



**electricity  
north west**

Bringing energy to your door

## Strategic direction statement

Planning for our future



From isolated farms,  
rural areas to heavy  
industry, urban  
populations and  
city centres



£1.4 billion

investment in our network from 2010 to 2015

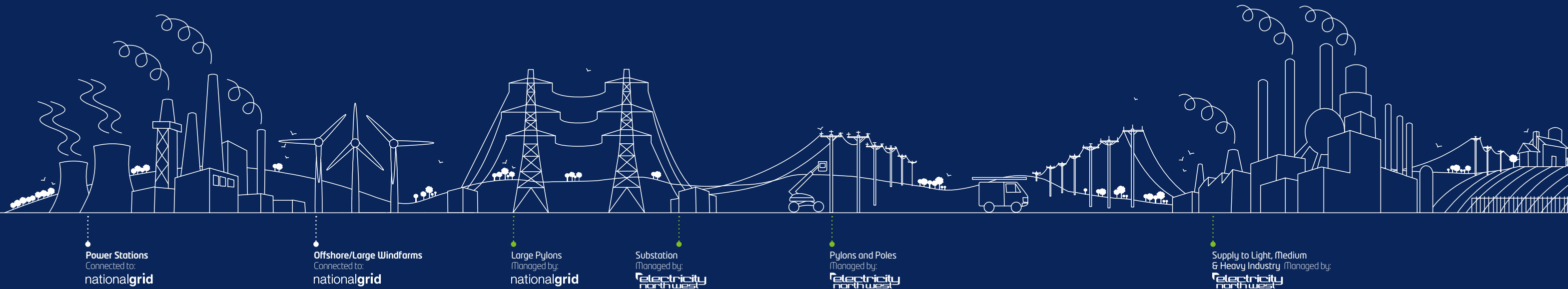
100 years  
of service  
to our  
customers

We have a stretching  
vision to become  
the leading energy  
delivery business

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# our network is as diverse as our customers



As a rough guide, about 55% of all customers live in Greater Manchester, 30% in Lancashire and 10% in Cumbria, with the remainder in parts of Cheshire, Derbyshire and North Yorkshire.

## Our distribution services area

Electricity North West plays a vital role in the North West region. We own, operate and maintain the electricity network: delivering energy to 5 million people and we have a strong track record in safety and reliability.



## Bringing energy to your door

**£20 million**  
workforce renewal investment  
programme by 2015

250 apprentices, graduates  
and trainees

Our entire network would cost approximately

**£9 Billion** to replace

we own around

**13,000 km** of overhead lines

we own almost

**44,000 km** of underground cables

we own around

**34,000** transformers

**89%**  
Overall Customer  
Satisfaction

We serve approximately  
5 million people at 2.4 million  
domestic & industrial locations



## Welcome

As an innovative and visionary player in the energy sector, it is our responsibility to constantly look to the future and put in place a strategy to meet the challenges we will face. Our strategic direction statement plays a key role in enabling us to engage with a wider audience to seek their views of the future. Since our last strategic direction was published in spring 2011, we have seen progress in the introduction of local generation, mainly encouraged by the Feed-In Tariff and we have seen increased activity in innovation particularly through low carbon initiatives. We have decided to update this document at this time to reflect this activity, but also to co-ordinate with our business planning cycle. In future we will update this publication each autumn.



“The aim of this document is to explore how our role in the energy industry will change over the next forty years and the developments we will need to make on our network.”

We will outline our role in the electricity supply industry, the services we provide, and the assets that we own. We will then explain how we manage our assets and the basis of the long-term investment plans for our network to the 2050s and so give an insight into the potential development of our services and network.

We would particularly like to highlight our plans for the introduction of the low carbon economy and the work we have done with stakeholders to establish future needs.

Our network has developed considerably since the first local authority networks were established in the late 19th century, and we believe that the next forty years will see the biggest changes since those local companies were combined to form the North Western Electricity Board in 1948.

These changes will be driven primarily by the needs of our customers and stakeholders as we move to a low-carbon economy, but many of our current drivers, such as looking after our current network, growth in demand and providing a reliable service to our customers, will continue to be of great importance to us.

As with all forecasts over an extended timeframe there is considerable uncertainty associated with our projections, but the aim of this document is to provide our view of changes in the energy landscape. Its intention is to be informative and focused around a central view rather than a discussion of all possible futures.

For further information on our shorter-term view we have published a Network Investment Plan document which gives more detail on our plans for the period from 2010 to 2015.

Our company purpose is "to be the leading energy delivery business" and we plan to efficiently invest to achieve this. This aspiration can only be achieved in partnership with our stakeholders and we would welcome any comment on our plans and also any suggestions as to how we can work together to develop a sustainable energy delivery future for the North West.

Steve Johnson  
Chief Executive Officer

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*We would appreciate any feedback tailored to the questions (like this paragraph) throughout the document, or indeed any feedback or input in relation to how our business needs to change to serve customers in the future. Please contact us using the details listed on the final page.*

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# The electricity supply industry

## Industry Structure

The electricity industry in Great Britain is divided into four main sectors:

- **The generators**, who own both the large power stations and smaller renewable generators. The generators produce electricity from a variety of fuel sources.
- **The transmission** companies, who own and operate the 400kV and 275kV transmission networks that link the major power stations and transport electricity in bulk across the country. National Grid Electricity Transmission is responsible for the transmission network in England and Wales.
- **The distribution companies**, who own and operate the lower voltage electricity networks, connecting the smaller power stations and the national grid to every electricity customer in Britain. Originally there were fourteen regional Distribution Network Operators (DNOs), but these have been joined by a number of smaller Independent Distribution Network Operators (IDNOs). The fourteen DNOs are currently owned by six different companies.
- **The electricity suppliers**, who buy the electricity produced by the generators, sell that electricity to their customers and pay the network operators for the transportation of that electricity across their networks.

The electricity market is regulated by the Gas and Electricity Markets Authority which governs and acts through the Office of Gas and Electricity Markets (Ofgem). Distribution operators are directly regulated by Ofgem and their charges for use of their networks are subject to a price control mechanism.

**Electricity North West is one of the fourteen regional DNOs and is a private limited company registered in England and Wales. We are owned by a consortium of funds controlled by the Commonwealth Bank of Australia and IIF International Holding GP Limited which is a constituent of JP Morgan Infrastructure Investments Fund.**

## About us

### Our assets and key facts

In simple terms our network is made up of overhead lines, underground cables and items of plant, such as switchgear and transformers, which are used to distribute electricity to customers' premises.

The bulk of electricity enters our network from the National Grid at Grid Supply Points. It then travels through our 132kV network to a substation where the voltage is transformed to enter our 33kV network. Similar transformations take place from 33kV to HV (high voltage) and from HV to LV (low voltage).

Through this network we deliver over 25 terawatt hours<sup>1</sup> of electricity each year to more than 2.4 million customer premises across an area of 12 500 square kilometres.

Our network covers a diverse range of terrain and customer mix from isolated farms in rural areas, to areas of heavy industry, urban populations and city centres.

The network performs such that on average a customer will experience a power cut once every two years and on average is without electricity for less than one hour every year.

This represents a reliability of over 99.99%.

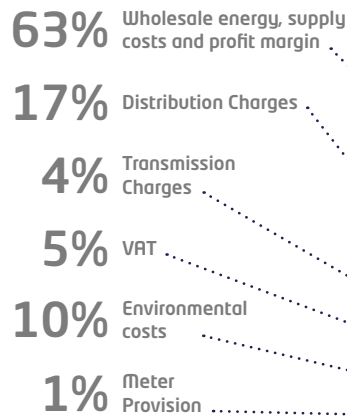
Our network comprises the following key assets:

- around 13 000 km of overhead lines;
- almost 44 000 km of underground cables;
- almost 84 000 items of switchgear; and
- more than 34 000 transformers.

## Breakdown of typical domestic electricity bill

Figures taken from Ofgem Factsheet 97 - published 18 January 2011.

Based on average annual consumption figures of 3,300 kWh averaged across all big six suppliers and across Great Britain.



## Where our income comes from and what we use it for

Other than charges for new connections to our network, we have no direct financial relationship with customers connected to our network. We charge electricity suppliers for the use of our network and the suppliers pass these costs on to their customers.

## Typically distribution charges account for around 17% of the final electricity bill for domestic consumers.

The amount of income that we receive from suppliers is governed by a price control which since 1990 has been reviewed every five years. From 2015 the review period will be extended to eight years. At the price review, we submit our business plan for the period to our regulator, Ofgem. Ofgem analyses our submission and compares it to those of the 13 other DNOs, together with data from other comparable industries. Based on this analysis they then decide how much revenue we are allowed to recover from customers in each year of the price review period under discussion.

Using these revenues we raise the finance to operate and maintain the network, to replace existing assets and to build new ones. This is undertaken whilst at all times focusing on the three industry-wide challenges of securing a low-carbon economy, security of energy supply and efficient delivery for our customers

Our income in each year is largely fixed but we can earn extra revenue by outperforming targets in incentive schemes, however if we fail to meet our targets our revenue may be reduced.

We are incentivised to reduce the number of interruptions that our customers suffer and to reduce the average length of interruptions. We are also incentivised to reduce the amount of electrical losses from our network.

We also have a responsibility to look after our network in the long term. Since 2010, we have reported on the condition of our network (using Health Indices - HI) and the network loading (using Load Indices - LI). Through the monitoring of these indices we will ensure that the overall condition of our network is being maintained in such a state that we can continue to provide a high quality service to our customers.

In order to ensure that we have a network with the appropriate technology for the 21st century we are also spending significant sums on research and development. We are allowed to recover some of our additional spending on research and development, either through the Innovation Funding Incentive (IFI) or the Low Carbon Network Fund (LCNF).

## The changing face of economic regulation

Since privatisation in 1990, distribution companies such as ours have been subject to an 'RPI-X' form of regulation, which is designed to encourage efficiency. The amount of revenue that companies are allowed to collect from customers is increased by RPI less an efficiency factor 'X' each year, encouraging them to reduce costs, although in recent years the emphasis has changed and DNOs have been allowed to increase their prices to reflect the need for greater investment in the network.

From April 2015 the regulatory framework will change so that DNOs are incentivised to invest in greater innovation and to deliver specific outputs which will form a contract with the regulator for a period lasting eight years rather than five.

This model, known as RIIO (setting Revenue using Incentives to deliver Innovation and Outputs) is designed to put a much greater emphasis on companies playing a full role in developing a more sustainable energy sector and delivering value for money network services for customers today and in the future.

<sup>1</sup> A terawatt hour is equal to a thousand million kilowatt hours

# Our vision of the electricity supply industry in the 2050s

## Recognisable, but changing

We expect that in forty years' time the physical structure of electricity networks will be largely recognisable as the structure that is in existence today, but there will be a number of significant changes as we move towards a more sustainable network.

## Driven by what customers want

By the 2050s customers will have an increased reliance on electricity due to the UK's drive to de-carbonise heating, transport and electricity generation. Electricity will be generated on a large scale predominantly from nuclear and large wind farms, but there will also be significant low-carbon generation owned by customers, or sited close to them.

Customer expectations will have changed to reflect the improved standards they have experienced, and the technology available. Because of the move to de-carbonised heat and transport they will be more dependent on electricity, but we expect that they could have a greater tolerance of short duration outages because of the capabilities of smart appliances and local storage. Conversely, given this tolerance is based on storage, they could have lower tolerance of longer outages.

In order to match the supply of electricity to demand, customers will use smart appliances which respond to price and market signals to run at the optimum time for the customer and the network as a whole. Customers will generally use considerably more electricity for heating and transport, but smart technology will spread the load to meet the available generation.

## Implications for energy networks

In order to meet customer expectations, future customer demand and generation will need to be forecast by both distribution and transmission operators. These forecasts will be integrated, in that they will be interactive between transmission and distribution companies.

Large generators will continue to be scheduled by the transmission system operator, National Grid, but customer behaviour, for both generation and demand will be influenced by signals from transmission, from the energy market, and from distributors. Real-time information will flow up and down the system allowing all parties to modify their signals and behaviours.

We are not forecasting any particular changes for the role that suppliers will play, with them continuing to be the key commercial contact for domestic customers. However the smart nature of future electricity networks will mean much greater interaction between customers, suppliers and DNOs at a local level.







### The new distribution company

Distribution companies will have to change to cope with the significant data management issues, both in relation to customer behaviour and in relation to the accuracy of asset data for system operation when dynamically managing power flows in real time.

The network will need to become more responsive to customer needs, so more automation will be required, particularly for the remote control of network equipment and the remote scheduling of customers' generation and storage.

There will also be a requirement for new commercial relationships with National Grid, small generators, network operators, suppliers and with customers or their agents.

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Do you support  
our vision?

*If not, what do you believe will be different?*

*We would welcome any views or information that helps us refine our vision.*

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## Drivers for change on our network

There are many factors which will influence the development of our network into the 2050s. Currently there is uncertainty about the extent to which each of these factors will materialise. The extent to which the factors become reality and the interplay between them will define how our future network will look.

We have identified the key components driving our network development as being:

- Moves to a low carbon economy.
- Changing customer expectations and needs.
- Stewardship of the existing network.
- Regional development and growth.
- Introduction of local renewable generation
- Introduction of electric vehicles.
- Introduction of heat pumps.
- Adapting to the impacts of climate change.
- New technology.

Many of these themes will be interlinked so our approach, policies and procedures will be modified to incorporate the new factors into our standard ways of working. In developing our future forecasts we have taken note of the Long-term Electricity Network Scenarios (LENS)<sup>2</sup> project, which set out five plausible electricity network scenarios for Great Britain in 2050.

The variations in the scenario for distribution companies largely relate to the size of the impact of the following factors:

- Level of consumer activity - both in generation and demand response;
- New players and new roles in distribution networks - such as energy service companies, microgrid system operators, and active consumers;
- More dynamic and even bidirectional power flows as a result of new activities in distribution networks.

We have also noted the '2050 Pathway Analysis' and 'Annual Energy Statement' documents published by DECC in July 2010 and updated in 2011. The pathway analysis presents a number of different scenarios as pathways and provides a framework through which to consider some of the choices and trade-offs which we will have to make over the next forty years.



We have used the LENS and Pathways themes to help shape our thinking of the major external factors, but we have developed our own view of the world. In each case, we have tried to assess:

- Likely external changes, either to the sector, or to wider customer and societal behaviour;
- Our proactive strategies to shape the future; and
- The effect on the above two on the shape and operation of the network, together with indicative investment requirements.

These differing themes will be explored in the following pages.

Our network will continue to change

**£30 million**

investment in research and development

Have we identified the right sources of information to inform our view of the future?

*Are there any specific issues that you believe we have overlooked?*

*Do you believe that there might be any development in the use or production of energy, particularly electrical energy, that we should take specific account of in our planning?*

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<sup>2</sup> Electricity network scenarios for Great Britain in 2050 Final Report for Ofgem's LENS Project (Ref. No. 157a/08) November 2008





## Moving to a low carbon economy

One of the major differences between the network that will be in place in the 2050s and the network of today is that we will have to adapt our network to respond to the needs of the low carbon economy.

### Low carbon economy and smart grids

In order to meet government targets to “reduce greenhouse gas emissions by 34% by 2020 and by at least 80% by 2050, compared to 1990 levels”<sup>3</sup> there is an expectation that emissions cuts within the UK energy system will have to be greater than 80%. In the electricity sector reductions will be achieved through:

- The introduction of low-carbon generation, much of it locally produced;
- Measures to reduce the overall amount of energy used;
- More intelligent use of the electricity that is used; and
- Decarbonisation of heat and transport.

Much of the low-carbon generation will be small-scale technologies such as wind turbines or photovoltaic cells, which will connect directly to our network rather than the transmission network.

Our network has been historically designed on the basis that the electricity flows in one direction, ‘down’ through the voltage levels, so the way that the network is designed and managed will need to be changed to facilitate the introduction of significant quantities of local generation.

Decarbonisation of heat and transport has the potential to create significant increases in total energy distributed and in the peak demand

for electricity, the timing of which will not necessarily coincide with when local generation produces electricity - for example photovoltaic generation does not generate after dark.

Consequently we will need to change from a passive ‘one-way’ network, to an ‘active’ network where we actively manage the flows of power. The term for the group of technologies which will enable us to match supply with demand in the optimal manner is a ‘smart grid’.

<sup>3</sup> HM Treasury - Energy Market Assessment - March 2010



The introduction of smart meters will be one of the tools in the delivery of smart grids. We are currently working with government and industry partners to ensure that the smart metering programme meets our future needs. There are a wide range of scenarios for the capability and complexity of smart grids. Some issues could include:

- Management of smart domestic appliances to ensure that they are run at times of low demand on the network, whilst still fulfilling their function in a timely manner with zero inconvenience for customers;
- As the embedded generation market grows significantly then the distribution companies will have to take on the role of system operators, instructing generators when to run, and customers to reduce (or even increase) demand, in order to balance supply and demand. Currently this is only done at the transmission level;
- As well as matching supply with demand, the implementation of demand-side management, where customers agree to reduce load at times of high demand, will also avoid the need to reinforce our network.

The development of smart grids will be driven by our customers' changing needs and we will work with customers and other stakeholders to identify those needs. We will then work with our partners and suppliers on research projects such as those supported through the Low Carbon Network Fund (LCNF) to ensure that we can provide the most effective solutions to customers' needs.

The Low Carbon Network Fund was introduced in 2010 to promote radical changes in electricity networks. The fund will allow up to £500m to be spent nationally over a five year period to try out new technology, operating and commercial arrangements, with the objective of helping all DNOs to understand what they need to do to provide security of supply at value for money as Great Britain moves to a low-carbon economy.

We believe that the low-carbon agenda will drive significant change to our business in the near future.

***We need advice and help from all our stakeholders in finding the right way forward. We expect that future strategy will be informed by significant interaction between us and our stakeholders, and we welcome any views you have now, particularly on how we should engage on these matters in the future.***

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## Capacity to Customers - C<sub>2</sub>C

With electricity consumption forecast to double by 2050 new and innovative ways of meeting increased demand will be required. Traditionally the response to an increase in demand would be to put "more copper in the ground" - installing new assets to cope with the increase.

We estimate that the cost of replacing our current network completely would be over £9 billion. To double our network capacity using traditional methods could cost a similar amount.

Along with other network companies Electricity North West are investigating ways of providing secure new capacity at more affordable prices. One method that we are looking at is through our "Capacity to Customers" project, known as C<sub>2</sub>C.

Electricity distribution networks in this country are built to meet a planning standard known as Engineering Recommendation P2/6. At higher voltages the network is designed to have sufficient spare capacity that if a circuit fails the flow of electricity can immediately be transferred to a parallel circuit with the result that the customers do not see an interruption in supply.

One of the consequences of building to this standard is that on most higher voltage circuits less than half the capacity is being used at any one time. The C<sub>2</sub>C project is designed to demonstrate a low risk transferable solution which releases this spare capacity through adaptive network reconfiguration techniques and real time management of demand and

generation, whilst maintaining security of supply. Together with new innovative customer commercial arrangements this method will be part of a move from passive to active network management for network operators.

The proposed method will reduce the need for traditional reinforcement, significantly cutting the cost and time required to provide new connections whilst also enhancing quality of supply for customers.

An initial trial has been planned for several hundred representative HV and EHV circuits across our network, serving approximately 310 000 customers, which is close to 13% of our customer base.

**The project will involve major energy users in our region signing up to a trial which will offer incentives to switch their consumption patterns and prioritise their energy usage. If successful, it could lead to reduced costs for new connections and lower charges for participating businesses. We have secured funding for this trial through the Low Carbon Network Fund (LCNF).**

## New technology and innovation

A key enabler of our movement to a low carbon economy will be the introduction of new technology. Over the last forty years a wide range of new technology has been developed, ranging from consumer appliances to items of network infrastructure. We expect the introduction of new technology to accelerate over the next forty years, and this creates uncertainty in our long-term plans.

For example, new consumer products may be popularised in the same way that mobile phones, mp3 players and large screen televisions have become commonplace over the past few decades. The introduction of similar types of appliances would serve to drive up demand. Conversely new technologies may be introduced which will make appliances (particularly 'white goods') and our distribution networks more efficient, which will drive down demand.

We expect that our network infrastructure will appear largely the same as it is today, but the introduction of new technologies will help us to

manage it in a more effective manner through greater use of real-time data and a greater ability to operate the network remotely, although the extent of these potential benefits are largely speculation at this stage.

Electricity North West has been active in investing in research and development, spending over £6m in the last five years to support 60 innovative projects. We are planning to expand our research activities particularly in relation to smart grids and the challenges of future networks.


Through continuing investment in innovation Electricity North West will work with our partners in industry and academia to continue to seek new solutions to network challenges.

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***Do you believe that our approach to innovation and change is sufficient? Are there other avenues we should be researching in relation to change and innovation?***

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**We are currently working on a number of innovative projects, two examples of which are closely related and will contribute to the move to the low carbon economy.**

In Stockport 2000 homes are being retrofitted with photovoltaic cells to provide electricity to those homes. We are installing smart fuse restorers in this area and using their monitoring capability to understand the impact of the photovoltaic cells on our network. The results of this study will inform our future network design parameters.

We are working with Durham University to investigate large scale energy storage on our network. Some sources of low carbon energy such as solar power are restricted in the times that they can generate and there may not be demand on our network to use that energy. If an effective storage solution can be implemented we will be able to use that energy to support our network.

Trials of this technology will also look at the commercial arrangements which would need to be in place to complement the engineering solution.

# Stakeholder Engagement

## Purpose

Electricity North West is committed to a programme of regular stakeholder engagement to ensure that future investment:

- meets the requirements of the region and its stakeholders;
- contributes to a low-carbon environment; and
- is sufficiently robust to minimise loss of service due to exceptional events.

We hold regular meetings with stakeholders such as the planning authorities and regional government agencies, and we have run workshops to explain our investment plans and new charging structures to interested parties. We also meet with local authorities and parish council representatives and have taken a leading role over the past few years in national forums in discussing environmental issues.

Electricity distribution has been described as a “low interest, high impact” service. Generally speaking customers have little interest in how the electricity supply gets to their door, unless that supply is interrupted when they become very interested.

Consequently most customers will only contact us when they have a fault, so we have little contact with the majority of customers.

All investment on our network is designed to ensure that our customers continue to receive the levels of service that they expect from us, so we are working to identify what the needs of those customers are. We will then develop our network to offer the services that they require.

As well as developing smart grids we are looking at smarter ways of finding out what our customers want. Two examples from spring 2011 are our Engaged Consumer Panel and the launch of our initial Strategic Direction Statement.

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*We plan to continue to develop our interaction with our stakeholders and would welcome individuals and organisations getting in touch to discuss ways in which we may be able to work together in developing a sustainable energy future for the North West.*

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## Engaging with our customers

### Engaged Consumer Panel

Because of the relatively low level of contact from customers and the low brand awareness it was decided that a random survey of customers would not provide useful results. Instead we decided to use an Engaged Consumer Panel. This is a group of randomly selected customers who had contacted us, who were then screened to identify those who had knowledge of our company and industry. It was felt that they would give a more useful, informed, response to the survey. A summary of their views and our response is given below.

### Guaranteed Standards Payments

Many viewed Electricity North West's only task as 'keeping the lights on' and would become 'anxious' or 'inconvenienced' quite quickly during an interruption.

Currently customers receive compensation under the guaranteed standards scheme if they are off supply for 18 hours or more. The majority of customers believed that compensation should be paid at an earlier stage, with the average being 9.5 hours, but were willing to accept a lower level of compensation - an average of £31.30 compared to the current £54 received by domestic customers.

**The value of Guaranteed Standards payments is agreed nationally between the DNOs and Ofgem. We are reviewing the feedback from our customers to establish whether it is viable to make alternative arrangements for our customers where we would pay a reduced amount at an earlier time.**

### Contacting us during interruptions

When customers contact us during an outage they think it is very important that they are told when power will be restored, that their call is answered quickly, that the person they speak to is able to explain why there is an interruption, particularly whether it is in the customers own home and that the call centre is based in the UK.

Pre-recorded information about known faults is considered a useful complement to human operators. The majority of respondents would like to hear recorded information about their fault with the option to talk to an operator if necessary.

Customers were also interested in the possibility of reporting faults by text message or e-mail.

**Our call centre, based in Manchester, provides pre-recorded information targeted at the specific area that the customer is calling from. If there are no existing faults in that area or the customer requires more information they can talk to an operator. To complement our call centre**



The panel chose 'safety', 'reliability' and 'speedy response to faults' as the three most important values for Electricity North West.

We agree with the panel and we will always aim to provide a safe, reliable network with a minimum of interruptions

**we have also developed the provision of outage data on our website so that customers have greater access to fault information, including the introduction of a "measle map" showing the location of interruptions. We are also investigating alternative methods of fault reporting.**





## Interruptible Tariffs

There was very little interest in the prospect of a tariff with a lower bill but a higher chance of a power cut, with most respondents stating that they would require a discount of more than 25% to accept such economic interruptions.

There was a little more interest in tariffs where Electricity North West had greater control of scheduling customers' appliances, but nearly a third weren't interested at all.

Many respondents reacted very strongly to the idea of any company telling them when their appliances could be used.

**If we are to maximise the benefits of the smart grid in the future we will need to identify innovative tariff structures that appeal to customers and optimise the use of our network. Projects such as C<sub>2</sub>C are designed to help us understand the appropriate commercial arrangements for a smarter grid.**

## Investment

Whilst reducing the number and duration of power cuts was seen as the most important investment priority there was not a great appetite to increase bills to fund additional investment. Nearly half were not prepared to pay any extra with the average for all respondents being £4.70.

The top priority for investment was the replacement of older assets before they fail, with strong support for investment where customers experience an above average fault rate.

In order to withstand extreme events the two investment areas identified were the rebuilding of overhead lines to a stronger specification and the improvement of flood defences.

The main area for environmental investment is the replacement of older oil-insulated cables, followed by low loss equipment.

**We will continue to invest to improve the reliability and resilience of our network, whilst reducing our environmental impact.**

## Community Involvement

When asked how Electricity North West should be involved in the local community most responded that securing substations from vandals and trespassers was the most important issue. Some questioned whether Electricity North West should be involved in the local community stating that they should focus on the primary role of 'keeping the lights on'.

**With the increase in metal theft substation security has become a priority for Electricity North West. We are currently spending around £1m each year on substation security and we expect to increase this amount in the coming years.**

## Vulnerable customers

There was strong support for prioritising the supply of electricity to those with a medical need and the elderly, with some support to include families with new born babies.

**We maintain a priority services register of domestic customers with additional needs such as pensioners, disabled and those who are chronically sick or have a medical dependency on electricity.**

**Where electricity is required to power life dependent equipment such as ventilators, oxygen concentrators or dialysis machines, customers will be informed in advance of any planned interruptions and will be contacted proactively when we have an unplanned interruption.**

**Where customers are not dependent on electrical equipment but would still benefit from assistance during supply interruptions we have partnerships with a number of external organisations who can help with welfare service provision. This could include a hot meal or drink or just a friendly voice on the phone.**





### Ongoing stakeholder engagement

When the first release of this document was published in spring 2011 a launch event was held at the Museum of Science and Industry in Manchester. This gave an opportunity for stakeholders from local government, industry and other interest groups to comment on our long term plans and to give feedback on their own priorities.

As expected a number of the issues that these stakeholders raised were the same as those of the engaged customer panel. Additionally they suggested that:

- Getting practical help to those who need it is more important than compensation for when things go wrong;
- DNOs should work to facilitate and promote the introduction of micro-generation;
- Local authorities could be a good partner for future work as like us they have an enduring relationship with the end customer.

We intend to continue this process of stakeholder consultation to ensure that our strategies will deliver the services that customers require. This will include consultation with end customers and other stakeholders within the region, seeking to determine customer priorities and willingness to pay for future enhancements.

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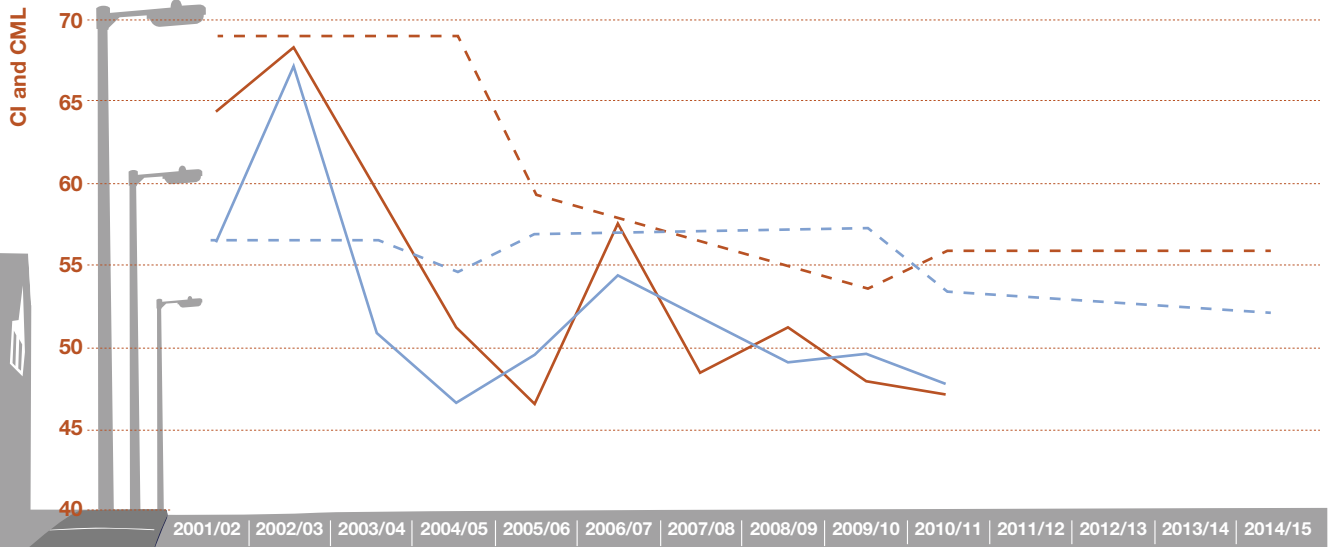
North West

***Are there any other issues that are important to customers and other stakeholders? How do you think they should be prioritised?***  
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# Customer service

## Quality of Service Performance

--- CI Target    — CI Actual    --- CML Target    — CML Actual



## Quality of service

As our stakeholder engagement demonstrates, the priority for all customers is to 'keep the lights on' and this will remain a major focus over the next forty years. The main measures of our success in this area are the number of interruptions over three minutes and the length of those interruptions.

Our performance in maintaining customer supplies is presented and measured in units known as Customer Interruptions (CI) and Customer Minutes Lost (CML). The interruptions measure, CI, is the total number of individual interruptions that an average group of 100 customers suffers in a year. The restoration measure, CML, represents the average number of minutes that a customer will be off supply in a year.

If we meet these targets then the average customer would expect to have a power cut once every 2 years and on average to be off supply for less than an hour each year.

If we fail to meet the targets of performance agreed with Ofgem, the revenue that we are allowed to collect from customers will be reduced but if we outperform these targets we can collect additional revenue. The targets and incentive rates are reviewed at each price review.

These measures have been in place for nearly 10 years now and we continue to seek ways of further improving our level of service. This mainly centres on reducing the effects of faults by the use of new

remote control and automation technology; however improvements become increasingly harder as the overall performance improves.

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*We believe that the incentive scheme works well and supports our aim to provide good customer service, with continual improvement. However it is important that we regularly validate our view, and we welcome any comments on our performance and on the incentive scheme.*

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In the financial year 2011/12 the impact of this incentive is that every time a customer is interrupted for more than three minutes due to a fault it costs us about £5 in reduced income, and for every minute that each of those customers is off supply it costs us an additional 25p. This money is not paid directly to affected customers, but is reflected in reduced charges to all customers through their suppliers.

## Customer service cont.

### Worst served customers

On average our customers will be off supply less than once every two years and for less than an hour each year. However the majority of our customers will receive a much better level of service than this, and conversely some customers will see a much poorer level of service.

Quality of Service incentives have been very effective in encouraging companies to improve the average performance of the network, but one anomaly of this approach is that the network which supplies the worst served customers is usually deemed to be uneconomic to improve.

Worst served customers are defined as those who experience 15 or more interruptions caused by our higher voltage network over a three-year period and a minimum of three of those interruptions in each year.

In the next five years Electricity North West is seeking ways to make a 25 percent improvement in performance for these customers and we are currently evaluating the most effective ways to achieve it.

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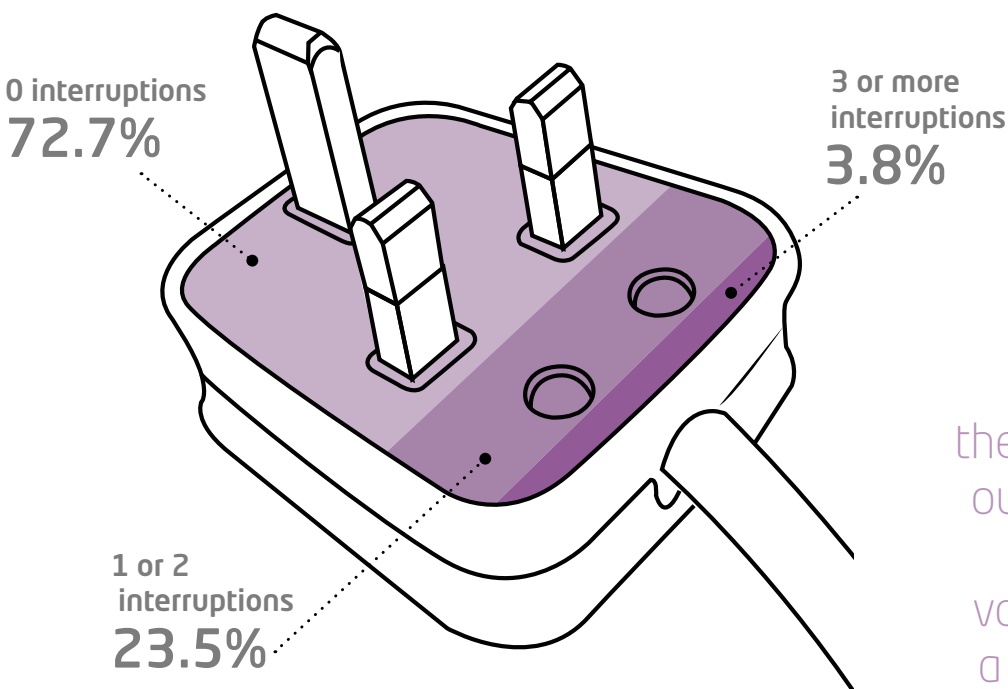
North West

We would be interested to hear of any views you may have on how our customer service can be measured, and what aspects of service you particularly value.

*We believe that our service level on average is good and compares well to that of other DNOs, but we would be pleased to receive your views on how worst served customers should be defined, as well as any suggestions on how we should look to improve our overall service to such customers.*

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### Customer Experience of Higher Voltage Interruptions - 2010



As can be seen from the illustration, most of our customers will not experience a higher voltage interruption in a typical year, and we aim to maintain this level of performance.





### Guaranteed Standards of Performance

Guaranteed Standards are standards of customer service backed by a guarantee - customers receive a payment, either directly from us or through their electricity supplier, if we fail to meet these standards. The standards are the same for all distributors and include restoring supplies within 18 hours, giving sufficient notice of planned power cuts and responding to voltage quality issues.

There are exceptional circumstances in which the Guaranteed Standards may not apply, including events beyond our control such as severe weather or industrial action.

New standards for connection services were introduced in October 2010 relating to the provision of estimates, the provision of quotations, the accuracy of quotations and the scheduling and completion of work. If we fail to meet any of these standards we will make a payment to the customer.

Our aim will always be to minimise the number of payments we make, by providing customers with the levels of service they expect.

We will also consult with customers and work with Ofgem to identify any new or changed standards that might be required to meet customers' future priorities.

### Safe network services

Whatever changes are required to our network in the future, safety will always be the first consideration of any business decision we make. We are committed to achieving the highest standards of safety for all our customers, employees and contractors.

We do not foresee any major changes in safety legislation, nor do we propose that safety should be subject to any form of comparative assessment between DNOs.

We will ensure that, at a minimum, we will comply with all relevant legislation to protect members of the public, but we will continue to strive for even higher safety standards and trial the use of new technology and techniques to this end.

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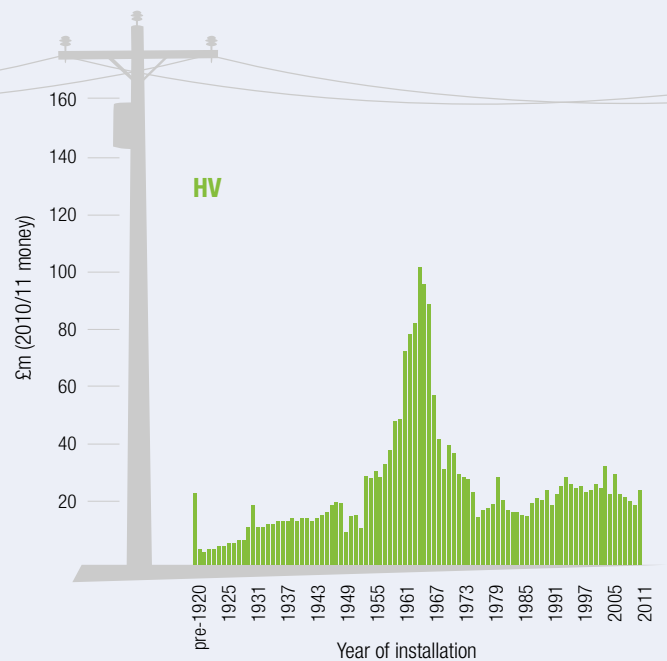
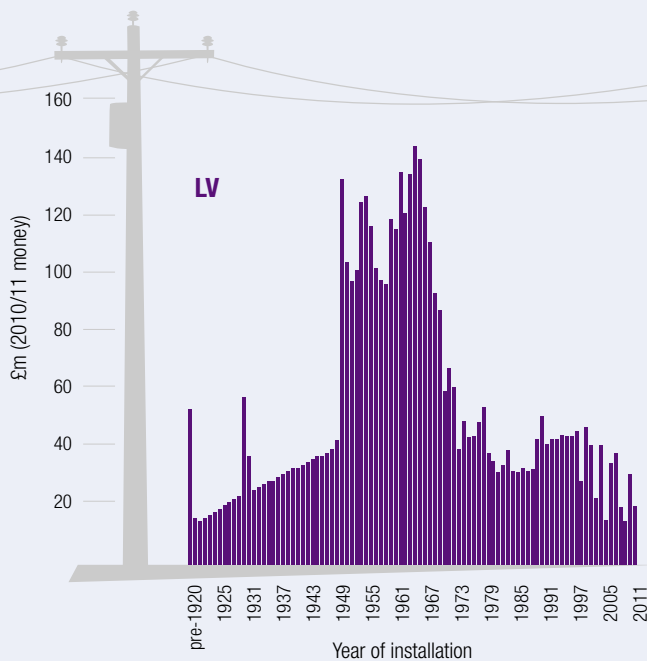
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Please let us have any views on our management of safety of the public from the dangers of electricity

***Do you believe there are any other specific areas or measures where we should be guaranteeing the level of performance?***

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## Replacement Cost of Electrical Assets by Year of Installation



## Stewardship of our network

### Replacing our current assets

For the next twenty years the major area of investment is likely to remain the replacement of the existing legacy network, but other drivers, such as the low carbon economy, may mean that this will not necessarily be through like-for-like replacements.

Historic development of the network has reflected UK economic cycles, including the post-war prosperity boom in the 1950s and 1960s, so much of our network is now over forty years old. This can be seen in the charts above which shows the age profile of our assets expressed as the current cost to replace all the assets installed in each year.

Traditionally, asset owners have replaced individual pieces of equipment based largely on considerations of age. Electricity North West has developed a process of Condition Based Risk Management (CBRM) which is used for our major above-ground assets. An assessment of the condition of the asset is used to develop a probability of failure, which when combined with an assessment of the criticality of the asset, allows us to prioritise our investment programme to ensure the maintenance of reliability levels at lowest overall cost.

The prioritisation process is designed to ensure that our investment targets those parts of the network that have the greatest need of some form of intervention.

This takes account of a number of factors that cover:

- safety to staff and public;
- condition of the assets;
- environment;

- operating history;
- previous faults on the same type of asset;
- availability of spare parts; and
- local knowledge.

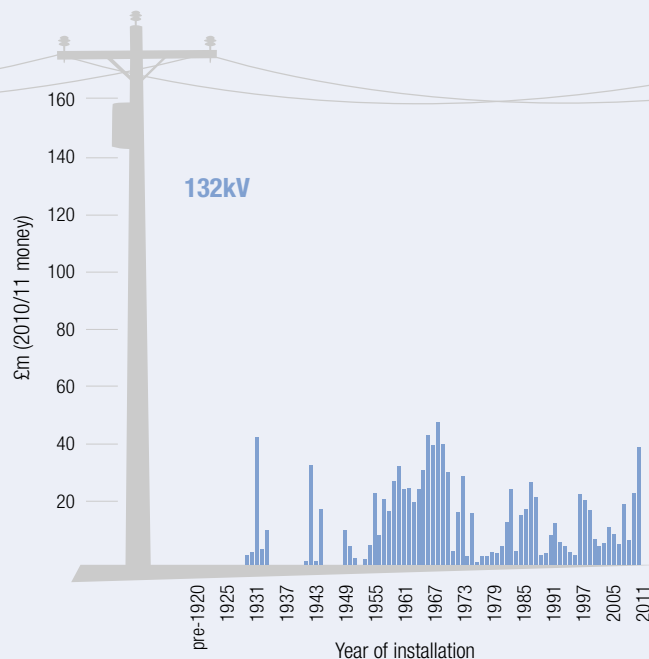
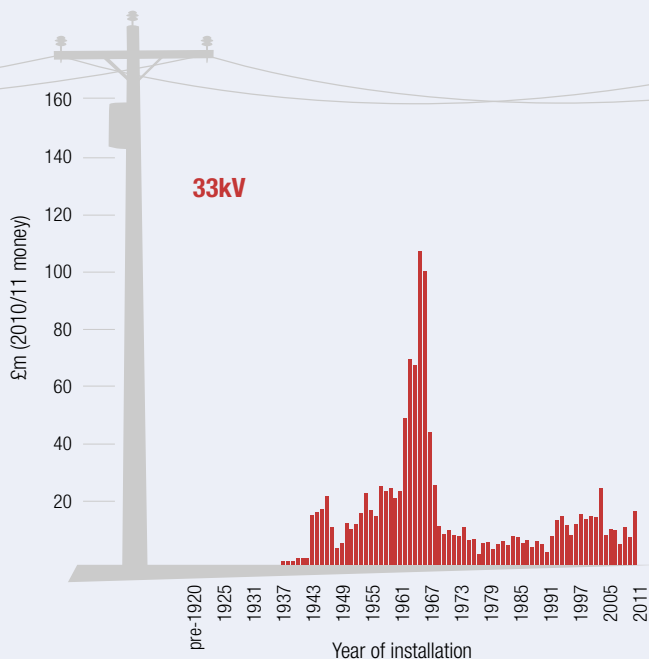
The resultant programme looks for the most efficient and cost effective 'intervention' which will be a combination of:

- doing nothing;
- additional inspections;
- maintenance;
- refurbishment;
- removal (without replacement); and
- replacement

The use of the CBRM approach developed by Electricity North West has reduced our expenditure requirements by tens of millions of pounds over the last five years.

We will continue to invest to maintain the overall health of the network, continuing our historically good performance and safety standards. We will also continue to invest in our asset management systems to enable us to model and plan for the future in a manner that optimises the timing and efficiency of any investment we make.

However, even with such careful targeting, replacement requirements are likely to rise over the next 20 years as the extensive first-generation network installed in the mid-20th century reaches the end of its life. Our overhead line network is relatively compact and cheap to replace,



however little of our extensive cable network has been replaced and it is unclear how quickly much of this network will deteriorate and require replacing. We are investing in research and development to understand these assets better and hence better plan their long-term replacement. Above ground plant items are easier to assess and predict and many of these existing assets will need to be replaced by assets with enhanced capabilities to address network changes stimulated largely by moves to a low-carbon economy.

*We will always try to prioritise the replacement of our assets in the most efficient manner to protect the service we provide to customers.*

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*Nevertheless we would be pleased to hear any views on how we should manage our assets, or how we can flex our investment to serve customers better.*

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### Resilience

We have observed over the last few years an increasing focus on preparedness for extreme events, whether stimulated by climate change, security concerns or the experience of real events such as the floods of 2007 and 2009.

The National Security Strategy (NSS)<sup>4</sup> identifies civil emergencies, whether in the form of a terrorist attack, a major accident, or a natural hazard, as one of the highest priority national risks in the coming years.

A strategic objective in the NSS is 'ensuring a secure and resilient UK', with a specific task to provide resilience to the UK by:

- being prepared for all kinds of emergencies;
- being able to recover from shocks; and
- maintaining essential services.

This requires security and resilience of the infrastructure most critical to keeping the country running against attack, damage or destruction; and resilient supply and distribution systems for essential services.

As a provider of critical infrastructure we support these objectives and we work with DECC, the Cabinet Office and other industry participants to ensure preparedness.

As we continue to deliver excellent service under 'normal' conditions, and as electricity becomes even more important in people's lives, we will encourage a focus on greater resilience which could require the development of new methods of risk assessment outside of traditional economic models.

*We recognise that planning for truly exceptional events is not straightforward, and that judgements have to be made about the right levels of investment to guard against extremely unlikely, but catastrophic events.*

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*We welcome any views you may have on this subject.*

<sup>4</sup> October 2010, HM Government: 'A Strong Britain in an Age of Uncertainty: The National Security Strategy' and the 'Strategic Defence and Security Review'

# New Connections

## Factors driving growth

As well as maintaining the current performance of our network we also have to plan for changes of use of our network.

Whilst energy efficiency measures will act to reduce the amount of energy used, other pressures will act to increase electricity demand. These include:

- population growth and movement;
- economic growth and/or economic regeneration;
- increased use of air conditioning;
- electricity displacing gas as a source of heating; and
- future use of electric vehicles, displacing petrol and diesel.

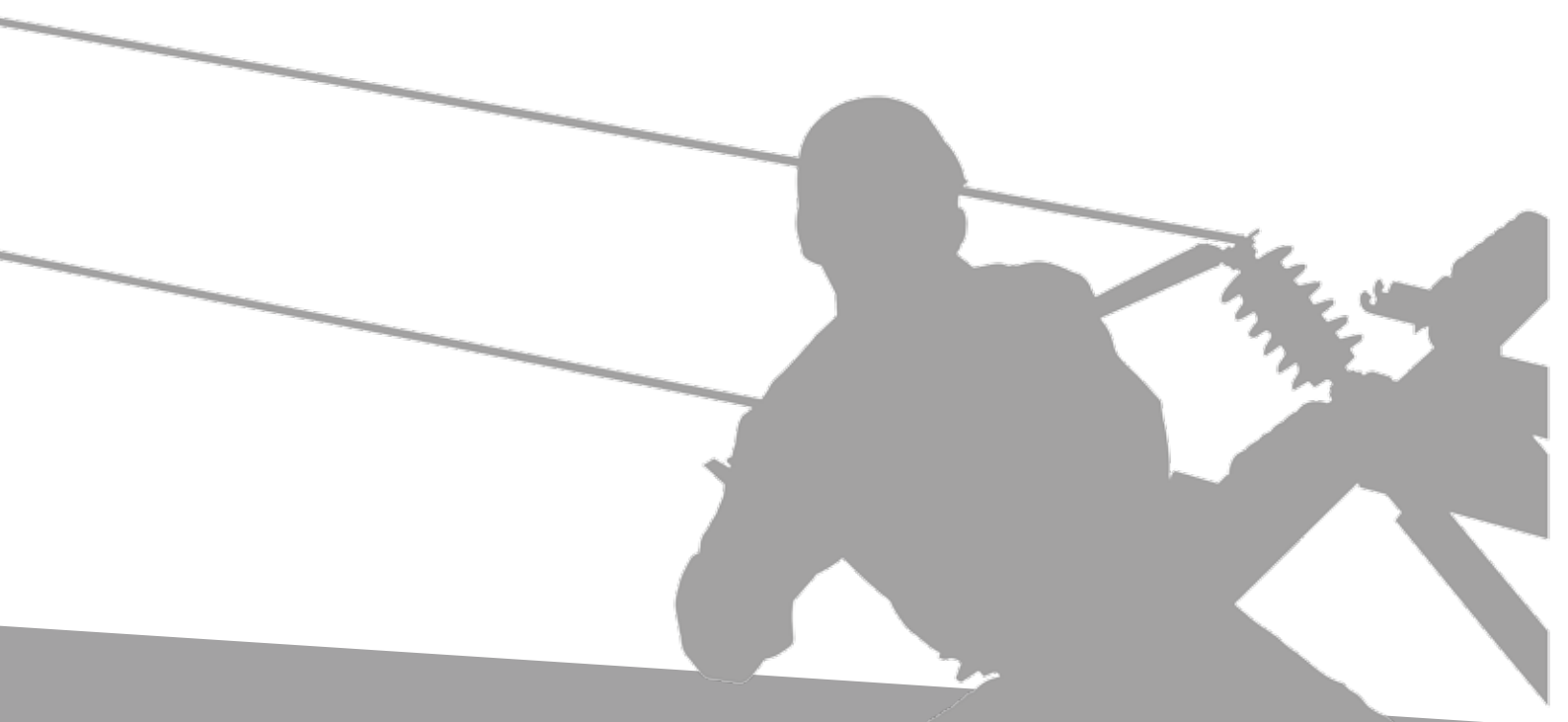
The increase in population, plus the increased intensity of electrical use is expected to lead to a major expansion in electricity demand. Government estimates suggest that electricity demand could double by 2050.

We will have to develop our network to meet this expected growth through a mix of our business-as-usual practices and new approaches where non-traditional loads appear.

As well as managing new connections associated with increases in demand we also have to cater for the increased amount of local generation that will connect to our network.

## Customer connections

We forecast that growth on our network will continue to be largely driven by demand from customers for new connections to new buildings. Customer connections is a competitive market area with a number of different service providers capable of providing quotations and making new connections to our network. Most connections however will ultimately be adopted as part of Electricity North West's network.





### Population growth

Figures from the Office of National Statistics predict that the population of our area will increase by 10% over the next 25 years. Growth will be concentrated in Greater Manchester which is expected to see growth of 12%, with increases of around 7% in the remainder of our area.

Just over 90% of our customers are domestic, consuming around a third of the electricity used in our area, so we will have to develop our low voltage network to cope with a larger population, living in a higher number of households in urban environments.

### Economic growth

Whilst less than 10% of our customers are commercial and industrial, they consume almost two thirds of the electricity. Their consumption over the last few years has fallen as a result of the economic recession.

In their '2050 Pathways Analysis' work DECC have assumed a GDP Growth of 2.5% to 2050, and this is reflected in our assumptions for the North West.

In addition to new connections, we need to reinforce the network where the load from existing connections increases to the extent that assets become overloaded. We are investing effort in developing new tools to predict where these may occur in a more complex environment. We are also carrying out trials of non-traditional responses such as Demand-Side Management (DSM) schemes to defer or avoid the need for network investment.

### Distributed Generation

The amount of local generation - often called distributed generation (DG) - that connects to our network is largely driven by the economic rewards for customers and developers. Many customers also want to connect renewable sources of generation to play their part in reducing their carbon impact. The introduction of the Feed In Tariff has driven an increase in the amount of DG connected to our network particularly solar powered photo-voltaic cells, and is also supporting growth in the numbers of small wind turbines that are being connected.

We expect that government incentives will continue to be the major driver for the introduction of DG until such time as the technology available becomes commercially competitive with other forms of generation.

*Have we identified the right sources of information to inform our view of the future?*

*Do you believe that we are planning a sufficient response to the challenges of the future?*

*Should we be taking any specific actions in relation to energy efficiency, or in measures to help manage customers' use of electricity?*

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## Environmental impact

### Introduction of electric vehicles

In the transport sector the major initiative to reduce CO<sub>2</sub> emissions will be the introduction of electric vehicles. If the take-up of electric vehicles reaches government targets then this will present a major challenge to electricity networks.

It is estimated that the electricity required to travel 80 miles is equivalent to the daily consumption of an average house. We will need to increase the capacity on our network to cope with the added demand from electric vehicles, whilst ensuring that the management of the 'refuelling' electrical load is undertaken in a smart manner, so that the overall load profile would be optimised over the day.

In DECC's pathways work their 'pathway 1' is the pathway that spreads effort to reduce emissions across all sectors. This pathway presents a scenario where vehicles become more efficient and there are breakthroughs in battery technology. This will drive the introduction of significant numbers of electric and plug-in hybrid electric vehicles, so that by 2050, 60% of mileage will be covered by electric and plug-in hybrid vehicles, with 20% covered by fuel cell vehicles.

The government has introduced the 'Plugged-In Places' programme which provides funding to support the installation and trialling of recharging infrastructure. The trials are designed to demonstrate how electric vehicle charging will work in practice in a range of different settings as well as testing innovative technologies such as rapid charging, inductive charging and battery swap.

It is planned to install 4000 charging points nationally under the scheme, which will inform the future development of a national recharging infrastructure.

Electricity North West has supported Greater Manchester's successful bid for funding under the government's Plugged-in-Places programme.

**More than 300 charging points will be installed across Greater Manchester and five rapid charging 'plug and park' areas will be created along a number of major routes.**

Picture courtesy of Pod Point ([www.pod-point.com](http://www.pod-point.com))



Heat pumps also need high electrical currents to start up so where a heat pump is being added to an existing home the supply may need to be reinforced before it can be used.

**Heat pump deployment may have a major impact on our network. We would welcome your views on the potential uptake of this technology. Visit us at: [www.enwl.co.uk/SwitchedOn](http://www.enwl.co.uk/SwitchedOn)**

### Introduction of heat pumps

The introduction of heat pumps will provide a 'greener' form of heating reducing carbon emissions associated with traditional heating systems, but they will have a major impact on our network.

Heat pumps extract heat from a natural source such as the ground or air and release it in another location at a higher temperature. This heat can then be used to heat homes or hot water.

In heating applications, heat is removed from ambient air or from soil or bedrock using a heat 'collection loop' and delivered to where it is needed, usually into the heating and hot water systems of the house, providing a low emission, renewable heating system. Heat pumps are well established in other European countries and are becoming more popular in the UK. We expect them to become more common in our area, primarily on new housing developments.

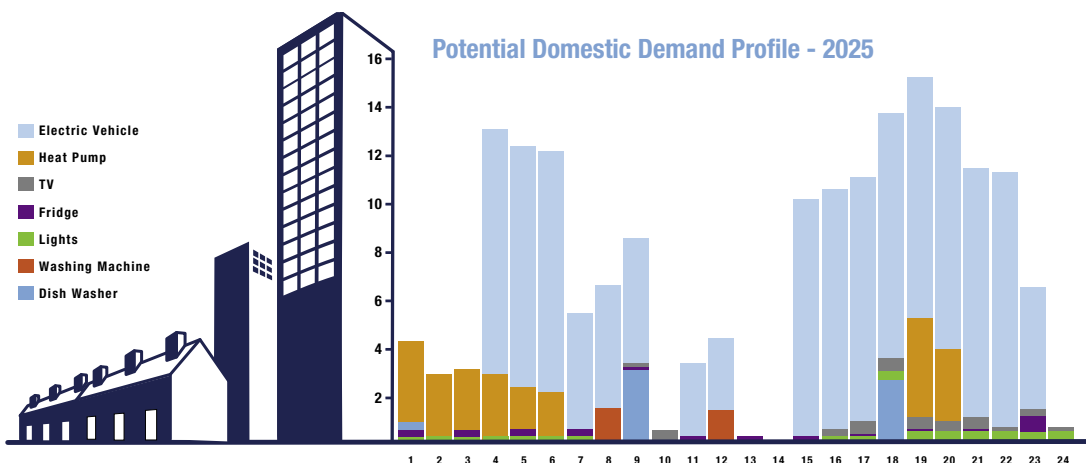
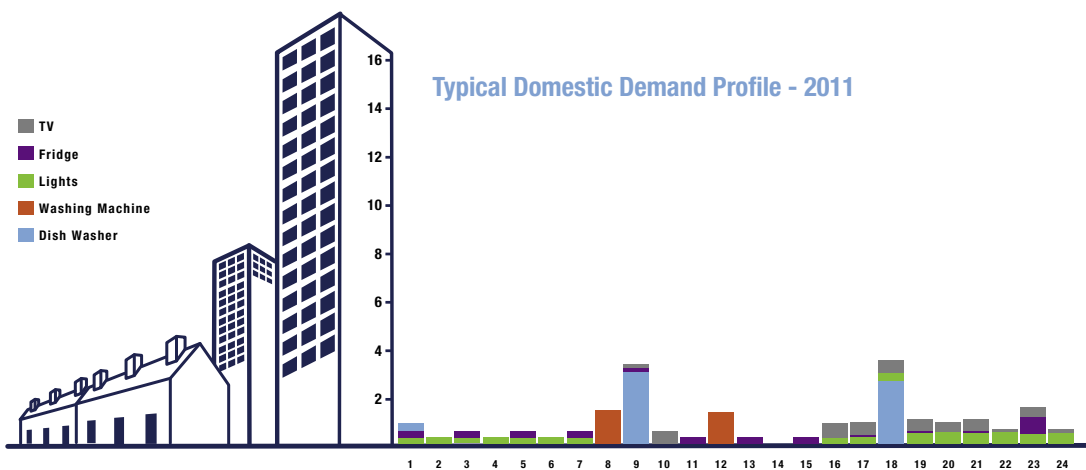
Heat pumps do have an impact on the environment as they need electricity to run but they use less electrical energy than the heat energy

they transfer. Typically you only need one unit of electricity to deliver two to three units of heat with a heat pump.

### Climate change mitigation

To mitigate the impact of climate change we will be working to reduce our own carbon emissions and also to facilitate the connection of low-carbon generation to our network (discussed earlier in the section on 'Low-carbon economy and smart grids').

In line with many other businesses we will be looking to use energy more efficiently to reduce our carbon footprint, particularly from our buildings and transport. Perhaps the biggest impact that Electricity North West can have will be to reduce the level of electrical losses on our network. Losses are an inevitable consequence of the transport of electricity, but where it is affordable we will adopt low-loss technology to reduce the amount of electricity lost in our network.



When heat pumps and electric vehicles are introduced, they could have a dramatic effect on customer demand. These charts illustrate how a customer's daily demand profile could change in the future. Our challenge is to manage the introduction of this new load, so it can be matched to the available generation.



## Environmental impact cont.

### Climate change adaptation

Climate change is expected to result in higher average temperatures, drier summers, wetter winters and a greater incidence of extreme events over the coming years. The Department of Environment, Food and Rural Affairs (Defra) is keen to understand how the country's infrastructure will cope with these changes in conditions.

Electricity North West has worked with other electricity network companies to identify any changes which may be needed to industry standards, and to implement necessary programmes of work to introduce these changes. In June 2011 we submitted our first report to Defra under the Climate Change Adaptation Reporting Power, which summarised the work undertaken to date and in particular how it will affect our network.

The biggest potential impact is expected to be the increased risk of flooding to our substations. We are already taking steps to install new, and improve existing, flood protection to major substations located on floodplains.

Initial studies suggest that other impacts will be of a smaller scale and any necessary modifications to our network will be built into our long-term maintenance, asset replacement and reinforcement programmes.

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We would be pleased to hear any views that you have on climate change, our role in mitigating it and adapting to it.

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### Undergrounding of overhead lines

Traditionally, the decision on whether to use an underground cable or an overhead line to supply customers has been based on considerations of cost, safety and location. Underground cables are significantly more expensive than overhead lines, but it is more appropriate to use them in certain parts of our area.

In conjunction with our stakeholders we established a programme of undergrounding for visual amenity in the price review periods 2005-10 and 2010-15. Up to £1m each year has been available to spend on removing overhead lines and replacing them with underground cables in National Parks and Areas of Outstanding Natural Beauty, in order to improve the 'visual amenity'. With this level of funding we expect to be able to underground an average of 10km each year.

We have worked with our stakeholders to implement programmes of work reflecting local priorities. We will continue to replace existing overhead lines with underground cables in conjunction with relevant parties where funding is available.

We welcome any views that stakeholders have on our existing plans and on how this initiative should be taken forward.

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## New nuclear in Cumbria

In July 2011 the government approved the National Policy Statements for Energy which had announced that two sites in our area are “potentially suitable for the deployment of new nuclear power stations by 2025”. These are the existing nuclear sites of Sellafield on the Cumbrian coast and Heysham in Lancashire.

In Cumbria we have significant network assets, but National Grid does not. The new nuclear generators will have to connect to National Grid’s transmission network, which may require construction of new lines in areas which we currently use for our overhead lines. We are working with National Grid and the local planning authorities to find an optimal solution for all stakeholders.

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Are there any other environmental issues we should be addressing?

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## Other environmental effects

Electricity North West will always aim to minimise the effect that our network has on the environment. For example we use oil and gases as insulation in our cables and equipment, and we need to ensure that this does not escape into the environment. In particular we will be looking at options to minimise the release of sulphur hexafluoride (SF<sub>6</sub>) from plant and oil from oil-filled cables. This could involve a future programme of replacement of these assets.

At our Whitegate substation we have replaced aging SF<sub>6</sub> equipment with up to date technology which has significantly reduced our carbon footprint. We will continue to use environmental impact as one of the criteria when evaluating projects.

## Education programmes

Electricity North West, as well as its predecessor companies, has always maintained a programme of educational activities. These have focused on public safety, targeting groups ranging from school children to angling clubs.

We will continue to work to ensure that all members of our community are aware of the dangers of electricity, as well as its benefits, and develop new materials appropriate to each audience.

In the future we will need to extend our engagement programmes as we move into the low-carbon world. Currently our major contact with customers is when we are fixing faults, whilst in the future we will need to have a direct relationship with customers as we manage an active network.

We need to help customers understand the impacts of the introduction of new technology so that they can help us to derive the maximum benefit from smart grid technology.

This will be done initially through our work with schools, but will be extended as the capabilities and requirements of the low carbon economy become apparent.

**One of the ways that we promote electricity awareness is through our Teaching Zone website, which contains educational resources for both teachers and children.**

**It can be found at [www.enwl.co.uk/teachingzone](http://www.enwl.co.uk/teachingzone)**

**As part of our ongoing Corporate Social Responsibility strategy to build links between Electricity North West and the wider community, we are starting a new initiative called the Young Ambassadors Project.**

The programme will enable employees to link with local schools to present and implement a programme which allows students to measure their school’s carbon footprint. They will then investigate ways to reduce their footprint.



## Summary

We foresee an exciting future for the electricity network where it will be required to supplement its traditional roles with new uses as part of a national move to a low-carbon economy. We will also need to consider more carefully the potential effects of extreme events on networks and replace the majority of the first-generation above-ground asset base in such a way as to provide continued excellent service for the rest of the 21st century.

As part of this, we need your input to help us develop our priorities and plans for the coming decades so we can develop a sustainable low-carbon energy future for the North West together.



We are interested in views on this document and our future plans, particularly whether there are any areas you feel we have missed, or other priorities and factors we should consider.

You can write to:  
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Birchwood Park  
Warrington  
WA3 6XG

Email us at [futurenetworks@enwl.co.uk](mailto:futurenetworks@enwl.co.uk)  
Or comment via the link on our website which also includes details of previous stakeholder events: [www.enwl.co.uk](http://www.enwl.co.uk)

We look forward to hearing your views.