



Business plan

for our electricity network for
East of England

Draft for consultation – Eastern network business plan
for 2015 to 2023

November 2012

ukpowernetworks.co.uk

**UK
Power
Networks** 
Delivering your energy



Thank you for taking the time to read our draft business plan for 2015 to 2023.

We are due to submit our final business plan for approval to our regulator Ofgem in July 2013. This document sets out in detail our planning process, the outputs we propose to deliver for our customers, and our current estimates of our costs and revenues. Our draft plan is dedicated to achieving our target of top third performance compared to the other electricity distribution networks in Great Britain.

We also describe the step change in performance that we have delivered for our customers since we became UK Power Networks in October 2010. I am delighted that we have reduced customer minutes lost by 39 per cent over the last two years, whilst at the same time reducing our overhead costs by 19 per cent and customer complaints by 81 per cent.

The next ten years or so will be a time of challenge and change for our networks, as we try and balance the different priorities of affordable tariffs, investment in the health and capacity of the network and supporting the UK's low carbon transition, whilst keeping the public and our employees safe. We must also innovate to utilise our network more efficiently, and prepare for a possible transition to a smart grid without creating stranded costs.

Your feedback on our plan is important to us and I encourage you to comment on any aspect of our plans or forecasts. Our consultation period closes on 1 February. After that we will publish a final draft plan reflecting all the feedback we receive, and this will form the basis of the business plan we then submit to Ofgem next summer.

With your help, our business plan for 2015 to 2023 will balance appropriately the needs of all our stakeholders."

Thank you

Basil Scarsella
Chief Executive





Contents

1.0	What does UK Power Networks do?	4
2.0	How to respond to this consultation	6
3.0	Executive summary	10
4.0	Quality of supply in the East of England	14
5.0	Smart innovation to meet demand	18
6.0	Outputs and expenditure: what we will spend to deliver to 2023	24
6.1	Outputs: our commitments to customers	27
6.2	Our plans build on current improvements	29
6.3	Expenditure: plans for our Eastern network	29
7.0	Financing: what this means for bills	34
7.1	Developing the revenue requirement	35
7.2	The impact on our customers	36
8.0	Glossary	38

This document is published in conjunction with a more detailed plan document covering all three of UK Power Networks' licensed electricity distribution networks ('Business plans for our three electricity networks'). Please refer to that document for additional information on the step change in our performance since 2010, our planning process and our stakeholder engagement activities, and how we will manage risk and uncertainty.

1 What does UK Power Networks do?

UK Power Networks owns, operates and manages three of the fourteen regional electricity distribution networks in the UK. Our licensed distribution networks are in the East of England (EPN), London (LPN) and the South East (SPN). UK Power Networks is one of the largest Distribution Network Operators (DNOs) in the UK, covering an area of approximately 30,000km², extending from the Wash in the east, through London, to Littlehampton on the Sussex coast. Approximately eight million connected customers depend on us for their power.

Our job is to deliver electricity to our customers safely, to 'keep the lights on' and to connect new customers. We are responsible for maintaining and modernising our networks and ensuring that there is adequate capacity to support the needs of our customers.

We are not the National Grid (the Great Britain-wide 'motorway system' for electricity). Also we are not an electricity retailer; we don't bill end customers and we don't own the electricity flowing through our networks. Instead we deliver electricity on behalf of the 'big six' and other energy retailers in our service area.

Electricity distribution costs represent approximately 18 per cent¹ of the average domestic electricity bill.

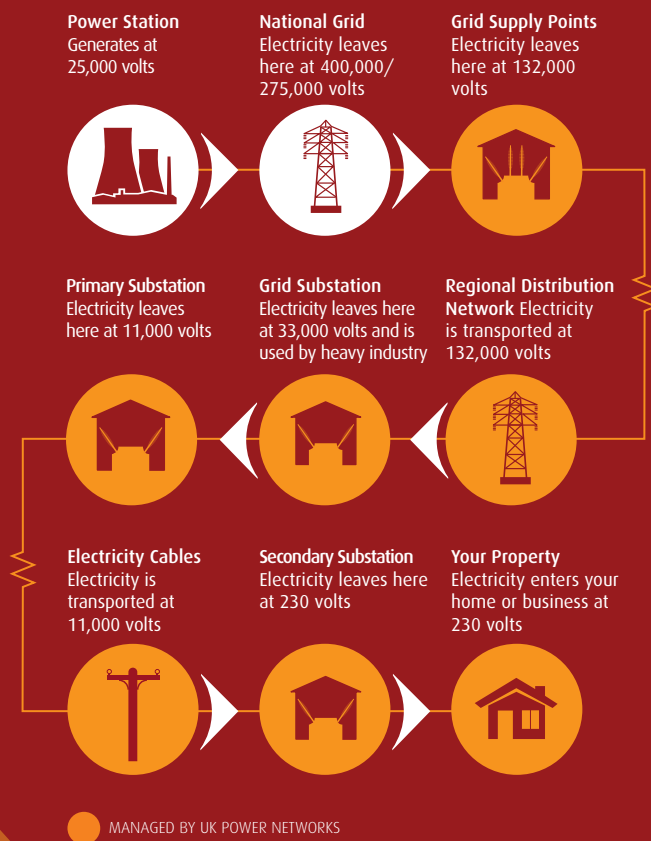
We are a monopoly and our distribution tariffs are regulated by Office of Gas and Electricity Markets (Ofgem). Ofgem has already set our prices for 2010 to 2015. Now we are consulting on the business plan that we will submit to Ofgem to form the basis of our prices for 2015 to 2023.

This document summarises our plan for our Eastern network. We have published separate summaries for our London and South Eastern networks, and a detailed plan document covering all three networks.

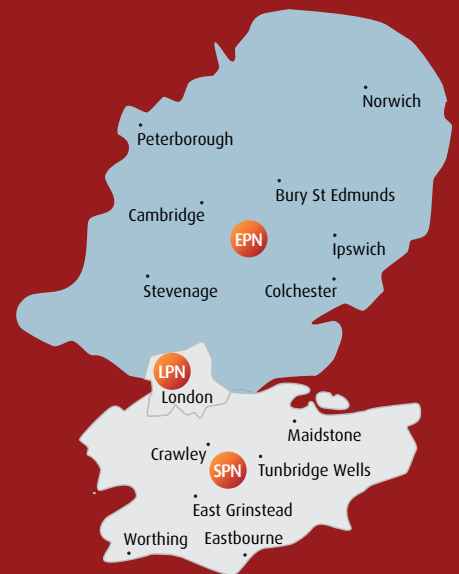
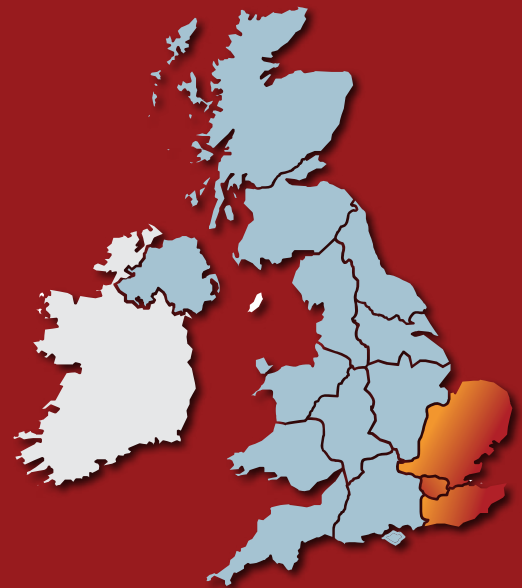
¹ Ofgem Fact sheet 97, 31 May 2012

What we do

We take electricity at high voltages from the National Grid and transform it down to voltages suitable for commercial and domestic use.



Where we operate



2 How to respond to this consultation

Thank you for taking the times 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.

<http://www.ukpowernetworks.co.uk/internet/en/have-your-say/business-plan/>

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 below:

Summary of all consultation questions

Reliability and security of electricity supply

- Q1. Are you satisfied with the reliability of your electricity supply? If not, please let us know why not, and what specifically you would like to see us do better
- Q2. We propose to hold our reliability performance approximately constant in future years. Do you agree with this or do you think that we should spend more to reduce either the number or the duration of power cuts, even if this would mean higher charges?
- Q3. Not applicable to the Eastern network business plan
- Q4. Do you think we should broaden our measures of quality of service to include additional customers? In particular, should we measure customers that experience a power cut of less than three minutes?

Conditions for electricity connections

- Q5. What do you think is important to customers when they request a new electricity connection, and what should we focus on improving? For example, the cost, the time to connect, the quality of our customer service?
- Q6. Do you think we should proactively provide more electrical infrastructure, before the capacity is required, so that electricity connections can be made more quickly or easily?
- Q7. Do you think we should invest more in the electricity network to make it quicker or easier for renewable or distributed generators to connect?
- Q8. Should any investment to make connections quicker and easier be subsidised by all customers in the region, or purely paid for by those wishing to make new connections?

Incentives and innovation

Q9. Do you think our approach to innovation and change is sufficient? Do you think we should be researching additional areas in relation to change and innovation, and if so what?

Q10. How much of a priority should each of the following areas be for us in 2015 to 2023?

- Facilitating renewable generation
- Facilitating new demand sources such as electric vehicles, heat pumps, etc.
- Empowering customers with information
- Managing customer demand to avoid the need for network reinforcement
- Improving electricity network service and reliability
- Increasing network control and automation in preparation for a 'smart grid'

Customer satisfaction and social obligations

Q11. What do you think we should do to improve customer service and to measure the satisfaction of our customers?

Q12. How can we make it easier for our customers to communicate with us, either in a power cut situation, for a new connection, or for a general enquiry?

Q13. Do you think there are additional services we should be providing to vulnerable or fuel poor customers?

Safety

Q14. Would you value more engagement or information around safety and electricity?

Q15. We believe we have improved signage and security around our excavations on the public highway. How should we improve the safety of employees and the general public?

Q16. What should we be doing more of in the future? For example:

- Greater prevention of metal theft and vandalism
- Additional safety education programmes

Environment

Q17. What are the current initiatives and issues that concern you surrounding our impact on the environment?

Q18. What should we be doing more of in the future? For example:

- Extending our programme of undergrounding overhead electricity lines beyond Areas of Outstanding Natural Beauty to other sensitive areas
- Installing equipment with lower lifetime carbon impact

- Increasing our programme to actively remove oil filled equipment
- Change our monitoring of SF6 (a greenhouse gas commonly used in electrical transformers)
- More challenging targets for our carbon footprint

Expenditure

Q19. Do you think our proposed level of expenditure is appropriate to meet the output targets in our business plan? If not, please be specific as to your views on what should change

Financing

Q20. What do you think about our assumptions regarding the financing of our activities and our proposed revenues and prices?

General

Q21. Is this consultation helpful? What could we have done better?

Q22. Do you have any general comments you would like to make about our forecast business plans for our electricity networks?

Q23. Please let us know if you have any other thoughts or comments on the points raised in this document, or if you would like to highlight any other issues you consider important

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:

Nawaz Ahmed
Head of Stakeholder Engagement
UK Power Networks
Newington House
237 Southwark Bridge Road
London, SE1 6NP

We look forward to hearing from you. All the responses we receive will be fed into our findings to help shape our business plans in a sustainable direction for RII0-ED1. At the end of the consultation all submissions will be posted on our website.

Consultation period ends 1 February 2013

3 Executive summary

Our business

Since October 2010 we have been owned by the Cheung Kong Group and the Li Ka Shing Foundation, long-term investors in utility businesses around the world. We own the London, Eastern and South Eastern power networks which are three of the 14 electricity distribution networks in Great Britain. We are a monopoly² business and the tariffs we charge are regulated by the Office of Gas and Electricity Markets (Ofgem).

As a result we periodically go through a process to justify our forecast expenditure to Ofgem. We are approaching the next review, which starts next year and will define our tariffs for the period from 2015 to 2023.

Consulting on our business plan for 2015 to 2023

This document outlines our Eastern Power Networks (EPN) business plan for that period. It describes the drivers for our investment and the total amount we will need to spend to deliver the outputs our customers value. We are publishing this consultation document in order to gather our stakeholders' input on our thinking so far. Doing this now enables us to integrate these views into our plans in time for the formal submission of our forecast business plan to Ofgem in July 2013.

This is the first time the electricity distribution business will be subject to Ofgem's new framework for agreeing our business plans, called 'RIIO' - Revenue = Incentives + Innovation + Outputs. This approach was adopted in 2009 and provides a toolkit with which to address future uncertainty and the transition to the low carbon economy.

We welcome the views of our stakeholders and have outlined in each chapter a series of questions that can help guide responses to this document.

Our step change in performance

Our vision is to deliver top third performance amongst the 14 distribution networks in Great Britain in the key areas of safety, network reliability, customer service, cost efficiency and employee engagement. We want each of our three networks to perform equivalent to or better than comparable networks.

We have delivered a step change towards that performance over the last two years. We have made significant improvements in

quality of supply, with customer minutes lost (CML) in Eastern Power Networks down by 39 per cent. We have improved our customer service with complaints down by 81 per cent across all our networks.

At the same time we are improving our cost efficiency to bring better value for money through sustainable cost savings programmes that have driven down our overhead costs by 19 per cent and are improving our employee and public safety performance.

Our plan lays the platform for a low carbon future

Electricity distribution companies have a role to play in facilitating the UK's transition to a lower carbon economy. We are expecting growth in electric vehicles and domestic heat pumps³ and that connecting these technologies will lead to new demands on our networks. We are planning now for these to appear on our networks to ensure we are prepared and can ensure we build the capacity to accommodate them. We are also expecting growth in distributed generation from smaller scale generation from solar panels on roofs to onshore wind farms. We are developing our thinking on how to best to develop our networks (e.g. taking into account smart technologies) and the ways we work so that our networks continue to provide long-term value for money for a range of plausible future scenarios. Our approach includes proactively participating in small and large scale real-time trials of innovative new approaches and technologies. In the East this is through our Flexible Plug and Play⁵ project and other innovation activities. We will also support energy suppliers in their roll-out of smart meters and will seek opportunities to adapt our business to use the data to better serve our customers.

Our plan is informed by the views of stakeholders

We have been developing this plan over the past two years and have engaged widely with our stakeholders in a variety of forums. Our objective is to ensure our stakeholders have the opportunity to influence the way in which we plan for the future. We have sought the views of stakeholders and ensured these views have been included in the plans so far and we have reflected that throughout this document. We are undertaking specific stakeholder engagement for our forecast business plan alongside our on-going engagement activities that continuously inform our decision making. Across our networks we engage with stakeholders through our Critical Friends panel, through willingness to pay surveys, and many other interactions.

² We are a monopoly as it is economically efficient for there to be only one network that provides electricity to homes and businesses in any given area, rather than multiple independent networks

³ A technology that can take energy from the air or ground and makes it useable to heat our homes

⁴ <http://lowcarbonlondon.ukpowernetworks.co.uk/>

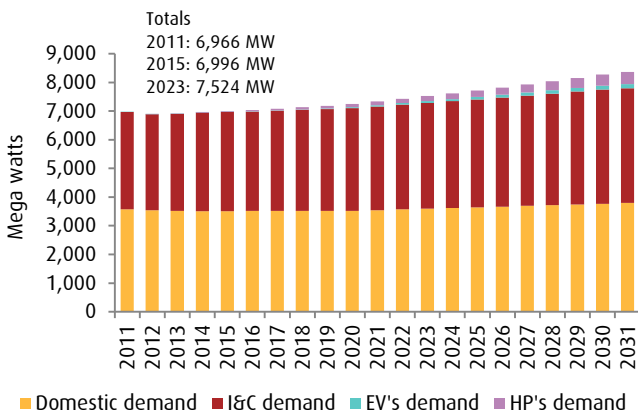
⁵ <http://www.ukpowernetworks.co.uk/internet/en/innovation/fpp>

Expanding our networks to reflect customer needs

The need to extend and expand our networks is driven by increases in electricity demand. We forecast electricity demand based on a wide range of factors including the number of new households and the rate of economic growth. We have worked with our stakeholders to refine our planning scenarios and have developed innovative models to enable us to take a longer-term view. We are also considering how new uses and ways in which people use electricity (such as electric vehicles or heat pumps) may impact our networks. We have taken views for the uptake on the more uncertain future demands from low carbon technologies (electric vehicles and heat pumps), how people may respond to tariffs that change with the time of day, and how much renewable generation may seek to connect to the networks. In formulating our views on the future electricity demand we have taken our stakeholders' views into account to build up our view on a core electricity demand growth scenario upon which to base our investment plans.

Our EPN forecast is based on the long-term trend in background growth in domestic and industrial and commercial (I&C) demand, together with a modest increase in new connections for heat pumps (233,000) and electric vehicles (243,000) by 2030.

Figure 3.1: EPN peak load evolution
Forecast growth of electricity demand



Regional challenges

Our Eastern network includes some of the most densely populated and expensive parts of the country. This fact has a direct impact on how we must operate and the overall cost of our business. We face higher than average salary costs as a result of the increased cost of living in our region compared to other parts of the country. We also have to deal with congestion under pavements and roads, meaning we have to avoid other pipes and wires when we do work, which increases the complexity of what we do. We also regularly have to put our equipment into small spaces and often underground to minimise how much land we use. This leads to higher costs to install and maintain our equipment.

The outputs we will deliver

Our forecast business plan is based on a range of assumptions including the commitments to our customers to what we will deliver across a range of outputs. The outputs and the target performance have been developed in conjunction with our stakeholders and a summary of those assumed in making this forecast business plan are presented in Figure 3.2.

Figure 3.2: Our plans delivers against Ofgem’s output categories and set ambitious targets for RIIO-ED1

Category	Reliability and availability	Customer satisfaction	Connections	Social responsibility	Environment	Safety
Forecast for 12/13	EPN ●	●	●	●	●	●
Forecast for 14/15	EPN ●	●	●	●	●	●
Our focus in RIIO-ED1	<ul style="list-style-type: none"> • Top third IIS performance • Reduce network risk in EPN for both HI/LI 	<ul style="list-style-type: none"> • Top third BMoCS performance • Smart fault handling 	<ul style="list-style-type: none"> • Improve time to connect every year • Targeted anticipatory investment for DG 	<ul style="list-style-type: none"> • Value for money focus • Reflect wider distribution system optimisation role in our investment decisions • Target investment on vulnerable and worst served customers 	<ul style="list-style-type: none"> • Top third performance amongst DNOs in BCF league table 	<ul style="list-style-type: none"> • Continue to aim for Zero Harm • Public safety awareness

Managing risk and uncertainty

Our forecast business plan considers the risks of the future being different to our forecasts. The management of risk and uncertainty in this time of transition to a decarbonised energy sector for our stakeholders is an important consideration in our plans. We have a well-developed strategy for the management of corporate risk and this is reflected in our business plan. The primary considerations in developing our approach to risk management for our forecast business plan are to:

- Recognise that we are best placed to manage risks to the delivery of the business plan

- Reflect the overall risks with an appropriate regulated rate of return on equity
- To only use uncertainty mechanisms proposed by Ofgem where we can materially demonstrate that we have considered the impact on customers as well as stakeholders

Figure 3.3 highlights the key areas of uncertainty that we consider need to be appropriately managed into the future.

Figure 3.3: Highlights the key areas of uncertainty that we consider need to be appropriately managed into the future

Category	Area of uncertainty	Our proposed uncertainty mechanism
Load	<ul style="list-style-type: none"> • Rate of take up of low carbon technologies (e.g. electric vehicles, heat pumps)– time to connect • Rate of load growth due to decarbonisation • Ability to predict and manage load growth • Clustering – regional combination of low carbon technology take up and load growth due to decarbonisation 	<ul style="list-style-type: none"> • A measure of the volume of work we have to undertake on our low voltage network as a result of low carbon technologies connecting – annual frequency
Non-load	<ul style="list-style-type: none"> • New technologies on the network (new standard of higher specification to be rolled-out as part of non-load replacement) 	<ul style="list-style-type: none"> • Re-opener in 2019
Cost	<ul style="list-style-type: none"> • Increase in general official measure of inflation • Costs of operating network business outturns higher than forecast • Higher than inflation increase in cost of material (e.g. copper, fuel) • Increase in pension deficit caused by exogenous factors 	<ul style="list-style-type: none"> • Indexation of annual revenues • Ex ante allowance with cost saving/overrun sharing with customers • Fixed ex ante allowance • Allowed pass through of efficient costs
Specific issues	<ul style="list-style-type: none"> • Government requirements to increase security standards • Legislation to enable local authorities to increase charges for lane rental for essential infrastructure repair works • Increased expenditure to allow network systems to recover from major national outage • Increased costs of roll out of new innovations in technology 	<ul style="list-style-type: none"> • Re-opener in 2019 to allow for efficiently incurred cost increases • Re-opener in 2019 to allow for efficiently incurred cost increases • Re-opener in 2019 to allow for efficiently incurred cost increases • Re-opener in 2019 to allow for efficiently incurred cost increases

Our expenditure plans

Our plan is created to ensure the delivery of the commitments we are making and to ensure we meet our statutory obligations (placed upon us through legislation, regulations and our licence). Taking all of the assumptions, risks and uncertainties into account we have developed our view of expenditure for the period from 2015 to 2023.

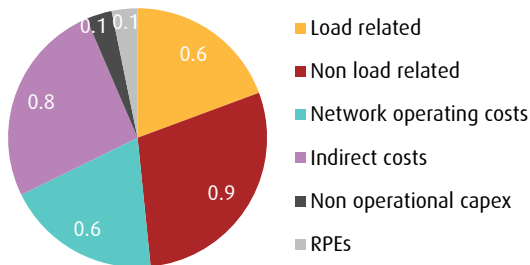
Overall our future plans as presented in this document are largely a continuation of today, with the addition of increasing prominence of low carbon technologies on our network (particularly wind generation), smart metering and the enabling steps for the future smart grid. We are expecting a return to more normal levels of reinforcement on our network as economic growth returns.

Our final business plan in 2013 will reflect the impact of 'smart' alternatives to traditional network reinforcement, including demand side reduction, more automation and controls and other innovative solutions. These are not included in the current draft plan, and should reduce costs further.

The following chart shows what we consider to be an efficient level of expenditure to deliver the outputs, meet our obligations and responsibilities and allow us to finance our business.

In our Eastern network we are forecasting to spend £3.1 billion in 2015 to 2023 before inflation. Our plans for EPN include our current estimates of strategic investments in network capacity to support lower cost connection of renewable generation and for the smart meter roll-out.

Figure 3.4: EPN total forecast expenditure from 2015 to 2023
Forecast plan period 2015 to 2023 (RIIO-ED1) (£bn)
Total £3.1bn⁶



Finances and customer bills

Our expenditure is paid for through the bills customers receive from their electricity supplier. Our revenues amount to around 18 per cent of the average bill. Figure 3.5 and Figure 3.6 present a forecast of how the average domestic and non-domestic bills may change and how that compares today to other distribution network companies (DNO). Currently our tariffs are amongst the lowest in Great Britain. Overall we expect to maintain our contribution to electricity bills at constant levels in real terms from 2019 for EPN through to 2023. Excluding the impact of the charges we pay National Grid, our revenues would fall on average for our three networks in real terms over 2015 to 2023.

Figure 3.5: Forecast impact on a typical domestic bill⁶

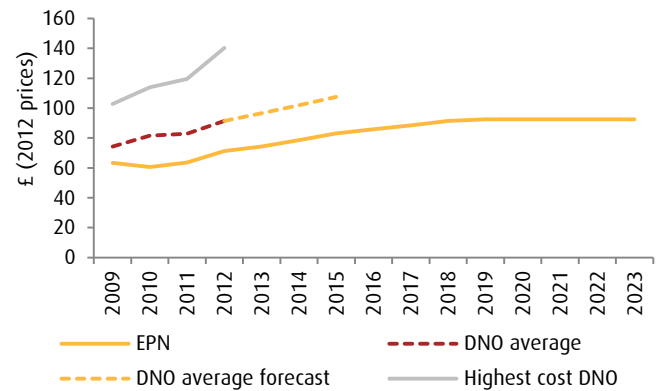
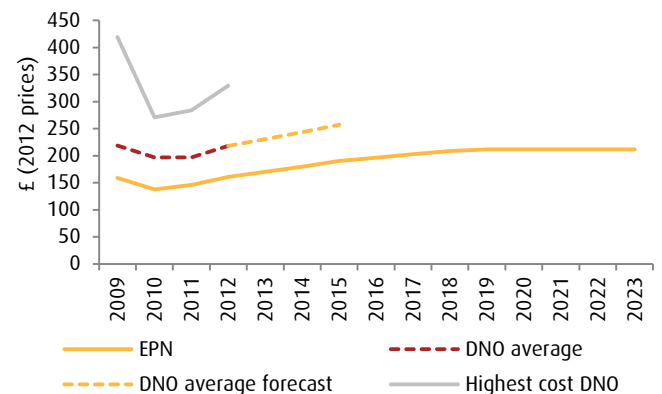


Figure 3.6: Forecast impact on a typical non-domestic bill⁶



This forecast business plan should see each of our networks remain amongst the lowest cost electricity distribution companies in Great Britain.

⁶ All prices are real 2012 prices for ease of comparison

4 Quality of supply in the East of England

Consultation questions for this section

Reliability and security of supply

- Q1. Are you satisfied with the reliability of your electricity supply? If not, please let us know why not, and what specifically you would like to see us do better
- Q2. We propose to hold our reliability performance approximately constant in future years. Do you agree with this or do you think that we should spend more to reduce either the number or the duration of power cuts, even if this would mean higher charges?
- Q3. Not applicable to the Eastern network business plan
- Q4. Do you think we should broaden our measures of quality of service to include additional customers? In particular, should we measure customers that experience a power cut of less than three minutes?

Strategic load related investments

Distributed Generation (DG) Infrastructure

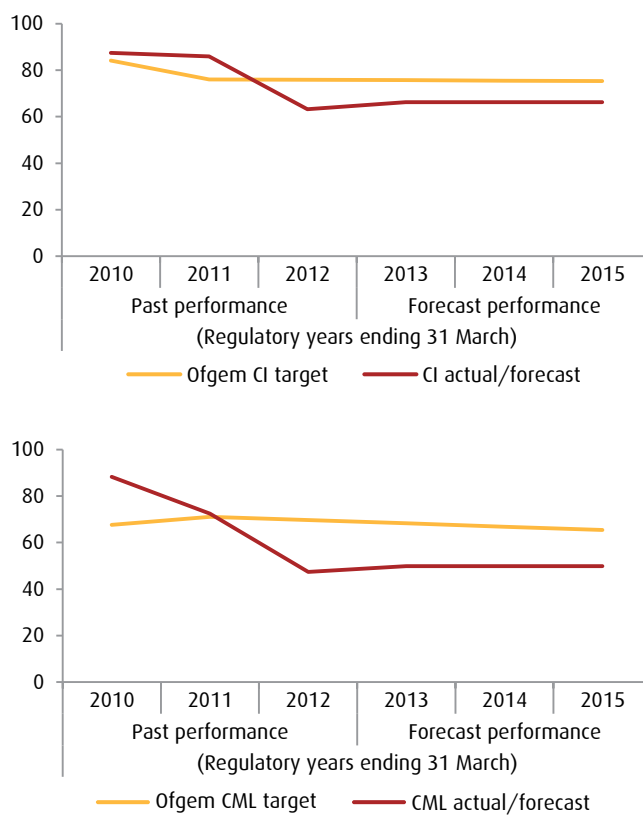
We would expect our networks to take their fair share of the UK's commitment to renewable generation. We are seeing a large potential for new wind farms connecting to our networks. This is particularly true in the East of England where the quality of the wind resource is high.

We have included a first view of a potential strategic investment for our EPN network. This concept is to provide a high-capacity 'spine' to allow new renewable generators to connect in a timely and cost effective way. We see blockers to renewables developments e.g. where small developments need extensive network reinforcements. These can make a project unviable as a result of when they have come forward. We are looking at the options and undertaking analysis on the benefits of developing new capacity on an anticipatory basis. This will be explored further in our 2013 forecast business plan.

Eastern network reliability

We have put plans in place to sustain the recent improvements through to the end of 2015. Our Quality of Supply strategy will ensure delivery of a more reliable service to customers. Reliability performance projections are presented in Figure 4.1. We expect to outperform all regulatory targets and deliver a more reliable service to our customers.

Figure 4.1: EPN network reliability performance to date and forecasts to 2015 (years to March)



What do our stakeholders say?

What they said in 2011

Network availability is an important issue for stakeholders, with many of them expressing support for all of the existing outputs. It was also suggested that performance against these outputs should be made more visible to stakeholders.

Our business plan says in 2012

We agree with stakeholders' desire for greater visibility of performance measures. We will produce an annual stakeholder report to address this, together with the inclusion of up-to-date measures on our website.

What do our stakeholders say today?

Do you think we can do more? We welcome your views.

Go to our stakeholder website at

<http://yourviews.ukpowernetworks.co.uk>

Innovation!

Energy storage

Flexibility of the electricity system is recognised as vital for a low carbon energy sector, particularly considering the increased penetration of intermittent renewable generation and the potential misalignment between times of peak generation and times of peak demand. Energy storage is one source of flexibility that has significant potential to support the system at the distribution level by mitigating the misalignment of these peaks.

We commissioned an energy storage system at Hemsby in April 2011. For the first year it operated as a source (export) and sink (import) of reactive power. Subsequently it has been operated to enable real power exchanges on the network through charging and discharging of the battery. The results so far are positive and have verified that the system is having the desired impact on the network in terms of both real and reactive power, as generation and demand changes over time. Further tests are now planned to demonstrate how we can improve the management of the distribution network and address some typical network issues using energy storage.

5 Smart innovation to meet demand

Consultation questions for this section

Incentives and innovation

- Q9. Do you think our approach to innovation and change is sufficient? Do you think we should be researching additional areas in relation to change and innovation, and if so what?
- Q10. How much of a priority should each of the following areas be for us in 2015 to 2023?
- Facilitating renewable generation
 - Facilitating new demand sources such as electric vehicles, heat pumps, etc.
 - Empowering customers with information
 - Managing customer demand to avoid the need for network reinforcement
 - Improving electricity network service and reliability
 - Increasing network control and automation in preparation for a 'smart grid'

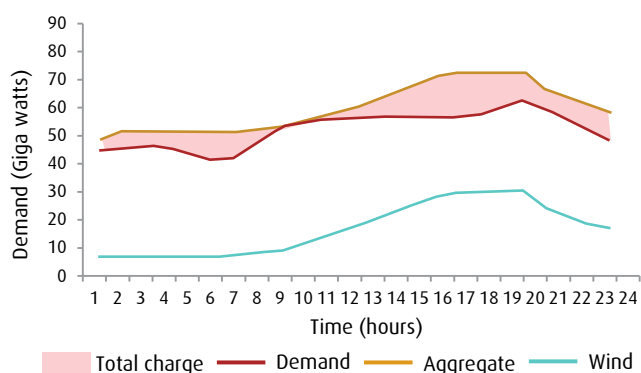
We are committed to playing our full role in facilitating the transition to a low carbon economy. We will need to adapt our business as our customers take up low carbon technologies and connect distributed generation. We are preparing for the journey and are developing our thinking as to what the network of the future looks like, learning how new technologies can help, and how our role might change to allow us to more actively manage the electricity flows across our network.

Enabling the transition to a low carbon future

The Government's Carbon Plan sets ambitious targets to reduce emissions by 18 per cent on 2008 levels by 2020. In order to achieve this, 40 per cent of our electricity must come from low carbon sources by 2020. We see these challenges as an exciting opportunity for innovation.

Our commitment to the low carbon economy and innovation is long-standing. Since 2005 we have built up a portfolio of projects that will enable the transition to a low carbon future. We want to be recognised as a low carbon leader in our industry, leading the way by ensuring the decarbonisation of electricity and playing our part in enabling the electrification of heat and transport.

Figure 5.1: Demand, aggregated demand and typical wind generation over a 24 hour period



Impacts on DNOs

We share the low carbon future vision and see the challenges it presents as opportunities to bring more value and reliability to our customers. If extensive reinforcement is to be avoided then smarter means of accommodating energy resources and of managing demand will be essential. The low-carbon future presents a scenario where wind generation will be the most significant generation source. This will provide low carbon energy for millions of home and businesses. This will also provide new challenges in forecasting generation output and in keeping the electricity system in balance on a second-by-second basis.

The challenges we face as an industry should be welcomed as an opportunity to change and improve. These challenges will impact distribution network daily load profiles. The increased use of wind and micro-generation and the new demands from electric vehicles and heat pumps will require close monitoring to respond to them. Over time the real-time management of electricity demand may become more critical to the successful delivery of the low carbon transition and to optimise network investment.

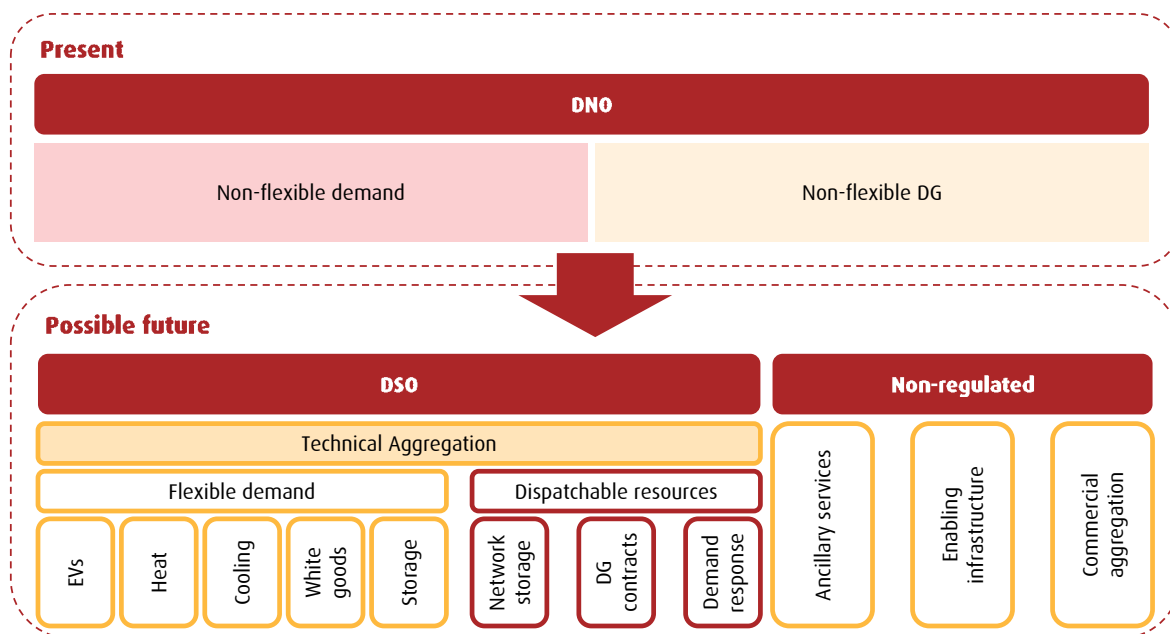
Smart Grids: The road to DSO?

Moving to a low carbon economy, with increased customer interaction to manage the network, our role may change. The traditional role of a DNO is to passively distribute electricity along its networks to customers. A DNO does not generally have the tools to manage demand and generation flexibly. As we move into a low carbon future, the relative inflexibility of traditional supply and demand is expected to change. As intermittent generation is brought on-line and new innovative technologies are harnessed, we must adapt our networks to facilitate this new flexible system. This gives rise to the concept of 'Smart Grids'.

As we potentially move towards new and innovative smart technologies, we should consider if moving to become a Distribution System Operator (DSO) would be of benefit. A DSO would provide a highly flexible network to adapt to responsive demand, by using electrical storage and controllable generation. Flexibility could be achieved by offering our own new incentives for customers or by using third party commercial aggregators.

The DSO concept is illustrated by the diagram below:

Figure 5.2: Transition from a DNO to a DSO



By way of contrasting the current role of a DNO with that of a DSO

A **Distribution System Operator (DSO)** has access to a portfolio of responsive demand, storage and controllable generation assets that can be used to actively contribute to distribution system operation. A DSO builds and operates a flexible network with the ability to control load flows on its network. The combination of a highly flexible network and access to demand and generation response allows the DSO to contribute to the increasing UK-wide challenge of system balancing.

By contrast, a **Distribution Network Operator (DNO)** continues to build in response to growth in maximum or peak demand. A DNO does not have the ability or desire to influence demand and generation, and tends to introduce flexibility only to the extent that it supports existing regulatory priorities (such as to reduce supply interruptions and the risk of catastrophic asset failure).

Future network development plan

We are preparing for a journey that may take us from DNO to DSO. The pace of our journey is closely linked to the uptake of low carbon technologies – which in turn depends on factors such as customer acceptance, economic conditions and government policies.

Change will be gradual, with incremental innovation and implementation. This incremental investment approach will allow us flexibility until we have more certainty on the impact of the low carbon transition, and allow us to avoid any unnecessary investments. We do expect changes to accelerate when certain technologies gain critical mass. This might well be the tipping point at which we move from an incremental to integral solution approach and when we have become a DSO.

Based on the current forecasts of low carbon technology uptake, we do not expect to reach this point until well beyond the end of the forecast period into the mid to late 2020s. Nevertheless, in preparation of this change we will need to start investing in enabling technologies such as increased monitoring and communications infrastructure during the forecast business plan period (2015 to 2023).

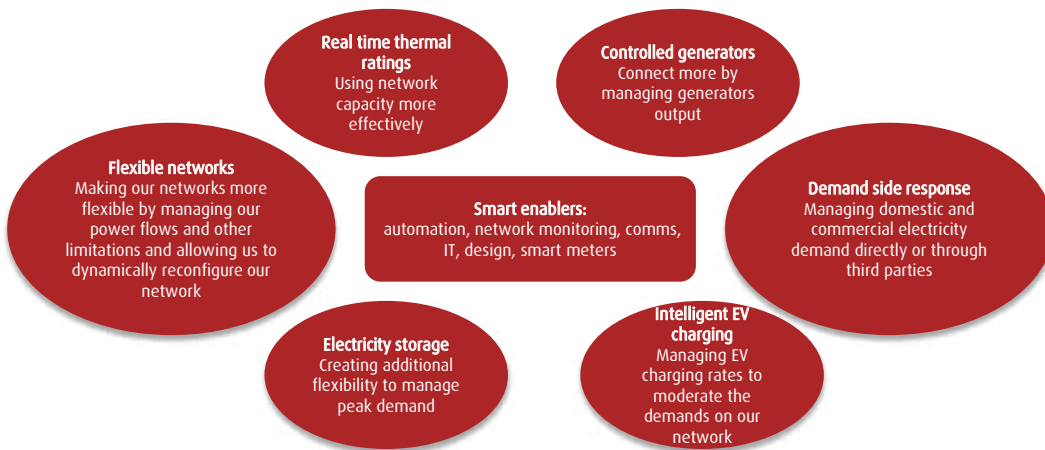
We have spent considerable effort, developing our thinking on how this will evolve and have captured this in our 'Future Network Development Plan (FNDP)', which provides guidance for our activities throughout the forecast business plan period and beyond.

This not only provides an exhaustive up-to-date review of technical and commercial solutions, but also brings these together into logical solution sets aligned with those developed in the cross-industry 'Smart Grid Forum' which is jointly chaired by Ofgem and the Department for Energy and Climate Change (DECC). In line with our FNDP we are trialling a series of technologies and approaches to develop our thinking on the best means to deliver the efficient development of our network in the future.

Low Carbon network fund

We are currently trialling innovative solutions to ease the transition to a low-carbon future. This is being funded by the Low Carbon Network Fund, which has two elements for funding projects – non-competitive (LCNF Tier 1) and competitive (LCNF Tier 2). In addition to research and development, an important aspect of the Low Carbon Network Fund is knowledge dissemination. We are sharing the knowledge gained from

Figure 5.3: Transition to a low carbon future: response through innovation



our projects with key stakeholders including the entire DNO community and other interested parties using a variety of methods to appeal to a wide audience.

Five LCNF Tier 1 projects have been registered to date:

Short-term energy storage on the distribution network (June 2010) – investigating how storage can be an alternative to traditional reinforcement of substation when additional capacity headroom (either thermal or voltage support) is needed infrequently for limited periods of time to avoid building network capacity where the long-term demand is uncertain.

Distribution network visibility (September 2010) – demonstrating the business benefits of collection, utilisation and visualisation of network data that is already available to improve our operational and investment decisions e.g. to improve time required to connect new customers.

LV current sensor technology evaluation (December 2011) – the first collaborative project (with Western Power Distribution) evaluating a range of network monitoring solutions that can help us understand the available network capacity to enable us to minimise customer disruption or delay when low-carbon technologies are deployed future.

Validation of Photovoltaic (PV) connection assessment tool (January 2012) – This project is testing the validity of our new planning tool, which assesses the impact of concentrations of small scale generation on our networks e.g. solar panels, enabling us to provide a better and faster service to our customers.

Smart urban low voltage network (July 2012) – Most LV networks are passive, meaning they cannot be actively reconfigured to match user requirements. We have been working in collaboration with TE Connectivity, to develop a new solid-state switching technology for use these networks. The devices developed can provide us with remote switching and re-configuration of the LV network. The system also has the ability to provide visibility of power flows on the network, using the near real-time communications and built in sensors. This enables extensive load monitoring so we can better understand the live state of the LV network.

Two LCNF Tier 2 projects have been awarded funding and a third proposal has been submitted:

- October 2010: Low Carbon London – Ofgem awarded £24.9 million to our first flagship project, supported by a £5 million investment by us
- November 2011: Flexible Plug and Play – awarded £6.8 million for a second flagship project
- Smarter Network Storage – the aim of this proposed project is to install a storage plant to solve a network constraint and to investigate additional revenue streams for providing network services. Electricity storage could provide value for customers by reducing the need for network reinforcement and has wider system benefits such as providing network services such as reserve and response to help keep electricity supply and demand in balance.

Flexible plug and play

January 2012 to December 2014

Flexible Plug and Play aims to enable faster and cheaper integration of renewable generation, such as wind power, into the electricity distribution network. The project will achieve this by:

- Trialling innovative technical and commercial solutions with real customers (renewable generation developers) to provide the most flexible and cost effective means of connecting renewable generation to the distribution network in a trial area of around 700km² between Peterborough, March and Wisbech in Cambridgeshire. These solutions would seek commercial arrangements which provide the customer with a non-firm (interruptible) connection which allows the generator's output to be changed by us to match the prevailing network conditions and needs
- Deploying smart technologies on the network that will make best use of the existing electricity network through, for example, dynamic rating of overhead lines based on weather conditions

- Allowing real-time management of network constraints through active control of generator output (for those generators with non-firm connections)
- Deploying the first Quadrature Booster on the distribution network; the Quadrature Booster will balance the load on parallel circuits by forcing the power away from the weaker circuit
- Developing an investment modelling tool that will determine the optimum network investment from both an economic and carbon emission perspective

Flexible Plug and Play will contribute towards the Department of Energy and Climate Change's (DECC) target of 30 per cent of the UK's electricity to be generated from renewable energy sources by 2030 by enabling the faster and cheaper integration of renewable generation to the network.

The first public deliverable from the Flexible Plug and Play project, the first Stakeholder Engagement Report, was delivered successfully in September 2012⁷. The major conclusion from this stakeholder engagement exercise is that generator curtailment is seen as offering substantial opportunities, implemented as part of Active Network Management schemes optimising the export of multiple generation developers onto the distribution network against known network constraints. Active Network Management can be used in conjunction with other smart technologies such as dynamic rating of lines or other assets.

Generation developers had no concerns about being offered connections with some form of curtailment, as long as the implementation was transparent and the estimate of curtailment had low uncertainty. The learning from this exercise has informed current activity on the project to develop proposed commercial arrangements for non-firm connections.

The project has had very positive engagement with many of the generation developers in the trial area. To date, five of these developers have received business as usual connection offers and have been invited to participate in the project in parallel. Three of these developers have already opted in to the project, with decisions pending from the other two. These developers will receive their formal flexible plug and play connection offer by March 2013, and the business as usual connection offer also remains open. Budgetary estimates developed to date indicate that flexible plug and play connection offers will be in the range of 33 per cent to 90 per cent cheaper than business as usual connection offers, representing a significant cost saving for the developer and thus providing a key enabler for faster and cheaper integration of renewable generation to the distribution network.

⁷ <http://www.ukpowernetworks.co.uk/internet/en/innovation/learning-zone>

What did our stakeholders say?

Our stakeholders believed that we are about to face a tactical issue with regard to the uptake of low carbon technologies. Some challenged the idea that the UK will be off gas by 2050 and believed that we could relieve some of the demand on the networks by facilitating CHP to reduce the amount of electric heating. Others believed we could also decrease load demand at peak times through innovative solutions such as controlling fridges and other electrical heating/cooling devices. Stakeholders commented that we now have a good opportunity to position ourselves in the middle of this now.

Our business plan says in 2012?

Our approach to planning, based on stakeholder-informed scenarios, reflects the on-going uncertainties and risk surrounding the transition to a low carbon economy. We share the views of our stakeholders that through innovation we can utilise the challenges of a low carbon transition as opportunities to deliver our customers better service. To prepare for the low carbon transition, we currently run two large demonstration trials to better understand new smart solutions to reduce peak demand. These trials are set up with a multitude of stakeholders and customers. We welcome the views of our stakeholders on this topic and are planning to incorporate how we will be using smart technologies and the potential transition to active management of our networks.

Do you think we can do more? We welcome your views

Go to our stakeholder website at
<http://yourviews.ukpowernetworks.co.uk>

6 Outputs and expenditure: what we will spend to deliver to 2023

Consultation questions for this section

Conditions for electricity connections

- Q5. What do you think is important to customers when they request a new electricity connection, and what should we focus on improving? For example, the cost, the time to connect, the quality of our customer service?
- Q6. Do you think we should proactively provide more electrical infrastructure, before the capacity is required, so that electricity connections can be made more quickly or easily?
- Q7. Do you think we should invest more in the electricity network to make it quicker or easier for renewable or distributed generators to connect?
- Q8. Should any investment to make connections quicker and easier be subsidised by all customers in the region, or purely paid for by those wishing to make new connections?

Customer satisfaction and social obligations

- Q11. What do you think we should do to improve customer service and to measure the satisfaction of our customers?
- Q12. How can we make it easier for our customers to communicate with us, either in a power cut situation, for a new connection, or for a general enquiry?
- Q13. Do you think there are additional services we should be providing to vulnerable or fuel poor customers?

Environment

Q17. What are the current initiatives and issues that concern you surrounding our impact on the environment?

Q18. What should we be doing more of in the future? For example:

- Extending our programme of undergrounding overhead electricity lines beyond Areas of Outstanding Natural Beauty to other sensitive areas
- Installing equipment with lower lifetime carbon impact
- Increasing our programme to actively remove oil filled equipment
- Change our monitoring of SF6 (a greenhouse gas commonly used in electrical transformers)
- More challenging targets for our carbon footprint

Safety

Q14. Would you value more engagement or information around safety and electricity?

Q15. We believe we have improved signage and security around our excavations on the public highway. How should we improve the safety of employees and the general public?

Q16. What should we be doing more of in the future? For example:

- Greater prevention of metal theft and vandalism
- Additional safety education programmes

Expenditure

Q19. Do you think our proposed level of expenditure is appropriate to meet the output targets in our business plan? If not, please be specific as to your views on what should change

The forecast business plan is created to ensure the delivery of the commitments we are making and to ensure we meet our statutory obligations (placed upon us through legislation, regulations and our licence). The expenditure forecast reflects our expectations of the challenges and assumptions outlined in this document. This chapter describes our plan and represents our current best view of the future justified needs and corresponding efficient expenditure.

Overall our future plans are largely a continuation of today, with the addition of an increasing prominence of low carbon technologies on our network, smart metering, the enabling steps for the future smart grid, and further efficiency savings. We are expecting a recovery in required levels of reinforcement on our network as economic growth returns.

6.1 Outputs: our commitments to customers

We are committed to delivering an excellent service to our customers. We will be measured by Ofgem against the commitments we make as part of our 2013 forecast business plans.

Ofgem defines six categories for our outputs, as follows:

- Network availability and reliability
- Customer service
- Connections
- Safety
- Environmental performance
- Social obligations

This section describes our current thinking on output levels and how we are continuing to seek views to help us find the right balance of cost for the level of output performance. Our proposed outputs have been developed in consultation with our stakeholders. We learned some significant lessons from our engagements:

- Domestic customers were able to provide valuable insights, although they needed some time to more fully understand the role of distribution companies within the wider energy market
- When asked what was most important to them, each group arrived ultimately at the six output categories defined by Ofgem. Within those categories, the participants were able to apply their experience of other service organisations and so provide extremely valuable feedback on their expectations

The potential outputs that have been developed to date are described below.

Many of the outputs ultimately may be set on an industry wide basis. We have quantified the proposed outputs we will deliver where our work is suitably well progressed; in other areas such as the 'time-to-connect' we are continuing to work as an industry to set out how such an incentive will work.

Network availability and reliability

Network reliability has always been an area of strong focus and will continue to be so during the forecast business plan period. We are acutely aware of how reliability issues impact our customers, as highlighted in customer satisfaction surveys.

The proposed outputs for network availability and reliability are suggested to remain:

- Customer Interruptions (CI) (planned as well as unplanned): Number of customers whose supplies have been interrupted per 100 customers each year
- Customer Minutes Lost (CML): (planned as well as unplanned): duration of unplanned interruptions to supply each year, measured by average customer minutes lost per customer where an interruption of supply to the customer lasts three minutes or longer
- Health Index – maintaining the overall risk for our networks – with the addition of criticality
- Load Index – maintaining a similar level of utilisation across our networks – with improvements on the consistency of application across the industry

Our plan is built on the expectation of delivering the outputs described in this section. All of the projected performance is provisional and work continues to validate these in terms of the cost to deliver the output and our customers' willingness to pay for different levels of performance.

Figures 6.1 and 6.2 indicate Ofgem's proposed CI and CML targets for ED1, as at September 2012.

Figure 6.1: Targets proposed by Ofgem in September strategy paper for unplanned CI over the forecast business plan period (2015 to 2023)

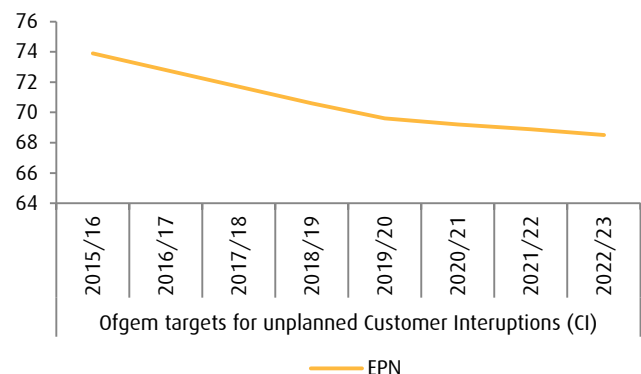
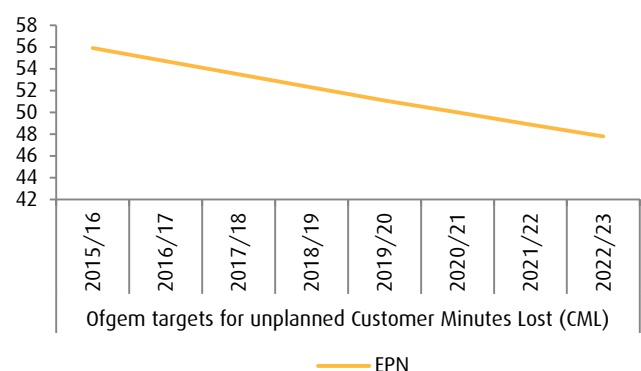


Figure 6.2: Targets proposed by Ofgem in September strategy paper for unplanned CML over the forecast business plan period (2015 to 2023)



We measure the condition of our network through assigning health indices (HIs) to all our assets, from 1 (brand new) to 5 (end of serviceable life). We target our expenditure to maintain the average health of the network, and in particular to avoid any increase in the number of HI 4 and 5 assets. We measure the loading of our network through load indices. Similarly these are scored from 1 to 5, and we invest to maintain the average load indices and in particular to avoid increases in the number of LI4 and 5 assets.

We are committed to delivering against our health index and load index targets. Figure 6.3 shows our commitment to improving the health of the assets for our Eastern network, and Figure 6.4 indicates our delivery of our load targets through DPCR5. We will have a better understanding of our utilisation forecasts at the end of the forecast business plan period (2023) when we provide our revised plan to Ofgem in July.

Figure 6.3: Commitment to EPN asset health at the end of the forecast business plan period (2023)

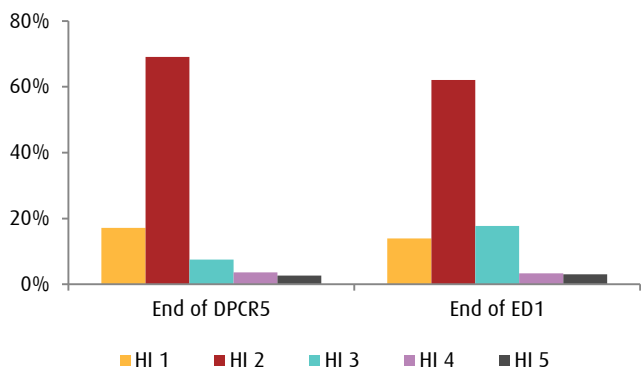


Figure 6.4: Delivery of DPCR5 load indices in EPN

Weighted LI average	DPCR5 start	2011/12	2014/15
DPCR5 forecast	2.26	2.20	2.13
Actual/revised forecast	2.05	1.82	1.94

Customer service

Our customer satisfaction performance over the forecast business plan period will be measured by the broad measure of customer satisfaction (BMoCS).

The BMoCS is intended to replicate the sorts of measures typically used by customer-facing businesses in competitive markets to monitor and improve the service they offer their customers. The measure comprises three different components:

- Customer satisfaction survey
- Complaints metric
- Stakeholder engagement

This is a compound measure that takes the results from customer surveys from customers who have contacted us, i.e. for a power cut, a connection or a general enquiry relating to our wires or substations or issue affecting their property. It also takes into

account our speed and effectiveness in responding to complaints and how we engage with our stakeholders.

Our vision for our company is to be in the upper third amongst our peers for customer satisfaction performance.

Connections

Our connections business is one of the largest in the UK. The areas in which we provide our services are amongst the most dynamic in the UK, with the highest load and population density of all networks and significant economic growth activity.

Listening to our stakeholders' views we support the introduction of a 'time-to-connect' measure. We welcome this introduction and we would be willing to enter into arrangements to incentivise us to deliver and provide a downside risk where we fail and it is our fault.

Our connections performance over the forecast business plan period will be measured against the following indicators (with the values to be determined through the Ofgem review process):

- Average time to produce a quote
- Average time taken from quotation acceptance to completion of works

The proposal is that performance will be assessed relative to a target based on current levels of performance, with the target ratcheted up over time to incentivise improving performance. Ofgem is suggesting that this incentive would be less strong than that proposed for the enhanced Broad Measure of Customer Satisfaction.

Safety

The safety of the public and our employees are our highest priority. Following on from stakeholder engagement we will continue to measure our own safety against the following measures:

- Accident Rate per 100 employees
- Injuries to members of the public

We are targeting to reach our target of zero injuries by the end of the forecast plan period. We also have a zero injury target for members of the public.

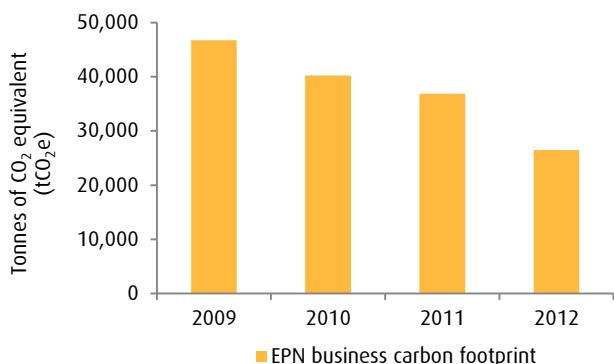
Environmental performance

As a DNO, we are committed to the low carbon transition. In addition to playing our role in facilitating a low carbon economy, we are also reducing our own CO₂ emissions. We have reduced our business footprint by 11 per cent and we are committed to reducing it further. Figure 6.5 shows our progress to date in reducing our carbon footprint.

Our environmental performance over the forecast business plan period will be measured against the following indicators:

- Innovation funding: percentage of allowance used – more than 80 per cent of allowance used over the forecast business plan period
- Business Carbon Footprint: Carbon emission related to business operations according to categories of building energy usage, operational and business transport, etc. – top third sector performance for our London network on average over the forecast business plan period

Figure 6.5: Current business carbon footprint reductions across our networks (tonnes of CO₂ equivalent)



Social obligations

The existing criteria on which our social obligations are measures are:

- Worst served customers – defined as those customers who experience on average at least five higher voltage interruptions per year, over a three year period, subject to a minimum of three in each year
- Provision of Priority Services Register and associated services to customers – a list of customers who are particularly vulnerable to the loss of the electricity supply and the precise nature of their needs

We will outline in our 2013 forecast business plans how we could improve the information held could be used to benefit customers. Specifically we will outline how we will build on our current partnerships to include other stakeholders (e.g. suppliers, other distributors and local authorities) to share and use information on customer vulnerability and fuel poor more strategically.

6.2 Our plans build on current improvements

Much of what we do today we will continue to do in the future. The majority of our expenditure continues to be related to maintaining the existing network and expanding it to serve new customers and growth in electricity usage. As such the expenditure in this 2012 forecast business plan is generally in line with what we have committed to and are forecasting for the current plan period.

This 2012 forecast business plan for 2015 to 2023 is a work in progress. The 2012 plan remains subject to uncertainty around some of the underlying assumptions. The level of uncertainty in some areas is greater in this business plan than in the past. This is predominantly due to the unknown rate at which the transition to the low carbon economy will occur. The emerging policy framework and rate of technology development both contribute to the uncertainty in the need for network capacity over the long-term. We believe that this uncertainty is higher than it was in the past.

We are still in the process of finalising our views on how our business will evolve over the next ten years and how we will evolve our business to deliver improvements in service and efficiency. We are also continuing to work with our stakeholders

to understand what they want from our networks. We are active in the cross-industry working groups that are seeking to provide a more consistent view of the smart grid investments that we should undertake to enable and facilitate the transition to the low carbon economy. The outcomes from this work will be incorporated into our 2013 forecast business plan.

This 2012 plan does include expenditure to enable us to extract the benefits for network companies identified by DECC from the roll out of smart meters (being undertaken by electricity suppliers). It also includes our initial thinking on strategic investments in our EPN network to facilitate the connection of new wind generation in areas with high quality wind resource.

6.3 Expenditure: plans for our Eastern network

This network covers the largest land area of our three networks from north London out to our most rural communities. It serves some of the most densely populated and expensive part of the country within the M25. This fact has a direct impact on how we must operate and the overall cost of our business. We face higher than average salary costs as a result of the increased cost of living in our region compared to other parts of the country. We also face additional operational challenges from the urban environment, associated with congestion under pavements and roads, and put our equipment underground to minimise how much land we use. This leads to higher costs to install and maintain our equipment. It also covers large rural areas that have high quality wind resource and we expect the trend of wind generation connections to support the UK's renewable energy targets to continue. We would expect this region to attract its fair share of wind turbines to support the renewables being deployed across the UK. We also expect this region to see noticeable numbers of heat pumps being deployed.

The charts show how the future business plan compares to our current plans.

Figure 6.6: Current period expenditure total = £2.8 billion

Current plan period 2010 to 2012 (DPCR5 – eight years equivalent) (£bn) Total £2.8bn

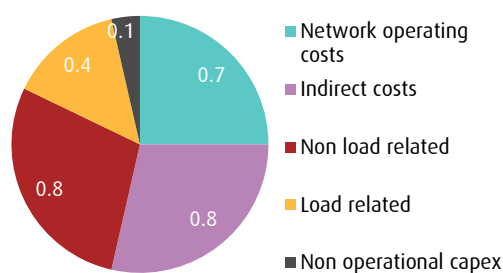
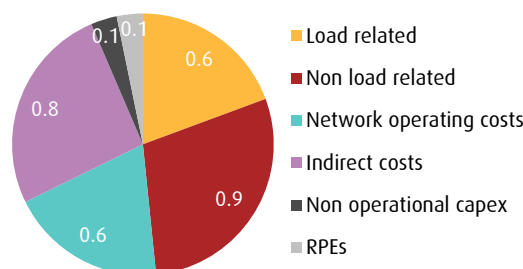


Figure 6.7: Forecast period expenditure total = £3.1 billion

Forecast plan period 2015 to 2023 (RIIO-ED1) (£bn) Total £3.1bn

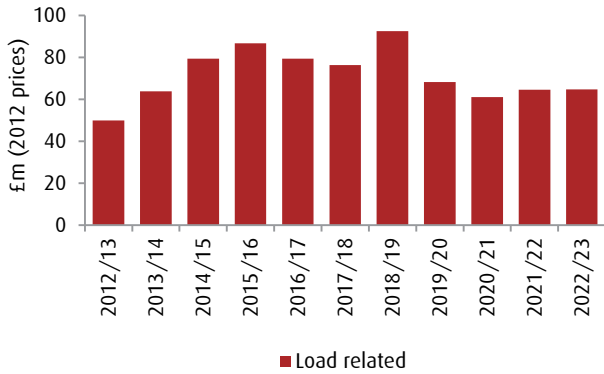


Direct capital expenditure

Direct capital expenditure primarily consists of the expenditure on expanding our network (load-related or reinforcement expenditure) and replacing and refurbishing our assets (non-load related). The underlying changes and drivers are explained in the following sub-sections.

Load related expenditure

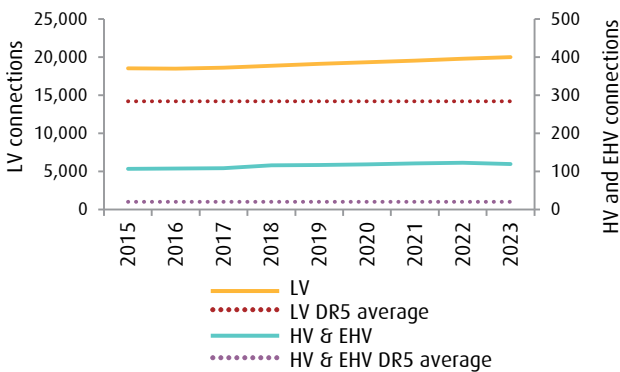
Figure 6.8: EPN load related capital expenditure



We are expecting our expenditure on expanding and extending the network to return to more normal (higher) levels over the future business plan period. This is based on our core scenario that shows a return to growth in electricity demand early in the forecast period.

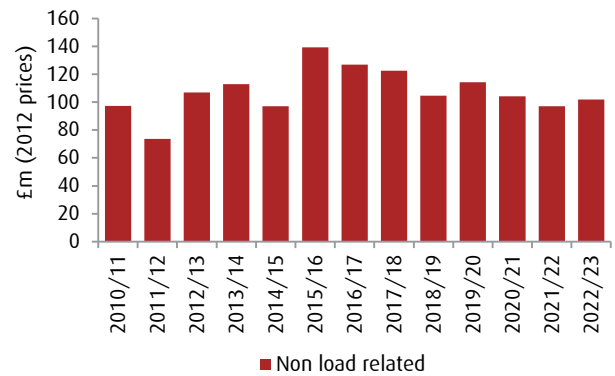
This growth in demand is also reflected in our expectations of connection volumes, which anticipate a significant increase in connections compared to the current plan period. Taken together these forecasts of increasing electricity growth and new connections lead to our overall view of the need for load-related expenditure.

Figure 6.9: Forecast connection activity



Asset replacement

Figure 6.10: Actual/forecast non-load related capital expenditure



Our expenditure on asset replacement is forecast to increase on average by approximately 30 per cent over the forecast plan period. The additional asset replacement volumes are being driven by ever improving understanding of the condition of our assets and how they are expected to deteriorate over time. The new modelling approach, Asset Risk and Prioritisation (ARP), is assisting how we decide on our interventions based on a more holistic view of risk and condition. The results show additional replacement volumes are required compared to the current plan period and we are currently reviewing and validating these outputs e.g. via additional condition sampling.

Expenditure on the asset types shown in Figure 6.11 represents a significant proportion of the increase in asset replacement expenditure compared to the current plan. We have included a brief commentary on the drivers that lead to these changes in volumes.

Our future expenditure plans show both rises and falls in expenditure. We have found reduced need for investment in the asset types shown in Figure 6.12 which represent a significant proportion of the reductions in spend, the remainder being spread across other asset types due to the normal variation in replacement profiles.

Figure 6.11

Asset group	Component	Commentary
Overhead Pole Line	LV Main (OHL) Conductor	We plan to return to our original strategy of conductor replacement following a short-term programme of rectification of defects during the current period
Cable	6.6/11kV UG Cable	We have revised the policy for this cable type. This includes collecting additional condition information to further improve our understanding of the future need for replacement. Our current replacement rates remain at a level that will see cables in service well beyond design life. Our long-term replacement strategy will be reviewed in light of the improving condition information
Switchgear	6.6/11kV CB (GM) Primary	We are experiencing increased unreliability of our oil filled switch gear that is driving increased forecasts of the need for replacement
Overhead Tower Line	132kV OHL (Tower Line) Conductor	We are anticipating a greater proportion of conductor replacement compared to the current mix that has more fittings only work

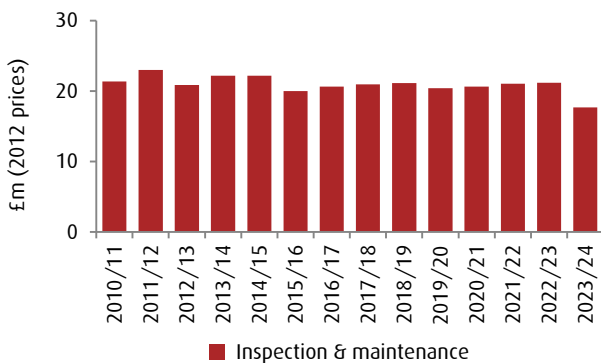
Figure 6.12

Asset group	Component	Commentary
Switchgear	33kV indoor, gas insulated, ground mounted circuit breakers	The population of assets in these classes are relatively small and reducing so we will spend significantly less on this asset category once our current programme of replacement ends in the current plan period
Switchgear	132kV indoor, gas insulated, ground mounted circuit breakers	

Direct operating expenditure

Inspection and maintenance costs

Figure 6.13 Actual/forecast inspection and maintenance costs



In the current plan period we believe we are currently spending at above the steady-state level that is required going forward. This is to carry out an identified backlog of work. This does result in us overspending against our current allowances, in this plan period, and we are exposed to 45 per cent of these costs. We believe that this is in the long-term best interests of the network and our customers.

Our forecast inspection and maintenance costs reduce from the current spend levels but have a number of movements both positive and negative. We are forecasting a significant growth in tower line painting based on our assessment of the optimum lifecycle policy for our tower lines. This is expected to preserve the asset life to defer replacement. Other upward drivers of cost are increasing inspection volume for rising and lateral mains and we continue to explore the scale of costs and the approaches to managing these assets. The second driver is the volumes of pole line inspections. These have increased following the results

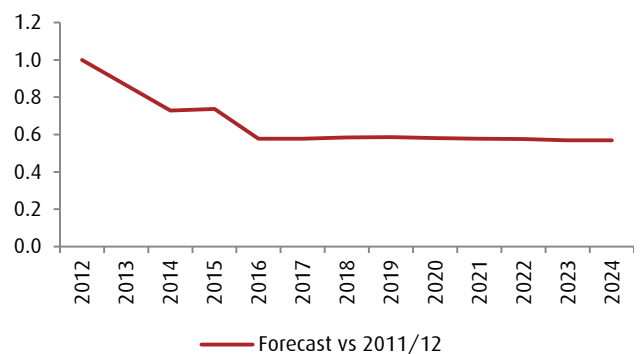
from recent surveys that have shown examples of poles in worse condition than expected and identified poles missing from our asset register.

The workload for protection schemes is reducing in the forecast period following a detailed survey of protection equipment and evaluation of the appropriate policy to apply to the actual population of assets.

The final area is an expected increase in the volumes for 33kV substation work, where we are also anticipating delivering significant efficiencies in how we deliver the work such that overall this results in lower costs for our customers.

In summary, the known upward volume effects are outweighed by volume reductions and compared to the current plan period our unit costs fall for these activities (see Figure 6.14).

Figure 6.14: EPN I&M; composite unit cost efficiency trend



Faults expenditure

Figure 6.15: Actual/Forecast fault costs

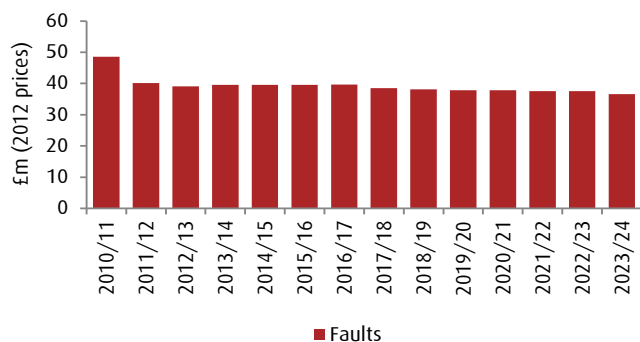
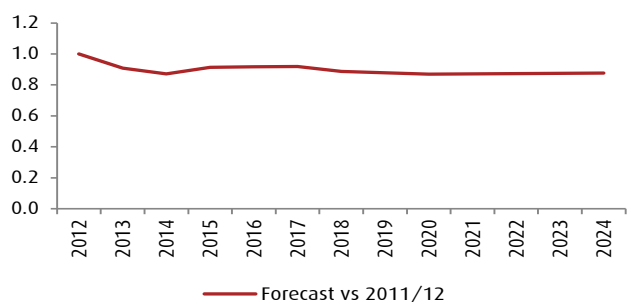


Figure 6.16: EPN faults; composite unit cost efficiency trend



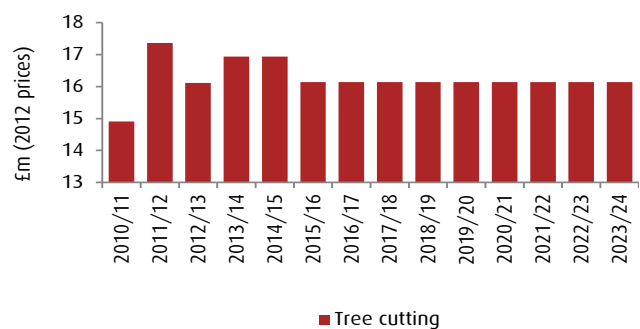
Our costs are based on our projections of fault rates by voltage and asset group multiplied by our forecast of efficient cost for fault repair for each.

Our projections of fault rates are generally forecast to be maintained at a constant level based on the delivery of our replacement and maintenance policies. We are forecasting rises in HV underground cable and LV underground mains (those that are not Concentric Neutral Solid Aluminium Conductor). This growth is expected due to deterioration in condition of these assets. We are increasing our understanding of the condition of our underground assets through increasing our use of post-fault analysis and investigation.

Overall the number of faults we are forecasting is expected to rise slightly by around 6 per cent over the forecast plan period. We expect our unit costs to fall, such that the total cost of repairing faults will remain broadly aligned to our current annual cost of repairing faults.

Tree cutting costs

Figure 6.17: Actual/forecast costs for tree cutting



Our costs are based on the line length affected by trees. Our total costs are forecast to be broadly constant through the forecast plan period which assumes that any increases in cost due to additional new lines affected by trees will be largely offset by efficiencies in delivering tree cutting.

Common and allocated costs

Overall indirect costs

During the current plan period we have made significant efficiency gains in the provision of business support activities and our closely associated indirects. For our 2013 forecast business plan we will incorporate additional benchmarking of our business support costs and factor in further achievable efficiency that is revealed. At this time we believe that maintaining our total business support costs constant over the forecast plan period is efficient. This implies productivity gains are found to compensate for growth in requirements, e.g. through new legislation, additional technology (e.g. providing platforms to support social media were not envisaged at the setting of DPCR5).

Our closely associated indirect costs are assumed to move with our direct costs. Our 2012 forecast business plan shows these are expected to be broadly constant on an average annual basis and approximately the same per annum as we are forecasting to the end of the 2015. We are assuming that we can deliver efficiency in our operations to offset any expected growth. We expect some changes to these costs as we develop our thinking on the future operating model and build in our thinking on the overall effect on efficiency and performance that our transformation plans will have on the customer facing functions (Customer Service, Connections and Network Operations). We expect these transformations to deliver higher levels of service at a more efficient cost.

Average annual spends for our total indirect costs across all three networks are therefore predicted to remain consistent with the current efficient level and to be maintained over the forecast business plan period. This shows a slight increase in our closely associated indirects costs (circa 1 per cent) that reflects the increase in direct work that we plan to complete and a focus on increasing our call centre capabilities. There is a small reduction (circa 3 per cent) in our business support costs that keeps the average total indirects costs flat over the forecast business plan period.

Non-operational capital expenditure

Our 2012 forecast business plan contains expenditure on transport and property that largely unchanged throughout the period. These are based on bottom-up analysis of requirements for properties and vehicles to enable the organisation to be effective in delivering on its commitments. Our approaches to running our property and transport were well regarded at the previous review by Ofgem's experts.

IT

Our expenditure on IT is much more dependent on the drivers on our business to adapt to the changing needs and expectations of our customers. Our 2012 forecast business plan includes a budget of circa £100m for IT transformation across our business over the period. As part of our benchmarking of other utility businesses we have identified that integration of key IT systems is a key enabler of future efficiency improvements and appears essential to support the transition to the low carbon economy. The business case for this expenditure is still at the

developmental stage. We will refine this for the 2013 business plan submission and we will amend our view of the appropriate and well justified expenditure.

Real price effects

We have taken a view for the forecast business plan period of the real price effects that should apply for internal and contract labour. This is based on the existing work undertaken for the Gas Distribution Networks and the work we carried out at the time of Ofgem’s previous review.

On materials it is based on our own internal forecasts of key commodities and reflects the mix of materials that we purchase. The latter is most effected by global movements and hence is subject to the balance of supply and demand. The economic downturn has generally suppressed demand amongst key commodities with examples of the supply side allowing stocks to run down leading to oversupply in some markets. We will review all of these assumptions for our 2013 forecast business plan submission.

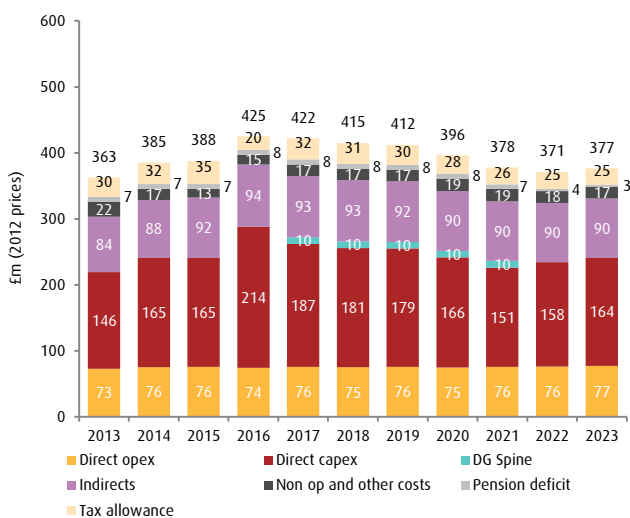
Figure 6.18

Real price effects	Current plan (DPCR5) Component	Forecast business plan (RIIO-ED1)
Direct capital expenditure	1.1%	1.0%
Direct operating expenditure and indirects	1.4%	1.3%
Efficiency	1.0%	0.9%

Total cost underpinning our plan

In summary the EPN plan remains largely a continuation of our spend profile today. There is a step up in our direct capital expenditure which is due to an increase in asset replacement expenditure required to maintain the long-term health of the network and the return to more normal levels of reinforcement as we see the economy recover early in the forecast period. In addition to these increases we expect our civil costs to rise from those seen in the current plan period. We believe that we will achieve greater efficiency and reductions around our expenditure on inspection and maintenance and continue to maintain our efficient level of indirect costs. A summary of our forecast expenditure is shown in Figure 6.19.

Figure 6.19: EPN expenditure profile (excluding pass through items)



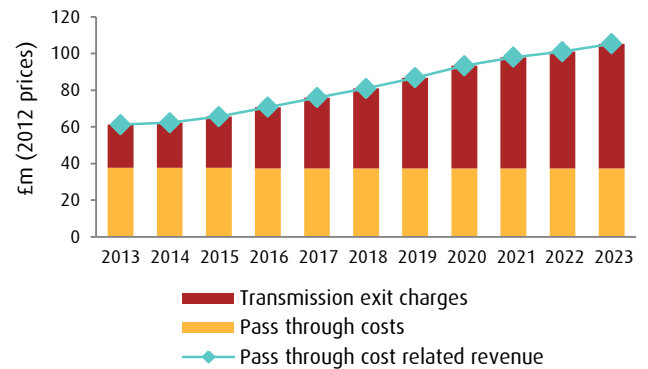
Pass through costs

All electricity distribution companies in Great Britain incur costs due to the way in which the industry is structured and over which they have no control. Three costs that we incur are described in Figure 6.20. Based on the transmission companies business plans, we anticipate that Transmission Exit Charges are expected to grow significantly (more than 60 per cent for EPN) over the forecast plan period. The chart shows the forecasts of these charges for EPN. Ofgem has proposed a lower amount of expenditure for National Grid and therefore the values shown here are likely to reduce. These will be refined in our next business plan.

Figure 6.20

Pass through item	Who charges them and why
Licence charges	Levied by Ofgem on all companies who are subject to their authority. The licence fee is allocated by them in order to recover the costs of their obligations in regulating the electricity industry
Business rates	Levied by HM Treasury based on the Valuation Office’s assessment of the rateable value of our assets
Transmission exit charges	Levied by National Grid based on the capacity of interconnections between their network and ours. These charges are expected to grow significantly over the period between 2015 and 2013 to reflect the increases in investment in the transmission network as agreed with Ofgem

Figure 6.21: EPN pass through costs



7 Financing: what this means for bills

Consultation questions for this section

Financing

Q20. What do you think about our assumptions regarding the financing of our activities and our proposed revenues and prices?

General

Q21. Is this consultation helpful? What could we have done better?

Q22. Do you have any general comments you would like to make about our forecast business plans for our electricity networks?

Q23. Please let us know if you have any other thoughts or comments on the points raised in this document, or if you would like to highlight any other issues you consider important

In this chapter we outline the impact on our customers' bills from our forecast business plan.

Customers who receive service and ultimately pay for the upkeep and development of our three distribution networks have been involved in defining this plan. As a result we have made changes that reflect their views on priorities and how the future may evolve.

We are requesting revenue to allow us to operate our business that reflects the risk we take, to ensure we are able to finance our activities.

Our charges to our customers are amongst the lowest in the industry and this forecast business plan shows a rise in our charges to our customers due to the strategic investments to help facilitate the connection of new wind generation.

7.1 Developing the revenue requirement

We are required to operate our business in a financially sound manner, maintaining an investment grade credit rating and avoiding financial distress. The revenue we require to fund our business covers the costs of operation, the cost of financing our investments, the associated tax and other liabilities such as the pensions for our employees.

Cost of capital

With the adoption of an indexation for the cost of debt in the RII0-ED1 framework, the cost of capital discussion is limited to a smaller number of factors. Our current view based on initial financial modelling is that most of the factors could remain unchanged from today. We believe that the transition to the low carbon economy introduces greater uncertainty and without additional mitigations will lead to a higher cost of equity. We are currently working on the basis of a cost of equity of 7 per cent and we will provide evidence to support that in our next business plan. This will include analysis of cash flow risk, investment uncertainties and market viewpoints to help identify the appropriate value.

For reference Figure 7.1 summarises the values that support our view on the appropriate cost of capital.

Figure 7.1

	Current plan (DPCR5)	Forecast business plan (RIIO-ED1)
Cost of equity	6.73%	7.00%
Notional gearing	65.0%	65.0%
Cost of debt	3.6%	Rolling 10 year average
Vanilla WACC	4.69%	4.24%-4.17% estimated
Totex split (fast/slow)	15/85 (business support + non-operational capital expenditure 100% fast)	30/70 on all expenditure categories
RAV depreciation	20 years	Single period transition to 45 years
Ofgem target dividend yield	5% on regulatory equity	5% on regulatory equity

Tax and pensions

We are assuming the DPCR5 approach and assumptions for the on-going treatment of pensions and tax.

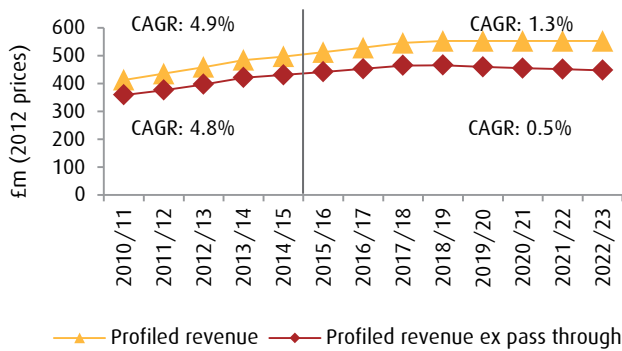
Revenue requested

In our revenue analysis we have shown our plans with and excluding those costs that we cannot control, e.g. transmission exit charges. We have included all of the expenditure we have forecast to spend over the period.

Figure 7.2 shows the year-by-year revenue we believe is efficient to allow us to finance our operations. In general, the revenue requirement is flat in real terms.

EPN revenues are forecast to average £544 million per annum, with a compound average growth rate of 1.3 per cent from 2015.

Figure 7.2: EPN revenue profile (real terms)



7.2 The impact on our customers

We have developed our forecast business plan with our customers and stakeholders. The overall impact on our customers is for bills in EPN to rise due to increases in investment until 2018 and then remain constant for the remainder of the forecast period to 2023.

We have estimated the impact on domestic and non-domestic customers. This has been done by extrapolating from today's charges in line with the increase in revenue that we have estimated we need to finance our businesses in the forecast plan period.

Underlying this is that revenue flattens for EPN from 2019. If we were to exclude the effects of pass through costs we would expect to see bills fall in real-terms.

This forecast business plan should see each of our networks remain amongst the lowest cost electricity distribution companies in Great Britain.

Figure 7.3: Projected change in average annual domestic bill (consumption = 3,330kWh) (excluding inflation)

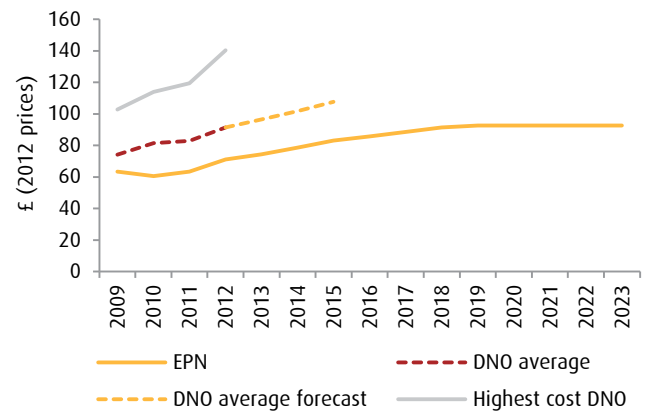
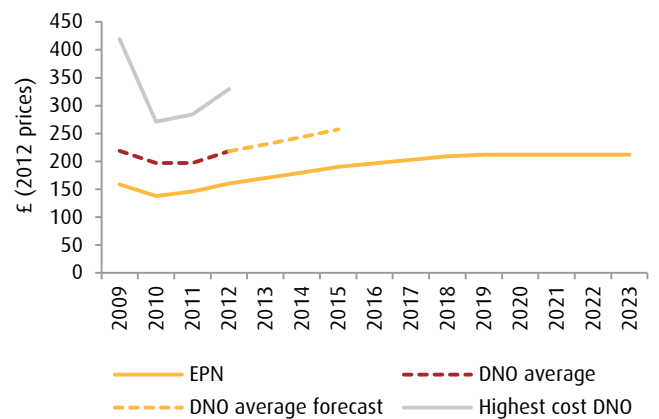


Figure 7.4: Projected change in average annual non-domestic bill (consumption = 9,900kWh) (excluding inflation)





A

Asset risk and prioritisation (ARP)

Models for establishing and forecasting the health of network assets. The ARP models use a combination of information relating to an asset's age, environment, duty and specific condition and performance information to derive a health score for each asset, underpinned by proximity to end of life and probability of failure

B

Business carbon footprint (BCF)

The BCF scheme was introduced as a reputational incentive in DPCR5 to encourage DNOs to consider the direct carbon impact of conducting their operations and to be proactive in the reduction of emissions

Broad measure of customer satisfaction (BMoCS)

A composite incentive consisting of a customer satisfaction survey, a complaints metric and stakeholder engagement. It was introduced for DPCR5 and is designed to drive improvements in the quality of the overall customer experience by capturing and measuring customers' experiences of contact with their DNO across the range of services and activities the DNOs provide

C

Capital expenditure (Capex)

Expenditure on investment in long-lived distribution assets, such as underground cables, overhead electricity lines and substations

Combined heat and power (CHP)

The simultaneous generation of usable heat and electricity in a single process, thereby discarding less wasted heat

Compound annual growth rate (CAGR)

Average annual growth rate over a defined period of time

Customer interruptions (CIs)

The number of customers whose supplies have been interrupted per 100 customers per year over all incidents, where an interruption of supply lasts for three minutes or longer, excluding re-interruptions to the supply of customers previously interrupted during the same incident.

Customer minutes lost (CMLs)

The duration of interruptions to supply per year – average customer minutes lost per customer per year, where an interruption of supply to customer(s) lasts for three minutes or longer

D

DCLG

Department for Communities and Local Government

DECC

Department of Energy and Climate Change

DEFRA

Department for Environment, Food and Rural Affairs (DEFRA)

Distributed generation (DG)

Distributed generation (also known as embedded or dispersed generation) refers to an electricity generating plant connected to the distribution network. There are many types and sizes of distributed generation facilities. These include Combined Heat and Power (CHP), wind farms, hydro-electric power or one of the new smaller generation technologies such as photo-voltaic cells

Distribution network operators (DNOs)

A DNO is a company which operates the electricity distribution network which includes all parts of the network from 132kV down to 230V in England and Wales. In Scotland 132kV is considered to be a part of transmission rather than distribution so their operation is not included in the DNOs' activities. There are 14 DNOs in the UK which are owned by six different groups

Distribution price control review 5 (DPCR5)

Distribution price control review 5. This price control runs from 1 April 2010 until 31 March 2015

Distribution system operator (DSO)

As DNOs actively manage the local levels of demand, whilst at the same time accommodating varying amounts of generation onto the network, they will start to behave like system operators (i.e. locally balancing demand and supply on their networks), known as the DSO

E

EA

Environment Agency

Eastern Power Networks (EPN)

One of the three distribution network licence areas owned and operated by UK Power Networks. The EPN network covers the East of England

Element Energy (EE)

Element Energy, a strategic energy consultancy, have provided economic analysis to inform the 2013 forecast business plan

Electric vehicle (EV)

Vehicles that utilise electric motor(s) or traction motor(s) and are powered by either an external power station, on-board electrical generators, or stored electricity

Electricity, safety, quality and continuity regulations 2002 (ESQCR)

The ESQCR specify safety standards, which are aimed at protecting the general public and customers from danger. In addition, the regulations specify power quality and supply continuity requirements to ensure an efficient and economic electricity supply service to customers

Extra high voltage (EHV)

Voltages over 20kV up to, but not including, 132kV

F

Fast money

Fast money is the revenue that is matched to the year of expenditure

Feed in tariff (FIT)

The price per unit of electricity that a utility or supplier has to pay for renewable electricity from private generators. These are used to encourage distributed renewable generation through private generators

Forecast business plan questionnaire (FBPQ)

Questionnaire through which data is submitted to Ofgem to help form Ofgem's initial views on the revenue requirements for price control reviews

G

Gigawatt (GW)

Measure of power equal to one billion watts

Guaranteed standards of performance (GSOPs)

Guaranteed Standards set service levels to be met in each individual case and are established by a Statutory Instrument. If the licence holder fails to provide the level of service required, it must make a payment to the customer affected subject to certain exemptions

H

Health index (HI)

Framework for collating information on the health (or condition) of distribution assets and for tracking changes in their condition over time. The HI will be used by Ofgem to inform an assessment of the efficacy of the DNOs' asset management decisions over the price control period. Health index arrangements were introduced as a part of DPCR5

High voltage (HV)

Voltages over 1kV up to, but not including, 22kV

Indirect cost efficiency (ICE)

The ICE programme was launched in 2011 in order to close the gap with the benchmark distribution companies in relation to indirect costs

Information technology (IT)

Technology systems used to manage information. In UK Power Networks this includes our management information systems, asset information systems and operational IT

Inspections and maintenance (I&M)

The activities of both:

- Inspections – the visual checking of the external condition of assets
- Maintenance – the invasive ('hands on') examination of plant and equipment

Innovation funding incentive (IFI)

The IFI is intended to encourage DNOs to invest in appropriate research and development activities that are designed to enhance the technical development of distribution networks (up to and including 132 kV) and to deliver value (ie financial, supply quality, environmental, safety) to end customers

Interruption incentive scheme (IIS)

The interruption incentive scheme is a symmetric annual rewards and penalties scheme based on each DNO's performance against their targets for the number of customers interrupted per 100 customers (CI) and the number of customer minutes lost (CML)

K

KiloWatt hour revenue driver (kWh)

A revenue allowance based on units distributed (kWh)

L

Load index (LI)

Framework for collating information on the utilisation of individual substations or groups of interconnected substations and for tracking changes in their utilisation over time. The LI will be used by Ofgem to inform an assessment of the efficacy of the DNOs' general reinforcement decisions over the price control period. The Load Index was introduced as a part of DPCR5

Load related expenditure (LRE)

The installation of new assets to accommodate changes in the level or pattern of electricity or gas supply and demand

London Power Networks (LPN)

One of the three distribution network licence areas owned and operated by UK Power Networks. The LPN network covers Greater London

Low Carbon Networks Fund (LCNF)

A mechanism introduced under the fifth distribution price control review to encourage the DNOs to use the forthcoming price control period to prepare for the role they will have to play as GB moves to a low carbon economy. The fund will see up to £500 million made available for DNOs and partners to innovate and trial new technologies, commercial arrangements and ways of operating their networks

Low voltage (LV)

This refers to voltages up to, but not including, 1kV

M

Megawatt (MW)

Measure of power equal to one million watts

Megawatt-hour (MWh)

A measure of energy production or consumption equal to one million watts produced or consumed for one hour

N

Non load related expenditure (NLRE)

The replacement or refurbishment of assets which are either at the end of their useful life due to their age or condition, or need to be replaced on safety or environmental grounds

O

Office of gas and electricity markets (Ofgem)

Responsible for regulating the gas and electricity markets in the UK to ensure consumers' needs are protected, including their interests in the reduction of greenhouse gases and in the security of the supply of gas and electricity. This involves promoting competition, wherever appropriate, and regulating the monopoly companies which run the gas and electricity networks

P

Photovoltaic (PV) connection assessment tool

Planning tool which assesses the impact of concentrations of small scale generation on our networks e.g. solar panels, enabling us to provide a better and faster service to our customers

R

Real price effects (RPE)

Increase in prices over and above increases in the Retail Price Index (RPI). For example, increases in the cost of copper, steel, direct or contract labour over and above increases in RPI

Regulatory asset value (RAV)

The value ascribed by Ofgem to the capital employed in the licensee's regulated distribution or (as the case may be) transmission business (the 'regulated asset base'). The RAV is calculated by summing an estimate of the initial market value of each licensee's regulated asset base at privatisation and all subsequent allowed additions to it at historical cost, and deducting annual depreciation amounts calculated in accordance with established regulatory methods. These vary between classes of licensee. A deduction is also made in certain cases to reflect the value realised from the disposal of assets comprised in the regulatory asset base. The RAV is indexed to RPI in order to allow for the effects of inflation on the licensee's capital stock. The revenues licensees are allowed to earn under their price controls include allowances for the regulatory depreciation and also for the return investors are estimated to require to provide the capital

RPI-X

The form of price control currently applied to network monopolies. Each company is given a revenue allowance in the first year of each control period. The price control then specifies that in each subsequent year the allowance will move by 'X' per cent in real terms

Revenue = incentives + innovation + outputs (RIIO)

Ofgem's new regulatory framework, stemming from the conclusions of the RPI-X@20 project, to be implemented in forthcoming price controls. It builds on the success of the previous RPI-X regime, but better meets the investment and innovation challenge by placing much more emphasis on incentives to drive the innovation needed to deliver a sustainable energy network at value for money to existing and future consumers

RIIO electricity distribution 1 (RIIO-ED1)

The first RIIO price control review to be applied to the electricity distribution network operators, following DPCR5. This price control will run from 1 April 2015 to 31 March 2023

Remote terminal unit (RTU)

Communications device that transmits readings and information about the status of the network back to the control centre

Renewable heat incentives (RHI)

Financial incentive scheme for renewable heat generation that will help the UK reduce carbon emissions and hit its European Union renewable energy targets

Ring main unit (RMU)

A HV switchgear arrangement for the connection and protection of distribution transformers

S

Slow money

Slow money is where costs are added to the RAV and revenues allow recovery of the costs over time together with the cost of financing this expenditure in the interim

South Eastern Power Networks (SPN)

One of the three distribution network licence areas owned and operated by UK Power Networks. The SPN network covers the South East of England

Site of Special Scientific Interest (SSSI)

Sites of Special Scientific Interest give legal protection to wildlife, geological and physiographical heritage under the Wildlife and Countryside Act 1981 There are over 4000 SSSIs in England, covering around 8 per cent of the country

Sulphur Hexafluoride (SF6)

One of the most potent greenhouse gases and is widely used in transmission and distribution equipment

System operator (SO)

National Grid Electricity Transmission is the electricity system operator, responsible for managing the operation of the electricity transmission system. They balance supply and demand ensuring the stability and security of the power system and the maintenance of satisfactory voltage and frequency

T

Tonnes of carbon dioxide equivalent (tCO₂e)

Unit of measurement that allows global warming potential of different greenhouse gases to be compared

Total operating and capital expenditure (totex)

Total of capital expenditure (capex) plus operational expenditure (opex)

W

Weighted average cost of capital (WACC)

This is the weighted average of the expected cost of equity and the expected cost of debt

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