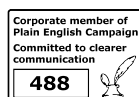


*National Grid  
Electricity Transmission*

**nationalgrid**

**Delivering our  
environmental future:  
annual statement**

March 2015



# Contents

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**At National Grid we're continuing to make the move to a low carbon network and putting sustainability and environmental management at the heart of our business. This statement summarises what we're doing in 2015 and beyond.**

We understand we have a crucial responsibility to facilitate the transition to a low carbon economy and take the lead within the industry by making sure that sustainability is embedded across all business operations.

This year we're developing environmental management processes that will highlight our performance and reduce our impact on both the environment and the communities we work in. Our stakeholders are helping us to prioritise and introduce these changes.

We have established frameworks, policies and schemes to prepare for future energy scenarios that will require improvements in the design of our network and will help us move to a low carbon network.

In 2014/15 we introduced several innovation projects and initiatives that resulted in environmental benefits for our customers and stakeholders. Learning from these will help us to make more informed decisions and develop best practice approaches.

We'll continuously review, improve and develop our processes to meet our industry's many different challenges and targets.

This 2015 annual statement explains our commitment to delivering a low carbon future and how we'll achieve it.

We'd love to hear your views.



John Pettigrew



*We'll continuously review, improve and develop our processes to meet our industry's many different challenges and targets.*

## We're developing our network to provide a fit-for-purpose electricity transmission system that connects the volumes of new technologies we expect to see, especially low carbon generation.

Our Electricity Ten Year Statement (ETYS), including the network development policy, will make the most of our existing system and help us explore the need for new transmission investment and more innovative non-build options. It will also help us to coordinate our plans as we develop the network for a low carbon economy.

We need to make sure the ETYS evolves to meet our stakeholders' changing needs. We share our network development plans with stakeholders in many ways, including the annual ETYS. You can find out about this online: <http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/Electricity-ten-year-statement/>

Our future energy scenarios play an important role in helping us to develop our network policy. These scenarios predict the future energy landscape and are the result of wide-ranging discussions with the industry, focusing on affordability, sustainability and security of supply.

One scenario is 'Gone Green'. This focuses on meeting the carbon and renewables targets set by the UK Government. This will see Great Britain move from around 10 per cent renewable capacity to nearly 50 per cent by 2030.

You can find out more about our future energy scenarios online: <http://www2.nationalgrid.com/uk/industry-information/future-of-energy/future-energy-scenarios/>

The number of wind farms and other forms of low carbon generation has increased. We've responded to our stakeholders' changing needs by taking part in industry forums and adapting our strategy to meet future needs.

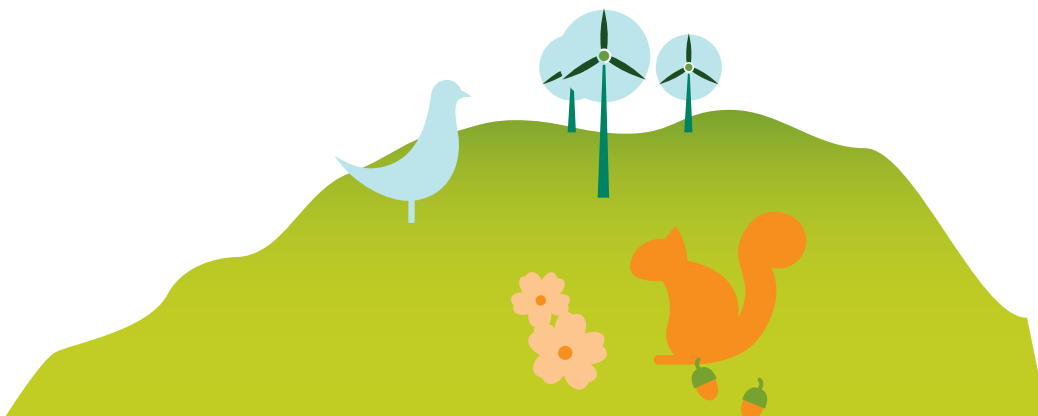
Examples include:

- supporting European code changes on wind farm connections, and the need to integrate with our technology
- developing a policy that allows us to invest efficiently in the network, providing connection for all generators but mainly new, low carbon sources
- taking part in Ofgem's energy efficiency directive, to look at developing more environmentally friendly transmission systems
- speeding up the connection of renewable energy sources through innovative network development.

We'll be talking to our stakeholders more widely, as part of the ETYS. This includes developing an interactive tool to allow new and existing customers to search for opportunities on the network. This will give us a better understanding of what's happening across the industry and help us create a future network that meets our stakeholders' needs.

The Integrated Offshore Transmission Project (IOTP) is being developed with industry to explore the economic benefits, technical considerations and commercial frameworks associated with offshore networks for connecting large renewable energy areas. Following last year's activity, there have been developments in the IOTP and in the coordination of large offshore wind zones, including Dogger Bank and Hornsea. The submission of the IOTP project report to Ofgem will be made on behalf of the cross-industry working group in Spring 2015.

Last year's ETYS included alternatives to developing the transmission infrastructure and reducing costs to the energy industry. These provide opportunities to generators, demand side response and energy storage providers by providing them with the opportunity to create future revenue streams.



In this year's ETYS network development section, we developed this approach and asked for funding for a Smartzone in the south-east corner of the network. The Smartzone is a network control concept that manages generation, demand and transmission assets in real time and can create capacity on the network where there aren't any transmission assets. This approach makes the most of our assets and reduces the demand for new facilities.

### No build Solutions

We're committed to finding innovative ways to connect new low carbon generation and to developing our network. 'Commercial non-build' allows us to connect new generation using commercial tools and services instead of installing assets. Our South East Smart Grid (SESG) development is an example of a commercial non-build solution that we developed in 2014 and proposed as an innovative project through the Network Innovation Competition (NIC).

The SESG builds on our Humber Smartzone concept, and matches our strategy of exploring innovative low-cost transmission capacity options. It's effectively a solution that doesn't involve any building and will help us integrate wind farms into our transmission network at the lowest possible cost. This Smartzone is far more complex than our existing proposal and deals with many more technical challenges.

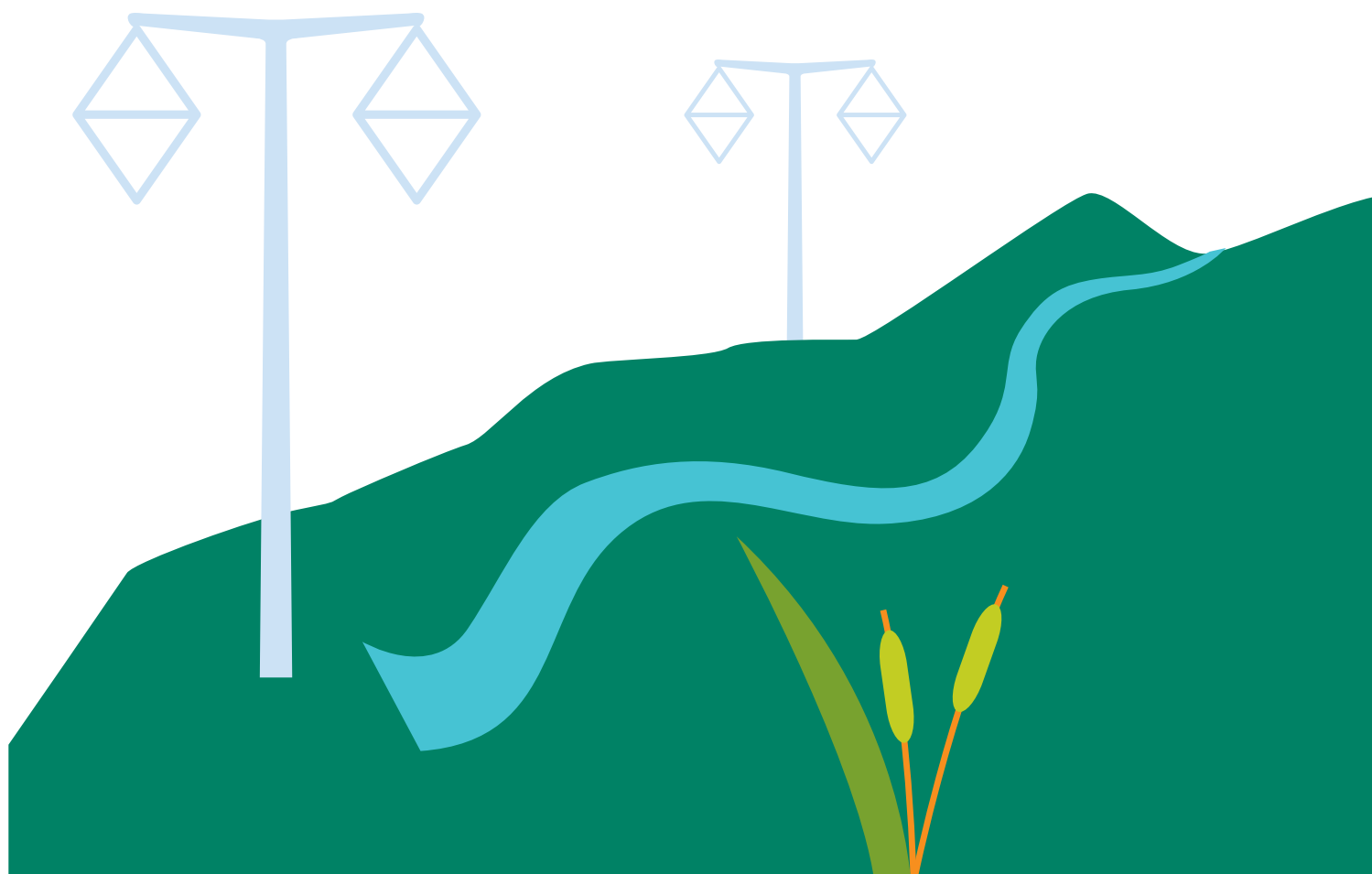
### The primary benefits for stakeholders are:

- it costs less to connect wind farms
- the potential to connect new generation (including wind farms) earlier, because of the reduced or delayed need for transmission investment.

### The fundamental elements of the project are:

- detailed control systems coordinating transmission system parameters, generation in the area and demand side response
- a potential saving of £500 million when compared to the investment in transmission system assets.

Unfortunately the project wasn't successful in the NIC funding proposals. However, we see it as such an important development that we're exploring ways to keep the project alive. When the SESG pilot is completed and the concept is proven, we'll have the tools and experience we need to start similar schemes across the network.



## We're working with our customers and stakeholders to identify innovative ways to simplify the connection process for low carbon generation.

Although we treat all our customers in the same way – that's one of our licence obligations – we also tailor our connection services to match the needs of individuals.

### Communicating with stakeholders

We look to understand and adapt to the needs of our stakeholders, including low carbon generators, in several ways. Our bi-annual seminars for electricity customers are a good example.

We always hold one of these seminars in Scotland, which is home to many customers with low carbon generation projects. Although we're not directly responsible for connections in Scotland, we are accountable for the contractual arrangements for connections.

We recognise that this can be confusing to new generators wanting to join the network, so we've spent a lot of time talking to them. We've had good feedback on these seminars, particularly from small businesses that are based in remote areas of Scotland and aren't familiar with the connections process.

In the spirit of collaboration, we involve our partners in these seminars. For example, Scottish Power Transmission and SHE Transmission provide workshops and information stands about the connection process.

We also invite stakeholders to set the agenda, to make sure we focus on the topics they want to talk about. As a result, we now include sessions on the system operability framework, to help new generators understand future operational challenges and how their project can help us meet them.

And we keep changing, developing ways to meet the needs of our stakeholders, including renewable generators.

### Our policies – Connect and Manage

Before we introduced our Connect and Manage scheme, generators often had to wait for more extensive network reinforcements to be completed, which significantly delayed their connection to the network. This was having a big impact on renewable generators, which tend to be smaller businesses.

To address these issues, we worked with DECC, Ofgem and our customers to develop and agree a new scheme to give generators a connection date based on an accurate project

schedule. Introduced in 2010, Connect and Manage is helping us to do exactly that. We're now able to achieve new connections between 5 and 10 years earlier than before.

In 2014, the scheme reduced emissions by two million tonnes of CO<sub>2</sub>. We anticipate further savings of 1.5 million tonnes in 2015/16 and two million tonnes in 2016/17.

Over the next 18 months we'll be making a further 58 new connections to the transmission network, totalling 7.6GW. We have more than 250 new connection schemes in the pipeline – if all of them are built, they will deliver more than double the government's 15 per cent renewables target by 2020.

### Our initiatives – Automatic Network Management

An important issue for the national electricity transmission network is dealing with lots of smaller renewable projects as they connect to the network.

It's important for us to manage this challenge and maximise the capacity available, so more electricity can be exported. We're working with Scottish transmission network operators and some distribution companies to explore the use of Automatic Network Management schemes.

These schemes monitor the output from the connected generation and the power flows on critical transmission circuits. If the system identifies a potential imbalance, where the flow on the transmission circuit is higher than it's designed for, the system automatically flags up the need to reduce generation output.

This is an innovative approach to managing power flows on our networks. Industry working groups are exploring early designs for the technical operation of the new system and the commercial arrangements that support it.

### Non-firm access

We have a policy that allows new connection sites to apply for non-firm access to the transmission system. It means they can connect before all of the local upgrades necessary for their connection have been completed.

However, this policy doesn't always allow those ready to connect the opportunity to connect first. This year, we have reviewed our policy to allow non-firm access only to those new connections sites that have planning consent in place: this means that those most able to connect quickly have the opportunity to do so. This approach has been developed with the transmission owners and has been welcomed by customers.

**Industry code change**

The amount of underwriting needed before a connection was proving to be a barrier for smaller entrants to the market. So in April 2013 we introduced a new industry code which reduces customer underwriting liability while their connection is being developed and built.

As a result, we have increased the amount of low carbon generation contracted to connect to our network.

**Future steps – interconnectors**

There are currently four interconnectors totalling 4GW of capacity – they connect us to France, The Netherlands, Ireland and Northern Ireland.

These interconnectors help to join energy markets and give us the platform to share low carbon generation with neighbouring countries.

There is planning consent for new connections totalling 2GW and we have had discussions with further new interconnectors as far away as Iceland. We have many contracts in place for interconnectors to connect between 2017 and 2022. Together, they will provide an additional 7.5GW of capacity.

All figures quoted from the National Grid Connect and Manage Quarterly Report, 1 October to 30 December 2014.



## We developed the System Operability Framework (SOF) to help existing and future customers identify further service opportunities on our onshore and offshore transmission systems.

The SOF provides a platform for the industry to discuss challenges and opportunities. It focuses on low carbon generation and outlines how system operability is expected to change in response to the developments described in our future energy scenarios (FES).

### The benefits for future system operability include greater:

- use of low carbon generation, particularly wind generation, as we remove some of the barriers by enforcing limits on renewable generation
- opportunities for wind farms and other low carbon generators to provide services to the transmission system, creating ways of making money
- understanding of future challenges, driving a broad range of industry-led changes.

The SOF has received excellent industry feedback. It has also given National Grid the opportunity to work on other industry initiatives being run by external bodies to meet the future challenges of a changing generation mix – the system architect consultation led by the Institution of Engineering and Technology is one example.

A future challenge identified by the SOF is the control of frequency, a system parameter that is integral to the safe and reliable operation of a transmission system. National Grid is leading a NIC project (see below) that aims to address this issue.

### Enhanced Frequency Control Capability

The Enhanced Frequency Control Capability (EFCC) project is developing a stronger frequency control framework that will allow the network to integrate more low carbon technology. Without such a system, in time we would have to limit the use of wind farms and other new sources of generation.

The project will bring many benefits to our stakeholders. For example, it will reduce the cost of connecting wind farms to the industry, thanks to lower system operational costs, network congestion and investment commitment. It will also allow low carbon technologies to play a part in addressing the challenges associated with the change in the generation mix, without creating additional security risks.

An important part of the project is ensuring that the technical features of new low carbon technologies will help us operate the future system. Another is supporting the development of an appropriate commercial framework before the full roll out.

The EFCC project will save a lot of money. The base case scenario will see the cost of response rising by £200 million to £250 million a year by 2020, but EFCC will cover much of this increase by allowing National Grid to use rapid response from a range of technologies. This rapid response will significantly reduce the overall level of response that's needed.

You can find out more about the project online: <http://www2.nationalgrid.com/UK/Our-company/Innovation/NIC/>

### Demand side response

We're developing demand side response (DSR), which is a set of initiatives that will help stakeholders (suppliers, district network operators and third parties, for example) to balance energy portfolios and supply and demand in electricity networks by postponing or avoiding network investment.

In 2014 we worked with the Energy Network Association and district network operators as part of the Electricity Demand Side Response Shared Services Group. This forum works to understand the feasibility of a shared framework that allows the electricity network operators to access DSR resources and investigate their benefits. After consultation across the industry, a concept paper was written in November 2014 to summarise feedback and propose the next steps.

Last year we set up the first demand side balancing reserve (DSBR) tendering event. The DSBR involves large energy users agreeing to reduce their demand during winter weekday evenings or peak times in return for a payment. This reduction in demand could be made available in the winter period in the unlikely event of insufficient generation being available. This tender could lead to up to 900MW of reserve being made available.

Looking ahead, we are contributing to the innovation project Customer Load Active System Services (CLASS). Working with Electricity North West and Manchester University, we are using CLASS to work out whether we can reduce voltage to reduce demand.

### The primary CLASS deliverables for this year include:

- complete the test and trial of CLASS
- identify potential further industry opportunities for CLASS
- develop models to support the use of CLASS
- submit a CLASS recommendation report.





*The Enhanced Frequency Control Capability (EFCC) project is developing a stronger frequency control framework that will allow the network to integrate more low-carbon technology.*



**Working in a sustainable way is important to us. We want to think about sustainability as we make decisions, to help us make a difference, preserve natural resources and respect the interests of our community.**

Our environmental sustainability strategy – Our Contribution – is built on three pillars: climate positive, positive about resource and enhancing ecosystems (see pages 12 to 17).

You can read the strategy online at:

**<http://www2.nationalgrid.com/responsibility/Connecting-for-tomorrow/Preserving-for-the-future/sustainability/>**

By understanding the social, economic and environmental impact of our business and building this into our decision-making processes, we'll make better decisions. This will mean that we can satisfy our customers' requirements, meet the expectations of our stakeholders and bring positive benefits for communities and society. Our activities will help to improve our decision making.

We formed a senior-level Sustainability Steering Committee in January 2012 to make sure that we're focused on these areas.

It is supported by our Sustainability Coordinators Group, which we formed in June 2014 and which is chaired by our Head of Sustainability & Climate Change. This cross-business group

coordinates current initiatives and makes sure they match our strategy, share best practice and make sustainability an important part of the way we do business.

The group also makes sure we deliver the promises we made in our environmental sustainability strategy and through our involvement in the Infrastructure Carbon Review (ICR) and the Accounting for Sustainability (A4S) project.

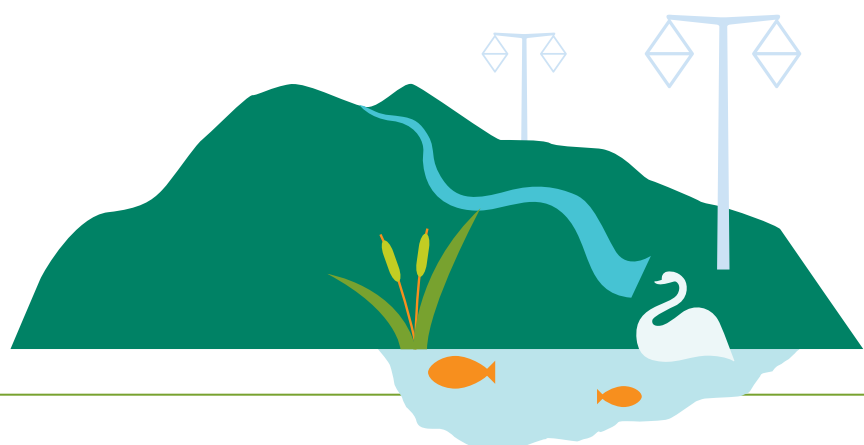
### Infrastructure Carbon Review

National Grid signed up to HM Treasury's Infrastructure Carbon Review at the end of 2013.

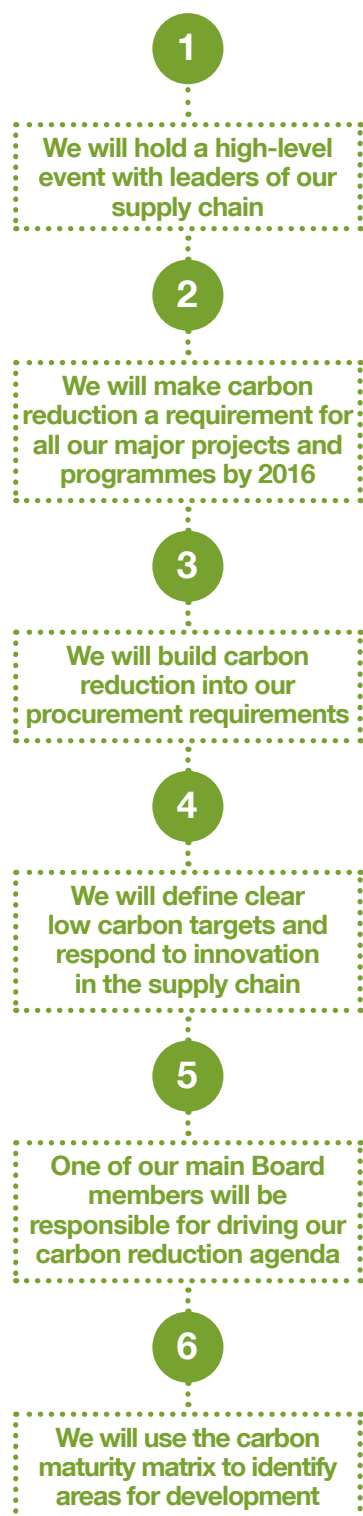
The ICR sets out a series of actions to reduce carbon from the construction and operation of the UK's infrastructure assets, in line with the UK's climate change commitments. By signing up to it, we're reinforcing our pledge to reduce our greenhouse gases by 45 per cent by 2020 and 80 per cent by 2050. The actions we take over the next three years and in the future will help reduce our overall emissions.



*Our Contribution – is built on three pillars: climate positive, positive about resource and enhancing ecosystems.*



## Our ICR commitments



You can find more information on the Infrastructure Carbon Review online

<https://www.gov.uk/government/publications/infrastructure-carbon-review>

The 'climate positive' section provides more information about how we're doing against these commitments.

### Accounting for Sustainability

We have signed up to The Prince's Accounting for Sustainability Project, set up by HRH The Prince of Wales. Andrew Bonfield, our Chief Financial Officer, represents National Grid and we contribute to many parts of this project.

The A4S project challenges organisations to demonstrate that it makes sense to consider sustainability when making decisions. It focuses on topics such as capital expenditure (capex), managing future uncertainty, and natural and social capital accounting, valuing the benefits that we receive from both the natural environment and through our social interaction. We contributed to the discussions around and development of the capex appraisal and the natural and social capital accounting guides.

You can find out more online.

#### Capex:

<http://www.accountingforsustainability.org/cfos/network-of-chief-financial-officers/a4s-cfo-leadership-network-activities/capex-guide>

#### Natural and social capital:

<http://www.accountingforsustainability.org/cfos/network-of-chief-financial-officers/a4s-cfo-leadership-network-activities/natural-and-social-capital>

#### Enhancing investor engagement:

<http://www.accountingforsustainability.org/cfos/network-of-chief-financial-officers/a4s-cfo-leadership-network-activities/investor-guide>

#### Managing future uncertainty:

<http://www.accountingforsustainability.org/cfos/network-of-chief-financial-officers/a4s-cfo-leadership-network-activities/managing-future-uncertainty>

Through our Sustainability Steering Committee and our Sustainability Coordinators Group, by March 2016 we'll identify the appropriate recommendations for our business and develop a decision-making framework that includes these new sustainability factors and approaches.

During 2016–17 we'll continue to build on our natural capital valuation approach and consider how our decisions can impact on the ability of the natural environment to provide us with what we need. We'll incorporate this into our decision making framework. By 2017–18 we'll do the same for social capital.

**Our Environmental Management System (EMS) is the foundation on which we've built our environmental sustainability strategy. It helps us to manage our impact on the environment and to deliver our environmental and sustainability commitments.**

### Managing our day-to-day impact

Since we refreshed our environment policy, we've focused on how we can keep improving in all our business activities, with a focus on how and what we should measure to inform investment and innovation.

With input from expert stakeholders, we've developed a suite of concise guides, with topics including the management of water, resources and waste. These guides help our employees identify risks and opportunities when they're managing our sites and assets. We have also made the EMS available on hand-held devices and from remote locations.

Our KPIs help us evaluate how we're performing against our environmental objectives. They fit with our environmental sustainability strategy and contribute towards our sustainability targets, including waste reduction, recycling and reuse, resource management (including oil and sulphur hexafluoride) and reducing greenhouse gas emissions.

Over the next 12 months we'll be introducing more environmental KPIs across our Electricity Transmission business, including those relating to environmental incidents and fluid-filled cables.

We're also developing a new environmental dashboard that brings together environmental data from across our business, providing a clear line of sight between the performance of individual business units and our overall corporate performance. We've completed phase 1 and will roll it out across the business in July 2015.

The dashboard will fit with our measures, targets and commitments. It will also provide information that's not currently available, along with access to the latest data, forecasted performance, trends and analysis. It will allow us to identify trends of good and/or poor practice and spot where more resource or effort is needed to improve performance.

### In numbers



Loss of cable oil

**60%**  
reduction in net loss of cable oil over the last six years



SF6

**9.5%**  
reduction in leak rate for Greenhouse Gas sulphur hexafluoride (SF6) equipment during 2014/15



**68%**  
reduction in greenhouse gases against 1990 baseline (2014/15 figure)



Waste

**96%**  
Of our non-hazardous waste, we've sent just 3.95% to landfill: in other words we've recycled more than 96%

## **CASE STUDY: Corporate bird licence pilot with Natural England**

As part of the enhancing ecosystems element of our strategy we are working closely with Natural England to reduce the impact that developing, operating and maintaining our network has on the natural environment.

Our starting point was our interaction with birds. In the past, if nesting or roosting birds affected our ability to develop or maintain our network, we would apply to Natural England for an individual bird licence to remove or relocate the birds or nests. This took a lot of work for both Natural England and National Grid, and sometimes there were several licence requests going through at the same time. This could lead to unexpected project delays.

Our corporate bird licence, the first of its kind to be granted by Natural England, means that we have a consistent approach to licensing. It applies across all the relevant areas of our business and puts agreed measures in place for when they're needed.

Our approach encourages conversation with our regulators, grantors and stakeholders so that we can understand where birds may have an impact on a project, now and in the future.

As part of a working group (including Natural England, our contractors, ornithologists and internal operational and environmental specialists) we agreed a series of proactive measures to help deal with potential risks and to avoid unnecessary disturbances. Examples include desktop studies, physical and audio deterrents, creating alternative nesting platforms and reorganising our works.

Armed with these measures, we can effectively manage the risks, reducing potential harm and disturbance to birdlife and ensuring that our energy networks can be developed and maintained as necessary. If these proactive measures aren't successful, we can use our corporate bird licence quickly, helping to make sure we deliver our work on time while reducing our impact on birdlife.

We monitor bird activity using a crowdsourcing database. It gathers site-specific information about known bird activity and is updated by local stakeholders and grantors. Using this information, we can take practical and proportionate measures well in advance of any planned work, ultimately avoiding the use of our licence.

Natural England is very supportive and has renewed our corporate bird licence for the next two years. It also supports our extension of the licence into Wales with Natural Resources Wales and is looking to work with us to develop licences for great crested newts and bats.



## As we carry out our investment programme, connecting new sources of renewable and low carbon energy for the UK, we'll keep working with our stakeholders and suppliers to reduce our impact on the environment and meet our climate change targets.

We've made a commitment to reduce our greenhouse gas (GHG) emissions by 45 per cent by 2020, and by 80 per cent by 2050.

In 2014, we featured in the Carbon Disclosure Leadership Index for the second year running. This is an independent review of our GHG inventory, stating that our approach follows best practice for corporate GHG reporting.

We will always be transparent and make sure our GHG emissions are verified by independent sources.

The Infrastructure Carbon Review will help direct our focus on and commitment to reducing GHG emissions. The goods and services that we buy have a huge impact on our own carbon emissions and working with our suppliers helps us to reduce our combined environmental impact.

To meet our GHG targets and our ICR commitments, we're focusing on these activities:

- **working with suppliers** – over the next three years we'll continue to talk to our supply chain to help deliver our sustainability commitments. We'll encourage more environmental improvements across our wider supply chain network, setting new standards and expectations across our industry and beyond. We held our first sustainability supplier forum in October 2014
- **carbon reduction as a requirement during procurement** – our tender for a new supergrid substation in Wimbledon will be our first large-scale tender to include a five per cent weighting relating specifically to carbon reduction
- **the Carbon Interface Tool (CIT)** allows us to measure accurately the impact of our construction projects in terms of carbon. We're using it to create best-practice standards and to set targets to reduce the carbon intensity of our construction schemes. The tool has helped us to gather enough data to define our target standards. These will be applied in future tenders so we can provide our suppliers with incentives to reduce carbon and lessen its wider impact.

### CASE STUDY: Middleton substation extension

We use the CIT to build consideration of carbon into all aspects of our projects. Our Middleton substation extension is a good example. The CIT highlighted significant areas of carbon use in the design and helped the development team plan how to reduce our overall carbon footprint efficiently.

The redesigned substation is half the original size, which will result in smaller excavations, lower use of resources, less packaging, and less waste transported to landfill. It will also achieve a 40 per cent reduction in sulphur hexafluoride (SF6) emissions, reducing harmful GHG gas emissions now and in the future. By optimising the design of the substation and working with our suppliers we expect to achieve a 10 per cent capital carbon saving, along with significant cost savings.



### Climate positive targets

#### Greenhouse gas emissions:

**45%**

reduction by 2020

**80%**

reduction by 2050

80 per cent of top 250 suppliers to report greenhouse gas emissions by 2020



*The Infrastructure Carbon Review will help direct our focus on and commitment to reducing GHG emissions.*

## CASE STUDY: Energy Management Group

In December 2014 we introduced a business-wide Energy Management Group, chaired by our Head of Corporate Property. This group looks at how we can reduce energy consumption in a coordinated and consistent way that also brings financial and environmental benefits.

In May 2015 our new energy management strategy will be agreed. It will line up with our climate change targets. Each area of our business will have to develop an implementation strategy and regularly measure and report progress against defined targets. This strategy will inspire innovation and conversation with our stakeholders and supply chain, leading to reductions in our energy consumption and associated GHG emissions.

## CASE STUDY: Highbury substation

Working with the local community and stakeholders, we developed a proposal for a new substation at Highbury. We wanted to use the excess heat from the substation to provide heating for a local primary school and a new residential development.

The project is well under way and the foundations for the 400kV and 132kV transformer bases are being laid. The design for the heat recovery scheme to the local school is also underway and we expect to finish construction in 2016.



## **Our goal is to make the most of all the materials we own and purchase, and to reuse or recycle 100 per cent of recovered assets by 2020, while working safely and reliably.**

Global population growth and demand for resources and materials are leading to price increases and volatility. They are also making it more difficult to get the materials we need.

To achieve our goal, we focus on three areas: minimising waste, following the circular economy principle and using resources efficiently. This approach allows us to make the most of the materials we own. It also reduces the risks from price fluctuation and minimises the environmental, carbon and social impacts of extracting virgin materials from the earth.

An important factor in delivering our commitments is positive discussion with our supply chain, industry peers and wider stakeholders.

### **Working with others – MIROG**

We're part of the Major Infrastructure Resource Optimisation Group (MIROG). This is a multi-utility collaboration that aims to reduce the impact of infrastructure developments, realising shared objectives and opportunities to improve the management of the materials and resources that are fundamental to our businesses.

We work with fellow MIROG members to identify opportunities for influencing policy and process and for removing barriers to using recycled materials. Together we are developing a tool that will map construction material demand in UK regions. The idea is that by sharing project information, we can optimise resources and reduce waste.

Within our construction business we have successfully launched our own materials exchange tool, bringing supply-side savings and helping us to work more efficiently. We will build on the success of this tool by using it more extensively within National Grid and by sharing it with MIROG representatives.

### **Improving our procurement process**

Since we published our global procurement sustainability policy in April 2014, we've been working with our supply chain to include sustainability factors in the tendering process. We have also reviewed our supplier code of conduct, which we will launch in 2015.

In 2014 we joined the Sustainability Supply Chain School. Our membership means we have the right skills and expertise within our procurement teams, along with a common approach across all our supply chains. This will help us to improve and realise our sustainability objectives.

Over the next 12 months we will work closely with our business, suppliers and procurement teams to change our network design processes, so that we build in the way we reuse resources. We will also look for innovative solutions and markets for our materials and will make sure we are working efficiently.

### **Moving to a circular economy more quickly**

The Circular Economy 100 (CE100) is a global group of leading companies and groups who are working to speed up the move to a circular economy.

Our membership of the CE100 will encourage innovation and support our drive to reduce inefficiency. We will work with our suppliers and build on the success and learning from our pilot studies.

We've set up pilot projects with our suppliers to look at the benefits and costs of reusing redundant metallic assets, reducing the amount of new material we need. We've already completed a successful pilot to reuse overhead line taken down from the electricity network and are working with our supply chain, stakeholders and regulators to extend this approach to all our major asset types.



**Positive about resources target**

# 100%

Reuse or recycle 100 per cent of recovered assets by 2020



**CASE STUDY:**  
**Cable extraction at Ross-on-Wye**

We've run a pilot that aims to reduce the environmental impact and liabilities associated with redundant underground cables and to reclaim the constituent materials for recycling.

As part of an innovation project in May 2014, we tested directional drilling. This is a more sustainable and cost-effective way of removing oil-filled cable, allowing it to be recycled. Working with service provider JSM, we developed an innovative process that allows us to remove oil-filled cables completely. As well as removing the risk of oil leaching into the ground, this method costs around half that of other removal techniques.

Open-trench methods of removing cable can increase the risk of damaging third-party services, creating high levels of waste and disrupting local communities. But with directional drilling, up to 200 metres of cable can be recovered in a single operation.

Here's how it works. The first step is to dig two small trenches at each end of the cable, so that the device can be attached. The drill then works its way underground, loosening the material around the cable until it reaches the other trench. The drill is then removed and the cable is pulled out. And because the cable puller is controlled from ground level, there's no need for operatives to enter the excavated area – an approach that reduces the risk of injury.

Directional drilling allows us to control our resources, reducing our exposure to price volatility. What's more, the reclaimed cable (including copper) can be recycled – taking us a step closer to achieving our target to recycle 100 per cent of recovered assets by 2020.

We're exploring how to use this innovative technology in other areas.



## The way that we manage the natural environment affects our business, our stakeholders and our communities.

It's vital that we get a better understanding of the benefits, services and values associated with the natural environment. This insight helps us to minimise our impact on the environment, find new ways of making money and deliver tangible benefits for our stakeholders.

We are working with our stakeholders and partners to reduce the environmental impact of our existing transmission assets, and to develop new approaches and tools that we can use as we deliver our new build programme.

Our enhancing ecosystems approach aims to use our non-operational land and natural capital assets to deliver better, bigger and more joined-up spaces for biodiversity and the communities where we operate.

We want to establish 50 sites by 2020, which will allow us to highlight a variety of sustainable benefits and services. We've 15 up and running across our business already.

### The Natural Grid

To deliver our enhancing ecosystems commitments we have adopted a 'Natural Grid' approach. We want to build a natural network that aligns to our current and future operational footprint. Working with our stakeholders, communities and NGOs to identify shared values, priorities and opportunities to work together is a fundamental part of what we do.

### Natural capital valuation

Recognising the value of our natural assets – the natural environment around our operational and non-operational estates – is helping us to identify new and more sustainable ways of management that delivers wider benefits to us and our stakeholders.

We've developed a tool that highlights the value of our natural assets, helping us understand our interactions and dependencies on the natural environment based on the benefits and services provided by them.

This approach helps us to focus on managing our environmental assets that deliver the greatest value to us and our stakeholders, providing new opportunities to work with partners to preserve and enhance the value and benefits.

The approach also ties in with our sustainability strategy, commitments and targets, realising environmental benefits that support UK Government policy. It involves customers, stakeholders, charities and non-governmental organisations at a national and local level, helping us to work more efficiently and further improves our reputation.

By effectively managing our natural assets – and including local environmental priorities – we are changing the views of external stakeholders about our commitment to safeguarding the environment. This has created opportunities to have positive discussions with many of our stakeholders, to share our sustainability ambition and to involve them in managing our non-operational landholdings.

Within the next 12 months we want to start projects at new sites.



*To deliver our enhancing ecosystems commitments we have adopted a 'Natural Grid' approach.*

## CASE STUDY: Thorpe Marsh – a natural capital approach

At our Thorpe Marsh substation we have used our valuation tools and process to identify new opportunities to increase the natural capital value of the site. Working closely with the Yorkshire Wildlife Trust we are developing sustainable management plans that involve local stakeholders and communities, and protect and enhance the natural environment.

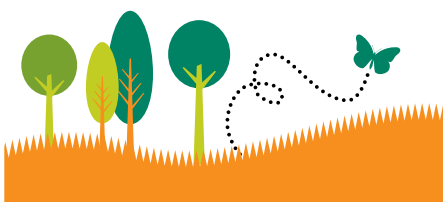
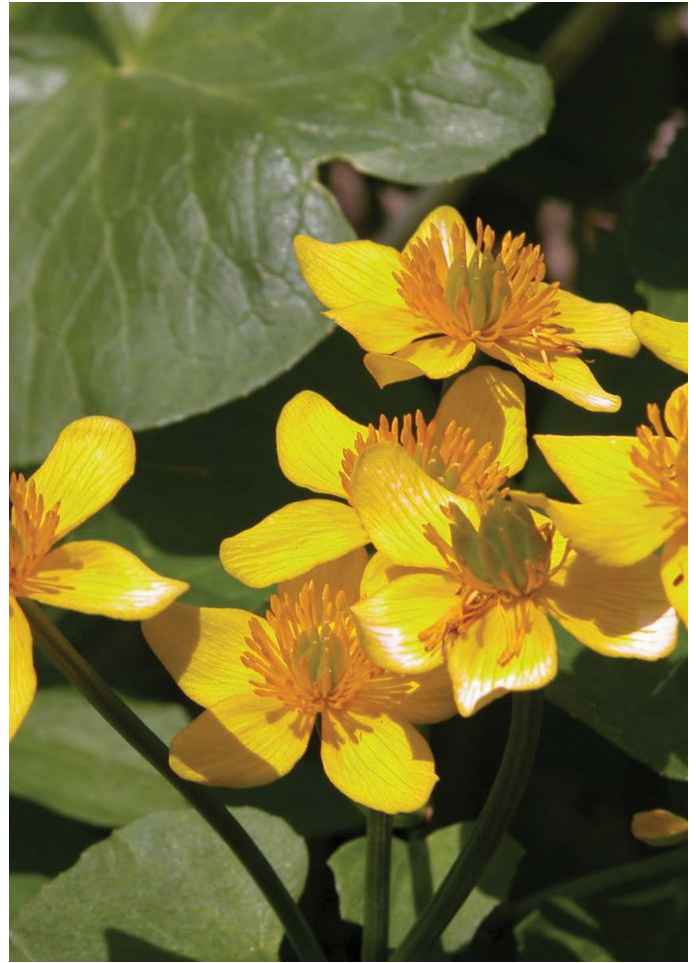
The site is located alongside the former Thorpe Marsh power station. It's rich in biodiversity and home to a range of unique habitats associated with its former industrial heritage. These habitats support a wide variety of notable species, including rare birds.

It's also a significant site for the local community – a memorial garden means that the four local workmen who lost their lives in an incident at the former power station in 1973 are remembered.

Over the next three years our partnership with the Yorkshire Wildlife Trust will develop and deliver a focused management plan that:

- involves the local community
- improves the ecosystems on site
- contributes to our enhancing ecosystems target
- makes a positive contribution to the regional objectives of our partners.

Our active and specialist management will make sure valuable assets and ecosystems are preserved and protected for future generations.



### Enhancing ecosystems target

Deliver sustainability  
action plans at  
50 sites by 2020

# 50

**Our innovation strategy focuses on making a difference for consumers and stakeholders. From an environmental perspective this includes improving efficiency, maintaining reliability, reducing our impact on the environment and improving safety.**

Our innovation projects help us to manage our impact on the environment, extend the life of our resources and assets, integrate renewable power generation and manage new network risks. Three examples are shown below.

### **Cable oil recycling**

In line with our positive about resource strategy, we saw an opportunity to recycle oil from oil-filled cables that were approaching the end of their design life.

Large quantities of insulating oil were being wasted during maintenance and repair activities on cables in service. So in 2013, in collaboration with Enervac Corporation and JSM Group, we designed an innovative on-site mobile facility that purifies and reuses oil extracted from cables during maintenance and repairs.

The oil is processed through a series of filters in the mobile facility, then tested. If the oil meets the required standard, it is re-introduced into the same cable. The plant and vehicle for the project have been bought and built to form a fully functioning mobile cable oil regeneration unit. We're now developing technical documentation for the unit, in preparation for a 12-month trial to demonstrate that it can purify the reclaimed oil to the level of quality needed for reuse.

### **Control of debris and dust**

In October 2013, through our work with United Utilities, we identified a need to capture dust and debris safely when preparing and repainting grade 4 tower steelwork, to prevent contamination of the water catchment area.

To address this problem we set up an innovation project working with three partners: PDC Utility Services Limited, Fountains Group and CLC Contractors Limited. Each party is trialling a different approach: fine debris netting; a hand-held vacuum device; and an industrial-type vacuum mounted on a truck.

The project is due to be completed this year. We'll evaluate the performance of these methods and, if they're successful and cost-effective, we'll develop new procedures so that we can use one or more of these approaches within National Grid.

### **Resource and Asset Toolkit**

We made good progress with our Resource and Asset Toolkit project in 2014. It aims to identify the opportunities, barriers and solutions relating to adopting a circular economy – a sustainable way of managing our resources, from design to disposal, across our company.

In the last 12 months we have carried out research in order to be able to introduce a circular economy approach in each area of our Transmission and Distribution businesses.



*We are reviewing and refining our innovation strategy, which will help to shape our current and future projects.*

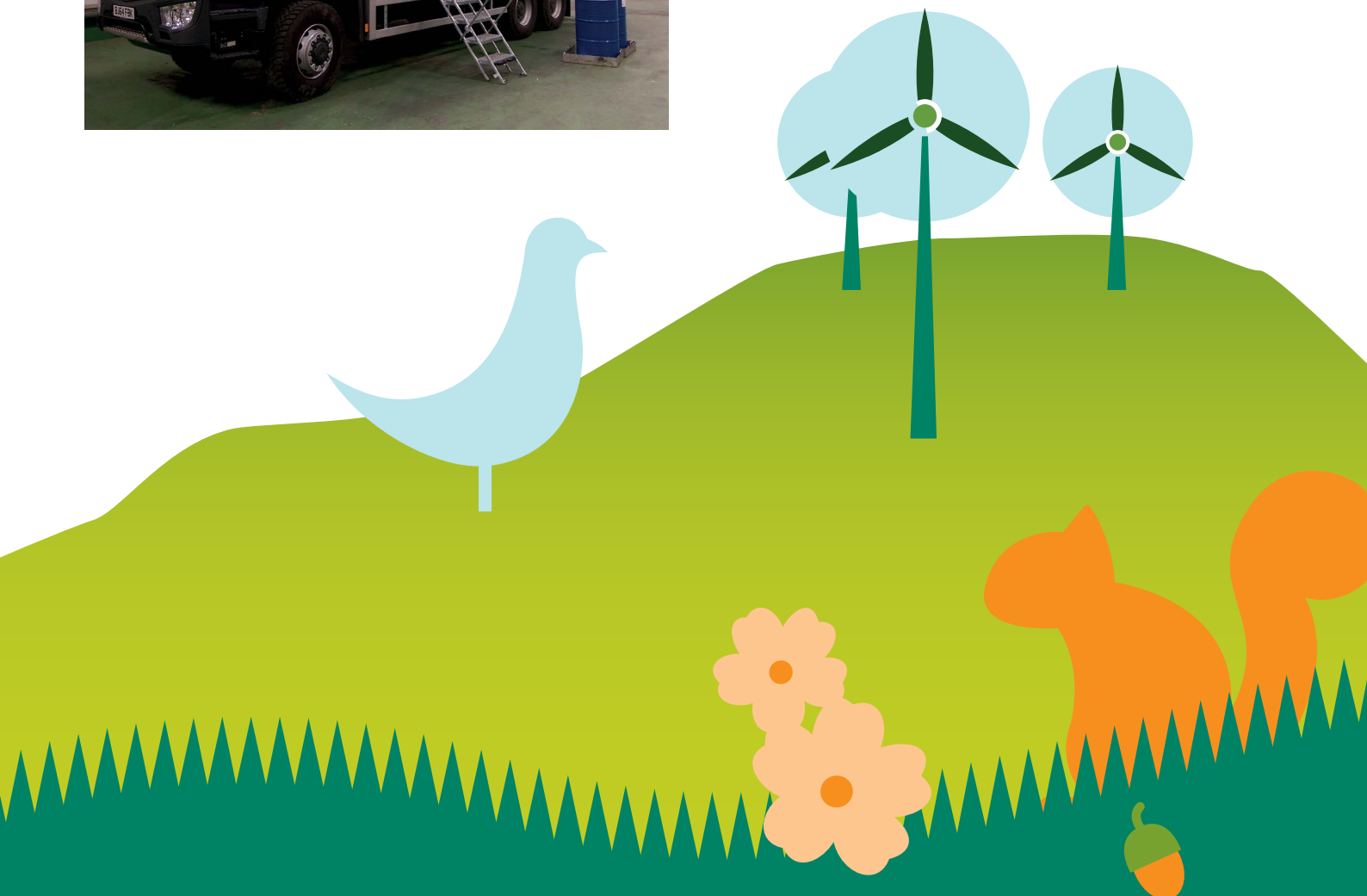


During the design stage of the project we assessed our current processes and the changes we would need to make in order to maximise the reuse of materials and assets throughout the business. Armed with this information, we created MARKit, an online tool designed to help with reuse in the company.

The final stages of the project will be to introduce and continue the results of MARKit, meet the original aims and allow us to increase reuse levels for our resources and assets. We will achieve this by the end of 2015.

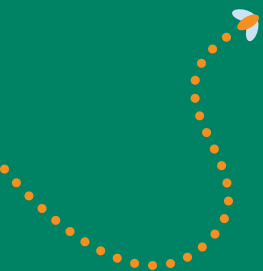
**Looking to the future...**

We are reviewing and refining our innovation strategy, which will help to shape our current and future projects. This will make sure that we continue to have a diverse innovation portfolio, identifying opportunities within the industry to reduce our impact on the environment and work closely with stakeholders to have a positive effect on the environment in which we work.



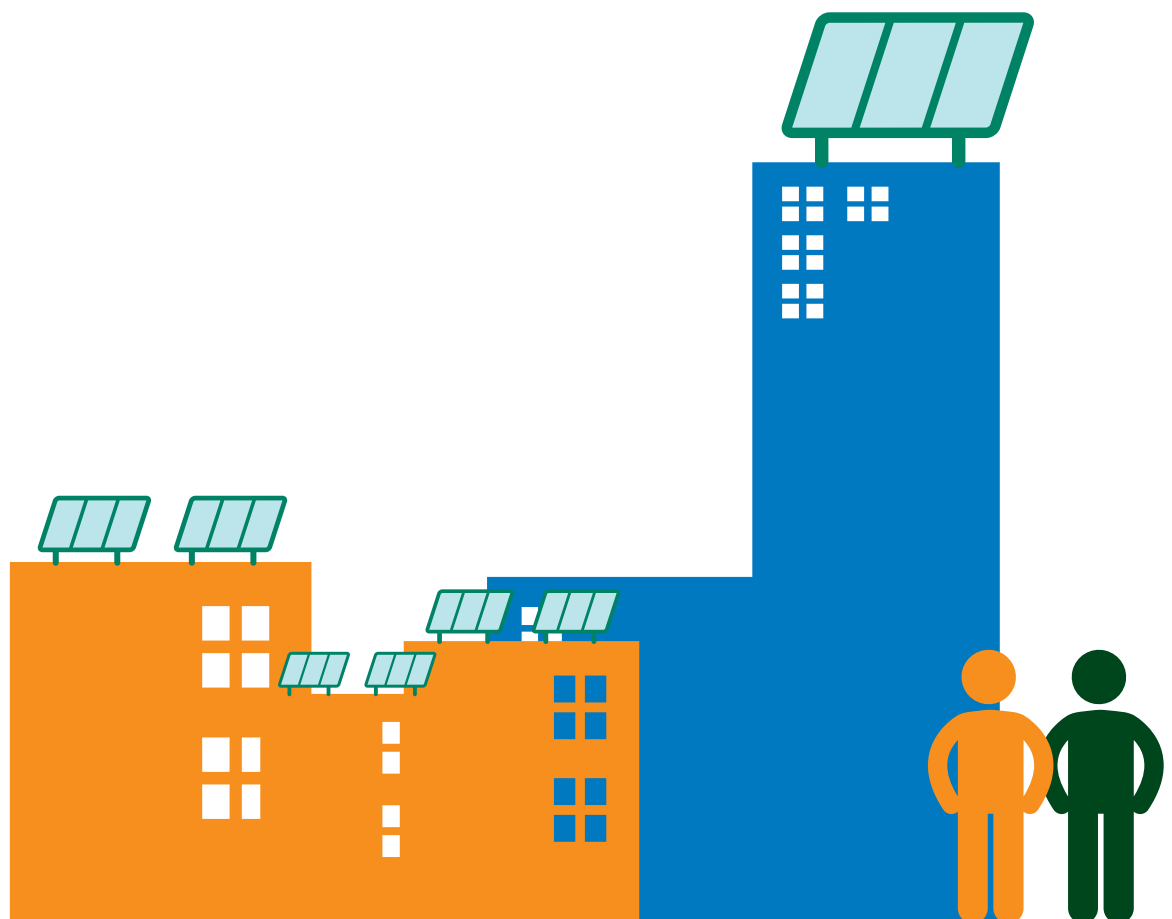
**We need your feedback to make sure that we're focusing on the right areas and delivering the right things.**

**We'll continue to share information about the projects outlined in this document at events like our customer seminars and operation forums. In the meantime, we'd like to hear from you.**



- How useful did you find the content of the Annual Statement?
- What part of the statement was most useful to you?
- Is there anything you would like National Grid to focus on more?
- Do you think National Grid is doing enough to facilitate the transition to a low carbon future?
- Do you think National Grid is doing enough to manage its impact on the environment?
- Do you have any further comments?

Please email your responses, along with any additional comments, questions and requests for further information, to [Talkingnetworkstransmission@nationalgrid.com](mailto:Talkingnetworkstransmission@nationalgrid.com)





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