constraints on these technologies that will limit the market penetration they can achieve.

In the medium to long term we expect to see a significant increase in demand for low- and zero-carbon electricity for heating. This could significantly increase the amount of electricity generation capacity required in the UK and also lead to a requirement to reinforce distribution networks to deliver additional load to homes and businesses. It is vital that we begin to think about the potential implications of this during DPCR5.

Low-carbon transport

Last year the Chancellor commissioned an independent review to examine the vehicle and fuel technologies which, over the next 25 years, could help to decarbonise road transport, particularly cars. The final report (Part II: Recommendations for Action) was published alongside the Budget in March 2008.

The report concluded that electric vehicles could make a significant contribution to reducing emissions from transport and that options to facilitate the efficient use of electric vehicles, such as smart metering, varying price for different times of the day and fast charging points, should be considered by the Government. In addition, the report also highlighted that it was crucial that the Government and the power industry should include the impact of electric vehicles on the electricity grid in relevant scenario planning. While we acknowledge that a mass roll-out of electric cars may be some years away, we are committed to facilitating the development of this exciting opportunity. It is crucial that we begin to think about the potential implications of electric cars during DPCR5.

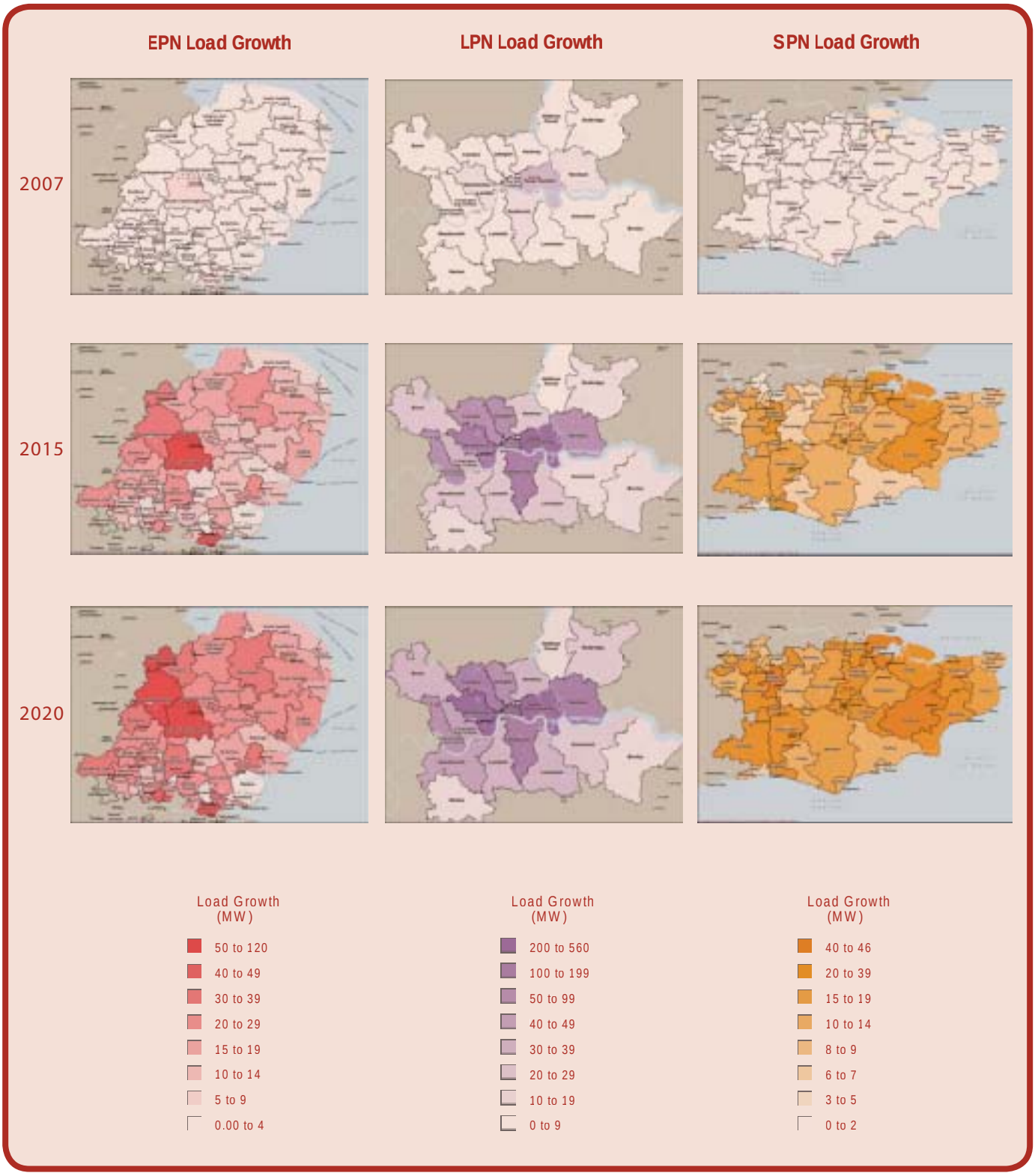

Figure 6: Regional maps illustrating the predicted increase in load growth between 2007 and 2020

Core business scenario summary

Against this view of the changing business environment in the energy sector, we believe that the distribution networks business will operate against a scenario of continued economic prosperity. The main features of this scenario are:

- Buoyant economic growth which is based on development agencies' published housing and employment forecasts
- Growth in distributed generation and renewable generation have limited reinforcement impact on the distribution network
- Combined effects of a slight drop-off in demand growth, energy efficiency and DSM all contribute to a fall-off in reinforcement by 2015
- Distributed generation accounts for 22 per cent of the generation portfolio nationally
- Network scenarios based on Industry SuperGen report
- Existing known development requirements are used to establish short-term factors in demand growth which drive the level of reinforcement required for our assets
- Grid firm-capacity will be increased to meet network demand growth over the DPCR5 period to generally maintain capacity margins and ensure that plant utilisation levels remain acceptable
- The further development of competition in the connections market will lead to a growth in third party-provided connections
- In the medium term, electric heating and transport are likely to increase demand. Investment decisions during DPCR5 will need to take into consideration the potentially significant increases in demand growth in future years

To develop our view of the future growth environment we liaise with Regional Development Agencies (RDAs) and local authorities to discuss the plans that will affect our network. We use information from the housing and development forecasts from regional planning documentation to model future power requirements. This information is fed into our network asset management planning process. There is no statutory requirement for development agencies to consult with their DNOs about their broader development planning assumptions. These assumptions have an impact on the supporting infrastructure, transport links and additional development to support new communities such as schools and other local amenities. The expected impact over time on the level of load growth within our three licensed networks is displayed in Figure 6.

Have your say - www.edfenergy.com/dpcr5

2. What are your views about the assumptions we have made with regard to the key issues that we have identified for the future of the electricity industry?

COST PRESSURE ON RESOURCES

We recognise that the delivery of our proposed investment plans is conditional on our ability to secure finances for the investment. In an increasingly constrained skilled labour market, future expected inflation in the cost of skilled resources can have a significant impact. The cost of materials that we use to invest in our networks, such as transformers, switchgear and cables, is highly dependent on the cost of global commodities such as steel, copper, oil and energy. We are engaging economic experts to ensure that we develop a good understanding of the relative price effects that relate to the resources we will be required to buy.

Material supply

Initial discussions with our equipment and material suppliers have not highlighted any particular issues that are likely to impact on our ability to deliver our future plans. Initial analysis of material requirements inherent in our investment plans suggest that volumes are not likely to increase to levels that would present significant sourcing difficulties. Economic analysis undertaken by external consultants on our behalf suggests that, although demand for electrical materials has been somewhat constrained in recent years, the laws of supply and demand are likely to ensure that new manufacturing production capacity is introduced to meet demand in the near future. As market forces equalise themselves over time, we do not believe that these capacity constraints will be ongoing. Detailed material requirements for critical material resources will be shared with suppliers as investment plans are developed.

Cost increases over the period

While the volume of delivered projects has increased and our initiatives to manage expenditure have improved efficiency and effectiveness, our unit costs have been unavoidably affected by market forces. In particular, the unit costs of work have increased because:

- Equipment and materials prices have increased significantly since April 2005 - this has been driven by world demand for commodities, particularly due to economic growth in China and India
- Excess demand in some sectors has been exacerbated in certain cases, for example by the closure of some transformer manufacturing plants in Europe and North America prior to the increase in demand
- Higher contractor prices - UK contractors are looking to pass on price increases in construction materials
- Construction industry inflation indices for the last two years are in double figures and regional growth in the South East of England is putting pressure on skilled labour resources
- Increased project management costs due to the limited availability of suitably skilled labour

Figure 7 demonstrates the rising price of the most common cables we use, some of which are purchased in tens

of thousands of kilometres per year. The British Cable Association Index (BCA) reflects the price of copper per tonne on the London Metal Exchange. Covering the period from April 2005 to April 2008, the BCA measure has increased by 228 per cent. The corresponding increase in cable prices ranges from 28 to 38 per cent. Actions have been taken to manage and mitigate these increases, but they continue to form a substantial addition to our capital expenditure programmes.

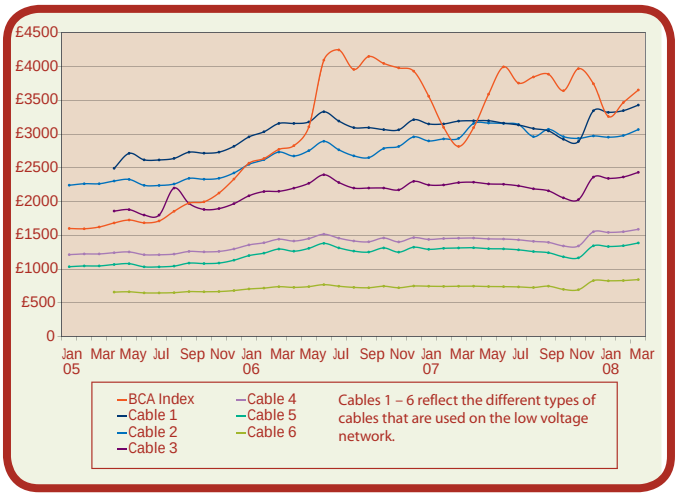

Figure 7: Change in the cost of copper

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3. Do you have any comments on how we could manage issues around the volatility of raw material prices?

One of our transformers being installed at Maidstone, Kent

Section 5

We are responsible for maintaining and modernising our three licensed networks and the work that is detailed in this section forms the core of our expenditure plans. This section also helps set the context for the rest of this consultation document, which looks at the work we would like to do over and above the schemes we are committed to in our core network plans.

5. PROVIDING A SAFE, SECURE AND EFFICIENT NETWORK

As a DNO, EDF Energy Networks owns, operates and manages the three licensed distribution networks in London, the South East and the East of England. Our primary role is to keep the lights on and to restore supplies in the event of a power failure. We are also responsible for maintaining and modernising our networks, parts of which are coming to the end of their useful life. We are currently committed to a £2.2 billion investment programme – that's over £450 million each year on average – on our networks as agreed in the last Distribution Price Control Review (DPCR4). By spending these sorts of sums we make sure our electricity supply is continuously available to our customers 99.98 per cent of the time.

During the next price review period (2010-2015) we estimate that we will need to spend £3.1 billion (all costs in this section are constant at 2008 prices), an increase in the range of 40 per cent, on replacing assets that have reached the end of their economic life and on extending our network. This is a significant increase in the total level of expenditure compared with previous price reviews. This section details the work that forms the core of our expenditure plans. It should be noted that elements of this longer-term capital expenditure are still subject to approval within EDF, and subsequent agreement with Ofgem. This expenditure does not take account of customer contributions for new connections. Figure 8 shows the planned gross capital expenditure between 2005/2006 and 2020/2021.

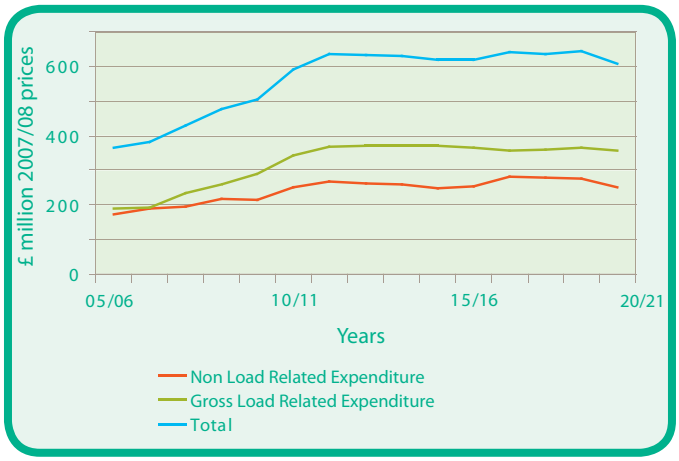


Figure 8: EDF Energy planned direct network investment 2005 – 2020

EDF ENERGY NETWORKS ASSET BASE

As the largest DNO in the UK, we have a diverse range of electrical assets operating from 132kV to low voltage. Figure 9 provides a summary of these assets. As part of the stewardship of our asset base, and as a leading asset manager, we are constantly reviewing the age and condition of our assets and, where economically necessary, replacing or upgrading the asset stock.

Network		LPN	SPN	EPN
Overhead lines (km)				
	LV	0	4,657	9,377
	HV	0	5,745	19,197
	EHV	15	1,313	3,479
	132kV	30	1,161	2,545
	Total	45	12,876	34,598
Underground cables (km)				
	LV	22,070	25,745	38,262
	HV	11,748	11,568	18,559
	EHV	1,269	1,320	2,289
	132kV	469	340	242
	Total	35,556	38,973	59,352
Total network length (km)		35,601	51,849	93,950
Substations				
	HV ground mounted	10,753	20,253	32,204
	EHV	94	299	483
	132kV	36	86	133
Other data				
	Total number of staff	1,076	1,182	1,807
	Network area (sq. km.)	665	8,300	20,300
	Network customers (millions)	2	2	3
	System winter demand (MW)	5,054	4,116	6,673
	Units distributed (TWh)	29,774	22,804	36,410
	Fluid-filled cable (km)	822	747	851
	Gas compression cable (km)	111	75	5

Figure 9: Networks Asset Base Data 2006/07

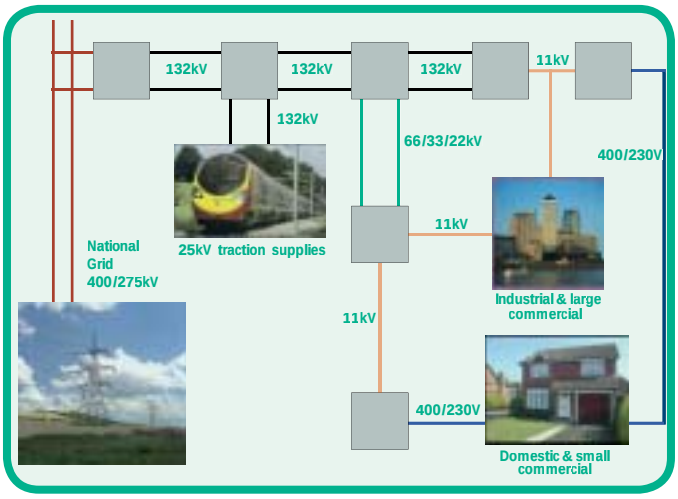


Figure 10: Existing network voltages and their application

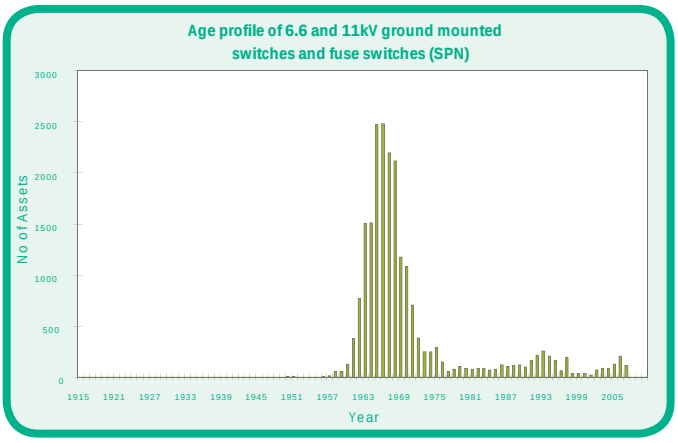
Overview of network assets and investment planning

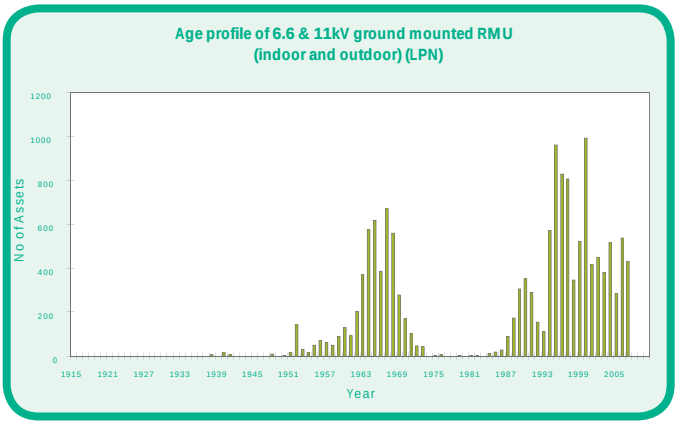
There are four levels of network which take electricity from the National Grid on to the distribution systems which directly supply our customers. These are:

- The 132kV network distributes bulk power from the National Grid Connection Points to our grid substations
- The Extra High Voltage (EHV) network, which operates at voltages between 66kV and 22kV, distributes power from our grid substations (and in some instances direct from National Grid Connection Points) to our primary substations
- The High Voltage (HV) network, which generally operates at 11kV or 6.6kV, distributes power from our primary substations to local substations where it is either transformed to low voltage or supplied directly to customers with higher power requirements
- The Low Voltage (LV) network which operates at 230V and delivers electricity directly to residential and commercial customers

The existing network voltages and their applications are illustrated in Figure 10.

Our existing networks, which have evolved over the last 100 years, have served the area well. However, we need to continue our work on the extensive refurbishment and replacement programmes we have started. This is particularly true in many parts of the South East and East of England where further industrial and residential development will cause the limits of design capacity to be reached. These imperatives provide the opportunity to rethink the way in which the infrastructure is developed to meet the needs of the area for the next 40 to 50 years. More accessible networks are being implemented, which better enable the connection of wind generators and other independent generation schemes. Our capital expenditure programme is split into load-related and non-load-related investment.





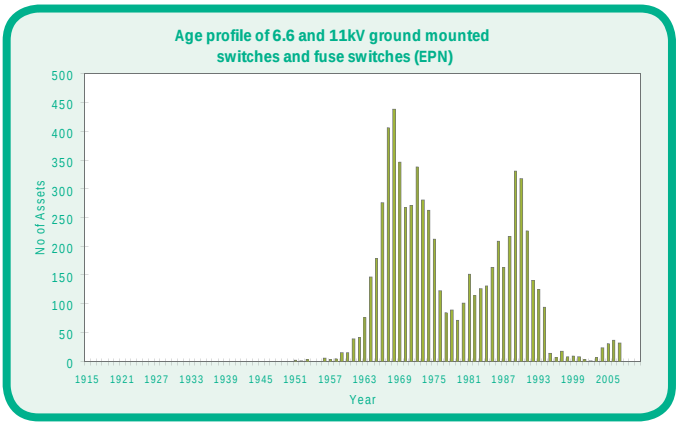


Figure 11: Representative age profiles of our assets

Load-Related Expenditure (LRE) refers to the upgrading of plant, including cables, transformers and switchgear, where the equipment's capacity margin (to meet security of supply criteria) is expected to be reached during the current planning cycle. It is mainly comprised of investment in three areas:

- Customer-specific work, primarily new connections to the network for additional demand such as the creation of new housing
- Network reinforcement which is driven by the growth of electrical load through increasing numbers of customers and the increased use of electrical equipment
- 'Future proofing' investment to equip the network with technologies which, for example, enable the connection of increased levels of distributed generation

Non-Load-Related Expenditure (NLRE) refers to the asset replacement of infrastructure and assets at the end of their economic life or as a result of other requirements such as regulation or statute law. This programme of work, is forecast to be approximately £1.6 billion in the next distribution price control period.

WHAT WE ARE DOING TO MAINTAIN THE PERFORMANCE OF OUR ASSETS

Asset condition knowledge is central to, and underpins, an effective asset replacement strategy. Condition-based replacement is not only determined by the planned lifetime of an asset but also by its actual performance and condition. This approach to asset management ensures that assets are replaced early, if necessary, to maintain security of supply or later, as appropriate, to avoid unnecessary costs and disruption. The programmes set out below draw on our asset condition knowledge and are structured to achieve an appropriate level of expenditure for each asset type consistent with maintaining the level of network risk.

We hold condition and age-based knowledge for each major asset type. This information is used to develop future asset type replacement programmes that reliably target assets with poor condition ratings or generic weakness (Figure 11).

A full asset condition data set for EHV and HV plant and equipment is maintained to ensure that asset replacement is driven by economic cost. However, to supplement specific condition-related replacement, where appropriate 'generic' replacement programmes of high-risk switchgear types are also implemented. Obtaining condition-based information for some types of assets is difficult, an example being underground cables. At this time the main driver for the replacement of 11kV cable is a fault history where age and degradation are identified as the prime cause of failure. However, improvements in this area are being delivered by the partial discharge testing of cables, which is being developed on the extensive London and South East cable networks. As we gather further data, this has the potential to improve the accuracy of forecasting when these cables are likely to fail.

LV asset replacement is based on asset knowledge where this is available. At this voltage level, because of the size of the asset base, maintaining a full condition register is less practical, although this is the ultimate goal. In some cases, therefore, the scale of the problem may be greater than is indicated by recorded asset condition knowledge, for example the condition of wooden poles and underground link boxes.

Investment planning

The high-level philosophy is illustrated in Figures 12 and 13 which show that business imperatives and asset condition information are reviewed to formulate an appropriate set of network activities. At the same time, an analysis of existing

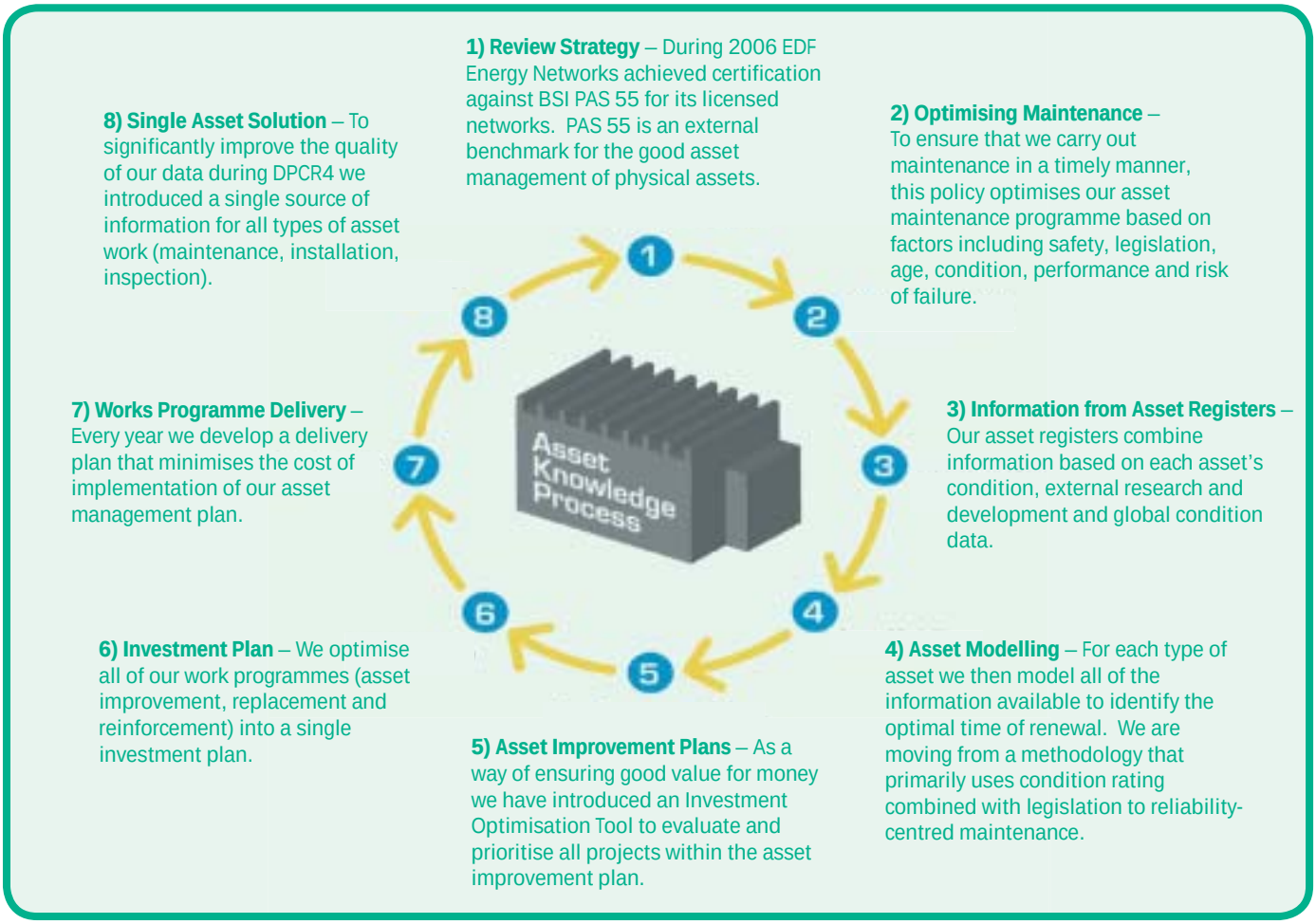


Figure 12: Asset knowledge process

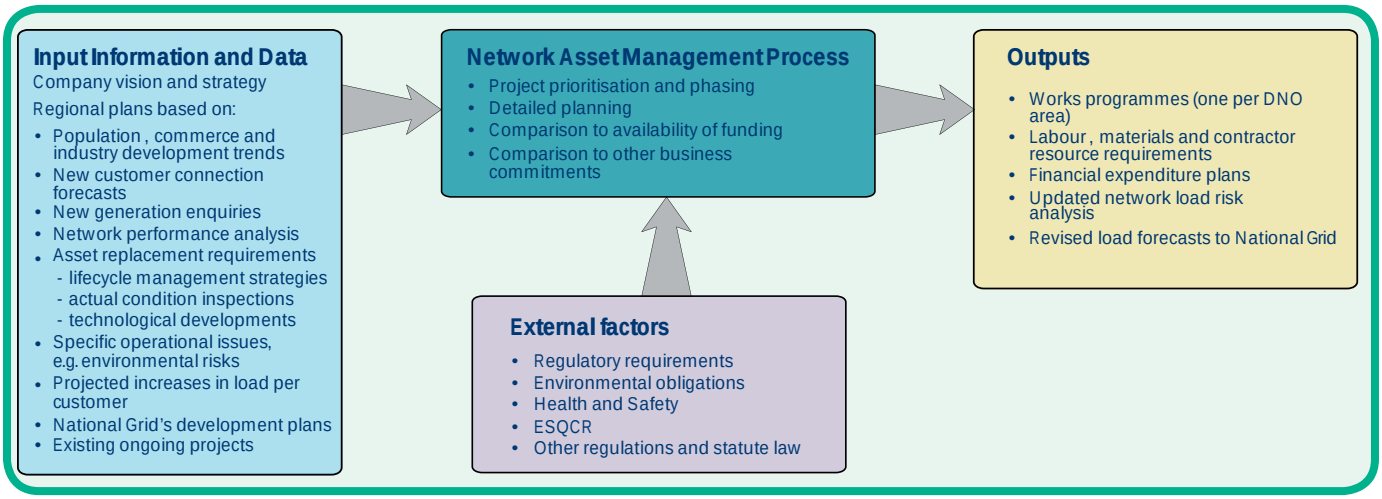


Figure 13: Asset management plan overview

network performance is used to determine the required level of investment to meet the regulatory Customer Interruptions (CI) and Customer Minutes Lost (CML) targets agreed with Ofgem. This approach ensures that suitable reinforcement schemes are being developed to address increasing demand and meet security of supply standards.

Assets are scheduled for removal or replacement based on condition, performance and economic considerations. The management of such asset knowledge is, therefore, a critical element in the development of the Investment Plan as it generates technical and economic information that is used

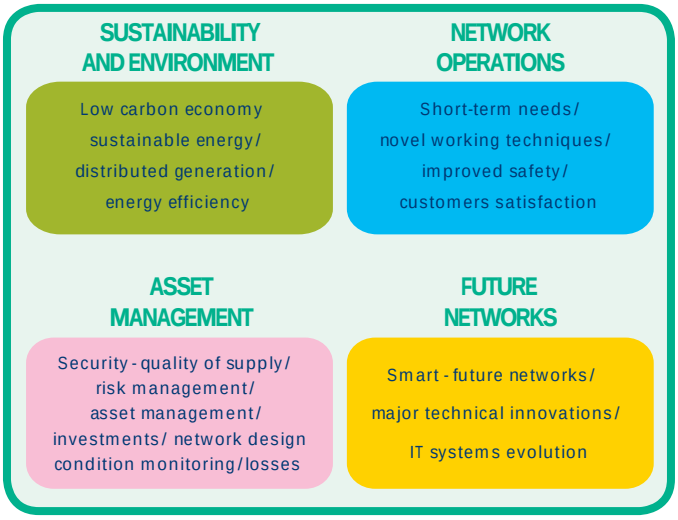


Figure 14: EDF Energy Networks Innovation Funding Incentive (IFI) programmes

to develop the asset strategies. Inspection and condition assessments are crucial to our better understanding of asset condition and this process has been bolstered by a significant investment in IT systems. This will allow us to maximise asset lives while reducing the number of systems that hold critical asset data, thus improving our data management and subsequent decision processes.

Introduction of new technologies

Ofgem devised the Innovation Funding Incentive (IFI) to encourage research and the development of innovative applications on the distribution network. The IFI funding is currently equivalent to approximately £4 million a year on a 'use it or lose it' basis. During the current DPCR4 period we must also make our own contribution of £750,000 per annum, which is an average of 20 per cent of this funding.

We have jointly developed an Innovation Fund with Ofgem to ensure a rigorous selection and review process for our projects. We also want to ensure the diversity of our research and development portfolio by addressing a wide range of current and forthcoming issues. Our research programme is divided into four work programmes as shown in Figure 14.

We have also developed an IFI portfolio management tool that enables progress to be carefully monitored, projects to be classified and the overall status of the portfolio to be monitored. We are seeking to exploit existing technologies and develop new methods to improve the quality of asset condition knowledge and the cost-effectiveness of information gathering. In addition to these objectives, other applications should lead to reductions in the cost of managing network faults. A summary of some of the main technologies we have developed can be found in Section 10.

HOW REGIONAL DEVELOPMENT IS REFLECTED IN OUR NETWORK PLANS

There are a number of reasons why we are planning to increase our investment in the South East and East of England during the next regulatory period. The most significant of these are:

- The general trend of high development in the area, both in housing and commercial schemes
- The requirement to continuously maintain and improve the networks to ensure high reliability, security of supply and minimised disruption, particularly in areas of dense business activity or susceptibility to major storms

Examples of the schemes to meet these requirements are covered in each of the regional development plans which follow. In addition to these two generic drivers, we anticipate that significant large-scale investment is needed to satisfy the extraordinary demands created by the Thames Gateway development in south Essex, north Kent and east London. The Thames Gateway stretches for 40 miles along the Thames Estuary from the London Docklands to

Southend, in Essex, and Sheerness, in Kent. Currently we have received firm enquires for more than £150 million of infrastructure development work associated with the Thames Gateway.

Each of the regional plans below shows an investment profile comprising both Non-Load-Related and Load-Related Expenditure. A brief review of the regional plans is contained within this section. Although elements of this longer-term capital expenditure are still subject to approval through our company authorisation procedures, these plans will form part of our submission to Ofgem for consideration as part of our investment during the next price review period (2010-2015).

Thames Gateway Area

The Thames Gateway broadly covers the area east of the M25, bounded to the north by the River Thames and to the south by the A2 and the Downs. Significant development is planned for the Thames Gateway, our current understanding of which is summarised here with reference to the following annotated map.

The developers' vision for the Thames Gateway is to create:

- 180,000 new jobs, through business and economic investment
- 160,000 new, well-designed homes, including affordable housing which can be rented or bought by first-time buyers
- A high quality transport system
- Better education facilities and high quality healthcare

Clearly, we will be required to carry out major extension and reinforcement work on our network in order to ensure sufficient capacity and reliability of service for many years to come. The Thames Gateway affects all three of our network areas in London, the South East and the East of England. The specific requirements are discussed in each relevant section below. The Thames Gateway in London also incorporates the 2012 Olympic Park area, which has a fixed deadline allowing no flexibility in timescales for delivery. After the event the Olympic Park in Stratford and the Lea Valley will be remodelled for a mixture of uses, including at least 9,000 homes, up to 11,000 jobs, a new park and permanent sports facilities. We have taken these development areas into account and compared them to the existing, and planned, infrastructure in the area. As a result, a number of specific schemes are planned to address the anticipated demand growth. Some examples follow.

Area	Nature of work	Anticipated year
Gravesend South	Upgrade capacity	2016
Gravesend East	New substation to meet capacity	Dependent on Grain (see below)
Rosherville	Replace existing assets and add new transformers	2013
Rainham	Increase capacity	2011
Kemsley	Reinforce connection to National Grid	Dependent on actual development
Sittingbourne (W)	Additional capacity	2014
Sittingbourne (N)	New substation	Dependent on actual development
Sheerness	Additional capacity	2010
Townsend Hook	Additional capacity	2014
Northfleet West	New substation	Dependent on actual development
Grain	Increase existing capacity and build a second substation	2013
Kingsnorth	Additional capacity	
London Gateway	New port, industrial development, additional capacity	2010 - 2021
Basildon	Additional capacity	Dependent on actual development
Barking	Network Development	2015
Southend on Sea	New Substation	2014

Figure 15: The major development initiatives within the Thames Gateway

South East Network (SPN) summary

Our power network in the South East is a mature and stable system supplying the needs of some 2.25 million customers at a peak demand of around 4,100 megawatts (MW). The network has been developed over the years to meet the rapid growth of urban communities, such as the new towns of Crawley and Ashford, and to provide secure services throughout the area as a whole. Further major growth is predicted for the Ashford, Medway, Sittingbourne and Thanet areas of Kent and the Crawley area in Sussex. Reinforcement is already under way in each of these areas.

Demand growth projections for the area to 2020 are explained in Section 6 (Figure 6 – EDF Energy Networks Load Growth 2007-2020). Figure 16 illustrates the planned level of expenditure of approximately £800 million in SPN during the next distribution price control review period. There is substantial increase in NLRE during the current DPCR4 period until 2010. Thereafter, the expenditure continues at a steady rate.

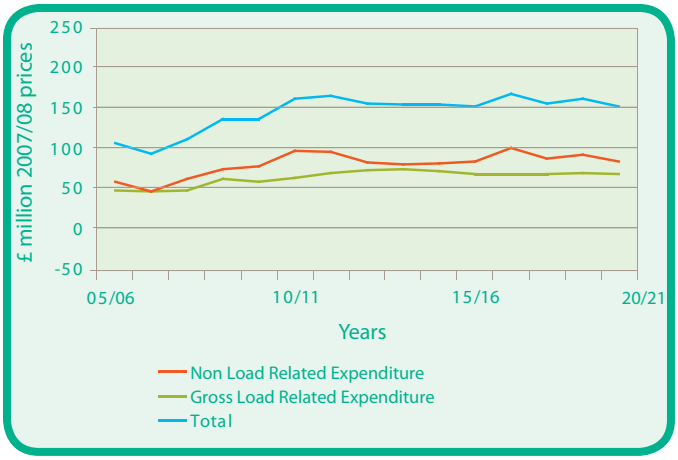


Figure 16: EDF Energy Networks - planned direct investment on the SPN network

It should be noted that elements of this longer-term capital expenditure programme are still subject to approval within EDF, and subsequent agreement with Ofgem for the next Distribution Price Control Review period (2010-2015). Some of the main examples of our infrastructure development programmes are outlined below.

East Kent
Reconfiguration of the 132kV network which will improve security and continuity of supply and accommodate the connection of wind generators. Total cost will be approximately £16 million.

In addition, grid transformer replacement projects are planned at Thanet, Canterbury South and Folkestone, totalling £6.6 million.

Chessington
Major replacement work at the 132kV Supergrid substation, due to ageing assets, will cost approximately £6 million.

Tunbridge Wells
Network reinforcement is required to meet anticipated load growth alongside the replacement of some assets based on condition, operational criteria and safety. We will invest around £15 million, depending on the final designs and negotiations.

Hastings
Replacement of obsolete circuit breakers at Hastings substation and the potential replacement of other apparatus on site that is showing signs of age-related deterioration. The practicalities of carrying out this work may dictate that a new substation is required as a more practicable solution. The estimated cost is £11 million.

Horsham
We anticipate required reinforcement to meet load growth of up to 20 per cent by 2020. To meet this demand we propose to establish new primary substations (33kV/11kV) to serve individual development areas and to build a new grid substation (132kV/33kV) to afford upstream reinforcement capacity. These investments will total around £30 million, some of which will be recouped from customer-specific projects, such as major supplies for corporate data centres.

Smallfield
Underlying demand growth and anticipated development will require new capacity in the area between Crawley and Redhill. Proposals for individual schemes are still being finalised and the investment level of around £7 million that has currently been identified is expected to increase significantly if all notified developments come to fruition.

Eastern Network (EPN) summary

Our power network in the East of England (EPN) has the highest number of connected customers, approximately 3.25 million at a peak demand of around 6,700MW. It covers the largest geographical footprint of any licensed network in England and Wales. It comprises, at one end of the scale, a sparsely populated rural area, typified by north Norfolk, while the other end of the scale includes significant areas of North London. The region contains important towns and cities such as Cambridge, Luton, Ipswich, Norwich and Chelmsford. It is also an important regional area in economic terms benefiting from its close proximity to London.

The network is faced with a number of concurrent challenges. These include ageing network assets and high levels of economic activity and growth, combined with the task of providing increasing levels of network performance to both rural and urban areas. Our 2010-15 investment programme, and beyond, has been planned to meet these needs and is illustrated in Figure 17.

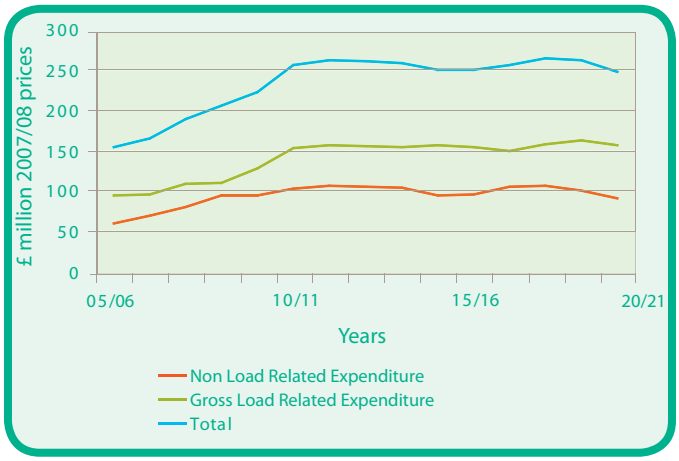


Figure 17: EDF Energy Networks - planned direct investment on the EPN network

Some examples of our capital expenditure programmes are outlined below.

West Norfolk
The replacement and expansion of our existing network in the King's Lynn, March and Peterborough areas will cost

over £26 million.

Due to the expansion of Peterborough, EDF Energy Networks and Central Networks are proposing to join forces to share the cost of a new connection to the National Grid at Bainton. The cost to EPN is initially estimated at £5 million.

Other projects in and around Peterborough are planned, totalling over £15 million.

Norwich and surrounding areas
In line with the proposals of The Greater Norwich Development Partnership, network extension and reinforcement projects include a new substation to connect to the National Grid, new 132kV circuits to Earlham and North Walsham, and other substation reinforcement. This extensive programme will cost approximately £75 million up to 2015.

West Suffolk
Extensive network reinforcement is required in this area. A new 132/33kV substation may be established and existing substations will also be reinforced. The total cost will be more than £60 million.

Cambridge
An additional National Grid connection and extensive modifications at Eaton Socon will cost an estimated £25 million.

A new substation and connections, costing more than £15 million, are required to meet the additional loads expected to arise from further development of the city centre and the airport area.

Additional industrial load in the area, such as at Royston, the Wellcome Foundation, the Babraham Institute and Hexcel require projects totalling over £17 million.

Bedford
A new substation is required to meet the increased demand of the proposed development of Elstow New Settlement, the expansion of the west side of the town, and additional load needed at Marston. Several options are being considered and the cost is expected to be in the order of £14 million.

M11 Growth Corridor
The Government's regeneration plans involve substantial development projects in this area, including the expansion of Stansted Airport.

Local area network reinforcement is likely to cost up to £17 million.

New substations may also be required to supply proposed developments to the north and south of Bishop's Stortford.

Developments to the north and the south of Harlow may require network reinforcement and new primary substations in the area, at an overall cost of over £25 million.

South and East Suffolk
Potential further development at Ipswich Docks may require a new primary substation within our existing site at Cliff Quay costing £3 million.

At Harwich and Felixstowe, expansion of the ports will require a new primary substation and further reinforcement

An example of an area of outstanding beauty where we have been working to remove overhead cables

which may be achieved by installing a new cable link across the Orwell Estuary. These projects are expected to cost approximately £20 million.

Essex
Colchester is undergoing continuous development and load growth, both in the town centre and the adjoining industrial sites. These developments will require new substations. Supply to the area around Tollesbury is to be reinforced at a cost of £7.4 million.

In the Braintree area, one, or possibly two, new substations will be required at a cost of between £9 million and £16 million.

The Boreham area north of Chelmsford has been identified in the local development plan for new housing, schools, business and supporting services. This will require a new primary substation with extensive new cable circuits to connect it to the existing network at a cost of over £8 million.

Bedfordshire, Buckinghamshire, Hertfordshire
Active development in and around Luton will require reinforcement, possibly including a new substation, approaching £20 million.

In Aylesbury there are proposals for at least a further 20,000 dwellings and supporting employment and infrastructure. Network reinforcement proposals will exceed £10 million.

At Hemel Hempstead a possible development of residential, light industry and offices in an area to the east of town may require the construction of a new substation which, together with work on our existing adjacent sites, will cost approximately £15 million.

London Network (LPN) Summary

Our power network in London (LPN) is a mature and stable power system supplying the needs of over 2.25 million connected customers, at a peak demand of around 5,100MW. The network is almost entirely underground and supplies highly-concentrated urban areas.

The City of London is one of the pre-eminent financial centres of the world and the dramatic redevelopment of the Docklands has attracted major multi-national companies to the area. Figure 18 shows the relative demand profile across central London. The peaks associated with the City and Docklands are clearly discernable and the high demand density of the West End can also be seen.

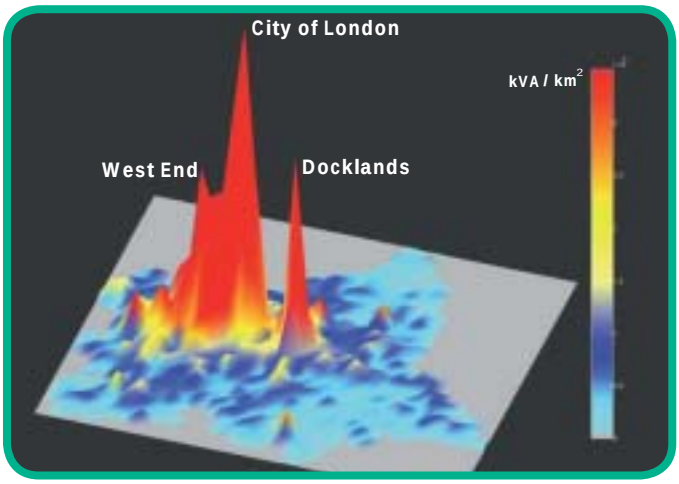


Figure 18: City of London relative electricity demand

The West End has gained world-wide renown for its entertainment venues and the vast numbers of restaurants and retail outlets that serve visitors and tourists from both home and abroad. London continues to generate commercial growth and can look forward to continuing redevelopment in both the commercial and domestic sectors. Londoners have an extremely reliable electricity supply and they expect this to continue.

Considerable investment is planned for this central area to meet the anticipated demand growth associated with major redevelopment proposals. The total level of direct capital investment in the London network is displayed in Figure 19.

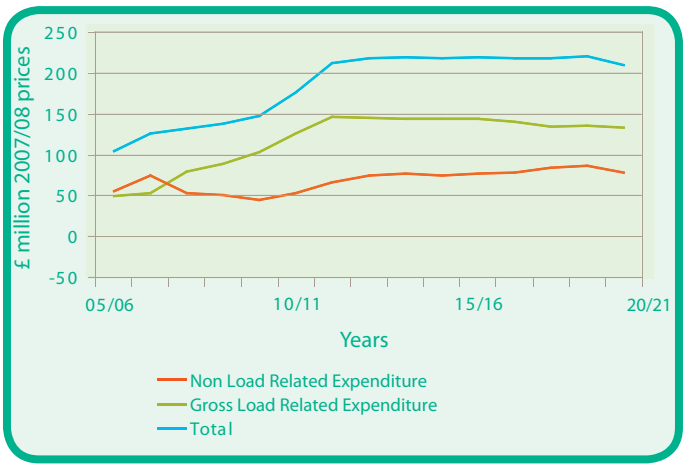


Figure 19: EDF Energy Networks - planned direct investment on the LPN network

Direct network investment is expected to grow by 67 per cent from 2010 until 2012 and then gradually flatten out. Much of this growth is driven by preparations for the Olympics, growth in the City of London and associated development in the Thames Gateway.

Central London (City)

Considerable development within the City of London requires us to plan for new substation capacity. It is difficult to obtain accommodation for our infrastructure equipment within this area so two existing sites will be refurbished, one being to the east of the City in Whitechapel and one to the west near Ludgate. In addition there will be a third new site established in the east; the location is still subject to negotiation with developers. The investment in these three substations will be around £70 million. These three sites will provide approximately 400MVA of additional capacity over and above existing projects.

Additionally, a number of existing substations will be upgraded or rationalised to provide extra capacity over the period to 2016/17.

The establishment of new infeed capacity from the east of the City of London will involve the construction of a deep tunnel that will also link to the Docklands development, where additional capacity is being installed to meet the new demand. The investment in this tunnel and the associated cable circuits will be around £66 million. These works will, at the same time, increase the resilience of the EHV network supplying the City and surrounding areas.

Central London (West End)

Additional capacity is being provided at the interface with the National Grid for distribution to the west and north-west of London. We shall, in turn, be upgrading our substations in these areas to provide new capacity for the West End and adjacent localities. An existing substation in the Covent Garden area will be re-equipped to provide an additional 100MVA capacity. This site is already served by a deep tunnel linking major substations north and south of the Thames. The associated investment will be around £18 million. The proposals for substation upgrades address the more heavily loaded areas. This includes the Covent Garden site mentioned above and a site in Pimlico where work is already well advanced. The additional capacity will relieve existing heavily-utilised substations and provide headroom for demand growth.

West London

A major substation in Paddington has been upgraded in conjunction with significant redevelopment works in the area. Our current plans include proposals to install an additional transformer at this upgraded substation at a cost of approximately £8 million. This will meet anticipated increases in demand and will also relieve other sites.

Further work is proposed at a substation in Fulham where an additional transformer will be installed to meet demand growth associated with riverside development costing around £7 million. At Vauxhall Cross a new substation will

be established, again to meet demand growth, involving an investment of around £15 million.

East London
To meet the demand associated with continuing development around the east London Docklands area, an existing substation in Silvertown will be upgraded to provide an additional 30MVA of capacity at a cost of around £6 million.

We shall also be reinforcing another key site in West Ham to meet anticipated demand growth associated with the regeneration of the Lea Valley area representing investment of around £6 million.

We have now installed the underground cable tunnels that will deliver power for the 2012 Olympics

New Cross – Wimbledon 132kV system
The New Cross to Wimbledon 132kV cable circuits will need to be upgraded to provide resilience and increased capacity in line with our licence obligations. The existing cables are oil-filled and their replacement will contribute towards the reduction in this type of asset, which can pose an environmental risk in the event of oil leakage. This will cost approximately £9 million.

Other infrastructure schemes
Railway land at King's Cross is to be developed and, to meet the associated demand, a new substation will be required. Continuing demand growth within Canary Wharf requires a further new substation to be established in the Westferry area.

There are numerous other infrastructure projects that will provide incremental reinforcement at various points on the London network. These include EHV circuit upgrades that will also remove significant lengths of fluid-filled cable from service.

HOW WE PROPOSE TO IMPROVE THE RESILIENCE OF OUR NETWORK AGAINST STORMS

Overhead line replacement
We own and maintain 48,000km of low and high voltage overhead lines in the East and South East of England. Our customers in London are served predominantly by an underground cable network. We recognise that these overhead lines are exposed to an increasing risk of severe storms as a consequence of climate change and a heightened risk from falling trees, which could result in power failures and disruption to customer service. Deterioration in the condition of overhead line supports and fittings represents another area of vulnerability, aggravated in coastal regions by the corrosive effect of airborne salt spray.

Following an inquiry into the impact of the severe storms of 2002, we decided it was necessary to improve the storm resilience of our LV and HV overhead networks. In addition to regular maintenance, which includes tree-trimming and pole replacement, we have investment programmes in place to replace bare wire overhead lines with more resilient designs where they provide cost-effective improvements in customer service. It is also necessary to consider the requirements of the Electricity Safety, Quality and Continuity Regulations (ESQCR) 2002 as amended. Regulation 20A (which takes effect from 31 January 2009) sets out a new requirement for duty holders to avoid interruptions caused by interference of trees with overhead lines.

Our engineers at work replacing overhead cables

Low voltage overhead network
The LV network suffers disproportionate damage during severe weather and the high number of incidents in a storm can result in some customers being without power for unacceptably long periods. In many instances, the experience of our remote customers is significantly affected by local LV network performance.

In 2004, we started a sustained, long-term programme to replace and/or refurbish our LV overhead network. Where we judge it to be necessary, existing bare wire (uninsulated) LV overhead lines are replaced with more

resilient fully-insulated cables, known as Aerial Bundled Conductor (ABC), or with underground cables. In addition to providing increased resilience in storm conditions, this replacement also reduces the number of repetitive faults due to contact with trees and wind-blown material. Where full replacement is not necessary, the bare conductor lines may be refurbished. Sustained investment at the current rate is needed through to 2020 to prioritise the replacement of bare wire overhead lines due to condition and network vulnerability, in order to reduce the number of damage-related faults.

In the East of England this means we would reduce the proportion of bare wire LV line from 58 per cent in 2010 to 41 per cent in 2015 at a cost of some £50 million. By 2020 this would see bare wire reduced to approximately 20 per cent of the total network. In the South East the proportion of bare wire LV overhead line would reduce from 70 per cent in 2010 to 38 per cent in 2015 at a cost of some £52 million. By 2020 this would reduce bare wire to approximately 10 per cent of the total network.

High voltage overhead network

Since 1996 we have been delivering a prioritised programme of HV overhead line refurbishment which has contributed to improved network performance. In 2002 we reprioritised our strategy to address the need to reduce repetitive faults. We now concentrate on reducing faults on specific HV circuits that 'feed' electricity from primary substations into our distribution network.

The two principle areas addressed by the programme are the replacement of three-stranded conductor that uses a light wire gauge (termed small-section conductor), which has been shown to sustain a disproportionate amount of damage during storm conditions, and the targeted replacement of fault-prone components. Our current programme will reduce inherent weaknesses in the HV network by removing known vulnerable conductor, improving the condition of overhead lines and reducing the number of fault-related power cuts.

We need to continue with steady investment over the next 10 years to remove vulnerable three-stranded conductors and thus diminish the known resilience risk.

The rate of replacement in EPN is planned to increase up to 288km per year by 2012 and we forecast that we will have eliminated the most vulnerable sections of conductor in both the East of England and the South East by 2017.

Have your say - www.edfenergy.com/dpcr5

4. To what extent should we increase our investment to further protect your power supply?

HOW WE PLAN TO IMPROVE NETWORK RELIABILITY AND REDUCE CUSTOMER INTERRUPTIONS

Together with Ofgem, we strive for continuous improvement in the quality of supply to our customers. In 2001, Ofgem introduced the Information and Incentives Project (IIP). This encourages DNOs to improve quality of service with a transparent and consistent approach to defining and measuring customers' quality of supply in terms of Customer Interruptions (CI) and Customer Minutes Lost (CML). IIP includes a customer telephone survey to measure customer satisfaction. Ofgem promotes this as Quality of Service (QoS), formerly known as Quality of Supply.

An overhead transformer, one of our many network assets

Ofgem intends to refine and improve IIP, guaranteed standards and exceptional event processes, which come into force during events such as a severe storm, to deliver further improvements in customer service. Network performance varies from year to year due to the variation in the number of faults and the corresponding impact on CI and CML figures. This variation is accounted for in our strategic planning to meet Ofgem's IIP network performance targets. We make every effort to minimise the variation by controlling the areas of network performance that we can directly influence.

There are two main options available to us to improve QoS. Firstly, reducing the number of historic faults would remove the initial cause, and secondly, we can reduce the number of customers affected by a fault when it occurs.

The reduction of the number of faults through asset replacement is very costly and would take many years to see the benefit in terms of CI and CML reductions. Ofgem has previously set asset replacement allowances to maintain fault rates at a constant level. (Our asset replacement investment is described earlier in this section).

Our QoS strategy will continue to be based on reducing the number of customers affected by a fault and the length of time that they are affected. The provision of remote control and automation on HV feeder circuits, which allows us to

re-route supplies swiftly during a power interruption, has been central to improving QoS in our three networks and this work will continue. Additionally, Ofgem has recognised in the current period that its CML targets could only be achieved through improvements in operational response time alongside capital investment. We believe that this dual-track approach will continue into DPCR5.

Updated QoS benchmarking and target-setting

There are a number of sources of information in the UK and internationally that could be used to benchmark the performance of our three distribution networks. For LPN it may be argued that benchmarking against other major cities around the world would offer the best comparison. However, there are differences in how performance is calculated and there are a range of strategies, incentives and regulations in place to deliver QoS in other countries.

The best data available for the comparison of all DNO network performance in the UK is provided through Ofgem's IIP process. Ofgem's initial proposals for 2015 QoS targets are based on up to five years of accurate data on customer interruptions. They are shown in Figures 20 and 21.

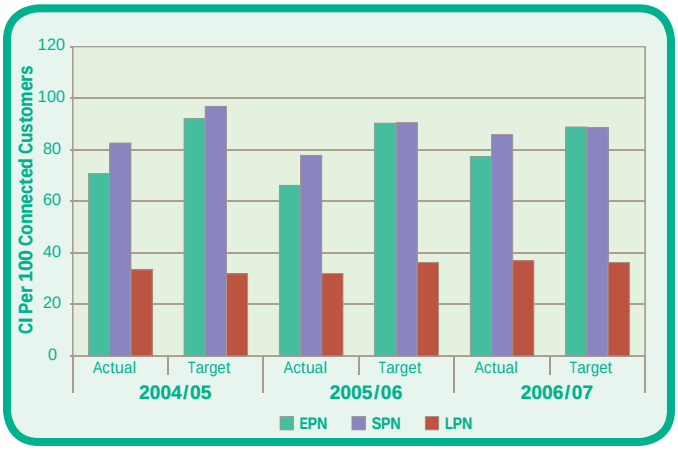


Figure 20: Unplanned Customer Interruptions (CI)

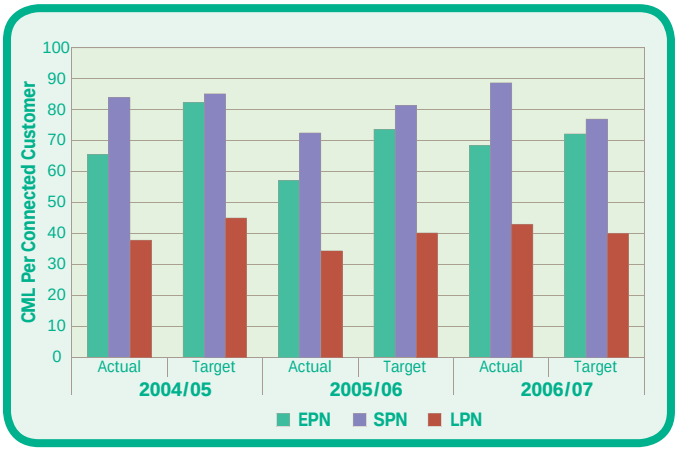


Figure 21: Customer Minutes Lost (CML)

Our assessment of Ofgem's initial proposals is that we should be able to achieve the 2015 performance targets by increasing the application of automation in our HV networks and by improving the availability of existing automation.

For the EPN network, our strategy is based on automating an additional 400 feeder cables. We currently operate about 1,700 automated feeders in EPN. We shall also add further switching points to automated feeders with high customer numbers to maximise the CI and CML improvement. These programmes will require the installation of approximately 1,000 items of HV switchgear.

The LPN network performance is currently at the frontier of CI performance and has little room for improvement in either CI or CML performance so our strategy is to maintain current levels. We operate about 915 automated feeders in LPN at present and we plan to add automation to a further 300 by 2015. In addition, we will invest in improving communication channels to improve the availability and performance of the automation.

The SPN network represents our biggest challenge in the forthcoming period. Our strategy is based on automating an additional 400 underground HV feeders. We shall also add further switching points to automated feeders with high customer numbers to maximise the CI and CML improvement. These programmes will require the installation of over 1,200 items of HV switchgear.

In all three networks we shall continue to seek ways to improve operational response times without compromising the safety of our staff or the public.

Exceptional events

The current interruption payment scheme is designed to focus on underlying network performance by excluding the impact of severe weather events. These are events that cause eight or more times the daily average number of faults at higher voltage over a 24-hour period; for the most part, they are related to severe weather and lightning. An incentive to restore supply during exceptional events could be given by introducing further compensation payments to customers under the industry's guaranteed standards.

Ofgem is consulting on possible amendments to the exceptional events criteria. It can be argued that the exclusion reduces the incentive on DNOs to perform well during exceptional events. However, including more high-impact events in the underlying network performance measure would add greater volatility and this may dampen the incentive to improve day-to-day performance.

All of our asset replacement, resilience and QoS investment plans are part of our continuous drive to seek opportunities to improve the performance of our networks in both normal and extreme circumstances. We also keep our emergency planning under review to learn from exceptional events so that we can improve our response to them.

Remote customers

The incentive scheme is good at improving the average reliability for all customers but it falls short of providing incentives for DNOs to improve services to customers who experience below-average reliability. Ofgem is consulting on customers' attitudes to network performance; it is felt that if the bulk of consumers are happy with the current

level of network performance there may be a need to build a framework for improving the reliability of supply for remote customers. A definition of remote customers will need to be developed, possibly based on a measure of those customers who have interruptions, or aggregated minutes of interruptions, greater than a predetermined value over the regulatory year.

We consider that our proposals for improving the resilience of the overhead network will have a particular benefit for remote customers since vulnerable parts of the network will be targeted, for instance, lines which are susceptible to interference from adjacent trees. Elsewhere, our focus on targeted LV cable replacement will be guided by the incidence of faults so we expect to be able to deal with potential multiple interruptions as they develop. We will continue to work with Ofgem on this and have identified that further investment in targeted areas of our HV overhead lines network will bring further improvements in this area.

Have your say - www.edfenergy.com/dpcr5

5. To what extent do you think we should broaden our measures of Quality of Service to include additional customers, for example our remote customers?

HOW WE ARE MINIMISING THE LEVEL OF DISRUPTION TO THE PUBLIC CAUSED BY WORKING ON OUR NETWORK

We own 127,000km of underground cables and much of our network is underground, particularly in London. Inevitably we need to dig up roads and pavements to maintain, enhance, extend, renew and repair our licensed networks. Street works are essential and we are working in a number of ways to ensure they are well-planned and carried out with minimal disruption to drivers and pedestrians.

These works are governed by two key pieces of legislation; the New Roads and Street Works Act 1991 (NRSWA) and the Traffic Management Act 2004 (TMA), major elements of which came into force on 1 April 2008. This has had a significant impact on the way street works are planned, co-ordinated and executed in the highway. Infringements of the new Act, such as over-running on street works projects, can result in heavy financial penalties. We take our responsibility for complying with this legislation very seriously.

Training has been provided to our staff and we have worked closely with everyone involved, including our supply chain contract partners and the 52 local authorities that we liaise with while carrying out street works. Our desire to develop improved relationships has seen us establish pioneering partnerships with a number of local authorities. These have been recognised as market leading and are featured in the Department for Transport (DfT) Good Practice Guide (May 2007).

A key strategic decision has been to maintain a dedicated street works team to support our activities across a number of business directorates. Our street works performance is principally determined by how well we plan, co-ordinate and execute works in the highway. A significant amount of work has been carried out to improve all areas over the last five years including: safety (the clear signing, lighting and guarding of our works), reinstatement of the highway after we have finished and reducing the number of works that overrun agreed durations.

The Department for Transport's code of practice on the co-ordination of street works sets a threshold of 90 per cent for sample inspections which include the signing, lighting and guarding of our street work sites and the quality of our reinstatement of the highway once we have finished. Failure to maintain this threshold can lead to Improvement Notices. We meet, and in many cases exceed, this threshold. We need to give local authorities adequate notice of our street works in terms of the duration, scope and correct address of the works. Historically, our notice quality has been patchy. Good notice quality is crucial to ensuring effective co-ordination, and this has been reinforced by the introduction of the Network Management Duty (NMD) in the Traffic Management Act. We have responded to meet the requirements of the NMD and have seen improvements in notice quality. We are exceeding 90 per cent but we are still some way from reaching our target for 2008 of 95 per cent.

New techniques to minimise disruption

In the City of London we face a unique challenge posed by a new generation of tall, high-occupancy office developments. These buildings create an enormous demand for supply in an area where any street works cause significant traffic disruption in highly-congested areas, including red routes. We are experiencing increasing difficulty in obtaining permission for routes for the conventional installation of 132kV and HV interconnecting cables in central London. There have been several projects in recent years for which the only practical solution was the construction of a deep tunnel. Such tunnels mean we can install, maintain and repair the cables without having to dig up the road. It also means that the cables are more protected from accidental damage during road works. Tunnelling is a costly solution

An example of our street works barriers erected to protect the public

but we believe it is the only way to meet demand without causing further disruption to road users and pedestrians. The construction cost of a deep tunnel is £3 million to £5 million per kilometre.

Mindful of the costs of developing these tunnels, we are also liaising with the London Development Agency and the Corporation of London to consider the possibility of sharing cable tunnels with other utility companies.

HOW WE ARE MAKING IT EASIER FOR CUSTOMERS TO CONNECT TO OUR NETWORK

We carry out more than 100,000 new connections every year. As the biggest connections business in the UK, we are flexible in our approach and offer customers innovative solutions tailored to meet their individual needs. We offer a wide range of services from repositioning an existing electricity service to providing a new connection to a street light, telephone kiosk, domestic, commercial or industrial property. There are two types of connections – metered and unmetered. Metered connections are where a meter is installed at the point of supply to a home or a business for billing purposes. Unmetered connections include, for example, local authority street lighting which is not metered but paid for through fixed charges.

Over the last few years we have worked hard to improve the service we provide. When a customer first contacts us they will now be given a date for a site visit and during this first visit they will receive a firm quotation from a site technician, reducing the amount of time between initial contact and the quoting stage. Throughout the process a customer is able to

Our engineers planning for new customers to connect to our network

check the status of their request. We will continue to make improvements to the service we offer our customers over the next few years and our plans to make it easier for them to connect to our networks are outlined in this section.

Improving our connections business

Following an industry-wide review of competition in connections last year, Ofgem published a set of proposed changes. The key proposals include: the introduction of a set of voluntary standards to improve the level of service to customers requiring unmetered connections; the adoption of good business practices, including better communication with customers; more transparent pricing and a proactive approach to resolving and complaints or disputes; and new regulations determining the minimum service levels for the provision of connection points to our distribution networks for Independent Distribution Network Operators (IDNOs) and Independent Connection Providers (ICPs).

Metered connections

In light of Ofgem's proposals we have introduced a number of measures to improve customer service which we will continue to develop. We have introduced dedicated account managers who hold regular meetings with local authorities and regional development authorities in order to address any customer issues as they arise. We have introduced a single point of contact for all requests for a new connection and we have introduced a separate application process for each main type of enquiry. To get regular feedback from our customers we have introduced a number of satisfaction surveys, some of which are carried out on a monthly basis, and we also conduct satisfaction surveys with our highway lighting and contracting customers. For these occasions when we get it wrong, we have also set up a dispute process which includes a referral of all disputes to our Director of Connections.

Unmetered connections

We are also continuing to improve our service to our unmetered connections customers, who include local authorities. Last October, Ofgem published a decision setting out key performance indicator targets for national service level agreements in unmetered connections (UMC). In order to meet these targets we have begun the process of harmonising our UMC business processes. Until now these processes were fragmented throughout the company, with as many as six models in use. These are being combined into one company-wide process adopting best practice and developing new processes and IT systems to help us to improve the service we offer.

Waterside primary substation

We have consulted our customers about these changes and 46 of the 52 local authorities we work with attended special workshops to discuss how we could make changes in a way that would be of most benefit to them. We are looking closely at the way we work with our subcontractors on UMC projects and will be reviewing all of our UMC contracts. We are also developing new IT systems in order to be better able to provide accurate and timely information to our customers. In the long term it is envisaged that our UMC customers will be able to track the progress of their jobs online.

HOW WE ARE IMPROVING CUSTOMER SERVICE

One of our company ambitions is to take more care of our customers and we strive continually to improve customer experience. Our performance, in terms of customer service and for the number of complaints received, is measured by the industry watchdog, energywatch. Although our performance is not as strong as we would like, we have worked hard to identify areas of customer complaint and put strong initiatives in place to address them. Our customer service has been recognised as exceptional over the past two years by Ofgem through the Electricity Distribution Customer Services Reward Scheme. We are the only DNO to have won the award for two consecutive years and have won £600,000 for our work with vulnerable customers. Our success was due to improved customer communications and corporate social responsibility schemes. This award gives us the opportunity to measure and evaluate our customer service strategy.

Furthermore, every complaint we receive is thoroughly investigated and the lessons learnt are used to drive ontinuous improvement in the service we provide.

Improvements to customer service

During the past five years we have made significant investments to improve our customer service. We recognise that network customers cannot transfer their custom elsewhere and we understand the adverse impact of power

We have many underground cable tunnels across our network, reducing the number of overhead cables and minimising the disruption to traffic owing to maintenance

cuts on both business and personal life. Our customer service, following a detailed survey of our domestic and business customers' expectations, is now driven by our customers. Several suggestions made during this survey are now part of our normal customer service strategy. We have also improved our telephony technology and all calls are now managed on a real-time loss of supply call handling system enabling bespoke messages to be produced to provide customers with up-to-date information. During a power cut we operate a call-back service, available by phone or via a text message, to keep those customers who leave their details informed of any updates to the status of the network.

We are constantly working to improve our customer service for you

Over the past five years we have merged our two control centres resulting in a 'one stop shop' for our customers and greater consistency of information and advice. It also means we can more easily ensure we have staff on a standby and general availability rota to support the contact centre during particularly busy periods. We have also revamped our customer service intranet site, creating links for information and telephone numbers for staff. All new employees are extensively trained and within six months they are multi-skilled and are encouraged to take an NVQ in customer service.

Additional customer services

During prolonged power cuts we offer additional advice and support to our customers and have developed partnerships with the Women's Royal Voluntary Service (WRVS) and the British Red Cross. The WRVS will visit customers on our Priority Services Register and offer assistance. The British Red Cross offers practical support along with updates on the fault situation to our customers. They also help nursing homes affected by power cuts and will transport customers with essential medical equipment to a place of safety if necessary. We also have a customer support vehicle which we send to neighbourhoods during power cuts to provide on-site contact, information, and practical support to our customers.

We have led the way in supporting our most vulnerable customers; those who are disabled or chronically sick, and the elderly. We go far beyond our obligations with a series of initiatives developed to meet the specific needs of these customers. In order to make contact with customers who are traditionally hard to reach, we now provide information to Talking Pages, Talking Books and via hospital radio. Our Priority Services Register is continually updated and those who are included on the register are provided with a unique emergency number. This number takes priority over normal emergency calls to the contact centre and goes straight through to an agent.

Additional planned services

We have taken steps to improve our customer service but we are not complacent and we want to make further improvements. Our customers' perception of our service is

continuing to rise and we must ensure we live up to their expectations and beyond. We aim to:

- Lead the way by developing an industry-wide priority services register
- Develop new ways of protecting vulnerable customers from the adverse effects of power cuts
- Provide uninterruptible power systems for all vulnerable customers using medical equipment at home
- Extend proactive contact with customers so that people who have had a power cut receive an automatic letter, or telephone call
- Register customer calls and call backs automatically
- Work with the energy ombudsman to ensure good customer service
- Build on our successful partnership with Neighbourhood Watch to keep people safe around our substations.

HOW WE ARE ENSURING THAT THE PUBLIC IS KEPT SAFE AROUND OUR NETWORK

Our day-to-day activities are potentially hazardous to both employees and the general public. Our health and safety aim is to achieve Zero Harm within our workforce. This ultimately means ensuring that none of our employees or contractors are harmed while working for us. At the same time, we have a responsibility to ensure the public remains safe and understands the hazards inherent in electricity production, distribution and use.

Safety for our customers is key and we run safety education initiatives in schools around our regions

Our dedicated public safety team works hard to get the 'Look Out, Look Up, Stay Safe' message across to the public in a number of ways. They proactively contact leisure groups, such as angling societies, as well as farmers and people working in the construction industry, to give advice. They also run safety seminars and workshops and publish and distribute targeted safety leaflets. They attend county shows and rural fairs to further spread the message. We also liaise with contractors working on, or near, our networks and with the emergency services. We help train the fire service on how to work safely in proximity to our overhead power lines and substations. The company's education team runs safety sessions for more than 100,000 schoolchildren a year. We have pledged to reach one million schoolchildren with our safety programme by 2012. We have set up a special website to give children more information about the dangers of electricity. For more information log on to www.edfenergy.com/powerup

Additional developments

Our public safety team is involved in developing a number of key projects which will come to fruition over the next few years.

Crime

We recognise the dangers posed by illegal trespass, damage and theft to our substations and equipment. We are working with police forces, business organisations and local communities to deter and prosecute those responsible. We have provided statistical data highlighting vulnerable locations and equipment to covert police teams and neighbourhood policing units. We have also tested and installed the newest sensor detection equipment at sites to assist potential police operations.

Construction workers

Our public safety team has designed an electrical training facility at the CITB - Construction Skills training centre in Norfolk. The equipment includes a non-powered overhead line set-up, an underground power line arrangement and a de-energised substation. It is used to train construction staff who may be working on, or near, our networks on how to work safely around our equipment. We are also producing an updated safety video which will be distributed nationally throughout the construction industry.

2008 saw the launch of a Zero Harm initiative, proving how seriously EDF Energy takes its approach to safe working practices at all times

Substation Watch

We have won Home Office approval for our work with Neighbourhood Watch groups in introducing Substation Watch to encourage people to report any suspicious activity or vandalism around local substations. We have already set the scheme up in our regions and information is available in a number of languages at www.edfenergy.com/core/safety/index.html

The Home Office is keen to see the scheme rolled out nationally to other DNOs.

If you would like further information on public safety we have established a new safety internet page for downloading multi-lingual leaflets, including a translation service for emergency incident reporting, covering the seven languages recommended by the Government's communication department (see the link above).

WHAT WE ARE DOING TO MINIMISE THE IMPACT OF OUR PLANS ON THE ENVIRONMENT

Fluid-filled cables

Fluid-filled cables (FFC) form part of our extra high voltage networks and utilise either nitrogen gas or special oil at low pressure to maintain the integrity of the cable insulation at these high operating voltages. The cable oil used in recent years is of a biodegradable type. There are similar amounts of FFC in commission on each of our networks. However, FFC comprises more than 50 per cent of the EHV network in London, whereas the equivalent proportions in the East of England and the South East are 10 per cent and 18 per cent respectively.

Figure 22: A cross section view of a fluid-filled cable

As leaks can develop it is important that these circuits are effectively managed to avoid the risk of environmental pollution, particularly where oil-filled cable circuits are located in environmentally-sensitive areas. It is estimated that approximately 300km of our FFC circuits are in very high risk environmental areas.

DNOs have worked together to create and publish Engineering Technical Recommendation 135 (ETR 135), 'Guidance for the Operation and Management of Fluid-Filled Cables' in March 2006. This is the basis of our own leak management strategy, which balances the condition of the cables and the business risk they pose to produce a flexible investment programme which will facilitate the decommissioning of poor condition FFC, regardless of the route, and FFC in high-risk environment locations.

Alongside our programme to replace deteriorating FFC, according to a risk-based prioritisation of circuits, we are investing in new leak location technology, which can pinpoint more accurately where a leak occurs, minimising the need for excavation and the associated disruption to traffic and pedestrians.

We have already consulted widely within the environmental community about the future decommissioning of FFCs. We take an active role on a national liaison group for environmental matters with the Environment Agency (EA) and share the agency's desire to 'make leaks a thing of the past'.

EDF Energy Networks' Leak Management Strategy

- To ensure that EDF Energy Networks effectively manages the risk of fluid loss from cables
- To ensure that the security of the network is maintained
- To comply with environmental legislation
- To set the criteria for prioritising the repair, refurbishment and decommissioning of FFC, including asset replacement on a non like-for-like basis
- To establish FFC decommissioning as a long-term capital investment programme

Consultation options

We are committed to maintaining our networks to a high standard and we take our responsibilities to the environment seriously. Given the major steps forward we have made in the last five years in terms of technological advances to identify high risk sections of FFC and to locate leaks more efficiently, we propose to continue our current decommissioning programme at the same rate at an estimated cost of £72 million. This investment will be targeted at cable sections in the worst condition and those in very high risk environment areas, as determined by our leak management strategy.

There are a number of other options we have also considered:

1. To prioritise the removal of all FFC in very high risk environmental situations

There are approximately 300 km of FFC circuits in very high risk zones which could be prioritised. Solutions for the removal of all of FFC in high risk environmental zones are estimated to cost between £200 and £300 million. However, difficulties in obtaining suitable routes, traffic management consents and network access could prolong the programme and increase costs, particularly if alternative methods such as tunnelling become necessary.

2. To prioritise the removal of all FFC circuits that have been irreparably damaged in very high risk zones

New information provided by our single asset management database provides a clearer view of how much irreparable FFC exists in these areas. This option is likely to cost between £100 and £140 million.

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6. To what extent should we change our investment plans for fluid-filled cable decommissioning?

Areas of Outstanding Natural Beauty

In the last price review Ofgem made an allowance of £2.9 million in the East of England and £7.7 million in the South East for the undergrounding of overhead lines in the Areas of Outstanding Natural Beauty (AONB) and National Parks within our network boundaries. Following initial consultation in the early stages, this has proved to be a highly successful initiative – and one that has won a great deal of support in our regions from environmental organisations, including Natural England, AONBs and our customers. Our latest forecasts are that the entire allowance will facilitate approximately 40 projects, some of which have already been completed, to remove more than 75km of overhead 11kV lines. Last autumn a further 20 projects had already been identified for the 2010-2015 period. An early decision from Ofgem on extending the allowance will enable us to start planning for these schemes.

In 2005, we encouraged the creation of regional steering groups in the East of England and the South East to ensure full consultation on the undergrounding schemes. The groups are chaired by Natural England, with membership drawn from each region's National Parks and AONBs.

Before and after: an overhead line was removed across an RSPB reserve at Buckenham Marshes, on the Norfolk Broads, in October 2006

There is further input from local councils, the Wildlife Trusts, the RSPB, National Trust and English Heritage. We provide technical guidance and act in an advisory capacity, but do not vote on scheme selection.

Consultation options

This has been a hugely successful scheme in terms of its environmental benefits and the impact on the landscape. We are keen to see this allowance continued in the next price review and will be proactively discussing options with interested bodies to persuade Ofgem of the case to significantly increase funding in the future. With more than 20 new schemes already identified last autumn for the 2010-2015 period, there appears to be sufficient suitable work to justify an allowance at least equivalent to the existing funding. There may also be co-funding opportunities, in which the project sponsors could secure additional financial contributions from other sources. We are proposing in our core business plan to continue the allowance at a constant level; this would be £3.5 million for the East of England and £9 million for the South East.

However, in view of the success in most areas and in response to strong lobbying from interested groups, we will be proactively lobbying for support to make a case for Ofgem to double the allowance, giving £7 million for work in the East of England and £18 million in the South East.

PRICING IMPLICATIONS

As part of our analysis of the impact of our plans, we have quantified the change in prices as a result of introducing our additional investment in AONBs. Prices for domestic customers would increase by approximately 15p per annum in SPN, and approximately 25p per annum in EPN. For a typical medium-sized commercial customer, prices would increase by approximately 1p a day in SPN, and 2p a day in EPN.

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7. To what extent should we change our investment plans for the undergrounding of cables in Areas of Outstanding Natural Beauty?

Localised flood protection

As a result of the flooding seen in 2005 and 2007, and the general concerns over global warming and rising sea levels, we have been working with other DNOs and the Environment Agency (EA) to review the level of flood protection on key network assets in our region. We have looked at both generic solutions and the indicative costs to mitigate the risk of flooding while considering permanent and temporary solutions. We have assessed the risks of the flooding of critical plant and equipment at our grid and primary substations based on their proximity to flood plains. This risk assessment has enabled us to develop a prioritised programme of investment. To minimise cost, and any impact on network performance, major expenditure on flood protection will be co-ordinated with the future development plans for our substations.

Localised flooding of EDF Energy Networks equipment at our Hemel Hempstead site

Flood protection programme

Based on a conservative mid-point view of the level of permanent investment and the application of temporary movable protection, we estimate that in the DPCR5 period we will invest between £18 million and £20 million on flood protection measures. However, work is ongoing with the EA to improve the quality of data used to assess the risk to our 76 grid sites and 116 primary sites known to be within EA flood plains.

HOW WE HAVE IMPROVED OUR RELATIONSHIPS WITH OUR CONTRACTORS

We have recognised that the challenge of efficiently and effectively delivering increased investment in our networks requires a new approach to resource management.

Supply chain focus

Critical to the achievement of a more effective supply chain was to establish and recognise the end-to-end supply chain process that supports the company's overall high level business processes. Figure 23 depicts the process involved within the supply chain and how functions within the supply chain organisation, and the wider business organisation, take responsibility for parts of the supply chain process.

In the last five years we have aligned the structure of the organisation to deliver an integrated supply chain. This has allowed the development of common processes and objectives that support efficient resource delivery. Key areas of skill deficiency in logistics management, inventory planning and demand planning have been resolved by the recruitment of experienced individuals with supply chain skills from other sectors. New personnel are able to identify and implement the improvement of supply chain processes to deliver better service with reduced investment.

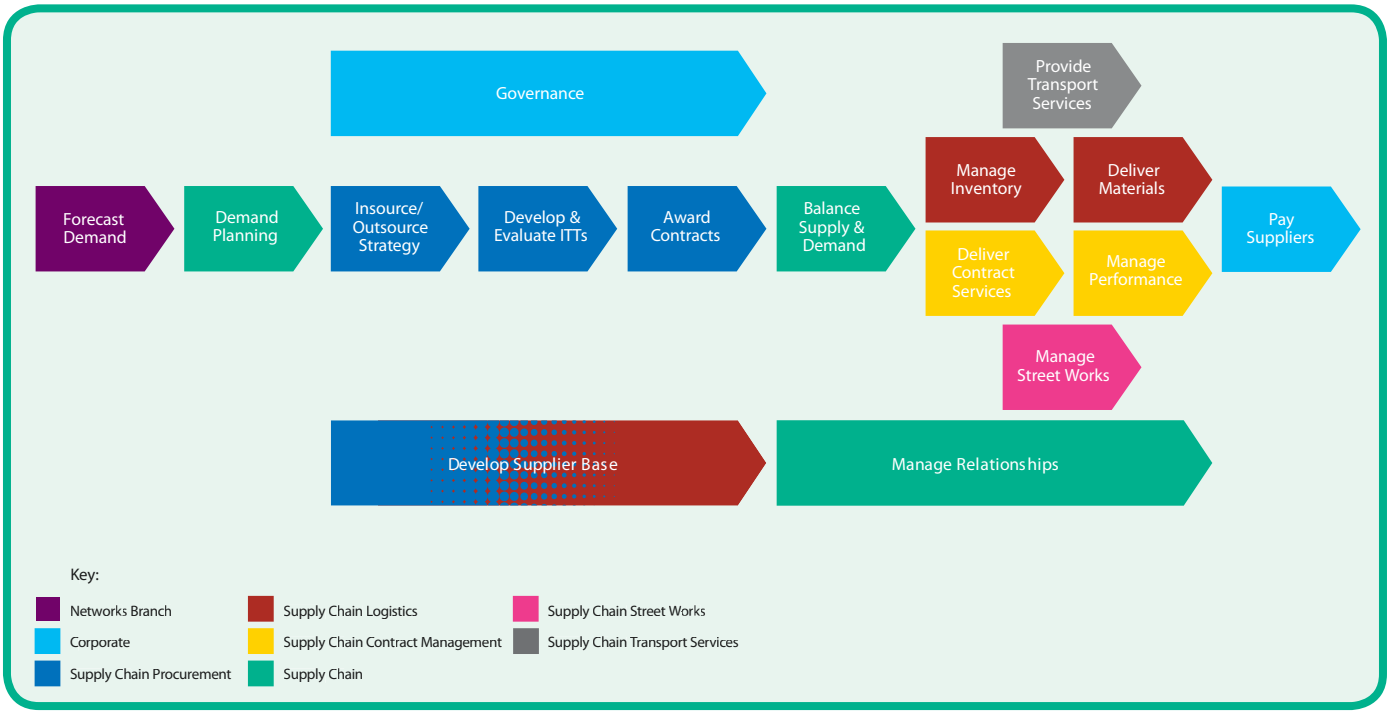


Figure 23: Our integrated supply chain

Supplier relationships

We have developed stronger relationships and better ways of working with our key material suppliers and contractors. One area where this has delivered significant change is within major project delivery. Alongside key capital project delivery contractors we have developed integrated delivery teams to deliver major capital projects. Because of the stability of longer term relationships we have been able to jointly develop more efficient ways of working together, for example by co-locating delivery staff and reducing the duplication of roles. Within the stability of longer-term commitments suppliers are better able to invest in recruitment and training to ensure resource availability. By using a standard contract framework, greater transparency of delivery costs has been ensured and overall delivery efficiency has improved. New ways of working with operational contract partners has also enabled us to focus on performance. Better sharing of information and forecasts with material suppliers has improved delivery performance and ensured the availability of materials in the right place at the right time to deliver planned investment.

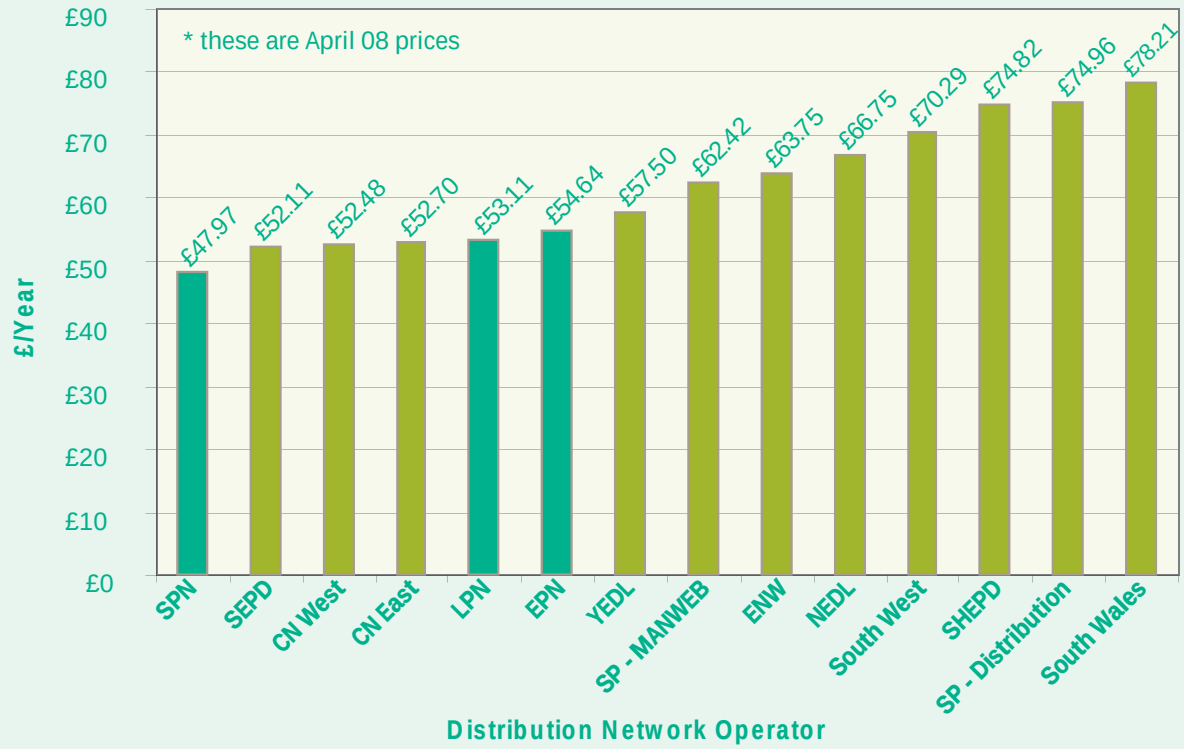
Portfolio planning

A key feature within our supply chain is the ongoing development of new processes and systems for planning and delivering the portfolio of investment activities on the network. Common processes and systems for portfolio planning enable delivery of better material forecasts allowing our procurement teams to develop sourcing strategies, including human resources, and our suppliers to better plan their long-term capacity requirements.

THE PRICING IMPLICATIONS OF OUR PLANS

As detailed in the industry league tables set out in Figure 24, we rank as one of the most competitive companies on price. The income we receive to maintain and improve our power distribution network equates to £52 per average domestic customer per year. To set this increase in context the distribution element of the electricity bill has decreased by approximately 50 per cent since the introduction of privatisation and incentive regulation 18 years ago. Our charges to maintain and improve the power distribution network equate to less than 20 per cent of customers' electricity bills at 2008 prices.

As part of our ongoing commitment to demonstrate what our plans mean for our customers we have assessed the impact of all of the projects detailed in this section on our prices. If we invest £3.1 billion in direct capital expenditure (CAPEX)



SPN	EDF Energy Networks - South East	**SP - MANWEB**	SP – Manweb (Part of Scottish Power)
SEPD	Southern Electric Power Distribution	**ENW**	Electricity Network West
CN West	Central Networks - West	**NEDL**	CE Electric UK - Northern Electricity Distribution
CN East	Central Networks - East	**South West**	Western Power Distribution - South West
LPN	EDF Energy Networks - London	**SHEPD**	Scottish Hydro-Electric Power Distribution.
EPN	EDF Energy Networks - East of England	**SP - Distribution**	Scottish Power - Distribution
YEDL	CE Electric UK - Yorkshire Electricity Distribution	**South Wales**	Western Power Distribution - South Wales

Figure 24: Comparison of domestic unrestricted distribution use of system bills

to improve our network then prices in the next price control period, for a typical domestic consumer, will increase by about 0.5p a day in all of our regional networks (LPN, SPN and EPN). For a typical medium-sized commercial customer prices will increase by about 14p a day in LPN, 13p a day in SPN and 11p a day in EPN.

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8. Do you have any general comments on our proposals contained in Section 5?

- EDF Energy Networks asset base
- What we are doing to maintain the performance of our assets
- How regional development is reflected in our network plans
- How we propose to improve the resilience of our network against storms
- How we plan to improve network reliability and reduce customer interruptions
- How we are minimising the level of disruption to the public caused by working on our network
- How we are making it easier for customers to connect to our network
- How we are improving customer service
- How we are ensuring that the public is kept safe around our network
- What we are doing to minimise the impact of our plans on the environment
- How we have improved relationships with our contractors
- The pricing implications of our plans

Works being undertaken to install part of one of our underground cable tunnels

One of our electricity pylons, delivering power to you

Sections 6 to 10

The following sections give details of the additional work we need to do to further improve the resilience and performance of our networks, meet the challenges we face in the future and to enhance the customer experience.

6. PLANNING FOR UNCERTAINTY

Last summer's floods have further fuelled the growing anxiety about future weather patterns, raising concerns about the ability of our networks to perform in extreme circumstances. While this section does not form part of our core business plan, it is in our interests, and in the wider interests of society and the economy, for us to examine all the options for improving the resilience of our networks. One proposal is to ask our major customers whether they would support, and ultimately pay for, the reconfiguring of our low voltage and high voltage networks in London to allow better interconnectivity and offer enhanced security of supply to the central business districts. This would reduce the impact of a potentially catastrophic event, such as localised flooding, on the central business districts by making it easier for us to re-route power supplies from other parts of our network and reduce the time taken to restore power. Initial discussions with Ofgem indicate that they are considering whether increased network resilience should be incorporated into network operators' core plans.

We have assessed the potential threats posed by high impact low probability (HILP) events - for example a fire, flood or the action, intentional or otherwise, of a third party - resulting in a major loss of electrical infrastructure. EDF Energy Networks has no regulatory or licence obligation to design its networks to cater for this type of event. The existing network design standards that we must comply with under the terms of our Distribution Licence, seek to provide a level of reliability that generally meets the expectations of the majority of customers with sufficient reserve capacity of supply provided to cater for the more common system failure scenarios, such as the failure of one of our cables or an item of plant.

Damage caused by a storm in 2007 being inspected by EDF Energy's CEO, Vincent de Rivaz

There is, however, the potential for events to occur that, while very improbable, would result in protracted outages to a large number of customers. If such events were to affect an important business district the consequences for the businesses concerned, and indeed the UK economy, could be considered to be both financially and politically unacceptable. We are playing an active role with other bodies, including BERR, the emergency services, the Corporation of London, local authorities and major business customers, in considering the societal and financial risks associated with such an event and exploring possible options to minimise those risks. Such investment should essentially be seen as providing 'insurance' and, as such, our investment decisions need to consider the value attached to the avoidance of damage to both society and the UK economy. We have identified three central business districts in London - the City of London, Canary Wharf and the mid-town area between Victoria and the western boundary of the City of London - which we believe warrant special consideration for increased resilience because of the high value each contributes to the economy of London and the UK.

YOUR OPTIONS

Mitigation measures can be either built into the design of our networks or incorporated into our contingency planning process.

Building extra network resilience

The first course of action would involve restructuring our networks and building in extra flexibility so that we could reroute supplies from one area to another more easily during a power outage. It would also involve building in additional resilience or reserved capacity into the network to ensure that we can minimise the loss of major infrastructure by relying on other parts of the network.

Damage caused by a storm to one of our van fleet

Such additional resilience is, to an extent, built in within our existing standards for security of supply but these standards address the more probable failure scenarios, like an underground cable fault, and not HILP events. Mitigating high impact events will require additional investment and, in many cases, the investment would need to be significant. If we lost supplies from a major substation in one of the central business districts for days or, in the worst-case scenario, weeks due to a serious flood or fire, it would have a hugely negative impact on our customers' businesses and, as a consequence, to the UK economy. Last year a burst water main flooded one of our substations in the Holborn area of London interrupting supplies to 1,300 customers including businesses, law courts and West End theatres. Some customers were without power for the best part of a day. We had to pump 3.5 million litres of water out of the substation before we could

dry out the equipment, repair and test it before restoring supplies to our customers. If the water had penetrated further into our distribution system our customers would have been without power for a significant period.

In London, due to the historical way our networks were designed, we do not currently have the ability to completely re-route power supplies from one major substation to another in order to restore supplies quickly following a fault. The existing security of supply criteria do not require this level of resilience. There may be up to 30 high voltage cables feeding power out of a major substation (but often there are very few) and in many cases there are no connections to neighbouring substations, this means we would be unable to re-route supplies in the event of the total loss of the substation. We would like to be able to provide that kind of interconnectivity to protect our customers and the economy from the consequences of a HILP event. But to do this we would also need to restructure our high voltage and low voltage networks because the current configuration makes such interconnectivity problematic.

The HV (11kV) and LV (400/230V) networks in central London are integrated in a way that allows customer supplies to be maintained in the event of the loss of an 11kV circuit. This design, although providing clear benefits, is responsible for limiting the 11kV interconnection options between major substations. To create the flexibility necessary to allow resilient 11kV interconnection between substations it will be necessary to restructure the network. This would be a major task across the whole of central London but it is considered manageable in respect of the network associated with the defined central business districts. Our provisional estimate for this work is £80 to 100 million. This has not been included within our core business plan.

We have also explored other options, including increasing interconnectivity at extra high voltages (132kV). Although this would provide a further level of resilience within our network, the initial estimated cost of this option is currently seen as prohibitive when compared to the overall economic benefits.

Physical reinforcement and other contingencies

As part of our business plans we have considered how to prepare for HILP events by ensuring the availability of emergency replacement plant and equipment and the logistical planning to manage the required emergency response are in place. This approach could provide an alternative to increased electrical resilience in some circumstances but, in other cases, the time needed to implement the emergency response, when set against the economic and societal impacts of the incident, may not be acceptable.

These measures include the availability of emergency plant, or equipment, both for replacing failed or damaged assets and as 'temporary works' where re-entry to a substation, switchroom or strategic cable route is not possible for a long period following an incident. For example, we could commission pre-fabricated container switchboards to replace substation equipment or complete, mobile off-site substations.

Other possible measures include enacting emergency response plans agreed by the emergency services and which have tacit Government approval for implementation. Such measures include surface-laid cables, which may require road closures, and temporary, street-level major plant installations, like generators. However, the central business districts are highly congested and, given the size of the temporary generators needed to supply such high demand areas, access would be a major issue.

PRICING IMPLICATIONS

We believe that to reconfigure the LV and HV network and increase interconnectivity between main substations will cost in the region of £80 million. As part of our analysis of the financial impact of implementing our HILP proposal, we have estimated that in the next price control period prices, for a typical domestic customer, would increase by about 0.1p a day and by about 4p a day for a typical medium non-domestic customer in LPN.

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9. We believe that increasing network resilience for High Impact Low Probability events is a key issue that currently lies outside our current regulatory plans; to what extent should this be core to our DNO investment plans in future?

HOW WE ARE ENSURING BUSINESS GROWTH IS NOT CONSTRAINED BY A LACK OF ELECTRICAL INFRASTRUCTURE

To ensure that we run our three licensed networks at peak efficiency, we operate them at close to system capacity. We continually review local authority plans and other development proposals to ensure we are able to meet short and medium-term growth in demand, both from new and existing customers who need to increase their supplies. However, the last decade has seen a significant increase in demand, both from developers building new commercial and housing estates and from existing customers who are using more power-hungry electrical equipment in their homes and offices, including air conditioning units.

London is an integral part of the UK economy. Ensuring we support the demand for electricity here is critical in our future plans

Our major business customers, particularly those based in the City of London and Canary Wharf, are pressing for substantial increases in capacity to run their energy-intensive data centres and to provide enhanced security of supplies. In the City and Canary Wharf alone, we have received recent enquiries about new capacity totalling 600MVA. This is equivalent to the energy needed to power several large towns. We are now reaching the point where it is difficult to provide new high load connections, especially in London, without significant investment to make the necessary reinforcement to our network. Increasing our capacity ahead of need will give us far greater flexibility to re-route supplies during a power failure and would make it easier to connect new major customers to our distribution network. But investing to provide for expected growth in demand carries financial risks, for example the extra capacity may never be used if developers' plans have to change for any reason.

We are also taking this opportunity to look at our options for how we charge customers – homeowners, local sports clubs, city corporations and developers - for new connections. When customers request either an increase to existing supplies, or a new connection to our networks, we need to charge them for the work that this entails. In the case of a major development or regeneration project, these charges can be substantial. If developers do not meet the costs of extending the electricity network for commercial developments those costs would have to be recovered from all customers.

Short to medium-term options

In the short to medium-term we have a number of technical options that will require deployment ahead of need. These are to improve the low voltage (LV) interconnected network in London, provide dedicated mini main substations to high-use customers and introduce a new 20kV-33kV network to increase resilience and capacity.

London's interconnected LV network
The LV interconnected network in central London is more than 60 years old and, despite improvements to the original design, increasing demand in the area means that it has become less resilient and more inflexible. We want to convert the LV and HV networks so that acceptable supply resilience is provided by HV automation rather than LV interconnection. This means replacing HV switchgear to enable automation and some reinforcement of both the HV and LV systems. This increased flexibility will allow us to switch supplies more swiftly to other areas, for example when we need to reroute supplies to restore electricity to customers affected by a power cut. It must be emphasised that this is not a quality of service initiative but a network restructuring proposal that ties in with HILP event mitigation and general improvements to operational flexibility.

Deployment of mini main substations and higher voltage connections
Historically, supplies in London have been provided mainly at low voltage, in many cases from secondary substations within customers' buildings. But the demand for 11kV supplies has increased significantly, particularly from tall, high-occupancy office developments, and the connection of these buildings to the existing 11kV network is presenting a challenge. We are considering two options: the installation of 132/11kV mini main substations within such developments, and the establishment of a 20kV- 33kV network capable of providing higher capacity connections.

- **Mini main substations (132/11kV)**
  We could install dedicated mini main substations within buildings with very high demand requirements (over 12MVA). These

substations would be adapted to meet the load of the building, although the option exists to install additional capacity for use in connecting other network customers.

- **Establishment of 20kV-33kV network**
  The establishment of a new 20kV-33kV network in London has a number of merits. As a new overlaid network we will not need to make alterations to existing infrastructure, which significantly reduces the risk of planned construction outages. The 20kV-33kV capacity can be obtained from the new or reinforced substations that are already planned for London. The proposed 20kV-33kV network design will also be able to provide a duplicate connection for customers requiring extra security of supply, for example companies with data bank centres on site.

CAPACITY HEADROOM AND ADVANCED INFRASTRUCTURE DEVELOPMENT

The ability of our networks to support the future growth of our regions is an important consideration in our development plans. We work closely with local authorities and developers to ensure there is sufficient electrical capacity to meet their future development needs. We operate our networks in accordance with our licence and have robust monitoring equipment which tracks the general trend in demand for increased capacity and indicates where reinforcement is necessary long before it becomes an issue. All efficient networks reach a point where forecast demand comes close to full capacity and at that point we invest in additional or higher capacity plant. This work is carried out as part of our capital investment and maintenance of our networks. (For further information about our core network plans see Section 5).

However, when we are approached about major developments and regeneration projects, like those in East Kent and the 2012 Olympic Park, meeting this increased demand where network capacity is already fully utilised poses a number of challenges. One such challenge is the reluctance of some developers to pay for the new upstream infrastructure required to provide the additional capacity needed for their development. If developers do not meet the costs of extending the electricity network for commercial developments then the costs would have to be recovered from all customers. New developments are generally funded by the first major developer on a site. Occasionally, we face the problem of identifying a lead developer on a major project and we cannot commit to carrying out an extension to our networks without knowing who to charge for the new connection. As a consequence of a developer's reluctance to take on the lead role, some areas of land that would otherwise be considered to have prime development potential are being sterilised.

For example, the Longwater development zone is a green field area west of Norwich and we have received a number of separate connection enquiries or formal connection requests representing a significant increase in capacity. In addition to this, there is a general growth in demand in the surrounding area, with significant outstanding enquiries for additional capacity. Our network in this area is already operating close to full capacity and a new primary substation is needed to accommodate growth in the area, plus further significant works to extend and reinforce the existing infrastructure.

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10. What impact do you think the current arrangements for the provision of new electricity infrastructure is having on economic growth?

We are working to ensure that electricity demands arising from infrastructure development are met

CONNECTION CHARGING METHODS

Our current charges for new connections fall into two categories. If the work requires us to replace or enhance our existing network or plant then the customer will not be required to pay the whole cost of the work but a fair proportion of it based on the capacity they use.

If the new connection requires us to provide new assets and build an extension to our networks then the whole cost of our work is charged to the customer or developer. Ofgem's current connection charge regulations require all DNOs to apply the same rules to all new connections projects, regardless of the size of the project and the voltage connection.

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11. What changes to the charging methodology for new connections would you like to see?

Connection charging methods

Ofgem is currently consulting widely with all DNOs on how they levy charges on their customers, including new connection charges. We are taking this opportunity to review our charging structure and are considering a number of options.

East Kent Spatial Development Model
One option is to look at new ways of funding and charging for major network extension projects for new development or regeneration. At present a developer has to pay upfront for our work to set up electricity services for their site. For a large development this can be costly and can stifle regeneration. We are looking at other payment methods to try to alleviate the impact of high upfront costs.

One innovative funding initiative was to work with the East Kent Spatial Development Company (EKSDC), which is working on a very large regeneration project in the area, including a new primary substation at Manston. The infrastructure project was funded in a unique way. Instead of the first developer on site having to pay the full upfront cost, we worked with EKSDC to obtain grants from European and UK government agencies to build the first section of network. When the end user, that is the customer who sets up businesses on the new site, connects to the network they pay us an appropriate proportion of the cost and we repay EKSDC. They can then recycle this money into paying us again to finance further network development needed for their project. It is an effective, albeit complex and administratively burdensome, way of funding speculative development in a more sustainable manner.

New developments require new connections to our network

8. BUILDING FOR A SUSTAINABLE FUTURE

At the heart of everything EDF Energy Networks does lies a simple need to balance economic, social and environmental concerns. We support the Stern Review's conclusion that the long-term costs of 'doing nothing' to reduce greenhouse gas emissions will be significantly more than the cost of taking action now. We are already at the forefront of the UK energy policy debate. The scale of our commitment to tackling climate change by reducing our carbon footprint, as embodied in Our Climate Commitments, goes far beyond anything the industry has ever seen.

Reducing our carbon footprint is only part of the story. On a global level this means reducing our carbon footprint by designing our networks to cope with environmental change and distributed local generation, and investing in new technologies. On a more local level it means minimising the impact our business has on our immediate physical environment. We are doing this in a number of ways including: removing overhead lines from Areas of Outstanding Natural Beauty to improve the visual amenity; removing deteriorating fluid-filled cables to reduce the risk of pollution to environmentally-sensitive areas; investigating no-dig tunnelling options in London; and considering less intrusive substation designs for urban areas. And, with a view to the future of our industry, it means addressing the skills gap and investing now in a highly-trained, highly-motivated workforce.

For the second year running, EDF Energy has been awarded 'Platinum' status in the Business in the Community Corporate Responsibility Index for 2007 with an overall score of 99 per cent. The index is a voluntary benchmark that companies use to compare their sustainability practices and performance against their peers and the wider business community. Our most notable improvements from the previous year were in the areas of strategic integration – the way in which we have implemented our corporate responsibility strategy right across the company – and minimising our environmental impact, including climate change and waste and resource management.

Our industry-leading initiative on the climate was followed this year with the publication of Our Social Commitments (OSC). Whereas Our Climate Commitments focused mainly on climate change, Our Social Commitments cover a wide and diverse range of challenges. They cover energy affordability, security of supply, safety, supporting vulnerable customers during power outages, ethical procurement, employee development and community investment. Like Our Climate Commitments, these pledges are bold and ambitious and go beyond anything yet seen in our sector.

WHAT WE ARE DOING TO REDUCE OUR CARBON IMPACT ON THE ECONOMY

Last year we announced far-reaching plans to reduce our carbon footprint. Our Climate Commitments (OCC) is the biggest package of environmental initiatives launched by any major UK energy company. The proposals set targets and outline how the company will reduce its own environmental impact and help customers reduce their energy consumption. An important element of the proposals is to inspire all of our employees to champion the company's energy pledges by taking active steps at home and at work to reduce their carbon footprint, and that of others, by 2012. We are making a fundamental change to our whole approach to energy and energy services by developing ways of maintaining profitability while encouraging our customers to use less energy in their homes and businesses. Within our Networks Branch this has resulted in a number of tangible actions and measures to reduce our overall impact on the environment. Figure 25 indicates the key measures in place throughout EDF Energy with their baseline (2006), our actual performance in 2007 and the medium-term target for 2012.

Every year we will produce an online sustainability performance report to provide a simple and convenient measure of our impact on the environment. This report is externally audited to ensure that it is robust.

Going green

Some of the key ways in which we are tackling the challenge of reducing our carbon footprint include reducing carbon emissions from our offices and depots, reviewing our transport policies and ensuring we comply with new

Measure	2006 Baseline	2007 Out-turn	2012 Target
To reduce our street works landfill waste	18%	64.6%	70%
Taking action to cut CO_2 emissions from our offices and depots	26.1 kT	24.1 kT (- 7.7%)	18.3 kT (- 30%)
To reduce CO_2 emissions from transport	27.1 kT	27.5 kT (+1.5%)	21.7 kT (-20%)
Increasing the recycling rate for our office and depot waste	5.9 kT	5.6 kT	3.84 kT

kT – Kilo-tonnes

Figure 25: Carbon impact on the economy

regulations governing the use of sulphur hexafluoride, a potent greenhouse gas commonly used in electricity distribution.

Our office emissions

We are fully committed to reducing carbon dioxide emissions from our offices and depots by 30 per cent by 2012 when compared to 2006 figures. Developing energy efficiency measures and on-site green generation projects will be crucial.

All new buildings, or major refurbishment projects, are now required to meet an 'excellent' rating under standards set by the Building Research Establishment Environmental Assessment Method (BREEAM). We aim to bring our top 20 existing buildings up to this standard. BREEAM is a useful benchmark as it takes into account water use, pollution levels, energy and transport management, health and use of materials. An 'excellent' rating confirms that every effort is being made to minimise a building's negative environmental impact.

We now publish our own energy efficiency tables comparing our different buildings against a recognised benchmarking format. This allows our facilities teams to measure their progress and to learn from the experiences gained at other properties. We have also improved the way we monitor energy consumption in our buildings, introducing smart metering to capture carbon emission data.

Green transport policies

Sharon Davies promoting our green campaign

We recognise that swift action is needed to meet our targets for reducing emissions from transport activities. Key staff, including those responsible for procuring and managing our vehicle fleet, planning our field operations, managing our building stock and operating our technology infrastructure, are involved in a policy review. They have drawn up an action plan outlining six key areas including investigating ways to reduce mileage (such as making more use of video conferencing), investing in more efficient vehicles and examining company policies on employee benefits and company cars.

Greenhouse gases

We have taken action to ensure that our networks comply with EU regulations and industry standards governing the use of sulphur hexafluoride (SF_6), a potent greenhouse gas. All network operators use equipment that requires SF_6 as an insulating medium. Historically it was introduced as a safer alternative to air-insulated systems; electricity can jump across air, but not across gas. This was before its environmental impact was understood. We use SF_6 in electricity switchgear and as a tracer gas to identify nitrogen in gas-filled cables. It is a fluorinated greenhouse gas with extremely high global warming potential. Just 1kg is equivalent to 23,900kg of CO_2, so even the smallest gas leak can have a major impact on climate change. In 2006 new EU regulations covering fluorinated greenhouse gases were published setting out guidelines to contain them, prevent leaks and reduce emissions. We have put reporting procedures in place to monitor our SF_6 holdings, their use and any leakages.

132kV substation with equipment filled with SF_6

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12. To what extent should network operators be targeted to reduce their direct impact on the environment?

WHAT WE ARE DOING TO MINIMISE THE IMPACT OF THE NETWORK ON THE ENVIRONMENT

Visual impact of substations

We have a statutory duty to develop and maintain an efficient, co-ordinated and economical system of electricity distribution. Among other things, this requires us to reinforce the network, which may require the construction of new major substations. Our traditional design for major substations is becoming less acceptable, especially within urban and semi-urban environments. We are experiencing increasing demands for architect-designed substations to meet the aspirations of local planning authorities. These designer solutions are generally more expensive than the conventional solutions. Current estimates indicate that we may need to create up to 60 new grid and primary substations in the period from 2010-2015. The added cost of 'designer' solutions for these could be £25 million to £45 million.

We are also encountering greater pressure on the land area being allowed for our assets within the built environment. Developer-built substations are excluded from this consultation but the design-led messages from such developments will inform the debate.

Technical losses reduction

The way that electricity is distributed from the National Grid to homes and businesses involves the loss of some energy in the form of the heat released during the process of transforming from one voltage to another and in passing current along the conductors. These losses are an inevitable part of the process and are not due to defective equipment. They are typically in the range of five per cent; this represents an overall 'machine' efficiency of 95 per cent.

We are working to reduce technical losses in order to further increase the efficient operation of our networks and to ensure we run a socially and environmentally sustainable business. Reducing our network losses by about 0.1 per cent would save approximately 46,000 tonnes of CO_2 annually, which would have a beneficial impact on our carbon footprint. But it is important to point out that, although replacing a transformer with a new 'low loss' version will reduce technical losses on our system, there is a significant carbon cost involved both in manufacturing the new transformer and in replacing equipment before the end of its useful life.

There are limited opportunities to minimise technical losses as a buoyant economy in the regions where we operate has led to a growth in demand. Such an increase in demand on the electricity distribution network inevitably leads to an increase in technical losses and to the carbon cost associated with these losses. Any significant and sustainable reduction in technical losses would require substantial changes to our network architecture, plant and equipment which, in terms of economics and practicality, could only be carried out over an extended period of time.

However, opportunities to reduce losses do arise as part of our ongoing maintenance and modernisation programme. Steps we have taken already include seizing the opportunity to minimise losses while working to rationalise cable and conductor sizes and during schemes to install more automated equipment on our networks. Further opportunities have arisen during our programme of overhead line replacement and reinforcement work. As we plan major investment projects we analyse possibilities for reconfiguring our networks to the best advantage, including the reduction of technical losses.

Our future options to minimise technical losses include: investment in new low loss equipment; working on creating a more effective network configuration; and reviewing the opportunities presented by the emerging technologies, the increasing penetration of DG and the evolution of active network architecture.

HOW WE ARE DEVELOPING OUR PEOPLE AND CONTRACTORS

We want to employ high-performing people so that we can meet our customers' expectations, achieve our social and climate commitments and ensure safety for all of our staff. To achieve this we need to invest in staff now, and in the future, to ensure that we can recruit and train talented

Sundridge Training Centre where we develop our skills

people, ensure their continued professional development and retain them by offering interesting work, career progression and by being an engaging place to work.

There is a serious skills gap looming in our industry. If we are to deliver the power that is essential to a modern society while developing new technologies to make our sector more efficient and environmentally sustainable, then we need to invest upfront to train and develop highly-skilled and talented people at all levels. While there is no recognition in the current regulatory price review system of the significant financial investment that is needed to ensure the industry avoids a damaging skills shortage, we have worked hard to improve recruitment, education and professional training for the power engineering sector.

We are proud that our commitment to skills development has been formally recognised though our achievement of the Investors in People Standard in November 2007.

Recruiting talented people

We currently recruit and train electrical engineering graduates and apprentices to ensure that we have a source of talent for the future. We also recruit from the job market and are forging ahead with an effective recruitment strategy to deal with the current challenging conditions. We know that the high-calibre candidates we want to recruit, especially those with engineering skills, are highly sought-after and can have their pick of lucrative contract assignments. Our recruitment challenge is twofold: firstly to identify as many different recruitment options as possible, for example national and international recruitment campaigns, agency engagement, industry PR; and secondly to ensure that EDF Energy Networks is an employer of choice for the best candidates.

Ensuring we have a talented workforce in place for the future is crucial to our success and we are currently developing a strategy to undertake long-term manpower planning. This process will enable us to forecast and plan to have the right people with the right skills at the right time to deliver our workload.

Engineers - powering us into the future

At EDF Energy Networks we recognise that our core competence is in power engineering and millions of our

Trainees at our Sundridge Training Centre

customers rely on our expertise in this area. To ensure that we have well-trained, highly-skilled engineers operating and managing our networks we offer and support a number of engineering development initiatives. These include the following programmes:

The Graduate Engineer Development Programme
Our Graduate Engineer Development Programme is accredited by the Institution of Engineering and Technology (IET). The 22-month scheme is designed to support our trainees through to registration as chartered engineers after approximately four to five years with the company. Since 2005 we have recruited and trained a total of 14 graduates and we plan to recruit a further 12 this year.

The Power Academy
We are a founder member of the Power Academy which is a cross-industry collaborative group co-ordinated through the IET and Energy and Utility Skills. Launched in 2004, it aims to encourage people to study electrical engineering at universities with renowned faculties. We have sponsored 29 students and hope that some of them will join our Graduate Engineer Development Programme following completion of their degrees.

Foundation Degree
In 2006 we developed a foundation degree in Power Distribution in partnership with London South Bank University. We are the only DNO to have created an open programme in Power Distribution and there are currently two non-employees on the two-year, full-time programme. We are keen to look at ways of delivering this successful joint venture in other geographical areas.

Apprentice Training Scheme
Our Apprentice Training Scheme currently has around 150 apprentices. It aims to train people for qualified craftsmen's roles, such as jointers, fitters and linesmen. This is an externally accredited programme with City and Guilds and as a level 3 National Vocational Qualification.

Although we offer a far-reaching set of engineering development activities, we also recognise that we have a gap in the area of development of 'middle engineers'. We have exciting plans to improve this through the development of a new engineer development programme in 2008. The programme will require candidates to study for an academic qualification in Power Distribution, probably at foundation degree level, or HNC, on a part-time basis while gaining experience of all parts of our networks business through several work placements.

ENSURING THE DEVELOPMENT OF OUR PARTNERS

Contractor skills, development and recruitment

Contractors will invest in their human resources on the basis of secure business. Long-term contracts mean that they will invest in staff recruitment, development and training. Realising that longer-term commitments are necessary to secure the resources that we need to deliver our work programmes, we have made changes to our contracting approach with the greatest changes in relation to our capital programme work. Instead of tendering on a project-by-project basis, we now offer multi-year contracts and this has resulted in contractors taking actions such as:

- Recruiting and training staff from non-traditional sources such as Eastern Europe and Asia
- Recruiting in anticipation of increased workloads and taking into account the lead-time to train and develop staff
- Significant increase in the number of apprentices and adult trainees, with one contractor reducing the average age of its field staff from the late 50s to the early 30s due to such a recruitment strategy
- Investment in their own training facilities and infrastructure

Have your say - www.edfenergy.com/dpcr5

13. To what extent should network operators be given incentives to address the skills gap and to build a sustainable industry?

9. PROVIDING GOOD VALUE FOR MONEY

WHAT WE ARE DOING TO KEEP OUR COSTS UNDER CONTROL AND IMPROVE EFFICIENCY

Sustainability is not just about tackling climate change; it is about strong economic performance and social responsibility – a field in which EDF Energy Networks has taken a lead. But it is equally important that we maintain a competitive edge and keep our prices down. In industry league tables we rank as one of the most competitive DNOs on price. We are working hard in the current price control period (2005-2010) to provide value for money for our customers and this will remain central to our future business plans. There are two main areas of focus in our drive to cut our operating costs. These are to increase the efficiency of our public networks business and to merge our public networks branch with our private networks branch to create a cost-efficient centre of excellence for all network services.

KEEPING COSTS UNDER CONTROL

Since 2004 we have transformed the way we run our business in order to reduce our operating costs to our customers. This has led to many improvements and business developments enabling us to more effectively and efficiently manage our substantial capital programme. We have achieved this despite operating in a challenging business environment which has seen substantial increases in the cost of materials and project contractor fees. The major areas of focus for our cost-cutting efforts have been on: reducing spending on our normal day-to-day operations; more efficient expenditure on our capital programme, which has seen significant increases in work volumes; and connecting new customers

A supergrid that forms part of our network

to our networks more efficiently, leading to greater customer satisfaction.

The most extensive change has been in the way we manage our resources and we have reorganised the vast scale of activities out in the field into a hubs and clusters model. Our three licensed networks are split into four sub-areas called 'hubs' and these are East of England (North), East of England (South), London and the South East. These hubs are further divided into smaller administrative units, called 'clusters'. A parallel could be drawn with a county being divided into cities, districts and boroughs. This has allowed us to make savings through the centralisation of our business support services. Another key benefit of this re-organisation is that the offices and depots where our field staff are based are now closer to the areas they cover. This means they can now respond to our customers more quickly and the shorter travelling times have led to a reduction in our fuel consumption and carbon emissions. We also use satellite navigation equipment which helps our staff find specific network sites and customers more quickly. We are also now less dependent on contractor resources and have seen a 20 per cent increase in the use and productivity of our employees.

Improvements to our property strategy have reduced operating costs in this area by £4.5 million per annum compared to 2004. Other significant cost-cutting initiatives include: a rationalisation of our transport fleet; the rationalisation of our insurance portfolio; a reduction in external consultant fees; and the re-negotiation of supply and management contracts for our transport fleet, vegetation control, meter supply and repairs and other supporting services.

During the current price control period (2005-2010) we have improved our ability to effectively manage our investments in our network assets. We now use a new bespoke investment optimisation tool which allows us to identify the best possible mix of projects and work programmes. We have also improved our technical analysis methods and this allows us to re-engineer investment schemes and develop lower cost alternatives. The combined savings afforded by these two new approaches is estimated to be approximately £25 million.

IMPROVEMENTS IN PROJECT DELIVERY

The £2.2 billion we negotiated in the last price review (2005-2010) to spend on maintaining our networks represented a substantial increase in our funding. In order to ensure we made the best use of this funding we had to radically rethink our approach to the way we plan and manage investment projects on our networks.

The new project management system we use to plan, carry out and assess major works on our network infrastructure, for example building new substations or replacing overhead power lines, has enabled us to make smarter decisions. Our new approach has benefits for our customers, our contractors and our suppliers. For example, we have developed a framework for agreements for all major equipment types and we now order long lead-time items, like grid transformers, in advance to secure manufacturing slots. This ensures we can plan and implement our projects on time. We are working to standardise all of our civil and

electrical designs and are establishing long-term contracts with key suppliers, which is essential if they are to have the confidence to recruit and develop the staff required. We have also implemented the use of the New Engineering Contract 3 (NEC 3) structure, which is widely regarded as best practice for construction projects.

DO I ALWAYS HAVE TO GET MY CONNECTION TO THE NETWORK FROM EDF ENERGY NETWORKS?

We carry out more than 100,000 new connections a year for major commercial and industrial developers, highways lighting authorities and individual homeowners. We constantly strive to improve the experience of customers needing to make a connection. This year we are introducing a new process to speed up new connections, improve the accuracy of our quotes and reduce the costs of small service connection orders. This work is carried out to performance standards laid down by our regulator, Ofgem. We believe we already offer excellent value for money but customers wanting a new connection to our distribution networks can seek competitive quotations from approved third parties for some of the works required.

The work involved in providing new connections can be split into two categories. The first category is non-contestable work. For safety reasons, and in order for us to comply with our duty under the Electricity Act 1989, to develop and maintain an efficient, co-ordinated and economical system of electricity distribution, non-contestable works can only be undertaken by us. These include:

- The connection and energisation of the extension to our distribution system
- Planning, designing and specifying any works for the reinforcement or diversion of the distribution system
- The removal, or repositioning, of existing electrical plant, lines or cables
- The operation, repair and maintenance of the electrical plant and lines

The second category is contestable work, which can be done by an accredited Independent Connection Providers (ICP), or approved contractor on the applicant's behalf, in accordance with our design and specification. For more information, go to www.edfenergy.com/core/smallservices/competitionconnections.html

Non-contestable works include:

- Preparing the site, including digging trenches and preparing the circuit routes between the development and the point of connection
- Construction of the network extension
- Recording the work undertaken and the location of new cable routes and other equipment on site, which must be provided to EDF Energy Networks
- Making provision for the installation of metering equipment

It is also possible to have your electricity connection provided by an Independent Distribution Network Operator (IDNO), who will build and then own this local network and who will provide all ongoing network services, including maintenance and fault repairs. The IDNO will also arrange the point of connection to the EDF Energy network.

As part of our analysis of the competitive connections market, we continue to expect an increase in third party entry into the market. This is principally based on the assumption of a continuation and extension of the current regulatory framework that incentivises competitive connections.

Have your say - www.edfenergy.com/dpcr5

14. Do you have any general comments on this section?

An electrical transformer

10. INVESTING FOR THE FUTURE

There are a number of technical uncertainties about the way distribution networks will operate in the future. EDF Energy Networks is preparing the way for the development of new technologies and looking at the impact they will have upon our business, our network architecture and in meeting our commitments to reducing our carbon footprint. Many of these emerging new technologies are still in the research and development stages. Two of the key areas we are examining are smart networks and distributed generation, both of which focus on renewable forms of energy production. We will be seeking reassurance from both BERR and Ofgem to ensure that we are given the appropriate incentives in the current price review to make the necessary investment to ensure that network constraints do not become a technical barrier to distributed generation, or to the development of a commercial market for decentralised energy.

DISTRIBUTED GENERATION (DG)

DG is the energy from windfarms, combined heat and power plants (CHP) and other renewable sources that are used to reduce the amount of non-renewable power we need to distribute on our local networks. At the time of the last price review we believed there would be a large uptake and increase in DG connections to our network. This has not yet materialised and there are concerns that we may not have got our DG connections pricing structure right. We are currently reviewing the pricing structure and our findings will be published in 2009/10. However, we believe that the real challenge is that we have no control over the development of DG.

Solar panels at a pre-school, an example of renewable distributed generation

Our focus is on developing and testing new technologies in order to prepare our distribution networks to be able to cope adequately and efficiently with DG connection and distribution at a local level. Until now our networks have taken electricity from the National Grid and then transformed and distributed it to our customers. To adapt to DG, where we will also take power into our networks at a local level, requires a vast amount of research and investment to redesign our networks to cope with this fundamental change. There are a number of things that we can start to do and we are using our Ofgem Incentive Funding Initiative grant to invest in research into new technologies to help achieve these changes. These nascent technologies are still largely unproven and we would like the IFI scheme to be extended in the next price review period to cover the costs of full field trials to allow us to fully assess their performance and benefits.

Various industry, government and academic groups are carrying out work to identify efficient solutions to overcome barriers to DG connections. We are involved with a number of working groups and forums, including the Electricity Networks Strategy Group, the Energy Networks Association's Distributed Generation Support Group and the government sponsored Centre for Distributed Generation and Sustainable Electrical Energy. We are also collaborating on research projects with engineering consultants as well as a number of universities such as Imperial College, London, University of Manchester and Strathclyde University. The technical areas being considered include:

- Voltage regulation
- Fault level manipulation
- Dynamic circuit ratings
- Novel protection
- Technical architecture
- The development of a UK Generic Distribution System (UKGDS) to analyse active networks
- Network islanding

The first wind turbine to be fitted to a block of flats in Southwark, South London

SMART NETWORKS

Smart Networks, or SmartGrids, is a generic term used to describe active network management which will allow us to: accommodate variable and less predictable power flows, such as those associated with distributed energy resources; achieve higher levels of utilisation; and our networks will be more readily configured to deal with actual or predicted power failures. The implied growth in renewable and decentralised forms of electrical energy production will result in much higher levels of generation connected to the distribution, rather than the transmission, network. This will require far more sophisticated forms of active monitoring and control of our networks than currently exist.

SmartGrids have the potential to transform distribution network architecture but the timescale for this transformation will be dictated by several factors. These include the speed of development and commercialisation of new network architecture technologies, the overall operational economics of SmartGrids and the availability of appropriate skills to develop, deploy and manage SmartGrids. Another factor is the speed of deployment of decentralised generation which, in turn, has many dependencies including:

- Economics, particularly of small-scale 'demand-side' generation, including micro-generation and domestic co-generation
- Technological development and commercialisation of affordable products
- The creation of a mass market, including participation in the energy market

We want to develop a cohesive strategy on SmartGrids to ensure we can maximise the benefits that the new technologies offer. There are a large number of possible applications, which include the following compatible options:

- To ensure we keep our voltage levels within statutory limits and avoid damage to customers' electrical appliances, we monitor and maintain voltage levels via specialised equipment in our primary substations. When a connected distributed generator produces energy it affects the power flows and voltage levels on our networks which will need more active monitoring and management as a result
- Our overhead lines can carry more or less current depending on weather conditions – in hotter weather the current needs reducing, in cooler weather overhead lines are able to deliver more current. We use cyclical ratings based on the season (summer, winter, etc.) to determine how much current is permissible. This system is not compatible with the variable and less predictable power flows provided year round by DG so we are considering the use of dynamic, real-time ratings which are more flexible and will allow for maximum network utilisation
- The use of network automation and active generator constraint management systems to optimise network configuration and generation export on a 'close to real-time' basis, which will also reduce technical losses
- Facilitating wider participation and competition in the energy market by sharing knowledge, providing information communication systems to support demand side participation, local generation export, smart metering and the virtual power plant model (VPP), which is where a number of distribution generators are grouped together to form a VPP

A handheld smart meter

- When a fault develops on our networks, circuit breakers in our substations operate to break the current up to a certain level (e.g. 10,000amps) to protect our equipment from further damage. With the input of distributed generation the level of current may be slightly higher and if the circuit breaker still attempts to break the current it will be damaged. In order to prevent this we will incorporate new fault-current limiting technologies and adaptive protection to provide increased 'fault-level' headroom
- The use of new battery storage technologies, partly as an ancillary service (system balancing) opportunity and partly as a means of counteracting wind generation output intermittency. A further potential benefit is local peak demand smoothing and hence improvement in network load factor / loss load factor with consequential deferred reinforcement and reduced losses benefits
- Use of real-time condition / utilisation monitoring applications to predict potential functional failure and, where appropriate, trigger automated network reconfiguration, a concept known as the self-healing network (see the section on AuRA-NMS below)

THE APPLICATION OF NEW TECHNOLOGIES TO MEET FUTURE CHALLENGES

We believe in delivering benefits to our customers through innovation, both in terms of quality of supply and value for money. Modernisation is crucial if we are to meet the complex demands of the 21st Century, including configuring our networks to accommodate distributed generation from small and medium-scale local renewable power generation. This is a huge and exciting challenge and, through our investment in research and development, we are improving the technical performance of our networks resulting in fewer, shorter power cuts, meeting carbon initiatives and targeting network investments. An Ofgem Innovation Funding Incentive (IFI) allowance, worth more than £4 million a year until 2015, will help us investigate new and emerging technologies to create a modern, efficient and resilient distribution network. Some of the exciting and challenging projects we are working on are detailed here.

The application of new technologies

We are evaluating the suitability of using Perfluorocarbon tracer (PFT) technology to locate damaged fluid-filled cables to enable us to more quickly locate and repair a fault without having to carry out a number of trial excavations in the highway. To date six circuits have had the PFT tracer, a miniscule amount of gas, added to the insulating fluid and seven leaks have been located in a total of eight excavations. More circuits are being included in the trial and an improved detector is now under test.

Partial discharge monitoring

When the paper insulation protecting some power cables starts to degrade the gap between the layers of paper allows tiny discharges of electricity to occur. The use of partial discharge monitoring is a well-known method of checking the condition of electrical insulation. Over the past eight years we have been actively involved in the development of 'on-line' partial discharge monitoring and mapping techniques. Approximately 600 cables and switchgear are currently continuously monitored in the EDF Energy Networks area.

Early indications show that there is a potential for pre-empting some faults before they manifest themselves in the form of a power cut and that the technology can help prioritise decisions about cable replacement. A number of pre-emptive repairs have been carried out and, following the replacement of sections of deteriorating cables, the success of the intervention was verified by observing a significant reduction in partial discharge activity.

Grid transformer monitoring

The Grid Transformer Monitoring project is investigating how easy it will be to retro-fit transformer monitoring devices to existing grid transformers at three sites. These devices will monitor how well the transformers are performing to reduce the risk of unexpected and sometimes catastrophic failures, avoiding expensive replacement, clean-up costs and unplanned downtime. The real-time monitoring data collected will also lead to improved decisions about asset replacement and to the optimisation of the lifespan of power transformers. To help us prepare for the future development of our network, including Smart Networks and Distributed Generation, we would like the current Investment and research programme to be extended to include the deployment of future technologies. We estimate that we will need to invest approximately £50 million between 2010 and 2015 in addition to our core business plan described in Section 5.

Autonomous Regional Active Network Management System (AuRA-NMS)

AuRA-NMS is developing a distributed control system to help pave the way for new SmartGrids technology and to help prepare for an increase in distributed generation (DG). We already use automated computer technology in our control centre to identify a fault on the network and to attempt to restore power to customers by automatically re-routing supplies. The new technology is more flexible and would be installed more locally. It involves installing new smart computers which offer real-time automated reconfiguration (switching), which will be tested initially on a regional network of up to four primary substations.

The programme aims to economically, efficiently and effectively integrate large amounts of small-scale distributed generation while taking into account our existing infrastructure and planned renewal programmes. It also aims to deliver network optimisation taking into account DG and electrical energy storage.

AuRA-NMS will determine the optimal network configuration between security of supply and technical losses of energy, which are an inevitable part of the distribution process. We will be installing an electrical energy storage device to determine the benefits of AuRA-NMS, and the beneficiaries, when connected to an UK distribution network with an expected increase in DG connections.

Bankside substation

Bankside substation is being completely rebuilt and re-equipped, including the installation of six oil/water, water/air cooled transformers. Because the substation is located within the Tate Modern gallery, we are taking the opportunity to install a developmental heat recovery system from the heat generated from the technical losses of the transformers. This will initially be used to heat domestic hot water for the existing gallery and to provide heat into the hot water ring-main for the new gallery. This will make use of heat that would otherwise be lost to the atmosphere. In addition, the transformer pumps and fans will be used less and therefore reduce electrical energy usage and maintenance costs.

PRICING IMPLICATIONS

As part of our analysis of the impact of our plans we have quantified the change in prices as a result of introducing our Smart Networks. If EDF Energy Networks was able to invest the full £50 million allowance in the next price control period prices, for a typical domestic consumer, will increase by about 0.01p a day in LPN, 0.02p a day in SPN and 0.02p a day in EPN. For a typical medium non-domestic customer the next price control period prices would increase by about 1p a day in LPN, 1p a day in SPN and 1p a day in EPN.

Have your say - www.edfenergy.com/dpcr5

15. To what extent should the current funding arrangements for research into new technologies be extended to their deployment?

Our underground Bankside tunnel

Section 11

How to respond

11. HOW TO RESPOND AND WHAT ARE THE NEXT STEPS

ONLINE CONSULTATION

Thank you for taking the time to read this consultation paper. Your views are important to us and you can have your say on the issues we have raised by logging on to our consultation website and registering at www.edfenergy.com/dpcr5

The consultation pages will take you through each section of the document and give you an opportunity to respond to a number of focused questions, as reiterated in this section.

ALTERNATIVE WAYS OF RESPONDING

If you do not have access to the Internet, you can reply to this consultation by post. Please send your comments to:

EDF Energy Networks – Planning for the Future
FREEPOST SEA 12430
Thornton Heath
CR7 7XT
(no stamp required).

While we welcome all comments on the consultation document, we would ask you to focus on the key questions we are seeking feedback on. These have been based on the issues raised at early engagement events prior to this consultation document being produced.

Consultation period: 1 July to 28 September 2008

REGIONAL WORKSHOPS

As part of our continued engagement with you during this consultation process, we will be running four regional workshops. These workshops will provide you with an opportunity to understand our plans in more detail and to further explore the options that we have raised in this consultation. We will be running these workshops in early September and they will be held in Central London, Norwich, Stansted and Gatwick. If you are interested in attending one of these events please e-mail us at your.views@edfenergy.com

CONSULTATION QUESTIONS

The questions we have put forward for your consideration are based on the views expressed by our key customers during our ongoing dialogue with them. More details of this process can be found in Sections 1-3.

When you have registered on the consultation website you will see a series of questions alongside any relevant background information. These questions, listed here according to the section in which they appear, are:

1. Do you have any general comments you would like to make about our Planning for the Future document?
Refers to Sections 1-3 - About EDF Energy Networks

2. What are your views about the assumptions we have made with regard to the key issues that we have identified for the future of the electricity industry?
Refers to Section 4 - The future business environment

3. Do you have any comments on how we could manage issues around the volatility of raw material prices?
Refers to Section 4 - Cost pressure on resources

4. To what extent should we increase our investment to further protect your power supply?
Refers to Section 5 - Improving the networks' resilience to storms

5. To what extent do you think we should broaden our measures of Quality of Service to include additional customers, for example our remote customers?
Refers to Section 5 - Quality of Service

6. To what extent should we change our investment plans for fluid-filled cable decommissioning?
Refers to Section 5 - Fluid-filled cable decommissioning

7. To what extent should we change our investment plans for the undergrounding of cables in Areas of Outstanding Natural Beauty?
Refers to Section 5 - Undergrounding cables in Areas of Outstanding Natural Beauty

8. Do you have any general comments on our proposals contained in Section 5?
Refers to the following topics covered in Section 5 - Providing a safe, secure and efficient network:

- EDF Energy Networks asset base
- What we are doing to maintain the performance of our assets
- How regional development is reflected in our network plans
- How we propose to improve the resilience of our network against storms
- How we plan to improve network reliability and reduce customer interruptions
- How we are minimising the level of disruption to the public caused by working on our network
- How we are making it easier for customers to connect to our network
- How we are improving customer service
- How we are ensuring that the public is kept safe around our network
- What we are doing to minimise the impact of our plans on the environment
- How we have improved relationships with our contractors
- The pricing implications of our plans

9. We believe that increasing network resilience for High Impact Low Probability events is a key issue that currently lies outside our current regulatory plans; to what extent should this be core to our DNO investment plans in future?
Refers to Section 6 - Planning for uncertainty

10. What impact do you think the current arrangements for the provision of new electricity infrastructure is having on economic growth?
Refers to Section 7 - Protecting the future of the UK economy

11. What changes to the charging methodology for new connections would you like to see?
Refers to Section 7 - Protecting the future of the UK economy

12. To what extent should network operators be targeted to reduce their direct impact on the environment?
Refers to Section 8 - Building for a sustainable future

13. To what extent should network operators be given incentives to address the skills gap and to build a sustainable industry?
Refers to Section 8 - Building for a sustainable future

14. Do you have any general comments on this section?
Refers to Section 9 - Providing good value for money

15. To what extent should the current funding arrangements for research into new technologies be extended to their deployment?
Refers to Section 10 - Investing for the future - new technologies

We look forward to hearing from you. All the responses we receive will be fed into our findings to help shape our investment plans in a sustainable direction. Please work with us to 'Plan for the Future'. At the end of the consultation all submissions will be posted on the website.

EDF Energy Networks, working to keep the lights on for you

EPN	Units	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Housing growth	%	0.46%	0.58%	0.69%	0.80%	0.85%	0.90%	0.94%	0.99%	0.98%	0.97%	0.96%	0.95%	0.81%
Employment growth	%	0.33%	0.44%	0.66%	0.77%	0.87%	0.97%	0.96%	0.95%	0.94%	0.93%	0.92%	0.92%	0.76%
Population growth	%	0.63% annual average												
Demand Growth (Gross)		**1.38%**	**2.72%**	**2.54%**	**2.61%**	**1.38%**	**1.39%**	**1.39%**	**1.37%**	**1.36%**	**1.34%**	**1.32%**	**1.30%**	**1.29%**
Estimated impact of Distributed Generation on system maximum demand	MVA	1.2	27.4	30.2	24.9	32.7	52.4	55.2	55.7	53.5	53.9	46.9	65.0	60.5
Estimated impact of micro-generation on system maximum demand	MVA	0.0	0.0	0.2	0.3	0.2	0.4	0.4	1.3	0.9	0.8	0.7	0.8	0.9
Estimated impact of domestic demand side management on system maximum demand	MVA	0	0	0	0	0	0	0	23.8	71.6	95.6	45.1	1.3	2.5
Demand Growth (Net)		**1.37%**	**2.33%**	**2.13%**	**2.29%**	**0.96%**	**0.72%**	**0.71%**	**0.38%**	**-0.20%**	**-0.51%**	**0.23%**	**0.56%**	**0.59%**
Connected generation capacity [potentially requiring network reinforcement]	MVA	0.0	53.8	63.6	57.2	74.6	113.4	118.4	120.4	116.9	118.4	106.4	136.4	119.0

LPN	Units	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Housing growth	%	0.56%	0.70%	0.83%	0.96%	1.02%	1.08%	1.13%	1.18%	1.17%	1.16%	1.14%	1.13%	1.12%
Employment growth	%	0.47%	0.62%	0.92%	1.07%	1.20%	1.34%	1.32%	1.30%	1.29%	1.27%	1.26%	1.24%	1.22%
Population growth	%	0.75% annual average												
Demand Growth (Gross)		**1.78%**	**3.18%**	**1.95%**	**2.16%**	**2.35%**	**2.32%**	**2.30%**	**2.25%**	**2.20%**	**2.15%**	**2.10%**	**2.06%**	**2.02%**
Estimated impact of Distributed Generation on system maximum demand	MVA	0.2	13.3	22.6	16.1	4.8	25.6	22.5	44.6	6.5	26.1	22.5	32.6	38.1
Estimated impact of micro-generation on system maximum demand	MVA	0.0	0.0	0.2	0.2	0.2	0.3	0.3	1.0	0.7	0.6	0.5	0.6	0.7
Estimated impact of domestic demand side management on system maximum demand	MVA								7.1	21.4	28.9	13.7	0.6	1.0
Demand Growth (Net)		**1.78%**	**2.94%**	**1.55%**	**1.89%**	**2.29%**	**1.92%**	**1.96%**	**1.44%**	**1.80%**	**1.35%**	**1.62%**	**1.64%**	**1.52%**
Connected generation capacity [potentially requiring network reinforcement]	MVA	0.0	30.4	48.2	43.3	24.1	64.3	64.1	101.1	32.1	65.9	64.1	77.1	73.9

SPN	Units	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Housing growth	%	0.39%	0.49%	0.58%	0.67%	0.72%	0.76%	0.80%	0.84%	0.83%	0.83%	0.82%	0.81%	0.81%
Employment growth	%	0.27%	0.36%	0.55%	0.63%	0.72%	0.80%	0.80%	0.79%	0.78%	0.78%	0.77%	0.77%	0.77%
Population growth	%	0.53% annual average												
Demand Growth (Gross)		**1.15%**	**1.31%**	**1.53%**	**0.99%**	**1.09%**	**1.19%**	**1.20%**	**1.21%**	**1.20%**	**1.18%**	**1.17%**	**1.16%**	**1.14%**
Estimated impact of Distributed Generation on system maximum demand	MVA	0.8	21.9	23.9	18.1	25.6	40.4	42.8	43.3	40.9	41.3	34.3	52.4	47.9
Estimated impact of micro-generation on system maximum demand	MVA	0.0	0.0	0.1	0.2	0.3	0.4	0.5	1.1	1.0	1.5	1.4	1.9	1.9
Estimated impact of domestic demand side management on system maximum demand	MVA								7.1	21.5	28.7	13.5	0.4	0.8
Demand Growth (Net)		**1.13%**	**0.81%**	**1.00%**	**0.59%**	**0.53%**	**0.31%**	**0.28%**	**0.13%**	**-0.13%**	**-0.31%**	**0.18%**	**0.06%**	**0.15%**
Connected generation capacity [potentially requiring network reinforcement]	MVA	3.1	42.0	49.8	41.9	57.6	87.0	91.0	93.0	88.7	90.2	78.2	108.2	92.7