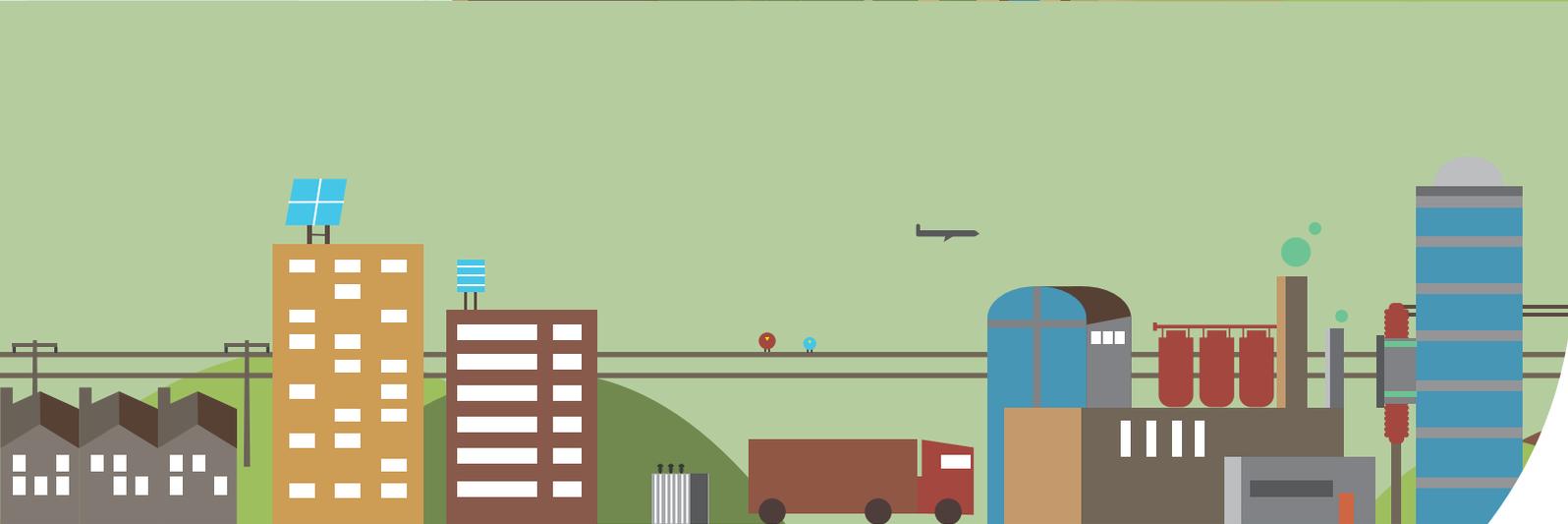


# SP Energy Networks 2015–2023 Business Plan

SP Distribution Ltd

SP Manweb plc

July 2013



Summary of key information for our stakeholders – Our vision for ED1 and our plans to deliver our vision.

1. Executive summary

Our business plan is written with our readers in mind, takes into account the things that make us unique and is underpinned by a robust process.

2. A guide to this document

3. About us

4. Process of creating our business plan

Our plans to meet the challenges of the ED1 period are informed by extensive stakeholder engagement and the consideration of alternative and innovative methods.

5. Meeting our challenges

6. Learning from our stakeholders

7. Our innovation strategy

Our clear and comprehensive output commitments are underpinned by a robust, deliverable and efficient programme of expenditure.

8. Our outputs and incentives

9. Our expenditure forecast

10. Business readiness

Our plans are resilient to uncertainty, efficiently financed and minimise the impact on our customers.

11. Uncertainty

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13. Our revenues and customer impact

Our plans enable us to help shape the energy future and our continual improvement is informed by enduring stakeholder engagement

14. Looking to the future

15. We are part of the Iberdrola group

16. Glossary

Our supporting annexes give additional detailed information to support our plans.

Volume 1 – Stakeholder, customer & IT

Volume 2 – Engineering

Volume 3 – Finance and expenditure

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# A Message from Frank Mitchell CEO

To build our plans we have learned from our stakeholders and customers, reinforcing our top priorities as your regional electricity network company: Safety, Customer Service and Value for Money.

Over the last few years we have focused on the fundamentals that are important to our customers and our wider stakeholders. This has resulted in us delivering continuous service improvements, lower cost contracts and accelerated outputs. We remain on track to deliver all of our 2010-15 commitments.

By 2023 we intend to lead the industry by continuing to apply our guiding values to be:

- *A customer service focused company trusted by our communities and stakeholders.*
- *An engineering company with strong stewardship of assets and world class safety credentials.*
- *A company that attracts and develops skills for the future from the communities we serve.*

The UK energy industry is entering the most exciting period for half a century. We have an unprecedented opportunity to play a major part in the UK's low carbon transition and help set the industry blueprint for the next 50 years.

The future network and its users will require a different approach, and our ambition is to transform the way you think of us.

- *Access to Smart metering data will allow us to revolutionise our customer relationship to be much more proactive.*
- *We will use innovation to reduce costs, improve service, and lay the foundations for a smart network.*

Our stakeholders have told us they want us to:

## Manage our ageing network to maintain public, staff and contractor safety

Much of our network was installed in the 1950-70s so is approaching the end of its operational life. We will continue our programme of renewing our assets over several price controls to minimise the impact on customer bills.

We will continue our industry leading approach to manage the replacement of end of life cables in high-rise and tenement flats.

We are ahead of the industry in making sure old overhead lines meet modern height and clearance standards. Our overhead lines across roads will be brought up to modern standards by 2015, and in all other areas by 2020.

## Reduce the number and length of power cuts

Our customers already enjoy 30% fewer power cuts than the UK average, and a reliability in excess of 99.999%. By 2023 we plan to reduce the number of customer power cuts by 7%, the average length of those power cuts by 16%, and the time that our average customer is without electricity by 25%.

## Improve customer service

Our goal is to lead the industry in the delivery of customer service. We have laid out a comprehensive set of customer commitments and will pay higher levels of compensation where we fail.

## Continue to invest to reduce power cuts during major storms

Since the late 1990's we have rebuilt and cleared trees from more than 10% of our rural high voltage overhead lines, helping to reduce power cuts during storms by 75%. By 2023 we will make more than 25% of our rural high voltage overhead lines more resilient to storms.

### Improve service to poorly served customers

A very small number of our customers receive a service which is much worse than others. We will continue to improve service to our poorly served customers and collaborate with other agencies to help our most vulnerable customers.

### Prepare the network for low carbon technologies

While the 2020 UK carbon emission reduction target is 34%, both Scotland and Wales have more ambitious targets of 42% and 40%. Our network will be 'low carbon ready' sooner than the UK average.

### Delivering value for money

We are acutely aware of the economic pressures on all of our customers. Since we published our draft plan highlights every component of our plan has been optimised for efficiency, taking into account real price effects, cost benefit analysis and industry benchmarking.

As a result we have reduced our forecast costs by over £700m compared to our May 2013 Draft Business Plan

- *Removing inefficient sub-contract margins*
- *Identifying scope for greater co-ordination*
- *Identifying other scope for efficiencies*

- *Including ongoing productivity of 1% p.a. compounding, reducing our forecast costs by 4.6% (£170M).*

As a result the cost of our final plan has reduced from £5.9bn to £5.2bn whilst our output commitments have increased and secondary deliverables have been maintained.

This means that on a like for like basis, whilst increasing our outputs and commitments to customers, our business will spend marginally less than allowed in DPCR5. We believe that the plan now represents best value for our current and future customers.

### Our total plan

We plan to create more than 2,500 jobs across our supply chain, investing up to £90m in recruitment and training (the customer impact of which will be £60m after taking account of efficiencies elsewhere).

Our forecast costs of £5.2bn include £2.5bn to renew and maintain our network, £600m to accommodate customer future energy usage, £1bn of supporting activities and £1.1bn of external costs including UK corporation tax and local business rates.

### Customer bill impact

The latest analysis from Ofgem shows that electricity distribution charges represent 16% of an average UK customer electricity bill.

Using the UK average consumption 3,300kWh, as required by Ofgem:

- *Our customers in Central and Southern Scotland will see an 8% reduction in our bills from £99 p.a. to £91 p.a.*
- *Our customers in England and Wales will see a 12% decrease from £126 p.a. to £111 p.a.*

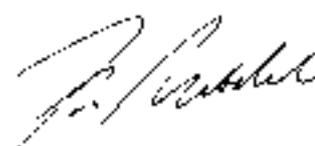
These numbers are expressed in 12/13 prices and will vary depending on actual inflation and consumption.

### Conclusion

We have set out a plan to satisfy our stakeholder needs and to transform the way you think of us as your electricity network company.

I would like to thank you for your input in developing our plan and encourage you to give us your feedback both on our final plan and ongoing service.

We look forward to providing you updates on our progress, and obtaining your ongoing input to our priorities through our various stakeholder engagement activities over the next decade.



Frank Mitchell

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# 1

# Executive summary

## Our whole business plan in brief

This chapter sets out our vision to transform the way you think of us as your electricity network company and includes highlights from the plan. Our £5.2bn of costs for the period 2015-23 will maintain safety and network performance, ensure we meet customers future energy needs, and further improve our network resilience to storms. Innovation embedded in our plan has reduced our forecast costs by more than £100m.

We have set out clear output commitments for customers, introducing voluntary arrangements going well beyond regulatory requirements.

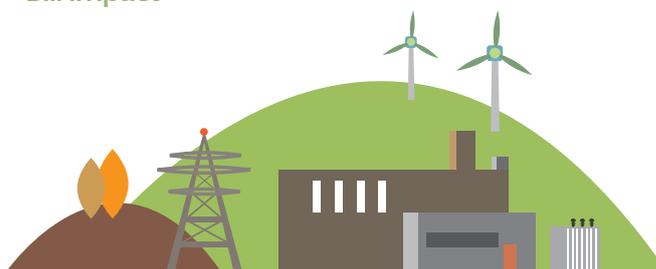
We will use incentive mechanisms to make further investments to deliver tangible benefits to customers.

A reduction of £700m from our draft plan published in May demonstrates our commitment to deliver in a highly efficient manner. Further demonstrated by our proposed financial package that clearly strikes an appropriate balance of risk between customers and stakeholders.

We will deliver all of this whilst reducing our average typical domestic customer bill by 8% in Central and Southern Scotland and 12% in England and Wales.

### In this chapter:

- Planning for 2023 and beyond
- Efficient expenditure
- Outputs
- Secondary deliverables
- Financing our plan efficiently
- Our revenues and customer impact
- Bill impact



# Planning for 2023 and beyond

## *This plan sets out our vision and commitments to transform the way you think of us as your electricity network company*

The UK energy industry is entering the most exciting period it has faced in half a century. We recognise that SP Energy Networks has a critical role in facilitating the transition to a low carbon economy at a time when we need to replace increasing numbers of end of life assets.

This presents an unprecedented opportunity for SP Energy Networks to play a major part in the UK's low carbon transition, and help to set the blueprint of the energy industry for the next 50 years.

By 2023 we intend to lead the industry by continuing to apply our guiding values to be:

- *A customer service focussed company trusted by our communities and stakeholders.*
- *An engineering company with strong stewardship of assets and world class safety credentials.*
- *A company that attracts and develops skills for the future from the communities we serve.*

We are acutely aware of the economic challenges our customers face:

- *We have benchmarked internationally to target costs amongst the lowest in the industry.*
- *We have set a further productivity improvement target of 1% p.a. across key areas.*
- *Innovation within our plans will deliver more than £100m benefits for customers.*
- *We have reduced our costs by £700m compared to our May 2013 published draft plan highlights, but increased our proposed outputs.*

The future network and its users will require a different approach, and our ambition is to transform the way you think of us.

- *Smart meters will allow us to revolutionise our customer relationship, allowing us to be much more proactive.*
- *We will innovate further to reduce costs, improve service, and lay the foundations for a smart network.*

We have set out a plan to address our stakeholders' priorities:

- *Managing our ageing network to maintain public and staff safety.*
- *Reducing time off supply for our average customer by 25%. Funded through incentives.*
- *Fewer customers affected by storms & a voluntary standard to restore customers within 36 hours afterwards.*
- *Being amongst the top performing network companies in customer service. Paying additional voluntary compensation if we fail.*
- *Improving service to poorly served customers & playing a role in addressing energy social issues.*
- *Preparing the network for low carbon technologies.*
- *An appropriate and efficient financial package that delivers long term value for customers and stakeholders.*

*In addition to our business plan we will make further investments to deliver customer value, funded and rewarded through incentive mechanisms*

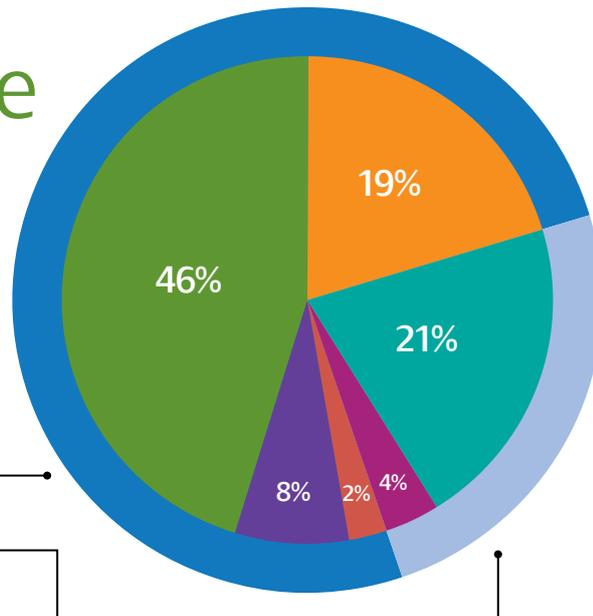
# Efficient expenditure

Includes 1.0% p.a. efficiency

**Total £5.2bn**

**75% — £3.9bn**  
Traditional core business

**25% — £1.3bn**  
New and external costs



**46% — £2.4bn** of our costs relate directly to managing our ageing network, including:

- Repairing more than 180,000 network faults.
- Inspecting and maintaining 30,000 substations, 70,000km of underground cables and 40,000km of overhead lines including:
  - Completing circa 3.5million asset inspections.
  - Cutting trees away from more than 300,000 spans of overhead lines (public safety).
  - Clearing trees away from 5000km of overhead lines (storm resilience).
  - Maintaining around 900,000 items of network equipment.
- Replacing 30 major substations each supplying 19,000 customers (average).
- Replacing 84 large substations each supplying 3,000 customers (average).
- Extending the life of 84 large substations each supplying 3,000 customers (average).
- Replacing more than 2,500 small substations each supplying up to 500 customers.
- Replacing more than 250,000 services inside customers homes & buildings.

• Making 25% of our high voltage network, and an additional 32% of our low voltage network resilient to storms.

**4% — £0.2bn** of our non-core costs relate to facilitating the uptake of low carbon technologies by 2023:

- Smart network innovation trials.
- Facilitating smart metering roll out by electricity suppliers and using the data from the meters.
- Enabling customers to use up to:
  - 620,000 solar panel installations (3% of households).
  - 310,000 heat pump heating systems (9% of households).
  - 130,000 electric vehicles (4% of households).

**8% — £0.4bn** of our costs allow us to accommodate customers' future requirements:

- Upgrading 125 major substations (each supplying between 1,000 and 20,000 customers) creating up to 500MW of local capacity for future customer needs.
- Connecting up to 5GW of new renewable generation.
- Connecting up to 2.5GW of housing, commercial and industrial customers.

• Accommodating 1% load growth.

**21% — £1.1bn** of our costs are other non-core costs, including:

- Corporation tax paid to UK government.
- Business rates paid to local government.
- Transmission charges paid to National Grid.
- Legacy pension costs.

**19% — £1.0bn** of our costs are engineering and corporate support activities, including:

- Recruitment and training of up to 100 apprentices and graduates per annum.
- Project management.
- Vehicles for our staff.
- Control rooms and call centres.
- Network design and management.
- Operating 34 offices & depots.

**2% — £0.1bn** of our costs relate to Real Price Effects

- An independent economic view of the increased costs above the Retail Price Index.

# Outputs

Our commitments to transform the way you think of us as your electricity network company

## Outputs

Our Outputs are the things that our customers and stakeholders directly experience and value. We have laid out our comprehensive outputs package within Chapter 8 — Our outputs and incentives.

### Highlights from our six output categories

Output Area	We will
<b>Safety</b> Minimising the risks associated with distributing electricity	<ul style="list-style-type: none"> <li>• Achieve zero employee lost time accidents</li> <li>• Work with contractors to reduce their accident rates by 75%</li> <li>• Remove high risk 'low' lines including those across roads by 2015 and all others by 2020</li> <li>• Continue our industry leading approach to renew end of life cables in flats</li> <li>• Increase our extensive public education programmes</li> </ul>
<b>Reliability &amp; Availability</b> Ensuring our network is resilient to extreme events and reliable under normal circumstances	<ul style="list-style-type: none"> <li>• Reduce the average number of times customers lose power by 7%</li> <li>• Reduce by 16% the length of time those customers have no power</li> <li>• Reduce by 25% the average time all customers are without power</li> <li>• Improve service to 40% of our poorly served customers</li> <li>• Improve service to 25% of our worst served customers</li> <li>• Reduce customers without power for more than 12 hours by 70% by 2016 and 100% by 2023.</li> <li>• Pay double Guaranteed Standard payments, excluding storms, where we make other arrangements</li> <li>• Introduce a voluntary Guaranteed Standard for restoration after storms</li> </ul>
<b>Environment</b> Reducing our impact on the environment and playing our part in the low carbon transition	<ul style="list-style-type: none"> <li>• Install lower loss transformers to reduce Electricity Supplier costs by up to £60M over the next 50 years</li> <li>• Reduce the carbon footprint of the business year on year</li> <li>• Reduce cable oil leaks by 50%</li> <li>• Buy equipment that far exceeds IEC international standards for SF6 insulating gas leakage rates</li> <li>• Underground 85km of overhead lines in areas of visual importance</li> </ul>
<b>Connections</b> Providing excellent service to all customers who want new connections	<ul style="list-style-type: none"> <li>• Continue to facilitate industry leading competition in our network areas</li> <li>• Improve our communication channels with customers</li> <li>• Improve availability and transparency of connection information and costs</li> <li>• Connect our new customers in time scales that are amongst the industry best</li> <li>• Pay customers double compensation for any Guaranteed Standard failure</li> </ul>
<b>Customer Satisfaction</b> Continuously improving	<ul style="list-style-type: none"> <li>• Improve our overall customer satisfaction scores by 20% by 2023</li> <li>• Never force disconnect calls, always give the option to speak with a person</li> <li>• Communicate with customers proactively and in ways that they prefer</li> <li>• Pay compensation of £10 where we do not deliver an agreed action on your enquiry.</li> <li>• Continue to offer hot meals and accommodation to vulnerable customers after 12 hours in exceptional events, and within 48 hours to all customers*</li> </ul>
<b>Social obligations</b> Recognising and meeting the needs of vulnerable customers	<ul style="list-style-type: none"> <li>• Roll out an awareness campaign for our Priority Services Register (PSR)</li> <li>• Contact PSR registered customers every 2 years (minimum)</li> <li>• Contact PSR registered customers more frequently before planned outages and during emergency power cuts customer service</li> <li>• Train our people to recognise and deal with vulnerable customers sensitively</li> <li>• Establish a specific network fund within the framework of the existing Energy People Trust to target initiatives to help vulnerable customers</li> </ul>

# Secondary deliverables

## Efficiently maintaining network safety and performance

Secondary deliverables are critical activities that form part of our regulatory contract and include management the health of our assets (Health Index) and the relative loading of our network (Load Index).

### Health Index

Our plan is to prevent the deterioration of our network over the next two decades, and manage increased risk during the intervening period through:

- *New programmes of life extending asset refurbishment to complement asset replacement.*
- *More frequent inspections and intrusive maintenance of assets with higher risk of failure.*
- *Introduction of on-line monitoring in major substations to identify potential failures before they occur.*

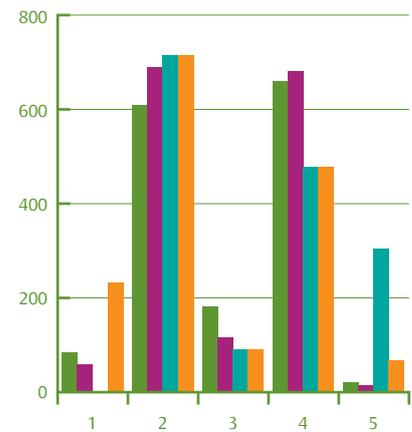
Our investment plans to manage our network are set out in detail in Chapter 9 — Our expenditure forecast and our secondary deliverables are detailed in Annex 2.2.

### Load Index

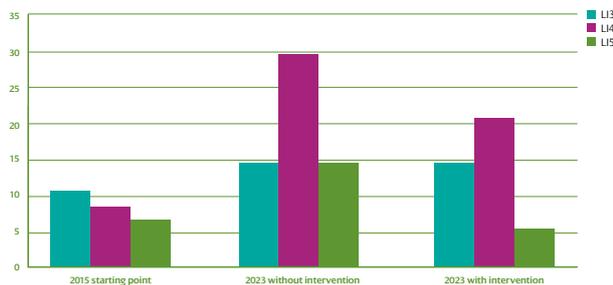
Increasing load on our network will trigger reinforcement when it reaches a certain level. Our plan, supported strongly by stakeholders, is to adopt a reduced trigger point for reinforcing our network. This 20% reduction (explained in more detail in Chapter 5 — Meeting our challenges and Chapter 9 — Our expenditure forecast), does not go as far as some other electricity distributors, but we believe strikes the right balance of cost and risk for existing and future customers.

More detail of our proposed asset investments and their impact upon both Health and Load Index are detailed in Chapter 9 — Our expenditure forecast and set out in detail within Annex 2.2 — Health Index Graphs (accompanying this document) showing the impact across our range of asset categories. Our Zonal Maps within our Annex 2.9 provide a geographical display of our investment plans.

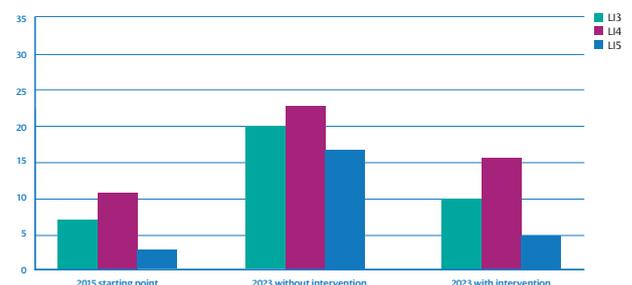
### 33 kV Circuit Breakers



SPD Load Index Change



SPM Load Index Change



# Financing our plan efficiently

**Our financing proposals are efficient and strike an appropriate balance of risk and reward between stakeholders**

In any price control review the regulator allows network operators to collect money from customers in order to pay dividends and interest charges. These account for around 20% of our charges to suppliers (3% of customers' bills).

Ofgem challenge network operators to prove that their financing plans are efficient. In other words, we must show that we are asking our customers to pay enough, but no more than we really need, to attract and retain funding from investors. If we receive too little, we won't be able to obtain sufficient funds from investors to allow us to maintain the network. If we receive too much, our shareholders will receive higher returns than they deserve. Neither is in the interests of customers.

We have prepared an efficient financing plan which meets this challenge. Scottish Power Transmission was 'fast tracked' at the RIIO-T1 review. We have learnt from that process and have further improved the quality and transparency of our evidence to demonstrate the efficiency of our financing plan.

## Cost of debt (The cost of borrowing to fund investments) — Indexed

Ofgem prescribe a mechanism which links this to an index. The purpose is to ensure that customers will only pay for efficient debt costs. Our financing plan uses Ofgem's proposed simple 10 year trailing average for this index without adjustment.

## Cost of equity (The cost of financing investments from shareholder equity) — 6.7%

We have carried out a thorough analysis which takes account of theoretical models, market evidence, stakeholders' views and relevant regulatory precedent. We are also taking into account risk, after mitigation from uncertainty mechanisms.

## Notional gearing (The proportion of investments funded by borrowing) — 65%

Our work on setting the notional gearing fully takes into account interactions between cash flow volatility and the cost of equity, again taking into account the risks and opportunities afforded by the overall package and their impact on the return on regulatory equity.

## Other financing parameters and policies

Our plan fully reflects Ofgem's prescribed policies including those applicable to the treatment of pensions and tax.

## Financeability

We tested that our financing plan is efficient by carrying out an assessment similar to that used by credit rating agencies including qualitative factors such as the regulatory environment. We targeted a credit rating that is consistent with that built in to the cost of debt index and with our licence obligation to maintain an investment grade credit rating. We have not included financeability adjustments under our fast track assumptions.

We have set out our approach to financing and provided supporting analysis in Chapter 12 — Financing our plans efficiently and Annex 3.1 — Efficiently financing our plans and our detailed financeability scenarios.

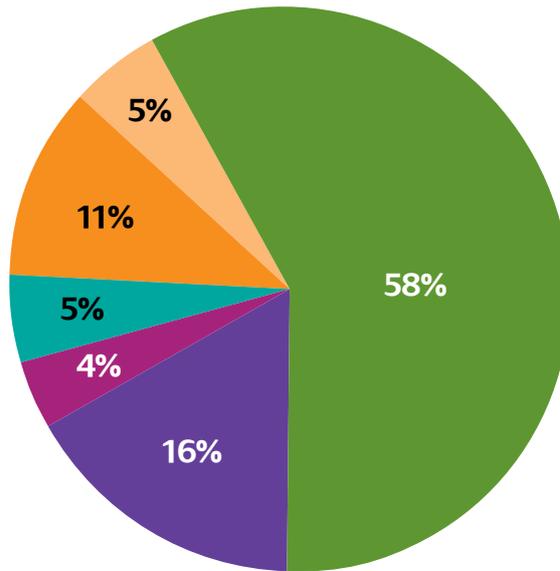
Parameter	Electricity Distribution DPCR5 2009	SPEN July 2013
Cost of Debt	3.6%	Indexed
Cost of Equity	6.7%	6.7%
Notional Gearing	65%	65%
Dividend Yield	5%	5%
Capitalisation	85%	80%
Asset Lives	20 years	45 years for new investments
Financeability	Investment Grade	Investment grade

# Our revenues and customer impact

## The makeup of average UK customer's electricity bill

- 58% — Wholesale energy, supply costs and profit margin
- 16% — Distribution charges
- 11% — Environmental charges
- 5% — Other costs
- 5% — VAT
- 4% — Transmission charges

*Ofgem customer bill fact sheet January 2013.*



## Our charges and customers' electricity bills

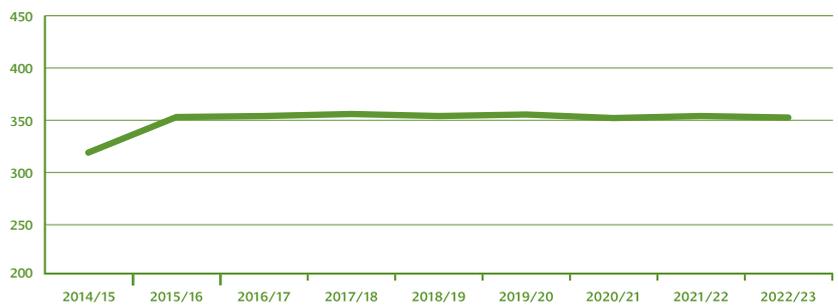
Ofgem publishes information on the components of customers' electricity bills. The latest information shows that electricity distribution charges make up 16% of customer's electricity bills on average across the UK.

### Base allowed revenues that we charge to suppliers

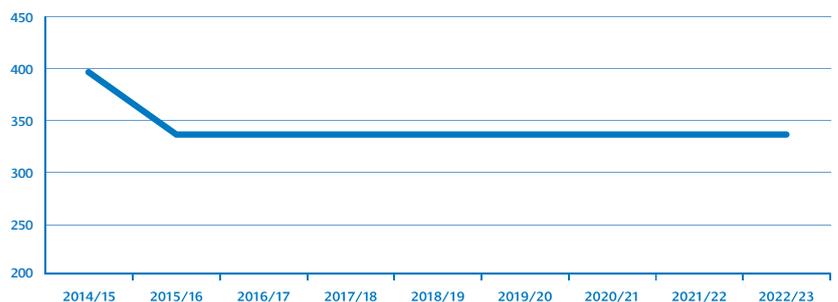
The impact of our plan and financial modelling results in the following **base** allowed revenue profiles for our two network companies:

The **total** allowed revenues we will be allowed to recover from suppliers will be subject to the outcome of the RII0 ED1 settlement by Ofgem and our performance against the incentives we outlined earlier.

Annual revenue – SPD (£m 2012/13 prices)



Annual revenue – SPM (£m 2012/13 prices)



# Bill impact

## What do our current draft plans mean for our customers?

We are acutely aware of the financial pressures on customers and the other factors that increase electricity bills. We have built our investment plans to maintain safety and network reliability while minimising costs, and we have increased our plans from this point only when supported by our stakeholder engagement in terms of concept and willingness to pay.

In order to provide comparability across network companies we are required to present the bill impact as movement relative to typical 2014–15 charges and using UK average domestic consumption 3,300 kWh.

We have also included average 2010–15 domestic customer charges (updated to 2012–13 price basis) consistent with the information at our stakeholder events.

The average domestic customer in Merseyside, Cheshire, North Wales and North Shropshire (SPM) will see our component of their bill drop 12% from £126 p.a. to £111 p.a. average (2015-2023).

The average domestic customer in Central and Southern Scotland (SPD) will see our component of their bill drop 8% from £99 p.a. to £91 p.a. average (2015-2023).

These numbers are expressed in 12/13 prices and will vary depending on actual inflation and consumption.

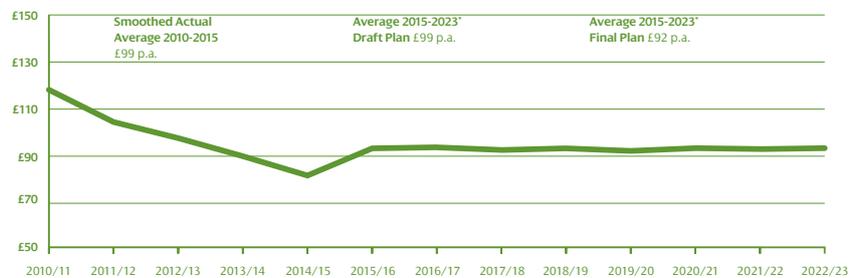
### Why is the SPM bill higher?

There are two reasons for this, firstly this is a consequence of differences between when assets were installed in SPD and SPM.

Secondly, our distribution network in England and Wales includes the 132kV network, in Scotland this part of the network is owned by the Transmission companies and therefore these costs are included within the charges SPD customers receive via their energy supplier.

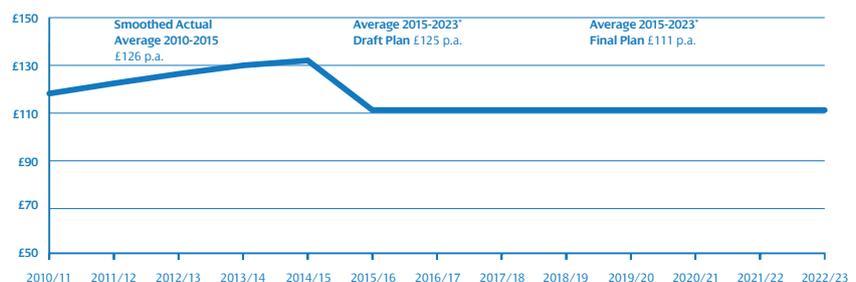
*Our customer bills, based on UK average consumption will reduce by an average 8% in Scotland and 12% in England and Wales*

Average domestic bill – SPD



*\*Based on UK average consumption*

Average domestic bill – SPM



*\*Based on UK average consumption*

SPD 12/13 Prices	Average bill 2010-2015	Average bill 2015-2023	Change %
Small business	£399	£381	-5%
Medium business	£8,993	£8,520	-5%
Large business	£53,645	£51,113	-5%
Unmetered	N/A	N/A	-5%

SPM 12/13 Prices	Average bill 2010-2015	Average bill 2015-2023	Change %
Small business	£403	£387	-4%
Medium business	£6,864	£6,577	-4%
Large business	£44,056	£42,238	-4%
Unmetered	N/A	N/A	-4%



**Our customer bills,  
based on UK average  
consumption will  
reduce by an average  
8% in Scotland and 12%  
in England and Wales.**

Summary of key information for our stakeholders – Our vision for ED1 and our plans to deliver our vision.

1. Executive summary

Our business plan is written with our readers in mind, takes into account the things that make us unique and is underpinned by a robust process.

2. A guide to this document

3. About us

4. Process of creating our business plan

Our plans to meet the challenges of the ED1 period are informed by extensive stakeholder engagement and the consideration of alternative and innovative methods.

5. Meeting our challenges

6. Learning from our stakeholders

7. Our innovation strategy

Our clear and comprehensive output commitments are underpinned by a robust, deliverable and efficient programme of expenditure.

8. Our outputs and incentives

9. Our expenditure forecast

10. Business readiness

Our plans are resilient to uncertainty, efficiently financed and minimise the impact on our customers.

11. Uncertainty

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Our plans enable us to help shape the energy future and our continual improvement is informed by enduring stakeholder engagement

14. Looking to the future

15. We are part of the Iberdrola group

16. Glossary

Our supporting annexes give additional detailed information to support our plans.

Volume 1 – Stakeholder, customer & IT

Volume 2 – Engineering

Volume 3 – Finance and expenditure

## 2

# A guide to this document

How this plan fits together, how it meets the expectations of Ofgem and our stakeholders and how to navigate through the document

Our comprehensive business plan sets out our commitments to our customers and stakeholders and our plans for delivering them during the period from April 2015 to March 2023.

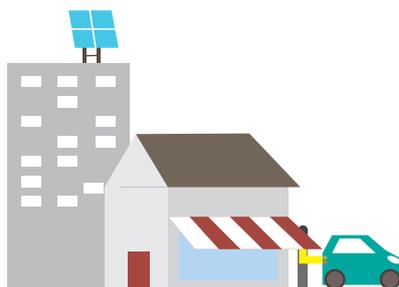
Our plan is designed to be readable and accessible for our customers, stakeholders and staff. We know that our readership will come from a wide variety of expert and non-expert backgrounds.

This chapter describes how our plan fits together:

- *It gives an overview of each chapter and introduces our document navigation map.*
- *It shows how our plan meets the expectations of Ofgem and our stakeholders.*
- *It maps key themes to the relevant sections of our plans.*

## In this chapter:

- Our published business plan
- Meeting the expectations of Ofgem and our stakeholders
- Key themes



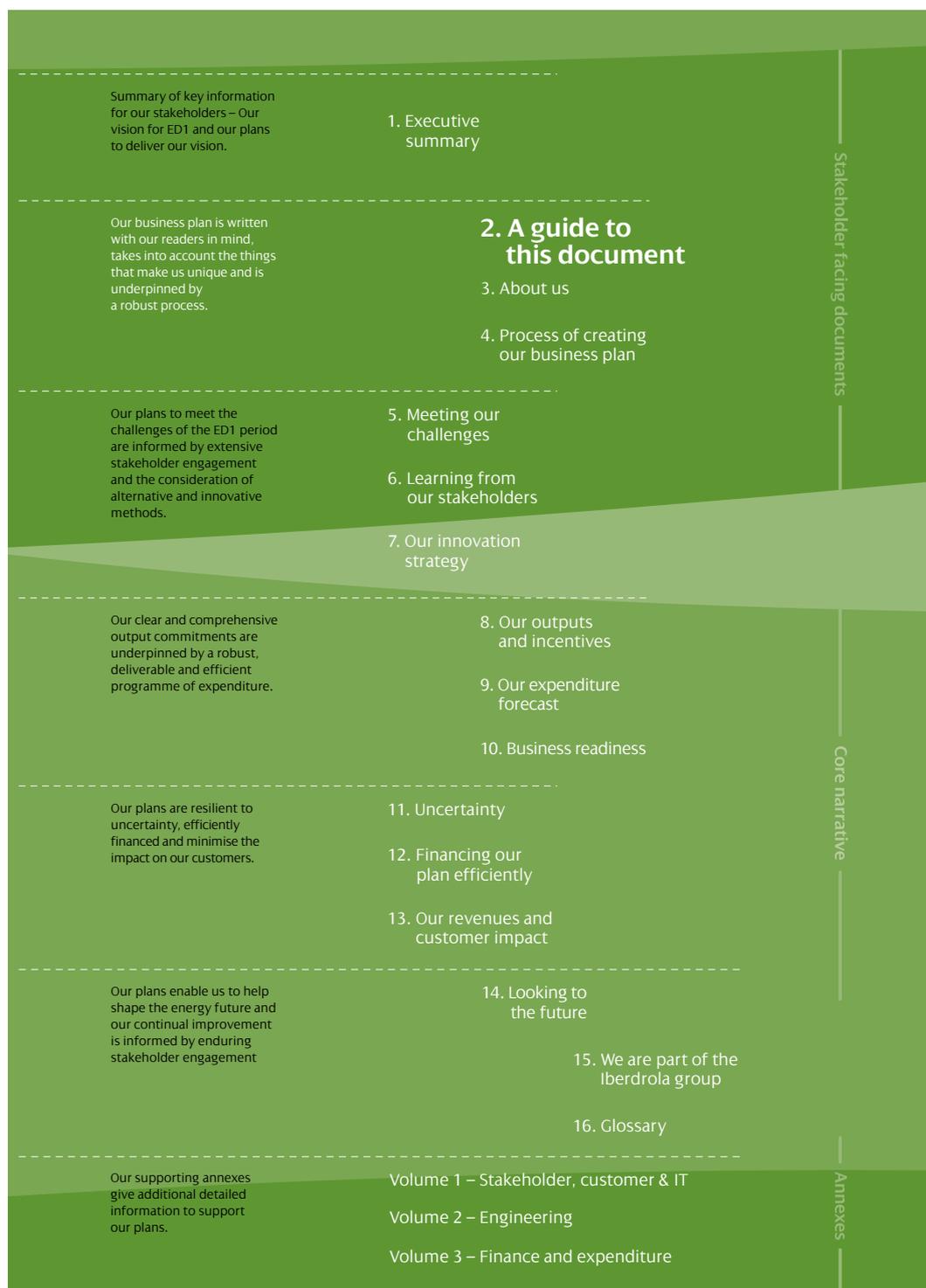
# Our published business plan

We have thought about our audiences and written our plan with them in mind:

- *Using plain English throughout.*
- *Producing a visually engaging plan.*
- *Optimising our published plan to be equally accessible in print or online.*
- *Using document maps, contents lists and hyperlinks to aid navigation.*

Chapter	Title	Page	Description
i	Message from Frank Mitchell, CEO	4	Our vision for ED1 and key elements of our plan.
1.	Executive summary	7	Our whole business plan in brief.
2.	A guide to this document	17	How this plan fits together, how it meets the expectations of Ofgem and our stakeholders and key themes.
3.	About us	23	Who we are, what we do and the things that are unique to us.
4.	Process of creating our business plan	35	The robust processes underpinning our plans and minimising our impact on our customers.
5.	Meeting our challenges	47	The universal challenges and opportunities of the ED1 period and those unique to our areas of operation.
6.	Learning from our stakeholders	57	Who we engage with, how we engage with them, the feedback we receive and how this has influenced our plans.
7.	Our innovation strategy	69	The ways in which we use innovation to improve our services and provide long term value for money.
8.	Our outputs and incentives	89	Our ambitious and well justified output commitments and the related incentives.
9.	Our expenditure forecast	125	Our expenditure forecast and the processes we have used to make our expenditure efficient.
10.	Business readiness	179	Our preparations to deliver our commitments.
11.	Uncertainty	191	Our plans to manage areas of uncertainty, such as the uptake of low carbon technologies.
12.	Financing our plan efficiently	197	Setting our competitive financial package to attract and retain funding from our investors.
13.	Our revenues and customer impact	229	The money we will recover from electricity suppliers and the effect this will have on our customers' bills.
14.	Looking to the future	235	How we will shape the energy future and how to get involved.
15.	We are part of the worldwide Iberdrola Group	239	Making the most of being part of the Iberdrola Group.
16.	Glossary	243	Industry-specific terms explained.
	Annexes Volume 1		Supporting information on our stakeholder engagement, our commitments to customers and our IT strategy
	Annexes Volume 2		Supporting information on the engineering aspects of our plan
	Annexes Volume 3		Our full financing plan and supporting information on our expenditure

Our document map placed at the beginning of each chapter enables readers to navigate our document with ease.



# Meeting the expectations of Ofgem and our stakeholders

In addition to our document map, this document can be navigated through the following table, which maps our chapters against the criteria that Ofgem and other stakeholders will use to assess the effectiveness of our plan.

Criteria	Refer to
<b>Process: Have we followed a robust process?</b>	
Our business plan is clearly presented, with all key content included.	Chapter 2 — A guide to this document Chapter 4 — Process of creating our business plan
We have engaged with stakeholders, and explained how this has influenced our business plan.	Chapter 6 — Learning from our stakeholders Annexes — Volume 1
We have submitted, and justified, all data templates and the PCFM.	Chapter 4 — Process of creating our business plan
Our business plan provides a strategy for long-term delivery.	Chapter 10 — Business readiness
<b>Outputs: Does the plan deliver the required outputs?</b>	
Our business plan covers the outputs specified in the Ofgem strategy decision and it provides clear and compelling justification for any departures from the strategy decision.	Chapter 8 — Our outputs & incentives
We have explained the resource implications for delivery of each output identified.	Chapter 10 — Business readiness — Resourcing
We have explained how we will deliver outputs, and justified our output baseline/forecast.	Chapter 8 — Our outputs & incentives Chapter 9 — Our expenditure forecast
We have explained the quality of our existing outputs and secondary deliverable information (including information on asset health, criticality and asset risk) and how we plan to improve this information in future.	Chapter 9 — Our expenditure forecast
<b>Efficient expenditure: Are our costs for delivering the outputs efficient?</b>	
We have demonstrated that cost projections are efficient.	Chapter 9 — Our expenditure forecast — Cost assessment
Our plan compares favourably to the plans of other DNOs and our plan reflects best practice.	Chapter 9 — Our expenditure forecast — Cost assessment
We have provided evidence that our costs are efficient (eg through market-testing).	Chapter 9 — Our expenditure forecast — Cost assessment
We have explained cost projections in the context of historical performance.	Chapter 9 — Our expenditure forecast
We have demonstrated a consideration of alternative approaches to achieving value for money in the delivery of our outputs.	Chapter 7 — Our innovation strategy Chapter 9 — Our expenditure forecast — cost benefit analysis
We have clearly linked our expenditure to relevant outputs and secondary deliverables.	Chapter 9 — Our expenditure forecast
<b>Efficient Financing: Are our proposed financing arrangements efficient?</b>	
Our business plan conforms to the financial policies specified in the Ofgem strategy and any departures are well-justified.	Chapter 12 — Financing our plan efficiently
We have provided evidence that our financial costs are efficient.	Chapter 12 — Financing our plan efficiently
The data in our plan is consistent and we have explained cost projections in the context of historical performance.	Chapter 9 — Our expenditure forecast
<b>Uncertainty &amp; Risk: How well does our plan deal with uncertainty and risk?</b>	
We have clearly articulated the key uncertainties we face and considered how we will address them (eg including uncertainty mechanisms).	Chapter 11 — Uncertainty
We have considered risk and how to mitigate those risks.	Chapter 11 — Uncertainty

# Key themes

The table below maps individual cost, output, uncertainty and finance areas to the relevant sections of our plan.

Area	Key theme	Page	Related annex
Outputs	Safety	92	2.2 — Health index graphs
	Reliability and availability	98	2.2 — Health index graphs 2.6 — Assessment of overhead line performance during severe storms 2.7 — Written evidence to Scottish Affairs Committee 2.10 — SP Manweb urban network
	Environment	104	2.3 — Cost benefit analysis
	Connections	108	N/A
	Customer satisfaction	112	1.4 — Customer service and social obligations strategy
	Social obligations	120	1.4 — Customer service and social obligations strategy
	Costs	Managing our ageing network	141
Accommodating future customer needs		160	2.3 — Cost benefit analysis 2.4 — HV and LV network investment analysis 2.8 — SPEN ED1 review project
Engineering and corporate support costs		166	N/A
Facilitating the low carbon future		173	2.1 — Innovation strategy 2.3 — Cost benefit analysis 2.4 — HV and LV network investment analysis 2.8 — SPEN ED1 review project
Non-core costs		174	N/A
Real price effects		175	3.3 — Forecasting real price effects and ongoing productivity improvements
Uncertainty		Smart metering	192
	Service position modernisation to allow smart meter installation	192	N/A
	Corporation tax	192	N/A
	Uptake of low carbon technology	193	2.4 — HV and LV network investment analysis
Finance	Allowed return	200	3.1 — Financing our plans 3.2 — Risk modelling
	Evolution of the RAV	225	3.1 — Financing our plans
	Financial policies	226	3.1 — Financing our plans 3.2 — Risk modelling 3.5 — Insurance strategy 3.6 — Price control financial model

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# 3

## About us

### Who we are, what we do and the things that are unique to us

We are the regional electricity distribution company delivering electricity to 2 million customers in the South of Scotland and 1.5 million customers in Merseyside, Cheshire, North Wales and North Shropshire. Our workforce of 2,500 internal employees, spread widely across 34 locations, is supplemented by around 2,500 contractors.

We are an engineering company with strong stewardship of assets and world class safety credentials. Our focus on public safety has us leading the industry in dealing with low overhead line clearances and replacing our end of life cables in flatted properties.

Our focus on network resilience to storms has delivered a 75% improvement since 1998. Our customers currently have 30% fewer interruptions than the UK average.

We are resolute in our goal of excellent customer service and are committed to continue to deliver improvements that customers will feel and value.

#### In this chapter:

- Our network
- Our organisation and communities
- How do we compare with others?
- Delivering our 2010–2015 regulatory contract
- Why RIIO-ED1 important?



# Our network

We are a proud engineering company with a strong heritage in asset stewardship and world class safety credentials. Our priorities are:

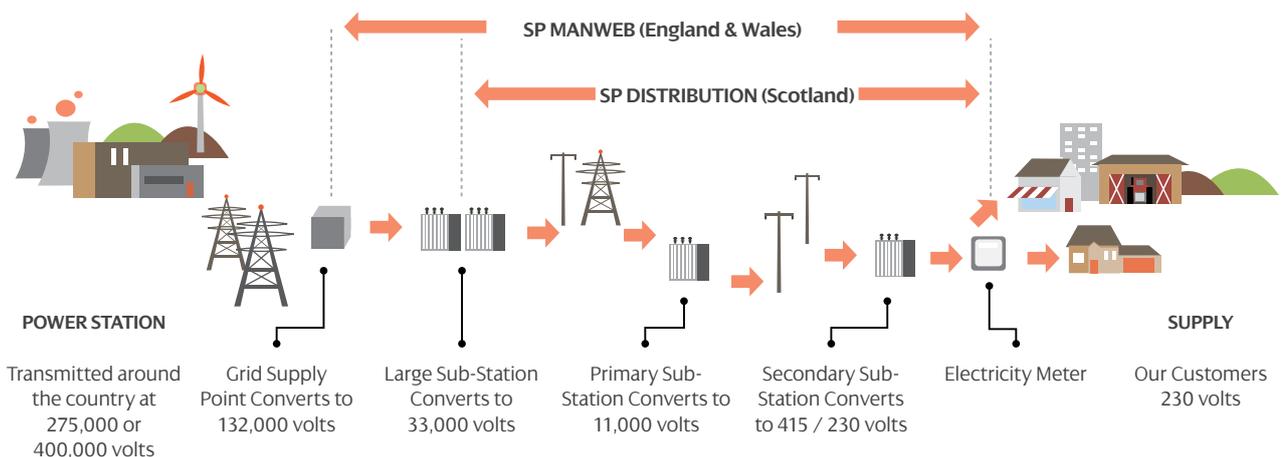
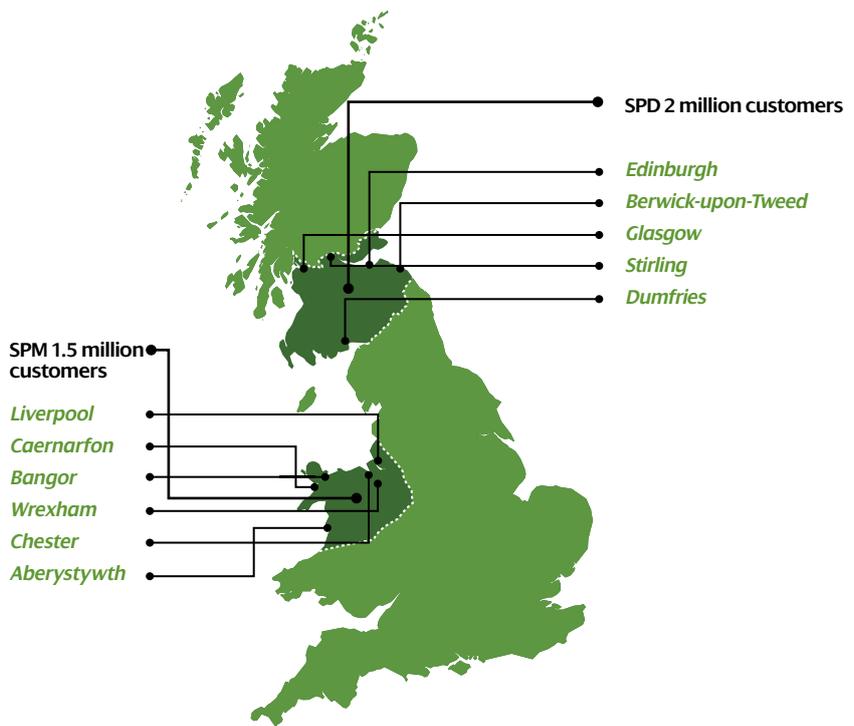
- *The health & safety of the public, our employees and contractors.*
- *Maintaining high levels of security of supply.*
- *Providing complete customer satisfaction — getting it right first time every time.*
- *Delivering appropriate levels of capital investment and maintenance activities to modernise the network and meet customers new needs.*
- *Innovating to reduce costs and improve services to customers.*
- *Playing our part in facilitating the Energy Policies of the UK, Scotland and Wales.*
- *Leveraging the strengths of being part of the Iberdrola group for the benefit of our customers.*

We are the licensed Electricity Distributor (DNO) for the South of Scotland and the Borders (SP Distribution, SPD).

We are the licensed Electricity Distributor for Merseyside, Cheshire, North Wales and North Shropshire (SP Manweb, SPM).

We have 30,000 substations (one substation for every 100 customers), more than 40,000km overhead lines (once around the globe), and 65,000km of underground cables.

Our network is vast and to replace it today would cost more than £10bn.



# Our organisation and communities

We are a substantial employer with a workforce of 2,500 internal employees based at 17 locations in the South of Scotland and 17 locations in England and Wales. We utilise around 2,500 contractors across these areas.

We operate in three of the UK's largest cities (Glasgow, Edinburgh, and Liverpool) accounting for 1.6m (43%) of our customers, as well as three significant rural areas (Scottish Borders, Dumfries and Galloway and North Wales).

Within our licensed areas are a range of communities, from some of the UK's most deprived and fuel poor locations to remote rural communities, some of which are not on the gas grid and solely reliant upon electricity for energy.

We operate to international standards across all aspects of our business operations. Our systems are audited and certified by Afnor UK Ltd, who in turn, are a United Kingdom Accreditation Service (UKAS) certified company.

SPEN are certified to:

- *ISO9001: 2008 — Quality Management Systems.*
- *ISO14001: 2004 — Environment Management System.*
- *OHSAS18001: 2007 — Occupational Health and Safety Management Systems.*
- *PAS55: 2008 — Optimal Management of Physical Assets.*

## SPD

**Lanarkshire**  
HQ/Offices /Depots: 5  
Staff: 675

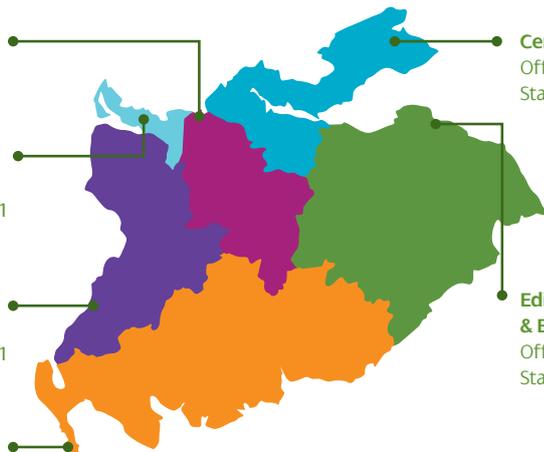
**Glasgow & Clyde North**  
Offices/Depots: 1  
Staff: 75

**Ayrshire & Clyde South**  
Offices/Depots: 1  
Staff: 100

**Dumfries & Stranraer**  
Offices/Depots: 3  
Staff: 75

**Central & Fife**  
Offices/Depots: 3  
Staff: 200

**Edinburgh & Borders**  
Offices/Depots: 4  
Staff: 200



## SPM

**Wirral**  
Offices/Depots: 3  
Staff: 425

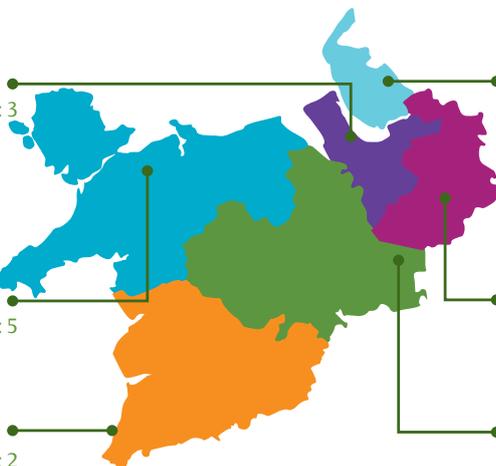
**North Wales**  
Offices/Depots: 5  
Staff: 150

**Mid Wales**  
Offices/Depots: 2  
Staff: 50

**Merseyside**  
Offices/Depots: 1  
Staff: 250

**Mid Cheshire**  
Offices/Depots: 2  
Staff: 150

**Dee Valley/ Oswestry**  
Offices/Depots: 4  
Staff: 150



All four management systems operate together as an integrated management system.

We plan to add the Business Continuity Standard, ISO 2230, to our portfolio of standards, becoming part of our integrated management system during 2015.



# How do we compare with others?

**Our goal is to be the best electricity network company in the UK**

**In this section:**

- Our focus on public safety
- Our focus on network resilience
- Reliability of customer supply
- Our focus on customer service

We compare our performance against our peers, we recognise we can always improve, and we take steps to achieve this aim. We are relentless in our pursuit of excellence.

## Our focus on public safety

Safety, whether public or employee, is our top priority, and is at the forefront of everything that we do. During the last 5 years, we have led the industry in addressing two significant public safety risks:

- *End of life cables in high-rise and tenement flats.*
- *Old overhead lines that do not meet modern height and clearance standards.*

### Replacing end of life cables in high-rise and tenement flats

Some common areas of high-rise and tenement flats contain very old cables. It's not always clear whether the responsibility for the maintenance and eventual replacement of these cables lies with the building owner or the electricity distributor.

We believe that this poses an unacceptable safety risk to the buildings' occupants and we are proactively replacing these cables where no clear ownership can be easily established.

In 2010-12 we invested more than £20m to address this public safety risk.

We were the only UK distribution company to seek and obtain approval from Ofgem for additional works in the period 2012-2015.

We will invest over £30m in this area from 2012-2015.

We will continue this unique approach in ED1, spending in excess of £100m to further address this risk for more than 200,000 of our customers.

### Ensuring old overhead lines meet modern height and clearance safety standards

One of the ways we manage public safety is by making sure old overhead lines meet modern clearance standards. This minimises the risk of accidental contact with our live power lines. We have measured our entire overhead line network (40,000 km) and prioritised work to bring it up to modern standards. We will eradicate all high risk low overhead line clearances including those over roads by April 2015 and we are committed to resolving all other high risk issues by 2020.

### As well as protecting the public, we are also protecting our employees and contractors from harm

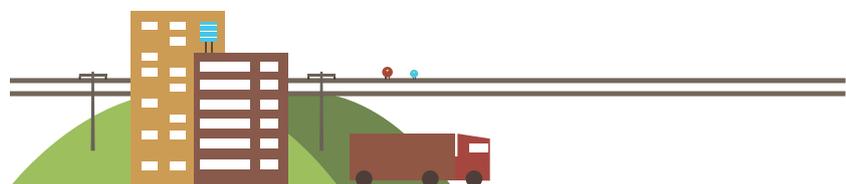
The UK electricity industry has a safety record that is envied the world over. SP Energy Networks safety performance is something of which we are rightly proud, but we are not complacent.

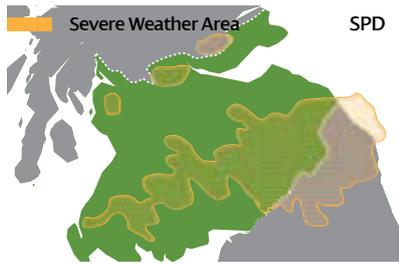
We reach beyond legal requirements, something that we see as a basic minimum and are passionate about investigating all incidents so that lessons can be learned quickly and improvements to our business become enduring.

This approach allows us to explore all incidents that cause harm, not just those that result in time away from work. **This relentless approach has borne great results, seeing our total accident rate improve by 70% over three years.**

Within our Chapter 8 — Our outputs and incentives we have outlined how we intend to deliver even greater levels of safety performance during the ED1 price review period.

***By 2015 we will have eradicated all high risk overhead clearances including 'low' clearances over roads***





## Our focus on network resilience

### Severe weather resilience

We are acutely aware of the hardships customers experience when they are without supplies for several days after major storms, and that this is more significant for vulnerable customers. With this in mind, **we will deliver a voluntary standard to reconnect our customers within 36 hours after storm events.**

### Case Study — The Boxing Day Storm in 1998

- *1 in 30 year storm event.*
- *affected more than 230,000 customers.*
- *Took 8 days to fully restore power.*
- *55% of customers restored within 1 day.*

After this experience, we commissioned a comprehensive review of our overhead line network and its capability to cope with extreme weather events, including risk of falling trees.

This review identified that large proportions of our networks in Scotland and Wales are in areas classified by the Met Office as particularly at risk of severe weather. As a result:

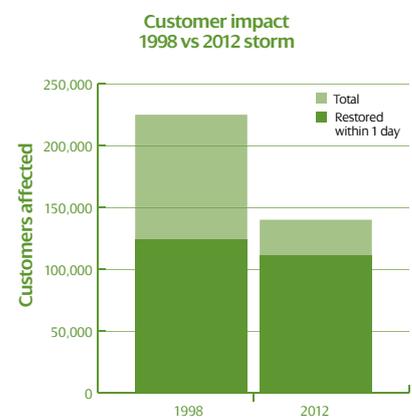
- *We have adopted an industry-leading approach of rebuilding overhead lines with specifications matched to expected weather conditions.*
- *We led the industry in developing a specification for tree clearance to make lines resilient to falling trees.*
- *We have installed more than 3,000 remote control switches to speed up the restoration of customer supply.*

This has led to significant improvements for our customers relative to other electricity network companies. In both of our network areas our performance in reducing power cuts is significantly ahead of the UK average, both including and excluding storm data.

### Case study — Jan 2nd Storm 2012

- *A 1 in 30 year storm event comparable to 1998.*
- *Affected 135,000 customers.*
- *No customers off longer than 4 nights.*
- *85% of customers restored within 1 day.*

**We have reduced the number of network power cuts in major storms by 75% since 1998**



**We will build upon this by targeting our investment to make 25% of our High Voltage rural overhead network resilient to severe weather by 2023 and we will double investment in our Low Voltage overhead line networks, making a further 32% resilient by the end of 2023**

## Reliability of customer supply

Our priority is to deliver a reliable supply of power to our customers. We have significantly reduced power cuts over recent years, and we will further reduce the number and duration of power cuts by 2023. Our targets cover the number of Customer Interruptions (CI) and the time that those customers are off supply (Customer Minutes Lost, CML). These targets take into account:

- The topography of our network — the Manweb network design delivers industry leading performance.
- The geography of our service area.
- Improvements already achieved.
- Improvements of other companies.

As we embrace the low carbon future, our customers will become increasingly reliant upon electricity for heating and transport. This means that our network must perform to a higher standard. We are investing and innovating to ensure we meet this challenge.

SP Energy Networks customers currently have 30% fewer interruptions than the UK average.

- Currently, an average customer in our SPD area experiences 5.3 power cuts every 10 years. Each of these power cut lasts an average of 93 minutes.
- Currently, an average customer in our SPM area experiences 3.6 power cuts every 10 years. Each of these power cuts lasts an average of 121 minutes.

To further improve the level of service our customers receive we will:

- Reduce the average number of times our customers lose their power supply by 7% and reduce the length of time those customers are without power by 16%. This means that:

- By 2023, our customers in SPD will experience an average of 4.9 power cuts every 10 years.
- By 2023, our customers in SPM will experience an average of 3.4 power cuts every 10 years.
- This means that by the end of the ED1 period, the average amount of time that a power cut lasts will be reduced to 78 minutes in SPD and 102 minutes in SPM.
- As a result of these improvements, reduce the average time off supply for our whole customer base by 25%.

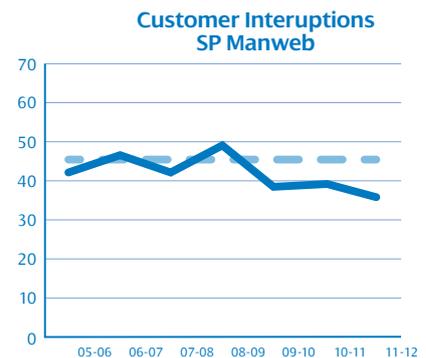
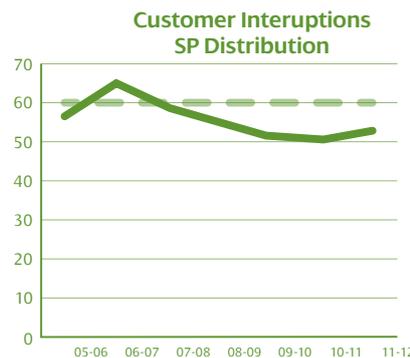
On average we have around 10,000 customers off supply each year for more than 12 hours across both our networks. We will:

- In the first year of ED1, reduce by 70% the number of customers experiencing a power cut of greater than 12 hours.
- Double our compensation payments for customers experiencing a power cut greater than 12 hours in the ED1 period (excluding major storms).
- Aim to have zero customers experiencing a power cut greater than 12 hours (excluding major storms) by the end of ED1.



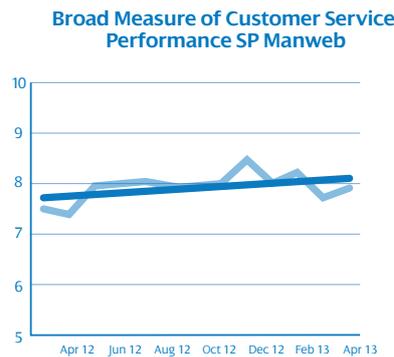
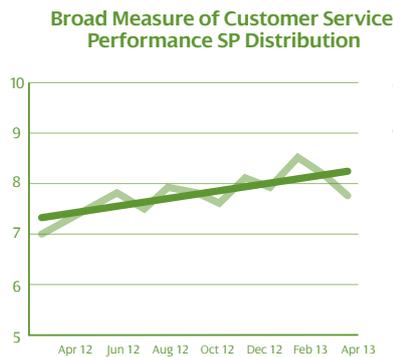
**SP Energy Networks customers currently have 30% fewer interruptions than the UK average.<sup>1</sup>**

<sup>1</sup>Based on last publicly released data 2010/11





*We are so resolute in attaining our goal of excellent customer service that we will pay double Guaranteed Standards payments and introduce a range of new voluntary compensation payments*



## Our focus on customer service

**Our goal is to become one of the leading DNOs for the delivery of excellent customer service.**

We appointed an experienced Customer Service Director who has driven improvements through all levels of our organisation in recent years. This has led to the introduction of greater accountability and a renewed focus on the fundamentals by working to:

- *Improve our performance in reducing the effects of power cuts on customers.*
- *Answer 100% of calls and never force disconnect a customer call.*
- *Give our customers good quality information.*

We ensure that customers always have a clear route towards the resolution of their complaint.

We've engaged with our customers and worked with the Institute of Customer Service to benchmark across the service industry, sharing best practice on how to improve customer service.

Feedback from customers is important in helping us better understand how we can meet the needs of the people we serve, and so we wanted a forum through which we could regularly test our customer service initiatives and gain feedback on a variety of topics.

**Our Online Community was launched in 2011** and now has 724 members. It provides us with honest, unfiltered feedback, and includes online focus groups, polls, surveys, and discussions. For this reason, we are keen to extend the community to a wider number of customers. We pro-actively recruit people to the community, and details of how to join are provided on our customer letters and website.

By talking openly, listening carefully and taking a proactive approach, we will achieve a 20% improvement in our overall customer service scores by 2023, placing us among the best in the industry.

Our customer service scores are increasing month by month and year by year.

- *Our concerted efforts are paying off.*
- *Our customer service metrics are showing the fastest rate of improvement in the industry.*
- *Our customers can feel the difference.*

Our goal is to become one of the leading DNOs for the delivery of excellent customer service. We have developed a comprehensive range of Customer Commitments, which cover all aspects of our business and far exceed the minimum guaranteed standards set by Ofgem. Added to this, we are investing in multi-channel communications systems to further benefit our customers now, into the ED1 period and beyond.

You can find more information about our online community: [http://www.spenergynetworks.co.uk/serving\\_our\\_customers/online\\_community.asp?NavID=1&SubNavID=5](http://www.spenergynetworks.co.uk/serving_our_customers/online_community.asp?NavID=1&SubNavID=5)

# Delivering our 2010-2015 regulatory contract

## Secondary deliverables

Secondary deliverables are critical activities that form part of our regulatory contract and include managing the health of our assets (Health Index) and the relative loading of our network (Load Index).

*We are committed to meeting our current regulatory contract*

## Health Index (HI)

In March 2013, we completed the third year of our DPCR5 Health Index programme and at that point had delivered almost 50% of the outputs for SPD and just over 40% for SPM.

This demonstrated significant progress from where we ended the previous year at 16% for SPD and 11% for SPM respectively. The present position in SPM reflects the scale and timing of our 132kV programme, which alone accounts for approximately 40% of the total HI outputs to be achieved.

We are making substantial progress on the SPM 132kV programme, with the vast majority of the key projects through design and in the procurement and construction phases.

These new assets will be energised over the final 2 years of DPCR5 and will be recognised in our results in those years. Outside of the 132kV programme, our performance across all of the other programmes in SPM is now over 50% complete.

Despite our slow start on our Health Index programmes across both Licences, our progress rates are now completely in line with what is needed to achieve full delivery of our commitments by the end of DPCR5.

For example, during the period between January 2011 and December 2012, monthly contractor man hours deployed on our key programmes rose by approximately 69%, from 130,000 to 220,000.

Over the last year, we have reviewed our internal reporting processes and we also engaged a recognised industry consultancy to undertake an independent review of our governance arrangements for Health Index reporting.

Our analysis identified that our results at the end of 2011/12 did not reflect all of the deliverables we had achieved at that stage. We have now addressed the underlying issues so that our results provide an up to date assessment of our progress.

## Load Index (LI)

The Load Index (LI) is a key regulatory deliverable for the reinforcement of primary (33kV) and 132kV network substations. Each primary substation was given an LI rating of LI1 (low) to LI5 (high) based on the percentage of its firm capacity utilised at its point of maximum demand. The bandings for the LI1 to LI5 ratings were set individually by each company to reflect their approach to asset management and network risk.

The maximum demand at a substation, a key element in the calculation of LI rating, is largely driven by our customers' usage at a particular point in time and this profile will vary across our franchise area. As a result, performance against the LI deliverable is not wholly within our control, and the actual schemes we deliver reflect the actual changes in our customers energy needs:

- *Some schemes have been deferred reflecting both the economic downturn and customer uptake in demand being less than forecast.*
- *Alternatively, other schemes are now required to accommodate previously unidentified customer demand.*

Overall this has resulted in some delay to investments, however, we intend to meet our regulatory commitments.

SP Distribution completed two schemes in 2012/13, and will complete a further seven in 2013/14 and seven in 2014/15.

The SPM network is unique in the UK (refer to Chapter 5 — Meeting our challenges — Our unique challenges). Due to the design, which uses smaller transformers, more reinforcement projects are usually necessary. In SPM, forty-five schemes were originally identified for DPCR5 and five additional schemes are now required due to network compliance issues around Chester, Nantwich, Ellesmere Port and St Asaph.

Our annual report for 2012/13 will show that seventeen schemes have been completed, thirteen are scheduled for completion in 2013/14 and a further twelve in 2014/15. All the remaining schemes will have commenced by 2015 and will be substantively complete in 2015/16.

## Safety

Earlier in this chapter we have outlined our industry leading approach to addressing:

- *Replacement of end of life cables in high rise and tenement flats.*
- *Old overhead lines that do not meet modern height and clearance standards.*

Whilst these investments are not recognised by the regulatory metrics agreed with Ofgem, we have led the industry in addressing these significant public safety risks:

- *By 2015 we will have modernised services for almost 70,000 customers in flatted properties.*
- *We have measured 100% of our overhead line network (40,000km).*
- *By 2015 we will have eradicated all high risk overhead clearances, including 'low' road crossings.*

## Flood risk

Using the Environment Agency flood risk data we have identified substations that are at higher risk of flooding. We apply a different degree of flood prevention dependent on the potential impact to customers and assess each site for the most cost effective solution. We have also invested in portable flood defences which can be quickly deployed for localised flooding incidents.

Our original plans included:

- *All of our large 132kV substation sites assessed and compliant to 1 in 1000 year event • 9 primary substation sites in SPD assessed and compliant to 1 in 100yrs event (SEPA standard).*
- *15 primary substations in SPM assessed and compliant to 1 in 200yrs event (EPA standard).*

During 2011/12, we completed SPD schemes in accordance with our forecast. In the same period in SPM we were actively engaged with stakeholders on broader flood mitigation measures in the Warrington area that would also afford more efficient protection to our substations rather than protecting them individually.

Our approach, following agreement with Ofgem in 2010, has been to commission detailed expert surveys of locations at risk to ensure the flood defences scoped are efficient and effective. In a number of cases, the detailed surveys have identified that no additional works are required to achieve compliance to industry standards, which is good news for our customers.

*Given the importance that our stakeholders have placed on flood defences, we have accelerated our ED1 plans (Shared in spring 2013) and will now complete these by 2015*

By 2015

- *All of our large 132kV sites have been assessed and will be compliant to a severe 1 in 1000 year flood.*
- *We will achieve compliance at 14 sites in SPD*
- *We will achieve compliance at 45 sites in SPM*

## Summary

We remain committed to meeting the commitments of our current regulatory agreement.

Our programme was always planned to be delivered towards the latter half of the price control and our 2012/13 performance has shown that we are making significant progress in delivering this. We are on track to achieve our targets.

We recognise the challenges but remain resolute in our ability to deliver these commitments.

Despite shortages of specialist resources within the UK labour market, we have resourced and contracted all significant activities until 2015. We have developed innovative solutions, in particular within overhead line delivery. Our partnerships between local colleges and our key contractors in Dumfries, Scotland and Coleg Menai, Wales demonstrates our ongoing commitment to support the communities we serve. All key material and plant contracts are in place until at least 2015.

In chapter 10 Business Readiness we discuss further the detailed plans we have developed to ensure we can smoothly transition into delivering against our new commitments for 2015 to 2023.

# Why is RIIO-ED1 important?



Regional electricity network companies, like SP Energy Networks, are natural monopolies. As a result we are regulated by the UK government in the form of the Office of Gas and Electricity Markets (Ofgem).

RIIO-ED1 is the name that Ofgem has given to the process of agreeing our contract for 2015 until 2023, which covers:

- The investments we will make in our networks and the outputs we are committed to deliver.
- The incentives that have been agreed, for example incentives to improve customer service or to be more efficient.
- The revenues we will be allowed to collect from customers through their Electricity Suppliers.

- Encourage us to deliver safe, reliable and sustainable network services that deliver long-term value for money to customers.
- Enable us to finance our required investment in a timely and efficient way.
- Remunerate us according to our delivery for customers.

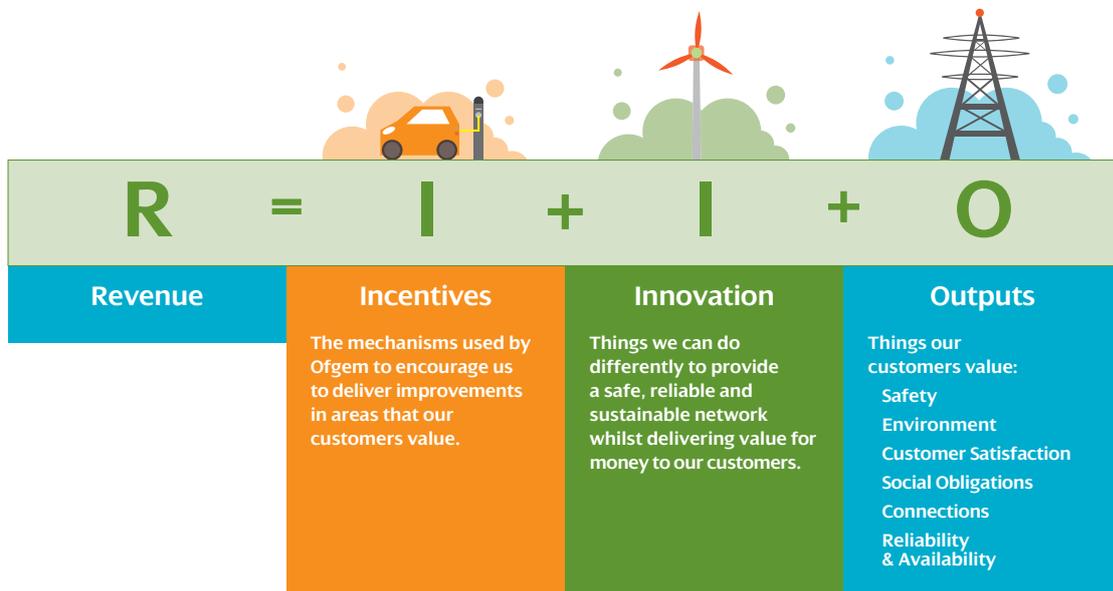
*RIIO-ED1 encourages us to play our part in facilitating the transition to a low carbon economy in a sustainable way that brings value for money to customers now and into the future*

RIIO ED1 is important to customers and stakeholders because:

- The investments we make will maintain public safety and improve customer service.
- We have a key role in facilitating economic growth and recovery.
- We have a key role to play in facilitating the uptake of low carbon technologies.
- Distribution network company charges typically represent 16% of a customer's electricity bill.

For more information on the RIIO-ED1 framework visit: <http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrl/riio-ed1/Pages/index.aspx>.

RIIO-ED1 is the first price control in electricity distribution (ED1) to use the RIIO model, and is designed to:





Summary of key information for our stakeholders – Our vision for ED1 and our plans to deliver our vision.

## 1. Executive summary

Our business plan is written with our readers in mind, takes into account the things that make us unique and is underpinned by a robust process.

## 2. A guide to this document

## 3. About us

# 4. Process of creating our business plan

Our plans to meet the challenges of the ED1 period are informed by extensive stakeholder engagement and the consideration of alternative and innovative methods.

## 5. Meeting our challenges

## 6. Learning from our stakeholders

## 7. Our innovation strategy

Our clear and comprehensive output commitments are underpinned by a robust, deliverable and efficient programme of expenditure.

## 8. Our outputs and incentives

## 9. Our expenditure forecast

## 10. Business readiness

Our plans are resilient to uncertainty, efficiently financed and minimise the impact on our customers.

## 11. Uncertainty

## 12. Financing our plan efficiently

## 13. Our revenues and customer impact

Our plans enable us to help shape the energy future and our continual improvement is informed by enduring stakeholder engagement

## 14. Looking to the future

## 15. We are part of the Iberdrola group

## 16. Glossary

Our supporting annexes give additional detailed information to support our plans.

## Volume 1 – Stakeholder, customer & IT

## Volume 2 – Engineering

## Volume 3 – Finance and expenditure

## 4

# Process of creating our business plan

The robust processes underpinning our plans and minimising our impact on our customers

Throughout the process of preparing this business plan we've been thinking about this final document and how we make it useful and accessible to a range of people. We have approached preparation of this plan in a robust and inclusive manner. We have processes in place to ensure the content of the plan has undergone scrutiny both within our business and from external parties.

We have ensured that innovation, stakeholder engagement and delivery of outputs have all been considered and are key inputs to the plan. We have developed an appropriate financial package that is efficient and balanced for all our stakeholders.

*We need to be able to deliver the plan and have carried out a comprehensive review of our strategy for resourcing and for contracting*

## In this chapter:

- Our business plan approach
- Our stakeholder engagement process
- Our innovation process
- Defining our outputs
- Our expenditure process
- Our programme delivery process
- Our finance and economics process
- Governance, assurance and policy development



# Our Business Plan Approach

In this section:

- Overview
- Creating our business plan

## The Process of Creating Our Business Plan



## Overview

We believe that our business plan represents a well-justified and realistic view of how we will address the challenges of the period 2015-23 and beyond. In creating it, we have combined the extensive experience of our workforce, contributions from a range of industry experts, and the views of our stakeholders. Our business plan:

- *Justifies our strategies to deliver our outputs backed by a thorough understanding of long-term trends. These are detailed in Chapter 8 — Outputs and Incentives.*
- *Demonstrates our commitment to play our part in delivering the UK carbon targets. This is detailed in Chapter 9 — Our Expenditure Forecast.*
- *Clearly links expenditure to our proposed outputs. This is detailed in Chapter 9 — Our Expenditure Forecast.*

- *Incorporates the views of stakeholders across our plan. This is summarised within Chapter 6 — Learning from our Stakeholders and detailed throughout the business plan.*
- *Demonstrates the application of innovative techniques to deliver long-term value for money. This is detailed within Chapter 7 — Our Innovation Strategy.*
- *Provides a holistic view of an appropriate financial package. This is detailed Chapter 12 — Financing Our Plan Efficiently.*

The five work streams (Stakeholder Engagement, Innovation, Outputs & Expenditure, Programme Delivery, and Finance & Economics) all lie within an overarching policy development, governance and assurance framework.

We worked collaboratively across our organisation and with the wider energy industry to create a high level of business and stakeholder engagement. In addition we enlisted a range of specialist organisations to inform our business plan. These are referenced throughout the business plan and within the supporting annexes.

## Creating Our Business Plan

We established a team of business experts, drawing on the knowledge of experienced senior personnel from across our business organised in five work streams, as shown in the diagram above.



# Our stakeholder engagement process

## In this section:

- Who did we engage with?
- How did we engage?
- Stakeholder feedback incorporated into our Business Plan

## Highlights:

- *We have engaged with around 2,000 customers and stakeholders during our business plan preparation.*
- *97% of stakeholders who attended our draft business plan stakeholder events felt we were listening to their views.*
- *Stakeholder feedback varied between licence areas, highlighting the need to engage separately in each area.*

## Who did we engage with?

We have directly engaged with around 1,100 individual domestic customers and around 900 other stakeholders as part of the planning process. We have held six stakeholder events involving 274 attendees, supported by senior staff from across our business.

## How did we engage?

### Phase 1 — Choosing our priorities

We sought stakeholder views on priority areas **before** preparing the draft business plan, through:

- *Customer focus groups.*
- *Stakeholder workshops, interviews, events, meetings, and targeted engagement.*
- *Employee leadership event.*

### Phase 2 — Our draft plan

We explained our draft plan to our stakeholders **during** plan development, through:

- *Customer surveys, at home and on-line.*
- *Stakeholder workshops, an online survey, one-to-one meetings and targeted engagement.*
- *Employee on-line survey.*

### Phase 3 — Our revised plan

We shared the revised business plan with our stakeholders **after** it was completed, by:

- *Publishing the proposed changes on our website.*
- *Consulting on the revised business plan summary.*

### Giving stakeholders detailed options

#### Getting the right level of detail

Stakeholders told us that detail was important if they were going to be able to make decisions about future investment in our electricity network.

#### Impact on all customer bills

We presented a detailed breakdown of the typical bill for domestic and various categories of business customer.

*We will report our performance annually on our website and in stakeholder events*

### Impact by location

We made sure we showed the bill impact by licence area.

### Publishing our changes

Based on stakeholder suggestions, we published all our findings, explained how we were going to use them to make changes to our plans and what impact this would have on the customer's bill.

## Stakeholder feedback incorporated into our business plan

We have incorporated stakeholder feedback and customer willingness to pay results extensively throughout our business plan. This is reflected within our proposed outputs and our forecasted expenditure over the 8 year period. Increases in our levels of investment are backed up by a clear engineering case and stakeholder support.

We have built stronger links with local authorities, special interest groups, community agencies and charities. We have carefully listened to our supply chain and contractors to better shape our delivery plans. Through our brand awareness campaign and engagement events we have raised awareness of SP Energy Networks, the unique services we deliver and the broader support we can offer to the communities we serve.

# Our innovation process

## In this section:

- Our commitment to innovation
- Developing our innovation strategy
- Innovation within our business plan

## Our commitment to innovation

Innovation runs throughout all of our business activities and is not confined to formal industry innovation trials. We deliver innovation through:

### Technology innovation

New assets and equipment and how we operate the network.

### Operational and process innovation

The way which we manage our organisation.

### Commercial innovation

Contractual arrangements with customers as well as with suppliers.

## Developing our innovation strategy

In developing our plans we consulted with a range of internal and external stakeholders. We have taken the priorities that stakeholders identified and the associated output measures into account in our innovation plans. Our innovation strategy is focused around six top priorities:

- *Managing an ageing network.*
- *Improving service to poorly served customers.*
- *Investing in storm resilience.*
- *Improving customer service during power cuts.*
- *Reducing the number and duration of power cuts.*
- *Preparing the network for low carbon technologies.*

We also talked to stakeholders and customers about their willingness to pay for further innovation trials through the Network Innovation Allowance (NIA). Through this allowance Ofgem allow us to invest between £3m and £6m of customers money each year in technology trials. Within the engagement process we presented a variety of options around the level of funding that we should have access to.

These options were based on a number of different strategies, each with a different timescale:

- *A lowest cost strategy focused on short term challenges only.*
- *A highest cost strategy looking at a broad spectrum of long and short term challenges.*
- *A combination of these approaches with different levels of funding.*

This process helped to establish customers willingness to pay for these activities, and the scope of innovation activity that stakeholders supported.

We have also benchmarked our management approach against other highly innovative companies. This included a knowledge exchange with 3M, a leading technology company, who are regularly identified as being one of the most innovative companies in the world. We undertake regular reviews with the wider Iberdrola group to ensure that our learning and innovation processes are fully embraced across the group.

## Innovation within our business plan

We designed our business plan with innovation at its core, using not only what we have learned from our formal innovation trials (Low Carbon Networks and Innovation Funding) , but the application of innovation to our operations, our processes and our commercial activities. We have also shared information with other network companies to adopt technology they have trialled for the benefit of our customers.

- *The actual and anticipated outcomes from previous innovation projects were considered as part of the development of our engineering plans.*
- *We commissioned an independent review by Smarter Grid Solutions (SGS), to review our conventional projects that create additional network capacity for customers, to identify where lower cost and quicker smart solutions could be deployed. SGS have assisted in other industry-wide sponsored work (through the Smart Grid Forum) of a similar nature, which allowed us to compare our plans with a broad range of solutions at the forefront of the industry.*

In developing our innovation plans we have balanced the risk associated with adopting new approaches against the overall costs and benefits they may achieve. For our larger projects we have captured this in a formal cost benefit analysis. Further details on our approach to innovation can be found in Chapter 7 — Our innovation strategy.

# Defining our outputs

## In this section:

- Our outputs framework
- Incentives

## Our Outputs Framework

We have developed a transparent and robust outputs framework that clearly shows:

- *What we will deliver to our customers.*
- *How we will demonstrate our performance throughout the ED1 period.*

Our commitments for the ED1 period take into consideration:

- *Stakeholder priorities.*
- *Past, present and future performance, our own and other companies.*
- *Challenges during the ED1 period.*
- *Levels of planned investment.*
- *Foreseeable innovation.*

We have focused on the needs of current and future customers. Through stakeholder feedback we have identified the things that are directly valued by our customers and aligned them to the six outputs categories:

- *Safety.*
- *Reliability & Availability.*
- *Environment.*
- *Connections.*
- *Customer Satisfaction.*
- *Social Obligations.*

Our outputs framework is made up of both primary outputs (those things that are directly valued by customers) and secondary deliverables (indicators of performance which, in themselves, are not directly experienced by customers but necessary to achieve delivery of our primary outputs and may be incentivised by Ofgem).

All areas of our business have been involved in the development of our outputs framework. Directors with the responsibility for delivering outputs were actively involved in their design prior to committing to them. This framework provides a measurement of our business performance for the ED1 period and links with our Operational Excellence approach described within Chapter 7 — Our innovation strategy.

We published our draft outputs framework within our 2015-23 Draft Business Plan — Highlights document in May 2013 as part of our stakeholder engagement and consultation process. As a result of feedback from this, we have modified our outputs framework and in some areas added more ambitious targets.

Overall, we have committed to measure our performance through a range of more than 90 outputs across the six categories. The detail of these are described in Chapter 8 — Our outputs and incentives.

Within Chapter 9 — Our expenditure forecast, we have shown the clear correlation between our outputs framework and the efficient expenditure proposed in our business plan.

## Incentives

The RIIO Regulatory Framework provides incentives to help deliver the things that are important to customers and stakeholders.

The incentives are designed to encourage efficiency, good customer service, innovation, and ensure the delivery of our outputs. There is a strong correlation between the incentives and the six primary outputs categories of the RIIO framework.

Ofgem calibrates these incentives to reflect the value that is delivered to customers and stakeholders. We have carried out detailed analysis of the Incentives framework and identified opportunities for reward as well as the risk of penalties. We have taken this into consideration when developing our detailed outputs in Chapter 8 — Our outputs and incentives.

As part of our business readiness activities we are considering ways of reflecting these incentives in the contracts we place with our suppliers.

We intend to perform well against these incentives, earning additional rewards for delivering improvements that our customers and stakeholders value and benefit from.

*All areas of our business have been involved in the development of our outputs framework*

# Our expenditure process

## In this section:

- Overview
- Cost assessment
- Cost benefit analysis

## Overview

In developing our expenditure plans we:

- *Carried out a detailed review of our current strategies.*
- *Assessed the suitability of our assets in the long term.*
- *Considered the increasing age of our network.*

We have made sure that what we propose to spend is suitable and efficient.

- *We talked to our stakeholders, and will deliver our investment plan in line with the priorities they identified.*
- *We held peer reviews with our internal experts.*
- *We talked to experts within the global Iberdrola business.*
- *Our internal Asset Stewardship Groups (ASGs), made up of a cross section of our employees, reviewed our plans.*

## Renewing our ageing network (non-load related investment)

Non-load related investment describes what we will spend to renew and refurbish our substations, overhead lines and underground cables. Our investment plans are based on the condition of our assets and the consequence of them failing. These factors are captured within our Asset Health & Criticality Index.

## Network capacity (load related investment)

Load related investment is important to stakeholders and customers as:

- *It creates the additional capacity in our network to allow new customers to connect.*
- *It deals with increases in demand from our existing customers before this presents a higher risk of power cuts.*

To identify the future requirements of our networks we have considered a number of factors:

- *Independent forecasts of economic growth.*
- *Cities and local authorities development plans.*
- *The appropriate triggers for us to take action to create additional capacity in our network.*
- *Department of Energy and Climate Change (DECC) scenarios for the uptake of low carbon technologies (e.g. heat pumps, electric vehicles, and photovoltaics) including the more ambitious Welsh and Scottish 2020 carbon reduction targets.*
- *Opportunities to use innovation to reduce our costs and charges to customers.*

More detail on each of these steps is detailed within Chapter 9 — Our expenditure forecast.

## Cost assessment

We are acutely aware of the financial pressures on our customers, particularly in the current economic climate. Consequently we have sought to make our plan the most efficient possible in order to deliver reductions in our customer's bills.

To review and challenge the efficiency of all aspects of our operations, we have:

- *Compared our costs to other distribution network operators in the UK.*
- *Compared our costs against other parts of the Iberdrola Global Networks Business.*
- *Identified areas where we can improve our own efficiency, including through innovation.*
- *Identified areas where we could challenge contractors margins.*
- *Identified areas where we could work more effectively with our contractors and suppliers.*
- *Set out plans to deliver these efficiencies.*
- *Embedded the identified efficiencies into our plans to deliver benefits for customers.*

This detailed and comprehensive review has delivered the majority of the £700m reduction in our forecast expenditure between our draft plan published in May 2013 and our final plan. This is described in more detail described in Chapter 9 — Our expenditure forecast.

## Cost benefit analysis

In defining our investment programmes we have actively identified and explored the alternative options available to ensure that we deliver long term value for money. Where we have identified more than one solution we have carried out a cost benefit analysis.

### Our approach to cost benefit analysis for RIIO-ED1

Our approach to cost benefit analysis is:

- *Proportionate.*
- *Robust.*
- *Compliant with current HM Treasury Green Book guidelines (July 2011 update).*

The programmes and schemes we have chosen for cost benefit analysis naturally fall into the following categories:

- *Major asset replacement / refurbishment schemes.*
- *Environmental schemes, flood protection, OHL undergrounding.*
- *Network future proofing and reinforcement.*
- *The application of Smart Grid technology.*
- *The application of low loss technology.*

In selecting our portfolio for cost benefit analysis we chose schemes with:

- *Discrete delivery choices available, consistent with our licence obligations.*
- *Alignment with RIIO-ED1 strategic objective to reduce carbon emissions and provide sustainable value for money for customers.*
- *Stakeholder input, where possible.*

Our CBAs were based on absolute actual cost inputs with benefits measured relative to a reference scenario — Ofgem's 'incremental' approach.

Each of the shortlisted options was assessed on its own merits and the preferred option chosen as the one with the maximum Net Present Value (NPV) or least Net Present Cost (NPC).

This methodology (Cost Effectiveness Analysis or Least Cost Analysis) avoids any risk of inflated benefits due to unrealistic reference cases and will aid cross-DNO comparison.

### The cost benefit analysis process

Our objective when developing the CBA process for ED1 was to ensure:

- *Consistency.*
- *Objectivity.*
- *Accuracy.*

### Consistency was achieved

By ensuring the project / scheme owners understood the process of developing the models and had access to key data such as asset deterioration curves and other fixed data sources.

### Objectivity was achieved

By holding the project / scheme owners to account for production of the models, provision of the input cost / benefit data and selection of the preferred investment option.

### Accuracy was achieved

Through a two-step assurance process. Firstly, the models were reviewed by senior engineering management to ensure they were consistent with the business plan submission. Secondly, the models were reviewed for accuracy by the regulatory and finance teams in order to ensure we had total confidence in both the modelling and the investment decisions that flowed from it.

The outcome from our cost benefit analysis has been fed into our investment plans and is outlined in Chapter 9 — Our expenditure forecast. In this section we have indicated where cost benefits analysis has either changed, or confirmed our investment plans.

***A summary of our CBAs can be found in Annex 2.3 covering 10% of our core plan***

# Our programme delivery process

## In this section:

- Preparing to deliver
- Our resourcing strategy

## Preparing to deliver

We have made thorough preparations to ensure we are ready to deliver our commitments as we move from the current price control period into ED1 and beyond. We have carried out a comprehensive review of our resourcing strategy and purchasing requirements, engaged with our contracting community and completed pre-project planning on a zone by zone basis across all our operational areas.

Our range of preparations include:

- *Detailed site surveys for our main programmes of work.*
- *Comprehensive engineering studies looking at alternative approaches.*
- *Programme and project planning activities.*
- *A thorough review of our contracting strategies.*
- *The development of a revised resourcing strategy.*

## Preparing to deliver zone by zone

To ensure we have a deliverable plan, we have:

- *Engaged with our experienced internal delivery teams to make sure our plans are viable and achievable.*
- *Undertaken comprehensive surveys and engineering studies.*
- *Prepared individual project engineering schemes and outage plans to ensure efficient delivery.*

- *Mapped all activities on a geographic basis to co-ordinate works and minimise disruption for Customers.*
- *Created Operational Zonal Maps to help our workforce and stakeholders understand the scale, timing and benefits of our plans throughout the ED1 period.*

## Preparing to deliver through our supplier & contracting community

We have engaged with our suppliers and contractors at dedicated stakeholder events. We shared our plans for ED1 and engaged on how we will work together. Our ongoing work in this area includes:

- *Supporting our contractors to develop plans to bridge the industry skills gap.*
- *Considering the reflection of reward and penalty incentives contained within our contract with Ofgem with that of our suppliers and contractors.*

A large proportion of our contracts will be renewed ahead of the start of ED1 in April 2015. This affords us an opportunity to review our purchasing strategies to make sure we secure a balanced range of contracts that are of mutual benefit to us, our contractors & suppliers, customers and stakeholders.

- *As part of the worldwide Iberdrola group we can purchase goods and services at more competitive costs, and deliver real value for money for our customers.*

- *We recognise that during the period 2010-2012 we made a slow start to our investments, due to a high proportion of contract renewal. Our robust ED1 preparations will avoid this happening again.*
- *We are reviewing all of our major contracts to ensure that they are in place for the start of RIIO-ED1 and that they fully meet our requirements in terms of customer service and productivity.*

## Our resourcing strategy

We know that having the right people, with the right skills, in the right place is essential for efficient and effective delivery. We need highly skilled, suitably authorised employees to deliver our investments. With the growth of our industry and the new challenges associated with the low carbon future, it's clear that we need to recruit and train new staff. We have carried out a comprehensive review of our resourcing strategy for the ED1 period and beyond to provide us with a highly skilled and well-trained workforce for the future.

See Chapter 10 — Business readiness for more details on our business readiness programme.

# Our finance and economics process

## In this section:

- An efficient financial plan
- Impact on customer bills

## An efficient financial plan

Investments in our network are funded by a mixture of shareholder investments and debt raised in the financial markets.

In building our plans we have considered the most efficient financing arrangements that:

- *Provide an appropriate balance of cost to customers and returns for shareholders.*
- *Reflect the levels of risk that shareholders are being asked to carry.*

We have followed a comprehensive process, building on our experience of being fast tracked in the Transmission Price Control (RIIO-T1), to establish an efficient and appropriate financial package. In preparing our financial plan we leveraged experience gained at the RIIO-T1 price control review by re-deploying the same specialist internal resources.

As part of our Governance and Assurance framework we established a Financial Issues Steering Group including representatives from Iberdrola's senior financial directors.

Involvement of our wider business experts and advisors is key to the successful deployment of our structured risk assessment framework. We developed our framework in conjunction with NERA. The analysis is also informed by joint work undertaken under the auspices of the ENA drawing on expertise from Oxera.

Our risk assessment inputs:

### Cash flow risk & uncertainty mechanisms and incentives

We collected templates provided by relevant business experts that set out their evaluation of operational cash flow risks with our plan, after taking into account the mitigating effect of proposed uncertainty mechanisms and incentive mechanisms.

### Cost of equity & gearing

We derived our initial values from market evidence, established economic models such as CAPM, recent regulatory precedent, and stakeholder views (both investor and non-investor). We then refined these initial values in light of financeability analysis, adhering to the Moody's Ratings Methodology as it applies to regulated electricity networks.

We also conducted Return on Regulatory Equity (RORE) analysis to ensure that the level of notional gearing assumed in our financial plan in conjunction with the overall package offers an appropriate range of returns.

We note that customer stakeholders (as opposed to investor stakeholders and their agents) are less able to engage directly on financial efficiency than on other areas of our business plan. Because of this, our process for developing an efficient business plan has placed considerable weight on Ofgem's prescribed policies and guidance and on lessons learned from recent Price Control Reviews.

Within Chapter 6 — Learning from our stakeholders, we explain how we engaged with stakeholders on our financial proposals and how we have built this feedback into our proposals.

In Chapter 12 — Financing our plan efficiently, we provide clear evidence that our financial plan is efficient for customers and provides appropriate levels of returns for shareholders.

## Impact on customer bills

While our efficient financial plan makes sure that customer bills fairly reflect our costs, customers and suppliers have also told us that they want their bills to be predictable and fair in the long term.

Our plan takes into account both direct customer feedback and feedback made available through Ofgem consultations. We have considered the impacts of transitional financing arrangements and revenue profiling.

We have detailed the impact of our business plan on the Distribution Use of System (DUoS) element of our customers' bills in each of our license areas in Chapter 13 — Our revenues and customer impact. Typically the DUoS element represents 16% of an average customer's bill.

We are acutely aware of the financial pressures on customers and the other factors that increase electricity bills.

Our investment plans meet minimum expectations of our stakeholders in terms of maintaining safety and network performance, and we have increased our plans from this point only when supported by our stakeholder engagement in terms of concept and willingness to pay.

# Governance, assurance & policy development

**In this section:**

- Helping to shape ED1 policy
- Our assurance process
- Adopting the principles of Ofgem’s data assurance guidance
- Our approval and sign off process

## Helping to shape ED1 policy

We actively participated in Ofgem’s RIIO-ED1 Work Groups to influence the development of the ED1 Policy for the benefit of our customers and stakeholders.

We continue to work alongside other DNOs to develop ideas and proposals, many of which have been included within the ED1 Policy Decision.

We provided a full and comprehensive response to the ED1 Strategy Consultation.

We will remain actively involved in all Ofgem and Industry forums throughout the ED1 period and beyond to represent the best interests of our customers and stakeholders.

## Our assurance process

The accuracy and completeness of our business plan is very important to us. We want our customers, stakeholders, collaborators, and regulator to have absolute confidence in it. Throughout the development of our ED1 business plan, we have implemented an assurance and governance framework to ensure our plan is robust, realistic and accurate.

Our assurance framework is made up of three essential elements: Governance, Risk Management and Compliance. The figure below shows how these three components work together:

## Governance

At each stage of our business plan development, we focused our governance and approval process on areas of higher risk. The governance forums established for ED1 included members of the:

- *ScottishPower Energy Networks Executive Team.*
- *Iberdrola Global Networks Business Executive Team.*
- *Licensee boards.*
- *Board of SPEN Holdings Ltd.*

Our governance framework makes sure that our plans are fully understood, endorsed and approved.

### Assurance Process



## Risk management

We have a well-established business risk reporting framework to help us understand and manage risks. This framework has been fully implemented within the ED1 Programme.

- *We've identified key risks.*
- *We've identified ways to manage or eliminate these risks.*
- *We have a programme risk register, which is reviewed on a regular basis.*
- *Significant risks are reported through our governance framework.*

## Compliance

We have made sure our submission complies with the appropriate regulatory guidance, including:

- *RIIO-ED1 Handbook.*
- *RIIO-ED1 Policy Decision.*
- *RIGS Regulatory Instructions & Guidance.*

## Adopting the principles of Ofgem's data assurance guidance

We are participating in a trial of Ofgem's Data Assurance Guidance (DAG), before the full implementation in April 2015. We have considered the guidance provided in the DAG and, where possible, adopted the principles for our ED1 Business Plan submission.

Our assurance process is designed to make sure our business plan accords with Ofgem's RIIO criteria, and the requirements of our stakeholders and customers. During the assurance process we used:

- *Internal SP Energy Networks resources.*
- *ScottishPower internal audit.*
- *External independent reviewers.*

Our assurance process included:

### Second Person Reviews

A check to ensure our submission is complete and accurate.

### Senior Management Sign Off

A detailed review of our submissions by an accountable senior manager.

### Internal Submission Process Audit

An internal independent review of the governance framework and assurance processes adopted in developing our business plan, carried out by ScottishPower Corporate Internal Audit.

### Independent Verification of our Stakeholder Engagement

Stakeholder engagement reviews including internal management interviews, external stakeholder interviews and reviews of supporting evidence, carried out by Two Tomorrows.

### External Review of our Business Plan

An overall review of our Business Plan carried out by David Elmes, Professor of Management Practice and Head of the Warwick University Business School, Global Energy Research Group. Course Tutor and Lecturer on the Warwick Global Energy MBA.

## Our approval and sign-off process

Our business plan submission has been approved and signed-off as follows:

<b>Senior Manager Sign-off</b>	<b>Regulation and commercial director (and head of RIIO-ED1)</b>
Detailed review of the business plan submission.	
<b>Director Sign-off</b>	<b>Functional directors</b>
Final review completed prior to submission.	
<b>CEO Sign-off</b>	<b>CEO</b>
Sign-off for completeness and accuracy.	
<b>Board Sign-off</b>	<b>Company Boards</b>
High-level overview.	

## Statement of Assurance and Accuracy

We have made a clear statement within our submission on the assurance of our business plan and the accuracy of the information submitted within the detailed data tables and accompanying narrative. The statement of Assurance and Accuracy has been included in our detailed submission to Ofgem.

Summary of key information for our stakeholders – Our vision for ED1 and our plans to deliver our vision.

## 1. Executive summary

Our business plan is written with our readers in mind, takes into account the things that make us unique and is underpinned by a robust process.

## 2. A guide to this document

## 3. About us

## 4. Process of creating our business plan

Our plans to meet the challenges of the ED1 period are informed by extensive stakeholder engagement and the consideration of alternative and innovative methods.

## 5. Meeting our challenges

## 6. Learning from our stakeholders

## 7. Our innovation strategy

Our clear and comprehensive output commitments are underpinned by a robust, deliverable and efficient programme of expenditure.

## 8. Our outputs and incentives

## 9. Our expenditure forecast

## 10. Business readiness

Our plans are resilient to uncertainty, efficiently financed and minimise the impact on our customers.

## 11. Uncertainty

## 12. Financing our plan efficiently

## 13. Our revenues and customer impact

Our plans enable us to help shape the energy future and our continual improvement is informed by enduring stakeholder engagement

## 14. Looking to the future

## 15. We are part of the Iberdrola group

## 16. Glossary

Our supporting annexes give additional detailed information to support our plans.

## Volume 1 – Stakeholder, customer & IT

## Volume 2 – Engineering

## Volume 3 – Finance and expenditure

# 5

## Meeting our challenges

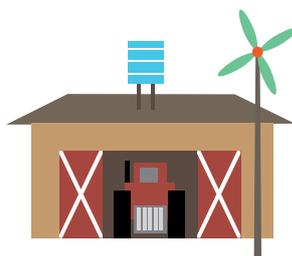
The universal challenges and opportunities of the ED1 period and those unique to our areas operation

We have a major role to play in delivering the UK's low carbon transition and in doing so will transform the way you think of us. There are challenges that all network operators are facing but there are also challenges that are unique to us that provide their own opportunities. The carbon reduction targets of the devolved administrations mean we are at the forefront of preparing the network for the low carbon transition. Large areas of where we operate are classified severe weather areas and have driven our significant improvements in severe weather resilience.

*We have connected 28% of distributed renewable generation to our network but have only 14% of the UK population*

### In this chapter:

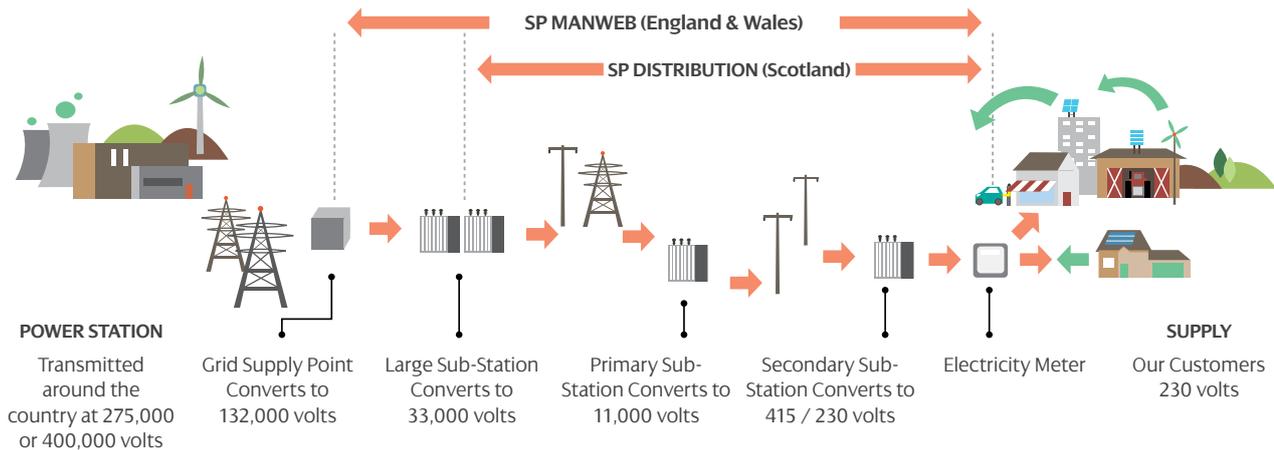
- The opportunities and challenges of the ED1 period
- Our unique challenges
- Our guiding values today and our 2023 vision



# The opportunities and challenges of the ED1 period

**In this section:**

- Embracing opportunities
- Upgrading our network
- The transition to a low carbon economy



*The UK energy industry is entering the most exciting period it has faced in half a century*

## Embracing opportunities

We recognise that SP Energy Networks has a critical role in facilitating the transition to a low carbon economy at a time when we need to replace increasing numbers of end of life assets.

This presents an unprecedented opportunity for SP Energy Networks to play a major part in the UK's low carbon transition, and help to set the blueprint of the energy industry for the next 50 years.

We intend to embrace this opportunity by:

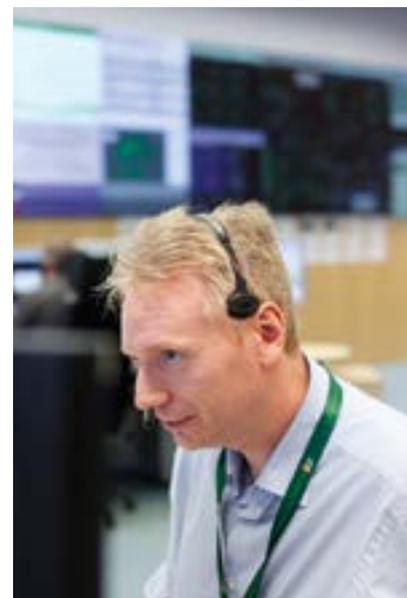
- *Agreeing a regulatory framework with Ofgem that allows us to respond flexibly to uncertainty whilst meeting the future energy demands of our customers.*

- *Applying technical innovation to reduce customer costs today and lay the foundations for a smarter network tomorrow.*

- *Developing more dynamic contractual arrangements with customers & generators to match their needs to local network capabilities in real time.*

- *Using information from smart meters and developments in multimedia technology to transform our customers experience.*

***We will transform the way our stakeholders and customers think about SP Energy Networks***



## Upgrading our network

A large proportion of our network was installed between the 1950s and 1970s so is approaching the end of its operational life.

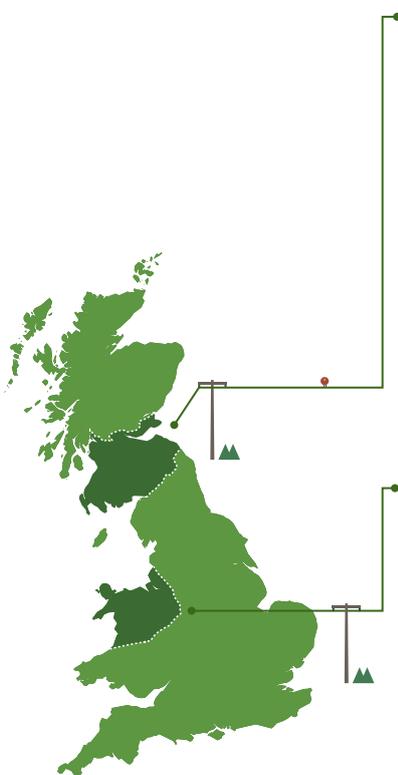
Throughout ED1 we will upgrade our networks to ensure we continue to provide a safe and reliable service for our customers.

We will invest intelligently to manage our ageing assets, maintaining our high levels of safety & performance and minimising cost to customers.

- *Traditionally our plans are developed and prioritised based upon asset condition (probability of failure) and consequence of failure (e.g. safety consequences and numbers of customers affected).*

- *We also consider customers' future requirements when we renew our network, future proofing to reduce future costs to customers.*
- *Our plans include further efficiencies we believe we can achieve, for example through being part of the Iberdrola Global Networks Business.*
- *Innovation is embedded within our plans to ensure the very best value for money for customers, for example using a mixture of replacement and life extending refurbishment.*

*We need to renew increasing numbers of end of life assets to ensure we deliver a safe and reliable service to our customers. We will manage this programme over several decades to minimise customer bill impact*



SPD Equipment	Number / Length	Scale	% Older than 40 years	% Older than 50 years
Grid Substations	83	around 23,000 customers connected to each	35	15
Primary Substations	500	between 2,000 and 11,000 customers connected to each	50	20
Secondary Substations	17,500	between 50 and 300 customers connected to each	19	5

In addition to these assets, we have 20,000km of overhead lines, components of which 50% are older than 40 years.

SPM Equipment	Number / Length	Scale	% Older than 40 years	% Older than 50 years
Grid Substations	110	between 16,000 and 160,000 customers connected to each	54	21
Primary Substations	700	between 2,000 and 11,000 customers connected to each	33	6
Secondary Substations	12,800	between 50 and 300 customers connected to each	61	18

In addition to these assets, we have 22,000km of overhead lines, components of which 50% are older than 40 years.

*Our stakeholders told us they would like us to prepare the network for people wanting to connect Low Carbon Technologies*

You can view our video on the changing energy landscape here:  
[http://www.spenergynetworks.com/serving\\_our\\_customers/haveyoursay.asp?NavID=1](http://www.spenergynetworks.com/serving_our_customers/haveyoursay.asp?NavID=1)



## The transition to a low carbon economy

Demand for electricity is forecast to steadily grow. At the same time, we remain heavily reliant on fossil fuels that will run out sooner than many of us realise. The UK Government has set ambitious low-carbon targets.

It is clear that we will all have to change to ensure a cleaner and more sustainable energy future.

The future network and our role will need to accommodate:

- Increased demand arising from new uses of electricity such as heat pumps and electric vehicles.
- A big increase in much smaller generation sources, with power coming back into the network from a variety of supply points and flowing in different directions.

*We will use smart meters to transform our relationship with our customers*

We are working with our stakeholders, the Department of Energy and Climate Change (DECC), and other electricity distributors to understand what will happen as more people move to low carbon technologies.

- We have carried out extensive work to understand the impact of new forms of electricity generation and changes in electricity usage in our geographical areas.
- Our plans include a best view of the DECC uptake scenarios, enabling customers to use up to:

- 620,000 solar panel installations (3% of households).
- 310,000 heat pump heating systems (9% of households).
- 130,000 electric vehicles (4% of households).

- Our business plan includes recruitment and training to make sure we have a workforce with the right skills for the future.

As a result of these changes, there is an increasing need to manage the balance of generation and demand on our networks in a more local and immediate way. In order to be ready for this change in role, we are:

- Investing in hardware to monitor the flow of electricity through our network.
- Investing in recruitment, training and IT systems to allow us to use data from smart meters effectively.



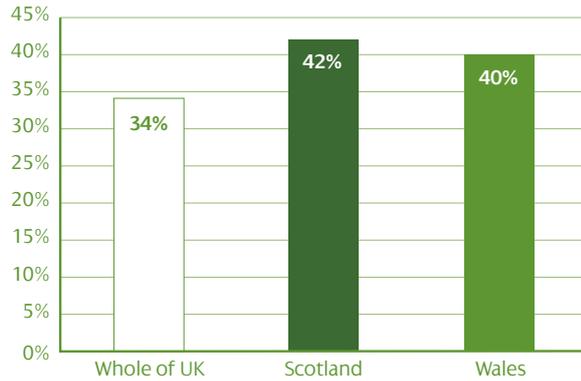
*We plan to invest more than £200m in ensuring we are ready to help our customers benefit from low carbon technologies*

# Our unique challenges

**In this section:**

- Scottish and Welsh low carbon targets
- Amount of renewable connection
- Network capacity
- Manweb interconnected network

**Carbon Reduction Targets by 2020**



## Scottish and Welsh low carbon targets

We are the only DNO to operate in Scotland, England and Wales. The UK target is to reduce carbon emissions by 80% by 2050.

While the overall UK target for 2020 is 34%, both Scotland and Wales have more ambitious targets of 42% and 40% respectively.

To ensure that the customers in our areas are able to start using low carbon technologies, our networks must be 'low-carbon ready' sooner than the UK average.

*Our network is expanding to accommodate renewable generation more quickly than any other DNO*



## Amount of renewable connection

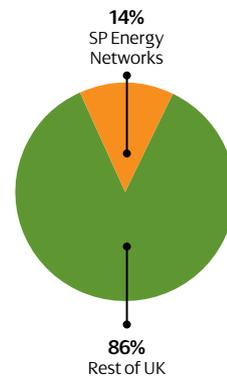
Our network is expanding to accommodate renewable generation more quickly than any other DNO.

We serve less than 14% of the UK customer population, but have connected approximately 28% of all the UK's distributed renewables to our network.

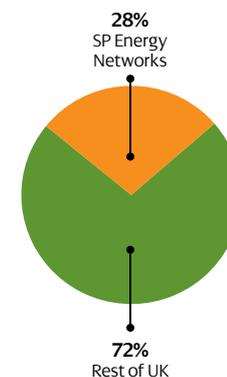
As we connect more renewable generation, our network needs to become capable of managing energy travelling from a larger number of smaller generation sources.

During ED1 we will reduce the average time to connect and be in the top group of DNOs to allow the connection of increased volumes of Low Carbon Technologies.

**UK customer population**



**Distributed renewables connected**





*Thanks to our interconnected network, we can give our Manweb customers a reliability of supply that is consistently in the top 25% of electricity distributors*

## Network capacity

Through the introduction of a standard UK network load measure and recent connections charging decisions by Ofgem, it has become apparent that we have operated our networks differently to other companies. Historically, maximum network loadings have typically been for short periods of time, such as the 'dinner-time' peak, which meant we could load our network up to 20% more than its constant rating. This allowed us to avoid or defer investments and keep customer bills lower but our assets have been working harder than those of other UK network companies.

We will apply a 20% lower threshold to trigger our general load reinforcement investments.

- *This new industry standard approach will reduce further the already low risk of major power cuts.*
- *Our customers will benefit from being treated in the same way as other customers across the UK.*

- *We have assumed a conservative 1% per annum average load growth, profiled to match independent economic forecasts.*

This change will also help us prepare for the way people will use and generate electricity in future.

- *Department of Energy & Climate Change scenarios forecast 20% to 90% increase in electricity usage by 2030.*
- *In a future with overnight charging of electric vehicles and constant demand from heat pumps, the traditional 'quiet times' on our network will become increasingly busy.*
- *It would no longer be practical and efficient to run our network as close to capacity as we have in the past.*

## Manweb interconnected network

Not all electricity networks are the same. At industry privatisation in 1989 our shareholders inherited an electricity distribution network in SPM that is unique in the UK and delivers the highest customer performance outside central London.

The SPM network was designed and built throughout the 1950-1970s with a design philosophy of high transformer utilisation to target lowest economic costs based on commodity price forecasts at that time. Smaller transformers than industry standard are run constantly interconnected at all voltages and standard cable sizes are used throughout.

Interconnected electricity network designs are typically described as 'X type' whilst more traditional radial network designs are described as 'Y type'.



The benefits of the interconnected 'X type' network design are:

- *The frontier customer interruption (power cut) performance it delivers. Unlike traditional radial networks, no customers lose supply for a single 11kV or low voltage fault.*
- *This network design is also inherently "smart" as the cables are designed to accept power flowing in either direction and alternative paths are available when there is a fault.*
- *The SPM network is more ready to facilitate customer uptake of low carbon technologies and the associated costs are lower.*

The disadvantage of the legacy network design is:

- *It is more expensive to build, as it requires more switchgear and unit protection which in turn requires a means of reliable communication between substation sites and a more robust building construction.*

Around 55% of the SPM network is designed and run as an "X-Type" network, solidly interconnected at 33kV, 11kV and LV. Of the remaining:

- *23% of the network is designed as a "Y-type" network, solidly interconnected at 33kV and 11kV but less so at LV.*
- *22% is designed as a radial network with single transformers feeding a non-interconnected 11kV and LV.*

Independent studies undertaken to consider alternative network designs have confirmed that the X-type network is not as cost effective as other network designs but that the size and complexity of the existing network does not allow wholesale change to the network design in urban areas without significant capital spend and major impact on the performance of the network for existing customers.

We therefore have no feasible alternative when replacing existing assets in interconnected areas other than to replace like for like, and to maintain the existing network arrangement.

We recognise that it is more cost effective to build new networks as a more traditional design, and therefore when we, or an independent connections provider, are designing new networks, we will build a non-interconnected design where possible, provided this will not impact on existing customer performance for more information refer to **Annex 2.10 SP Manweb urban network.**



*The SPM network is readier to facilitate customer uptake of low carbon technologies and the associated costs are lower*

# Our guiding values today and our 2023 vision

## Customers will see a transformation in our service over the next 10 years driven by our guiding values

We will play a major part in the UK's low carbon transition and in doing so, transform the way you think of us. By 2023 we intend to lead the industry by continuing to apply our guiding values:



## Serving our customers:

We are a customer service focused company trusted by our communities and stakeholders.

Vision	Goal	Delivered by
<b>Proactive management of customers</b>	<ul style="list-style-type: none"> <li>• Industry leading customer service and customer care</li> <li>• Communicating with customers via their media of choice</li> <li>• Embracing our social obligations</li> </ul>	<ul style="list-style-type: none"> <li>• Delivering a 20% improvement in our overall average scores in the industry customer satisfaction survey. Our customers will feel the difference.</li> <li>• Further developing our leading Customer Relationship Management (CRM) system, using multi-media communications and by using Smart Metering Data we will help customers understand what is happening on the network, particularly during fault conditions.</li> <li>• Deploying targeted initiatives in our fuel poor areas, particularly to our most vulnerable areas, where customers may be both fuel poor and off gas grid.</li> <li>• Using smart metering data to identify power cuts and other network issues before customers need to contact us.</li> </ul>
<b>Connecting our customers more quickly</b>	<ul style="list-style-type: none"> <li>• Access to an instant quote for customers</li> <li>• Faster connection for all customers including renewables</li> <li>• Minimised cost of connection</li> </ul>	<ul style="list-style-type: none"> <li>• Reducing our load index reinforcement trigger by 20% to invest earlier in additional network capacity and by providing fast track quotes and connections.</li> <li>• Developing online 'instant quote' tools and detailed 11kV heat maps which clearly show network capacity.</li> <li>• Continuing to develop innovative connections solutions.</li> <li>• Through projects such as Accelerating Renewable Connections (ARC) and Active Network Management (ANM)</li> </ul>

## Managing our assets:

We are an engineering company with strong stewardship of assets and world class safety credentials.

Vision	Goal	Delivered by
<b>Optimised asset management</b>	<ul style="list-style-type: none"> <li>• A safer network</li> <li>• A network more resilient to severe weather</li> <li>• Our customers off supply less</li> <li>• Reduced need for asset replacement and pushing down refurbishment costs</li> </ul>	<ul style="list-style-type: none"> <li>• Eradicating all low overhead line clearances across roads by April 2015 and continuing to enhance public safety by upgrading all of our overhead line clearances to the latest industry technical standards by 2020.</li> <li>• Safeguarding residents of flats and tenement buildings by continuing our major investment programme to modernise service positions, rising mains and laterals.</li> <li>• Continuing our investments that have delivered a 75% reduction in storm related faults to date.</li> <li>• Ensuring that all of our rural customers benefit from a distribution network that is resilient to severe weather events by 2034.</li> <li>• Reducing the average number of times our customers lose their power supply by 7%, the length of time those customers are without power by 16%, and the average time our customers are off supply by 25%.</li> <li>• Deploying industry leading asset management techniques, increasing the rate at which we modernise our substations by over 20%, improving safety and reliability at a lower overall cost.</li> </ul>
<b>Resilience for the future</b>	<ul style="list-style-type: none"> <li>• Smarter use of technology to connect generation sources quickly</li> <li>• Value for money, innovative solutions</li> <li>• Guaranteed standard storm impact reduced to 36 hours</li> </ul>	<ul style="list-style-type: none"> <li>• Using Smart technology we will support the quick connection of generation sources, reconfiguring protection within 24hrs.</li> <li>• We will identify low carbon technology (LCT) hotspots using network monitoring, smart metering data and stakeholder engagement to inform our investments.</li> <li>• Continuing our track record of developing innovative modern "Smart Grid" network solutions.</li> <li>• Continuing to invest in overhead line rebuild and resilient tree cutting programmes and through the dedicated and professional response of our workforce to storm events.</li> </ul>

## Our people:

We are a company that attracts and develops skills for the future from the communities we serve.

Vision	Goal	Delivered by
<b>Employer of choice</b>	<ul style="list-style-type: none"> <li>• Recruiting, training and retaining more than 1400 direct staff and utilising around 1000 contracting staff</li> <li>• Providing rewarding careers and highly skilled roles</li> </ul>	<ul style="list-style-type: none"> <li>• Deploying a range of recruitment and training channels including apprentices, graduates and trainees.</li> <li>• Developing specialist courses with universities and colleges.</li> <li>• Recruiting up to 150 staff every year from now to 2023.</li> </ul>

Summary of key information for our stakeholders – Our vision for ED1 and our plans to deliver our vision.

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Our business plan is written with our readers in mind, takes into account the things that make us unique and is underpinned by a robust process.

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Our plans to meet the challenges of the ED1 period are informed by extensive stakeholder engagement and the consideration of alternative and innovative methods.

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Volume 3 – Finance and expenditure

## 6

# Learning from our stakeholders

Who we engage with, how we engage with them, the feedback we receive and how this has influenced our plans

Stakeholder views are important to us and have influenced what is in our plan and how we have presented our plan. We have stepped up our engagement on the business plan and engaged with stakeholders from the very start of this process and taken them with us as we've developed the plan. They have influenced our investments and are the driver for our future performance targets. Stakeholder views were not always aligned and we have strived to achieve the right balance of benefits for all interested parties.

*We have engaged with more than 2,000 stakeholders and customers in the development of our plan*

## In this chapter:

- The process at a glance
- Our phased approach
- Feedback



# The process at a glance

## In this section:

- A broad range of stakeholders
- Varied means of engagement
- Localised engagement
- Senior management involvement

## Highlights:

- We have engaged with 2,000 customers and stakeholders during our business plan preparation.
- 97% of stakeholders who attended our draft business plan stakeholder events felt we were listening to their views.
- Stakeholder feedback varied between licence areas, and across stakeholder groups.
- We are doing more in storm resilience as a result of stakeholder feedback.

Our stakeholder engagement process has involved a broad range of stakeholders who we have engaged with in a number of different ways. Our engagement strategy has been simple three-phase approach, with a fourth phase of continuing engagement as we approach the ED1 period.

This comprehensive strategy meant that stakeholders were able to influence our plan preparation at a number of stages:

- We captured a broad range of stakeholder's views through our accessible variety of events.
- For those who couldn't attend our events in person, information was made available on our website.
- Telephone and online surveys were provided as alternative means of providing feedback.
- To make sure that all voices were heard, we used independent facilitators to collect the key themes that emerged.

*Stakeholders have shaped our business plan. We are committed to delivering that plan*

## A Broad Range of Stakeholders

Our stakeholders include our wide range of customers (from large demand customers to small generation and domestic customers), local authorities, developers, contractors, suppliers, research bodies, environmental groups, and many others.

Our database of stakeholders grew from 1,200 to 1,800 during the engagement process for our business plan, and an independent review concluded that no stakeholder group was missing from our map. They further added that:

*SP Energy Networks has the foundations of an extremely comprehensive and inclusive stakeholder database*

Quote from Explain Market Research



SP Energy Networks Distribution stakeholders								
Customers	Internal	External						Regulator
		Electricity Industry	Delivery	Developers	Interest groups	Research and Development	Government	
Consumer groups	Individual employees	Competitors	Contractors	Commercial and Housing developers	Business groups	Academic institutions	Local Government	
Distributed Generation customers	Trade Unions	Energy Suppliers	Suppliers	Renewable developers	Environmental groups	Research Bodies	Central Government	
Large Demand customers	SPEN Management		Service Providers		Conservation groups	Manufacturer R&D		
Individual Domestic customers	Iberdrola Management		Skills and resourcing		Charities			
	Investors		Statutory planning consultees					

## Varied Means of Engagement

At each phase of the process we used a combination of engagement routes to collect the broadest possible range of stakeholder views. For example, during Phase 1 we identified gaps in stakeholder representation at our events and rectified this through targeted in-depth telephone interviews.

All stakeholder event material, independent reports, on-line surveys and actions in relation to feedback have been published on our website:

### Have your say

[www.spenergynetworks.co.uk](http://www.spenergynetworks.co.uk),

click on Have Your Say then RII0-ED1.

## Localised engagement

The networks in our two areas are different and our investments have a different impact on customer bills. We engaged on each plan separately, showing the relevant bill impact, and on some topics received different feedback by region.

Stakeholders throughout the UK told us that they want:

- *The network to be operated in a cost efficient way to keep bills down.*
- *Their electricity supply to remain no less available and reliable than it is at present.*

Stakeholders in Scotland specifically wanted us to do more to improve services for poorly served customers and undertake even earlier reinforcement of the network, although the latter was not supported by customer willingness to pay surveys (see Responding to polarised feedback).



## Senior Management Involvement

The management team responsible for preparing the business plan received feedback from stakeholders first hand at our stakeholder events and a director of the organisation was also present at the events to give an opening statement and talk to stakeholders.

Updates were presented regularly to all directors to ensure the views of stakeholders were being heard at the top of the organisation.

*At each phase of the process we used a combination of engagement routes to collect the broadest possible range of stakeholder views*

# Our phased approach

## In this section:

- Phase 1
- Phase 2
- Phase 3
- Phase 4
- Ongoing stakeholder engagement

	Purpose	Engagement media	Target audience
<b>Phase 1</b> Quarter 3/4 2012	<b>Identify priorities</b> ahead of drafting plan	Facilitated events Telephone interviews Tailored events Focus groups Facilitated event	All stakeholders All stakeholders Contractor/supplier stakeholders Customers Employees
<b>Phase 2</b> Quarter 1 2013	<b>Share draft plan</b> Providing options around priorities	Facilitated events On-line survey Face-to-face survey On-line survey	All stakeholders All stakeholders Customers Employees
<b>Phase 3</b> Quarter 2 2013	<b>Share revised plan</b> showing where plan has been changed	On-line consultation Tailored event Web publication On-line consultation	All stakeholders Political stakeholders Customers Employees
<b>Phase 4</b> Quarter 3 2013 to March 2015	<b>Continue engagement</b> Up to the start of RIIO ED1.	Facilitated events Targeted events Targeted events Web publication	All stakeholders Contractor/Supplier stakeholders Local authorities All stakeholders

## Phase 1

We sought stakeholder views on priority areas before preparing the draft business plan. This included:

- *Two stakeholder events to identify priorities in September 2012 with 47 participants.*
- *Eight domestic customer focus groups in October 2012 with 58 participants.*
- *In-depth telephone interviews to plug stakeholder gaps in November 2012 with 33 participants.*
- *Two contractor/supplier events in November/December 2012 with 88 participants.*
- *An employee leadership event in November 2012 with 130 participants.*

We used independent facilitators to collect key themes from our stakeholder feedback. Around 30 priorities from across all Ofgem output categories were identified. Of these, six specific topics came through as the top priorities (see Feedback — key findings) and these formed the basis of our Phase 2 stakeholder engagement activity.

## Phase 2

We explained our draft plan to our stakeholders during plan development. We made sure the draft plan was understandable and highlighted the impact it would have on customer bills, then asked what improvements they would like us to make.

The plan was presented in a way that focused on the six top priorities identified in Phase 1, and our activities included:

- *Two stakeholder events to share the draft plan including options to vote in February 2013 with 51 participants.*
- *An online stakeholder survey to plug stakeholder gaps in April 2013 with 47 participants.*
- *A face-to-face domestic customer willingness to pay survey in April 2013 with over 1,000 participants.*
- *An employee online survey in April 2013 with 437 participants.*

Our activities were again supported by independent facilitators at the events and during the analysis stage. Stakeholders, customers and employees were all presented with the same investment options, in a way that was tailored to the audience and method of engagement.



*'Just a quick note to say thanks for today's SPEN stakeholder event. I certainly got more from the day than I had hoped for and realise we should be doing more with this side of the ScottishPower Business.'*

Consumer group, February 2013, attendee at Phase 2 stakeholder event.

*'Useful to be involved in these discussions at an early stage'*

Consumer group representative who attended the Phase 1 stakeholder event in Glasgow

### Giving stakeholders the detail required to make informed decisions

Stakeholders told us detail was important if they were going to be able to make decisions about future investment in our electricity network:

#### Tailored material

At our stakeholder events, we presented material which was tailored specifically to the audience, e.g. investment levels and bill impacts **specific to licence area** (Phase 2 workshops) and material **specific to stakeholder group** (Phase 1 contractor/supplier events). We also **simplified** our material for our domestic customers.

#### Impact by location and by customer group

At our workshops and on our website, we ensured our customer bill impact information was **specific to each**

**licence area** and included **bill impact by domestic and business customer categories**.

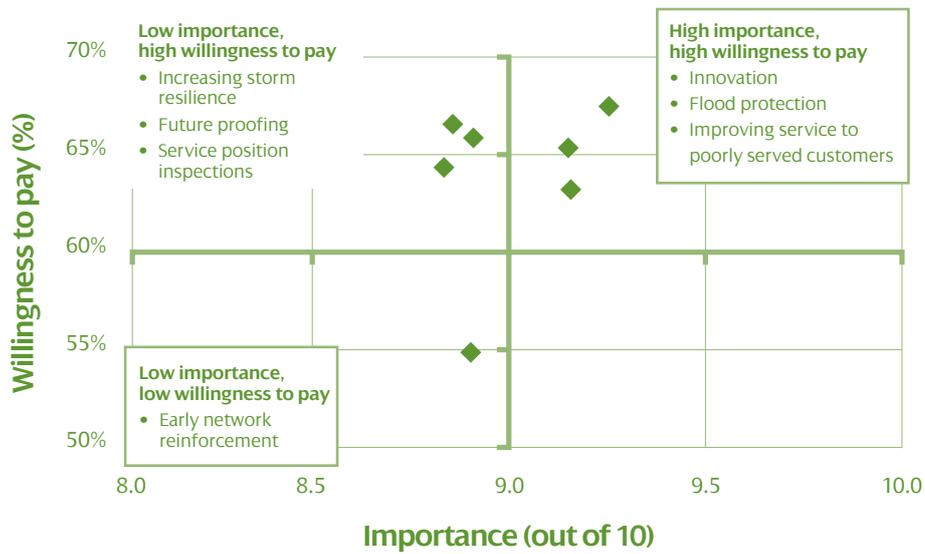
#### Audience response

At our events we used an **innovative** audience response system, which allowed stakeholders the opportunity to communicate their own preferred options and to get an **instant impression** of thinking amongst peers.

#### Tracker sheet

At the stakeholder workshops, we provided stakeholders with a 'tracker sheet' showing all the investment options on one page and the impact on the customer bill, so that stakeholders could keep track of the **cumulative impact of the bill change as a result of their choices**. We adopted this as best practice from another DNO and refined it to include more information.

### Importance vs willingness to pay (SPD)



#### Online survey functionality

Our online surveys, designed for stakeholders and employees, both **featured innovative functionality** which allowed stakeholders to vote on their preferred investment levels and see the potential **impact of these decisions on the total average customer bill**. Stakeholders then had the opportunity to revise their choices.

#### Publishing changes

We published the presentations, handouts and audience response data from our events on our website and sent emails to stakeholders with a link to the published material. This was important in order to **reach those who could not attend on the day**. In addition, **at the request of stakeholders** attending our Phase 2 workshops, we updated our tracker sheet with the audience response data and the proposed changes we were considering making to the plan as a result.

#### Willingness to Pay

We conducted willingness to pay analysis using the principles of simalto analysis, plotting importance against willingness to pay.

We first asked customers how important a topic was to them before then considering their willingness to

pay. We plotted the results on a matrix. When initially plotted, all investment areas appeared in the upper right hand quartile, high importance and high willingness to pay. In order to prioritise investment areas, the scales were shortened so that a spread could be seen on a more concentrated scale.

In general, customers were primarily interested in bill reductions. Our SPD domestic customers suggested they were willing to pay an average of £94 per annum (lower than current average) and our SPM domestic customer suggested they were willing to pay an average of £120 per annum (lower than current average). Our customer bill impacts achieve this aim for our customers (see Chapter 13 — Our Revenues and Customer Impact for bill reductions). The simalto analysis provides valuable directional insight into what customers feel is important and where they have an underlying willingness to pay.

The results in each area were similar with only minor differences:

**Customers demonstrated least support for what we described as 'strategic investment' which is triggering earlier network reinforcement.**

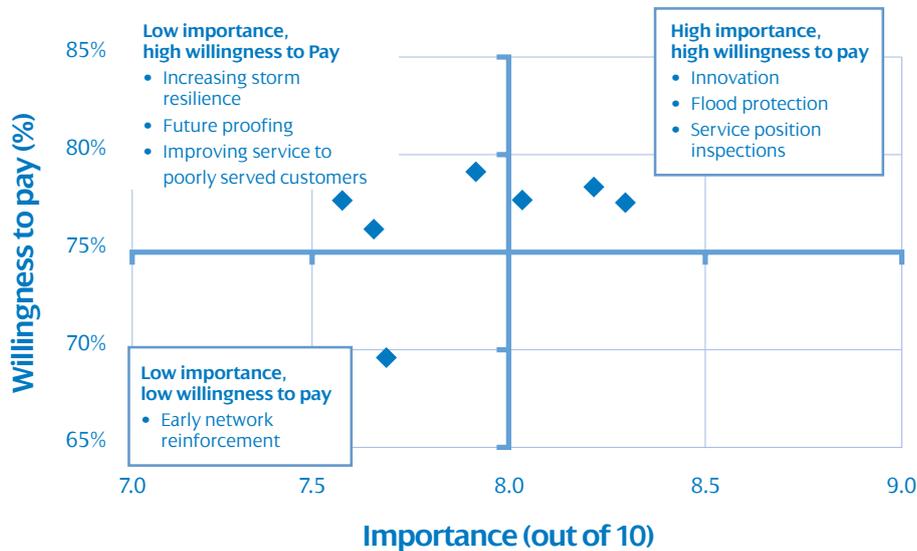
## Phase 3

### Sharing the Business Plan

We published the highlights of our business plan in May 2013. The highlights document was specifically designed for our stakeholders:

- *Using language that was understandable to our stakeholders.*
- *Compact, in order to be readable for our stakeholders.*
- *Including information specifically requested by stakeholders, e.g. greater detail on resourcing on an area by area basis and more detail on our revenues and impact on customer bills.*
- *Published at a time where we could provide specific detail to stakeholders, whilst still allowing for a 4 week consultation period.*
- *Accessible through our website, in high and low resolution formats, and emailed directly to our stakeholders.*
- *Accompanied by an online survey, to make it easier for stakeholders to give us their feedback.*

### Importance vs willingness to pay (SPM)



Prior to publication, we communicated our draft investment plans and the revisions we were making to them, to two key stakeholder groups who represent our customers:

- *Electricity suppliers, at a collaborative engagement event with other DNOs.*
- *Politicians, at drop-in sessions at Westminster, Holyrood and Cardiff.*

Our 'draft plan highlights document' was well received with the majority (ranging from 85% to 98%) of survey respondents agreeing with our proposed plans.

## Phase 4

We will continue our stakeholder engagement up to the start of ED1 and beyond, building on the good relationships we have already formed and consistently seeking to engage with new and existing stakeholders and customers.

Shortly after submission we will:

- *Publish a business plan highlights document in Welsh.*
- *Update our stakeholder video with the highlights from our plan and publish online.*

Before the end of 2013 we will:

- *Hold contractor stakeholder events to communicate the scale of our plan, changes to our contracting approach, and a timetable for purchasing.*
- *Engage with local authorities to communicate investment plan zonal maps.*

In 2014/15 we will:

- *Host tailored stakeholder sessions on specific topics*
- *Host an annual stakeholder event describing current performance and letting stakeholders know what's coming next.*

## Ongoing stakeholder engagement

Stakeholders will continue to shape our future. We will regularly share our performance against business plan with our stakeholders and we are committed to enduring stakeholder engagement. Stakeholders have told us that they want more tailored events but that broad business planning events are also useful. Stakeholders want a variety of means of engagement with us from participation at events through to receiving information updates:

- *We will further develop our online community to support our stakeholder, customer and employee engagement programmes.*
- *We will embrace stakeholder engagement as business-as-usual.*
- *We will introduce an annual programme so stakeholders know what to expect.*
- *We will report our performance at an annual stakeholder event.*

# Feedback



## In this section:

- Key findings
- Our response
- Overview of feedback
- Feedback incorporated into our plan

## Key Findings

Phase 1 identified 30 priority areas from across all 6 Ofgem output categories of Safety, Reliability and Availability, Environment, Connections, Customer Satisfaction and Social Obligations.

Of these 30 priority areas, stakeholder feedback identified 3 overarching priorities and 6 specific priorities:

### Overarching Priorities

- *Health, Safety & Environment.*
- *Value for money.*
- *Customer service.*

### Specific Priorities

- *#1 Managing an ageing network.*
- *#2 Reducing the number and length of power cuts.*
- *#3 Investing for storm resilience.*
- *#4 Improving customer service during power cuts.*
- *#5 Improving service to poorly served customers.*
- *#6 Preparing the network for low carbon technologies.*

## Our response

### Responding positively to feedback

Feedback in some areas was very strong and we have responded positively to this in a number of ways.

### Flood protection

Stakeholders were supportive of our plans for flood protection with on-line stakeholders demonstrating high importance and high willingness to pay. Customers in both SPD and SPM ranked flood protection as one of the most supported investment options.

In response, we have substantially accelerated our investment plans to reduce the risk of flood related disruption to approximately 168,000 customers and will have completed our flood protection programme in advance of the start of RIIO ED1.

### Storm resilience

Stakeholders would like to see us invest more in storm resilience than we originally presented in our draft plan, in particular at our SPD stakeholder events with a further 45% wanting us to do more than our draft plan. Political stakeholders were very supportive of our approach to storm resilience and the benefit it has delivered in recent storm events. Employees, online stakeholders and customers rated storm resilience to be of high importance.

In response, we have decided to invest more in storm resilience than originally proposed, making an additional 10% of our network, in severe weather areas, storm resilient.

### Responding to polarised feedback

#### Earlier network reinforcement

The feedback we received was not always aligned. For example, we were minded to go further than planned with respect to early network reinforcement based on strong stakeholder feedback

at the Phase 2 stakeholder events, in particular in the SPD area. However, the customer willingness to pay research showed this to be the **least supported investment option by customers.**

We therefore decided to maintain our draft plan position on this — the draft plan already included a 20% improvement in this area.

### Responding contrary to feedback

#### Educating young people

The feedback received did not always align with our core values and one area was in public safety and the education of young people. Whilst many stakeholders highlighted this as a priority, individual domestic customers were more mixed in their opinions, with some suggesting this was already represented in the school curriculum and that it was a not a priority for spending by a DNO. We believe our spending on public safety is proportionate and we plan to continue our industry leading public education programme.

### Responding to localised feedback

In the SPD region, all stakeholder groups demonstrated support for doing more with respect to improving service to poorly served customers. In SPM region there was support for maintaining the draft plan proposal.

To improve service for our poorly served customers, we are targeting under performing overhead lines and cables. In response to the feedback in SPD area to do more, we are investing a further 14%.

## Overview of feedback

Throughout the engagement process we have received feedback at various stages from many groups of stakeholders. The table below summaries this feedback and shows what we have included in the final plan. The arrows indicate the general direction of feedback across the the investment options we engaged on during Phase 2. More detail on what stakeholders have told and how we have responded to this, including linkages to our outputs is included in Annex 1.1 — Stakeholder engagement.

SPD		Phase 2				Phase 3	
Stakeholder priority areas	What we proposed in draft plan (Feb 2013)	Stakeholders workshops (voting)	Stakeholder on-line survey (simalto)	Employee on-line survey (simalto)	Customer face to face survey (simalto)	What's in our final plan?	
Storm resilience	Improving resilience to >10% customers	↑	↔	↔	↔	↑	Draft plan + additional 10% of km in severe weather areas will be made resilient
Poorly served customers	Improving service to 40% of poorly served customers	↑	↑	↑	↑	↑	Draft plan + additional 14% investment targeted to poorly performing overhead lines and cables
Energy advice for fuel poor	No expenditure in draft plan	↔	Proposed alternative output related to fuel poverty				
Network capacity information for new connections	No expenditure in draft plan	↔	Exploring options for this to be funded by connections customers				
Future proofing the network	No expenditure in draft plan*	↑	↑	↔	↔	↑	Investment in future proofing, in line with £10m option presented at stakeholder events
Earlier approach to network investment	7 new grid or primary sites, 14 uprated sites	↑	↑	↓	↓	↔	Consistent with draft plan – triggering reinforcement 20% earlier
Future innovation spend	No expenditure in draft plan**	↑	↑	↑	↑	↑	80p per customer per annum, based directly upon stakeholder feedback
Service position inspections	Inspection every 5 years starting 2015	↔	↓	↓	↔	↓	Inspections to start 5 yrs after smart-meter installation – later than draft plan assumption. Reduced investment in ED1.
Flood protection	Protect 48,000 customers against 1 in 200 year event	↔	↑	↓	↑	↑	Accelerating our flood protection programme prior to ED1. Reduced ED1 investment.

\* As stakeholders demonstrated strong support for Future proofing at our workshops, we presented an option for £10m investment in our surveys.

\*\* As stakeholders demonstrated strong support for Innovation at our workshops, we presented an option for **investment of 50p per customer per annum** in our surveys.

SPM		Phase 2				Phase 3	
Stakeholder priority areas	What we proposed in draft plan (Feb 2013)	Stakeholders workshops (voting)	Stakeholder on-line survey (simalto)	Employee on-line survey (simalto)	Customer face to face survey (simalto)	What's in our final plan?	
Storm resilience	Improving resilience to >10% customers	↑	↑	↑	↔	↑	Draft plan + additional 10% of km in severe weather areas will be made resilient
Poorly served customers	Improving service to 40% of poorly served customers	↔	↑	↑	↔	↔	Consistent with draft plan – investment targeted to poorly performing overhead lines and cables
Energy advice for fuel poor	No expenditure in draft plan	↔	Proposed alternative output related to fuel poverty				
Network capacity information for new connections	No expenditure in draft plan	↔	Exploring options for this to be funded by connections customers				
Future proofing the network	No expenditure in draft plan*	↑	↑	↔	↔	↑	Investment in future proofing, in line with £10m option presented at stakeholder events
Earlier approach to network investment	6 new grid circuits or transformers, 30 new or uprated sites	↔	↔	↓	↓	↔	Consistent with draft plan – triggering reinforcement 20% earlier
Future innovation spend	No expenditure in draft plan**	↑	↑	↑	↑	↑	80p per customer per annum, based directly upon stakeholder feedback
Service position inspections	Inspection every 5 years starting 2015	↔	↓	↔	↔	↓	Inspections to start 5 yrs after smart-meter installation – later than draft plan assumption. Reduced investment in ED1.
Flood protection	Protect 120,000 customers against 1 in 100 year event	↔	↑	↔	↑	↑	Accelerating our flood protection programme prior to ED1. Reduced ED1 investment.

\* As stakeholders demonstrated strong support for Future proofing at our workshops, we presented an option for £10m investment in our surveys.

\*\* As stakeholders demonstrated strong support for Innovation at our workshops, we presented an option for **investment of 50p per customer per annum** in our surveys.

The table shows how different groups had different views on the options present, requiring us to decide how best to respond.



## Feedback incorporated into our plan

We have incorporated stakeholder feedback and customer willingness to pay results extensively throughout our business plan. This is reflected within our proposed outputs and our forecasted expenditure over the eight year period. **We have ensured that where we have increased our levels of investment, this is backed up by a clear engineering case and stakeholder support.**

We have built stronger links with local authorities, special interest groups, community agencies and charities. We have carefully listened to our supply chain and contractors to better shape our delivery plans. **Through our brand awareness campaign and engagement events we have raised awareness of SP Energy Networks, the unique services we deliver and the broader support we can offer to the communities we serve.**

We have learned much about our stakeholder community throughout the process of engagement and as we transition into our enduring engagement activities, we believe that this will serve us well into the future. At times, it has been necessary for us to balance the varied and sometimes conflicting requirements of different groups of stakeholders, whilst setting this against customer priorities and their willingness to pay. **We believe our draft Business Plan achieves the right balance of benefits for all interested parties.**

*'Excellent day, I enjoyed the discussion generated by the diverse topics covered and the input of the individuals on the table.'*

Attendee at the Phase 1 stakeholder event in Glasgow from the Delivery stakeholder sub-group



A low-angle photograph of a worker in dark clothing and a white hard hat climbing a tall, complex metal lattice tower. The worker is positioned on the right side of the frame, reaching up to a horizontal beam. The tower's structure consists of numerous intersecting diagonal and horizontal beams, creating a dense geometric pattern. The background is a plain, light-colored sky. The overall composition emphasizes height and industrial scale.

**97% of stakeholders  
who attended our  
draft business plan  
stakeholder events  
felt we were listening  
to their views**

Summary of key information for our stakeholders – Our vision for ED1 and our plans to deliver our vision.

1. Executive summary

Our business plan is written with our readers in mind, takes into account the things that make us unique and is underpinned by a robust process.

2. A guide to this document

3. About us

4. Process of creating our business plan

Our plans to meet the challenges of the ED1 period are informed by extensive stakeholder engagement and the consideration of alternative and innovative methods.

5. Meeting our challenges

6. Learning from our stakeholders

7. Our innovation strategy

Our clear and comprehensive output commitments are underpinned by a robust, deliverable and efficient programme of expenditure.

8. Our outputs and incentives

9. Our expenditure forecast

10. Business readiness

Our plans are resilient to uncertainty, efficiently financed and minimise the impact on our customers.

11. Uncertainty

12. Financing our plan efficiently

13. Our revenues and customer impact

Our plans enable us to help shape the energy future and our continual improvement is informed by enduring stakeholder engagement

14. Looking to the future

15. We are part of the Iberdrola group

16. Glossary

Our supporting annexes give additional detailed information to support our plans.

Volume 1 – Stakeholder, customer & IT

Volume 2 – Engineering

Volume 3 – Finance and expenditure



# Our innovation strategy

The ways in which we use innovation to improve our services and provide long term value for money

Innovation is key to getting more out of the network and delivering value for money for customers. We are part of a global group with a strong innovation heritage recognised as one of the top 5 most innovative European Utilities. We have a strong track record of converting innovation trials into practical applications and making our innovation spend go further by collaborating with others. We recognise the importance of sharing our knowledge on innovation developments to make sure others can benefit from our learning.

*Innovation embedded in our plans will deliver more than £100m of customer benefits*

## In this chapter:

- Our priorities for ED1
- Innovation at SP Energy Networks
- Applying existing innovation in ED1
- Innovation funding in RIIO-ED1
- Outputs from innovation
- From inspiration to solution
- Making the most of being part of Iberdrola



# Our priorities for ED1



The use and generation of electricity in the UK is changing. We want to help shape the future and be prepared for the challenges it brings. To deliver our 2023 vision, our network and our organisation need to evolve and adapt.

Our Think Big, Start Small, Scale Fast approach enables us to be at the forefront of innovative practice.

At SP Energy Networks, we believe in the power of innovation to enhance all aspects of our business and improve our service for the benefit of our customers. We will deliver innovation to reduce costs to customers and meet their future requirements through:

- *Technology innovation — operating our network more dynamically.*
- *Operational and process innovation — driving efficiency and service benefits.*
- *Commercial Innovation — new contractual arrangements with customers and suppliers.*

We have a strong record of translating innovation trials to practical application. The table on the next page shows the roadmap that our vision will take us on and links the projects to customer benefits.

We will continue to co-operate with other UK network companies to ensure that all UK customers benefit from customer funded innovation trials.

Innovation embedded in our draft plans will deliver more than £100m of customer benefits.

SP Energy Networks are part of the Iberdrola Group, one of the largest energy companies in the world. The Iberdrola group prides itself on its commitment to innovation.

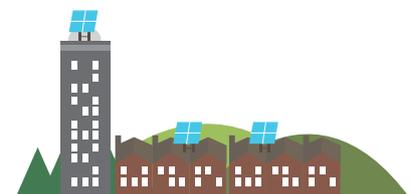
Across the Iberdrola group in 2012:

- *in excess of €145 million was invested in Research & Development.*
- *over €50 million of the investment was associated with networks.*

• *innovation involves a variety of R&D across distribution and transmission.*

• *investment includes funds leveraged from a variety of sources including European Framework programmes, government funding and stakeholder investment.*

***Our Think Big, Start Small, Scale Fast approach enables us to be at the forefront of innovative practice***



## Our innovation roap map

	Timeframe				Outputs achieved					
	2010-15	2015-2017	2017-2019	2020-23	Safety	Reliability & availability	Environment	Connections	Customer satisfaction	Social obligations
<b>Automation</b>	Automation deployed through trials by SPEN and other DNOs	Substations designed to be automation ready.	Application of automation for managing load flows	Increased automation intelligence for self healing networks	✓	✓			✓	
<b>Demand side response</b>	Demonstration projects currently underway by other DNOs, SPEN demonstration in 2013/14	Further pilot projects at scale to quantify benefits		Development of relevant standards to enable as business as usual		✓	✓		✓	✓
<b>Energy storage</b>	Projects being undertaken by other DNOs	Continue to observe demonstration and adopt learning from others	Demonstration project to build on learning from other DNOs	Build business case and confidence in technology for roll out as the market evolves		✓	✓	✓		
<b>Using smart meters</b>	Simulation project being undertaken in 2013/14	Initial systems constructed to manage data as it becomes available	Application of smart metering data to improve customer service and operation of the network	Advanced application of Smart metering data for improved asset management and demand response		✓		✓	✓	✓
<b>Active network management</b>	SPEN project in the Scottish Borders  Other DNO projects being observed	Conclude project and reflect learning into policies, applying where relevant across our practices	Active Network Management contracts become normal practice for generation connections	Linkage of Active Network management with other technologies including dynamic rating as normal practice		✓	✓	✓		
<b>Monitoring and managing fault levels</b>	Development of Fault Level monitoring and Limiters	Deployment of Fault level monitors at various sites. Continued development of fault current limiter technology	Management of fault level through automation and monitoring.	Deployment of fault current limiter as part of business as usual to mitigate reinforcement costs	✓	✓	✓	✓		
<b>Dynamic rating of network in real time</b>	Project with generators in North Wales on 132kV overhead network. Application to cables and Transformers being tested on other projects.	Application of Dynamic rating to mitigate initial reinforcement schemes. Demonstrate alternative means of dynamic rating	Use of Dynamic rating as a standard alternative to replacing highly loaded substations.	Integration of Dynamic rating with other solutions including Active Network Management		✓	✓	✓		

# Innovation at SP Energy Networks

## In this section:

- Overview
- Innovation at SP Energy Networks
- Innovation case studies
- Sharing knowledge

## Overview

We have a strong commitment to investing in innovation for the future, backed up by a track record of innovative projects and direct applications.

In the first two years of DPCR5 we have invested over £5m through the Innovation Funding Incentive (IFI) and Low Carbon Network Fund (LCNF). This has been leveraged against other funding sources, to generate a total value of research, development and demonstration in the order of £24m. Thanks to this investment, a number of our projects have been developed into solutions that are already being deployed as part of business as usual, while we have other projects that will be in a position to be applied in the ED1 timeframe:

- *The Power Network Demonstration Centre is a world leading facility to help accelerate technology development to a point where it can be deployed on the network.*
- *Network automation is being developed in collaboration with various companies to ensure we have a robust communication infrastructure as well as system intelligence. This has helped to significantly improve our response to faults and storms.*
- *We have developed active network management solutions to connect renewable generation faster and at lower cost.*

We have also been active in other areas of research and development, most notably:

1: We are participating in a Knowledge Transfer Partnership with University of Strathclyde about energy consumption and how this will shape the network in the future. This has been match funded by the Technology Strategy Board.

2: We are a partner in the Step Up (Strategies Towards Energy Performance and Urban Planning) European FP7 funded project. ScottishPower is leading the energy analysis element of the project, creating an energy masterplan for the city of Glasgow. A range of stakeholder information will be used to create this plan, which will:

- *Map the energy consumption across Glasgow*
- *Highlight key energy users and the role they could play as 'anchors' to planned energy projects*
- *Highlight potential 'zones' for specific technologies, such as district heating and heat pumps.*
- *Highlight the potential to link key infrastructure projects with anticipated development in Glasgow.*

The outputs of this analysis will be used to shape local and national policies to promote and facilitate projects that help deliver Glasgow's ambition of achieving a 30% reduction in carbon emissions by 2020.

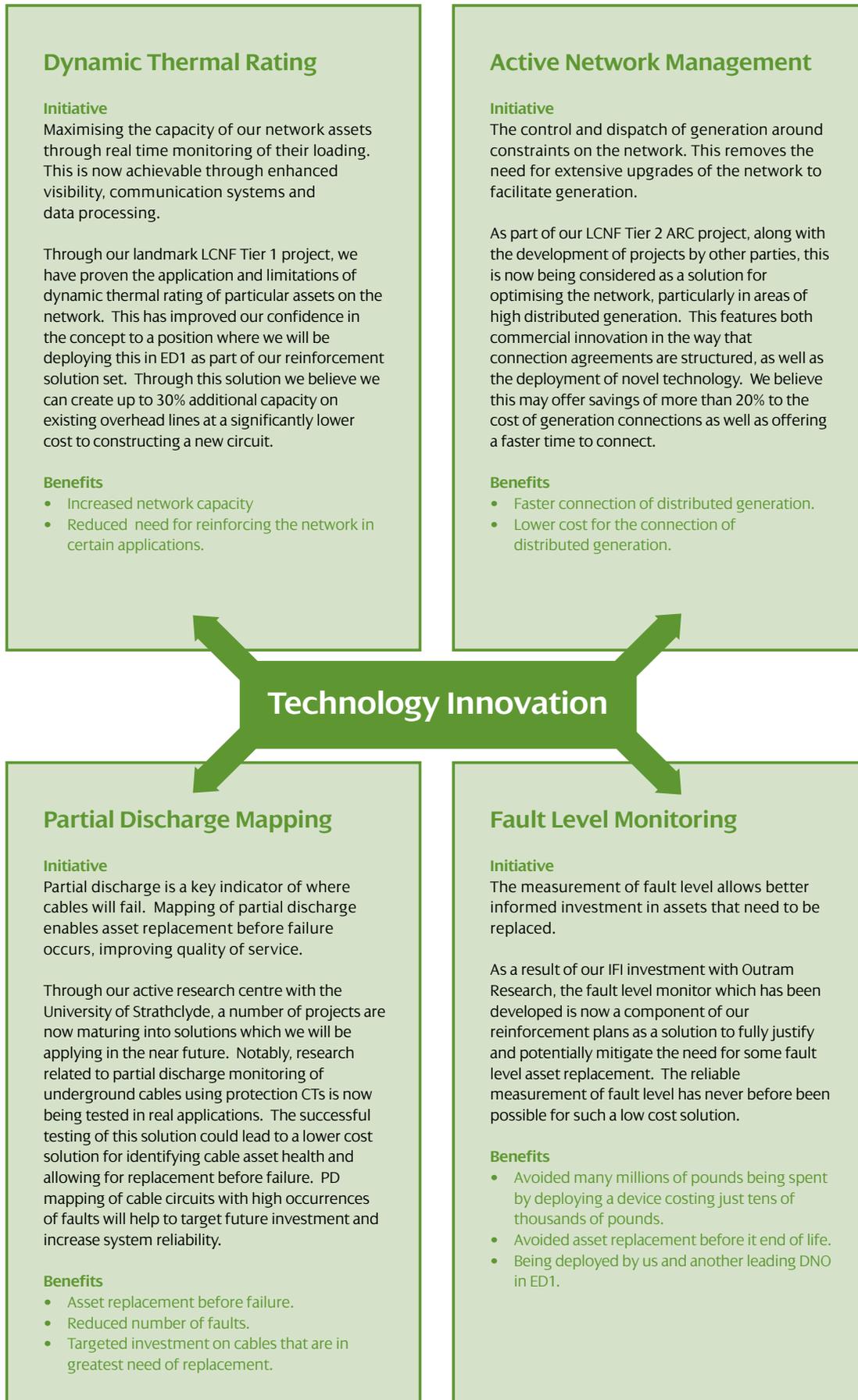
3: The Scottish Power Active Research Centre (SPARC) is a collaboration with University of Strathclyde that has been running since 2006. In this programme we sponsor research that is relevant to the power sector with particular emphasis on how ScottishPower can improve the network in the short to medium term. The programme has delivered new techniques for cable health monitoring and software tools for the analysis of alarms, among many other developments. The collaboration also gives us new R&D opportunities and insight into new technologies.

*For every £1 of customers' money we spend on R&D, we secure a further £4 from other sources such as project partners or research grants through academia*

SPEN total	LCNF	IFI	No of Reported Projects	Leveraged funding
2004/05		£223k	12	£1.5m
2005/06		£546k	36	£3.0m
2006/07		£1282k	41	£5.0m
2007/08		£1793k	50	£7.0m
2009/09		£1978k	38	£9.0m
2009/10		£1462k	35	£7.0m
2010/11	£700k	£1621k	27	£8.0m
2011/12	£900k	£1975k	40	£11.0m

## Innovation Case Studies

### — Some examples of our technology innovation



## Innovation Case Studies — Some examples of our process innovation



## Innovation Case Studies

### — Some examples of our commercial innovation

#### Connection agreements for distributed generation

##### Initiative

Alternative connection agreements are being offered as part of our Low Carbon Network Funded (LCNF) Accelerating Renewable Connections project.

We are in the process of offering non-firm connection agreements on a business as usual basis rather than by exception, allowing generation to be efficiently managed, rather than firm agreements that can require high cost investment and cause delays to generation being energised.

##### Benefits

- Increased speed of connection of distributed generation.
- Lowered cost of connections to the network.

#### Excavation and Cable Laying Contract

##### Initiative

Replacing our “defined cost” excavation and cable laying contract with a “schedule of rates” contract, we introduced zonal coefficients, reflecting the reduced or increased costs due to rural/urban working, contractor locations and establishment costs and mix of work.

The contract also introduced multiple contractors across our areas, some doing planned-only work and some covering reactive faults. This change to a non-exclusive contract allows contractors to flexibly manage their productivity.

We introduced Quantity Surveyors to assist in controlling fault costs, supported by a major training initiative prior to contract start.

##### Benefits

- Reduced costs due to improved productivity and commercial management.
- Reduced risk through multiple contractors.
- Improved customer service through greater localisation.

### Commercial Innovation

#### Group Purchasing arrangements

##### Initiative

Organising our purchasing activities through both our Global Purchasing Group and UK Purchasing means we can purchase equipment and services at competitive rates.

We purchase key strategic assets, such as cables, switchgear, and transformers globally. We are working to create standard specifications across our global networks business.

Locally, we procure a mixture of contractors within our multi-contractor model. Using commercial innovation in both of these approaches, we obtain the best value for money for our stakeholders.

##### Benefits

- Improved commercial arrangements, bringing new sources of supply to the market.
- Improved flexibility especially in rural areas in emergency/out of hours conditions.
- Reduced our costs
- Improved data quality and customer service.

#### Introduction of new participants in market

##### Initiative

We established Iberdrola Engineering and Construction (IEC) as a design and delivery organisation.

IEC programme manage our major projects and we place multiple contracts with our suppliers. This removes multiple contract layers which normally would contain a risk premium. This approach therefore reduces costs.

##### Benefits

- More efficient management of major projects.
- Reduced costs.

## Sharing Knowledge

The new approaches we develop are important to others as well as ourselves. We recognise the importance of sharing our knowledge to make sure that others can benefit from our learning.

We're active participants in the Energy Innovation Centre, a vital platform that helps to connect organisations with DNOs and other utilities with new ideas. Within the Energy Innovation Centre we can talk to SMEs with innovative ideas, collaborate with other DNOs, and work with other organisations such as Gas Distribution Networks.

We have been active in a number of ENA industry working groups to share our learning, engage with a broad group of stakeholders, and keep up to date with industry developments.

We have been engaged with the Smart Grid Forum and participated in a number of the working groups.

The development of the TRANSFORM model through the Smart Grid Forum has been valuable in sharing learning from IFI and LCNF activity to influence the definition of the model outputs. We've also used the TRANSFORM model in the development of our load-related investment plans.

We have co-chaired the Scottish Smart Grid Sector Strategy and Action Plan . This is designed to:

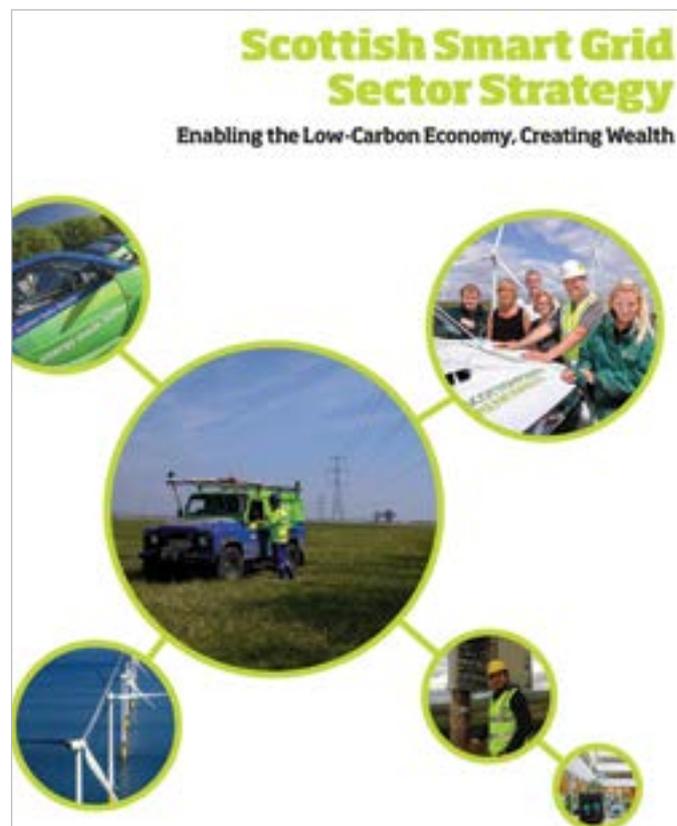
- *highlight the potential benefit of creating a smarter network.*
- *raise awareness of how organisations can be involved in the development of a smarter grid.*
- *discuss how the transferability of these skills can create economic benefit for the country.*

We are a member of Smart Grid GB, which allows us to interact directly with smart grid technology manufacturers on a regular basis and help shape the national benefits of smart grids.

We participated in the Low Carbon Network Fund conference over the past two years to share our learning with other DNOs, suppliers and industry participants. Our learning is now being reflected in the activity of other DNOs who are building on our successes, for example the integration of Fault Level Monitoring with Active Network Management.

Our investments have the wider social benefits of job creation, skill development, and new commercial opportunities. We have seen this in the growth of SMEs working with us on projects.

***We integrate our innovation process and development across our network activities so the whole business benefits***



# Applying existing innovation in ED1

The Innovation Funding Incentive (IFI) and Low Carbon Network Fund (LCNF) were the key innovation funding mechanisms within the DPCR5 period.

Throughout DPCR5 we have:

- *been active within both the IFI and LCNF funding schemes.*
- *created a Business change team to oversee innovative process improvement and new commercial arrangements.*

- *created a Future Networks team who were responsible for the portfolio of LCNF and IFI projects.*
- *ensured that learning was shared effectively between network operators.*

Applying this innovation is an important part of our business plan, and innovation developed throughout the DPCR5 period will be applied in ED1. Some of the most significant initiatives that have been built into the business plan are summarised in the table below.

Throughout the RIIO-ED1 period we will continue to engage with customers, and innovation will be one of the elements of this engagement.

Activity 2015–2023	Source of innovation 2010–2015	Benefit
Partial Discharge Mapping	SPEN IFI project	We can replace assets before they fail by identifying cables with a high probability of a fault occurring.
Fault Level Monitoring	SPEN/WPD LCNF Tier 1 project	We can measure fault levels and actively manage rather than using traditional calculation-based evaluation.
Smart Enabled Primary/Secondary Groups	Iberdrola best practice	Our substations will be ready for the future and operable with new equipment.
Active Network Management	Various LCNF projects	We can equip substations for the management of new generation on a non-firm basis, facilitating future connections at lower cost.
HV Statcom	Other DNO LCNF projects	We can apply power electronics to control system voltage and avoid reinforcement.
Dynamic rating	SPEN LCNF	We can maximise the capability of our assets through real time analysis
Online condition monitoring of primary breakers	Iberdrola best practice and technology developments	We can optimise condition monitoring to improve maintenance and replacement
Secondary Sub monitoring	Various project	We can increase network visibility of power flows and emerging issues for improved load indexing.
Soule switch	SPEN best practice	We can replace manual switches with automated switches to improve fault response.
Fault passage indicators	SPEN Fault practice	We can identify faults faster to reduce duration of power cuts
Low loss transformers	SPEN best practice	We are using low loss technology as standard, reducing the losses on the network and overall environmental impact

# Innovation funding in RIIO-ED1

**In this section:**

- What are the innovation funding mechanisms
- Proposals for the network innovation allowance
- Consulting with our stakeholders
- Proposals for the network innovation competition
- Proposals for the innovation rollout mechanism

There are various different funding mechanisms within the RIIO-ED1 framework, and we will use them to build on our previous innovation successes.

Our range of innovation projects will be focused around the priorities outlined above, and form a balanced portfolio of short, medium and long-term deliverables. This approach allows for initiatives at all stages to be pursued, from academic research through to demonstration activity.

## What are the innovation funding mechanisms?

### A Network Innovation Allowance (NIA)

Designed to fund smaller innovation projects.

### A Network Innovation Competition (NIC)

An annual competition to fund selected flagship low carbon and environmental innovation Projects

### An Innovation Rollout Mechanism (IRM)

Designed to fund the rollout of proven innovations that will contribute to the development of a low carbon energy sector in Great Britain or broader environmental benefits.

### Proposals for the Network Innovation Allowance (NIA)

Our existing portfolio includes a broad range of activity, from academic partnerships (such as the Scottish Power Active Research Centre) through to technology demonstration (such as our LCNF Tier 2 project Flexible Networks).

Based on our experience and view of the current industry, we will focus our ED1 innovation activity on a number of topics. We have mapped these topics against our stakeholders' priorities below.

## Operating Our Network Safely/ Providing Value for Money / Delivering Excellent Customer Service

Improving service to poorly served customers	Improving customer service during power cuts	Reducing the number & duration of power cuts	Investing in storm resilience	Managing an ageing network	Preparing the network for low carbon technologies
Application of smart metering data			Alternative conductor materials	Demand side response as an alternative to asset replacement	
Network visibility through online systems		Low voltage automation		LV voltage contro;	
Advanced automation			Remote asset tracking	Community led solutions	
Tackling metal theft			Alternative conductor materials		
Smart metering data for active network management			Insulation failure detection		EV charging management
Energy efficiency	Advanced mobile workforce capability			Remote asset inspection	Local energy management
Energy storage		Research in asset management			Network optimisation to reduce losses
Distribution system operator model					
Power electronics technology		Superconducting technology		Hydrogen systems	
Alternative conductor materials					

Short Term	Medium Term	Long Term
------------	-------------	-----------

Funding level	Additional cost per customer p.a. (approximate)	Stakeholder Response	Strategy
No funding	£0.00	10%	Not to utilise the NIA
0.5% revenue	50p	36%	Significant emphasis on short term activity, some focus on medium term activity and marginal focus on long term activity
0.75% revenue	75p	33%	Comprehensive focus on short and medium term activity with marginal focus on longer term activity
1% revenue	£1.00	21%	Comprehensive focus across short, medium and long-term horizon.

## Consulting with our stakeholders

In mapping our innovation projects onto the priority areas identified with our stakeholders, we took into account the following factors:

- *Many of our innovation initiatives will fulfil more than one priority at a time.*
- *Individual projects will be assessed relative to others in terms of the overall cost, effort, risk and benefit to customers and the network.*
- *The successes of innovation projects will be an important input to the ongoing strategy.*
- *What we learn from our innovation initiatives will have an impact on the overall innovation priorities. Where we have addressed a problem the priority may become less relevant, or if an initiative is unsuccessful that priority may require greater focus.*

We presented our innovation proposal to our stakeholders as part of our engagement programme, and asked for their views on a range of options including:

- *not to utilise the NIA at all (so that stakeholders did have this as an option).*
- *a low cost strategy focused on short term challenges only, equating to approximately 50 pence per customer per annum (0.5% of annual revenue).*
- *maximising amount of funding available to look at a broad spectrum of long, medium and short term challenges, equating to approximately £1 per customer per annum (1% of annual revenue).*
- *a combination of these approaches with greater emphasis on short and medium term challenges and a lesser amount of long term focus, equating to approximately 75 pence per customer (0.75% of annual revenue).*

*Innovation was rated the most important with the highest willingness to pay*

The proposed strategy was outlined against each option so the benefits and costs of different allowances could be considered. The range of options and responses are summarised below.

Over 50% of stakeholders we asked were in favour of an allowance of at least 0.75% based on our proposed strategy and benefits.

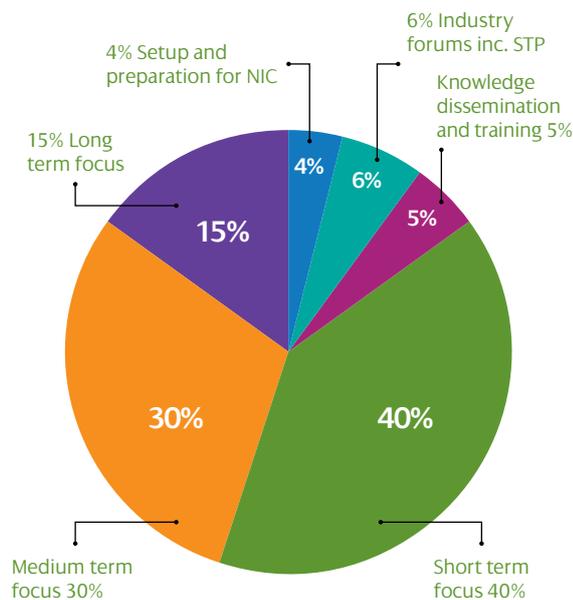
This was further supported by our customer on-the-street survey which included 1100 members of the public. Out of all the areas surveyed, innovation was rated the most important with the highest willingness to pay in both our license areas.

In light of this response, and with consideration of our innovation plans, we propose an innovation allowance for both SPD and SPM of 0.8% of annual revenue. We expect this level of funding to be split as shown in the figure below.

A number of our projects will start in the period leading up to ED1, and continue into the new innovation funding framework. We'll ensure all of these are consistent with our proposed approach for ED1.

*Over 50% of stakeholders we asked were in favour of an allowance of at least 0.75% based on our proposed strategy and benefits*

**Proposed NIA Spend**





## Proposals for the Network Innovation Competition (NIC)

In the first three years of the LCNF Tier 2 process, we have been awarded two projects. In the ED1 period, we will continue to develop larger scale demonstration projects as part of our ethos of:

*“think big, start small, scale fast.”*

Our projects will be developed within the guidelines of the NIC and also align with our stakeholders views. Particular areas of interest include:

- *Advanced application of Smart Metering data.*
- *Demonstrating the DSO concept and the future role of the DNO.*
- *Consumer involvement in the network through DSR and exploring other possible services.*

- *Facilitating the smart city and community.*
- *Loss reduction solutions.*
- *Energy solutions for vulnerable and off gas grid customers.*
- *Medium Voltage DC systems to improve connectivity.*

This is not an extensive list as we expect the priorities to change over the period depending on the success of other projects.

## Proposals for Innovation Rollout Mechanism

The Innovation Rollout Mechanism is in the early stages of development, and we will use it as we see appropriate throughout ED1. We regularly review technological developments, both our own and those of other DNOs, and we will evaluate the rollout potential and benefits of these new technologies as necessary.

# Outputs from innovation

Our focus for innovation is on real issues that the distribution network will be faced with, informed by stakeholder feedback.

Our innovation activities align with the business plan outputs:

## Network reliability

We plan to develop new automation schemes on the Low Voltage network to restore customers faster using embedded intelligence. This will be a key element in reaching our target of reducing fault restoration times by 16%.

## Customer satisfaction

We'll apply smart metering data to proactively provide improved information on what is happening on the network, particularly during fault conditions.

## Connections

We'll demonstrate demand side response solutions to assist in allowing for faster connection to the network.

## Environment

We'll develop alternative conductor and insulation materials to reduce the use of oil in our equipment.

## Safety

We'll develop new approaches to combating metal theft through alternative detection, such as using technology currently being developed through the Energy Innovation Centre.

## Social obligations

We'll provide communities with information from smart meter data and incentives to change their energy consumption behaviour for their own and the network's benefit.

Our innovation and collaboration with other parties will:

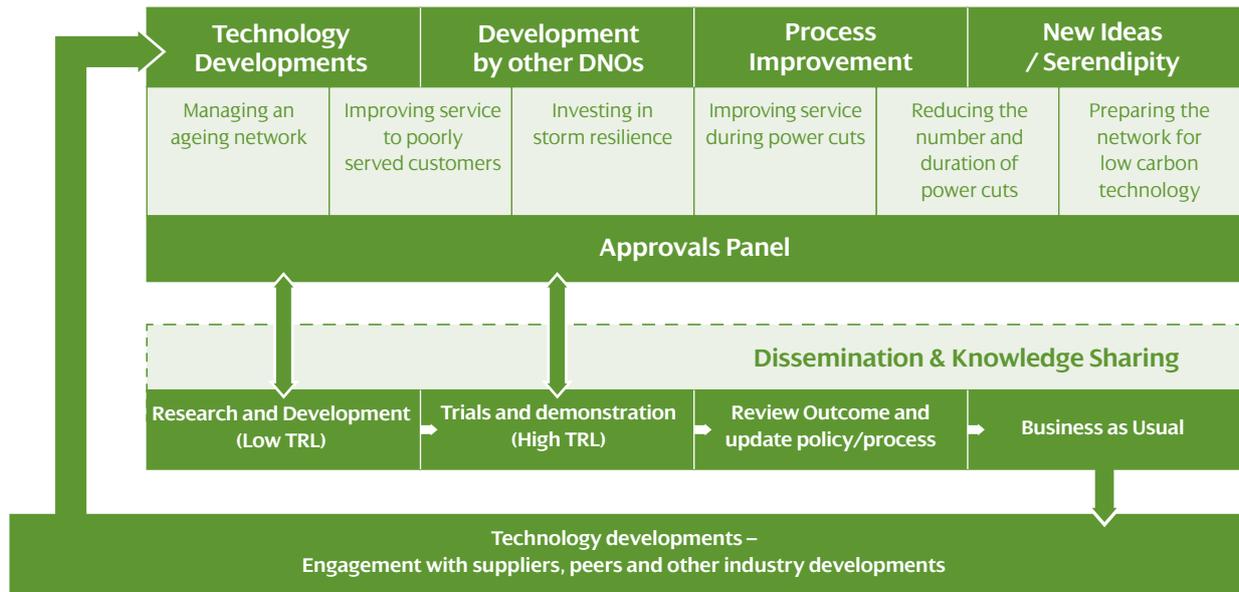
- *help develop the supply chain to understand our future requirements and coordinate suppliers to work together for mutual benefit.*
- *forge stronger links with the academic community.*
- *engage a wider range of community and stakeholder groups.*
- *allow us to understand how other parties can help facilitate the low carbon transition.*
- *share learning to help accelerate the development of new, innovative solutions.*

Innovation is essential for our future, and the detrimental consequences of not innovating would include:

- *Losing our opportunity to reduce the cost of operating the network through the application of new technologies and commercial arrangements. Although a lack of innovation might look like a saving in the short term, it could cost customer more money in the long term.*
- *Hindering the low carbon transition as we adapt to face unprecedented challenges.*
- *Hinder our preparation for the further challenges of ED2, when the uptake of new technology will increase further and place new strains on our network. Without timely investment in alternative solutions the longer-term cost may be higher, as highlighted through the Smart Grid Forum work stream 2 and 3 reports.*
- *Continuing to deploy asset intensive solutions, and failing to be in a position to adopt new technology as it is developing due to a lack of confidence.*

# From inspiration to solution

## Technology Developments flow chart



Through the development of our innovation strategy, we have discussed our plans and shared knowledge with others.

- *The leading technology company 3M are consistently recognised as one of the most innovative companies in the world. We held a knowledge-sharing event with them to compare our innovation management processes with an organisation outside our sector. This exercise helped us to review our process and the way we think about developing new solutions on the network.*

- *We benchmarked our process with the innovation team in Iberdrola. This helped us to ensure we are at the forefront of innovation management, ensure value for money, and create a more productive environment.*
- *We reviewed our innovation activity with University of Strathclyde to agree our objectives and keep abreast of academic developments.*

The key steps of our innovation process are:

### 1: Idea generation

Ideas can come from a variety of sources. We have internal initiatives such as 'What's the big idea' that encourage staff from all parts of the business to propose new ideas to our Executive team.

These can include ideas for business improvement as well as innovation. The other areas where we look for new innovative ideas are:

#### Technology developments

The introduction of new technology by suppliers or academia. This includes working within the competitive marketplace and working collaboratively with others.

#### Developments by other network companies and wider industry

This includes the developments by other DNOs as a result of LCNF, IFI and NIA/NIC in the future. A watching brief will be maintained on developments outside the UK, in particular the outcome of FP7 projects and activity within other parts of the Iberdrola group.

### Process improvement

Our business change team is working to improve the way that the business operates. We use proven Lean Sigma methods to ensure the customer is at the heart of our procedures.

### Serendipity

As with some of the best developments in history, innovation cannot always be planned. Our innovation plans includes a degree of flexibility to allow new developments to be pursued if we believe they will provide benefits to customers.

## 2: Approval

Our R&D approvals panel reviews all technology innovation projects before they progress with NIA/NIC funding. This is to ensure that the project aligns with our strategy, offers value for money, and is expected to deliver benefits that will justify the cost and risk. Following feedback from our Transmission innovation strategy, we are also aiming to reorganise our R&D approvals panel over the course of 2013 to include a number of external stakeholders such as University of Strathclyde for external verification. External governance will allow further scrutiny of our investments to ensure value for money, however we will balance this against any potential conflicts of interest that external involvement could introduce.

## 3: Project management and monitoring risks

All of our projects are managed inline with the ENA Good Practice Guide for Innovation in Electrical Distribution Networked Systems (G85). A project manager is assigned to all projects to ensure effective ownership, and our project managers can either be from the Future Networks team or from another part of the business. All projects are monitored throughout their lifecycle and reported on back through the R&D approvals panel. Should the anticipated benefits not arise through the course of the project, the Approvals Panel have the necessary authority to stop the project.

## 4: Project closure and adoption into business as usual

The manager for each project is responsible for directing the learning that comes out of a project to the relevant internal policies for use within our business. The same manager also tells the rest of our business about the project through a variety of channels including our intranet, team briefs, and other internal documentation. Where a significant change to policy is identified, we create a project charter that outlines the benefits and steps that are required. Each charter is overseen by our business change department to ensure the innovation is implemented into the wider business.

### Reviewing our innovation strategy

The environment we work in is constantly changing, and our innovation strategy needs to adapt to this. We will be undertaking an annual review of our innovation strategy through our R&D approval panel and in line with our stakeholder feedback. Because innovation takes time to develop the benefits, we do not expect to update our strategy every year, but will review its content depending on the learning and other developments by our suppliers and other DNOs.

We know that we can't do this alone. We work with a variety of collaborators on our projects, with multiple benefits. Collaboration allows for the sharing of ideas, which in turn allows us to make greater progress, faster. It also allows a sharing of risk so that no one party is carrying all the consequences of a project failing. This in itself is recognised as an important learning point; proving why things don't work can be just as important as proving what does.

## We work with a wide variety of collaborators



Throughout the ED1 period and beyond, we want to ensure good practice and continually review our innovation process.

- We have worked along with other DNOs as part of the Energy Networks Association R&D group to develop G85 Good Practice Guide to R&D Management.
- We will hold a bimonthly review of the progress of all NIC and NIA projects to ensure risks are being managed effectively.
- Larger projects are subject to a project charter (administered by the business change team) to ensure that the project is not only delivered but that the proposed benefits from the project are realised. This charter is reviewed at an Executive level.

• Our objectives will be subject to a formal internal review on an annual basis to ensure that they are still appropriate.

- A continuous review will be undertaken as part of the ongoing stakeholder engagement programme throughout the course of ED1.

Since 2011, we have run an internal innovation conference and over 150 members of staff from across our company have attended to date. This event showcases a number of our projects, provides an update on what other DNOs are doing, encourages open discussion on the areas we are focussing on, and invites feedback on new areas where staff feel we should be focussing. The conference has included speakers from some of our project partners as well as internal staff. It has proven to be very successful with a lot of positive feedback, and we intend to continue running the conference during the ED1 period and beyond.

# Making the most of being part of Iberdrola

## Innovation at Iberdrola

SP Energy Networks are part of the Iberdrola Group, one of the largest energy companies in the world. The group prides itself on its commitment to innovation. Across the group:

- *in excess of €145 million was invested in R&D in 2012*
- *over €50 million of the investment was associated with networks.*
- *innovation involves a variety of R&D across distribution and transmission*
- *investment includes funds leveraged from a variety of sources including European Framework programmes, government funding, and stakeholder investment.*

This impressive investment demonstrates Iberdrola's commitment to innovation.

*In 2012 Iberdrola was identified as the 5th most innovative utility in Europe by the European Commission. Iberdrola were the only utility with UK network presence to feature in the top 300 companies*

Source: Iberdrola 2012 Innovation Report

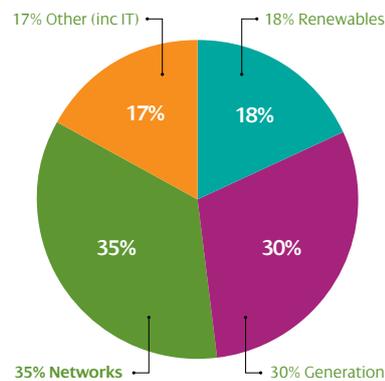
We want to make the most of being part of this highly innovative group. We collaborate extensively with other areas of the Iberdrola group, looking at all elements of networks, led by an international steering group for Smart Grids. To give three examples:

In our ED1 business plan the design and deployment of light current technology was informed by experiences of our Iberdrola colleagues in Spain (specifically the substation protocol standardisation to IEC 61850). This has allowed us to contact a greater variety of suppliers, thereby increasing competition and reducing costs.

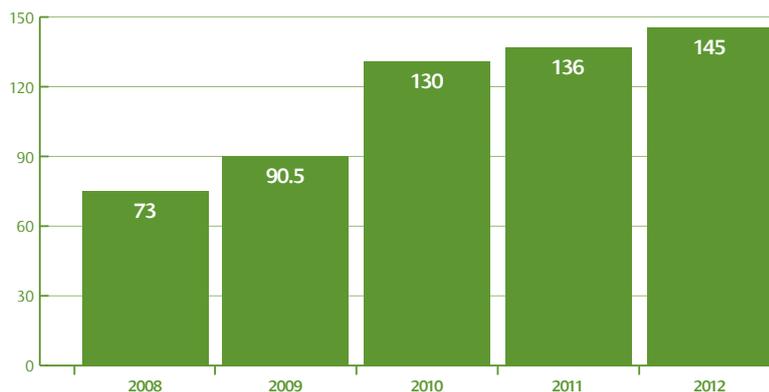
Iberdrola's experience of smart metering in the USA and Spain, and the data this creates, has helped us to plan our IT strategy and refine our requirements for the IT systems we will purchase over the ED1 period.

Iberdrola also have a collaborative electric mobility programme in Spain with SEAT to obtain and share data on the actual operating conditions of electric vehicles. Our access to this data will improve our understanding of the impact of this technology on our network.

R&D investment in 2012 across Iberdrola



Iberdrola R&D investment (€m)





Summary of key information for our stakeholders – Our vision for ED1 and our plans to deliver our vision.

## 1. Executive summary

Our business plan is written with our readers in mind, takes into account the things that make us unique and is underpinned by a robust process.

## 2. A guide to this document

## 3. About us

## 4. Process of creating our business plan

Our plans to meet the challenges of the ED1 period are informed by extensive stakeholder engagement and the consideration of alternative and innovative methods.

## 5. Meeting our challenges

## 6. Learning from our stakeholders

## 7. Our innovation strategy

Our clear and comprehensive output commitments are underpinned by a robust, deliverable and efficient programme of expenditure.

## 8. Our outputs and incentives

## 9. Our expenditure forecast

## 10. Business readiness

Our plans are resilient to uncertainty, efficiently financed and minimise the impact on our customers.

## 11. Uncertainty

## 12. Financing our plan efficiently

## 13. Our revenues and customer impact

Our plans enable us to help shape the energy future and our continual improvement is informed by enduring stakeholder engagement

## 14. Looking to the future

## 15. We are part of the Iberdrola group

## 16. Glossary

Our supporting annexes give additional detailed information to support our plans.

## Volume 1 – Stakeholder, customer & IT

## Volume 2 – Engineering

## Volume 3 – Finance and expenditure

# 8

## Our outputs and incentives

Our ambitious and well justified output commitments and the related incentives

We have identified over 90 outputs for delivery in the business plan period. Our outputs respond to stakeholder and customer feedback and address our core values on health and safety, customer service and strong stewardship of our assets. Our commitments on safety go far beyond legal requirements and continue our focus on public safety. Our customers want above all a reliable electricity supply so we will drive down the average time customers are off supply by 25% and double the compensation when we fail to meet standards. Strong stewardship of our assets is achieved through knowing the health and criticality of our equipment in order to target our investment appropriately.

*Our successful storm resilience programme means we are pushing the boundaries and have introduced a voluntary standard to reconnect customers to the network within 36 hours after a storm event*

### In this chapter:

- Overview
- Safety
- Reliability & availability
- Environment
- Connections
- Customer satisfaction
- Social obligations
- Other incentive schemes



# Overview



*Our outputs reflect stakeholder feedback and focus on those areas of our activities which are important to our current and future customers*



## Outputs:

We have developed a transparent and robust outputs framework that shows:

- *What we will deliver to our customers.*
- *How we will demonstrate our performance throughout the ED1 period.*

Our commitments for the ED1 period take into consideration:

- *Stakeholder priorities.*
- *Past, present and future performance.*
- *Challenges during the ED1 period.*
- *Levels of planned investment.*
- *Foreseeable innovation.*

We have detailed our outputs across all six output categories, including many that go far beyond the minimum expectation of Ofgem. Our outputs reflect stakeholder feedback and focus on those areas of our activities which are important to our current and future customers. Our outputs are the things that our customers directly value. In the RIIO-ED1 framework defined by Ofgem these outputs fall into six categories:

- *Safety — minimising the safety risks associated with distributing electricity.*
- *Reliability & Availability—ensuring that our network is resilient and reliable.*
- *Environment — reducing our impact on the environment and enabling the introduction of low carbon technology.*
- *Connections — providing excellent service to those who wish to connect to our network.*

- *Customer satisfaction — continuing to improve our customer service.*
- *Social obligations — recognising and meeting the needs of vulnerable customers.*

## Secondary Deliverables:

These are indicators of performance which, in themselves, are not directly experienced by customers, but necessary to achieve delivery of our primary outputs. For example, we use network health and load indices to determine the investments necessary to maintain network reliability. Within Chapter 9 — Our expenditure forecast, we describe our proposed investments and why these costs are necessary. These secondary deliverables form a key element of the regulatory contract and are described in our reliability and availability section.



## Incentives:

The RIIO Regulatory Framework provides incentives to help deliver the things that are important to the future shape and direction of our industry. We intend to perform well against these incentives, earning additional rewards for delivering improvements that our customers and stakeholders value and benefit from. In some cases the incentives also apply penalties for poor performance. The incentives are designed to encourage efficiency, good customer service, innovation, and ensure the delivery of our outputs. There is a strong correlation between the incentives and the six primary outputs categories of the RIIO framework.



# Safety

Safety is at the forefront of everything we do

## Our stakeholders want us to:

- Maintain our excellent safety record.
- Continue to replace old services cables in tenements and high rise dwellings.
- Continue to protect our equipment from metal theft.
- Continue to educate young people about electricity safety.



## Our safety outputs:

Reducing harm	Compliance with health & safety law	Operational integrity	Substation security	Educating the public
We will achieve zero employee lost time accidents	We will lead the industry for public safety.	We will safeguard residents of flats and tenement buildings by continuing our major investment programme to modernise service positions and cables.	We will safeguard our staff and members of the public and minimise disruption to supplies by implementing additional security measures to reduce the impact of interference & metal theft at our high risk substations	We will increase our extensive public education programmes: <ul style="list-style-type: none"> <li>• “PowerWise” Classroom Safety Education Programme — delivering 4000 teaching days to 400,000 children</li> <li>• “PowerWise Web Site” — exceeding 1 million hits</li> <li>• “Crucial Crew” Community Safety Events — delivering 576 events to 60,000 children</li> <li>• Fixed Safety Education Centres “Risk Factory” and “DangerPoint” — combined footfall in excess of 128,000 visitors.</li> <li>• Delivering safety demonstrations to the agricultural community at the Royal Highland Show and Royal Welsh Show.</li> </ul>
We will conduct thorough incident investigations, learn lessons quickly and implement changes to make our business safer.	We will have zero negative discussions with the Health & Safety Executive about any of our business activities.	We will eradicate all low overhead line clearances across roads by April 2015 and will continue to enhance public safety by upgrading all of our overhead line clearances to the latest industry technical standards by 2020.		
We will help our contracting teams to reduce their accident rate by 75%.		We will increase the rate at which we modernise our substations by over 20%, improving safety and security of supplies at a lower overall cost.		
We will put the Health into Health & Safety — All our employees will benefit from a wellbeing programme.				

**Key:**

- What our customers will experience
- Our supporting initiatives



*“Our commitments go far beyond legal compliance and include continuing our focus on public safety”*



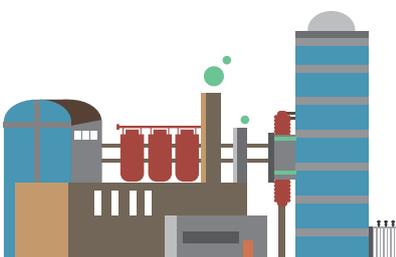
Ewan McMillan  
Health & Safety Director

We have developed a comprehensive set of outputs to clearly demonstrate our intention to continue to lead on public safety while continuing to protect our employees and contractors from harm. Our commitments go far beyond legal compliance and include continuing our focus on public safety, achieving the ultimate goal of zero employee lost time accidents, working more closely with the Health & Safety Executive, investing in the integrity of our network, installing the latest substation security measures and continuing our comprehensive public education programme.

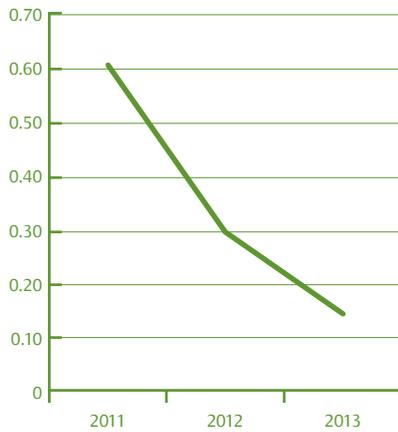
## Reducing Harm

Our industry is recognised as leading in the area of health and safety and while our performance is undoubtedly strong, we are not complacent. Indeed, we believe that recording merely lost time incidents is too blunt a measurement of performance. Far richer information comes from analysing all health and safety incidents, an approach which is adopted by world leading health and safety organisations. This allows for more intelligent intervention and better outcomes. We have significantly improved our Reportable Incident Rate year on year and will continue to do so up to and throughout the ED1 period.

At the same time as recording all health and safety incidents, we are targeting zero employee lost time accidents during the whole ED1 period. This ambitious goal demonstrates our commitment to the health and wellbeing of our employees and the confidence we have in our safe systems of work and professionalism of our workforce.



**Recordable incident rate  
Lost Time/Medical Treatment  
Rate per 100,000 hrs**



As well as our own staff, we work with a network of contractors, who are equally essential to the delivery of our outputs. We work in partnership in targeting health and safety improvements, so much so, that we are committing to help our contracting teams reduce their accident rate by 75% by the end of ED1.

Whilst we aim to eradicate safety incidents, we are mindful that when incidents do occur we will conduct thorough investigations, learn lessons quickly and implement improvements right across our business for the benefit of our staff, our contractors and the wider industry.

But it is not all about safety incidents, the health of our staff is of utmost importance to us. We plan to put the 'health into health and safety' by introducing wellbeing programmes for all of our employees, regardless of their role or location.

To reduce harm we will:

- *achieve zero employee lost time accidents.*
- *help our contracting teams to reduce their accident rate by 75%.*
- *conduct thorough incident investigations, learn lessons quickly and implement changes to make our business safer.*
- *put the Health into Health & Safety — All our employees will benefit from a wellbeing programme.*

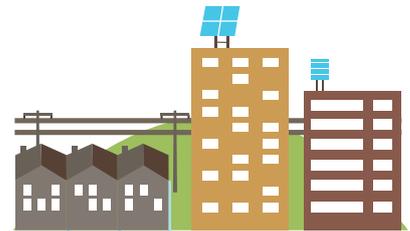
## Compliance with health & safety law

We recognise that we must comply with relevant health and safety legislation, e.g. The Electricity Safety, Quality and Continuity Regulations (ESQCR) 2002, The Health and Safety at Work Act (HSWA) 1974 and The Electricity at Work Regulations (EAWR) 1989. Our management systems are independently audited and certificated to the latest international standards, notable British Standard OHSAS 18001.

However, we view this as a basic minimum requirement and reach well beyond in our goal of zero harm to our employees, contractors and members of the public. Indeed, we plan to be recognised as an industry leader in public safety through both our investments in Operational Integrity and our comprehensive Public Education programmes.

In compliance with health & safety law we will:

- *lead the industry for public safety.*
- *have zero negative discussions with the Health & Safety Executive about any of our business activities.*



## Operational Integrity

Our commitment to legal compliance and reducing public safety risk to the lowest practicable level is total. We have worked closely with the Health and Safety Executive and lead the industry in addressing the issue of low overhead line clearances. By April 2015 we will have eradicated all low clearances across public roads and our ED1 plan will ensure that our complete networks will meet the latest minimum clearance standards by 2020. We will also continue our pioneering programme to replace ageing electrical infrastructure in multi-occupancy buildings. By the end of DPCR5, we will have modernised services for almost 70000 customers in such buildings and we will address more than 200,000 during ED1.

To maintain our high standards of operational integrity we will:

- *increase the rate at which we modernise our substations by over 20%, improving safety and security of supplies at a lower overall cost.*

- *eradicate all low overhead line clearances across roads by April 2015 and will continue to enhance public safety by upgrading all of our overhead line clearances to the latest industry technical standards by 2020.*

- *safeguard residents of flats and tenement buildings by continuing our major investment programme to modernise service positions and cables.*

## Substation Security

Over recent years, metal theft from our network has increased significantly. We're working hard with a range of agencies to reduce the impact. This is not a victimless crime and can have dire consequences directly for the thieves, but wider impacts by causing power cuts and leaving our assets less secure, where innocent members of the public or curious children may stray. Communication campaigns have been run in areas most affected and we continue to improve education and awareness with our local schools and communities on the dangers of electricity. During ED1 we will continue

to invest in the latest security measures for our high risk substations. These measures may include the installation of security doors, locking systems, alarm systems, CCTV and electric fences. We are also trialling the installation of an innovative electronic theft detection system in areas of highest risk.

In Substation Security we will:

- *safeguard our staff and members of the public and minimise disruption to supplies by implementing additional security measures to reduce the impact of interference & metal theft at our high risk substations.*

## Educating the Public

We will continue our proactive public education programmes with the schools and local communities within our licensed areas. Specifically we will focus on metal theft and the education of primary school pupils on electricity and energy. There will be a renewed focus on the agricultural community to improve their safety and minimise disruption to our network.

Looking ahead to RIIO-ED1, the “PowerWise” classroom education programme will be refreshed and the target audience will be expanded to include children in secondary education. During the price control period we will deliver over 4000 teaching days and 400,000 children will be taught about safety from the electricity network at a critical developmental stage in their lives.

During RIIO-ED1, our website will have much improved functionality, better support the educational programmes and be more widely publicised and therefore we expect the number of hits to exceed 1 million. [www.powerwise.org.uk](http://www.powerwise.org.uk)

We have a history of working with other agencies at community safety events organised by Local Councils and Emergency Services. Crucial Crews are safety events arranged for children in the final year of primary school education whereby they attend a half day session to learn about a range of safety topics relevant in their community.

Moving to RIIO-ED1, our staff who volunteer for these events and live and work in the communities, will support an additional 576 dates at Crucial Crew events delivering safety messages to over 60,000 children.

In our licensed areas, two fixed centres operate to educate children about safety and risk; The “Risk Factory” in Edinburgh (<http://www.theriskfactory.org/>) and “DangerPoint” in North Wales (<http://www.dangerpoint.org.uk>). Mock overhead power lines and substations are permanent scenarios at the centre and visitors learn the key messages about staying safe near electrical apparatus. Each year we invest in each of the centres by supporting the production of a workbook for schools and improving the electricity safety scenarios. We will continue supporting both safety education centres and expect that The “Risk Factory” will see a footfall in excess of 72,000 and DangerPoint 56,000.

We have been making links with established safety groups in industries at high risk from inadvertent contact with the electrical network. Building on the success with the construction safety groups, we plan to join other established groups increasing our predicted number of safety events for micro construction companies from 6 in the current price control period to 20 in ED1. In 2013 we will attend the Royal Highland Show, specifically to educate the agricultural community in the dangers of working near overhead power lines. The show attracts an average of 183,000 visitors each year. Our attendance at both the Royal Highland Show and the Royal Welsh Show will achieve the equivalent of our attendance at 16 lesser events.

In Educating the Public we will increase our extensive public education programmes by delivering:

- *PowerWise’ Classroom Safety Education Programme — 4000 teaching days delivered to 400,000 children*
- *‘PowerWise Web Site’- will exceed 1 million hits*
- *‘Crucial Crew’ Community Safety Events — 576 events delivering safety messages to 60,000 children*
- *‘Fixed Safety Education Centres “Risk Factory” and ‘DangerPoint’ — combined footfall in excess of 128,000 visitors.*
- *Delivering safety demonstrations to the agricultural community at the Royal Highland Show and Royal Welsh Show.*

***We will lead the industry for public safety***



**DANGER OF DEATH  
KEEP OUT**

# Reliability & Availability

We are committed to improving the reliability of supply to our customers.

## Our stakeholders want us to:

- *Maintain our leading position in terms of reliability and availability of supply*
- *Minimise the length and number of power cuts experienced*
- *Continue to improve storm resilience across the network*
- *Continue to improve resilience against substation flooding*
- *Target investment to improve service to customers who are currently 'worst' or 'poorly' served*

## Ofgem incentive scheme:

**Interruptions Incentive Scheme (IIS)** — Sets targets for planned and unplanned electricity power cuts. Performance is measured by both number and duration of power cuts. It both rewards outperformance and penalises underperformance against targets.

**Guaranteed Standards of Performance (GSOPs)** — Set the minimum level of customer service. They cover a range of activities including connections, supply interruptions and responses to complaints. We pay compensation to customers if we fail to meet these service levels.

Network performance	Enhancing network resilience	Guaranteed standards
We will reduce the average number of times our customers lose their power supply by 7%.  We will reduce the length of time those customers are without power by 16%.  By doing this we will reduce the average time our customers are off supply by 25%	We will ensure that all of our rural customers benefit from a distribution network that is resilient to severe weather events by 2034.	We will reduce by 70% the number of customers experiencing a power cut of greater than 12 hours by 2016
	We will make 25% of our rural high voltage network resilient to severe weather by 2023 and we will double investment in our low voltage overhead line networks making a further 32% resilient by the end of 2023	We will aim to reduce by 100% the number of customers experiencing a power cut of greater than 12 hours by 2023
	We will deliver a guaranteed standard to reconnect our customers after storm events within 36 hours.	We will target zero failures in all other guaranteed standards
We will improve service to 40% of our poorly served customers	We will accelerate our flood protection plans to be complete by the end of March 2015.	We will double the compensation for all guaranteed standard failures (excluding exceptional events where we make other arrangements)
	We will increase substation battery life to 72 hours in the event of major power losses	

### Key:

- What our customers will experience
- Our supporting initiatives



*“SP Energy Networks customers currently experience 30% fewer interruptions than the UK average and in ED1 we will be doing more.”*



Guy Jefferson  
Operations Director

## Network Performance

We are committed to improving the reliability of supply to our customers. We are already amongst the industry leaders in terms of customer interruptions with our customers

experiencing 30% less power losses than the UK average. Our plan aims to improve this position further through our ongoing inspection, maintenance and asset modernisation programmes, including analysis of failure patterns driving targeted refurbishment of our overhead lines and replacement of poorly performing underground cable sections. As a result we plan to reduce the number of times our customers lose their supply by 7%. We also plan to take actions to reduce the average duration our customers are off supply in the event of a fault by 16%.

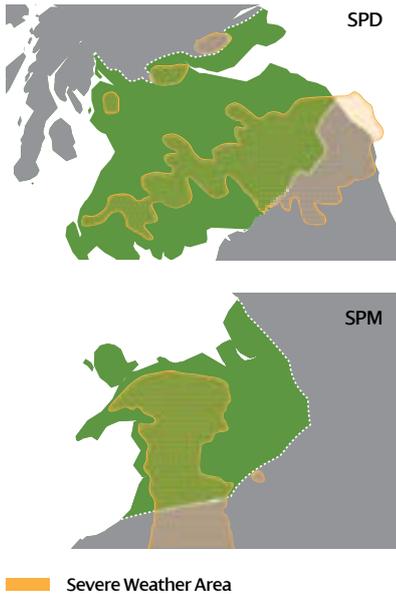
To achieve this we will continue to develop the capabilities of our staff, maximise use of fault location technology, develop further the functionality of the new network control system (commissioned in 2012) and add more remote switching capability to our networks. As a result of these improvements, we will reduce the average time our customers are off supply by 25%.

Whilst our network performance for the vast majority of customers is exceptional high, there are a minority of our customers who experience a service that is ten times worse than the

average customer. In SPD around 1% of our customers, and in SPM around 3% of our customers experience more than ten times the average interruptions per annum. These customers are typically served by poorly performing ‘spur lines’ and cables. Our stakeholders and customers support our planned investments to improve service to 40% of our poorly served customers. We will also use the Worst Served Customer mechanisms provided by Ofgem to reduce the number of power cuts to 25% of our very worst served customers.

To improve Network Performance we will:

- *Reduce the average number of times our customers lose their power supply by 7%.*
- *Reduce the length of time those customers are without power by 16%.*
- *As a result of these improvements, reduce the average time our customers are off supply by 25%*
- *Improve service to 40% of our poorly served customers and 25% of our Worst Served Customers*



## Enhancing Network Resilience

Large proportions of our networks are in areas classified by the Met Office (UK's National Weather Service) as particularly at risk of severe weather.

We have made substantial improvements over the last 3 price review periods in improving the resilience of our networks to severe weather events and can demonstrate a reduction of 75% in the number of faults experienced (refer to Chapter 3 — About us — Our focus on network resilience).

We will build on this success by continuing our overhead line rebuild and resilient tree cutting programmes making 25% of our HV rural overhead network resilient to severe weather by 2023 and we will double investment in our LV overhead line network, making a further 32% resilient by the end of 2023.

As a direct result of our stakeholder and customer survey results, we have substantially accelerated our investment plans to reduce the risk of flood related disruption to approximately 168,000 customers.

By the end of March 2015, all of our primary sites will be capable of withstanding at least a '1 in a hundred year' flood event.

The GB Power Network is normally operated in a state of dynamic equilibrium between connected load and available generation. In the rare event that this equilibrium is disturbed then the result could be total or widespread loss of the power network. Recovery from this situation is termed 'Black Start'. Traditionally the timescale required to implement a Black Start recovery has been considered to be 18 to 24 hours however recent work carried out across the GB power industry through the Energy Emergencies Executive (E3C), the time line for total recovery can now be considered in the order of 72 hours. In order to accommodate this change, we will invest to upgrade the battery systems in our major sub stations necessary for communications and remote operation of our equipment to allow us to reconnect customers, after a black start event.

To enhance network resilience we will:

- *ensure that all of our rural customers benefit from a distribution network that is resilient to severe weather events by 2034.*
- *make 25% of our rural high voltage network resilient to severe weather by 2023 and we will double investment in our low voltage overhead line networks making a further 32% resilient by the end of 2023.*
- *deliver a guaranteed standard to reconnect our customers after storm events within 36 hours.*
- *increase substation battery life to 72 hours in the event of major power losses.*



*“Our approach to network resilience has delivered a 75% reduction in network faults during recent severe weather events.”*



Pearse Murray  
Asset Strategy & Network Programmes Director

## Guaranteed Standards

Guaranteed Standards of Performance set the minimum level of service expected by customers, as defined by Ofgem. They cover a range of activities including supply interruptions. Through the application of our robust asset management strategies we aim to reduce by 70% the number of customers experiencing a power cut of greater than 12 hours. If we fail to meet the agreed service levels, we will double the financial compensation to customers in accordance with Ofgem’s published schedule of payments (excluding exceptional events).

We are acutely aware of the hardship customers experience when they are without supplies for several days, and this is more significant for vulnerable customers after a storm event. With this in mind, we will deliver a guaranteed standard to reconnect our customers within 36 hours after a storm event.

In Guaranteed Standards we will:

- *reduce by 70% the number of customers experiencing a power cut of greater than 12 hours by 2016*
- *aim to reduce this by 100% by 2023*
- *Target zero failures in all other GSOPs.*

*Pay double the compensation for all guaranteed standard failures (excluding exceptional events where we make other arrangements)*

## Asset Health & Criticality Index

Since 2010 a regulatory measure was introduced to track the condition of assets and the improvements that we plan to carry out in the period. These Health Indices categorise assets, on a 1 to 5 scale with 1 representing new assets and 5 representing assets which have come to the end of their useful life and should be considered for replacement. As part of RIIO ED1 DNOs are taking this one step further and also categorising assets by their Criticality. Criticality represents the consequence of failure for a particular asset and covers four main consequences — Safety, System, Environment and Financial. By applying this in addition to our Health Indices we can prioritise our investments on those assets which are in poor condition and/or which have a greater consequence of failure than an average asset.

Within Chapter 9 — Our expenditure forecast, we have published the current Health & Criticality of our assets and the expected future Health & Criticality of our assets both with and without our planned investments. These planned investments are known as Secondary Deliverables and form part of our regulatory contract.

### Secondary Deliverables:

These are indicators of performance which, in themselves, are not directly experienced by customers, but necessary to achieve delivery of our primary outputs. For example, we use network health and load indices to determine the investments necessary to maintain network reliability.

In managing our ageing network in the 8 years to 2023 we will:

- *Repair more than 180,000 network faults.*
- *Inspect and maintain 30,000 substations, 70,000km of underground cables and 40,000km of overhead lines.*
- *Complete circa 3.5million asset inspections.*
- *Cut trees away from more than 300,000 spans of overhead lines (public safety).*
- *Clear trees away from 5000km of overhead lines (storm resilience).*
- *Maintain around 900,000 items of network equipment.*
- *Replace 30 major substations each supplying 19,000 customers (average).*
- *Replace 84 large substations each supplying 3,000 customers (average).*
- *Extend the life of 84 large substations each supplying 3,000 customers (average).*
- *Replace more than 2,500 small substations each supplying up to 500 customers.*
- *Replace more than 250,000 services inside customers homes & buildings.*
- *Make 25% of our high voltage network, and an additional 32% of our low voltage network resilient to storms.*

## Load Index

Load Index measure was introduced during the previous price control period as a measure of comparative loading between DNOs. Within the framework substations are ranked according to the following definitions.

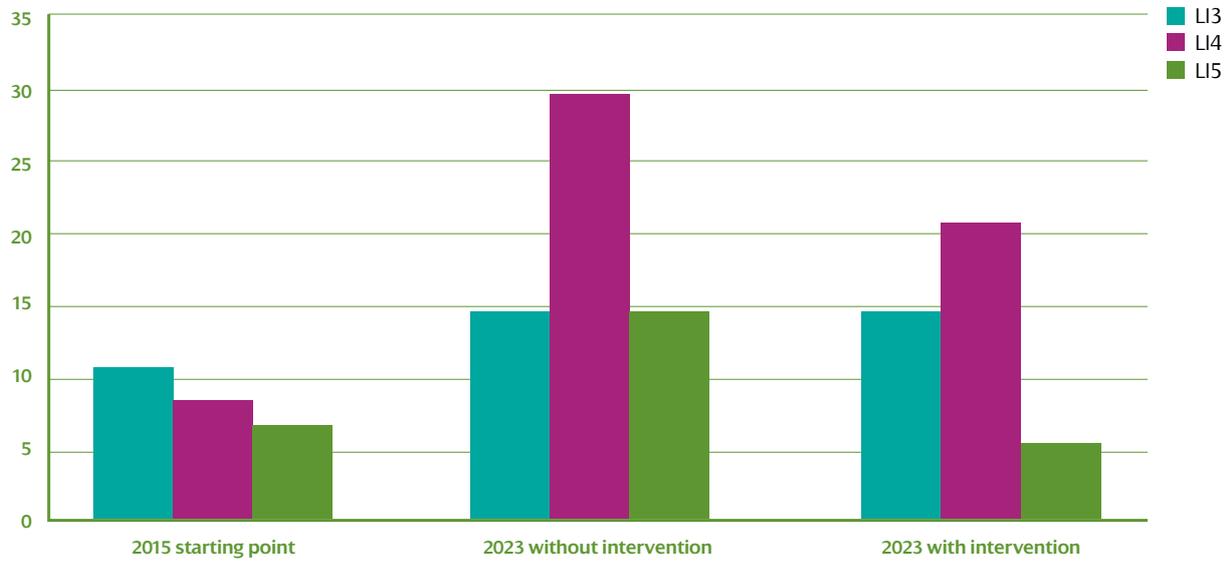
The following graphs indicate the effect that our proposed investments will have based on the assessment at the beginning of RIIO-ED1 (for more detail refer to Chapter 9 — Our expenditure forecast)

To accommodate future customers requirements we will:

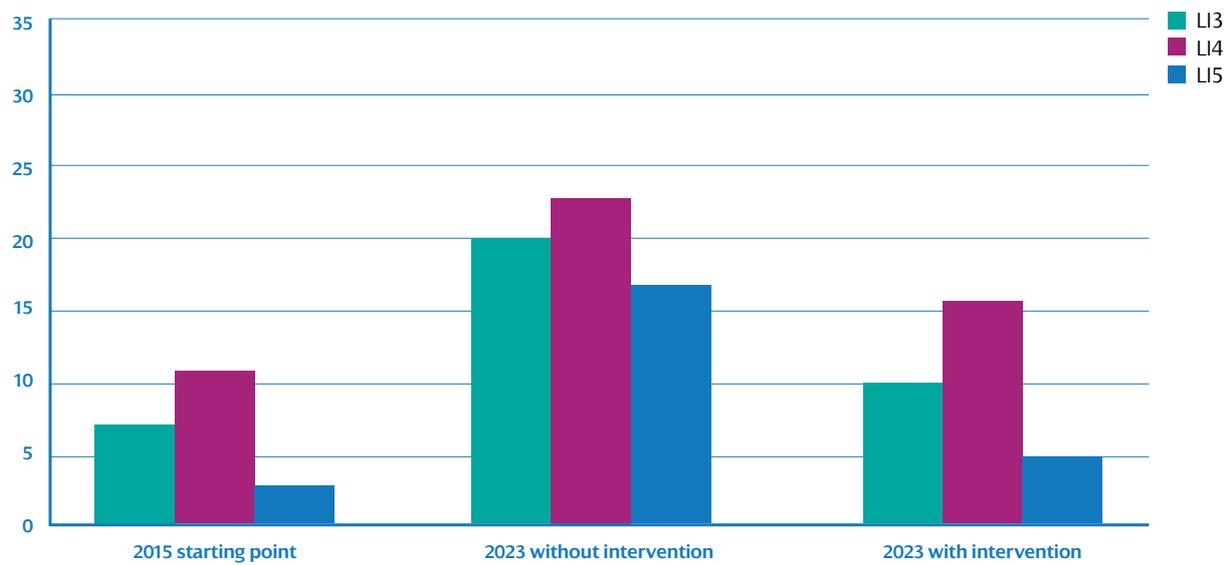
- *Upgrade 125 major substations (each supplying between 1,000 and 20,000 customers) creating up to 500MW of local capacity for future customer needs.*
- *Connect up to 5GW of renewable generation.*
- *Connect up to 2.5GW of housing, commercial and industrial customers.*
- *Accommodate 1% load growth.*

LI band	Description
L1	Significant spare capacity
L2	Adequate spare capacity
L3	Highly Utilised
L4	Fully utilised, mitigation requires consideration
L5	Fully utilized, mitigation required

### SPD Load Index Change



### SPM Load Index Change



# Environment

We consider and respect the environment in everything we do.

## Our stakeholders want us to:

- Increase the amount of 'future-proofing' on our network
- Minimise oil and greenhouse gas (Sulphur Hexafluoride, SF6) leakage
- Continue to underground cables where there is a proven benefit in terms of visual amenity
- Engage with local authorities and developers to understand their priorities and align our plans.
- Develop our network in a way that is sensitive to the environment.

## Ofgem incentive scheme:

**Losses** — Electricity losses are an inevitable consequence of transferring energy across electricity distribution networks and are a significant source of greenhouse gas emissions. Ofgem's Losses mechanism is made up of four components — license obligation, losses reduction expenditure, annual reporting and a discretionary reward.

Facilitating increased volumes of Low Carbon Technologies (LCTs)	Reduce the carbon footprint of the business	Reduce the environmental impact of our activities	Improving visual amenity in Areas of Outstanding Natural Beauty	Reducing Electricity Losses
We will use Smart technology to ensure all generation sources are supported quickly.	We will use our electronic vehicle management system to optimise our vehicle utilisation keeping vehicle numbers, broadly similar in ED1.	We will install oil containment around all new and high risk plant containing high volumes of oil and exceed IEC international standards for SF6 switchgear by specifying a maximum leakage rate five times more stringent for 33kV and below and twice as stringent for higher voltages.	We will underground 85km of overhead lines in Areas of Outstanding Natural Beauty	We will install lower loss transformers to reduce losses by 50% at more than 1300 of our secondary substations, reducing the costs Energy Suppliers build into customers bills by £50 — 60m over the lifetime of the assets.
We will reduce costs to customers by developing modern "Smart Grid" network solutions.	We will monitor and reduce the energy used within our substations, invest in lower carbon buildings and reduce energy use in existing buildings	We will reduce oil leaks by 50% through the replacement of poorly performing 132kV cable in SPM.		
We will be connecting 4.5GW of distributed generation by 2018, with up to 6GW of generation connected to our network by 2023.	We will utilise low carbon alternatives to travel, through the use of technology and smarter ways of working.	We will continue to engage on the environmental impacts of our developments from a very early stage.		
We will carry out "Smart" asset replacement — using future proofed assets where justified.	We will increase the use of electric vehicles and charging points.			
We will identify LCT hotspots using network monitoring, data from smart meters and stakeholder engagement.				

### Key:

-  What our customers will experience
-  Our supporting initiatives

## Our environmental outputs fall into two broad areas:

- *Assisting with the achievement of the UK low carbon targets*
- *Reducing the environmental impact of our business activities*

### Facilitating increased volumes of Low Carbon Technologies (LCTs)

The UK target is to reduce carbon emissions by 80% by 2050. While the overall UK target for 2020 is 34%, both Scotland and Wales have more ambitious targets of 42% and 40% respectively. Low carbon technologies, such as electric heating, electric vehicles and solar (PV) micro generation are forecast to increase during the ED1 period and into ED2. To ensure that the customers in our areas are able to start using low carbon technologies (LCT), our networks must be 'low-carbon ready' sooner than the UK average. We have developed a set of outputs based on stakeholder feedback to allow this transition to take place quickly and at reduced cost to our customers.

Our outputs package ranges from using modern 'smart grid' network solutions to minimise costs, to identifying LCT hot spots by gathering data from our network, smart metering data and stakeholder engagement. To allow us to collect the necessary data, we will invest in modern communications to 90% of our main substations. The data will allow us to consider 'smart' asset replacement by using larger sized assets where we can identify a strong indicator of future need.

In addition to the connection of LCTs, our network is expanding to accommodate renewable generation more quickly than any other DNO.

### Reducing the carbon footprint of the business

As part of the Iberdrola group, we support the 'policy against climate change' which supports compliance with; international treaties, national climate change policies and objectives supporting the development of efficient technologies in terms of Green House Gas emissions; encourage an efficient internal use of energy, and to raise customers' awareness regarding efficient and responsible energy consumption. We have developed a series of outputs which demonstrates our contribution to the group objective of improving CO2 emissions performance by 20% by 2020.

#### Our fleet of vehicles

Transport and fuel are some of the largest contributors to our business carbon footprint. Since 2008 we have reduced year on year the number of vehicles in our operational fleet, thereby reducing our environmental impact.

***We will connect 4.5GW of distributed generation by 2018 to meet the current demand of our customers, with up to 6GW of generation connected to our network by 2023***

In DPC5 we invested in an electronic vehicle management system across our entire fleet of vehicles. This has delivered safety and environmental benefits by allowing us to optimise our fleet and improve our vehicle utilisation. We are therefore forecasting that our vehicle numbers will broadly remain at these reduced levels throughout the ED1 period.

#### Increasing the use of electric vehicles (EVs)

We already utilise electric vehicles and a small number of LPG powered vehicles within our fleet and we have installed electric vehicle charging points at our main locations. In DPC5 we supported EV trials as part of the Ultra Low Carbon Demonstration Programme. This involved the leasing of vehicles for use by ScottishPower and the associated installation of charging point infrastructure. The trial has now come to an end, but we retain the leased vehicles which are deployed throughout our fleet.

During ED1 we will expand the use of electric vehicles. This approach aligns with our Low Carbon Technology forecast (refer to Chapter 11 — Uncertainty).



*“We will continually work to reduce waste and to minimise our environmental impact, exploring and harnessing new and sustainable technologies where possible.”*



Gareth Hislop  
Legal Director

Specifically ScottishPower are involved in the E-cosse EV Partnership that supports the accelerated roll out of electric vehicles in Scotland. Led by the Scottish Government, this partnership includes SSE, Toyota, Siemens, Nissan, Scottish Enterprise, Axion, Allied Vehicles, St Andrews University, WWF, Cosla, Dundee City Council, and others. Gordon McGregor of ScottishPower chairs the Strategy Board alongside Transport Minister Keith Brown. One of the key tasks of the group is to develop a roadmap that considers market development, infrastructure, training, economic development and research & development. Our work in this area has included extensive engagement with third parties. For more information click on <http://www.e-cosse.net>

Scottish Power are working in partnership with Jaguar Land Rover (JLR) to trial and demonstrate the new ALL Electric Land Rover Defender — developed by JLR in South Africa with UK-based lithium-ion battery manufacturer Axion. The technical trial, using a bespoke demonstration model, will involve Scottish Power Renewables, Generation and Energy Networks businesses.

Scottish Power are evaluating the proportion of plug in electric or plug in hybrid vehicles for our future fleet purchasing strategy for 2014 onwards

### Greater use of technology

We will continue to minimise travel through the use of mobile technology amongst our field based workforce and continue to encourage our office based staff to use video and audio conferencing rather than travel. During ED1 we will invest in upgraded field and desktop computer systems which will increase these methods of working further. We will continue to promote on-line lift-sharing schemes and the use of public transport amongst our employees.

### Energy usage

Energy use within our buildings and within our substations has a further carbon emissions impact. With this in mind are reviewing our property estate with a view to transitioning to a more modern and consolidated range of buildings. Where we re-locate offices and operational depots we will continually invest in lower carbon buildings, enhancements in metering

and seek to reduce energy use in existing building by introduction of other enhanced technologies and continue to influence staff behaviours. This will include enhanced metering arrangements for three of our depot locations in Scotland, most offices and depots currently have AMR systems installed. We will continue to support wider compliance with the national Carbon Reduction Commitment scheme.

We will continue to gather, monitor and report improved data on energy use within substations and when available and cost effective we will deploy enhanced technologies to reduce energy usage.

## Reducing the environmental impact of our activities

The majority of our 33/11kV transformers do not have oil containment. In order to ensure compliance with environmental legal obligations and minimise the impact of oil spillage in terms of revenues and reputation we have established a programme to improve and mitigate against such events. We are currently surveying our primary substations to ensure the programme is prioritised in an optimum manner alongside refurbishment or replacement of the transformer.

- *We will install oil containment around all new and high risk plant containing high volumes of oil.*

We have also introduced an initiative to install noise reduction measures for power transformers at selected key sites in order to improve the environment and address public concerns.

- *We will install noise reduction measures at selected key sites.*

Sulphur Hexafluoride (SF6) is an insulating gas present in electrical switchgear and is considered the most potent of all greenhouse gases. To reduce the environmental impact of SF6 leakages from our equipment we will impose more stringent leakage rates than currently required under IEC international standards.

- *We will exceed IEC international standards for SF6 switchgear by specifying a maximum leakage rate five times more stringent for 33kV and below and twice as stringent for higher voltages.*

Some of our older high voltage cables contain oil based fluids which help to insulate and cool the cables. We will invest to replace some of our most poorly performing cables on the 132kV network in SPM.

- *We will reduce oil leaks by 50% through the replacement of poorly performing 132kV cable.*

We attached great importance to the effect our works may have on the environment and aim to contain and reduce the impact of our activities. From an early stage we engage in environmental and technical consultations with a wide range of stakeholders which continues throughout our developments.

## Improving visual amenity in areas of outstanding natural beauty

In order to supply electricity to remote areas historically overhead lines have been built that take the most expedient route. The first Area of Outstanding Natural Beauty (AONB) was awarded in 1956 and as more have been declared it has been identified that many overhead lines in the UK run through these areas. As a result UK DNOs have started a programme of undergrounding the overhead lines that run through AONB areas to improve the visual amenity.

Our strategy is to deliver improvements in visual amenity within Areas of Outstanding Natural Beauty (AONB), National Parks (NPs) and National Scenic Areas (NSAs). Our programme has been developed through consultation with our stakeholders (Snowdonia National Park, Anglesey, Llyn Peninsula, and Denbighshire AONBs and in Scotland through discussions with the Loch Lomond & the Trossachs National Park).

We have signed an 'accord' with Snowdonia National Park and will refresh this in 2013, highlighting our continued positive relationship. We believe this is a unique arrangement.

In DPCR5 we have replaced lines in Clynder, Maentwrog, LLanfrothen and the Nant Peris Pass with underground cable.

## Reducing electricity losses

Electricity losses are an inevitable consequence of transferring energy across electricity distribution networks. Losses occur in both transformers and cables as electrical power is transferred across the network. This power is generated, but never consumed by customers, and is considered to be a significant source of greenhouse gas emissions.

During ED1 we will replace pre-1962 secondary transformers in SPD and SPM on a standalone basis as part of a focused programme to reduce electrical losses. This programme has been justified through cost benefit analysis which demonstrates that based on future traded carbon prices there is a clear benefit to replace additional units over and above the current RMU driven programme, only limited by deliverability.

We have completed a cost benefit analysis (CBA) to assess the merit of installing larger size conductor when rebuilding OHL in normal weather areas. This offers two potential benefits; reduction in electrical losses and "future proofing" to accommodate potential future load growth. The CBA demonstrated that it is beneficial to adopt this policy on selected circuits with a higher number of connected customers.

- *We will install lower loss transformers to reduce losses by 50% at more than 1300 of our secondary substations.*
- *This will reduce the costs Energy Suppliers build into customers bills by £50 – 60m over the lifetime of the assets.*
- *We will install larger size conductor when rebuilding Overhead Lines in normal weather areas with higher numbers of connected customers.*

# Connections

## Our stakeholders want us to:

- *Ensure greater flexibility in the connections process to remove red tape*
- *Further improve our communication with customers and provide a single point of contact for queries*
- *Improve transparency of information, including budget quotations and network capacity*

## Ofgem incentive schemes:

**Guaranteed Standards of Performance (GSOPs)** — Set the minimum level of customer service. They cover a range of activities including connections, supply interruptions and responses to complaints. We pay compensation to customers if we fail to meet these service levels.

**Time to Connect Incentive** — This new reward-only incentive measures a combination of the time to provide a quotation and the time to deliver the connection for minor connection customers. Targets get tighter throughout the period.

**Incentive on Connections Engagement (ICE)** — A penalty only incentive designed to encourage engagement with major connection customers.

Our commitments for faster connections	Providing of First Class Customer Service	Facilitating the competitive market
We will meet our connections guaranteed standards of service 100% of the time.	We will actively engage customers and stakeholders through events, monthly surgeries, surveys and one to one meetings to understand their ongoing needs.	We will continue to work proactively with 3rd parties groups wishing to connect to our network.
We will always work with customers to try to deliver a fast track quotation when they need it — not just within the guaranteed standards.	We will ensure our customers are kept informed of the connection process throughout every stage:	We will continue to promote competition in every way we can.
We will always work with customers to try to deliver a fast track connections when they need it — not just within the guaranteed standards.	<ul style="list-style-type: none"> <li>• We will be proactive in our approach minimising the need for customers to have to contact us — we will contact them first</li> <li>• We will communicate with our customers through their media channel of choice</li> <li>• We will develop communication plans tailored to meet individual needs</li> <li>• Through our communication plans we will remove any uncertainty.</li> </ul>	We will continue to engage with OFGEM and ICPS to extend the boundaries of competition.
We will ensure our average time to deliver connections is amongst the industry best.	We will continue to work with our major customers to further improve the service we offer.	
We will reduce our general load investment trigger by 20%, enabling quicker connections in future.	We will build our business, operating and improvement plans around the needs of our customers and stakeholders.	
We will use innovative solutions to meet the uptake of low carbon technologies.		

### Key:

-  What our customers will experience
-  Our supporting initiatives



## Our commitments for faster connections

We recognise that it is very important for us to help customers to progress through our connection process.

At the first point of contact we will explain our process, and provide all the necessary information to help customers progress through each stage. We will ensure they are kept fully informed and that there is no uncertainty as we progress the work.

We will continue to provide an efficient, effective and comprehensive connections service meeting the guaranteed standards of performance. These standards set out the minimum service expected by Ofgem. We will meet these standards 100% of the time.

In addition we will:

- *Always work with customers to try to deliver a fast track quotation when they need it — not just within the guaranteed standards*

- *Always work with customers to try to deliver a fast track connections when they need it — not just within the guaranteed standards*

- *Continually develop and improve our processes, based on our customer's expectations and customer feedback*

- *Continually develop and improve our processes and internet site, based on our customer expectations and feedback, to enable year on year improvements to be made.*

- *Ensure our average time to deliver connections is amongst the industry best*

- *Use innovative solutions to meet the uptake of low carbon technologies*

We are developing a range of online tools to make the application and design process better for our customers. We are developing on-line detailed 11kV heat maps to provide up to date information on potential connection capacity and our future plans. This will enable our customers to undertake quick assessments of their connection requirements at the very earliest stages of the planning process. We will continue to develop and expand our online cost calculators and introduce online quoting. All of these will ultimately allow our customers to generate their own network design to allow them to estimate the most economic design solution.

Through the introduction of a standard UK network load measure and recent connections charging decisions by Ofgem, it has become apparent that we have operated our networks differently to other companies. Which in some cases will have impeded the provision of new connections in a timely manner. Throughout ED1 we will reduce our network reinforcement trigger by 20%, in order that our customers benefit from being treated the same way as other customers across the UK.



*“We will be industry leaders in customer service, delivering faster connections through excellence in customer service, quality and workmanship”*



Paul Brown  
Connections Director

We have a proven track record in providing innovative design solutions for our customers and we will continue with this approach to enable faster more economical connections:

- *Our dynamic thermal rating (DTR) project in North Wales and our Accelerating Renewable Connections (ARC) project in the Scottish Borders will allow greater penetration of low carbon electricity in a timely and lower cost manner.*
- *Our Active Network Management (ANM) solutions will negate the need for costly network reinforcement. ANM uses network measurements, communications and network control algorithms to manage network configurations and generator outputs in order to get the most out of the installed plant.*
- *Promotion of share excavations and cable tracks.*
- *Development of dedicated circuits to facilitate the connection or rural Distributed Generation.*

## Providing First Class Customer Service

Our goal is to become one of the leading DNOs for the delivery of excellent customer service, we will continually seek feedback from our customers to enable us to work together to improve our processes, timescales and meet their expectations.

This will be achieved by:

- *Continuing to make improvements to our web site to simplify the language used and to further advance the navigation and retrieval of information.*
- *Developing a facility to allow our customers to obtain quotations via web quoting, make on line payments and track the progress of their project from enquiry through to final connection. We will engage fully with our online community and our stakeholders during its development.*

- *Providing a dedicated Customer Account Manager to our Major Customers. This will be a single point of contact to ensure that every project is delivered in excess of our customers' expectations. Future projects will be discussed at the early planning stage.*
- *Clear communication throughout every stage of the process. Our teams will agree, at the time of first contact, each Customer's preferred communication channel. Our teams will be trained to meet the following key Customer communication milestones:*
- *Contact the customer within 1 working day of receiving their application to provide a single point of contact to manage their project through our quotation process.*
- *Contact the customer within 2 working days of receiving their payment to provide a single point of contact to manage their project through our delivery process and where possible provide a date for connection.*

Upon completion of a connection project we will contact our Customers to ensure they are fully satisfied with the service we have provided. We will use this feedback to identify areas where we can improve in the future.

We will target zero failures in our guaranteed standards of service, if we do fail we will pay double the compensation required by Ofgem

## Facilitating the competitive market

We are already recognised as a market leader in facilitating competition in the connections market, we will continue to work and build relationships with all 3rd party groups wishing to connect to our network, to provide an efficient, effective and comprehensive service.

Competition in the connections market provides customers with a choice of options or companies who can provide some or all elements of the connection process. These can either be provided by ourselves, Independent Connection Providers (ICPs) or Independent Distribution Network Operators (IDNOs). We recognise that a customer has the choice of service provider and we will offer the same commitment to customer service whichever option is chosen.

We will continue to engage with our customers and stakeholders to remove any perceived barriers to competition and to improve understanding of our processes and the connection options available. We will engage in regular ICP/IDNO workshops with monthly interface meetings to continually build, develop and improve our relationships. We will publish monthly newsletters which provide up to date information and explain process improvements. We encourage feedback to enable our service to be continually improved. Annual surveys will be completed and used to gauge the level of customer awareness.

As industry leaders in the development of competition in the connections, we will continue to collaborate with Ofgem, other distribution network operators and ICPS to extend the boundaries of completion which can be carried out by ICPS and IDNOs. For example we have already trialled ICP's carrying out metered and unmetered jointing on our existing networks (closing joints).

## *We are Industry Leaders in developing Competition in the Connections market*



# Customer Satisfaction

Our goal is to become one of the leading DNOs for the delivery of excellent customer service.

## Our stakeholders want us to:

- *Improve customer service experience for a domestic customer reporting a power cut.*
- *Improve awareness of who SP Energy Networks is and how to contact us*
- *Give customers up-to-date information during a power cut*
- *Increase the use of text messaging to keep customers up to date. Make the telephone number to report a power cut easier to find, potentially by posting information to homes*

## Ofgem incentive scheme:

### Broad Measure of Customer Satisfaction (BMCS) —

Is an industry wide survey of the views of our customers on our levels of service. It covers customer satisfaction, social obligations, complaint handling and how we engage with our stakeholders. It both rewards and penalises performance against the targets.

### Guaranteed Standards of Performance (GSOPs) —

Set the minimum level of customer service. They cover a range of activities including, supply interruptions and responses to complaints. We pay compensation to customers if we fail to meet these service levels.

Customer service	Telephone responses	Communicating with customers	Stakeholder engagement	Complaints	GSOP awareness
We will achieve a 20% improvement in our overall scores in the industry measure of customer service (Broader Measure of Customer Satisfaction) by the end of ED1	We will continue to answer calls in less than 10 seconds and will never force disconnect calls. If a customer wants to speak to someone they will always have that option.	We will continue to provide a restoration time for every outage	We will continue our annual customer awareness campaign to raise awareness of who SP Energy Networks are and when and how to contact us.	We will respond to all customer complaints quickly and resolve complaints to the satisfaction of our customers, first time, every time.	We will include information about our guaranteed standards of service in our annual customer awareness campaign
We will compensate you with a £10 payment if we fail to take the agreed action on your enquiry.	We will never transfer you when you call us. If the person you are speaking to can't help, they will always take your details and you will be called back.	We will contact all customers impacted by an outage to keep them informed during the outage, through multi channel options.	We will report our performance against plan and outputs at an annual stakeholder event.		
We will continue to offer hot meals and accommodation to vulnerable customers after 12 hours during exceptional events and within 48 hours to all customers	We will compensate you with a £10 payment if we fail to call you back.	We will write to all customers in advance of planned interruptions and will text them the day before to remind them	We will provide an annual stakeholder communication on our engagement activities and actions.		

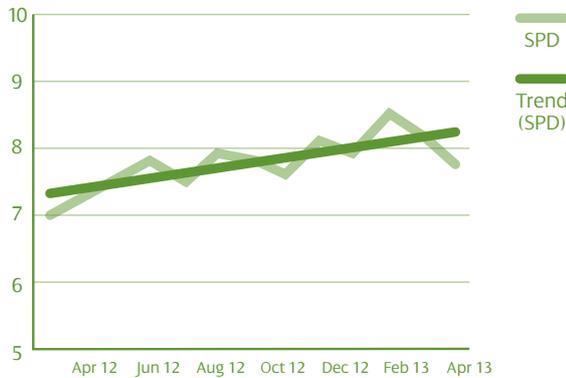


Customer service	Telephone responses	Communicating with customers	Stakeholder engagement	Complaints	GSOP awareness
<p>We will continue on our journey with the Institute of Customer Service to benchmark across the service industry, sharing best practice and continually putting the needs of our customers first.</p>	<p>We will ensure abandoned calls are less than 1%</p>	<p>We will use Smart Metering Data proactively to help customers understand what is happening on the network, particularly during fault conditions.</p>	<p>We will further develop our online community to support our stakeholder, customer and employee engagement programmes.</p>	<p>We will continue to reduce the number of complaints we receive by understanding the root cause and minimising our impact on our customers</p>	
<p>We will invest in our people at every level, developing and motivating them to deliver fantastic service to our customers in line with the Institute of Customer Service quality assurance standards.</p>			<p>We will introduce an annual programme so stakeholders know what engagement to expect.</p>		
			<p>We will embrace stakeholder engagement as "business as-usual" and will build on the approach of more focused and centralised engagement.</p>		

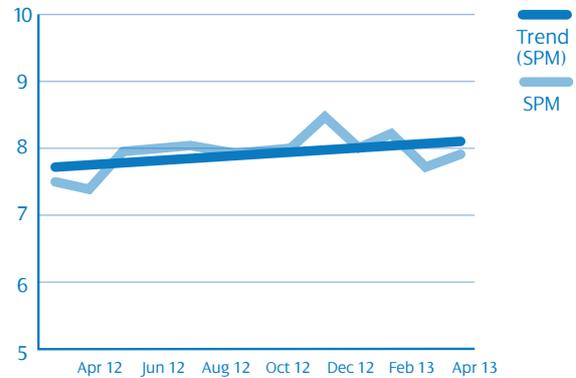
**Key:**

- What our customers will experience
- Our supporting initiatives

**Broad Measure of Customer Service Performance SP Distribution**



**Broad Measure of Customer Service Performance SP Manweb**



## Customer service

We will achieve a 20% improvement in our overall scores in the industry measure of customer service (Broader Measure of Customer Satisfaction) by the end of ED1

We are a customer service focused company and we constantly strive to improve our customer service offering. Our goal is to become one of the leading DNOs for the delivery of excellent customer service. In recent years, we have appointed an experienced Customer Service Director to drive improvements through all areas and levels of our organisation. This has led to the introduction of greater accountability and a renewed focus on the fundamentals in working to:

- *Improve our performance in reducing the effects of power cuts on customers.*
- *Answer 100% of calls and never force disconnect a customer call.*
- *Give our customers good quality information.*

We are driving through further cultural improvements in our organisation to enable us to achieve these aims. We have already engaged with a research agency who as well as delivering our customer research programme will undertake an internal programme of work with our staff to measure how effectively customer service is embedded within our company culture and identify any issues which may be stopping this from happening.

In addition to learning from customer survey results, we have carried out a customer engagement campaign to understand in detail how our customers feel about the service we offer and how we can improve. As a direct result of this feedback, we have brought together the teams delivering customer service for Connections, General Enquiries and Interruptions under our Customer Service team to ensure that we deliver a consistent service to any customer contacting us.

In readiness for ED1, we are implementing a new Customer Relationship Management (CRM) system during 2013/14. This system will allow us to measure our customers'

experiences in detail and enable us to track our delivery against the promises we make to our customers more effectively.

Our customer service scores are increasing at the fastest rate of improvement in the industry, showing that our customers are feeling the benefit of our efforts to improve our service.

Together, our above-average rate of improvement and our wide ranging improvement initiatives mean that we can be confident that:

- *Our approach is working*
- *Our ambitious target to improve our overall scores by 20% by the end of the ED1 period is achievable.*

***We are targeting an overall 9 out of 10 rating from our customers by 2023.***

Achieving this performance improvement will mean that we are well placed to deliver industry leading performance and demonstrate that our 'customer first every time' culture is truly embedded throughout our business. In short, we will put the customer first every time.

Our aim is to get it right first time every time, and this means that when we promise to take a particular course of action, we will carry it out.

We are acutely aware of the hardships customers experience when they are without electricity as a result of exceptional weather events, and that this is more significant for vulnerable customers. With this in mind, we already provide hot meals and accommodation to vulnerable customers after 12 hours during exceptional events and within 48 hours to all customers voluntarily. We will continue to provide this voluntary service throughout ED1 as part of our commitment to protecting our customers from the hardship of loss of electricity supply.

We've engaged with our customers and worked with the Institute of Customer Service to benchmark across the service industry, sharing best practice on how to improve customer service. As a result of this, we have developed a comprehensive range of Customer Commitments, which cover all aspects of our business and far exceed the minimum guaranteed standards set by Ofgem. We will continue to work with the Institute of Customer Service to ensure that our continued improvements in customer service make our customers happy and make a tangible impact on the performance of our organisation.

Where we identify areas for improvement we will act on these quickly and coach our staff to deliver the service you want. We will regularly take our staff into learning sessions in our Call Centres, our Field Teams and our Control Rooms to look at real examples of the service we have delivered and discuss as a team at

how we can improve that service. Our teams are encouraged to work together across our business to look for ways of making the experience our customers have when they contact us as good as it possibly can be.

***"To demonstrate this commitment, we will pay £10 in any instance where we have failed to take the action we have agreed in response to a customer enquiry."***



Vicky Kelsall  
Customer Services Director

## Telephone responses

We know that when our customers contact us, they want us to answer the phone quickly and they want the option to speak to a real person. We currently answer every call we receive within 10 seconds and all callers have the option to speak to one of our staff. Our enviable 10 second response time is not assisted by the practice of 'force-disconnecting' customers. We will continue to provide this high level of service throughout the ED1 period.

Being transferred from one team to another can be both frustrating and time consuming. We will never transfer you when you call us and if we can't solve your problem immediately, we will take your details and call you back.

***To demonstrate our commitment to call back rather than transfer callers, we will pay £10 in any instance where we have failed to call a customer back as agreed.***

We believe that no customer should have to wait so long for an answer that they abandon their call and hang up. We currently have one of the lowest rates of abandoned calls in the industry and we will continue to build on this by ensuring that less than 1% of all our calls are abandoned throughout the ED1 period.

## Communicating with customers

Effective two-way communication with our customers enables us to identify problems on our network quickly and minimise the impact of power cuts. Recognising this, we have asked our customers about the ways they would like to communicate with us. The graphs above show the responses we received at our workshops when we asked our customers to choose how they would like to receive information from us during a power cut.

It is clear from these responses that our customers value having a range of different communications channels to choose from.

We will continue to provide a restoration time for every outage. Occasionally we need to shut off customers' power supply in order to maintain or replace equipment on our network. We understand the inconvenience that these power outages cause and we know that having clear information about the outage helps our customers to plan effectively to deal with the loss of electricity.

For planned outages, we will continue provide outage start and restoration times to all customers affected by letter 7-10 days in advance. During the outage, customers in ED1 — as currently — will be able to access the most up-to-date information via our interactive voice response system.

We will contact all customers impacted by an outage to keep them informed during the outage, through multi channel options. When our customers are without electricity, they want to know that we are working to restore their supply as quickly as possible.

We already keep those customers who contact us to report a power cut up to date by providing the most up-to-date restoration time information via an interactive voice response system. We also contact all customers who have registered a mobile number with us by text to update them through the duration of the power outage. Once the power is restored we advise customers again by text message to let them know the restoration is complete.

We know that our customers value choice in terms of the way information is shared with them. When asked to choose the preferred modes of communication during a power cut, a proportion of our customers value receiving outage update information through a range of other means and we expect this proportion to increase as the use of new communications technology such as smart phone apps and social media evolves through the ED1 period.

The introduction of our new CRM system will allow us to offer our customers a range of different communication channels, including enhanced web services where customers can access a wider range of services online, social media and web chat. We will continue our efforts to understand how our customers want to interact with us by asking our younger customers about the ways they like to communicate, enabling us to proactively deliver up-to-date services before our customers ask for them.

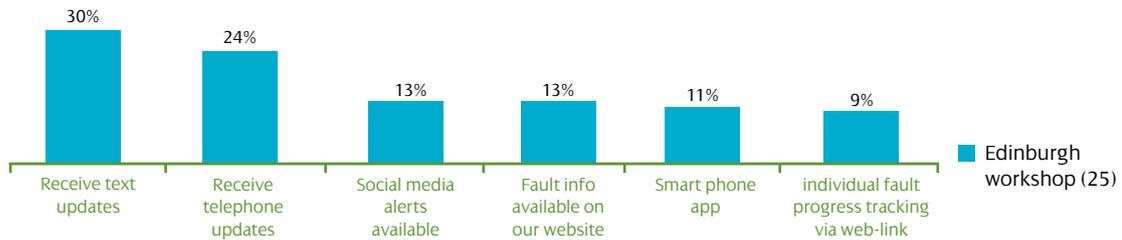
We currently warn all customers affected by a planned interruption by letter seven to ten days in advance. During the ED1 period, we will also text any customers who have registered their phone number with us the day before the outage to remind them.

In addition to this, we will use our new CRM system to enable us to run campaigns to proactively notify customer groups about interruptions to their supply, planned work, and major projects on the network.

The roll-out of smart metering is due to complete during the ED1 period. This means that we will start to receive smart metering data, giving us real-time insights into the performance of our network. This data will allow us to identify what is happening on our network more quickly and to proactively contact our customers to help them understand what is happening during a power cut.

*We will invest in our people at every level, developing and motivating them to deliver fantastic service to our customers in line with the Institute of Customer Service quality assurance standards*

**Which of the following service improvements do you think we should adopt for communication in a power cut? (Select all that apply)**



**Which of the following service improvements do you think we should adopt for communication in a power cut? (Select all that apply)**



**Stakeholder engagement**

The views of our stakeholders are important to us. They provide valuable insight into how we should change our business to improve our performance now and into the future.

We have made a step change in our approach to engagement around how we prepare our plans, engaging with stakeholders early in the process and making the way we present our material much more stakeholder focused. The priorities and needs of a broad range of participants have had a tangible impact upon both what we plan to deliver in the ED1 period and how we plan to deliver it.

See Chapters 4 — Process of creating our business plan and 6 — Learning from our stakeholders for more information on our process of engagement and the results.

Our customers and stakeholders have told us that we need to improve awareness of our brand and make sure customers understand the difference between us and their supplier.

In response to this, we have started an annual awareness campaign including a series of leaflet drops, radio and newspaper features to:

- *Communicate our role and ensure that customers know how and when to contact us*
- *Proactively recruit new members to our online community*
- *Lay out clearly what our customers can expect from us*
- *Raise awareness of our priority services register and our guaranteed standards of service (to be included in our 2014 campaign onwards)*

We will continue this annual awareness campaign throughout the ED1 period, acting on further customer and stakeholder feedback to ensure that we continue to improve the initiative. We will report our performance against plan and outputs at an annual stakeholder event.

We recognise that there is a requirement for a regular and centralised programme of stakeholder activities that focus on business priorities identified by stakeholders. Central to this will be an annual event that focuses on our performance against our business plan and identifies stakeholder priorities. Three key priorities will be selected for topic-specific stakeholder workshops to be delivered throughout the year.

We will also deliver an annual stakeholder newsletter that sets out the activities we are undertaking with stakeholders and the resulting actions.

We currently conduct stakeholder engagement at a business unit level across our business and we recognise that our programme of engagement can be made more powerful by centrally coordinating these activities.

We will use our CRM system to consolidate the findings of these stakeholder engagement activities, creating opportunities to identify key themes and better target future engagement. We will further develop our online community to support our stakeholder, customer and employee engagement programmes.

Since its launch in 2011, membership of our online community has steadily grown to over 700 members. It provides us with honest, unfiltered feedback, and includes online focus groups, polls, surveys, and discussions. For this reason, we are keen to extend the community to a wider number of customers. During ED1, we will continue to proactively recruit people to the community and details of how to join are provided on our customer letters and website.

**You can find more information about our online community here:**

[http://www.spenergynetworks.co.uk/serving\\_our\\_customers/online\\_community.asp?NavID=1&SubNavID=5](http://www.spenergynetworks.co.uk/serving_our_customers/online_community.asp?NavID=1&SubNavID=5)

An enduring programme of focused, regular and robust engagement is vital to our continual improvement. In recent years, we have appointed an experienced Stakeholder Engagement manager to ensure that stakeholder engagement is fully integrated into our business-as-usual, and we are continually working to further extend and tailor our engagement activities. We will build on this approach during the ED1 period, recognising the relevance and value of the insights our stakeholders can give us.

## Complaints

We know mistakes can happen and we understand that both the speed and the way in which we resolve complaints are vital to satisfying our customers. To improve the speed of our complaint resolution, we have improved our ways of working to ensure that the routes to resolving complaints are simpler and more direct.

To improve the quality of our complaint handling, we have conducted an extensive programme of customer service and complaint handling training for staff across our business and we hold regular team sessions to drive improvements in complaint logging, complaint closure and understanding the root causes of customer complaints. We will sustain this training throughout the ED1 period, drawing on experience from the Institute of Customer Service and across the industry to inform our programme of continual improvement.

We are working to reduce the overall number of complaints we receive by understanding the root cause of each complaint in detail. We have updated our business systems to allow us to accurately record the reasons for complaints and this data has been vital in reducing the number of complaints we receive. In addition to training our staff in complaint handling and customer service, we are also training our staff to recognise potential issues earlier to enable us to mitigate problems before they affect our customers. We are also working to minimise our impact upon customers across all of our areas of activity and to give our customers clear and timely information, further reducing the risk of complaint.

## GSOP awareness

We are committed to giving our customers the best possible service. For many of our activities we promise our customers a guaranteed level of service, and if we fail, we will pay compensation. While we give clear details of these guaranteed standards on our website, we recognise that customers may not be aware of them. During the ED1 period, we will include information about our guaranteed standards in our annual customer awareness campaign to ensure that all of our customers are aware of the standards of service they can expect.

***We will double the compensation for all guaranteed standard failures (excluding exceptional events where we make other arrangements)***



# Social Obligations

We are a responsible company and work hard to do the right thing for the communities we serve

## Our stakeholders want us to:

- *Raise the profile of the Priority Service Register*
- *Identify and support vulnerable customers by working with third parties such as charities, GPs and social services.*
- *Provide regular updates during an extended power cut to vulnerable customers.*
- *The fuel poor were a concern for stakeholders, however they struggled to suggest a specific role for SP Energy Networks in supporting this sector of society.*
- *Continue to be involved with charitable initiatives and raise the profile of this activity.*

## Ofgem incentive scheme:

**Broad Measure of Customer Satisfaction (BMCS)** — The Broad Measure of Customer Satisfaction is an independent industry wide survey that takes account of the views of our customers on the levels of service provided by DNOs. It covers customer satisfaction, how we meet our social obligations, complaint handling and how we engage with our stakeholders. Fixed performance targets will be set by Ofgem for ED1. It both rewards outperformance and penalises underperformance against the targets.

Our Priority Services Register for vulnerable customers	Improving the services provided for vulnerable customers	Working in Collaboration with our Communities
We will always ensure our people are trained to recognise and deal with vulnerable customers sensitively	We will send a welcome letter and information pack to every new customer joining the Priority Service Register.	We will ensure our Network is ready for off gas grid customers to transition to new electric heating systems
We will proactively contact all Priority Service Registered customers at least every 2 years	We will contact our vulnerable customers during an unplanned outage at least every 4 hours	We will establish an additional fund within ScottishPower's existing Energy People Trust to target initiatives to help vulnerable customers
We will continue to establish mechanisms to share information on vulnerable customers with other agencies and authorities.	We will contact all vulnerable customers in advance of planned power interruptions and review their individual supply requirements.	We will deliver initiatives that will help the fuel poor by working with agencies such as Energy Action Scotland, National Energy Action, Scottish Government Fuel Poverty Group etc.
We will engage with GP Surgeries, Libraries, Post Offices and Pharmacies to make sure our communities are aware of our Priority Services Register.	We will continue to work in local communities impacted by outages to ensure they have access to hot meals, drinks and company.	We will continue to work with agencies to understand how we can collaborate to best support our customers and communities.
	We will continue to produce winter packs and make them available to all of our vulnerable customers	
	We will make automatic compensation payments to all Priority Service Registered customers should we fail to restore their supply within 12 hours following a fault.	
	We will continue to work with Emergency Planning Officers to provide support to our vulnerable customers during outages	

**Key:**

-  What our customers will experience
-  Our supporting initiatives

## Our Priority Service Register for vulnerable customers

We know how difficult it is for anybody during a power loss, but in particular we recognise how especially worrying it must be if you rely on electricity for medical equipment, or have other special needs. We hold a Priority Services Register (PSR) so that we can contact our most vulnerable customers if they do experience a power loss. Customers can be included in our register if they are:

- *Dependent on medical equipment.*
- *Chronically sick.*
- *Disabled.*
- *Or have some other special needs you would like us to consider.*

Being on our register won't necessarily mean we can restore power more quickly, but we will proactively contact our PSR customers if we know of a problem in their area. We will keep our PSR customers informed with regular updates and, if necessary, we can work with external agencies who may be able to assist them.

Our customers and stakeholders tell us that we could improve awareness of our Priority Services Register within our communities and as part of our vulnerable customer strategy. We will roll out an awareness campaign to make sure local agencies and community groups are aware of our register and work with us to direct customers to register so that we can support them throughout a power loss.

*“Our online community scored us 9.2 out of 10 for ease of joining our priority services register.”*

*Vicky Kelsall  
Customer Services Director*

We have planned a programme of work to continue to build on our engagement with agencies already undertaken in DPCR5 and to develop this further to engage with a wider range of agencies supporting vulnerable and fuel poor customers. We will also be targeting community locations such as post offices, libraries, GP surgeries and community centres to promote our “Good Neighbour” campaign to ask people to look out for their neighbours and encourage them to register with us if they are elderly or require priority services. Our customers and stakeholders told us that whilst they expect us to look after our most vulnerable customers they also think that the community themselves have a responsibility and therefore our plan makes sure we have targeting both of these areas.

Our front line staff are a vital link within our communities, therefore we are training our staff to engage with vulnerable customers who are registered for priority services but also to recognise vulnerability within our community which we may not be aware of. A training programme will be rolled out across our employees to make sure our staff know what is expected of them and to enable them to recognise vulnerable customers and offer assistance.

## Improving the services provided for vulnerable customers

We recognise that sometimes we cannot restore supplies as quickly as we would like. In ED1 we will provide a guaranteed standard to restore electricity supplies within 12 hours following a fault. If we fail to keep this promise, we will pay double the Ofgem recommended compensation to our customers. For PSR customers, this payment will be made automatically.

We recognise however that as well as compensation it is vital to work closely with our more vulnerable customers during periods of power interruption to offer assistance and engage with other agencies where necessary to offer as much help and support as possible.

## Working in collaboration with our communities

The strong and enduring relationships we have with our local communities is a source of great pride to us — and one that we believe is essential to the economic development of our business. Building and maintaining the trust of our communities has been one of our key priorities over many years. We aim to conduct our activities responsibly, in a way that is considerate to local communities and the environment.

We also have a long track record of supporting communities not only financially, but also through the skills, generosity and enthusiasm of our people.

To find out more details on Scottish Power's work in the community click here: <http://www.scottishpower.com/pages/community.asp>

Within our customer service and social obligations strategy, Annex 1.4, we have laid out our intention to build on our existing engagement and have detailed how we will engage with agencies supporting vulnerable and fuel poor customers. To further demonstrate our commitment to the communities we serve we will set up an additional fund within ScottishPower's existing Energy People Trust to target initiatives to help vulnerable customers in our licence areas and we will encourage community groups to come forward with their ideas. To find out more about the Scottish Power Energy People Trust click here: <http://www.energypeopletrust.com>

We have also obtained data on the fuel poor communities within our licences areas and will target specific campaigns in these areas to assist vulnerable and fuel poor customers. We have already engaged with Energy Action Scotland (<http://www.eas.org.uk>) and will be developing a joint initiative called "Community Building Energy Efficiency Fund". We will be investing in the heart of our fuel poor areas for the benefit of the whole community.

Through the 'Community Building Energy Efficiency Fund' we will work with EAS and local parliamentarians to nominate a community building in need of energy efficiency upgrade, this may include improvements in heating systems, cavity wall insulation and loft insulation. For instance, we may target a community centre used for mother and toddler groups which has inadequate heating and make this a better environment to visit.

Raising awareness of energy issues is a vital addition to complement the practical measures we can deploy. This is an extremely valuable way of taking energy efficiency messages back into the home and into the wider community. Having seen the range of measures installed in a local community building, its users are likely to be more receptive to saving energy and tackling fuel poverty on a personal level. To achieve this, EAS will deliver energy efficiency training to the staff and volunteers using the centre, or to other community representatives where appropriate.

We will use the opportunity to help people understand who they need to call in a power cut and how our role is different from that of an Energy Supplier.

### Customers off Gas Grid

To make sure we target our most needy customers we will look at where we have fuel poor communities which are also off gas grid and will target these communities as a priority.

The roll out of new electric heating technology is an enabler of the UK transition to the low carbon economy and a key consideration in our plans. We anticipate that some of the early adopters of heat pumps will be off gas grid customers because of the savings that could be achieved in comparison to other non-electric heating systems. Within our load related investment plans we have factored in the higher proportion of off gas grid customers present within our network area.

The roll out of the Renewable Heat Incentive, Green Deal, Renewable Heat Premium Payment and other heat related incentive schemes are likely to drive increased interest for off gas grid customers to make the transition to new electric heating systems. Our plans will make sure our Network is ready for this transition.

### Quality of Initiatives for Vulnerable and Fuel Poor customers

We intend to engage with our customers and stakeholders before and after each initiative to understand what difference the work has made to them and learn any lessons for future schemes. We recognise the importance of making sure we are delivering the things our customers want and things that make a real difference to their day to day lives. We will engage an independent research company to measure the impact of our work in this area.

These initiatives will help us to target the largest number of customers either directly or indirectly.

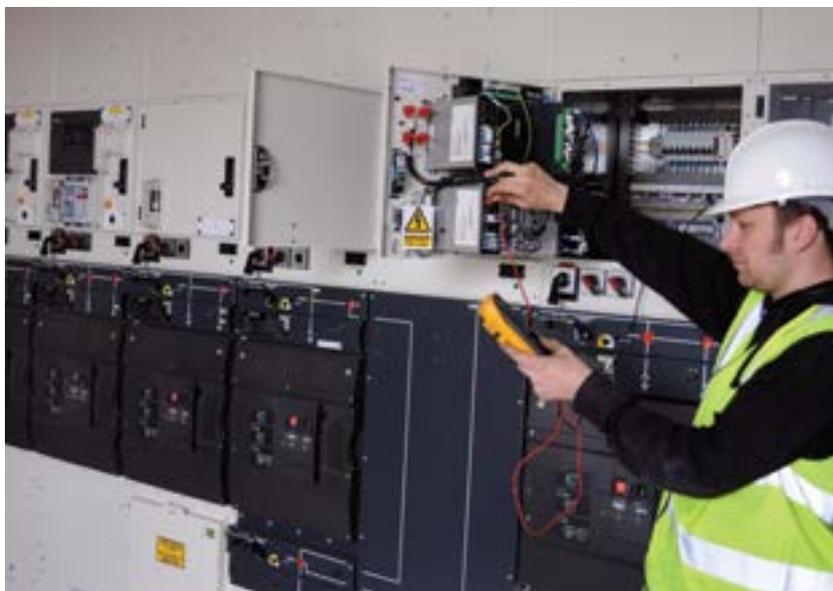
Our key outputs in this area:

- *We will establish an additional fund within ScottishPower's existing Energy People Trust to target initiatives to help vulnerable customers*
- *We will ensure our Network is ready for off gas grid customers to transition to new electric heating systems*
- *We will continue to work with agencies to understand how we can collaborate to best support our customers and communities.*
- *We will deliver initiatives that will help the fuel poor by working with agencies such as Energy Action Scotland, National Energy Action, Scottish Government Fuel Poverty Group etc.*

# Other incentive schemes

*Throughout our plan we have targeted our costs to be amongst the most efficient in our industry and we have set a further 1% per annum productivity improvement target across key activities*

Incentive for ED1	What we have included in our plan
<p><b>Information Quality Incentive (IQI) and Efficiency Incentive Rate (EIR)</b></p> <p>It is important that we deliver outputs at an efficient cost, providing value for money for current and future customers. The information quality incentive (IQI) aims to provide realistic cost forecasts and we are incentivised to provide the most efficient business plan possible. The Efficiency Incentive Rate (EIR) encourages us to deliver further efficiency and shares the benefits of any cost savings we can make with customers resulting in lower customer bills.</p>	<p><b>We have carried out a thorough review of every cost associated with our ED1 Plan.</b></p> <ul style="list-style-type: none"> <li>• Our business plan reflects the most efficient costs to operate our network in a safe and efficient manner whilst delivering our outputs.</li> <li>• We have reflected significant customer benefit arising from being part of a larger Iberdrola global networks business.</li> <li>• We will continue to review our costs in line with advancements in technology, our own innovation projects, and those of other DNOs.</li> </ul>
<p><b>Network Innovation Competition (NIC) and Network Innovation Allowance (NIA)</b></p> <p>The Network innovation Competition and Network Innovation Allowance are time-limited mechanisms to fund innovation where this adds value to customers. These new incentives replace the Low Carbon Network Fund and Innovation Funding Incentive. These allowances are essential if we are to meet the challenges of the Low Carbon Economy by introducing Smart solutions to our Network.</p>	<p><b>We believe that innovation is essential to enhance all aspects of our business.</b></p> <ul style="list-style-type: none"> <li>• Innovation embedded in our draft plans will deliver more than £100m of customer benefits.</li> <li>• A Network Innovation Allowance of 0.8% of annual revenue is needed to allow us to deliver our innovation strategy.</li> <li>• In our Chapter 7 — Our innovation strategy we have laid out our detailed plans for Innovation throughout the ED1 period and beyond.</li> </ul>



*“A Network Innovation Allowance of 0.8% of annual revenue is needed to allow us to deliver our Innovation Strategy”*



*Jim Sutherland  
Network Development Director*

Summary of key information for our stakeholders – Our vision for ED1 and our plans to deliver our vision.

1. Executive summary

Our business plan is written with our readers in mind, takes into account the things that make us unique and is underpinned by a robust process.

2. A guide to this document

3. About us

4. Process of creating our business plan

Our plans to meet the challenges of the ED1 period are informed by extensive stakeholder engagement and the consideration of alternative and innovative methods.

5. Meeting our challenges

6. Learning from our stakeholders

7. Our innovation strategy

Our clear and comprehensive output commitments are underpinned by a robust, deliverable and efficient programme of expenditure.

8. Our outputs and incentives

9. Our expenditure forecast

10. Business readiness

Our plans are resilient to uncertainty, efficiently financed and minimise the impact on our customers.

11. Uncertainty

12. Financing our plan efficiently

13. Our revenues and customer impact

Our plans enable us to help shape the energy future and our continual improvement is informed by enduring stakeholder engagement

14. Looking to the future

15. We are part of the Iberdrola group

16. Glossary

Our supporting annexes give additional detailed information to support our plans.

Volume 1 – Stakeholder, customer & IT

Volume 2 – Engineering

Volume 3 – Finance and expenditure

# 9

## Our expenditure forecast

Our expenditure forecast and the processes we have used to make our expenditure efficient

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This chapter sets out our efficient expenditure plans, how we have benchmarked ourselves and how we have gone about ensuring we are amongst the most efficient of all DNOs across a number of areas. Our costs are split between our traditional core business (75%) and non core costs (25%) including 4% to facilitate the low carbon transition and 21% of external costs detailed on the following page.

### In this chapter:

- Overview
- The process of building our expenditure plans
- Delivering long term value for money
- Managing our ageing network
- Accommodating future customer needs
- Engineering and support costs
- Facilitating the low carbon future
- Non-core costs
- Real price effects



# Overview

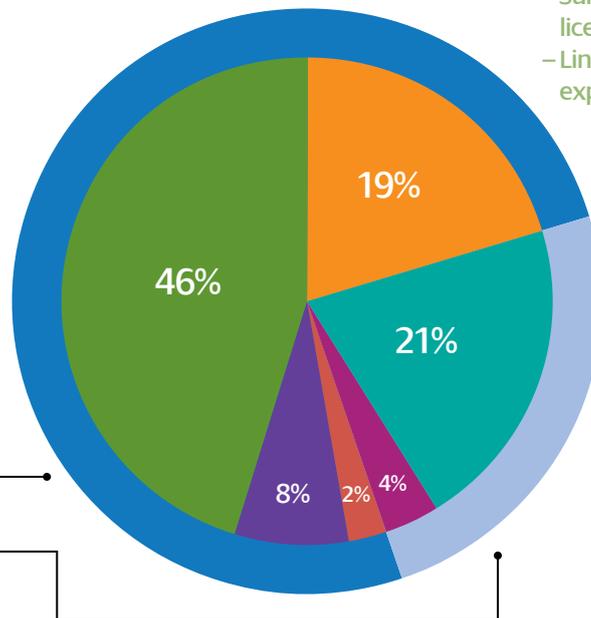
## Summary of our total expenditure

### In this section:

- Summary of our total expenditure
- Summary of our expenditure by license area
- Linking our outputs and expenditure

### Total £5.2bn

- 75% — £3.9bn  
Traditional core business
- 25% — £1.3bn  
New and external costs



46% — £2.4bn of our costs relate directly to managing our ageing network, including:

- Repairing more than 180,000 network faults.
- Inspecting and maintaining 30,000 substations, 70,000km of underground cables and 40,000km of overhead lines including:
  - Completing circa 3.5million asset inspections.
  - Cutting trees away from more than 300,000 spans of overhead lines (public safety).
  - Clearing trees away from 5000km of overhead lines (storm resilience).
  - Maintaining around 900,000 items of network equipment.
- Replacing 30 major substations each supplying 19,000 customers (average).
- Replacing 84 large substations each supplying 3,000 customers (average).
- Extending the life of 84 large substations each supplying 3,000 customers (average).
- Replacing more than 2,500 small substations each supplying up to 500 customers.
- Replacing more than 250,000 services

inside customers homes & buildings.

- Making 25% of our high voltage network, and an additional 32% of our low voltage network resilient to storms.

4% — £0.2bn of our non-core costs relate to facilitating the uptake of low carbon technologies by 2023:

- Smart network innovation trials.
- Facilitating smart metering roll out by electricity suppliers and using the data from the meters.
- Enabling customers to use up to:
  - 620,000 solar panel installations (3% of households).
  - 310,000 heat pump heating systems (9% of households).
  - 130,000 electric vehicles (4% of households).

8% — £0.4bn of our costs allow us to accommodate customers' future requirements:

- Upgrading 125 major substations (each supplying between 1,000 and 20,000 customers) creating up to 500MW of local capacity for future customer needs.
- Connecting up to 5GW of new renewable generation.

- Connecting up to 2.5GW of housing, commercial and industrial customers.

- Accommodating 1% load growth.

21% — £1.1bn of our costs are other non-core costs, including:

- Corporation tax paid to UK government.
- Business rates paid to local government.
- Transmission charges paid to National Grid.
- Legacy pension costs.

19% — £1.0bn of our costs are engineering and corporate support activities, including:

- Recruitment and training of up to 100 apprentices and graduates per annum.
- Project management.
- Vehicles for our staff.
- Control rooms and call centres.
- Network design and management.
- Operating 34 offices & depots.

2% — £0.1bn of our costs relate to Real Price Effects

- An independent economic view of the increased costs above the Retail Price Index.

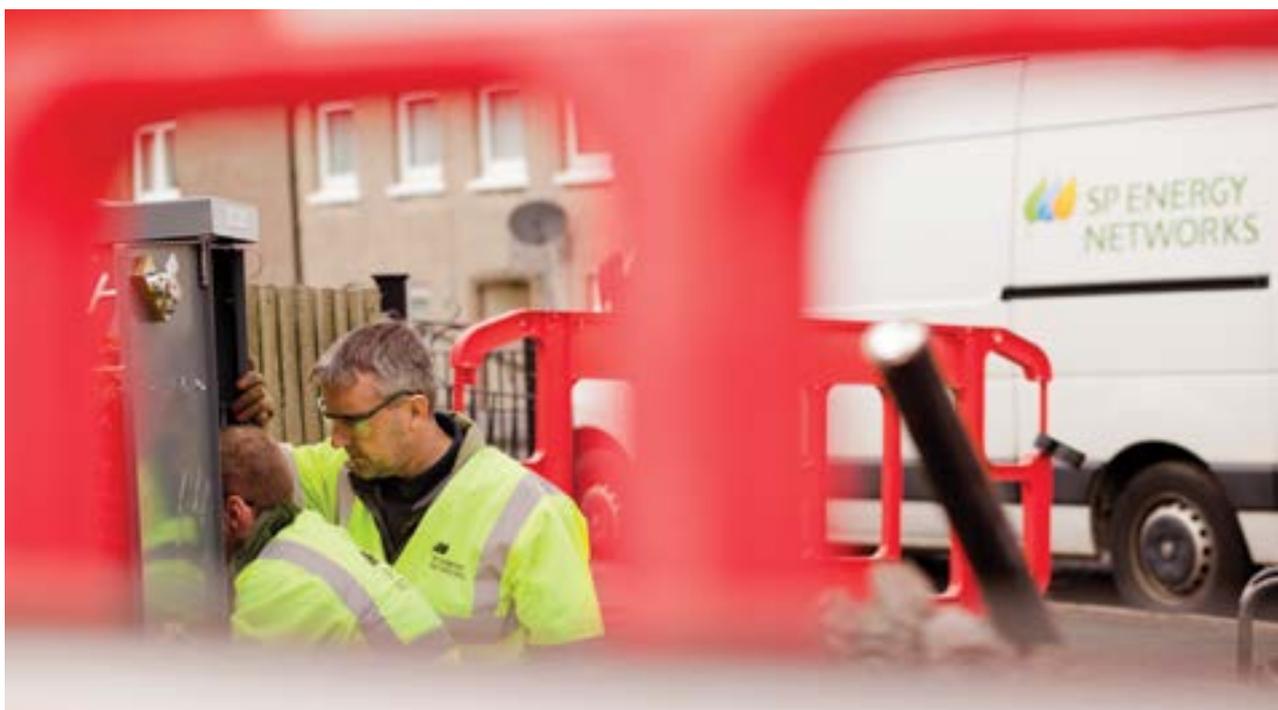
<b>SP Energy Networks</b> Summarised Ofgem business plan categories, 2012/13 price basis	<b>2015-2023 (£m pa)</b>	<b>15-16</b>	<b>16-17</b>	<b>17-18</b>	<b>18-19</b>	<b>19-20</b>	<b>20-21</b>	<b>21-22</b>	<b>22-23</b>	<b>2015-2023 (£m total)</b>
Inspections, maintenance and vegetation management	35.4	33.6	35.0	34.7	33.6	35.0	36.3	36.5	37.1	283.0
Troublecall & Other Network Operating Costs	49.4	51.2	50.7	50.3	49.6	49.2	48.8	47.6	47.3	395.0
<b>Total network operating costs</b>	<b>84.8</b>	<b>84.8</b>	<b>85.7</b>	<b>85.0</b>	<b>83.2</b>	<b>84.3</b>	<b>85.1</b>	<b>84.2</b>	<b>84.5</b>	<b>678.0</b>
Asset Replacement and Refurbishment (including future proofing)	149.4	158.1	163.1	152.5	148.8	152.4	153.2	142.7	124.1	1195.0
Operational IT and Telecoms	9.3	7.5	7.5	8.5	9.1	9.3	11.4	10.6	10.9	74.7
ESQCR (Low Ground Clearances)	14.0	18.3	18.1	17.9	17.7	17.6	17.4	2.5	2.4	111.9
BT 21st Century, Environmental, Legal and Safety	15.0	22.2	27.6	17.5	10.9	10.8	10.6	10.4	10.2	120.0
Black Start Resilience	1.8	1.8	1.6	2.0	2.0	2.0	1.7	1.6	1.4	14.2
Rising & Lateral Mains	15.0	15.6	15.4	15.3	15.1	15.0	14.8	14.6	14.5	120.1
AONB and Worst Served Customer initiatives	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	18.0
Diversions	4.3	4.7	4.4	4.2	4.2	4.1	4.1	4.1	4.1	34.0
<b>Total non load-related expenditure (including future proofing for low carbon scenarios)</b>	<b>211.0</b>	<b>230.5</b>	<b>240.1</b>	<b>220.2</b>	<b>210.1</b>	<b>213.4</b>	<b>215.4</b>	<b>188.6</b>	<b>169.8</b>	<b>1688.0</b>
Customer driven reinforcements (net of contributions)	5.9	5.8	6.7	6.7	6.5	6.1	5.7	5.4	5.2	47.3
General reinforcement including low carbon technologies	47.9	45.6	64.0	58.9	51.7	43.9	37.0	44.4	38.1	383.4
<b>Total load-related expenditure (including low carbon scenario)</b>	<b>53.9</b>	<b>51.5</b>	<b>70.7</b>	<b>65.6</b>	<b>58.2</b>	<b>50.1</b>	<b>42.7</b>	<b>49.8</b>	<b>43.3</b>	<b>431.0</b>
Indirect costs	82.5	88.5	85.7	83.9	82.7	82.3	80.9	78.0	77.7	659.9
Business support costs	35.6	37.5	36.8	36.4	35.9	35.5	35.0	34.3	34.0	285.0
Non-operational capex	13.1	24.5	13.8	14.0	13.9	18.3	6.6	6.5	6.5	104.4
<b>Total engineering and corporate support costs</b>	<b>131.1</b>	<b>150.5</b>	<b>136.3</b>	<b>134.2</b>	<b>132.4</b>	<b>136.2</b>	<b>122.6</b>	<b>118.9</b>	<b>118.2</b>	<b>1049.0</b>
Smart metering enabling works	1.1	0.9	1.4	1.7	2.0	1.9	1.1	0.0	0.0	9.0
Technology Trials (stand alone funding mechanisms)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	116.0
Non activity-based costs	132.5	145.1	146.4	146.1	145.0	144.0	144.4	94.5	94.0	1060.0
Real price effects	15.5	-0.4	2.2	4.8	10.3	16.8	23.6	30.4	36.0	124.0
<b>Total</b>	<b>644.4</b>	<b>677.3</b>	<b>697.3</b>	<b>672.1</b>	<b>655.8</b>	<b>661.0</b>	<b>649.5</b>	<b>580.9</b>	<b>560.3</b>	<b>5155.0</b>

SP Distribution Summarised Ofgem business plan categories, 2012/13 price basis	2015-2023 (£m pa)	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	2015-2023 (£m total)
Inspections, maintenance and vegetation management	14.6	13.6	14.2	14.4	13.4	14.3	15.5	15.3	15.6	117.0
Troublecall & Other Network Operating Costs	25.8	26.8	26.5	26.2	26.0	25.8	25.5	24.9	24.7	206.0
<b>Total network operating costs</b>	<b>40.4</b>	<b>40.3</b>	<b>40.7</b>	<b>40.6</b>	<b>39.3</b>	<b>40.1</b>	<b>41.0</b>	<b>40.3</b>	<b>40.4</b>	<b>323.0</b>
Asset Replacement and Refurbishment (including future proofing)	54.9	57.3	56.7	56.5	54.8	54.2	54.2	53.3	52.5	439.4
Operational IT and Telecoms	3.7	3.5	3.3	3.6	3.6	3.4	4.5	3.9	3.9	29.7
ESQCR (Low Ground Clearances)	3.9	5.0	4.9	4.9	4.8	4.8	4.7	0.9	0.9	31.0
BT 21st Century, Environmental, Legal and Safety	5.1	6.2	6.9	5.9	4.5	4.5	4.4	4.3	4.3	41.0
Black Start Resilience	0.3	0.3	0.2	0.4	0.4	0.4	0.2	0.2	0.2	2.2
Rising & Lateral Mains	10.1	10.5	10.4	10.3	10.2	10.1	10.0	9.9	9.8	81.1
AONB and Worst Served Customer initiatives	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	8.5
Diversions	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.3	11.0
<b>Total non load-related expenditure (including future proofing for low carbon scenarios)</b>	<b>80.5</b>	<b>85.3</b>	<b>85.0</b>	<b>84.0</b>	<b>80.8</b>	<b>79.8</b>	<b>80.4</b>	<b>74.9</b>	<b>74.0</b>	<b>644.0</b>
Customer driven reinforcements (net of contributions)	1.3	1.6	1.4	1.3	1.3	1.2	1.2	1.2	1.1	10.3
General reinforcement including low carbon technologies	21.2	15.6	24.1	29.6	25.9	20.4	14.2	19.8	19.9	169.4
<b>Total load-related expenditure (including low carbon scenario)</b>	<b>22.5</b>	<b>17.1</b>	<b>25.5</b>	<b>30.9</b>	<b>27.2</b>	<b>21.6</b>	<b>15.4</b>	<b>21.0</b>	<b>21.0</b>	<b>180.0</b>
Indirect costs	42.4	45.0	44.3	43.1	42.5	42.4	41.8	40.1	39.7	338.9
Business support costs	18.7	19.5	19.4	19.1	18.9	18.7	18.5	18.0	17.8	150.0
Non-operational capex	6.7	13.6	6.4	6.3	7.4	8.9	3.5	3.7	3.7	53.4
<b>Total engineering and corporate support costs</b>	<b>67.8</b>	<b>78.1</b>	<b>70.0</b>	<b>68.6</b>	<b>68.8</b>	<b>70.0</b>	<b>63.7</b>	<b>61.8</b>	<b>61.2</b>	<b>542.0</b>
Smart metering enabling works	0.6	0.5	0.8	0.9	1.1	1.1	0.6	0.0	0.0	5.0
Technology Trials (stand alone funding mechanisms)	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	58.0
Non activity-based costs	82.0	89.0	88.8	88.9	88.3	87.9	87.9	62.6	62.3	656.0
Real price effects	6.9	-0.3	0.8	2.1	4.6	7.3	10.1	13.5	16.9	55.0
<b>Total</b>	<b>307.9</b>	<b>317.3</b>	<b>318.8</b>	<b>323.2</b>	<b>317.3</b>	<b>314.9</b>	<b>306.4</b>	<b>281.2</b>	<b>283.0</b>	<b>2463.0</b>

SP Manweb Summarised Ofgem business plan categories, 2012/13 price basis	2015-2023 (£m pa)	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	2015-2023 (£m total)
Inspections, maintenance and vegetation management	20.8	20.1	20.8	20.3	20.3	20.7	20.9	21.2	21.5	166.0
Troublecall & Other Network Operating Costs	23.6	24.4	24.1	24.1	23.7	23.5	23.3	22.7	22.6	189.0
<b>Total network operating costs</b>	<b>44.4</b>	<b>44.5</b>	<b>44.9</b>	<b>44.4</b>	<b>43.9</b>	<b>44.2</b>	<b>44.2</b>	<b>43.9</b>	<b>44.1</b>	<b>355.0</b>
Asset Replacement and Refurbishment (including future proofing)	94.4	100.8	106.4	96.0	94.0	98.2	99.0	89.5	71.6	755.5
Operational IT and Telecoms	5.6	4.0	4.2	4.9	5.6	5.9	6.9	6.7	7.0	45.0
ESQCR (Low Ground Clearances)	10.1	13.3	13.2	13.0	12.9	12.8	12.7	1.5	1.5	81.0
BT 21st Century, Environmental, Legal and Safety	9.9	16.0	20.7	11.6	6.4	6.3	6.2	6.0	5.9	79.0
Black Start Resilience	1.5	1.6	1.4	1.6	1.6	1.6	1.5	1.3	1.2	12.0
Rising & Lateral Mains	4.9	5.1	5.0	5.0	4.9	4.9	4.8	4.7	4.7	39.0
AONB and Worst Served Customer initiatives	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	9.5
Diversions	2.9	3.3	3.0	2.8	2.8	2.8	2.7	2.7	2.7	23.0
<b>Total non load-related expenditure (including future proofing for low carbon scenarios)</b>	<b>130.5</b>	<b>145.2</b>	<b>155.2</b>	<b>136.2</b>	<b>129.3</b>	<b>133.6</b>	<b>135.0</b>	<b>113.7</b>	<b>95.8</b>	<b>1044.0</b>
Customer driven reinforcements (net of contributions)	4.6	4.3	5.3	5.4	5.2	4.9	4.5	4.2	4.1	37.0
General reinforcement including low carbon technologies	26.8	30.1	39.9	29.3	25.8	23.5	22.8	24.6	18.2	214.0
<b>Total load-related expenditure (including low carbon scenario)</b>	<b>31.4</b>	<b>34.3</b>	<b>45.2</b>	<b>34.7</b>	<b>31.0</b>	<b>28.4</b>	<b>27.3</b>	<b>28.8</b>	<b>22.3</b>	<b>251.0</b>
Indirect costs	40.1	43.5	41.4	40.7	40.1	39.9	39.2	37.9	38.0	321.0
Business support costs	16.9	18.0	17.4	17.2	17.0	16.8	16.6	16.3	16.1	135.0
Non-operational capex	6.4	10.9	7.4	7.6	6.5	9.4	3.1	2.9	2.8	51.0
<b>Total engineering and corporate support costs</b>	<b>63.4</b>	<b>72.4</b>	<b>66.2</b>	<b>65.6</b>	<b>63.7</b>	<b>66.1</b>	<b>58.9</b>	<b>57.1</b>	<b>57.0</b>	<b>507.0</b>
Smart metering enabling works	0.5	0.4	0.6	0.8	0.9	0.9	0.5	0.0	0.0	4.0
Technology Trials (stand alone funding mechanisms)	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	58.0
Non activity-based costs	50.5	56.1	57.6	57.3	56.7	56.1	56.4	31.9	31.7	404.0
Real price effects	8.6	-0.1	1.5	2.7	5.7	9.5	13.6	16.9	19.1	69.0
<b>Total</b>	<b>336.5</b>	<b>360.0</b>	<b>378.5</b>	<b>348.8</b>	<b>338.5</b>	<b>346.0</b>	<b>343.1</b>	<b>299.6</b>	<b>277.3</b>	<b>2692.0</b>

## More detail of our expenditure by license area

Purpose of expenditure	Use of system funded expenditure Ofgem business plan categories, 2012/13 price basis	SPD 2015-2023 (£m by total)	SPM 2015-2023 (£m by total)	SPEN 2015-2023 (£m by total)
Managing our aging network	Inspections, maintenance and vegetation management	117.0	166.0	283.0
	Troublecall & Other Network Operating Costs	206.0	189.0	395.0
	<b>Total network operating costs</b>	<b>323.0</b>	<b>355.0</b>	<b>678.0</b>
	Substation Modernisation	164.0	289.0	453.0
	Security, Protection and Black Start	14.0	27.0	41.0
	Environmental management	21.5	22.0	43.5
	Overhead line modernisation	238.5	414.0	652.5
	Underground cable modernisation	40.0	89.0	129.0
	Rising mains, surface wiring and service positions	94.5	61.0	155.5
	Network control, Telecoms, Protection	52.5	111.0	163.5
	Diversions	11.0	23.0	34.0
	<b>Total non load-related expenditure</b>	<b>636.0</b>	<b>1036.0</b>	<b>1672.0</b>
Accommodating future customer needs	Network reinforcement (net of low carbon)	143.0	210.0	353.0
	<b>Total load-related expenditure</b>	<b>143.0</b>	<b>210.0</b>	<b>353.0</b>
Engineering and corporate support costs	Indirect costs	339.0	321.0	660.0
	Business support costs	150.0	135.0	285.0
	Non-operational capex	53.0	51.0	104.0
	<b>Total engineering and corporate support costs</b>	<b>542.0</b>	<b>507.0</b>	<b>1049.0</b>
Facilitating the low carbon future	Smart metering enabling works	5.0	4.0	9.0
	Reinforcement and future proofing for low carbon	45.0	49.0	94.0
	Technology Trials (stand alone funding mechanisms)	58.0	58.0	116.0
	<b>Total low carbon expenditure</b>	<b>108.0</b>	<b>111.0</b>	<b>219.0</b>
Non-core costs	Non activity-based costs	656.0	404.0	1060.0
Real price effects	Real price effects	55.0	69.0	124.0
<b>Total</b>		<b>2463.0</b>	<b>2692.0</b>	<b>5155.0</b>



## Linking our outputs and expenditure

Our outputs (described in Chapter 8 — Our outputs and incentives) will be funded in one of three ways:

*1. Base price control revenues; Costs included in our efficient plans set out in this document paid for by customers through our charges (shown in executive summary).*

*2. Out performance of incentives; Our incentive mechanisms are described in Chapter 8 — Our outputs and incentives. We can earn additional revenues or receive penalties depending upon how we perform, resulting in increased or reduced customer bills.*

*3. Reduced returns/profits; Our regulatory contract sets an agreed level of returns for the investments that our shareholders make. Where we fund customer compensation this will reduce the returns available.*

Area	Sub Category	Source of funding
Safety	Reducing Harm	Base revenues (efficient support costs)
	Compliance with Law	
	Operational Integrity	
	Substation Security	
	Educating the Public	
Reliability & Availability	Network Performance	Incentive outperformance
	Enhancing Network Resilience	Base revenues (in overhead line & tree cutting)
	Guaranteed Standards	Additional generators & staff through base revenues (efficient fault costs). Smart metering data funded by benefits post 2020. Double GS payments from reduced returns
Environment	Facilitating Low Carbon	Base revenues (included in reinforcement costs) and customer funded works. Technology trials through base revenues leveraged with investor funding and external funding sources
	Carbon Footprint	Business as usual (efficient support costs)
	Reduced Leaks	Base revenues (Asset replacement/refurbishment)
	Undergrounding in AONB	Base revenues (AONB & Recreational area)
	Reducing Electrical Losses	Base revenues (Asset replacement costs)
Connections	Faster Connections	Application of technologies with trialling funded through base revenues (see Chapter 7 — Our innovation strategy). Efficient customer funded connections. Incentive outperformance. Double GS payments from reduced returns
	First Class Service	
	Competitive Market	
Customer Satisfaction	Customer Service	Base revenues (efficient support costs). Incentive outperformance. Additional compensation through reduced returns
	Telephone response	
	Communication	
	Stakeholder Engagement	
	Complaints	
Social Obligations	Priority Service Customers	Base revenues (efficient support costs)
	Vulnerable Customers	Base revenues (efficient support costs). Incentive outperformance or Reduced returns
	Collaborating with communities	Incentive outperformance

# The process of building our expenditure plans

## In this section:

- Overview
- Our investment strategy
- Building our plans to manage our ageing network
- Asset modernisation forecasting methodology
- Building our plans to accommodate future customer needs
- Applying real price effects

## Overview

In developing our expenditure plans, we have considered:

- *Stakeholder views*
- *a detailed review of our current strategies.*
- *the suitability of our assets in the long term.*
- *the increasing age of our network.*

To ensure that what we propose to spend is appropriate and efficient, we have:

- *talked to our stakeholders, and aligned our investment plan to their priorities.*
- *had our plans reviewed by our internal Asset Stewardship Groups (ASGs), made up of a cross-section of our employees.*
- *held peer reviews with our internal experts.*
- *sought expertise from within the global Iberdrola business.*

## Our investment strategy

We take a structured and holistic approach to the management of our assets. We drive continuous improvement by regularly reviewing our asset management model and we will continue to refine our activities throughout the ED1 period and beyond.

- *We were a founding participant in the development of PAS55, the internationally acknowledged standard for asset management*

Our investment plans manage the risk of our ageing asset base through:

- *improved information about our asset base.*
- *targeting replacement of end of life assets.*
- *refurbishment or retrofit to manage deterioration and extend the life of our assets.*

This approach is complemented by inspection, maintenance and condition monitoring of our assets including forensic examination of assets after they are removed.

## Public safety

Safety is at the forefront of everything we do, and we are fully committed to managing public safety and complying with HSE regulations. We work closely with the Health and Safety Executive in to develop programmes to address areas of increasing risk.

We lead the industry in addressing the issue of low ground clearances:

- *By 2015 the highest risk ground clearance hazards (mainly road crossings) will be removed*
- *By 2020 our entire network will meet the latest clearance standards.*

We are continuing our pioneering programme to replace ageing electrical cables in flatted properties including high rises and tenements.

## Network resilience to severe weather

Our investment in storm resilience has delivered significant service improvements and value for our customers to date (refer to Chapter 3 — About us — How do we compare with others). Stakeholders agree that we should continue this activity and we will achieve additional storm resilience by continuing to rebuild overhead lines to a 'fit for purpose' specification in severe and normal weather areas, complemented by the removal of trees within falling distance of our lines.

- *Over 25% of our rural mainline high voltage network will be resilient to storms by 2023.*

Stakeholders have identified flood risk as a high priority, so we have accelerated our programme to reduce the risk of disruption at our substations since we published our business plan highlights in May 2013. Our flood resilience programme will be largely completed by 2015, protecting an additional 14 of our strategically important grid substations against a 1 in 1000 year event and up to 59 of our primary substations against at least a 1 in 100 year event. During the ED1 period we will continue to assess the latest available information from the Environment Agency (EA) and the Scottish Environment Protection Agency (SEPA) and where appropriate install additional mitigation measures.

### Accommodating customers' increasing demand

We have adopted a reduced trigger level for load related investment of 100% firm capacity for 132kV and primary substations to achieve a risk profile that matches industry levels and the expectations of our stakeholders. This trigger level also enables us to provide headroom for low carbon technologies for the next two decades. Our projected underlying average growth in electricity demand of has been informed by external economic trends at 1.4% p.a., and we believe this to be a conservative estimate considering the potential uptake of low carbon technology.

### Innovation

We use the power of innovation to deliver tangible benefits for our stakeholders. We have deployed a range of innovative initiatives throughout our plans to reduce costs in ED1 and beyond.

*Our ED1 expenditure plans have been reduced by over £100m as a result of innovation*

### Incentives

In addition to our planned investments, we will further invest to deliver additional customer value. This additional value will be rewarded through the incentive mechanisms explained in Chapter 8 — Our outputs and incentives.

### Building our plans to manage our ageing network

#### Renewing our ageing network (non load-related investment)

We describe our expenditure on renewing and refurbishing our substations, overhead lines and underground cables as non load-related investment. Our investment plans are based on the condition of our assets and the consequences if they should fail — factors captured within our asset health and criticality index.

### Extending the lives of existing assets

Manufacturers specify the nominal "design life expectancy" for network assets under typical operating conditions. Within our regions, the environment within which our assets operate can vary significantly from exposed coastal and mountainous areas to relatively benign inland urban areas. The prevailing environmental conditions together with the service duty (e.g. number of operations, "demand" etc.) placed on an asset can all have an impact on its actual life, meaning that some assets last for either a longer or shorter time than their nominal 'life expectancy'.

In circumstances where it is technically feasible & economic we extend the life of our assets through refurbishment or retrofit. This involves replacing part of the asset with new components. In some situations it is possible to introduce a new "modern equivalent" component that has additional advantages such as improved functionality or performance.

*We were a founding participant in the development of PAS55, the internationally recognised standard for asset management*

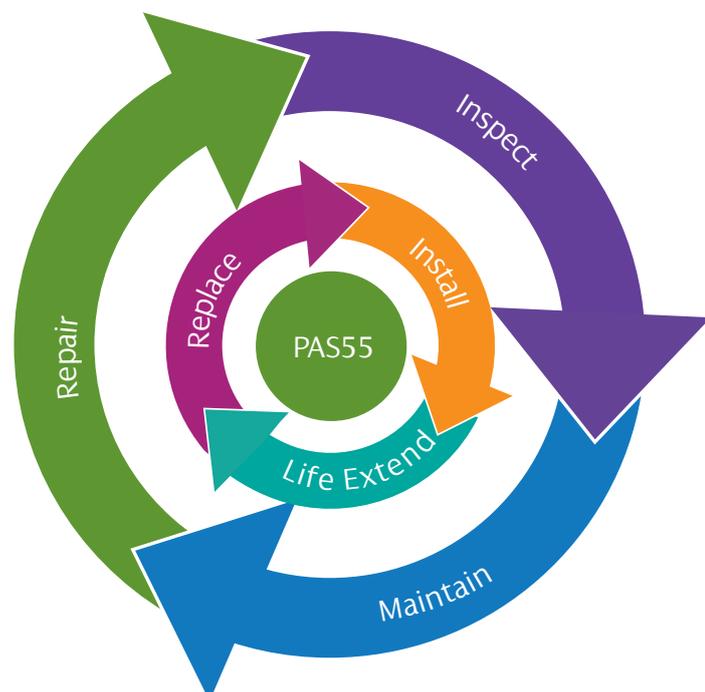
### Replacing end-of-life assets

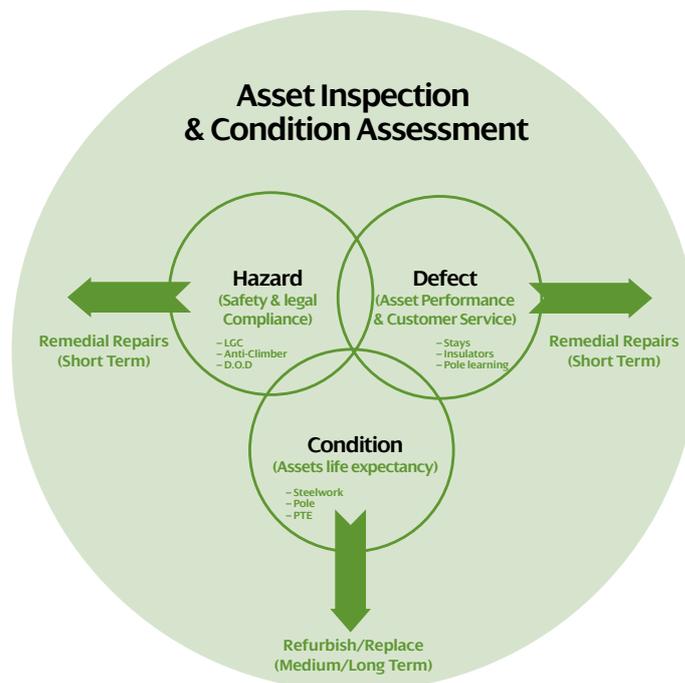
Where assets have failed or reached the end of their working life, and cannot economically be refurbished or repaired, we replace them with their modern equivalent. This can involve adopting new technology

(e.g. replacing oil filled switchgear with SF6 or vacuum, replacing electro-mechanical control relays with digital), offering significant improvements in functionality or performance.

### Inspecting existing assets

Our inspection processes are designed to ensure compliance with our legal obligations to inspect our assets on a periodic basis, assess risks and identify any hazards or defects that could affect the integrity, safety or performance of our assets.





Where appropriate, we monitor and evaluate the in-service performance of our assets to identify any deterioration trends. We also periodically carry out detailed condition assessments to evaluate the 'health' of each asset and develop plans for refurbishment or replacement where required. We use this information to develop a risk-prioritised programme of interventions including remedial hazard and defect repairs, refurbishment, retrofit and replacement.

### Maintaining existing assets

Our maintenance programme ensures the ongoing safety and performance of our assets consistent with their nominal 'design life expectancy'.

We generally perform maintenance activities at fixed intervals and the work we do to maintain the asset, determined by the 'as found' condition, aims to ensure that the asset remains safe and continues to perform adequately until its next planned inspection.

### Repairing existing assets

We replace "higher criticality" assets (i.e. those assets with a significant safety, customer service or environmental impact) before they fail. Although our inspection and condition monitoring regimes are robust, some assets will fail unexpectedly in service and require repair or replacement. These failures do not necessarily result in a loss of supply, but when they do, and where it is not possible to achieve a repair quickly, we use generators or other temporary arrangements to minimise inconvenience for our customers

### Asset Modernisation Forecasting Methodology

To determine our network investment needs, we must consider both **the current condition of our network and how we expect that condition to deteriorate over time.**

### Age Based Modelling

Long term age based modelling is used to develop future capital expenditure volume forecasts and predict potential peaks in future workload.

Our age based modelling methodology complements the detailed condition assessment process, enabling immediate and longer term risks to be adequately managed. The asset replacement model records information relating to age, voltage and circuit parameters for the different categories of assets employed on distribution networks, including:

- Cables
- Transformers
- Overhead Lines
- Switchgear

The modelling methodology is used in two ways:

The first applies our view of an average asset life to each asset category to determine future long term, replacement volumes. The asset life has been determined:

- using industry available information

- *knowledge gathered from our own activities*
- *an independent reviewed by a leading industry consulting company*

This provides a view based on our knowledge of our asset base and its expected service life.

The second uses our actual historic replacement volumes to provide an inferred asset life. This 'tuned' asset life is then used to predict future replacement volumes. This approach provides a view based on continuation of historical strategy and provides a useful comparison with the first approach.

### Asset Health Indices (HI)

To assist in the detailed assessment of asset health of we have an approach which categorises assets against a scale from 1 to 5 as per the table below, covering asset condition from new to end of life.

In addition to physical condition, Asset Health is influenced by a number of factors:

- *Design Standards — acceptability to the current specification*
- *Deterioration — range of decay from 'None' to 'Major' and which may include specific indicators (such as dissolved gas analysis results, inspections or maintenance data)*
- *Operational Issues — operational restrictions, fault levels, safe working procedures*
- *Vicinity and Location — indoor/ outdoor*

### Asset Health Index

Asset Health Index	1	2	3	4	5
Condition	New	Good	Acceptable	Poor	End of Life

- *Fault Rate — tolerance of rate within the asset base compared with others*
- *Critical Issues -identified critical defect*
- *Maintenance Spares — availability and suitability of parts and expertise*

Asset health indices can be used for asset categories where detailed condition information is readily available. Currently asset health indices are used as an output measure for:

- *11kV ground mounted switchgear*
- *33kV switchgear*
- *132kV switchgear (SPM Only)*
- *11kV ground mounted transformers*
- *33kV transformers*
- *132kV transformers (SPM only)*
- *LV poles*
- *11kV poles*
- *33kV poles*
- *132kV overhead line conductor (SPM only)*
- *132kV overhead line towers (SPM only)*
- *132kV overhead line fittings (SPM only)*

The use of asset health indices is continuing to develop within the industry and we have extended its use to LV pillars and substation buildings and structures.

### Predicting Asset Health

To forecast the future asset health index an assessment of deterioration and knowledge of planned interventions is applied to the current asset health index. This is done in two stages to provide the health index at the end of DPCR5 (March 2015), the mid point (March 2019) and the health index at the end of RIIO-ED1 (March 2023).

Techniques and approaches for predicting asset deterioration continue to evolve. During planned interventions such as maintenance and repairs, and through the application of condition monitoring equipment we will gather information to inform our knowledge of asset condition and deterioration.

We will also share the knowledge acquired with Ofgem and other industry experts.

As uncertainty in deterioration is reduced, the prediction of future asset health will be refined and our detailed plans will be reprioritised accordingly.

Once the deterioration has been predicted the impact of intervention strategies can be assessed. There are two potential intervention strategies, replacement or life extension (refurbishment/retrofit).

Replacement will move the asset from category 5 to category 1. Refurbishment however, could improve an asset health index from category 4 to category 2.

The deterioration between categories will also be impacted by maintenance activities. For example maintenance undertaken more frequently may extend the time period for deterioration between categories. Conversely a decrease in frequency would reduce the time period.

This approach has been applied to each asset group identified above.

Details of the impact of our investments on our asset health indices is provided in Annex 2.2 — Health index graphs.

### Asset Criticality Index (CI)

To manage the growing risks of an ageing asset base whilst maintaining public and staff safety we are working to develop a more sophisticated asset management model that allows more asset specific risk assessment.

Consequence of failure is inherent in our historic asset management processes at an asset class level. We have now begun to capture additional information about our assets operating environments at a specific asset level, and are working with Ofgem and other experts in the industry to define a consistent evaluation and scoring mechanism for criticality or consequence of failure.

Criticality scores will take into account 4 types of consequence;

- *Safety*
- *System*
- *Environmental*
- *Financial*

Each of these scores will be expressed in a common currency which allows them to be combined to provide an overall criticality score for that asset.

We will use this new methodology to obtain a better understanding of how network risk changes over the ED1 period and prioritise our investment plans accordingly.

### Upgrading our assets

Stakeholders have told us they want us to renew our ageing network and to innovate to reduce future costs.

We have developed an efficient and effective plan for upgrading our assets, using a combination of replacement (for end-of-life assets) complimented by an innovative lower cost retrofit and refurbishment programme. This approach has allowed us to manage the growing risk of an ageing network whilst reducing the cost impact by more than £30m. The major assets to be replaced or refurbished at 132kV, 33kV and 11kV in large substations are all individually identified.

### Upgrading our overhead lines and cables

We want to meet our stakeholders' expectations by improving the underlying reliability of our network and continuing to improve resilience in storm conditions. We'll do this by a programme of replacement and refurbishment, prioritising individual overhead line circuits at all voltages based upon their condition and investing in modern assets better suited to the severe weather conditions in which they operate. Our draft investment plans were presented to our stakeholders. We asked them where they thought we could do more (or less) and modified our plans based on their feedback.

### Building our plans to accommodate future customer needs

#### Network capacity (load-related investment)

Load related investment is important to stakeholders and customers because:

- *it creates the additional capacity in our network to allow new customers to connect.*
- *it allows existing customers to utilise new, more electricity reliant devices.*
- *it deals with increases in demand before they present a higher risk of power cuts.*

In identifying the future requirements of our networks we have considered a number of factors:

- *Independent forecasts of economic growth.*
- *Cities and local authorities' development plans.*
- *The appropriate triggers for us to take action to create additional capacity in our network.*

- *Department of Energy and Climate Change (DECC) scenarios for the uptake of low carbon technologies (e.g. heat pumps, electric vehicles and photovoltaics) including the more ambitious Welsh and Scottish 2020 carbon reduction targets.*

- *Opportunities to use innovation to reduce our costs and charges to customers.*

### Independent forecasts of economic growth & development plans

These inform both the volumes and types of new customer connections and the future demand of existing business and domestic customers, and allow us to model where and when future additional capacity is likely to be needed on our network.

### Appropriate triggers to take action

It is important that we create capacity on our network at the appropriate time. We have reviewed the trigger points at which other DNOs increase the capacity of their assets and we have considered recent connections charging decisions. This review has identified that we have operated our networks differently to other companies and our assets have been working harder. This is explained in more detail in Chapter 3 — About Us.

### How do we compare to others.

We consulted with our stakeholders on reducing our trigger for increasing our network capacity by 20%, bringing us in line with industry standard practice. We received strong stakeholder support for this change and we have used this new trigger point to build our plans.

### DECC forecasts of the uptake of low carbon technologies

We worked with DECC, Ofgem and the rest of our industry to develop regional forecasts of customer adoption of new technologies, and an industry model that allowed us to forecast the impact on our networks.

This allowed us to identify the most cost effective balance of technology and commercial solutions to create the future capacity on our networks. We commissioned an independent network study by an engineering consultancy (TNEI) to validate the output from the model, and selected a 'best view' low carbon uptake scenario which reflected the balance of views from our stakeholders.

### Opportunities to use innovation to reduce our costs and charges to customers

With assistance from Smarter Grid Solutions (recognised as industry experts for their industry-wide work on smart networks projects) we challenged ourselves to create additional network capacity through non-traditional means. This challenge has allowed us to embed the appropriate learning from industry technology trials and significantly reduce our investment plans.

## Applying real price effects

### What are Real price Effects?

Real Price Effects (RPEs) are the difference between the index that is used to update our revenues each year (the Retail Price Index) and the movements in commodity costs (for example copper) or specialist labour (for example engineers).

### Our approach to determining RPEs

Under guidance from economic consultants (NERA) we have undertaken a study of real price effects Our study included:

- *a review of available cost and price indices*
- *an evaluation of candidate price indices against the following criteria:*
  - *Relevance to electricity distribution*

— *Data quality, in terms of length of historical time series, sample size and volatility of time series*

— *Regulatory precedent*

- *a selection of the most appropriate indices*
- *the development of a method for forecasting RPEs*

Based on the most relevant indices selected, we:

1. *base our near-term forecast RPEs on published sources' and projected the difference between the expected growth rates in relevant indices and their expected growth rates in RPI (where published forecasts from reputable third party agencies were available)*
2. *If third party forecasts were not available, or beyond the period that third parties forecast, we base our forecast on an extrapolation of long-run historical trends in real input price inflation based on our own statistical analysis.*

We consider that this approach is broadly consistent with the methods used by Ofgem and their advisors at recent price control reviews, as our analysis is based on long-term trends in the inflation of relevant cost indices above the rate of RPI inflation.

# Delivering long term value for money

In this section:

- Cost assessment
- Cost benefit analysis

## Cost assessment

We are acutely aware of the financial pressures on our customers, particularly in the current economic climate. Consequently we have sought to make our plan the most efficient possible in order to deliver reductions in our customers' bills.

To review and challenge the efficiency of all aspects of our operations, we have:

- Compared our costs to other distribution network operators in the UK.
- Compared our costs against other parts of the Iberdrola Global Networks Business.
- Identified areas where we can improve our own efficiency, including the application of innovation.
- Identified areas where we could challenge contract margins.
- Identified areas where we could work more effectively with our contractors and suppliers.
- Set out plans to deliver these efficiencies.
- Embedded the identified efficiencies into our plans to deliver benefits for customers.

These activities have delivered a reduction greater than £500M in our plans.

In addition we have sought an independent economic view of ongoing productivity and have reduced our plans accordingly.

- Our plans have reduced by 1% p.a., compounding over 8 years for ongoing productivity.

This has reduced our forecast costs by more than £170M.

This detailed and comprehensive review has delivered a total reduction of £700M in our forecast expenditure between our draft plan published in May and our final plan,

- Delivers a £7 p.a. average bill reduction for our customers in Central/South of Scotland
- Delivers a £14 p.a. average bill reduction for our customers in Merseyside, Cheshire and North Wales

## Cost Reviews

We have completed a rigorous review of all of our costs within two of our main cost areas:

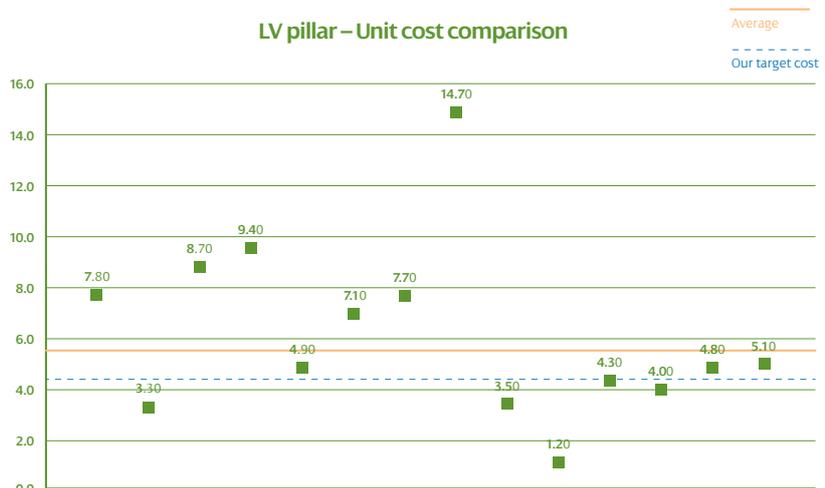
- Unit Costs (e.g. the cost of carrying out work).
- Indirect Costs (e.g. the cost of supporting and managing work).

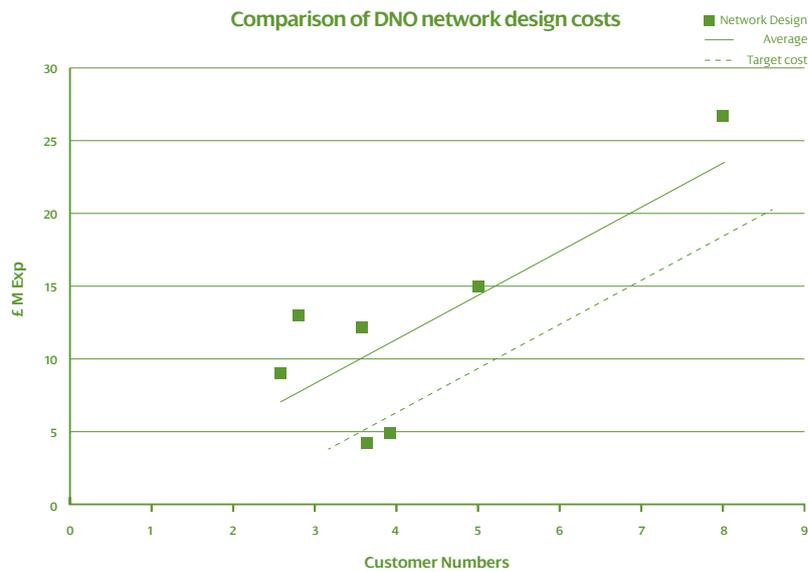
## Unit costs

We've reviewed every activity we undertake on our networks, including cost of installation, cost of refurbishment and cost of restoration:

- We've reviewed the costs associated with the supply of plant and equipment.
- We've reviewed the contracts associated with the supply of installation or service contractors.

LV pillar – Unit cost comparison





- We've reviewed our own internal costs.
- We've reviewed the time we spend on our activities.
- We've made sure that all costs accord with the Regulatory Instructions and Guidance (RIGs) provided by Ofgem.

We have compared our costs both internally and externally:

- We compared costs of our two networks (SPD and SPM) to make sure the most efficient processes were being adopted across our business.
- We compared our unit cost against the unit costs submitted by all other DNOs in January 2013. Where possible we improved our costs and aimed to deliver upper-quartile performance.

#### Indirect Costs

We've reviewed our indirect costs, which include project management, control centres, training, vehicles and transport:

- We've refined our processes to ensure that all our costs are categorised in accordance with the RIGs guidance.
- We've reviewed the costs in each area to see where we can improve our efficiency.
- We've compared our costs with other DNOs.

**Our business plan reflects the most efficient costs to operate our networks in a safe and effective manner**

## Cost benefit analysis

Where there are two or more options available to us, we have carried out cost benefit analysis (CBA) on our investment plans to ensure we are delivering value for money.

Our approach to cost benefit analysis is proportionate, robust and compliant with current HM Treasury Green Book guidelines (July 2011 update).

### Our approach to cost benefit analysis for RIIO-ED1

The programmes and schemes we chose for cost benefit analysis naturally fall into the following categories:

- *Major asset replacement / reinforcement / refurbishment schemes and programmes.*
- *Environmental schemes, OHL undergrounding.*
- *Network future proofing.*
- *The application of Smart Grid technology.*
- *The application of low loss technology.*

In selecting our portfolio for cost benefit analysis we chose schemes with:

- *Discrete technology or delivery choices available, consistent with our licence obligations.*
- *Alignment with RIIO-ED1 strategic objective to reduce carbon emissions and provide sustainable value for money for customers.*
- *Stakeholder input, where possible.*

Our CBAs were based on absolute actual cost inputs with benefits measured relative to a reference scenario — Ofgem's 'incremental' approach. Each of the shortlisted options was assessed on its own merits and the preferred option identified as the one with the maximum Net Present Value (NPV) or least Net Present Cost (NPC).

In some circumstances we have applied our engineering judgement and chosen an alternative option for inclusion in our plans. We have justified why the alternative option is a more efficient or technically appropriate solution.

### The cost benefit analysis process

Our objective when developing the CBA process for ED1 was to ensure, consistency, objectivity and accuracy.

**Consistency** was achieved by ensuring the project / scheme owners understood the process of developing the models and had access to key data such as asset deterioration curves and other fixed data sources.

**Objectivity** was achieved by holding the project / scheme owners to account for production of the models, provision of the input cost / benefit data and selection of the preferred investment option.

**Accuracy** was achieved through a two-step assurance process. Firstly, the models were reviewed by senior engineering management to ensure they were consistent with the business plan submission.

Secondly, the models were reviewed for accuracy by the regulatory and finance teams in order to ensure we had total confidence in both the modelling and the investment decisions that flowed from it.

The outcome from our cost benefit analysis has been fed into our investment plans and later in this chapter we have indicated where this has either changed, or confirmed our investment plans. The accompanying annex to this document (Annex 2.3 — Cost benefit analysis) provides a summary of each of the cost benefit analyses we have performed in building our plans.

*Our cost benefit analysis activities cover close to 10% of our core plan*

# Managing our ageing network

## In this section:

- Network inspections, maintenance and vegetation management
- Substation modernisation
- Overhead line resilience and modernisation
- Underground cable modernisation
- Rising mains, surface wiring and service position modernisation
- Network control, telecommunications and protection modernisation
- Diversions
- Future proofing

## Network Inspections, Maintenance & Vegetation Management

A large proportion of our networks were installed in the period 1950-1970. This means that we are renewing increasing volumes of assets and also managing higher proportions of assets that are near the end of their useful lives.

As any asset ages then typically the costs of ensuring they continue to perform increase, networks are no different.

We have incorporated a number of initiatives within our plans to limit these increased costs. Our strategy is to improve our understanding of our ageing assets through detailed inspection & condition assessment which will be integrated with our assessment of asset criticality (consequence of failure).

- *High criticality assets reaching end-of-life will receive more intrusive levels of inspection and maintenance.*

This approach will be complemented by a significant increase in reliance upon condition monitoring equipment on our networks, including:

- *Monitoring of transformer deterioration, enabling life extension or asset replacement works at the most appropriate time.*

- *Measurement of circuit breaker performance, with embedded intelligence highlighting developing problems which can be addressed before they cause failures.*
- *Low cost load monitoring technology at secondary substations, trialled in one of our Low Carbon Network Fund projects, will provide a much more detailed view of network conditions.*

There are associated costs along with the benefits of deploying these new technologies.

- *Online monitoring requires telecoms bandwidth to support an increase in communications traffic.*
- *New systems and processes will be developed to enable analysis and decision making*

## Inspections

Although we have introduced efficiencies and refined our policies, our overall inspections costs will increase due to:

- *A new programme of customer service position inspections, commencing in 2021, prioritised using information gathered during Smart metering roll-out by Suppliers*
- *Inspection cost associated with new requirements for fire risk assessment*
- *Increased frequency of overhead line inspections to assess risk and better understand condition*

- *Inspection of 132kV & 33kV cable tunnels, bridges and strategic routes to assess security and risk*

## Maintenance

Our asset replacement strategy is to target end of life assets, however the remaining assets will require more onerous maintenance regimes to preserve condition and performance.

Maintenance costs will increase due to:

- *Increased 33kV and 132kV tower painting requirements*
- *More intrusive and extensive maintenance on older assets*
- *Increased levels of condition assessment to improve future investment plans*

These cost increases have to some extent been offset by:

- *a reduction in BT line rental costs*
- *management of defects & hazards through our refurbishment plans*
- *installation of new low maintenance assets (e.g. SF6 switchgear)*

Inspection, Maintenance & Vegetation Management		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
Inspections	SPD	0.9	1.8	14.0
	SPM	1.6	2.1	16.8
Maintenance	SPD	3.9	5.0	39.7
	SPM	6.5	7.3	58.2
Vegetation Management	SPD	5.2	7.8	62.6
	SPM	12.1	11.4	90.8
Total		30.2	35.3	282.1

### Vegetation Management (Tree Cutting for safety, Tree Clearance for storm resilience)

Experience has shown that a 3 year cycle of tree cutting to maintain safety clearances from our overhead lines provides optimum efficiency. We are moving to this frequency presently and costs will reduce as we complete this by 2015. Our approach is supported by stakeholder and customer feedback.

The cost of clearing trees to falling distance to improve resilience to storms will increase:

- *Addressing vegetation “grow back” on sections of the network already made resilient.*
- *Extension of our programme to include selected spur lines with high customer numbers.*



Trouble call	RIIO-ED1 Annual Average	Total
	£m pa	RIIO-ED1 Total
SPD	23.6	189.0
SPM	21.3	170.0
TOTAL	44.9	359.0

Other network operating costs	RIIO-ED1 Annual Average	Total
	£m pa	RIIO-ED1 Total
SPD	2.1	17.0
SPM	2.4	19.0
TOTAL	4.5	36.0

### Trouble call (responding to incidents)

Trouble call is the name used by the industry to describe the activity of our staff respond to incidents on our network including:

- *restore customer supplies after a fault*
- *making repairs to our network after a fault*
- *visiting the location of other types of incidents which do not affect supplies, for example public safety incidents.*

Our forecast volumes of activities have been based upon a 3 year trailing average of actual historic performance adjusted to reflect the impact of investments we will make on the network and taking into account increased costs of storm events.

Our costs include the repair of more than 180,000 faults and attendance at a similar number of other incidents.

### Other Network Operating Costs

The main costs in this area are dismantlement of assets which will not be replaced and purchase of the electricity that we use in our many thousands of substations for heating and operation of equipment such as battery systems.

Our current electricity purchases are based upon estimates of consumption within substations (as this is more cost effective than metering all substations). Historically in Manweb we have estimated lower energy consumption than SP Distribution as many substations have lower energy dehumidifier units rather than heaters.

We have installed metering at a number of substations in both our network areas to provide more up to date estimates for our modern substation equipment, and are also following a programme of reducing energy consumption within our substations where this is cost effective.

## Substation modernisation

### Overview

Switchgear and transformers in substations are critical assets and the consequences of failure can be significant in terms of safety, reliability and availability of supply.

### Switchgear

Switchgear is a key component of our network, allowing us to safely disconnect parts of the network that have faults and to provide electricity from alternative routes when parts of the network are out of operation.

Our objective is to identify and replace end of life switchgear ahead of failure.

To allow us to manage the growing volume of end of life assets over the next 2 decades we will complement this with a new innovative programme of refurbishment and retrofitting of equipment before it reaches the end of its life, and deployment of on-line monitoring for our circuit breakers.

### Transformers

Transformers are used to change the network voltage from higher voltages that allow us to move energy around efficiently down to voltages that customers can use. Transformers are reliable assets that have limited moving parts and our strategy is to intervene and manage the main deterioration mechanisms arising from external corrosion, moisture ingress or overloading.

We draw on a wide range of internal and external information sources (equipment type, performance and condition) to develop and prioritise our investment plans.

### Substation Civil Infrastructure

Effective management of our substation civil assets (buildings and support structures) is fundamental to the achievement of our objective of maximising the life expectancy of the switchgear, transformers and ancillary equipment. The integrity and performance of equipment designed

for indoor use is highly susceptible to the environmental conditions within the substation and it is important to maintain dry and warm operating conditions.

We also have some substation sites that are no longer fit for purpose and where civil costs can be substantial, for example listed buildings, old power stations or tram depots.

A significant proportion of substation civil assets are deteriorating with age and in order to manage these risks we have developed a detailed civil asset condition assessment & health index methodology.

We have implemented a programme to survey all of our 132kV & primary substations together with a targeted selection of our highest risk secondary substations. Development of the civil health indices will ensure that our remedial work programme is fully optimised.

We have increased expenditure on civil refurbishment activities in DPCR5 and the output from our condition assessment surveys has confirmed that additional investment will be necessary in ED1.

### Optimising efficiency

Our investment strategy for substations is to maximise efficiency by co-ordinating work on civil, protection & control assets with modernisation of major plant such as switchgear and transformers. In addition:

- *Retro-fitting and refurbishment provide cost effective 10-20 years life extension*
- *Online monitoring will allow resolution of problems before they affect customers*
- *This approach will reduce our costs by more than £30M*

## Grid and Primary Substations

Our 183 grid substations each supply between 16,000 and 160,000 customers, whilst our 1,200 Primary substations supply between 2,000 and 11,000 customers.

The assets in these substations are critical to security of supplies to our customers.

### 132kV Circuit breakers

We will replace 62% (48 units) of our 132kV air blast and bulk oil circuit breakers by 2023, with the remainder being replaced by 2031. These strategically important assets, installed in the 1950-60s, have become unreliable and difficult to service due to a lack of spare parts and manufacturer support. There is also significant cost and network outage time associated with maintenance. The accompanying annexes to this plan include summary project scheme papers that show proposed solution and alternatives considered for each of these projects.

- *Each of these projects has been assessed on its own merit*
- *We have optimised our plans to exploit advances in new technology*

Our plans include utilizing air insulated switchgear AIS, gas insulated switchgear GIS and hybrid switchgear. Where appropriate we have rationalised substation designs to deliver a more efficient outcome.

## Grid and Primary Transformers

Although grid & primary transformers are generally reliable, and our network operates with built in redundancy, the consequence of failure is significant as they supply large numbers of customers and replacement timescales are typically very long. The lead time on the manufacture of one of these large transformers can be more than 24 months.

- *Where possible end of life transformers must be identified and replaced ahead of failure.*

Volumes of Asset Replaced / Refurbished in RIIO ED1				
	SPD	SPM	SPD	SPM
Asset	Volume (Units)		% Population (p.a.)	
132kV Grid transformers		21		1.8%
132kV Switchgear		48		2.7%
33kV Indoor / outdoor switchgear	148	156	1.6%	1.1%
33kV Ring main unit (RMU)		33		1.1%
11kV Primary Switchgear	905	689	2.5%	1.6%
Primary transformers	146	174	2.4%	2.8%

Grid Substations	DPCR5	RIIO-ED1		
		£m pa	£m pa	RIIO-ED1 Total
Grid Substations	SPD	3.5	3.6	29.0
	SPM	7.0	13.6	109.0
Primary Substations	SPD	7.0	7.6	61.0
	SPM	10.5	11.3	90.0
Total		28.0	36.1	289.0

Our transformer population is ageing and our modelling indicates a peak in replacement investment will be required in the next 10-15 years. To manage this, we will introduce a programme of mid-life refurbishment targeted where a life extension of at least 20 years can be achieved.

- *Cost benefit analysis has confirmed that this is the most economic approach*
- *The attached annex includes the summary Cost Benefit Analysis (CBA)*

Our refurbishment and replacement plans have been prioritized through analysis of insulation oil (which provides information on the internal condition, potential insulation degradation or electrical discharges) and through external condition assessment.

### 33kV Switchgear

We will replace 90% (190 units) of life expired 33kV outdoor circuit breakers at Grid and Primary Substation sites.

33kV Ring Main Units are unique to the SPM urban interconnected networks and life expired units will be replaced with the most economic modern equivalent switchgear.

### 11kV Switchgear

As the age of our 11kV indoor switchgear increases and demand for suitable replacements grows, several manufacturers have developed solutions which enable the moving portion of life expired oil filled circuit breakers to be replaced ("retrofitted") with a modern equivalent SF6 or vacuum device.

Our cost benefit analysis (summary in accompanying annex to this document) has confirmed the cost effectiveness of this approach with replacement or refurbishment of switchgear dependant on type and condition.

Volumes of Asset Replaced / Refurbished in RIIO ED1				
	SPD	SPM	SPD	SPM
Asset	Volume (Units)		% Population (p.a.)	
11kV Indoor / outdoor switchgear	935	155	1.2%	0.7%
11kV Indoor / outdoor (RMU)	1,109	2,301	1.0%	2.6%
LV switchboards & pillars	400	800	0.3%	0.9%
Secondary transformers	714	2,117	0.5%	2.3%

Secondary Substations	DPCR5	RIIO-ED1		
		£m pa	£m pa	RIIO-ED1 Total
Secondary Substations	SPD	7.8	7.0	55.8
	SPM	8.5	9.3	74.2
Total		16.2	16.3	130.0

## Secondary Substations

Our 30,000 Secondary substations supply electricity to between 50 and 300 customers, and are located close to the majority of customers that we serve.

### Switchgear

Our strategy for secondary switchgear is to replace end of life assets based on an assessment of operational adequacy and on-site condition information gathered during routine inspections, planned and post fault maintenance interventions.

### Transformers

Secondary transformers can be either ground mounted or pole mounted and are generally very reliable. We replace 11kV secondary transformers when the external condition has deteriorated beyond economic repair or oil test results demonstrate internal degradation.

In 1962, advances in materials technology enabled manufacturers to develop a new design of transformer with significantly lower electrical losses.

Our current strategy is to replace pre 1962 ground mounted secondary transformers in an efficient manner, alongside end of life switchgear replacement in order to achieve a reduction in network losses.

We will also introduce an additional programme to reduce electrical losses by targeting replacement of all pre 1962 transformers that are operating at high demand levels.

- *Our cost benefit analysis (summary in accompanying annex) demonstrates societal benefit in terms of the cost of carbon emissions.*
- *Installation of lower loss transformers will reduce the costs Electricity Suppliers build into our customers bills by £50-60M over the lifetime of these assets*

*Installation of lower loss transformers will reduce the costs Electricity Suppliers build into our customers bills by over £50M over the lifetime of these assets*

Volumes of Asset Replaced / Refurbished in RIIO ED1				
	SPD	SPM	SPD	SPM
Asset	Volume (Units)		% Population (p.a.)	
LV Street pillars	1,600	160	1.7%	5.8%
LV Link boxes	2,736	7,120	3.7%	4.1%

Street Pillars & Link Boxes	DPCR5	RIIO-ED1		
		£m pa	£m pa	RIIO-ED1 Total
Street Pillars & Link Boxes	SPD	1.8	2.3	18.0
	SPM	1.8	2.0	16.0
Total		3.6	4.3	34.0

## Street Pillars & Link Boxes

These low voltage assets in public areas are used to minimise disruption to customers when we are working on the network and to restore supplies more quickly when there are faults.

Due to their location, ease of public access and vulnerability to physical damage and interference, above ground low voltage street pillars and underground link boxes are inspected on a regular basis and poor condition assets are repaired, refurbished or replaced as appropriate. LV street pillars are given a high priority as damage can expose live parts that present a risk to members of the public.

## Security & Protection

### General Security

Protecting the public from the dangers presented by our network is a legal obligation, and our highest priority.

The increase in metal theft seen over the last few years, from virtually zero to a peak of 509 incidents in a year, has made securing our substations even more of a priority.

We are investing in security solutions to target geographical areas against metal theft and interference. This includes investment in security doors, new padlock key systems, alarm systems and installation of CCTV and electric fences at high risk substations.

We are working with local police forces following incidents and this has led to a number of arrests and prosecutions. We are also working proactively to prevent further incidents occurring, using a range of innovative surveillance and asset identification techniques. We are undertaking public information campaigns on the dangers of entering and interfering with electrical equipment. Also, regular liaison with regional and national cross-industry taskforces ensures that we are abreast of the current trends and issues relating to metal theft and the legislative actions of Government to tackle the problem.

When metal theft or vandalism occurs, there is a requirement to replace or repair the stolen or damaged assets. This can include replacement doors, fences and padlocks or replacement electrical equipment.

In some cases this also requires a substantial environmental cleanup, due to oil being emptied from equipment in order to access the copper components inside.

### Critical National Infrastructure (CNI)

Some of our assets are critical to national security and we liaise closely with Government agencies to ensure that potential threats & risks are assessed. In circumstances where potential risks are identified we will enhance the security of our assets, investing around £2m in the ED1 period.

Security & Protection		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
General Security	SPD	1.4	1.3	10.2
	SPM	0.7	1.5	12.3
CNI	SPD	0.0	0.0	0.0
	SPM	0.3	0.2	1.9
Fire Protection	SPD	0.1	0.2	1.2
	SPM	0.2	0.2	1.2
RoEP	SPD	0.0	0.1	0.6
	SPM	0.2	0.2	1.9
Total		2.9	3.7	29.3

Black Start Resilience		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
Black Start Resilience	SPD		0.3	2.0
	SPM		1.3	10.0
Total			1.6	12.0

### Fire Protection

Understanding and managing fire risks in our substations has a significant role to play in ensuring public safety. One of the key areas of risk is basement and embedded substations housed below or adjacent to buildings. Our proposals to mitigate risk include installing fire doors, provision of adequate ventilation, installation of low smoke zero halogen (LSZH) cables and refilling transformers with an insulating medium less flammable than oil.

Historically asbestos was used in substations to provide fire protection. We have a continuing need to deal with asbestos safely for the protection of our staff when required to disturb it within substation buildings.

### Rise of Earth Potential (RoEP)

Rise of Earth Potential can cause hazards to public in the vicinity and to telecoms systems. Mitigation work involves assessment and improvement of substation earthing systems. We have identified the higher risk locations and will test and where necessary, re-design the substation earthing system to ensure safety of our staff and members of the public.

### Black Start Resilience

The UK power network is designed and operated to deliver an extremely robust power supply to all connected customers. There are however circumstances through which the normal balance between connected generation and connected load can become disturbed, which left unchecked can in the most extreme case result in the cascade loss of the entire or large portions of the UK power network. Whilst considered rare, recent experience in both the USA and Europe have demonstrated that this is a credible risk.

The recovery from this kind of event is termed Black Start. The Government and the UK Electricity Industry consider that full restoration of the network to its normal operating state will take up to 72 hours.

It is a key requirement that all equipment on which the recovery process relies is made resilient for a period of 72 hours, with the main considerations being remote control facilities, voice and data communications, and protection systems

We will deliver this level of resilience across our main substations and operational locations involved in the black start recovery process through a portfolio of solutions, ranging from the installation of standby generation, installing larger capacity batteries and in some cases extending the durability of our site batteries by installing load disconnection schemes.

Black Start expenditure in the SPD area is less than SPM due to the 132kV network in Scotland being covered by the SP Transmission licence.

Environmental Management		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
Environmental Management	SPD	0.9	2.7	21.4
	SPM	0.9	2.8	22.3
Total		1.8	5.5	43.7

## Flood Risk & Environmental Management

Over recent years across the UK there have been incidents of flooding impacting on substations and resulting in loss of electricity supplies.

Using information provided by the Environment Agency (EA) and the Scottish Environment Protection Agency (SEPA), we have identified substations that are at higher risk of flooding than others and in accordance with industry guidance, we have applied a different degree of flood prevention dependent on the potential impact to customers. During DPCR5, our programme will be largely complete.

- *By 2015 an additional 14 of our strategically important Grid substations will be protected against a 1 in 1000 year event*
- *We consulted on protecting our primary substations against at least a 1 in 100 year event by 2023*
- *Our stakeholders have asked us to do more to try and mitigate the risk of flooding.*

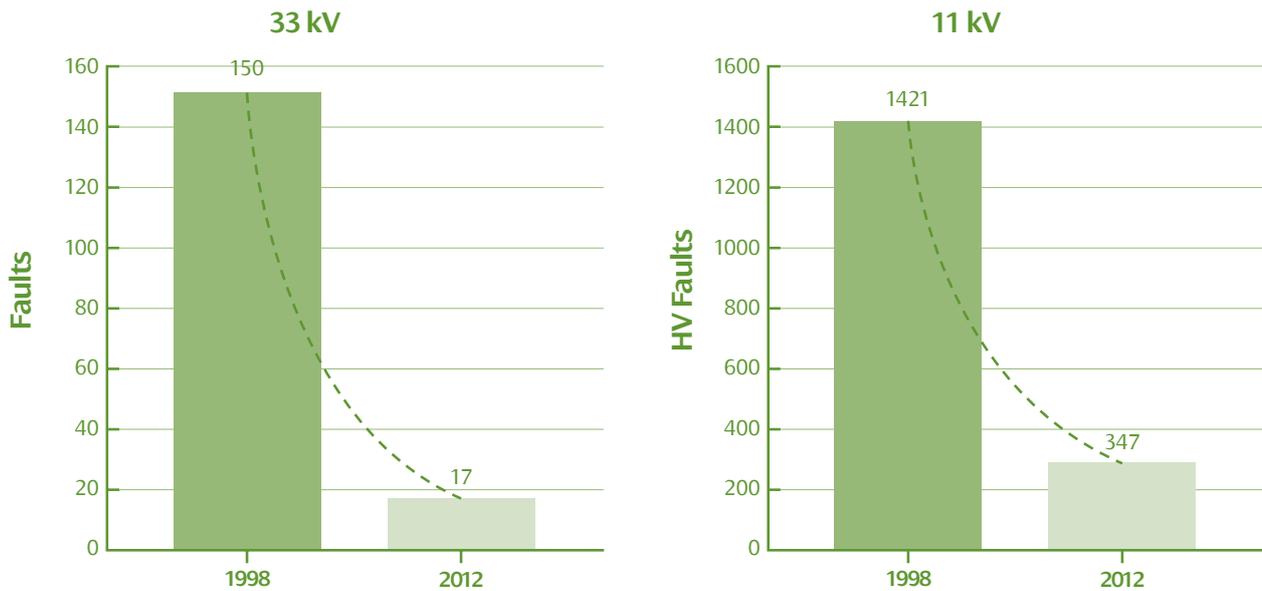
- *We have accelerated our plans and by 2015 will protect up to 59 of our primary substations against at least a 1 in 100 year event*

The mitigation measures designed or installed to date have been to cater for a fluvial (rivers) or coastal risk as this was the only information available from EA and SEPA. Both these agencies have recently indicated their intention to publish detailed pluvial (rain) maps and when available, we will assess the impact on our substations and implement appropriate mitigation measures during the ED1 period.

The majority of our primary transformers do not have oil containment. The environmental impact of oil spills is such that we are required to improve and mitigate against such events. Our programme to install improved oil containment measures, together with replacement or refurbishment of transformers will reduce this risk.

We also plan investment for noise reduction measures associated with a small number of our transformers. We continue to experience the impact of new domestic properties being built relatively close to existing substations or existing properties being taken over by new owners. This can lead to local council noise abatement orders and the need to invest in noise reduction measures.

*We have accelerated our flood protection investments as a result of stakeholder and customer feedback.*



## Overhead Line Resilience & Modernisation

### Overview

#### Overhead Lines

Over coming decades it is likely that our customers will rely more heavily upon the electricity we deliver to them due to the uptake of low carbon technologies such as electric vehicles and heat pumps.

This will further increase the value stakeholders place on some of today's priorities:

- resilience against severe weather events,
- management of an ageing asset base
- reductions in the number and length of interruptions to supply.

We are focusing much of our overhead line expenditure on improving resilience against severe weather events, and will also improve service to customers we designate as 'poorly served' and utilise our incentive mechanisms to fund investments to reduce the number and duration of disruptions to supply.

#### Storm Resilience

Following a series of severe weather events in the late 1990s we introduced a major initiative to improve the resilience of our rural overhead line networks.

- *Rebuilding our main 33kV & 11kV wood pole lines (the "backbone" of our network) to stronger construction standards suitable for localised weather conditions*
- *A tree clearance programme to reduce the risk of trees falling onto our overhead lines*

This initiative has already demonstrated significant benefits for our customers with over a 75% reduction in faults during recent severe weather events compared to a similar storm in 1998 and a '10' fold reduction in fault rate on lines that were constructed to our more storm resilient standards (for more detail refer to Chapter 3 — About us).

By 2023, our plan will ensure that:

- *over 25% of our rural high voltage network will be resilient to severe weather*
- *a further 32% our low voltage overhead line will be made resilient (doubling current investment levels)*

Within our plan we have reflected feedback from our stakeholders who told us that they are willing to pay to improve storm resilience to a further 10-11.5% of customers.

This additional investment will be targeted toward the high voltage lines in the severe weather areas that maximise the benefit for our customers. Our long term plan is that by 2034, the majority of our rural customers will benefit from a distribution network that is resilient to severe weather events.

### 132kV Tower Lines

Our 132kV overhead line network in SPM is mainly based on steel lattice towers. Routine painting & replacement of sections of corroded tower steelwork, tower foundation repairs, replacement of corroded conductor and damaged

insulation components helps to maximize the life expectancy of this strategically important asset.

We utilise information gathered from a range of sources including aerial helicopter surveys using high resolution cameras, conductor corrosion testing and climbing inspections to ensure that our work programme is targeted in the most efficient manner.

- *During RIIO-ED1 we will invest over £105m and refurbish or replace approximately 420 km of 132kV lines.*

### 33kV & 11kV wood pole lines

Our 33kV & 11kV wood pole lines are refurbished on a rolling 12.5 year cycle with circuit work content and scope specified to maintain safety and operational performance. In order to manage the expected deterioration in performance as our lines get older we intend to increase refurbishment investment by extending the scope of work we perform to maintain acceptable fault rate performance.

- *Rebuilding or refurbishing over 20,500 km of line*

- *Replacing more than 68,300 wood poles and 4,155 km of life expired conductor*

Our cost benefit analysis has confirmed that in some circumstances it is appropriate to install a larger size conductor when re building 11KV overhead line in a normal weather area. This will provide environmental benefits through reduction of electrical losses and future-proofing to accommodate demand growth and uptake of LCT.

### Worst Served customers

A small number of our customers are considered to be worst served, defined by Ofgem as “experiencing on average at least four higher voltage interruptions per year over a three year period ie 12 or more over three years.” A worst served customer must also be one who has had “a minimum of three higher voltage interruptions in each year,” during the three year period.

### SPM 132kV refurbishment/replacement programme

Route	Route length (kms)
Birkenhead to Wallasey in Merseyside	14
Bold Heath to Kirkby in Merseyside	6
Capenhurst to Chester in Cheshire	19
Carrington in Manchester to Warrington in Cheshire	25
Colwyn Bay to Dolgarrog in Conwy	16
Connahs Quay in Deeside to St Asaph in Denbighshire	57
Crewe in Cheshire to Barlaston in Staffordshire	39
Crewe in Cheshire to Stoke in Staffordshire	70
Crewe in Cheshire to Whitchurch in Staffordshire	24
Crewe to Hartford in Cheshire	17
Crewe to Northwich in Cheshire	30
Frodsham to Ince in Cheshire	12
Frodsham to Moore & Dutton in Cheshire	9
Frodsham to Runcorn in Cheshire	7
Southport in Merseyside to Pentwortham in Lancashire	19
St Asaph in Denbighshire to Colwyn Bay in Conwy	24
Wrexham in Denbighshire to Whitchurch in Shropshire	31
<b>Total</b>	<b>419</b>

Volumes of Asset Replaced / Refurbished in RIIO ED1				
	SPD	SPM	SPD	SPM
Asset	Volume (Units)		% Population (p.a.)	
OHL Rebuild (33kV & 11kV)	1,414	1,193	1.1%	1.0%
OHL Refurbishment (33kV & 11kV)	9,569	8,400	6.5%	7.3%
OHL Conductor (All voltages)	3,386	3,925	1.3%	1.4%
OHL Poles (All voltages)	47,376	54,902	2.0%	2.2%

Overhead lines		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
132kV Lines	SPD	0.00	0.00	0.00
	SPM	5.3	14.0	112.0
33kV Lines	SPD	3.5	5.7	45.2
	SPM	1.8	4.7	37.3
11kV Lines	SPD	11.4	15.3	121.1
	SPM	9.7	12.8	102.7
LV Lines & Services	SPD	4.8	4.4	34.9
	SPM	6.4	8.9	71.1
Total		42.9	65.7	525.3

These customers typically live in very remote areas and due to the prevailing weather conditions, experience frequent power interruptions. In most cases, these areas are a considerable distance from our main substations and are connected to very long overhead lines with no alternative network support.

We will prioritise use of the funding allocated by Ofgem to maximize the number of these customers that we can improve service to.

#### Poorly Served Customers

Our stakeholders have informed us that they would like us to improve our service to “poorly served” customers, customers experiencing more than 10 times the average numbers of power cuts. We will prioritise our asset refurbishment and replacement activities to address the worst performing underground cable circuits and overhead spur lines to improve service to 40% of these customers.

#### LV wood pole lines

##### Village Modernisation

A significant proportion of our low voltage wood pole overhead line network was installed as part of the rural electrification programme during the 1930/40s. This network is now approaching end of life and in order to manage safety and operational performance we plan to double our rural village modernisation programme from 2% per annum in DPCR5 to 4% per annum (3,096km over 8 years).

The existing bare wire overhead line network will be replaced with an insulated overhead line conductor system which will enhance public safety and in combination with our tree management programme significantly improve severe weather resilience and reduce long duration interruptions (our low voltage overhead line network typically contributes to the long duration interruptions greater than 2 days — the “tail of the storm”).

We have undertaken a cost benefit analysis (summary in Annex 2.3 — Cost benefit analysis) and confirmed that our proposal to use an insulated overhead line conductor system for village modernisation is more economic than an alternative approach using underground cable.

***We will replace bare wire overhead lines with an insulated conductor system to enhance public safety and storm resilience.***

In order to provide the network capacity to accommodate anticipated growth in low carbon technology and minimize the environmental impact associated with very large overhead line conductors, we expect that it will be necessary for around 9% (282km) of LV overhead lines to be replaced with underground cable.

Legal & Safety		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
ESQCR LV	SPD	4.8	3.1	24.6
	SPM	9.6	8.8	70.6
ESQCR 33kV & HV	SPD	0.1	0.8	6.4
	SPM	0.5	1.3	10.4
Total		15.0	14.0	112.0

AONB & Recreational Areas		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
AONB & Recreational Areas	SPD	0.0	0.8	6.0
	SPM	0.6	1.2	9.6
Total		0.6	2.0	15.6

## Legal & Safety

The Electricity Safety, Quality and Continuity Regulations (ESQCR) 2002 specify the clearance requirements for overhead lines from structures and height above ground. These requirements were introduced to enhance public safety by minimizing the risk of inadvertent contact by persons or vehicles.

Whilst all new overhead lines are designed and constructed to be fully compliant, some existing overhead lines that were installed before the new Regulations were introduced do not fully meet the new standards.

We have led the industry by developing a measurement system & risk based approach to prioritization of the remedial work, in discussion with the Health and Safety Executive. This approach enhances public safety by ensuring that the highest risk hazards are identified and dealt with first. These will be resolved increasing the height of the wood pole supports and through installation of insulated conductors.

- *We have completed a detailed survey of our entire low voltage overhead line network*
  - *19% of lines will need to be upgraded due to low ground clearance issues*
  - *56% of these issues affect main lines, 44% affecting services.*
- *We will resolve the highest risk ground clearance hazards (mainly road crossings) by 2015*
- *All other clearance hazards will be removed by 2020.*

## AONB & Recreational Areas

Our strategy is to deliver improvements in visual amenity within Areas of Outstanding Natural Beauty (AONB), National Parks (NPs) and National Scenic Areas (NSAs), within the [£11.3m] allowance proposed by OFGEM.

Our programme has been developed through consultation with our stakeholders. For SP Manweb: Snowdonia National Park, Anglesey AONB, Llyn Peninsular AONB and Denbighshire AONB. For SP Distribution: Loch Lomond & the Trossachs National Park.

Protecting the public from the dangers of inadvertent contact with overhead lines from fishing sites, caravan parks and recreational areas is also an area which is an ongoing priority. The solutions range from providing adequate warning signs to removing the hazard altogether through diverting or undergrounding the overhead line. We will invest £4.8m to improve safety by removing [53km] of our overhead lines from recreational areas.

Volumes of Asset Replaced in RIIO ED1				
	SPD	SPM	SPD	SPM
Asset	Volume (Km)		% Population (p.a.)	
132kV, 33kV & 11kV cable	224	265	0.2%	0.4%
LV Cable	64	32	[0.03%]	[0.02%]

Underground Cables		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
132kV Cable	SPD	0.0	0.0	0.0
	SPM	4.0	4.5	36.3
33kV Cables	SPD	0.9	0.9	6.9
	SPM	0.7	0.8	6.7
11kV Cables	SPD	0.9	2.3	18.0
	SPM	1.2	2.7	21.5
LV Cable & Services	SPD	1.2	1.9	14.9
	SPM	1.8	3.1	24.6
Total		10.6	16.1	128.9

## Underground Cable Modernisation

### 132kV Cables

132kV gas compression cables installed in the 1950s have become increasingly unreliable and over the last ten years we have been progressively replacing these strategically important circuits. We will replace the final 5.1km of poorly performing cable (Lister Drive to Wavertree in Liverpool).

132kV oil filled cables can cause environmental problems when the insulating oil leaks. The majority of cables which continually experience leaks have been replaced.

We will replace the one remaining 10.8km end of life circuit (between Kirkby and Bootle).

### 33kV and 11kV Cables

Our condition and performance assessment programme has highlighted that around 40% of faults occur on 10% of our 33kV and 11kV cable circuits. Our strategy is to target these poorly performing cable circuits and maintain overall failure rates near national average.

The replacement work will be targeted on worst performing sections of circuit based on circuit specific fault and condition information. This will be achieved by deploying diagnostic technology such as on-line partial discharge testing and mapping to aid cable replacement. The replacement of cable sections will therefore be more focused and cost effective. After finding where the exact weak point(s) on the cable are, we can replace only the weak points rather than large sections of the circuit where most of the historical problems have been.

We will also identify poor condition cable during faults and optimise the repair to remove these poor sections.

### Low Voltage Cables

At low voltage there are two specific designs of cable from the 1970s (Consac and concentric mains cable) which require replacement. They are performing poorly or cannot be jointed to with the cable live resulting in inconvenience to customers.

Rising Mains, Service Wiring & Service Position Modernisation		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
Rising Mains	SPD	10.4	10.1	81.1
	SPM	4.4	4.9	39.1
Mural Wiring	SPD	0.0	0.0	0.0
	SPM	0.8	1.7	13.8
Service Positions	SPD	1.4	1.7	13.2
	SPM	1.3	1.0	7.7
Total		18.4	19.4	154.9

## Rising Mains, Surface Wiring & Service Position Modernisation

Rising & Lateral mains are cables delivering power to customer's homes within multi-occupancy properties (including high rise and tenement flats). Mural and under-eaves wiring are cables that are attached to and run along the outside of customer's properties. Service positions are the location within customer premises where our cables are terminated before the Electricity Suppliers meter.

The main public safety risks of these assets arise from direct contact or fire, and smoke hazards within high occupancy buildings having constrained points of access and egress.

Our asset replacement programme for ED 1 will:

- *Maintain equipment safety, integrity and performance.*
- *Ensure compliance with our legal and licence obligations.*

- *Intervene where possible prior to asset failure.*
- *Reduce risk of third party direct contact with electrical equipment.*
- *Install low smoke emitting equipment.*
- *Support the UK governments smart meter roll out programme.*

### Rising & Lateral Mains (RLM)

Approximately 70% of properties in SPD and 60% of properties in SPM have their electricity meter connected to a RLM system.

We are leading the industry through our programme to modernise these installations and we will complete the majority of the "high rise" multi-occupancy tower blocks within our area by 2015.

By 2023 we will modernise the remaining life expired RLM in other types of multi-occupancy properties reducing risk exposure for an additional 200,000 customers.

### Mural and under-eaves wiring

We plan to complete our mural wiring modernisation programme by 2030. Under eaves wiring will where possible, be coordinated with our rural village overhead line modernisation programme with all life expired assets replaced by 2023.

### Service Positions

Approximately 10% of our service position installations are approaching end of life. Modernisation of these will be delivered through the above work programmes together with a targeted programme coordinated with the roll out of Smart metering.

## Network Control, Telecommunications & Protection Modernisation

Our network control, telecommunications and protection infrastructure supports the management of our distribution networks on a “real time” 24/7 basis. These assets provide important information about the status and performance of our network and substations and are essential to the provision of reliable and secure electricity supplies.

Our network control, telecommunications & protection modernisation strategy will manage the risks associated with an ageing and obsolescent asset base and provide a modern infrastructure with the necessary performance, resilience and capacity to support:

- *Introduction of Low Carbon Technologies (LCT)*
- *Active network management (dynamic thermal ratings etc.)*
- *Online asset condition monitoring*
- *Enhanced network automation, control and supervision*

### Network Control Systems

Network control systems (SCADA, Supervisory Control And Data Acquisition) include assets installed in our substations which collect information in “real time” and then deliver this information to operators based at our control centres via telecommunications infrastructure.

There are approximately 400 legacy RTUs (Remote Terminal Unit) in use on the SPD network and 857 legacy RTUs on the SPM network, most of which were installed in the mid 1990s. Increased failure rates, obsolescence and lack of ongoing technical support requires most of these (1134 units) to be replaced.

We have completed a cost benefit analysis (see cost benefit analysis annex) of installing modern technology replacement RTUs utilising the latest communications protocols which requires associated telecoms network upgrades compared with the alternative solution of continuing to install “bespoke” RTUs using legacy protocols.

The cost benefit analysis demonstrated that the life cycle costs of the options considered are broadly comparable.

However, the solution using modern RTUs and communications protocols offers significant technical advantages;

- *removal of supplier & technology risk*
- *significantly enhanced control & data management capability*
- *compatibility with industry standard substation protocols and designs.*
- *potential for increased integration with substation main plant & protection*

SCADA investment programmes will also target the replacement of end of life system monitoring equipment and automation components. In addition, new monitoring systems will be deployed to monitor critical alarms at remote locations and ensure system safety without disconnecting customers unnecessarily.

Investment will be made in new weather stations at strategic locations across the network to gather data for dynamic thermal rating (DTR) feasibility studies.

- *Enabling optimised connection solutions in areas where network constraints exist*
- *Efficiently supporting economic growth and the Low Carbon transition.*

Investment plans for the SCADA Central Systems include annual hardware and software updates together

with improvements to the Data Historian system and enhancement of cyber security intrusion prevention technology.

Over the next 10 years modernisation of our Control Centres at Prenton and Kirkintilloch will be necessary and a full refresh of the central SCADA system is scheduled to commence in 2019 as the current system reaches end of life. This will enable us to adopt & exploit anticipated advancements in functionality arising from the development of Smart Grid technologies.

### Telecommunications

A reliable telecommunications infrastructure is necessary to ensure that we are able to control & communicate with our substations. Our telecoms infrastructure consists of our own assets in the form of copper pilot cables, fibre cables, point to point radio systems and scanning telemetry systems as well as 3rd party systems such as BT leased circuits.

Telecoms investment requirements have increased substantially in due to essential alterations to system architecture to support ongoing service requirements and modernisation of ageing pilot cables & other telecoms bearers.

Underground pilot cables are used for protection and telecoms applications and increased investment is necessary to address deteriorating condition and reliability as asset age increases and provide the capacity to support future network control and data requirements.

In SPM, reliable pilot assets associated with the 11kV & 33kV urban interconnected networks are essential to ensure that protection operates correctly to maintain the current frontier levels of network performance and comply with our legal obligations.

In SPD we will target replacement of poorly performing ADSS fibre assets and in SPM continue with our ongoing programme to modernise end of life optical fibre wrap to ensure the integrity of key routes which form the backbone of our telecoms network.

Telecoms bearer works are also necessary to facilitate replacement of the life expired Hardex (underslung pilot cable used on 33kV overhead line circuits). This cable is no longer manufactured and cannot be supported.

We will install network terminal equipment to provide Ethernet communications to all major substations. This work will facilitate the RTU replacement programme and is necessary due to the higher bandwidth requirements associated with modern RTU protocols and the need to share the current infrastructure between multiple services. This development will also support other substation applications such as online condition monitoring.

Legacy scanning telemetry systems in SPD will be replaced due to reliability and support issues as well as bandwidth limitations of existing systems.

We will install modern scanning telemetry systems which provide increased bandwidth consistent with our forecast of future telecoms network demand and service requirements.

Other Telecoms works involve modernisation of active equipment including PDH and SDH multiplexers, control room telephony and management systems. These products are typically supplied to the global commercial telecommunications markets which are characterised by rapid product development and therefore relatively short after market support for legacy products.

Further investment will also be made to ensure continued performance of ancillary equipment associated with the telecoms network including; batteries and chargers and air conditioning systems.

## Protection Modernisation

Protection equipment is installed in our substations and is necessary to ensure compliance with our legal obligations and maintain the integrity and safety of electrical plant and circuits.

Protection modernization investment will increase significantly in ED1 due to asset condition & obsolescence driven by the rapid development of protection technology and short life expectancy of some types of electronic components.

Our strategy includes replacement of protection, batteries and chargers for both local & remote end equipment when completing major substation modernisation work involving replacement of the main plant. This holistic approach will enable the work to be delivered more efficiently overall and will enhance the long term reliability & performance of the substation.

## BT21CN

In 2018 BT will instigate forced service migration to their new communications platform. Without mitigation work, deficiencies with the new BT21CN delivered communications services will prevent correct operation of our main protection equipment causing potentially significant customer impact (due to extended fault clearance times and discrimination issues), and we will be reliant on backup protection for fault clearance.

This work is a continuation of a current programme and will include solutions such as new radio hill site service, fibre installation and in circumstances where SP Energy Networks owned solutions cannot be economically established we will use 3rd party telecoms networks.

Network Control, Telecommunications & Protection Modernisation		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
Network Control	SPD	0.3	1.8	14.7
	SPM	1.2	2.6	21.1
Telecomms	SPD	2.5	3.0	24.0
	SPM	1.6	5.1	40.7
Protection	SPD	0.4	1.1	8.6
	SPM	1.0	2.6	20.4
BT21CN	SPD	0.4	0.6	5.0
	SPM	2.0	3.6	28.9
Total		9.4	20.4	163.4

Diversions		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
132kV Diversions	SPD	0.0	0.0	0.0
	SPM	1.0	1.2	9.2
33kV & 11kV Diversions	SPD	1.2	0.7	5.4
	SPM	1.2	0.9	7.4
LV Diversions	SPD	1.0	0.7	5.7
	SPM	0.9	0.8	6.2
Total		5.2	4.2	33.9

## Diversions

When overhead lines are installed on private land we generally secure a wayleave and pay landowners an annual rental since this is the most cost effective licence arrangement. The main disadvantage is that the landowner can terminate this arrangement. An alternative approach is to secure an easement which is a permanent right of way that remains in place even if the land is sold. Although more expensive, we would normally seek to obtain an easement for an underground cable installation due to the high cost of subsequently moving the asset.

Diversions arise when landowners request that assets are moved. Diversions are also necessary to permit large infrastructure projects such as the West Coast Main Railway Line upgrade.

In certain circumstances it is more advantageous to convert a wayleave to an easement rather than move the asset. This requires negotiation with the landowner and although we seek to minimise costs, the resultant compensation payment may be significant. In some cases statutory powers are used to arrive at an acceptable settlement.

In recent years, agents specialising in injurious affection compensation due to overhead electricity lines affecting property prices have encouraged landowners to submit a Wayleave termination and offer to negotiate a permanent Easement. Each claim is rigorously challenged, however this has resulted in an increasing cost trend.

Current indications in the market show that infrastructure remains one of the key growth areas due to the regeneration of the road and rail networks. We have predicted diversion expenditure will initially increase in the early part of the ED1 period and then decrease as private sector investment increases.

## Future Proofing

Our stakeholders have informed us that it is important that we prepare for the Low Carbon future.

When developing our asset modernisation plans we have identified £16m investment opportunities to “future proof” our network in order to provide for anticipated demand growth and uptake in Low Carbon Technology.

In most cases this involves replacing an existing life expired asset with a modern equivalent having a greater capacity or additional functionality.

Future proofing within our plans includes:

- *Rebuilding 11kV overhead lines in normal weather areas with larger capacity conductors*
- *“Smart” monitoring of demand profiles in secondary substations*
- *Control & automation of switchgear in substations to enable demand transfer*
- *Replacement of LV overhead main lines with larger capacity underground cables*

These initiatives will be deployed on specific projects where cost benefit analysis demonstrates the initiative represents the most economic solution. (see Annex 2.3 — Cost benefit analysis for summary CBAs)

*Our stakeholders have informed us that it is important that we prepare for the Low Carbon future.*



# Accommodating future customer needs

## In this section:

- Network capacity
- General network reinforcement
- Primary network reinforcement
- Fault level
- Smart alternative to conventional reinforcement
- Secondary work reinforcement

## Network Capacity (Load Related Investment)

Load related investment is important to stakeholders and customers as:

- *it creates the additional capacity in our network to allow new customers to connect,*
- *it allows existing customers to utilise new more electricity reliant devices,*
- *it deals with increases in demand before this presents a higher risk of power cuts*

To identify the future requirements of our networks we have considered a number of factors:

- *Independent forecasts of economic growth*
- *Cities and local authorities development plans*
- *The appropriate triggers for us to take action to create additional capacity in our network*
- *Department of Energy and Climate Change (DECC) scenarios for the uptake of low carbon technologies (e.g. heat pumps, electric vehicles, and photovoltaics) including the more ambitious Welsh and Scottish 2020 carbon reduction targets*
- *Opportunities to use innovation to reduce our costs and charges to customers*

## Independent forecasts of economic growth & development plans

These inform both volumes and types of new customer connections and the future demand of existing business and domestic customers, and allow us to model where and when future additional capacity is likely to be needed on our network.

## Appropriate triggers to take action

It is important that we create capacity on our network at the appropriate time. We completed a review of other DNOs triggers, and considered recent connections charging decisions. This review identified that we have operated our networks differently to other companies and our assets have been working harder. This is explained in more detail in our unique challenges section (within Chapter 5 — Meeting Our Challenges)

We consulted our stakeholders on a 20% reduction in our network capacity trigger that would bring us in line with industry standard practices.

**We received strong stakeholder support for this change and used this new trigger point to build our plans.**

## DECC forecasts of the uptake of low carbon technologies

We worked with DECC, Ofgem and the rest of the industry to develop regional forecasts of customers adoption of new technologies, and an industry model (called the Transform model) that allowed us to forecast the impact on our networks and identify the most cost effective balance of technology and commercial solutions to create the future capacity on our networks.

We commissioned an independent network study by an engineering consultancy (TNEI) to validate that the modelled output was what should be expected, and selected a 'best view' low carbon uptake scenario reflecting the balance of views of our stakeholders

## Opportunities to use innovation to reduce our costs and charges to customers

We challenged our plans to create additional network capacity both internally and with an external engineering consultant (Smarter Grid Solutions) who are recognised as industry experts for their work on smart networks projects across the industry.

This allowed us to ensure that we embedded the appropriate learning from industry technology trials and significantly reduce our investment plans.

More detail on each of these steps is detailed within this section

## Forecasts of future requirements

Our business plan is aligned with the UK governments future vision for a low carbon economy. Ofgem has mandated that we use scenarios & models developed with the Department of Energy and Climate Change (DECC) for the uptake of low carbon technologies.

To help understand the impact of these scenarios on particular geographic areas, the distribution network companies commissioned EATL (an engineering consultancy) to develop a model that translated the UK position to a DNO regional version (TRANSFORM). This model also assesses:



Best view demand growth forecast								
2015–16	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22	2022–23	Avge
0.35%	0.34%	0.37%	1.48%	2.27%	1.91%	2.23%	2.33%	1.41%

- *the impact on networks*
- *the options to create additional capacity (including traditional or innovation)*
- *proposes a mix of solutions using a cost benefit analysis*

The output of the TRANSFORM model using our “best view” for our networks is:

- *130,000 electric vehicles (4% of households)*
- *310,000 heat pump heating systems (9% of households)*
- *620,000 photovoltaics (3% of households)*
- *a reduction of over £21m through innovation to avoid traditional reinforcement*

Chapter 12, Uncertainty, provides additional detail on the range of potential outcomes from these scenarios and explains how we will deal with the actual situation that develops.

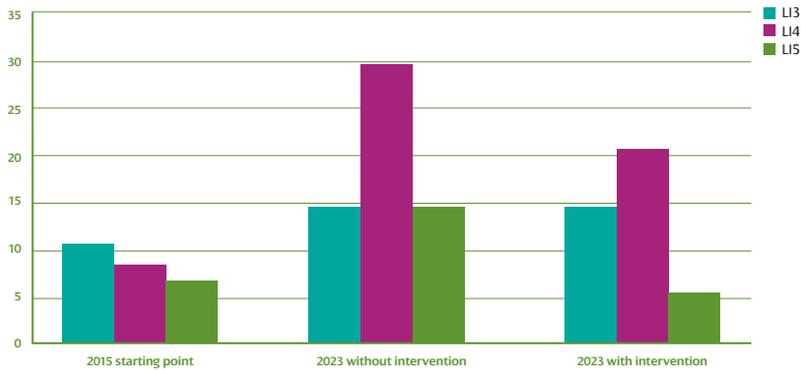
We have based our secondary reinforcement requirements significantly on the outputs from the EATL V3 TRANSFORM model, however, we have undertaken separate assessments to identify the needs for our Primary and 132kV network reinforcement (overall, we have assumed a conservative 1.4% average demand growth over the ED1 period), as the generic nature of the model was not appropriate for determining specific investment requirements at this level. The load growth and uptake in LCTs from TRANSFORM was used to inform the load growth at the higher voltage levels thereby ensuring a level of consistency across the networks.

Connections forecasts are based on historic data combined with economic and market projections through the period.

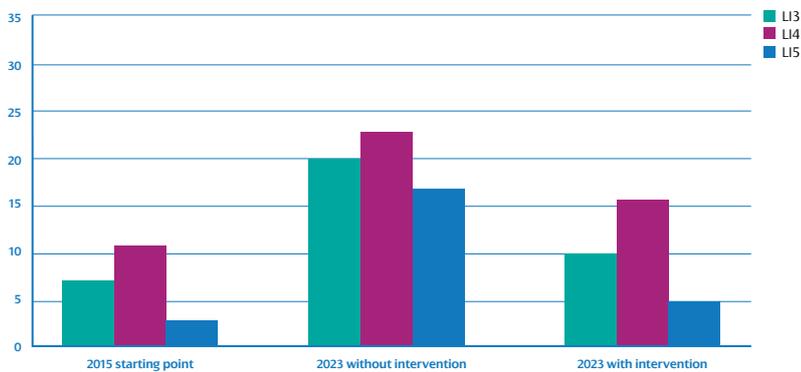
We have embedded £80m within our reinforcement plans to accommodate the uptake of low carbon technologies.

*We have embedded £80m within our reinforcement plans to accommodate the uptake of low carbon technologies*

SPD Load Index Change



SPM Load Index Change



LI Banding	Loading Percentage (%)	Duration Factor (time)
LI1	0-80	n/a
LI2	80-95	n/a
LI3	95-99	n/a
LI4	99+	<9 hours over 100%
LI5	99+	>9 hours over 100%

## General Network Reinforcement

General reinforcement covers the investment required to accommodate general demand growth increases from existing customers.

It is a requirement of our Licence that our networks are designed to meet the levels of security as specified in Engineering Recommendation P2/6, Security of Supply. This specifies the amount of spare capacity which we should provide for particular levels of demand.

We must also comply with the Electricity Safety, Quality and Continuity Regulations 2002 which specify the voltage ranges which the network must be designed to maintain.

### Load Index (LI) Secondary Deliverable

The Load Index measure was introduced in 2010 as a regulatory measure of comparative network loading and risk across different companies. This has been further refined and a consistent methodology has been introduced for all companies. These loading percentages are based on the substation maximum demand during the year:

The application of this methodology has allowed us to:

- Identify that we have been running our networks harder than other companies
- Develop proposals to trigger investments sooner, moving towards industry average
- Obtain stakeholder support for this approach

Load index movement over RIIO-ED1

	2015 starting point			2023 without intervention			2023 with intervention		
	LI3	LI4	LI5	LI3	LI4	LI5	LI3	LI4	LI5
SPD	12	8	7	14	29	14	14	20	5
SPM	6	9	4	20	27	19	10	15	6

Primary Network Reinforcement		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
132 & 33 kV Reinforcement	SPD	4.9	9.4	75.6
	SPM	11.6	19.6	156.4
Total		16.5	29.0	232.0

## Primary network reinforcement

Through the introduction of a standard UK network load index output measure, and recent connections charges decisions by Ofgem, it has become apparent that we have operated our networks differently to other companies. Historically, maximum network loadings have typically been for short periods of time, such as the “early evening” peak, which meant we could load our network up to 20% more than its constant rating. This allowed us to avoid or defer investments and keep customer bills lower but our assets have been working harder than other network companies.

Scenarios developed with the Department of Energy & Climate Change forecast 20% to 90% increase in electricity usage by 2030. In a future with overnight charging of electric vehicles and constant demand from heat pumps, the network demand profile is expected to become more constant. It will therefore no longer be practical and efficient to operate our network as close to capacity as we have in the past.

Due to these changes in demand profiles and to ensure our customers are treated consistently with other customers in the UK, we will trigger our general load investments at 100% of firm capacity (rather than 120% used historically).

## Network Reconfiguration

The distribution network has been designed over the past forty years on an economic and efficient basis. In SPD, this has led to situations where a number of primary substations are supplied via the same 33kV circuits. The future uptake in demand has indicated that these arrangements are no longer suitable. Our plans include a number of schemes to reconfigure our 33kV network to improve the supply arrangements and to provide additional circuit capacity to allow these substations to operate to their full potential.

## 6.6kV Network Upgrading

A significant proportion of our distribution network in SPM, and to a lesser extent in SPD is operated at a voltage level of 6.6kV. The 6.6kV system is a legacy from the early development of the distribution system. Modern networks are constructed to operate at 11kV and in recent years we have undertaken several projects to upgrade certain areas from 6.6kV to 11kV. This allows replacement of assets which are in poor condition and releases additional latent capacity (as you are able to transport a greater capacity through the 11kV system). It is our intention to continue with a phased replacement of our 6.6kV network, as the spare capacity this creates in urban areas is where we expect demand to increase due to the decarbonisation in transport and heating.

Based upon our proposed investment plans, the following changes in the LI outputs would be observed.

Individual substation scores will be aggregated to give an overall score which reflects network loading risk. Our proposed investment plan will yield, based on this aggregation process, a particular level of loading risk at the end of the ED1 period and we will be required to deliver this level of loading risk (output measure), within an agreed tolerance band.

Fault Level		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
Fault Level Reinforcement	SPD	3.4	3.3	26.4
	SPM	2.7	2.9	23.5
Total		6.1	6.2	49.9

## Fault Level

When certain faults occur in the network it is possible for large amounts of fault current to flow through the system until this is interrupted by switchgear. Each item of switchgear on the network is designed with a particular fault level capability.

Whilst the network has been designed to cater for these flows, it is possible from the increase in embedded generation and large motors connecting to the distribution network that the capability of the switchgear can be exceeded. This can lead to an increased risk of catastrophic failure of the switchgear when it operates. SPEN, like other Distribution Network Operators has a duty of care towards its employees and members of the public to ensure that they are not at risk of injury arising from failure of our assets.

Since fault levels are dependent on the network configuration and what is connected to the network at a particular period in time we undertake a periodic fault level survey using desktop analysis software, to identify locations where switchgear may operate above 95% of its rating.

We intend to further refine this analysis by deploying fault level monitoring equipment at key locations, this technology was developed through our innovation trials since 2010. This initiative is supported by our cost benefit analysis and will enable us to optimise our investment plans by more accurately tracking the development of fault level toward the switchgear rating.

In ED1 we will continue to remove risks associated with operating switchgear above its fault level rating. A variety of solutions have been considered, however, these predominantly consist of replacing the existing switchgear with higher rated equipment.

## Smart alternatives to conventional reinforcement

We commissioned Smarter Grid Solutions (SGS) Ltd, an industry leader in smart grid technologies, to review over 100 of our major projects planned for ED1 and identify alternative “smarter” solutions to conventional reinforcement.

This review identified that up to 25 of these projects would benefit from adoption of innovative solutions as an alternative or complementary to conventional reinforcement. Each solution was validated to ensure that the technology was viable and would be available within the timescales required for project delivery. The solutions considered were:

- *Real Time Thermal Rating (RTTR) Transformer + Monitoring*
- *Fault Level Monitoring*
- *Smart Enabling of new substations*
- *Distribution Flexible AC Transmission Systems (D-FACTS) — HV connected STATCOM*
- *Active Network Management — Dynamic Network Reconfiguration*
- *Phase shifting transformer*

In a number of cases, the review identified opportunities to ‘smart enable’ new switchgear and associated substation and field equipment to provide the foundation for additional smart functionality and improved network management in future.

We have updated our project design proposals and investment plans to include the smart alternatives.

*Using innovative smart alternatives has reduced our load plans by more than £65m*

Secondary Network Reinforcement		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
11 kV Reinforcement	SPD	3.3	5.1	40.8
	SPM	2.0	3.0	23.9
LV Reinforcement	SPD	1.4	3.4	27.1
	SPM	0.7	1.3	10.3
Total		7.5	12.8	102.1

Connections Driven Reinforcement		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
DUOS Funded	SPD	1.4	1.2	10.0
	SPM	4.0	4.8	38.0
Total				

## Secondary network reinforcement

We commissioned Smarter Grid Solutions (SGS) Ltd, an industry leader in smart grid technologies, to review over 100 of our major projects planned for ED1 and identify alternative “smarter” solutions to conventional reinforcement.

Reinforcement expenditure on the secondary (HV and LV) networks has tended in the past to be low, as generally there was good understanding of the demands of customers supplied at these levels and sufficient headroom was accommodated within the network to adapt to changes in electricity usage. Expenditure tended to be required to meet specific issues identified by single customers such as a voltage complaint.

Whilst the types of historic expenditure is expected to continue, during the next 10 years we expect the adoption of LCT will become the main driver for investment in the HV and LV network.

### New connections

Connections forecasts are based on historic data combined with economic and market projections through the period. We have facilitated industry leading levels of competition in connections provision and our plans assume strong levels of competition will be sustained.

We are keen to offer innovative solutions to allow connection with efficient reinforcement costs. This can be through offering solutions utilising new technology or bringing together individual customer connections to share costs.

## Connections Driven Reinforcement

Connection costs are divided into two categories that are treated differently. Assets installed exclusively for a new customer are called “sole use” assets. The new customer funds 100% of these and they are outside the ED1 price control.

In some cases there is a requirement to increase the capacity of the existing network to enable a new connection to be made. This costs of this customer triggered reinforcement is shared between new connecting customers and electricity distribution companies following rules set out in the Electricity Act, Regulations and regulatory guidelines.

As our existing assets become more heavily utilised through demand and generation arising from uptake of new low carbon technologies we anticipate more reinforcement work will be necessary in order to provide new connections.

*During the next 10 years we expect the adoption of LCT will become the main driver for investment in the HV and LV network*

### Demand connections

We expect the Housing market to pick up from 2016 onwards and we have forecast volumes to reflect this with a peak during 2019 – 2024. This coincides with some of the new initiatives developed and implemented by government bodies to reduce the expected housing shortage over the next ten year period.

The Industrial and Commercial market is expected to continue to grow through to 2017 due to forecasted investment in education and health, thereafter levelling off for the remainder of the ED1 period. We have worked with stakeholders to developing plans for the Glasgow and Liverpool areas, developing efficient proposals to assist in the regeneration of these cities and are continuing to work with all the local authorities across our license areas to respond to their development plans.

We will provide new heat pump and electric vehicles connections as the market develops. It is expected that the current heat pump and electric vehicle demand will grow during this period and we have based our growth assumptions on the output of the low carbon uptake modeling described later in this chapter and consultation with our main Stakeholders.

## Distributed Generation (DG) Connections

As set out in Chapter 3, About Us, both our networks have experienced significant development of renewable generation connections in the last decade. This is forecast to continue through the ED1 period with connection of around 220MW of small scale DG and up to 5GW of larger DG connections, including the Mid Wales scheme which facilitates connection of up to 650MW of generation.

We will provide new photovoltaic connections as the market develops and grows in the coming decade.

# Engineering and support costs

## In this section:

- Network capacity
- General network reinforcement
- Primary network reinforcement

CAI Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	42.4	40.1	82.5
Total RIIO-ED1 cost	339.0	321.0	660.0

Business Support Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	18.7	16.9	35.7
Total RIIO-ED1 cost	150.0	135.0	285.0

Non Operational Capex	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	6.7	6.3	13.0
Total RIIO-ED1 cost	53.0	51.0	104.0

## Overview of closely associated indirects, business support and non-operational capex

To deliver our outputs and secondary deliverables effectively, our front line staff and contractors rely on an extensive and efficient network of support staff and services, these are referred to as Closely Associated Indirects and Business Support.

We have thoroughly reviewed our costs in this area to ensure that we provide a support service that is both efficient and cost effective. We have compared our costs to those provided by the other DNOs in the UK and with our network businesses in Brazil, USA and Spain.

We have analysed each cost category on a case by case basis to ensure that we perform at an upper -quartile basis in comparison to other DNOs. We recognise that currently not all of our costs are at upper-quartile, therefore we have initiated an improvement programme to ensure that we implement the necessary changes in a controlled manner to bring our costs to the target efficient level.

Our drive for efficiency and cost reduction means we can minimise further the impact on our customers' bills.

### Closely Associated Indirect Support costs

These costs relate to the following activities — Network Design and Engineering, Network Policy, Project Management, Engineering Management and Clerical Support, System Mapping, Control Centre & Call Centre, Stores, Operational Training and Vehicles and Transport.

### Business Support costs

Business Support costs include our corporate and central activities and relate to the following activities — HR and Non Operational Training, Finance and Regulation, CEO, IT & Telecomms & Property Management.

### Non-operational capex

These costs relate to buying vehicles, buying IT systems and capital investments on buildings.

The cost for each of these areas is shown above. All costs are net of allocation to non-price controlled activities.

Network Design Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	2.6	2.5	5.1
Total RIIO-ED1 cost	20.6	20.0	40.6

Project Management Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	4.5	4.4	8.9
Total RIIO-ED1 cost	35.9	35.4	71.4

Eng Mgt and CS Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	15.9	13.8	29.7
Total RIIO-ED1 cost	127.0	110.1	137.1

## Closely associated indirect costs

### Network Design and Engineering

Our Network Design and Engineering Departments are based in our Blantyre (SPD) and Prenton (SPM) offices. These functions are responsible for the stewardship of our system performance. They review all high level designs and check that the network can accommodate load, renewable and Low carbon technology connections. In addition we have further design staff in our control rooms and depots ensuring that designs at lower voltage levels comply with our License obligations and maintain the safety of our network. Our costs for providing these services are shown above.

### Project Management

Our work programmes from 132kV Major Projects to simple defect clearance programmes rely upon a dedicated group of Project Managers and Co-ordinators. All of our investment programmes, whether undertaken by internal staff or Contractors are subject to rigorous planning in terms of customer service, quality, safety and cost control.

Our costs for this activity are shown above.

### Engineering Management and Clerical Support

This category includes staff that are not directly related to Project Management, for example team managers, administrative support staff. Our wayleaves function is included in this area. Our costs for providing these services are shown above.

Carto Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	0.8	0.8	1.6
Total RIIO-ED1 cost	6.4	6.7	13.1

Control Centre Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	4.3	4.0	8.3
Total RIIO-ED1 cost	34.3	31.8	66.1

Call Centre Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	1.6	1.4	3.0
Total RIIO-ED1 cost	12.8	11.6	24.4

Stores Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	1.3	1.2	2.5
Total RIIO-ED1 cost	10.8	9.7	20.5

### System Mapping — Cartographical

To manage our business effectively, it is essential that we have an accurate record of where our assets are, the condition of those assets and specific information about them. To achieve this we have a dedicated, small team of cartographers and data input staff who ensure our corporate systems are maintained and kept up to date.

These teams are based in our Cambuslang (SPD) and Prenton (SPM) offices supported by staff in our depots.

### Control Centre

We operate two network control centres to manage our networks, one in each licence area, each backed up by a local disaster recovery site. These are backed by disaster recovery sites in Hamilton (SPD) and Wrexham (SPM). The staff at these sites provide operational monitoring and control, access to the network and outage planning on a 24 hour basis.

### Call Centres

Our customer service call centre are located adjacent to our control rooms in Kirkintilloch (SPD) and Prenton (SPM). These centres provide 24/7 call handling for incidents on our network, dispatching the necessary response staff and ensuring communications with our customers are well managed. We plan to increase our expenditure in this area for ED1, which will be offset by savings realised through the utilisation of SMART metering data in the future.

### Stores

Our main central stores are strategically located at the centres of our two network areas. There are additional smaller stores across our operational depots. As part of our purchasing strategy, we realise savings by purchasing materials and equipment at lower cost and making these available to our contractors for use on our network.

The distribution and control of these items are managed by our logistics staff in our central stores.

Operational Training Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	7.1	7.0	14.1
Total RIIO-ED1 cost	56.6	55.9	112.5

Vehicle Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	3.3	3.9	7.2
Total RIIO-ED1 cost	26.7	31.5	58.2

Network Policy Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	1.0	1.0	2.0
Total RIIO-ED1 cost	8.0	8.0	16.0

### Operational Training

Over the next ten year period more than 1400 of our staff will either retire or leave our business. To allow for training and the time taken to achieve competence we need to recruit around 1200 graduates and trainees to replace those leaving between now and 2026. This category includes the costs of recruiting and training new staff and the costs of up-skilling existing staff. These costs represent our investment in our highly skilled workforce of the future.

We plan to increase our expenditure in operational training by 60% in SPD and by 41% in SPM in comparison to expenditure in DPCR5. We believe that this expenditure is fully justified and represent the best value for our customers. For more detail of our Resourcing Strategy refer to Chapter 10 — Business Readiness.

### Vehicles and Transport

This is the costs associated with the leasing of cars and vans to enable us to deliver our outputs and secondary deliverables.

*we need to recruit around 1200 graduates and trainees to replace those leaving between now and 2026*

### Network Policy

Our Asset Management teams are responsible for developing our network policies across a range of engineering and asset management disciplines. For example, these include inspection, maintenance and risk management policies to ensure that our networks remain safe for our staff, contactors and members of the public.

HR and non OP Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	1.0	1.0	2.1
Total RIIO-ED1 cost	8.3	8.3	16.6

Finance and Regulation Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	6.0	5.4	11.4
Total RIIO-ED1 cost	48.0	43.2	91.2

## Business support costs

### HR and Non Operational Training

Our expenditure on our Human Resources function includes development of HR policy, employee relations, payroll management and the provision of non operational training.

### Finance and Regulation

These costs are associated with the provision of financial support and control and for the management of the regulatory aspects of our business. These include all aspects of our reporting both statutory and regulatory.

### Insurance

The Iberdrola group seek to maximise economies of scale and its purchasing power by tendering the provisions of insurance for the group as a whole. The group have appointed Aon insurance brokers as our corporate advisors. The annual insurance year for the group runs from 1 June – 31 May.

Within the ScottishPower, business insurance is managed by a UK corporate insurance team.

The payment of premiums is handled centrally and costs are then allocated to the relevant country and cascaded to the business units based on established parameters which are listed below for significant areas.

- *Property and Business Interruption-Pro-rata on property value in area and basis of loss history;*
- *General Liability-Pro-rata on basis of loss history in area;*
- *Motor Third Party Liability-Pro-rata on basis of vehicle numbers and loss history; and*
- *Employers Liability-Pro-rata on basis of employee numbers and loss history.*

Additional detail on our insurance strategy is included in Annex 3.5 — Insurance strategy.

CEO Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	1.3	1.3	2.6
Total RIIO-ED1 cost	10.2	10.2	20.4

IT and Telecomms Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	7.5	6.9	14.4
Total RIIO-ED1 cost	60.0	55.3	115.3

Property Management Costs	SPD (£m)	SPM (£m)	SPEN (£m)
Average Annual RIIO-ED1 cost	2.9	2.3	5.2
Total RIIO-ED1 cost	23.4	18.5	41.9

### CEO

These costs under the CEO category include the costs of our executive team and associated services. It also includes the costs of our communications teams.

### IT and Telecomms

Efficiencies are being delivered to limit the increased cost of managing our assets, through sharing expertise, governance, applications, and procurement leverage across the Iberdrola Group.

### Property Management

We have 36 buildings in our property portfolio. The costs in this category, including rent, security, routine maintenance and cleaning,

The ScottishPower Group operates from a number of owned and leased properties predominately within the central belt of Scotland. A number of the owned properties now need capital investment as mechanic and electrical systems are reaching the end of their useful lives. In addition a number of the leased sites will expire over the next 9 years.

This provides opportunities to reduce costs which have been reflected in our ED-1 forecast and therefore passed on to our customers.

The Scottish Power Property Strategy is to consolidate property assets so that a number of sites can be brought together to deliver operational efficiencies and savings in overall property costs.

The main initiative is the development of a new out of town office, Ochil House, at Hamilton International Park together with the construction of a new headquarters property in Glasgow.

The operational costs of Ochil House are lower than that of our main office, New Alderston House, which is to be vacated in September 2013. Our newly built office has an Energy Performance Certificate of B+, reducing our business carbon footprint and supporting our environment outputs (refer to Chapter 8 — Our outputs and incentives — Environment).

In both shared sites of Ochil House and Scottish Power Headquarters, business separation measures have been incorporated into the overall building design and layout.

### Facilities Management

Facilities Management Services are tendered either “Globally” via Iberdrola, our Parent Company, or locally via the UK Business Services team with a focus on efficiencies. The optimal approach is determined after an appraisal of potential service benefits, efficiencies and economic benefits.

The length of tender period usually averages 3 years but can be up to a maximum of a 5 year term.

*Our newly built office has an Energy Performance Certificate of B+, reducing our business carbon footprint*



### Non-operational capex

These costs relate to buying vehicles, buying IT systems and capital investments on buildings.

Within our plans we have included £104m to cover non-operational capex (SPD £53m, SPM £51m).

#### IT, telecomms and vehicles

Our ED1 business plan requires improved customer information, enhanced network monitoring, the use of SMART metering data and the greater collection and analysis of asset and business data.

Our non operational Capex will increase to deliver IT systems capable of supporting these new challenges. Our plans allow for the introduction of SMART, accounting for over 25% of our total IT costs.

In addition, significant investment is required for Customer Relationship Management, Upgrades for applications, mobile devices and infrastructure, Optimised Scheduling and Workforce Management, Asset Management, Business Intelligence and Content Management.

A small number of our specialist vehicles (test vans and rubber glove trucks) are purchased. The majority investment in this area is to provide generation capability to ensure we meet our goal to be and industry leader in the delivery of customer service. Generators will be deployed to vulnerable customers and those we anticipate to be off supply for 12 hours during a fault.

#### Property Non operational capital expenditure

A 10 year plan is maintained and expenditure is detailed on an individual site basis using maintenance records, statutory and industry guidelines the need for replacement of plant and machinery at the sites — eg. air conditioning equipment.

We balance the need for investment in aging sites against cost of relocating to new sites. We are actively considering the business case for relocating to alternative premises in the SPD and SPM areas due to the age of current properties.

# Facilitating the low carbon future

Smart Metering		DPCR5	RIIO-ED1	
		£m pa	£m pa	RIIO-ED1 Total
Smart Metering	SPD	0.2	1.8	14.6
	SPM	0.2	1.4	11.2
Total		0.4	3.2	25.8

## Smart Metering

The government has set a target for Electricity Suppliers to install a Smart Meter in every UK household by the end of 2020. This programme is expected to increase the number of service positions each year requiring remedial works by network companies.

Our service position activities (cut out changes, mural wiring and rising and lateral mains works) have been designed with the Smart Metering installation works firmly in mind.

- *Recognising the importance of easily accessible and clearly identifiable means of local isolation to meter installers.*
- *End of life equipment in our programmes are likely to be areas where meter installers would have difficulties.*

Where our modernisation works are completed, we do not expect there to be any issues that would delay the roll out.

However, as the Smart Metering programme is Supplier led works will be required in areas where our investment works have not been completed and our existing programmes will need to be re-directed or accelerated accordingly.

Smart meters will provide useful data that will enable network operators to provide a better customer service and help understand the behaviour of the low voltage network. In order to utilise this data, it will be necessary to interface our systems with the Data Communication Company (DCC), the central organisation established to process and distribute smart meter data to the relevant users. Our plans include the IT investments to develop & manage these interfaces.

We will use the data from smart meters to transform our relationships with customers

- *Contacting customers proactively when faults occur*
- *Using information to improve our response times and information provided*

## Throughout our plan

We have also included other low carbon enabling costs throughout other areas of our plan.

- *Within our non-load plans we have included £16m (£8m SPD, £8m SPM). See page 158.*
- *Within our load plans we have included £80m (£38m SPD, £42m SPM). See page 161.*

We also plan to invest in technology trials that will be funded separately.

# Non-core costs



Non-core costs include:

- *Corporation tax*
- *Business rates paid to local government*
- *Transmission charges paid to National Grid*
- *Central smart metering system costs*
- *Legacy pension costs.*

Within our plans we have included £1.06bn to cover these costs (£656m SPD, £404m SPM).

These are all external costs that we do not control. For more information please see Chapter 11 — Uncertainty.



# Real price effects

## In this section:

- What are real price effects
- Our approach to determining RPEs
- On-going efficiency

## What are Real price Effects?

Real Price Effects (RPEs) are the difference between the index that is used to update our revenues each year (the Retail Price Index) and the movements in commodity costs (for example copper) or specialist labour (for example engineers).

## Our approach to determining RPEs

Our forecast of real price effects and ongoing efficiency for RIIO-ED1 are:

- *Real price effects of 0.7% per annum.*
- *More than offset by ongoing efficiency of 1% per annum.*
- *Resulting in a challenging real unit cost decrease of 0.3% per annum.*

We engaged economic consultants (NERA) who have undertaken a detailed study of real price effects (Annex 3.2). Our study included:

- *a review of available cost and price indices*
- *an evaluation of candidate price indices against the following criteria:*
  - *Relevance to electricity distribution*
  - *Data quality, in terms of length of historical time series, sample size and volatility of time series*
  - *Regulatory precedent*

- *a selection of the most appropriate indices*
- *the development of a method for forecasting RPEs*

Based on the most relevant indices selected, we:

1. *base our near-term forecast RPEs on published sources' and projected the difference between the expected growth rates in relevant indices and their expected growth rates in RPI (where published forecasts from reputable third party agencies were available)*
2. *If third party forecasts were not available, or beyond the period that third parties forecast, we base our forecast on an extrapolation of long-run historical trends in real input price inflation based on our own statistical analysis.*

We consider that this approach is broadly consistent with the methods used by Ofgem and their advisors at recent price control reviews, as our analysis is based on long-term trends in the inflation of relevant cost indices above the rate of RPI inflation .

Our analysis suggests an overall RPE of between 0.3% and 0.7% on average over the forthcoming price control period. Offset against this, long-run historic data indicates trend productivity growth of between 0.5% and 1.1%. This suggests a net effect on overall unit costs of between -0.6% per annum and +0.2% per annum.

Given this relatively wide range of possible outcomes that could be supported through analysis of historic data and trends, we have crosschecked our RPE and productivity analysis against observed trends in unit costs in comparator sectors of the UK economy using data from the EU KLEMS database.

We have analysed data using the two measures of unit cost growth used by Ofgem in a similar analysis conducted as part of RIIO-T1/GD1. The first measure is growth in unit labour cost (VA) at constant capital (gL). The second is growth in unit labour and intermediate input costs (GO) at constant capital (gLEMS). Both these measures are calculated relative to RPI and reflect the yearly growth in expenditure on labour and intermediate inputs (EMS) required to produce a certain level of output, keeping capital constant. Therefore they form a benchmark for our estimate of RPEs, net of productivity growth.

These figures suggest that the overall historic trend in unit costs, relative to RPI, lies between -0.4% and +1.4%, depending on the comparator industries selected and the method used. However, by most measures, long-term trends in unit costs are slightly positive, i.e. real input price inflation exceeds improvements in productivity. In contrast, our forecast RPEs and productivity growth are equivalent to a net change in unit costs of between -0.6% per annum and +0.2% per annum.

<sup>1</sup> See, for example, Ofgem (2012), "Strategy Consultation for RIIO ED1: Tools for cost assessment", paras. 11.7-11.8

**Table [n.n]: Relevant input indices (before on-going efficiency)**

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
General Labour (capex)	1.00	0.99	0.99	0.99	0.99	1.00	1.03	1.05	1.08	1.10	1.11
General Labour (opex)	1.00	0.99	0.99	0.99	0.99	1.00	1.03	1.05	1.08	1.10	1.11
Specialist Labour (capex)	1.00	0.99	0.98	0.98	0.99	0.99	1.00	1.02	1.04	1.06	1.08
Specialist Labour (opex)	1.00	0.99	0.98	0.98	0.99	0.99	1.00	1.02	1.04	1.06	1.08
Materials (capex)	1.00	1.00	1.03	1.05	1.06	1.07	1.08	1.09	1.11	1.13	1.16
Materials (opex)	1.00	1.00	1.03	1.05	1.06	1.07	1.08	1.09	1.11	1.13	1.16
Equipment/Plant	1.00	1.00	0.99	0.96	0.95	0.95	0.94	0.93	0.92	0.92	0.90
Transport	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**Table [n.n]: Weighted average RPE based on Ofgem RIIO-GD1 Weightings**

	Opex	Capex	Repex	ED1
RPE (%)				
Direct Labour	34%	11%	10%	1.07%
Contract Labour	18%	45%	67%	0.81%
Materials	6%	19%	13%	1.46%
Plant & Equipment	1%	4%	0%	-1.00%
Transport	2%	0%	0%	0.00%
Other	39%	21%	11%	0.00%
Weighted Avg ED1 RPE	0.59%	0.72%	0.84%	0.71%

Comparing our range of RPEs and ongoing productivity to historic unit cost trends therefore suggests a value towards the top end of the range would be most appropriate.

- We have therefore combined the forecast of RPEs of +0.7% per annum (see table above) with assumed ongoing efficiency of 1% per annum
- This implies a challenging real unit cost decrease of 0.3% per annum, on average (ongoing productivity more than offsets real price effects over RIIO-ED1).

- Ongoing efficiency of 1% per annum (compounding) is applied across the Business Plan reducing our plans by more than £170M

- Real Price Effects are forecast to be £125M (shown separately)

### On-going efficiency

The ongoing efficiency assumption within our business plan is 1% per annum. As detailed in Chapter 9 — Our expenditure forecast, the business has reviewed in detail direct and in-direct costs to ensure our plan is efficient. In addition to establishing our base costs a 1% on-going efficiency challenge is

embedded across labour, contractor and material costs in our business plan. We believe this is an aggressive assumption and the independent report from economic consultants Reckon supports this view.

Reckon LLP independently reviewed historical data on comparable efficiency gains (refer to Annex 3.4).



**Deployment of  
innovation has  
reduced our  
overall costs by  
more than £100m**

Summary of key information for our stakeholders – Our vision for ED1 and our plans to deliver our vision.

1. Executive summary

Our business plan is written with our readers in mind, takes into account the things that make us unique and is underpinned by a robust process.

2. A guide to this document

3. About us

4. Process of creating our business plan

Our plans to meet the challenges of the ED1 period are informed by extensive stakeholder engagement and the consideration of alternative and innovative methods.

5. Meeting our challenges

6. Learning from our stakeholders

7. Our innovation strategy

Our clear and comprehensive output commitments are underpinned by a robust, deliverable and efficient programme of expenditure.

8. Our outputs and incentives

9. Our expenditure forecast

10. Business readiness

Our plans are resilient to uncertainty, efficiently financed and minimise the impact on our customers.

11. Uncertainty

12. Financing our plan efficiently

13. Our revenues and customer impact

Our plans enable us to help shape the energy future and our continual improvement is informed by enduring stakeholder engagement

14. Looking to the future

15. We are part of the Iberdrola group

16. Glossary

Our supporting annexes give additional detailed information to support our plans.

Volume 1 – Stakeholder, customer & IT

Volume 2 – Engineering

Volume 3 – Finance and expenditure

## 10

# Business readiness

## Our preparations to deliver our commitments

We have made thorough preparations to ensure we deliver our outputs and the commitments we have made in our Business Plan.

In this chapter, we describe those preparations, which include engagement with our contractor and supplier community, our internal functions and the third party's on whom we depend.

A large volume of our contracts will be renewed ahead of the ED1 period. With this in mind, we have reviewed our purchasing strategy and looked at how we can secure a balanced range of contracts that reflect the needs of all interested parties.

We have carried out a comprehensive review of our resourcing strategy for ED1 and in this chapter we outline the scale of our recruitment plans and how we plan to bridge the industry skills gap by investing in a comprehensive training and development programme

### In this chapter:

- Overview
- Preparing to deliver our investments
- Purchasing
- Resourcing and training



# Overview

## In this section:

- Preparing to deliver
- Preparing our purchasing strategies
- Resourcing and training

## Preparing to deliver

We have made thorough preparations to make sure we are able to deliver our outputs and commitments as we transition from the current price control period, into ED1 and beyond. We have carried out a comprehensive review of our resourcing strategy, engaged with our contracting community, looked at our purchasing requirements with our supply chain and completed pre-project planning on a zone by zone basis across all our operational areas.

### Preparing to deliver through our supplier and contracting community

We have engaged with our suppliers and contractors at dedicated stakeholder events. We shared our plans for ED1 and engaged on how we will work together. 60% of attendees agreed that SP Energy Networks are either good or very good to work with. We are working to increase this percentage by:

- *Supporting our contractors to develop sustainable recruitment and training plans.*
- *Looking at different contractual relationships to most efficiently deliver our investment plans and meet our customer service targets.*

## Preparing to deliver zone by zone

To ensure we have a deliverable plan, we have:

- *Engaged with our internal and contracting staff to make sure our plans are viable and achievable.*
- *Undertaken comprehensive surveys and engineering studies.*
- *Prepared individual project engineering schemes and outage plans to ensure efficient delivery.*
- *Mapped all activities on a geographic basis to enable co-ordination of works and minimise disruption for Customers.*
- *Created Operational Zonal Maps to help our workforce and stakeholders understand the scale, timing and benefits of our plans throughout the ED1 period.*

In creating our plans, we have made the most of being part of the global Iberdrola group:

- *Our engineering plans have undergone a robust peer review by engineers within Iberdrola and have been compared with similar approaches in both Spain and USA.*
- *We have applied Iberdrola's global purchasing expertise to ensure that the costs underpinning our programme are efficient.*

## *Iberdrola's global purchasing expertise means that the costs underpinning our programme are efficient*

## Preparing our purchasing strategies

A large number of our contracts will be renewed ahead of the start of ED1 in April 2015. This affords us an opportunity to review our purchasing strategies to make sure we secure a balanced range of contracts that are of mutual benefit to us, our contractors & suppliers, customers and stakeholders.

- *As part of the worldwide Iberdrola group we can purchase goods and services at competitive costs, and deliver real value for money for our customers.*
- *We recognise that during the period 2010-2012 we made a slow start to our investments, due to a high proportion of contract renewal. Our robust ED1 preparations will avoid this happening again.*
- *We are reviewing all of our major contracts to ensure that they are in place for the start of RIIO-ED1 and that they fully meet our requirements in terms of customer service and productivity.*



## Resourcing and training

We have carried out a comprehensive review of our resourcing strategy for the ED1 period and beyond to provide us with a highly skilled and well-trained workforce for the future. We know that having the right people, with the right skills, in the right place is essential for efficient and effective delivery. We need highly skilled, suitably authorised employees, with the specialist skills to deliver our investments. With the growth of our industry and the new challenges associated with the low carbon future, it's clear that we need to recruit and train new staff.

### Our current workforce

We employ a wide range of highly trained and specialist staff to operate and maintain our network, deliver our investment programme and respond to our customers needs 24/7. We also have support functions to assist in managing our business. Our staff can be categorised as follows:

- *1200 Field Staff — linespersons, jointers, fitters & support staff.*
- *900 Engineers and technical specialists.*
- *400 customer service staff, central support staff and managers.*
- *We also utilise approximately 2,500 contracting staff.*

The outcome of our comprehensive resourcing review has shown:

Between now and 2023, over **1400** of our employees and **1000** of our contractors will leave mainly through retirement or changing jobs, and these trends will continue into the following decade.

In addition, we also need to recruit another **100** highly skilled people to deliver our new customer service targets and increased investment plans.

We are embarking upon an ambitious programme to invest up to **£60m** in the recruitment & training of highly skilled people to deliver our investment plans and meet our customer service targets.

This training and recruitment programme represents an unprecedented opportunity for us to shape our business to meet the challenges of the ED1 period and beyond.

Our programme will include:

- *Recruiting from a variety of sources including:*
    - *Graduate Trainees.*
    - *Engineering Apprentices.*
    - *Craft Apprentices.*
    - *Skilled individuals direct from the market.*
  - *Collaboration with colleges and universities to bridge the industry skill gap more quickly.*
- We are one of the few DNOs that have retained our own operational and technical training centres
- *We plan to further invest in our training centres in Cumbernauld and Hoylake.*
  - *These centres provide essential training and authorisations for both direct and contracting staff and are a key part of our deliverability strategy for the future.*

# Preparing to deliver our investments

## In this section:

- Overview
- Preparing to deliver our 132kV investments
- Preparing to deliver our other investments
- Preparing to deliver zone by zone

## Introduction

We want our customers to receive the benefits of our comprehensive outputs package promptly. For this to happen, we need to be ready to start delivering our investments as soon as the ED1 period begins in April 2015. This section describes the plans and preparations we have made to ensure that we are ready to deliver as soon as the ED1 period begins.

The rigorous processes we have used to prepare our plans for business readiness are detailed in Chapter 4 — Process of creating our business plan.

Our preparations include:

- *comprehensive on-site surveys.*
- *detailed engineering studies, considering alternative solutions.*
- *project and outage planning, including coordination with third parties.*
- *a comprehensive review of our purchasing strategies.*

We have significantly increased the level of detail in our early deliverability plans for the ED1 period. We have shared our plans with our key suppliers and the contractor community through dedicated events, one-to-one meetings and small group sessions. We have examined the critical aspects of our business plan and established a robust business readiness programme.

## Preparing to deliver our 132kV investments

The 132kV network construction programme in our SPM license area provides the most complex planning challenge of our ED1 investments. We are working in close liaison with National Grid Transmission, Electricity North West, Western Power Distribution and our own operational control team to ensure we have the necessary outages secured to allow us to undertake our programme of work.

Our design, delivery and operational staff have worked in conjunction to complete detailed surveys of all 57 132kV projects proposed for ED1. We have completed civil surveys at all of the proposed substations and reviewed the proposed OHL routes.

From this preparatory work we have individually designed, costed and planned each of our 132kV projects, building a 12 year delivery programme aligned with our current programme for 2010 to 2015.

Sharing our programme of work with all of those involved in network access has allowed us to optimise our programme, making sure we have the best possible plan for delivery over the ED1 period. Sharing our planned programme with our supplier and contractor community has enabled us to confirm that it is, well planned and deliverable.

## Preparing to deliver our other investments

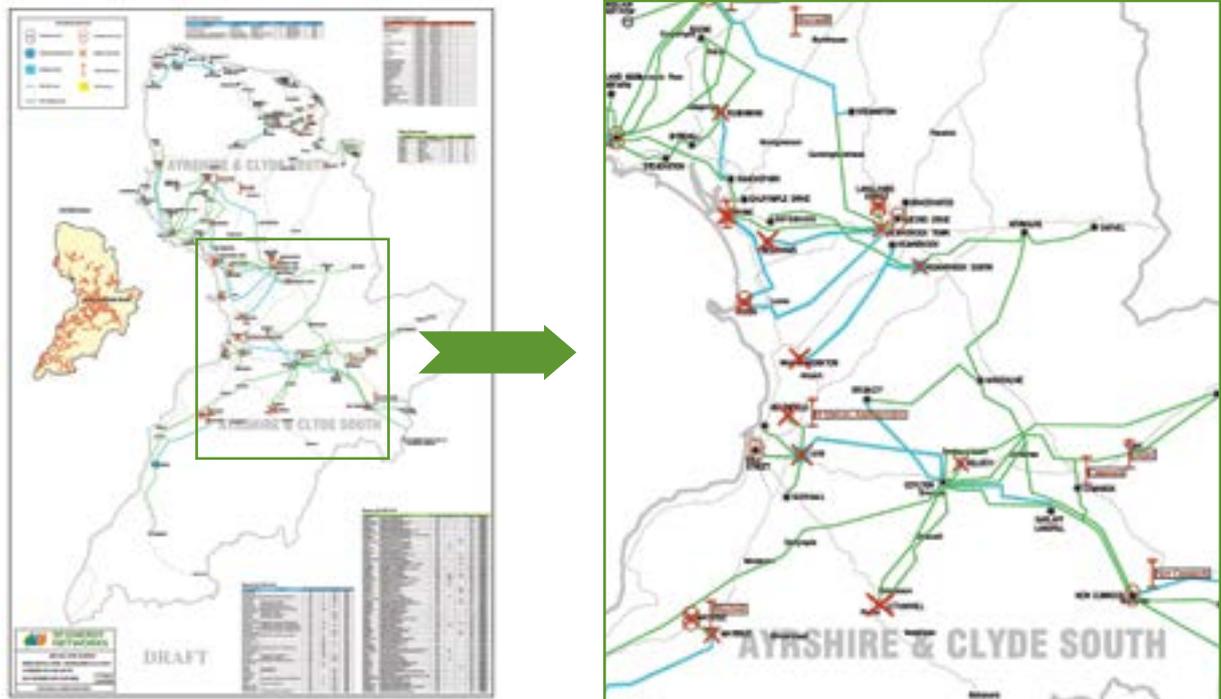
We have taken a similar approach in preparing to deliver our planned investments at 33kV and at our primary substations. We have surveyed each of the 150 sites proposed for investment over the ED1 period, confirmed the scope of the work required at each site and individually costed and designed each project. We have developed programmes of work for each of our 12 work 'zones', enabling us to take a complete view of all of the work required in an area to minimise costs and disruption.

We have shared these programmes of work with our outage planners to ensure that we can achieve the necessary access to the network. While this outage planning is less complex than at 132kV, it is an equally important part of our business readiness process.

Programmes of work at lower voltages do not require the same level of pre-planning as they are less complex to deliver. We have compared the volumes of work and the geographical areas in which we will be working in order to co-ordinate work packages and ensure that there is an effective transition into ED1 in April 2015.

We believe that this robust and proportionate approach to planning our workload will enable us to deliver results right from the outset of the ED1 period.

*Our zonal maps help our stakeholders, contractors, suppliers and workforce visualise the scale and sequence of our planned investments*



## Preparing to deliver zone by zone

We have created visual aids in the form of 'Zonal Maps' to help our stakeholders, contractors, suppliers and workforce visualise the scale and sequence of our planned investments. For each zone, we have plotted all of our proposed projects onto a single map. The zonal maps include both our work to replace or refurbish equipment that has reached the end of its operating life (non-load related investment), and work to upgrade our system to accommodate future load (load related investment).

Our zonal maps deliver a number of very important benefits, from customer and stakeholder engagement to project co-ordination:

### **We are coordinating all our work**

We can see at a glance what work we'll be doing, when, and where. This coordination will help us deliver our outputs in the most efficient and cost-effective way possible.

### **We are minimizing customer disruption**

Our customers and local communities have specifically asked us to review the way we coordinate our work, to make sure that they are not off supply several times for different types of work that could have been done at the one time. We have listened to this feedback and changed our approach, coordinating our work to make sure that we avoid repeated outages. This is a significant change in our approach and ensures that disruption will be kept to an absolute minimum.

### **We are helping our workforce**

Our zonal maps are a powerful visual aid for our workforce. Available in office locations, depots and via our electronic workforce tablet devices, the scale of our investment plans can be easily understood allowing staff, contractors and suppliers to see exactly what we plan to deliver over the eight year period.

### **We are talking to local communities**

We are sharing our zonal maps with our local communities and a wide range of stakeholders via our stakeholder events and website. During the delivery of our investment plans we will regularly encourage our stakeholders to provide feedback on our plans and maintain our maps to visually demonstrate our progress against our business plan.

### **Preparing to deliver improved network performance**

We are committed to improving the reliability of supply to our customers. We are already amongst the industry leaders in terms of customer interruptions with our customers experiencing 30% fewer power cuts than the UK average. Our plan aims to improve this position further through our ongoing inspection, maintenance and asset modernisation programmes, including using our analysis of failure patterns to drive targeted refurbishment of our overhead lines and the replacement of poorly performing underground cable sections.

# Purchasing

## In this section:

- Our purchasing strategy
- Preparing for ED1
- Contract renewal
- Stakeholder engagement
- Suppliers

## Our purchasing strategy

We regard our suppliers as strategic stakeholders and we manage our purchasing activities closely to ensure that our supply chain is fair, transparent and ethical. When interacting with our supply chain, we

- *Use selection and award processes designed to ensure fairness, transparency, equal opportunities, integrity and mutual interest*
- *Promote among our suppliers principles of responsible behaviour from social, economic and environmental perspectives.*

We have developed a Global Supplier Management Model (including a Total Supplier Management System) that enables us to register and classify our suppliers.

Amongst other criteria, we assess the technical and production capacity of our suppliers and we weight their credentials in the following areas:

- *Quality*
- *Safety and occupational risk prevention*
- *Environment*
- *Social responsibility with special emphasis on respect for human rights*
- *Economic-financial situation*

We need to achieve value for money in the goods and services that we purchase and these must be produced or delivered in line with our aims of environmental sustainability and social justice.

We use a series of measures to ensure compliance with the Anti-Bribery Act and to assess the potential risk of corruption and bribery when entering into a new relationship or renewing an existing contract with a supplier.

We continue to use our purchasing power to achieve win-win solutions by building supply chains that provide responsibly sourced products and services and balance the benefits of globalisation with the health of our local and national economies.

As a regulated business, we adhere to the EU Public Procurement Directive and all our purchases above the thresholds it prescribes comply with the legislation and its fundamentals of openness, transparency and fairness. We strive to deliver the best value for money through competitive testing of the market place via our online tendering tool, thorough negotiations, and where practicable, the use of e-auctions.

## Preparing for ED1

We have reviewed our contract renewal plan and ensured that all of our bought-in goods and services will be in place ready for us to deliver our ED1 commitments. This includes service contracts and equipment (such as cables, switchgear, and transformers).

We purchase all of our services and supplies at the most competitive price that we can achieve through effective use of our group global buying power, participation in the Selectusonline Purchasing Consortium and best-in-class procurement processes.

## Contract renewal

We consider and recognise the benefits and risks associated with the renewal process of our contracts. We are actively mitigating the risks by reviewing our key contract renewal plan, current market conditions, contractor resource availability, and approved equipment availability to drive a seamless transition into ED1 with the most suitable contracts in place. Where the market conditions are appropriate, we are seeking to establish longer term agreements to support our interaction with our supply chain. Where appropriate, our contracts with suppliers and contractors will share the incentives and penalties agreed by Ofgem. Adopting this approach, these incentive mechanisms will reach our whole supply chain, driving sustainable performance and bringing improved benefits to our customers.

## Stakeholder engagement

As part of our Stakeholder Engagement process we have recently held workshops with former, current and potential contractors and suppliers. Of the 88 representatives at our events in Liverpool and Glasgow, 80% of our contractors by value and 78% of our direct activity was represented, totalling 42% of our annual total expenditure (totex).



At these events, 60% of attendees agreed that we are either good or very good to work with, and we are working to increase this percentage by:

- *Sharing our ED1 plans with our contractors early in the process.*
- *Working together to train and recruit new staff for the industry.*
- *Implementing a simpler process for authorising staff to work on our network.*

Contractors have told us that they need longer contracts to allow them to invest in people, plant and premises.

- *78% of contractors favoured contracts of more than 4 years.*
- *48% of suppliers favoured contracts of 3 years' duration.*

We are currently reviewing our purchasing strategy to build in this feedback.

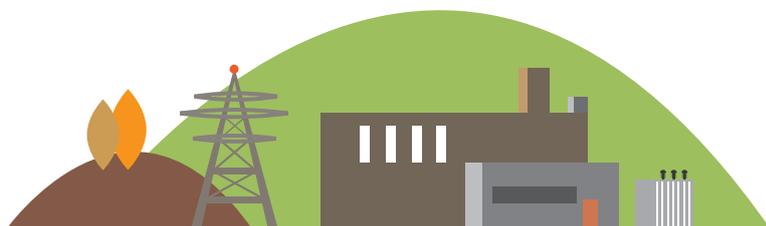
We will hold another series of meetings with our key suppliers and contractors, once our business plan is submitted, to demonstrate that we have listened and we are responding to their feedback, and moving forward with our ongoing engagement for the future.

***Event feedback — 100% of attendees stated the sessions were useful, worked well and that they would like to attend future SPEN engagement events.***

## Suppliers

Our purchasing policy ensures that we secure our goods and services at the very best price. We capitalise on being part of the Iberdrola Group by aggregating a number of our purchases and negotiating our contracts via our global purchasing group to leverage additional benefits, delivering real value for money for our customers and stakeholders.

Our outlook is not solely global, but also local. Wherever possible, we seek local recruitment for our contracts. Wherever possible we encourage our contractors to engage local resources for their contracts, supporting local communities.



# Resourcing and training

**In this section:**

- Overview
- Our current workforce
- What we need to do
- How we are going to do it

## Overview

Having the right people with the right skills in the right place is essential for efficient and effective delivery. We need suitably experienced employees with the specialist skills to deliver our investments. With the challenges associated with the growth of our industry and adapting to the low carbon future, it's clear that we need to recruit and train new staff. In addition to these challenges, 1400 of our people will be retiring or leaving work between now and 2023, as can be seen in the graph below.

We have carried out a comprehensive review of our resourcing strategy for the ED1 period and beyond to address these challenges, providing us with a highly skilled and well-trained workforce for the future.

## Our current workforce

We employ a wide range of highly trained staff to operate and maintain our network, deliver our investment programmes and respond to the needs of our customers 24/7. Our workforce also includes staff to support these functions. Our workforce can be categorised as follows:

- *1200 field staff — linespersons, jointers, fitters and support staff*
- *900 engineers and technical specialists*
- *400 customer service staff, central support staff and managers*
- *We also utilise approximately 2,500 contracting staff.*

## What we need to do

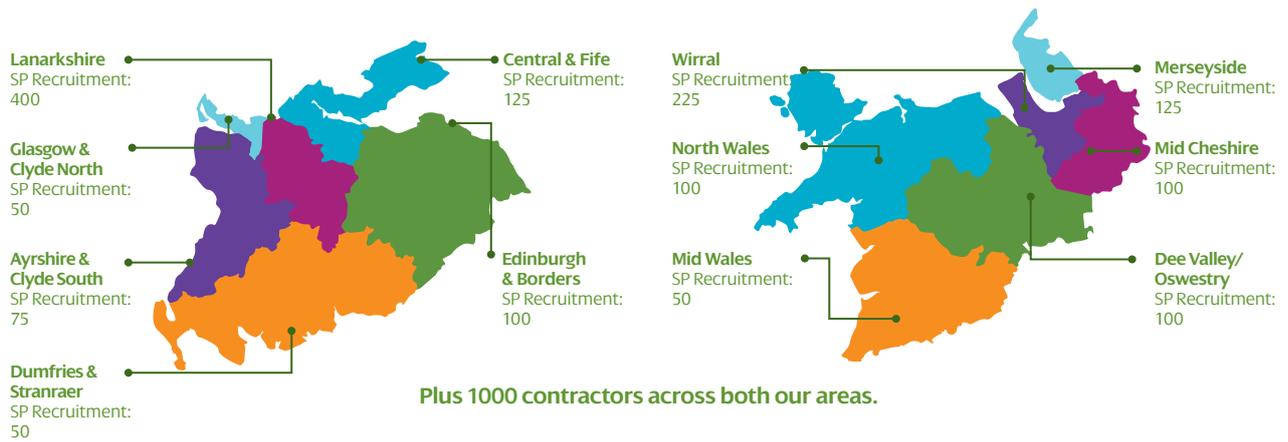
We have reviewed our recruitment and training programmes to ensure that we are ready to replace 1400 staff and make the required increases to support the changes in our investment plans.

Working with EU Skills and the other DNOs we have identified that the ageing profile of staff is a UK wide issue across the energy sector. Although our attrition level (the rate at which people leave the business for reasons other than retirement) of 1.82% is among the lowest in the UK, the large numbers required to replace those who are leaving means we need to recruit and train a whole new generation of highly skilled staff.

As well as replacing staff leaving through attrition or retirement we also need to recruit around 100 additional staff to support our commitments to deliver improved customer service, new programmes of work and increases to existing programmes.

**SPEN FTE changes through retirement and attrition**





We are changing our working practices to ensure that we are ready to meet the improved restoration of supply standard of service (restoration target in normal weather reduced from within 18 hours to within 12 hours), meaning that we will require greater staff cover outside normal working hours. In addition to this, we are changing our working practices to meet our improved time to connect targets. These together mean that we need to recruit an additional 40 staff (Jointers, Linesperson and Engineers).

In order to realize our aim of becoming one of the leading DNOs for the delivery of excellent customer service, we need to invest in 20 new staff in our call centres and control centres.

As our investment in our ageing network increases, we will need to invest in an additional 40 staff to support the delivery of increased investment, maintenance and inspection programmes.

We will recruit 1500 staff between now and 2023 across our 12 operational zones as shown in the maps above.

## How we are going to do it

In 2011 we implemented a workforce renewal programme and this dedicated programme team has taken on the responsibility for the recruitment, training and development of graduate trainees, engineering apprentices, craft apprentices and the up-skilling of existing staff to support our delivery in ED1.

This represents an investment programme — known as our workforce renewal programme — in excess of £60m over the period 2015 to 2023.

### Training programmes

Our training and recruitment programme for ED1 represents an unprecedented opportunity for us to shape our business to meet the challenges of the coming decades.

The majority of our recruits will begin as apprentices and graduates chosen from the local communities we serve. With this in mind, all of our training programmes are delivered in partnership with local colleges and through our in-house training centres, with trainees gaining practical experience through working within our business operations.

Our in-house training centre offering includes formal classroom sessions and practical workshop activities followed by field-based training and assessment. Using our innovative toughbook tablet devices, our trainees are able to build up electronic portfolios of their experience, which are assessed and externally verified.

Our training programmes include:

- *Graduate trainees — a 2 year programme providing graduates with on-the-job experience, a variety of work placements and technical/behavioural training, followed by a training year in post.*
- *Engineering apprentices — a 3 year pilot programme for school leavers with A levels or Highers. The programme aim is to develop and train engineering apprentices to operational engineering level through a combination of technical and behavioural learning.*
- *Craft apprentices — a 3 year programme. Apprentices work towards achieving industry recognised City & Guilds and NVQ qualifications in engineering as well as gaining on-the-job experience and taking part in behavioural learning.*

- *Adult craft trainees — an external programme developed to recruit semi- skilled individuals from other industries and upskill them to become qualified craftspersons within our industry. The programme provides a balance of academia (Diploma L2 in Electrical Power Engineering) and vocational skills through on-the-job training.*

These training programmes are supported by our collaboration with colleges and universities, ensuring that we are recruiting from our local communities. We participate in large-scale STEM (Science, Technology, Engineering and Mathematics) events that raise our profile within our local communities. We train our graduate and apprentice populations to become STEM ambassadors, giving them the necessary skills to engage with event attendees varying from primary school children to those changing careers, encouraging them to view a career in engineering as an exciting and valuable choice.

We deliver programmes to attract young people into our industry, including:

- *Career Academies*

- *A UK based programme which selects pupils with engineering aspirations, giving pupils taster sessions in engineering activities and four weeks' paid summer work. We work in partnership with Career Academy UK in our SPD license area and Fazakerley Engineering Specialist School in our SPM license area.*

- *Skills for Work*

- *A Glasgow-based programme focused on students with strong Science, Technology, Engineering and Mathematics (STEM) results. The aim is to gain a skill for work qualification in engineering over one year.*

- *Power Skills Programme*

- *A Glasgow-based partnership between ScottishPower and The Scottish Government, aimed at young people who have underachieved through traditional routes. Students work towards National Certificate level in Engineering Craft Skills.*

We sponsor further education programmes including:

- *Engineering Foundation Programme*

- *A pre-apprentice programme delivered across 3 locations — Glasgow, North West England and Edinburgh. Students gain level two electrical engineering qualification over one year. We deliver overhead lines, cable jointing, basic hand skills, fitting and first aid training. This programme acts as a technical feeder for our craft apprenticeship programme.*

- *Scholarship Programmes*

- *We currently invest in scholarship programmes to attract new candidates to the power sector by sponsoring students through their studies, including the Iberdrola Foundation programme where students are sponsored to complete a Post graduate course in a relevant Engineering discipline and our Power Academy scholarship programme in Scotland which is run in conjunction with the IET. We provide financial support to students and work placements with industry training.*

## Up-skilling and multi-skilling our workforce

We recognise the need to have a highly skilled, suitably authorised workforce, with the specialist skills to deliver more efficiently across our operational, maintenance and investment programmes.

We are continuing our up-skilling and multi-skilling programmes where we teach Craftsperson skills in another trade. In these programmes linespersons are taught jointing techniques whilst jointers are taught climbing practices. We have also included fitting activities in all of our Craftspersons training. This allows us to form smaller teams of staff who can effectively multi-skill to deliver shorter restoration and repair times and more effectively deliver our work programmes.

We have further developed these teams through increasing the levels of authorisation the Craftspersons have. This up-skilling activity has already seen considerable benefits in the delivery of our current work programmes and it is our plan to extend this into RIIO-ED1 at the end of which we will have both multi-skilled and up-skilled over 1,000 of our staff.

## Our training centres

We are one of the few DNOs to have retained our own operational and technical training centres. These centres provide essential training and authorisations for both our direct and contracting staff and are a key part of our delivery strategy for the future. Our increased programme of recruitment and upskilling in ED1 brings an increased need for training across our multi-disciplined workforce and we need to invest in upgrading our training facilities to meet this need.

We are investing £400K in each of our two training centres in Cumbernauld outside Glasgow, and Hoylake outside Liverpool, to upgrade facilities and provide new training apparatus and classrooms.

These improvements mean that the increased numbers of trainees recruited will attend training facilities offering an outstanding range of equipment and opportunities.

Proposals for enhanced facilities and training provision include:

- *Altering our workshops to enable increased class sizes.*
- *Recruiting five additional technical trainers.*
- *Recruiting 2 staff to support new trainees in their first-year residential period*
- *Providing additional locker rooms, shower rooms and drying areas*
- *Setting up an IT platform to enable trainees access to an e-library as a source of reference materials and record keeping.*
- *Purchasing additional and replacement resources to support training (climbing poles, substation equipment and MEWPS)*

We recruit from a wide geographic area to support operations across the breadth of our two license areas, but our recruits are initially trained in our central training centres. To reduce daily travel, protect the environment and minimize road risks, we provide accommodation for trainees while they attend our training centres and partner colleges.

### Our contracting partners

We deliver our work programmes using a combination of our own workforce and a network of contracting partners, through which we utilise approximately 2,500 contracting staff. This approach ensures we have the correct balance of insourced and outsourced resources available to deliver work efficiently and cost effectively.

Through our stakeholder engagement process we have recognised that our contractor partners are facing the same resourcing challenges we do. It is important that we work together to train and recruit new staff to replace those employees leaving the industry and support future investment and the achievement of improved customer service.

We are actively involved in the National Skills Academy for Power (NSAP) and through this relationship we have been a major influence in developing and supporting the Talent Bank initiative. Talent Bank is a UK wide pilot working in partnership with NSAP and ScottishPower's contractor population to train additional apprentices. Apprentices are trained and developed over two years before joining the industry either as direct staff or as a member of our contractor community.

Candidates work towards achieving industry recognised City and Guilds and NVQ qualifications in engineering.

Recognising that our contractor base performs a key role in the delivery of our programmes, we support colleges located in Dumfries and Bangor, North Wales to deliver training to contracting staff trainees. Working in partnership with these colleges, we have delivered two pilot programmes to enable them to offer this training as part of their curriculum activities, helping to mitigate the wider workforce shortfalls that our contractors are experiencing.

### We are a business where people matter

We are, and always will be, a business where people matter. At the end of 2012 we launched the Employee Deal. The Deal outlines a new approach to improving the ways that our employees interact with each other and with the business.

The Deal is as simple as a handshake, and just as powerful. It provides us with clarity about how we do things. It applies to everyone, at every level, and helps us ensure that we are able to offer employees the best value we can — for their career, their family and their community.

At the heart of The Deal is a single shared commitment:

### *We will all work together to make a world of difference*

By improving how we work together, The Deal is designed to improve the performance of the business.

Underlining this single shared commitment, The Deal is built upon a series of shared expectations that help our organisation and workforce to work better together to deliver more for our customers. These expectations are shared between the company and the individual.

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## 11

# Uncertainty

Our plans to manage areas of uncertainty, such as the uptake of low carbon technologies

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Our industry is entering a period of unprecedented change. We have described some of the opportunities these changes present but with these opportunities come some level of risk. We are a resilient business and confident in the strength of our plans.

## In this chapter:

- Uncertainty within ED1
- Low carbon technology uncertainty



# Uncertainty within ED1

## *We are a resilient business and confident in the strength of our plans*

We manage risk and uncertainty daily to ensure that our service remains reliable and represents the best value for money now and into the future. In putting together our business plan, we have used the most up-to-date information available to us and given our 'best view' of the investment we need to make during the ED1 period.

We proactively manage the risks to delivering our plans through our risk management and governance frameworks, however, we recognise that there are some uncertainties beyond our control. Where such uncertainties exist, we are able to propose financial mechanisms to help us manage them.

We have worked with Ofgem and other network companies to consider who is best placed to manage particular areas of uncertainty.

## **Risks to be managed by SP Energy Networks:**

DNOs are best placed to manage the forecasting risks of Load Growth, including Low Carbon Technologies and the further penetration of Renewable Distributed Generation.

For general load growth associated with economic growth, we have assumed a conservative 1% average over the ED1 period, although the detailed profile matches independent economic forecasts for low carbon costs.

Ofgem has provided the protection to customers and shareholders of a price control re-opener if costs fall outside the 80% to 120% range agreed by Ofgem.

## **Risks materially outside SP Energy Networks control**

We agree with the approach developed by Ofgem to provide pass-through of these items:

- *Business rates.*
- *Transmission exit charges (paid to National Grid).*
- *Distribution charges (from other DNOs).*
- *Historic pension deficits.*

We agree with the approach developed by Ofgem to provide uncertainty mechanisms:

### **Smart metering**

IT system costs / licensing costs for central UK systems. We agree with the approach to provide 100% funding of these uncertain costs until smart meters are fully rolled out and we will accept the challenge of delivering customer benefits outweighing those costs thereafter.

### **Service position modernisation to allow smart meter installation (eg customer accessible locations)**

We agree with Ofgem's proposed approach to provide funding upfront for an agreed level of costs and retrospective reconciliation of actual costs.

### **Streetworks costs**

Payments to councils / government (eg rental for road opening arising from changes in legislation). We agree with Ofgem that this should be subject to a price control re-opener when costs exceed 1% of revenue. We will manage the risk within this.

### **Corporation tax**

We have agreed with Ofgem that we will be exposed to changes in corporation tax up to a threshold of the greater of 1% tax rate or 0.33% of our revenues.

*We have worked with Ofgem to develop a set of uncertainty mechanisms that provide appropriate protection to customers and stakeholders*



# Low Carbon Technology Uncertainty

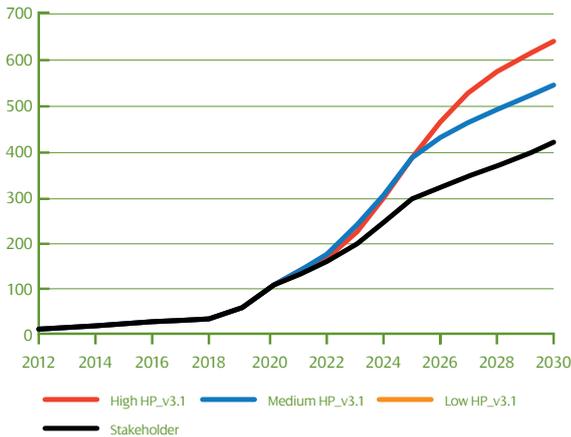
One of the new uncertainties that we have to manage during the period 2015-2023 is the adoption of low carbon technologies by customers. Department of Energy and Climate Change (DECC) has laid out four scenarios which would allow the UK to meet the Governments carbon reduction targets:

<b>Scenario 1</b>		<b>High emissions abatement in low carbon heat</b>
Medium levels of fuel efficiency	High levels of low carbon heat	High level of emissions reductions from uptake of low carbon heat in buildings and industry (8 million installations) with significant emission reductions from transport (60g CO <sub>2</sub> /km) and significant thermal insulation of buildings (5 million solid wall insulation).
High levels of low carbon heat	High levels of solid wall insulation	
High levels of solid wall insulation		
<b>Scenario 2</b>		<b>High emissions abatement in transport</b>
High levels of fuel efficiency	Medium levels of low carbon heat	High level of emissions reductions from transport (50g CO <sub>2</sub> /km), with comparatively lower reductions from low carbon heat (7 million installations) and significant thermal insulation of buildings (5 million solid wall insulation).
Medium levels of low carbon heat	High levels of solid wall insulation	
High levels of solid wall insulation		
<b>Scenario 3</b>		<b>High electrification of heat and transport</b>
High levels of fuel efficiency	High levels of low carbon heat	High electrification in heat and transport, with significant uptake of Electric Vehicles and heat pumps (as in scenario 1 and scenario 2) and lower comparative levels of insulation (2.5 million).
High levels of low carbon heat	Low levels of solid wall insulation	
Low levels of solid wall insulation		
<b>Scenario 4</b>		<b>Credit purchase</b>
Low levels of fuel efficiency	Low levels of low carbon heat	More than one key technology under-delivers, and carbon credits are purchased. It assumes 1.6 million low carbon heat installations, medium levels of insulation (4.5 million) and fuel efficiency of 70g CO <sub>2</sub> /km.
Low levels of low carbon heat	Medium levels of solid wall insulation	
Medium levels of solid wall insulation		

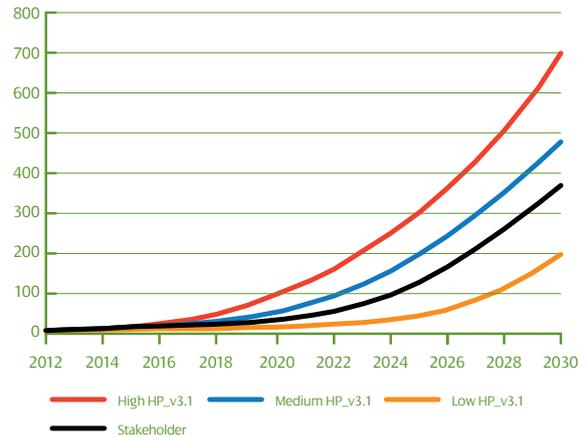
Scenarios 1 to 3 will have an impact on our electricity distribution network and we need to be ready to deal with each of these scenarios should they occur:

SP Distribution Area

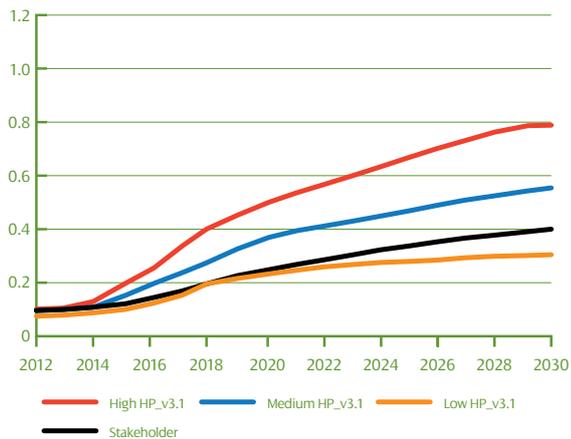
Domestic Heat Pumps (in 1,000's)



Domestic EV Charging (in 1000's)



Photovoltaics (1,000,000's)



Technology by household	Low	Med	High	Best view
Heat Pumps	6 %	14 %	14 %	12 %
Electric Vehicles	2 %	5 %	8 %	4 %
Photovoltaics	2 %	4 %	5 %	3 %

Each scenarios has a potential significant impact on our related investments and our resourcing requirements.

We have carried out extensive analysis and engaged with stakeholders to identify our 'best' view of the future. We have used this as the basis of our business plan. We have worked with industry developed models to assess the impact on our networks. We have provided details of this work and how it has shaped our investment plans in Chapter 9 — Our expenditure forecast.

At our Phase 2 stakeholder events, we engaged with stakeholders on which of DECC's low carbon scenarios would be most appropriate for us to plan our investments around. We also sought feedback on the whether to adopt High, Medium or Low scenarios for the three key elements of heat pumps, electric vehicles & charging points and photovoltaics through the use of audience response voting.

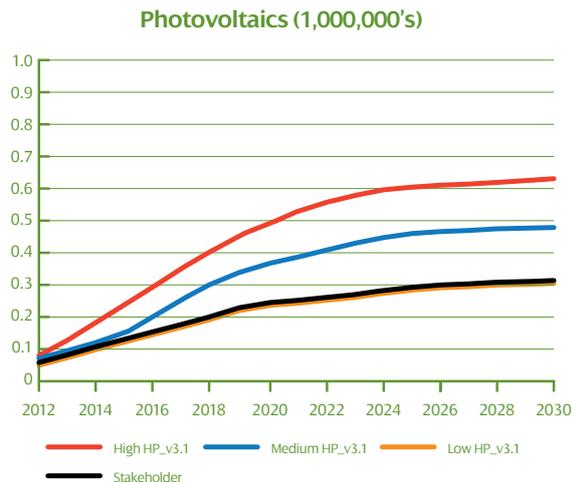
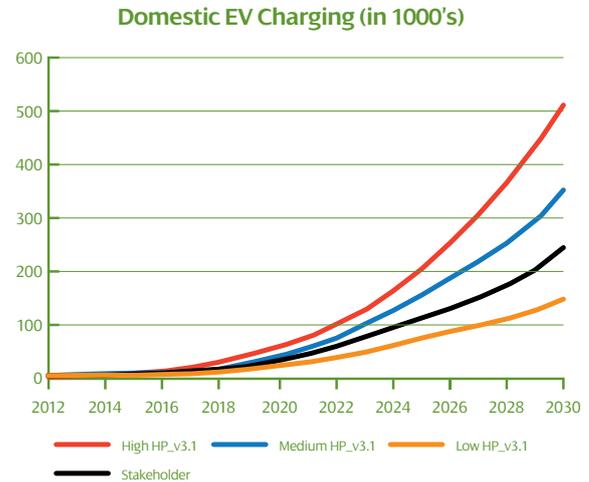
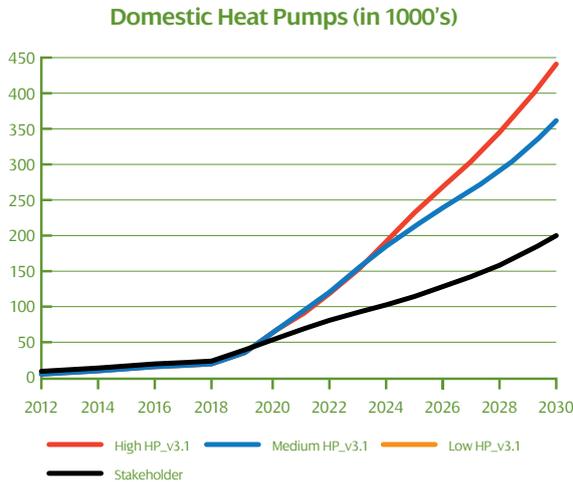
Stakeholders voted in support of our proposal for a scenario that had a medium forecast against each of the elements with over 70% of the votes at each of the events.

However this contradicted voting on the individual components which tended to support the low and medium scenarios. We used voting on the individual components to derive a new scenario which better reflects stakeholder views.

Our plan includes a domestic customer uptake of low carbon technologies as follows (by 2023):

- 620,000 solar panels (photovoltaics) (3% of households)
- 310,000 heat pumps (9% of households)

SP Manweb Area



Technology by household	Low	Med	High	Best view
Heat Pumps	4 %	9 %	9 %	6 %
Electric Vehicles	2 %	6 %	9 %	4 %
Photovoltaics	2 %	3 %	4 %	2 %

• 130,000 electric vehicles (4% of households)

Included within our plans are around £100M of investment to allow customers to use these new electrical devices, however if the highest scenario was to become reality we would need to invest over £300M.

Ofgem has proposed a 'reopener' mechanism for load related investments that provides protection to both investors and customers if our investment needs vary materially from our forecasts, and we agree that this provides an appropriate balance of risks.

We believe that the most efficient way to manage this uncertainty is through a balance of using contracting resources (to minimise costs and maximise flexibility) and applying technical and commercial innovation to minimise the physical works that are both time consuming and expensive.

Our innovation strategy has been developed with this requirement clearly in mind. Refer to Chapter 7 — Our innovation strategy.

Our assumptions on energy efficiency improvements are an important factor within our Business Plan. We have assumed a degree of general electrical appliance energy efficiency improvements throughout the ED1 period. We will monitor Government policy on energy efficiency and will take the opportunity to promote general energy efficiency improvement measures with our stakeholders as part of our future stakeholder engagement activities.

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# Financing our plan efficiently

Setting our competitive financial package to attract and retain funding from our investors

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In this chapter we justify the financial arrangements within our business plan.

Given that much of our evidence is relatively technical, we provide our full detail and analysis within Annex 3.1 — Efficiently financing our plans and our detailed financeability scenarios. To fully understand the justification of our financing plan, Annex 3.1, which has been prepared as a standalone document should be read in full. This chapter (also a standalone document) is a summary of that detail and should be accessible to a wider range of stakeholders.

## In this chapter:

- Overview
- Allowed return
- Evolution of the regulatory asset value
- Financial policies



# Overview

	SP Distribution	SP Manweb
Cost of Equity	6.7%	6.7%
Cost of Debt	iBoxx 10 year trailing average	iBoxx 10 year trailing average
Notional gearing	65%	65%
Financeability Adjustment	None	None
Capitalisation rate	80%	80%
IQI	Includes 'fast track' income in financeability tests	Includes 'fast track' income in financeability tests
Dividend	5%	5%
Credit rating	A3/ Baa1	A3/Baa1
Other policies	Per Ofgem	Per Ofgem
Customer Bill Impact	P0 +11% then flat in real terms	P0 –16% then flat in real terms

This chapter considers the overall financeability proposal within our business plan. We propose a financing plan for each of SP Distribution and SP Manweb that is efficient and adheres to Ofgem policies laid out in its Strategy Decision document, that is consistent with RIIO principles and, in particular, ensures financeability at a comfortable investment grade credit rating but no higher. This chapter also tackles the question of what is the appropriate cashflows for the businesses and return to shareholders.

**Given that much of our evidence is relatively technical, we provide our full detail and analysis within Annex 3.1. To fully understand the justification of our financing plan Annex 3.1 which has been prepared as a standalone document should be read in full. This chapter (also a standalone document) is a summary of that detail and should be accessible to a wider range of stakeholders.**

We have also taken into consideration the views of customers, investors and other stakeholders in preparing our plan. In addition, to support the process of assessing financeability we have engaged economic consultants including NERA, First Economics and OXERA and clearly reference throughout the section the other guidance to which we have referred.

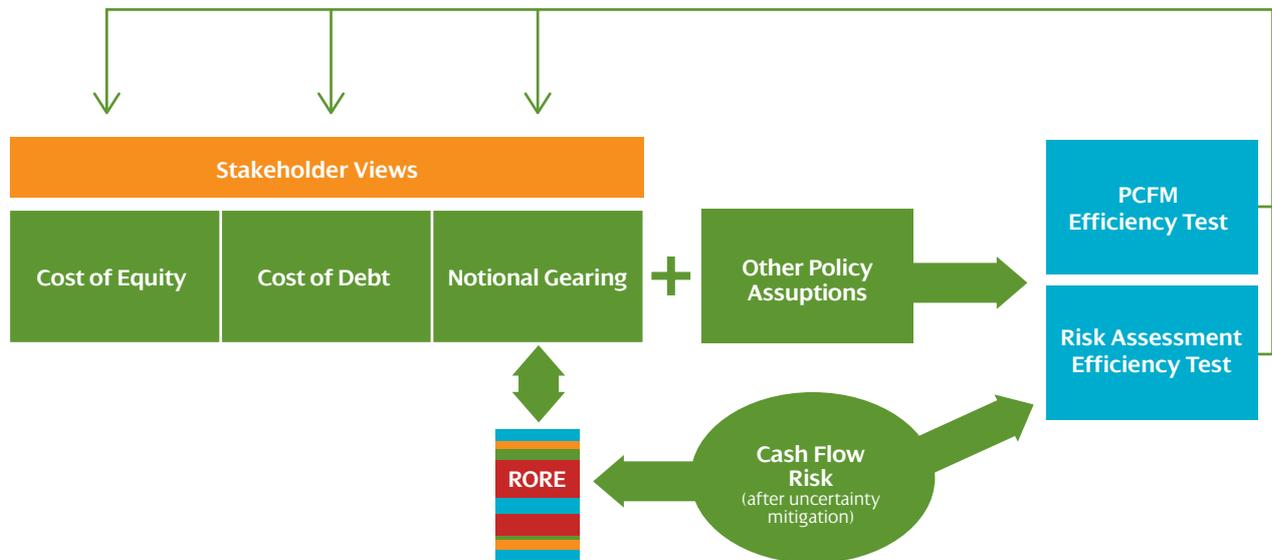
Ofgem have a statutory duty to ensure that DNOs are financeable, meaning that they are allowed sufficient cash flow to pay interest and dividends to the providers of finance. It is our DNOs responsibility to demonstrate that our financing plan is 'efficient' i.e. requiring no greater cash flow than is necessary to be 'financeable'.

Our base financial plan gives a credit rating of A3. We then considered further external risk which arguably yield one notch lower.

## Structure & Objectives of this chapter:

- *In our **Allowed return** section we provide justification for the allowed return used in our business plan. This takes up the bulk of this chapter.*
- *Firstly we present a range of stakeholder views around the topic on financing costs to provide context for our other analysis.*
- *Next we consider the cost of equity based on economic and financial principles.*
- *On the cost of debt we discuss how we have adopted Ofgem policy without alternative weighting or transition.*

- Next we consider notional gearing. At this stage we introduce cash flow risk and test that our proposal delivers acceptable upside and downside potential from the price control package using Return on Regulatory Equity (RoRE) analysis.
- Next we test that our plan is financeable. Here we present results from the Price Control Financial Model and carry out 'static' (or in other words non-probabilistic) testing to ensuring an expectation of a comfortable investment grade credit rating — but no higher.
- Finally we further test the efficiency and financeability of our plan by conducting a comprehensive probabilistic risk analysis using a framework developed in conjunction with our advisers NERA to test our plan against external shocks.
- In **Evolution of the regulatory asset value** we present our plan assumptions around capitalisation and regulatory depreciation.
- In **Financial policies** we discuss how we have adopted Ofgem's financial policies concerning the treatment of taxation and pension costs.
- Our structured approach can be illustrated as follows:



# Allowed Return

## In this section:

- Stakeholder views
- Cost of equity
- Cost of debt
- Notional gearing and return on regulatory equity
- Financeability
- Risk assessment



In this section we set the key financing components of allowed return in our business plan. We then take these out alongside other financing assumptions and present the results alongside our efficiency tests. In other words, against a backdrop of stakeholder opinion we move in stages from economic and financial principles through to a full probabilistic risk assessment.

We have replicated Moody's<sup>1</sup> approach to credit ratings to ensure that our overall proposal is financeable and efficiently so.

## Stakeholder Views

In formulating our proposals around the allowed return we have taken into account the views of both investors and other stakeholders. Our stakeholder engagement has included the investor community and also stakeholder views expressed via Ofgem's "Consultation on strategy for the next electricity distribution price controls — RIIO-ED1 — Financial Issues".

Other stakeholders have expressed interest in the absolute level of the resultant customer bill, as well as predictability and volatility of charges rather than the specific financial policy decisions.

Our stakeholder engagement has included:

- *A careful review of comments received to Ofgem's RIIO-ED1 Strategy Consultation.*
- *An investor survey targeted at both equity and debt investors and brokers.*
- *A review of broker comments at the time of the publication of the RIIO-GD1 and RIIO-T1 initial proposals (this was the point at which the gearing and allowed Cost of Equity were announced and did not change for the final proposals).*

- *We also analysed the market's reaction by reviewing National Grid's share price performance versus the FTSE-100 and the Dow Jones STOXX Utilities index for the days immediately after the publication of these initial proposals.*

This engagement has identified that stakeholders are in broad agreement on the identified credit metrics and, where opinions have been given, generally stakeholders believed that a low single A credit rating should be targeted. There was also broad support for Ofgem's approach to calculating the cost of debt.

Our stakeholder engagement identified two areas where stakeholders' views differ significantly: Cost of Equity and Notional Gearing. Some stakeholders believe a higher gearing than 65% may be appropriate. One supplier indicated that the appropriate Cost of Equity could be lower than the top end of the range suggested by Ofgem.

<sup>1</sup> Moody's Investors Service (2009) "Rating Methodology — Regulated Electric and Gas Networks", August



However our investor survey results indicated that the investor community believe that an appropriate gearing level would be in the 60-65% range and that an appropriate cost of equity would be in the top half of Ofgem's indicated range.

On the whole and after careful consideration of all of our stakeholders' opinions, we consider that our base assumptions included within this Business Plan strike an appropriate balance for all stakeholders while ensuring our business is financeable under a range of assumptions.

## Cost of equity

The cost of equity is the return required by shareholders for bearing the residual risk, after the operation of risk sharing and uncertainty mechanisms. It is the minimum return needed to attract and retain equity finance for our distribution businesses, which is essential to fund the necessary investment to deliver the outputs that our customers require and to facilitate the transition to a low carbon economy. We estimate the cost of equity to be 6.7% real, post-tax.

In estimating the cost of equity, we have taken into account:

- *Theoretical asset pricing models*
- *Market evidence*
- *Regulatory precedents*
- *Views of stakeholders*

We also reflect on the views of and evidence from Ofgem's advisors.

### Asset pricing models

Ofgem's preferred framework is the Capital Asset Pricing Model (CAPM). This derives the cost of equity by adding the company or sector risk premium to the risk free rate. The risk premium is calculated by applying a measure of relative risk, known as the "beta" factor, to the risk premium for the stock market as a whole. Formally, the CAPM equation for the cost of equity is:

$$\text{cost of equity} = (\text{risk free rate}) + \text{beta} \times (\text{equity market risk premium})$$

The risk free rate has traditionally been estimated from long run averages of yields on index linked gilts. However, these have become distorted successively by pensions' regulations, quantitative easing, the Eurozone sovereign debt crisis and the "flight to quality".

For the purposes of our CAPM estimate, we have taken the real risk free rate to be 2%, which is consistent with the 10 year average on index linked gilts, prior to the implementation of quantitative easing. As shown later in Table 4, this is also consistent with recent regulatory precedents.

The equity market risk premium is assumed to be 5%, which is consistent with the long run arithmetic average for the UK.

The equity beta is estimated to be 0.94 which is within Ofgem's proposed range for RII0-ED1 and implies an asset beta of 0.33 at 65% gearing.



We note that this asset beta is at the bottom end of the range of 0.33 to 0.44 estimated by NERA but we understand that NERA have used a “Blume<sup>2</sup> adjustment” to estimate their betas, which assumes that equity betas revert to one over time.

However, in their report for Ofgem, Imrecon reject the use of the Blume adjustment for regulated network companies and they assert:<sup>3</sup>

*“Blume adjustments are generally, and rightly, rejected by regulators. There appears to be no justification for applying them to betas in the network sector.”*

NERA’s analysis shows that (unadjusted) equity betas for individual UK energy and water network companies, at a notional gearing level of 65%, lie in the range of 0.6 to 1.0 during the last year but 0.7 to 1.7 in the three years up to October 2010. However, these beta estimates are not stable over time.

<sup>2</sup> Blume, M (1971) “On the assessment of risk”, *Journal of Finance*, March; and Blume, M (1975) “Betas and their regression tendencies”, *Journal of Finance*, June

<sup>3</sup> Imrecon (2012) “RIIO reviews — Financeability study”, November, page 25

In their assessment of relative risk, Oxera conclude<sup>4</sup> that asset risk may be higher in RIIO-ED1 and suggest a beta range of 0.95 to 1.20 at 65% gearing. However, consistent with RIIO-T1 and GD1, we use the capex/RAV ratio and the potential spread of return on regulatory equity (RoRE) as our primary indicators of relative risk.

Similarly, in their assessment of relative riskiness First Economics’ conclude:<sup>5</sup>

*“the DNOs are likely to be among the more risky regulated networks from the perspective of equity investors.”*

Nevertheless, we note that, unlike the water and sewerage sector, electricity DNOs are not traded as separate entities. It is therefore a matter of judgement as how best to estimate and interpret betas obtained from larger groups and comparators.

<sup>4</sup> Oxera (2013), “RIIO-ED1 Risk assessment framework”, April 10th

<sup>5</sup> First Economics (2012), “The Riskiness of the Electricity DNOs under RIIO Relative to Other Regulated Networks”, August

Combining these CAPM components, we calculate the cost of equity to be 2% + (0.94 x 5%) = 6.7% real, post-tax.

This is consistent<sup>6</sup> with Oxera who have estimated that 6.7% is likely to be the minimum cost of equity for RIIO-ED1.

We have cross checked this against other approaches, including:

- *Forward looking estimates*
- *Dividend Growth Model (DGM)*
- *Total market return*

### Forward looking estimates

The onset of the financial crisis in 2008 brought an end to the ‘Great Stability’ period, making prospects for UK and global economic growth appear not just weaker, but more uncertain. This elevated uncertainty is likely to have adversely affected spending decisions and contributed to the depth of the recent recession and the weakness of the recovery.

<sup>6</sup> Oxera (2012), “Determining efficient financing costs for RIIO-ED1”, September 3rd

**Table 1: Equity risk premium estimates over different time horizons (%)**

	Spot	1Y	2Y	5Y	10Y	Long-Run (DMS)
Bloomberg	9.9	9.7	10.1	9.7	n/a	5.0
Bank of England	c.7.25	c.7.0	c.6.0	c.5.5	c.5.0	
German Bundesbank	c.10.0	c.9.5	c.8.5	c.7.5	n/a	

Sources: Bloomberg, Bank of England Financial Stability Report, June 2012, Bank of England Quarterly Bulletin 2010, Q1 and German Bundesbank, Monthly Report November 2012.

Notes: Underlying data for BoE and German Bundesbank report not publicly available (averages estimated). No provider publishes the exact calculation behind its model. Bundesbank Monthly Report February 2013 contains estimate of total market returns but not explicitly the ERP. DMS refers to data compiled by Dimson, Marsh and Staunton, who are authors of the Global Investment Returns Yearbook and Sourcebook published by Credit Suisse.

Furthermore, during periods of heightened uncertainty, investors require greater compensation as insurance against future risks.

KPMG derives the equity market risk premium by assessing current income, growth expectations and current prices. The general Discounted Cash Flow (DCF) formula is then used to solve for the implied discount rate that reconciles these parameters. Deducting the risk-free rate from this implied discount rate will yield an implied equity market risk premium. KPMG conclude:<sup>7</sup>

*"equity market risk premia have been relatively stable before 2008, after which all equity market risk premia have significantly increased and have stabilised around 6.5%."*

NERA have also considered forward looking estimates of the equity risk premium (ERP) which are summarised in the following table.

We note that all providers use slightly different long-run growth rates and

discounting assumptions and that there is no agreed method in the literature that would support one provider's approach over another. Table 1 shows that all current estimates of the ERP are higher than the long-run estimate of 5.0%. This is in line with expectations, as current estimates of the risk-free rate are lower and these two parameters are known to move in opposite directions.

On a forward looking basis, the Bank of England's higher risk premium of around 7.25% offsets the currently negative real interest rates to give the same estimate of the cost of equity of  $-0.1\% + 0.94 \times 7.25\% = 6.7\%$  real, post-tax.

<sup>7</sup> KPMG (2013), "Equity Market Risk Premium — Research Summary", January

**Table 2: European energy network companies' DGM-derived real cost of equity (zero growth, actual gearing, post-tax)**

Company	2010	2011	2012	Average
National Grid PLC	8.1%	6.6%	6.0%	6.9%
SSE PLC	7.7%	6.0%	6.5%	6.7%
Terna SPA	6.3%	6.4%	7.2%	6.6%
ACEA SPA	n/a	8.6%	6.7%	7.7%
SNAM SPA	7.2%	6.4%	7.9%	7.2%
Red Electrica Corporacion SA	8.5%	7.7%	8.4%	8.2%
Gas Natural SDG SA	9.4%	6.9%	9.1%	8.5%
Enagas SA	8.4%	8.7%	8.8%	8.7%
UK energy sample average	7.9%	6.3%	6.2%	6.8%
Total average real CoE	8.0%	7.2%	7.6%	7.57%
Average gearing D/(D+E)	52.1%	50.3%	57.0%	53.2%

Source: NERA analysis of Bloomberg data.

## Dividend Growth Model

An alternative approach is to use the Dividend Growth Model (DGM). This is the alternative to the CAPM for calculating the cost of equity that is widely used in US regulatory proceedings. The DGM derives the cost of equity by computing the discount rate that equates a stock's current market price with the present value of all future expected dividends.

Table 2 shows the results of the DGM-derived real cost of equity for a sample of European energy network companies, using Bloomberg consensus analysts' short term DPS forecasts for the first three years but zero growth thereafter.

**Table 3: European energy network companies' DGM-derived real cost of equity (g = GDP growth, actual gearing, post-tax)**

Company	2010	2011	2012	Average
National Grid PLC	10.1%	8.4%	7.8%	8.8%
SSE PLC	9.6%	7.9%	8.2%	8.6%
Terna SPA	7.8%	7.8%	8.3%	8.0%
ACEA SPA <sup>8</sup>	n/a	10.0%	7.9%	8.9%
SNAM SPA	8.7%	7.8%	9.0%	8.5%
Red Electrica Corporacion SA	10.0%	9.1%	9.5%	9.5%
Gas Natural SDG SA	10.9%	8.4%	10.2%	9.9%
Enagas SA	9.9%	10.1%	9.9%	10.0%
UK energy sample average	9.9%	8.2%	8.0%	8.7%
Total average real CoE	9.6%	8.7%	8.9%	9.05%
Average gearing D/(D+E)	52.1%	50.3%	57.0%	53.2%

Source: NERA analysis of Bloomberg data.

Table 3 repeats the analysis but uses forecast long run real GDP growth rate for UK and the Euro-zone respectively at time of valuation for the subsequent years.

In its report<sup>9</sup> for Ofgem, FTI Consulting undertook its own analysis using the DGM and concluded:

*"As a cross-check using the DGM, we estimated a reasonable range for the cost of equity for National Grid PLC to be 6.8% to 8.6%, and a reasonable range for SSE to be 6.3% to 8.1%. These estimates are for the listed companies. We have not attempted to use these to develop specific estimates of the network companies' cost of equity. We conclude that the range of estimates using a DGM is consistent with Ofgem's range of estimates of the cost of equity using the CAPM."*

We observe that FTI's estimates for National Grid and SSE are similar to NERA's.

We conclude that our 6.7% cost of equity is at the lower end of the range of estimates produced by the DGM for comparator companies.

<sup>8</sup> Acea SPA omitted its dividend payment in 2010.

<sup>9</sup> FTI Consulting (2012), "Cost of capital study for the RIIO-T1 and GD1 price controls", 24 July

## Total market return

As Smithers & Co noted<sup>10</sup>, the overall market return is more stable than the individual components of the CAPM.

Stephen Wright, a joint author of the Smithers' reports has recently again endorsed this approach in evidence<sup>11</sup> to the Australian Energy Regulator (AER).

Alan Gregory (formerly reporting panel member of the UK Competition Commission, from 2001-2009, and currently an External Advisor to the UK Competition Commission's Finance and Regulation Group) in his own recent evidence<sup>12</sup> to the AER also supports this approach.

The arithmetic average total market return is 7.1%, which is calculated from UK data from the Credit Suisse Global Investment Returns Sourcebook 2013.

For TPCR4, Smithers' estimated<sup>13</sup> the implied arithmetic mean for total market returns using an adjustment to the geometric mean to reflect the volatility of market returns:

Arithmetic Total Market Return =  
Geometric Total Market Return + ½  
Equity Market Variance

Updating Smithers' approach with UK data from the Credit Suisse Global Investment Returns Yearbook 2013 gives:

<b>A</b>	Geometric Mean returns (1900-2012)	5.2 %
<b>B</b>	Standard Deviation returns (1900-2012)	20 %
<b>C</b>	Variance of returns (= B <sup>2</sup> )	4.0 %
<b>D</b>	½ Variance (= C/2)	2.0 %
<b>E</b>	<b>Implied Arithmetic mean return (= A+D)</b>	<b>7.2 %</b>

## Other models

In view of Ofgem's and FTI Consulting's criticisms of the Residual Income Model (RIM) and the Intertemporal Capital Asset Pricing Model (ICAPM), for example, Brennan and Xia<sup>14</sup> (2006), we have not relied on these approaches.

In using the same cost of equity as set for DPCR5, we have reflected Ofgem's view that the increase in the length of the price control for RIIO has not increased systematic risk as measured by the CAPM beta.

Nevertheless, we note that the CAPM is a single period model and, therefore, not designed to assess multi-period issues, such as those arising from a longer price control period.

## Market evidence

We are aware that some commentators attempt to draw conclusions from the relation between market values and the regulatory value attributed to the RAV. Although a few water and sewerage companies are still quoted on the London Stock Exchange and it is possible to track the Market to Asset Ratio (MAR) i.e. market capitalisation value relative to the RCV: this fluctuates markedly.

Since PR09, MARs have averaged between 1.0 and 1.1 for the average of all of the listed water companies. However, for individual companies the pattern is more volatile and the range of MARs varies between 0.85 and 1.15. Some of this range is a function of the variability of estimates of the value of the non-regulated businesses, especially for Pennon.

Moreover, unlike the water sector, there are no continuously traded entities that solely reflect the value of electricity DNOs. For electricity DNOs, there are only occasional changes of ownership and these are generally accompanied by claims that the new owners will improve performance.

Furthermore, the highest bid premiums have been associated with highly leveraged transactions at a time of exuberance in the credit markets and these now face substantial refinancing risks.

We note that Imrecon, in their financeability study<sup>15</sup> for Ofgem concluded:

*"We consider that high equity valuations provide some corroborating, but not primary, evidence for the cost of capital. We do not believe it is appropriate to place significant weight on them."* 16

<sup>10</sup> Smithers & Co. Ltd.(2003), "A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K.", 13 February

<sup>11</sup> Wright, S (2012), "Review of Risk Free Rate and Cost of Equity Estimates: A Comparison of UK Approaches with the AER", 25 October

<sup>12</sup> Gregory, A (2012), "The AER Approach to Establishing the Cost of Equity — Analysis of the Method Used to Establish the Risk Free Rate and the Market Risk Premium", 5th November

<sup>13</sup> Smithers & Co. Ltd., "Report on the Cost of Capital — provided to Ofgem", 1 September 2006

<sup>14</sup> Brennan, M and Xia, Y (2006), 'Risk and valuation under an Intertemporal Capital Asset Pricing Model', *Journal of Business*, 79:1

<sup>15</sup> Imrecon (2012) "RIIO reviews — Financeability study", November, page 24

<sup>16</sup> Joint Regulators Group (JRG), (2013), *Cost of Capital and Financeability*, Table 3.1, March

**Table 4: Real risk-free rates used in recent price controls**

Decision Year	2006	2007	2007	2008	2008	2009	2009	2010	2011	2011	2011	2012
Price Control	Ofgem: TPCR4	CAA: Heathrow	Ofgem: GDPCR	ORR: PR08	CAA: Stansted	Ofwat: PR09	Ofgem: DPCR5	CAA: NATS	Ofcom: MCT	Ofcom: WBA	Ofgem: TPCR4	Ofgem: RIIO T1/GD1
Risk-free rate	2.5 %	2.5 %	2.5 %	1.8 %	2.0 %	2.0 %	2.0 %	1.75 %	1.5 %	1.4 %	2.0 %	2.0 %

Source: Joint Regulators' Group<sup>16</sup>

**Table 5: Market risk premia used in recent price controls**

Decision Year	2006	2007	2007	2008	2008	2009	2009	2010	2011	2011	2011	2012
Price Control	Ofgem: TPCR4	CAA: Heathrow	Ofgem: GDPCR	ORR: PR08	CAA: Stansted	Ofwat: PR09	Ofgem: DPCR5	CAA: NATS	Ofcom: MCT	Ofcom: WBA	Ofgem: TPCR4	Ofgem: RIIO T1/GD1
Market risk premium	4.5 %	4.24 %	4.75 %	5.0 %	4.67 %	5.4 %	5.25 %	5.25 %	5.0 %	5.0%	5.0 %	5.25 %

Source: Joint Regulators' Group<sup>17</sup>

We conclude that the past premia paid for electricity DNOs are not a reliable indicator of the forward looking cost of capital.

### Regulatory precedents

The risk-free rates and market risk premia used by regulators are set out in Tables 4 and 5.

As regards the real risk free rate, there is broad consistency across sectoral regulators, although Ofcom takes a slightly different approach due to factors that specifically affect the telecommunications sector. Unlike other regulators, Ofcom sets price controls using nominal returns and of shorter length — typically three years — so it places more weight on shorter term averages and forward rates.

Most regulators take a long term view on the appropriate market risk premium, although some allowance has been made for the impact of the Credit Crisis.

### Dividend Yield

We have assumed a dividend yield of 5% on the notional equity proportion of the RAV. This is again consistent with Ofgem's assumptions for DPCR5 and RIIO-GD1.

Observed dividend yields for UK network comparators lie within the range 4.4% to 5.5% with energy companies notably having a higher dividend yield than water companies.

**Table 6: Dividend yields for UK network comparators**

Company	Dividend Yield
National Grid	5.1%
SSE	5.5%
Pennon	4.5%
Severn Trent	4.4%
United Utilities	4.8%
Average	4.9%

There are several economic theories which show that dividend policy does matter to investors, including:

- *clientele effects*<sup>18</sup>
- *signalling and asymmetric information*<sup>19</sup>
- *term premium*
- *agency theory*<sup>20</sup> and free cash flow

<sup>18</sup> Scholz, John Karl, *A Direct Examination of the Dividend Clientele Hypothesis*. *Journal of Public Economics* 49, 261–285, 1992

<sup>19</sup> Bhattacharya, S. *Imperfect information, dividend policy, and "the bird in the hand" fallacy*. *Bell Journal of Economics*, 10, 259-270, 1979

<sup>20</sup> Easterbrook, F. H. *Two agency-cost explanations of dividends*. *American Economic Review*, 74, 650-659, 1984

<sup>17</sup> *ibid.*, Table 3.2



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## Conclusion

Following detailed modelling and consideration of advice from economic consultants we estimate the cost of equity to be 6.7% real, post-tax. We have cross-checked this estimate using a variety of approaches that also support 6.7%.

We believe this appropriately balances the, unsurprisingly, differing views of investors and suppliers and is consistent with Ofgem's determinations for DPCR5 and RIIO-GD1.



## Cost of Debt

We accept Ofgem's proposed index for the cost of debt. This is calculated from the ten year rolling average of the yields on iBoxx A and BBB rated sterling non-financial bond indices, with a maturity of more than ten years, less the "break even inflation rate", calculated from UK index linked gilts.

In our business plan we have based our modelling on a cost of debt of 2.92% per annum as prescribed by Ofgem for comparability reasons.

Nevertheless, we believe that a longer trailing average period would be more reflective of DNOs' actual cost of debt, as bonds issued more than ten years ago will drop out of the cost of debt index.

Consequently, there will be risk of a significant mismatch between the cost of debt index and the actual cost of debt. DNOs are obliged to continue to pay the coupon on bonds which they have issued until they are redeemed, which in many cases extend beyond ten years.

Ofgem's analysis of the cost of debt index has focused on the comparison of the coupon on DNO debt with the cost of debt index, as at the date of issue. However, this ignores subsequent movements in the cost of debt index relative to the fixed coupon. The allowed cost of debt index is forecast to continue to decline for the foreseeable future, whereas DNOs will continue to pay the same fixed coupon until the bond matures.

Oxera have identified a number of ways in which a DNO remains exposed to the risk that the cost of debt index does not match that incurred by the DNO. These include:

- *Frequency of debt issuance*
- *Re-financing profile*
- *RAV growth*
- *Intra-year volatility of yields*
- *Time varying inflation risk premium*

Oxera conclude<sup>21</sup>:

*"A number of factors suggest that the exposure to the cost of debt risk will not be zero under indexation. Debt indexation may actually increase the exposure to cost of debt risk compared with a fixed cost of debt allowance. For example, for companies whose debt costs are largely fixed over the price control period, annual updating of the cost of debt allowance will introduce additional uncertainty around the difference between the allowed and the actual cost of debt."*

Similarly, First Economics have advised that:

- *For DNOs, the cost of debt index is likely to over-react to changes in market interest rates<sup>22</sup>*

<sup>21</sup> Oxera (2012), "RIIO-ED1 consultation on strategy — Financial issues, November 16th

<sup>22</sup> First Economics (2012), "Ofgem's Cost of Debt Index and the Cost of Equity" 8th June



- *“Break-even inflation” is not a sufficiently robust or accurate measure to calculate the real cost of debt<sup>23</sup>*

- *DNOs’ recent experience of debt issuances calls into question the extent to which ‘headroom’ will exist in future to pay for items that are missing from Ofgem’s cost of debt formula<sup>24</sup>*

### Conclusion

We have no strong justification to depart from Ofgem’s policy on cost of debt therefore we have implemented the iBoxx 10 year trailing average in accordance with Ofgem’s guidance.

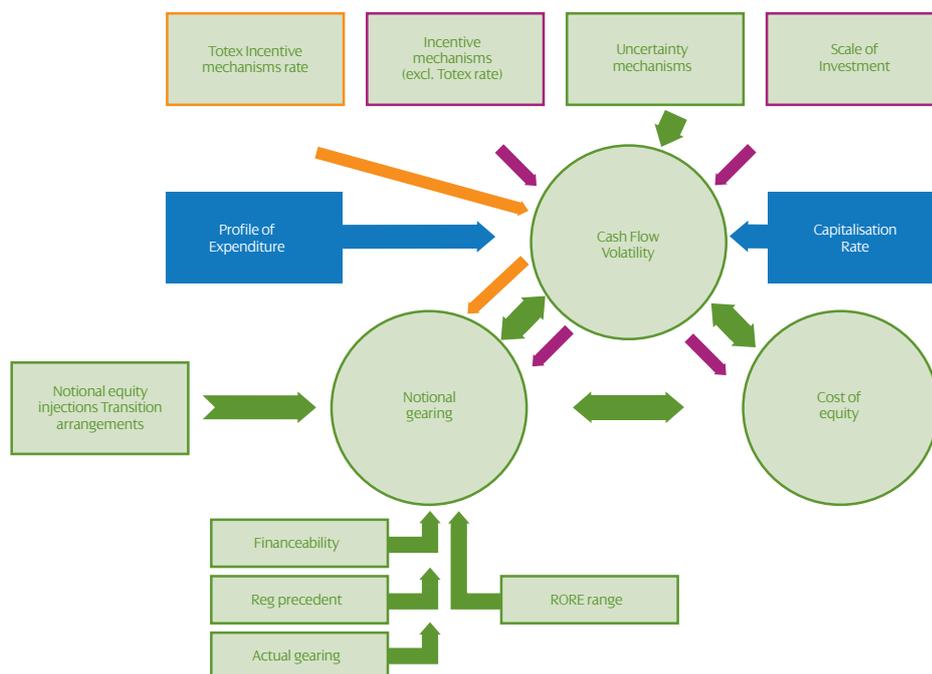
We note that Ofgem has considered these issues and concluded that the methodology for calculating the cost of debt utilised in RIIO-GD1 and RIIO-T1 remains appropriate for RIIO-ED1.

In line with Ofgem’s generic assumption, our financial modelling assumes that our debt portfolio includes 25% of index-linked debt. We understand that this is reflective of the extent to which network companies typically rely on index-linked debt to fund their activities.

<sup>23</sup> First Economics (2012), “Indexation of the Cost of Debt and Inflation”, 8th June

<sup>24</sup> First Economics (2012), “Benchmark vs Actual Cost of Debt in 2011”, 8th June

Figure 7: Setting notional gearing



## Notional Gearing & Return on Regulatory Equity (RORE)

In this section we assess notional gearing in the context of the financial benefits and penalties that are available to the network companies in RIIO-ED1 from outperforming or underperforming the price control assumptions.

The issues and interactions in setting notional gearing are many. The diagram above expands on Ofgem’s RIIO-ED1 Strategy Decision<sup>25</sup> methodology diagram to show the wider range of interactions.

We aim to ensure that given various externally determined factors, the idiosyncratic risk for a notional average network business at a given level of gearing will, when exposed to the full range of RIIO-ED1 incentives and external risk, lead neither to excessive returns for shareholders nor to financial distress.

We introduce a central base scenario for gearing of 65% along with two alternatives of plus and minus 5%.

Precedent has demonstrated that in the recent past gearing of 65% was broadly consistent with the target credit rating of A – Baa for a typical UK Distribution business

A notional gearing of 65% was accepted by DNOs at DPCR5. This level was accepted by Gas DNOs at the recent RIIO-GD1 review. Moody’s see no appreciable increase in risk in the transition to the RIIO-GD1 regulatory framework and other stakeholders have said that they do not see any compelling reasons for a reduction in notional gearing levels from those used in DPCR5.

The scale of investment during RIIO-ED1 is not materially different to that at DPCR5. Had it been higher we would have placed greater emphasis on the consideration of an initial gearing below 65%.

Taking these factors into account, 65% is the obvious base scenario around which to carry out our detailed overall financeability testing in sections **Financeability** and **Risk assessment** and in Annex 3.1.

Having identified a starting range for our gearing assessment, we then introduce a range of plausible out or underperformance outcomes arising from the most material of the package of RIIO-ED1 incentives.

This allows us to stress test our proposed level of notional gearing by examining the overall range of returns to which DNOs will be exposed. We aim for moderate double digit returns at the maximum and returns around the level of the Cost of Debt index at the minimum.

We later further validate our conclusion on Notional Gearing by simulating the external risks to cash flows and the resulting impact on business financeability (by Monte Carlo using Moody’s credit rating methodology). This further credit rating test is described fully in section **Risk assessment** and in Annex 3.1.

<sup>25</sup> RIIO-ED1 Strategy Decision Supplementary Annex: Financial Issues

### Return on Regulatory Equity

The assumptions underlying our RoRE analysis are summarised below.

For an average FAST TRACK DNO:			
	SP Manweb	SP Distribution	
Base Revenue (average p.a.)	£336m	£355m	As calculated by PCFM
Equity RAV (average p.a.)	£659m	£579m	As calculated by PCFM
Gearing	65%	65%	Base Scenario
Efficiency Incentive Rate	70%	70%	Fixed for fast-track
Totex (average p.a.)	£279m	£219m	Plan Totex
IQI additional income	2.5% of Totex — fast track reward.	2.5% of Totex — fast track reward.	Fixed. Subject to tax.
Totex Incentive	+10%/- 5% of Plan Totex	+10%/- 5% of Plan Totex	Includes RPE and risk associated with Load-related Reopener and Health Index. Asymmetry reflects both output pressure on expenditure and the extent to which efficiency is already built into fast-track plan.
BMCS	+/- 1.5% of base revenue	+/- 1.5% of base revenue	Regulatory cap and collar
IIS	+/- 250 basis points (before tax & sharing)	+/- 250 basis points (before tax & sharing)	Regulatory cap and collar
Guaranteed standards	-£0.5m p.a.	-£0.5m p.a.	Connections & Reliability
Taxation Trigger Deadband	17 bps	20 bps	Worst case 0.33% of total base revenue
Connections	+0.4%/-0.9% of Base Revenue	+0.4%/-0.9% of Base Revenue	Regulatory cap and collar
Losses	0-7 bps	0-7 bps	Discretionary Award — upside only. Model upper limit set at 1/14th of total fund.

We show the relative impact of the most material RIIO-ED1 risks as basis points of RoRE in Tornado Charts figures 8 and 9.

Figure 8

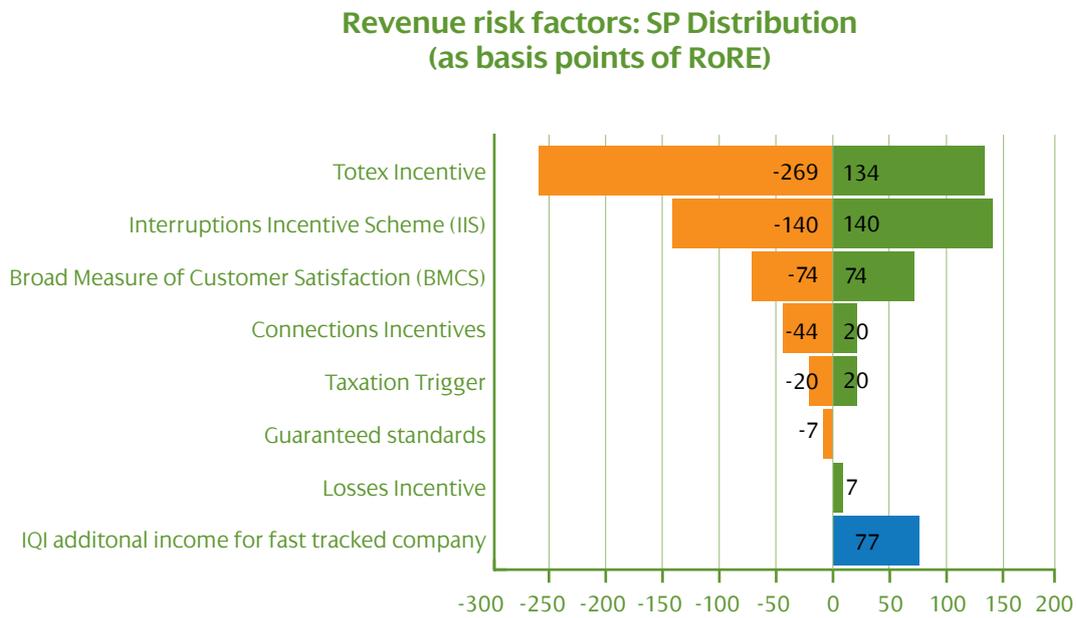
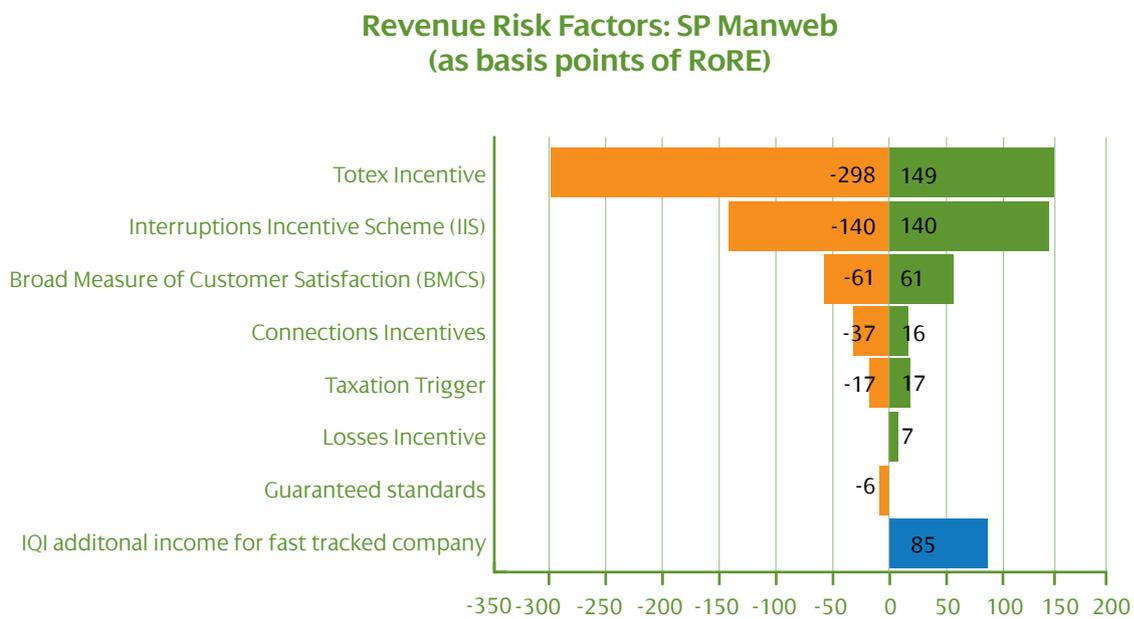
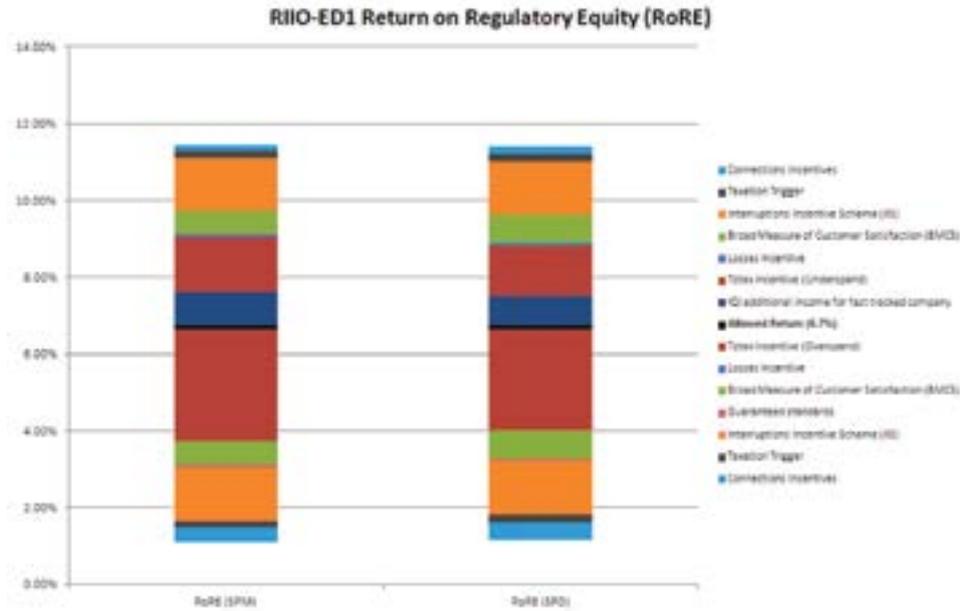


Figure 9



In aggregate these individual risks determine the overall range of feasible RoRE performance in RIIO-ED1. We present this as a 'layer cake' in figure 10. (for 65% gearing):

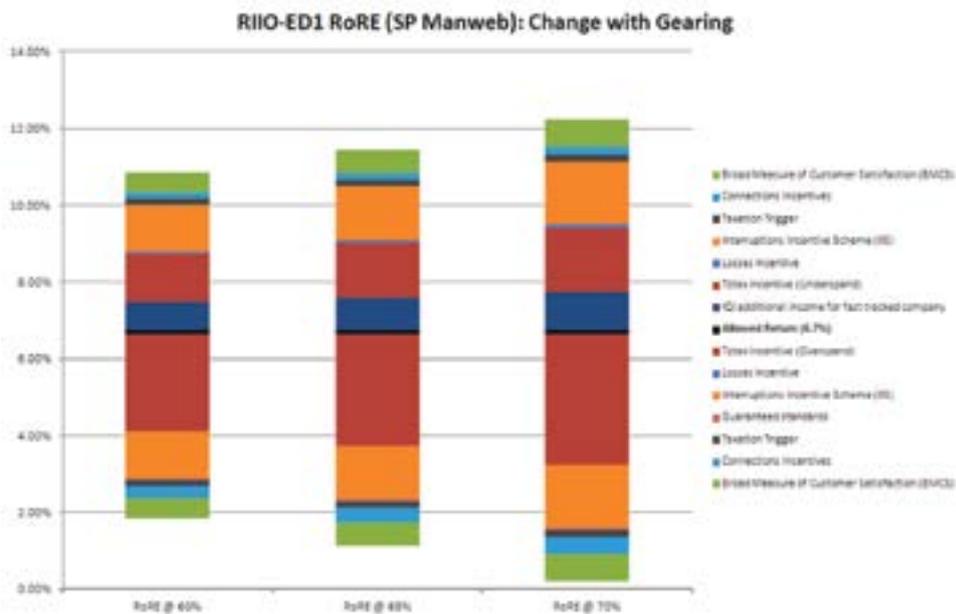
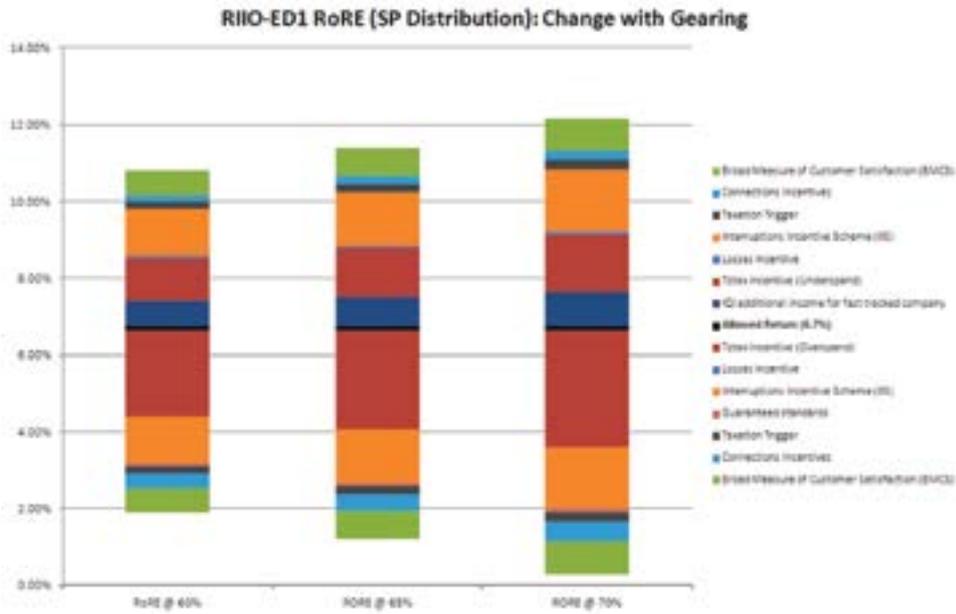
Figure 10



The range of feasible RoRE at 65% gearing extends from a maximum of 11.44% for SPM and 11.38% for SPD (low double figures) down to a minimum of 1.13% (SPM) and 1.20% (SPD) (compared with a Cost of Debt likely to fall from a starting point of 2.92% in RIIO-ED1.)

This indicates that our preferred Cost of Equity and Gearing are consistent with the level of risk in our RIIO-ED1 Business Plan. To determine whether we have identified the optimal level of gearing we have examined the effect of varying the gearing either upwards or downwards. We adjust the gearing in increments of 5%. The impact of these changes in gearing is shown in Figure 11.

Figure 11



Gearing	Opportunity for Outperformance	Adequate Downside Cover	Overall Conclusion
60%	10.8%	1.9%	Unsatisfactory
65%	11.4%	1.2%	Satisfactory
70%	12.2%	0.25%	Unsatisfactory

The conclusions are similar for both SPD and SPM.

At 60% gearing, the potential for RoRE outperformance is constrained. The absolute maximum achievable is only 10.8% (10.1% if the uplift from IQI additional income is excluded). This suggests that 60% gearing does not present any significant possibility of double-digit returns.

At 70% gearing, the minimum of the RoRE range is more than 2% below the present (or any likely future) level of the Cost of Debt Index, at 0.21% for SP Manweb and 0.29% for SP Distribution. We conclude that 70% gearing is likely to result in excessive risk of financial distress.

Results are summarised in the table above.

Should it be impossible to set the gearing to provide a satisfactory range of returns we would be forced to re-examine our starting Cost of Equity and set of cashflow risks (incentive calibration), and then repeat this analysis. We do not believe that this is necessary.

We conclude (operating in 5% increments) that 65% is the optimal level of gearing, and is consistent with a financeable Business Plan which allows the possibility of reasonable returns without excessive downside risk and at the lowest overall cost to customers.



## Financeability

### Target Credit Rating

We have assessed the credit ratings for each of SP Distribution and SP Manweb against our target overall rating of A3 or Baa1. This makes sure that our financeability criteria are fully consistent with credit quality underpinning the allowed cost of debt index, which equally weights A and BBB (S&P) rated non-financial sterling bonds. This is also consistent with our licence obligation to maintain an investment grade credit rating.

As explained in the following section, we have taken into account the full range of credit rating factors and not just the key credit metrics. Consequently, the scores for individual sub-factors may be outside A3 or Baa1 and indeed could be out with the wider investment grade range of A1 to Baa3 (A to BBB range per S&P ratings).

### Financeability Assessment

We have primarily followed Moody's rating methodology<sup>26</sup> for regulated electric and gas networks. This approach considers both credit metrics and qualitative factors for example business risk and regulatory environment. Moody's stated objective is for users of this methodology to be able to estimate a company's rating within two alpha-numeric notches.

Moody's analysis focuses on four key rating factors. These four factors are as follows:

1. *Regulatory Environment and Asset Ownership Model*
2. *Efficiency and Execution Risk*
3. *Stability of Business Model and Financial Structure*
4. *Key Credit Metrics*

Each of these factors is made up of a number of sub-factors, to each of which Moody's assigns a weighting. We set out in detail our assessment of each sub-factor in Annex 3.1.

### Ensuring Efficient Financing Costs — Price Control Financial Model ('Static') Analysis

In this section we present our financing plan and primary analysis. We refer to this as our 'static' analysis in contrast to our further 'probabilistic' risk assessment presented later in this section.

By 'static' we mean that we introduce a number of financing components and assumptions and test the outcomes to ensure that an efficient, financeable plan can be demonstrated using Ofgem's Price Control Financial Model (PCFM). In section **Risk assessment** we carry out a 'probabilistic' risk assessment in order to evaluate the likely impact of external risks upon our financeability ratios by applying Monte Carlo analysis to the model.

<sup>26</sup> Moody's Investors Service (2009), "Regulated Electric and Gas Networks", Rating Methodology, August

	SP Distribution	SP Manweb
Cost of Equity	6.7 %	6.7 %
Cost of Debt	2.92 %	2.92 %
Gearing	65 %	65 %
Asset lives additions from 1.04.2015	Straight to 45	Straight to 45
Capitalisation Rate	80 %	80 %
IQI Additional Income	2.5 % of totex	2.5 % of totex
Equity Injection Threshold	5 %	5 %
Dividend % of Notional Equity	5 %	5 %

Our allowed return financing components were explained in the first four sections of this chapter. Further explanation of other assumptions and policies is contained in Annex 3.1.

Our over-riding objective has been to deliver an efficiently financeable plan that will offer an adequate return to investors at the lowest possible cost to customers.

We interpret an efficient plan as one that ensures that the expected overall credit rating is consistent with that underpinning Ofgem's cost of debt index. By 'overall' we mean after recognising non financial ratio components, such as the high rating associated with UK regulatory stability. Specifically we target an overall Moody's credit rating for the regulated businesses of around A3/Baa1.

### Price Control Financial Model Results

The financial parameters above have been adopted in our best view business plan submission. This results in the following credit rating based on Moody's August 2009 rating methodology for regulated electric and gas networks

	SP Distribution	SP Manweb
Moody's notional credit rating	A3	A3

### Revenue Profiling

From our quarterly meetings with stakeholders to discuss our revenue forecasts we are aware of customers' aversion to volatility in charges. SP Distribution's revenues showed minimal volatility and were not re-profiled. SP Manweb's revenues showed significant volatility and we have made a smoothing adjustment. Full details are provided in Annex 3.1.

### Model Results

Using Ofgem's Price Control Financial Model (the "Return&RAV", "Revenue", "FinancialStatements" and "FinancialRatios" tabs), the overall summary revenues, cash flows and key credit metrics are shown in the following tables.

## SP Distribution

Revenue £m 2012/13 prices	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
Closing RAV	1572.9	1612.1	1654.7	1693.1	1730.8	1761.9	1793.8	1829.5
Revenue	354.2	354.4	357.3	356.7	356.0	354.7	354.9	353.9
Cash Flow £m Nominal	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
Funds from Operations	185.8	188.7	194.0	198.6	203.0	208.6	215.0	219.5
Retained Cash Flow	155.9	157.2	160.7	163.6	166.3	170.1	174.8	177.3
Debt Movement	(36.1)	(41.9)	(47.9)	(45.8)	(47.3)	(40.7)	(42.1)	(47.8)
Credit Metrics	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
FFO/Interest	3.9	3.9	3.8	3.7	3.7	3.6	3.6	3.6
PMICR using RAV depreciation	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Net Debt: RAV	64.3 %	63.8 %	63.4 %	63.0 %	62.6 %	62.1 %	61.6 %	61.2 %
FFO/ Net Debt	16.2 %	15.7 %	15.4 %	15.1 %	14.7 %	14.6 %	14.5 %	14.2 %
RCF/ Net Debt	13.5 %	13.0 %	12.7 %	12.3 %	12.0 %	11.8 %	11.6 %	11.3 %
RCF/ Capex	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8

## SP Manweb

Revenue £m 2012/13 prices	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
Closing RAV	1643.1	1759.4	1850.5	1932.0	2020.7	2106.1	2186.9	2249.1
Revenue	335.7	335.7	335.7	335.6	335.7	335.6	335.7	335.6
Cash Flow £m Nominal	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
Funds from Operations	184.2	180.7	189.2	194.0	194.7	197.0	204.7	213.9
Retained Cash Flow	153.0	146.3	152.0	154.1	151.8	151.0	155.7	162.0
Debt Movement	(104.9)	(133.9)	(109.1)	(105.1)	(122.5)	(127.8)	(111.5)	(89.3)
Credit Metrics	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
FFO/Interest	3.8	3.5	3.3	3.2	3.0	2.9	2.8	2.8
PMICR using RAV depreciation	1.7	1.5	1.5	1.4	1.4	1.3	1.4	1.5
Net Debt: RAV	65.5 %	66.8 %	67.3 %	67.8 %	68.5 %	69.3 %	69.4 %	69.1 %
FFO/ Net Debt	15.1 %	13.1 %	12.6 %	11.9 %	10.9 %	10.2 %	9.9 %	9.8 %
RCF/ Net Debt	12.4 %	10.5 %	10.0 %	9.3 %	8.4 %	7.6 %	7.3 %	7.2 %
RCF/ Capex	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.6

SP Distribution	Aaa	Aa	A	Baa	Ba	B
<b>Factor 4: Key Credit Metrics (40%)</b> a) Adjusted Interest Cover Ratio (3 Year Avg) b) Net Debt/ RAV (3 Year Avg) c) FFO/ Net Debt (3 Year Avg) d) RCF/ Capex (3 Year Avg)			x	x	x	
<b>Rating</b> Indicated Rating from Grid factors 1-4			A3			

SP Manweb	Aaa	Aa	A	Baa	Ba	B
<b>Factor 4: Key Credit Metrics (40%)</b> a) Adjusted Interest Cover Ratio (3 Year Avg) b) Net Debt/ RAV (3 Year Avg) c) FFO/ Net Debt (3 Year Avg) d) RCF/ Capex (3 Year Avg)				x	x	
<b>Rating</b> Indicated Rating from Grid factors 1-4			A3			

*Note: We rate SP Manweb at A3. Whilst Ofgem's prescribed modelling assumption around the cost of debt of 2.92% mechanically yields a Baa1 this is not a realistic position. In fact, a marginally lower assumption on cost of debt yields an A3 rating. In any case the adjusted interest cover which is the marginal ratio is only weak in two years of the eight year period.*

### Moody's Notional Credit Rating

The key credit ratings from the above tables result in the above rating assessment under Moody's methodology. When these are combined with the Factor 1-3 ratings the overall indicated rating results

### Alternative Scenarios

It is a feature of our modelling results that our base financing assumptions and 'vanilla' Ofgem policy assumptions deliver an efficient financing plan for each of SP Distribution and SP Manweb. Most significantly we found that under this 'fast track' proposal including the associated additional income there was no need for financeability adjustments. However we considered various alternative scenarios. Further detail and a broader range of scenarios are included in Annex 3.2.

### Transition to 45 Year regulatory asset lives/ Capitalisation Rates

We had initially considered that a financeability adjustment would be required and that this would involve a one period transition in the move from the assumed 20 to 45 regulatory asset lives. We found that this was unnecessary. We tested a one period transition and found that the only key result was to move revenues from future periods into RIIO-ED1. We see no clear rationale in reducing future customers' charges at the expense of today's particularly at a time when customers are so sensitive to the level of energy prices. Whilst our overall credit rating remained unchanged, key credit ratios unsurprisingly improved significantly. For example the 3-year FFO/Net Debt ratio moved for each company by almost 10%. However, we did not consider this to be efficient for customers.

Had a financeability adjustment been required our preference would be for one that was long term value neutral for customers. An alternative lever of this type would be an alternative to our empirically justified 80% capitalisation rate. We tested the impact of 5% higher and lower which had similar financeability impacts to those described above albeit also unnecessary in our business plans.

### Notional Gearing

Our primary justification for a gearing level of 65% was explained in section **Notional gearing and RoRE**. There we demonstrated that a gearing level of 5% higher or 5% lower gave an appropriate range of outperformance opportunity. We modelled gearing at these levels and found the impact upon financeability to be negligible. We further tested and rejected gearing of 70% as part of our probabilistic assessment described in **section Risk assessment**.



### Cost of Equity

Again we place weight upon our estimate of the cost of equity explained earlier. Small variations around 6.7% were found to have negligible effects upon allowed revenues in the period and financeability.

### Cost of Debt

Ofgem asked all DNOs to model the allowed cost of debt at a standard 2.92%. We believe that the index will move significantly lower during the period. Our modelling revealed that for all credible forecasts there was no material impact on financeability.

## Risk Assessment

As part of our justification that our proposed financing package is not just efficient, but robust, we have worked with economic consultants (NERA) to develop a Financeability risk model. This model is based on the Ofgem Price Control Financial Model. We have extended the base model to incorporate the calculation of credit metrics and overall score (using the Moody's Methodology previously described).

We attach a paper by NERA describing their modelling methodology as Annex 3.2.

We have used this Risk Model to demonstrate that our preferred financeability scenario delivers an efficiently financeable plan that will offer an adequate return to investors at the lowest possible cost to customers.

In order to demonstrate efficient but robust financeability, our model simulates (by Monte Carlo) the individual and aggregate credit metrics over the full range of plausible outcomes for each of the individual risks we have identified.

The model considers the risk to cash flows from external risks only. For each of these, we have (where possible) identified what we believe to be the plausible distribution of outcomes for an average network business. In conjunction with our RoRE analysis, this should ensure that the business is sufficiently securely funded that the normal operation of RIIO-ED1 incentives is unlikely to lead to financial distress when coupled with adverse shocks from external risks.



We interpret a robust plan as one that ensures that the expected overall credit rating ('overall' meaning including non financial ratio components) for a notional average distribution business will be solidly within the A to Baa (Moody's) range of credit rating, with only a small probability that under any realistic adverse combination of external outcomes this rating might drop to a level inconsistent with the allowed Cost of Debt. More specifically we target an overall credit rating of A3 or Baa1.

### Initial Assumptions

Before conducting our financeability testing we have considered each of the components of the allowed return to provide opening parameters for our risk and financeability testing established earlier.

Cost of Equity (real, post-tax)	6.7 %
Cost of Debt (real, indexed)	2.92 %
Notional Gearing	65 %
Dividend Yield (on Equity proportion of RAV)	5 %
Capitalisation Ratio	80 %

Risk	Comment	Modelling approach
<b>Real Price Effects (RPEs)</b>	DNOs are exposed to uncontrollable changes in costs which inflate at a rate different from RPI.	Modelled independently from "controllable" Totex uncertainty. We apply a normally distributed shock to Totex centred on a mean of zero.
<b>RPI</b>	Fixed ex ante RPI assumption for RIIO-ED1 means that inflated real interest costs may not match actual nominal interest. This affects relationship between tax allowance and actual tax.	We simulate actual nominal interest using 18 independent RPI forecasts (as published in Treasury report), equally weighted.
<b>Taxation (Corporation Tax)</b>	The Tax Trigger uncertainty mechanism has a central deadband within which DNOs are exposed to changes in tax (allowance is not recalculated).	For simplicity we approximate by applying a plausible tax change impact as a direct revenue adjustment. A symmetric triangular distribution is used with maximum and minimum set at 0.33% of revenue.

## Our Financeability Assessment

We test the robustness of our financial plan only to those external risks which are not directly within the control of the DNO. We exclude risk arising from performance under regulatory incentives.

The external risks considered are shown above.

We simulate a set of outcomes by Monte Carlo. For each iteration of the Monte Carlo Model we calculate the credit metrics and use these to derive an overall credit rating using Moody's methodology (as described in section **Financeability**).

Moody's methodology applies significantly greater weights to components of the overall calculation which are towards the low rating end than to components at A or above. This means that the distribution of rating outcomes is strongly asymmetric. This skew towards outcomes on the downside is clear in the following analysis.

Figure 12: Fan Chart Showing SPD credit rating including External Risk

Figure 13: Fan Chart Showing SPM credit rating including External Risk



**SP Distribution**

The distribution of credit rating outcomes generated by simulation is shown as a fan chart in Figure 12.

The central path for SP Distribution (the median) is shown as a dark line which runs almost exactly along the boundary between an A3 and Baa1 rating.

**SP Manweb**

The distribution of credit rating outcomes generated by simulation is shown as a fan chart in Figure 13.

The central path for SP Manweb (the median) is shown as a dark line predominantly within the Baa1 band, briefly crossing into A3 mid Price Control.

We conclude that the base financeability position of our plan is robust to a plausible range of external risks and consistent with the Allowed Cost of Debt.

**Alternative Levels of Gearing**

As with our RoRE risk analysis, we consider the impact of varying the level of gearing. Specifically, we consider the impact of a 5% increment in gearing from 65% to 70%. This analysis is provided in Annex 3.1.

For both SP Distribution and SP Manweb, we find that the probability of ratings well below Baa1 becomes much more substantial at 70% than at 65% gearing. A gearing level of 70% leads to a significant probability of a credit rating inconsistent with the allowed cost of debt which targets the range A3 to Baa1. 65% is therefore the optimal level of gearing.

In summary, we have demonstrated by this Risk Assessment that our plan, and in particular a notional gearing of 65% should ensure a business sufficiently securely funded that the normal operation of RIO-ED1 incentives is unlikely to lead to financial distress when coupled with adverse shocks from external risks.

# Evolution of the Regulatory Asset Value



This section sets out our business plan assumptions impacting the evolution of the Regulatory Asset Value (RAV). In all cases our assumptions are consistent with RIIO principles and fully adhere to Ofgem's strategy decisions.

## Totex & Capitalisation

Our total expenditure (totex) comprises of the categories prescribed by Ofgem. Within our plan a fixed 80% of totex is allocated to the RAV for both SP Distribution and SP Manweb.

This was calculated with reference to the expenditure projections over the RIIO-ED1 period and applying an asset life threshold to distinguish between 'slow' and 'fast money'.

## Asset Lives & Depreciation

Our base assumption is to recognise a move to regulatory depreciation using average economic asset lives of 45 years for new assets with straight line depreciation.

Existing assets continue to be depreciated over 20 years.

As noted above our analysis suggests that both SP Distribution and SP Manweb are financeable at a comfortable investment grade credit rating without the need for any transitional arrangements or other financeability adjustments.

# Financial Policies

## In this section:

- Taxation
- Pensions

## Taxation

The Ofgem policy decisions effecting taxation are in the main modelled automatically in the Price Control Financial Model. Our business plans fully reflect all policies that are well established and understood. Full details are provided in Annex 3.1.

## Pensions

Our business plans fully reflect Ofgem's pensions methodology as set out in various documents and consultations since 2009.

Our pension costs are calculated on the basis of the decisions set out in section 6 of the RIIO-ED1 Strategy decision document (Financial Issues reference 26d/13) and clarification of a number of points in those decisions in a presentation by Ofgem and subsequent meetings/correspondence with Ofgem.

## Established deficit

For both the ScottishPower Pension Scheme (SPPS) and the Manweb Group of the Electricity Supply Pension Scheme (Manweb Scheme) a roll forward valuation to 31st December 2012 has been produced from the previous formal triennial valuations dated 31st March 2009 reflecting the requirements set out in Appendix 6, paragraph 1.38 of the RIIO-ED1 Strategy decision document (Financial Issues reference 26d/13). We have used the method set out in the Pension Deficit Allocation Methodology (PDAM) to determine the split of liabilities and assets between pre (Established) and post (Incremental) cut-off date of 31 March 2010.

The funding allowance of the regulatory portion of the Established deficit reflects a 2.6% discount rate spread evenly over the 12 years from 1st April 2013.

## Incremental deficit

The incremental deficit is included in totex and benchmarked as part of total totex. Consistent with the calculation of the Established deficit, this has been calculated based on a roll forward of the 31st March 2009 triennial valuation to 31st December 2012. The following table is a summary.

Established Deficit Annual Allowance	SPPS	Manweb Scheme
Regulatory fraction	57.4 %	80.0 %
SPD annual allowance 12 years from 1 April 2013 at discount rate of 2.6 %	£20.6 m p.a.	
SPM annual allowance 12 years from 1 April 2013 at discount rate of 2.6 %		£19.4 m p.a.

Incremental Deficit Annual Allowance	SPD	SPM
Incremental deficit payments over 8 years from 1st April 2013	£1.8m p.a.	£1.8m p.a.



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# Our revenues and customer impact

The money we will recover from electricity suppliers and the effect this will have on our customers' bills

In this chapter we show the movement of our forecast revenues from 2014/15 (the last year of the current DPCR5 price control) through the eight year ED1 period.

We also explain the impact this will have on our customers' bills. The latest analysis from Ofgem shows that electricity distribution charges represent 16% of an average UK customers electricity bill.

Using the UK average consumption 3,300kWh, as required by Ofgem:

- *Our customers in Central and Southern Scotland will see a 8% reduction in our bills from £99 p.a. to £91 p.a.*
- *Our customers in England and Wales will see a 12% decrease from £126 p.a. to £111 p.a.*

## In this chapter:

– Our revenues and customer bill impacts

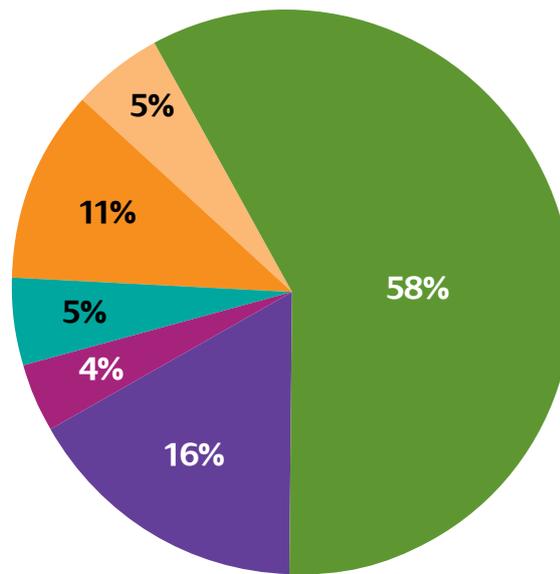


# Our Revenues & Customer Bill Impacts

## The makeup of average UK customer's electricity bill

- 58% — Wholesale energy, supply costs and profit margin
- 16% — Distribution charges
- 11% — Environmental charges
- 5% — Other costs
- 5% — VAT
- 4% — Transmission charges

*Ofgem customer bill fact sheet January 2013.*



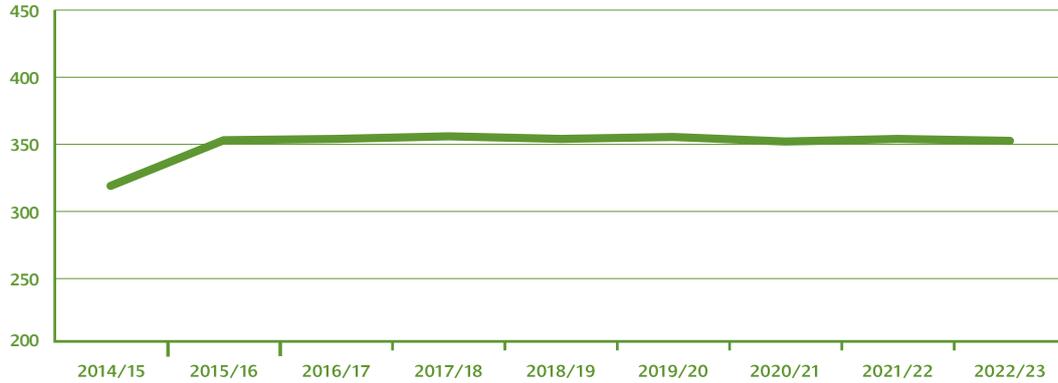
We believe we have demonstrated that our financing business plan is efficient. Application of the financial parameters to our cost forecasts result in revenues that lead to a forecast investment grade credit rating for both SP Distribution and SP Manweb. This is without the need to resort to any transition arrangements in respect of depreciation lives which ensures that there are no intergenerational issues in respect of customers funding of RIIO-ED1 total expenditure.

Stakeholders have told us that they want to know the impact on future bills particularly in the short term. This section shows the movement in forecast revenues from 2014/15 (the last year of the current DPCR5 price control).

To ensure that the revenues are comparable the 2014/15 forecast revenues only include base revenue plus any pass through adjustments including any tax trigger adjustments and any adjustment to transmission exit charges; they do not include any incentives or clawbacks which make up the balance of total revenue. This section also includes graphs showing the impact on domestic customer bills based on average annual consumption of 3,300kWh.

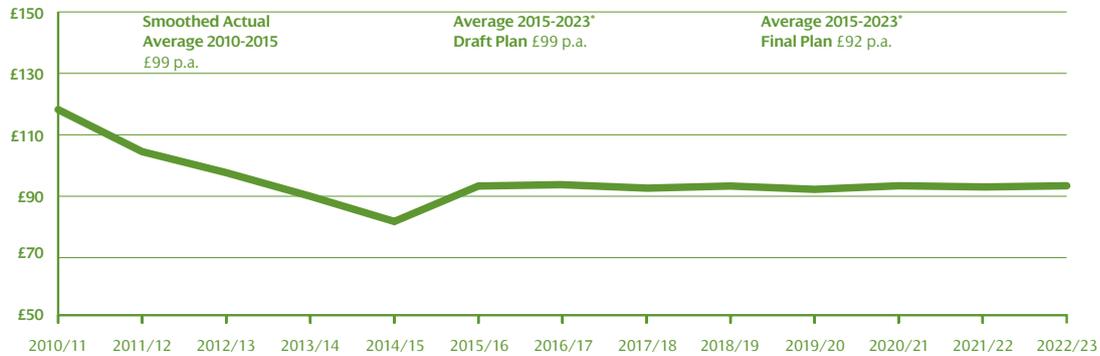
Stakeholders have also told us that they are averse to volatility and we have taken this into account when considering whether or not the revenues need to be profiled.

### Annual revenue – SPD (£m 2012/13 prices)



Graphs based on unprofiled revenues using 2012-13 price base

### Average domestic bill – SPD

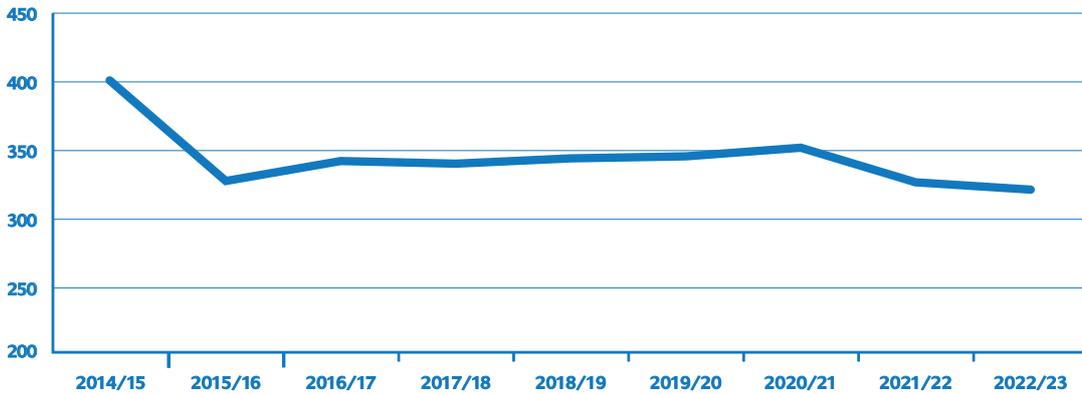


\*Based on UK average consumption

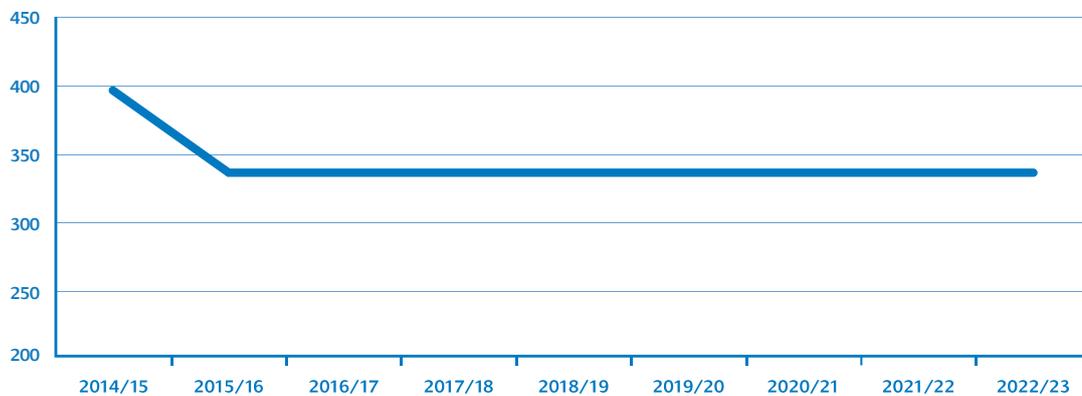
Average revenues across the eight years of RIIO-ED1 are £355.3m (2012/13 prices). The graph above (top) shows that there is very little variance to the average and minimal volatility. As a result we did not deem it necessary to make any profiling adjustment. The increase in revenue between 2014/15 and 2015/16 is a consequence of the profiling in DPCR5 which resulted in declining base revenues.

The impact on domestic bills for SP Distribution customers is shown in the second graph above. Apart from 2015/16, the annual changes are less than +/- 1.0% which we believe is not unreasonable.

**Annual unprofiled revenue – SPM**  
(£m 2012/13 prices)

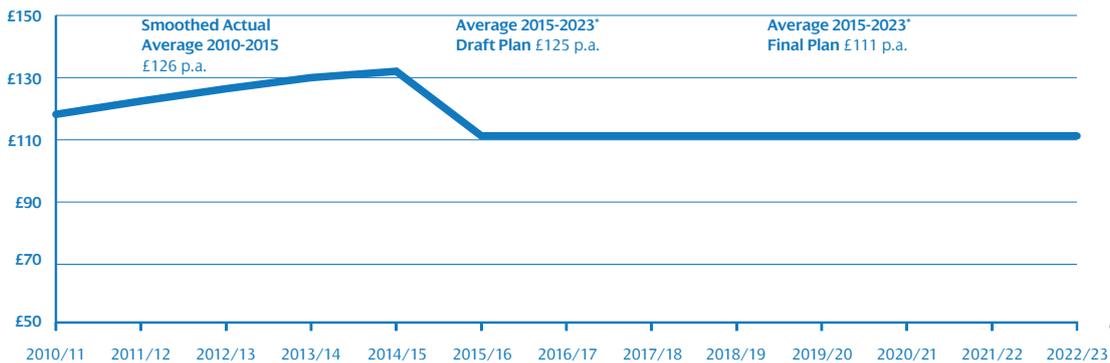


**Annual revenue – SPM**  
(£m 2012/13 prices)



*Graph based on profiled revenues using 2012-13 price base*

**Average domestic bill – SPM**



*\*Based on UK average consumption*

Average revenues across the eight years of RIO-ED1 are £335.9m (2012/13 prices). The graph above (top) shows quite significant variation (£7.4m under to £9.0m over) to the average and material volatility.

Apart from 2015/16 the forecast impact on domestic bills ranges from 3.2% to -4.3% over the remaining years of RIO-ED1. As a result we decided to smooth

the RIO-ED1 revenues by making profiling adjustments. The reduction in revenues in 2021/22 and 2022/23 arises because the 15 year RAV depreciation smoothing adjustment finishes in 2020/21 (the smoothing commenced in DPCR4 as a result of the vesting depreciation cliff edge). The reduction in revenue between 2014/15 and 2015/16 is a legacy of the profiling in DPCR5 which resulted in increasing base

revenues. The above graph (middle) shows the profiled revenues for SP Manweb which result in a flat profile in 2012/13 prices.

The impact on domestic bills for SP Manweb customers is shown in the above graph (bottom). Apart from 2015/16, annual changes to domestic bills in respect of allowed base revenues are forecast to be 0.0%.



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# Looking to the future

How we will shape the energy future and how to get involved

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Our 2015-2023 Business Plan sets out our vision and commitments to transform the way you think of us as your electricity company. In this chapter we conclude our Business Plan by summarising the key highlights, we outline the RIIO-ED1 timetable up to April 2015, and finally we provide our customers and stakeholders with an opportunity to provide their feedback on our plans.

## In this chapter:

– Looking to the future



# Looking to the future

## *Our 2015 – 2013 Business Plan sets out our vision and commitments to transform the way you think of us as your electricity network company*

The UK energy industry is entering the most exciting period it has faced in half a century. We recognise that SP Energy Networks has a critical role in facilitating the transition to a low carbon economy at a time when we need to replace increasing numbers of end of life assets. This presents an unprecedented opportunity for SP Energy

Networks to play a major part in the UK's low carbon transition, and help to set the blueprint of the energy industry for the next 50 years.

By 2023 we intend to lead the industry by continuing to apply our guiding values:

- *A customer service focussed company trusted by our communities and stakeholders.*
- *An engineering company with strong stewardship of assets and world class safety credentials.*
- *A company that attracts and develops skills for the future from the communities we serve.*

We are acutely aware of the economic challenges our customers face:

- *We have benchmarked throughout our plans to target costs amongst the lowest in the industry.*
- *We have set a further productivity improvement target of 1% p.a. across key areas.*
- *Innovation within our plans will deliver more than £100m benefits for customers.*
- *We have reduced our costs by £700m compared to our May 2013 published draft plan highlights, but maintained or increased our proposed outputs.*

The future network and its users will require a different approach, and our ambition is to transform the way you think of us.

- *Smart meters will allow us to revolutionise our customer relationship, allowing us to be much more proactive.*
- *We will innovate further to reduce costs, improve service, and lay the foundations for a smart network.*

We have set out a plan to address our stakeholders' priorities:

- *Managing our ageing network to maintain public and staff safety.*
- *Reducing time off supply for our average customer by 25%.*
- *Fewer customers affected by storms & a voluntary standard to restore customers within 36 hours afterwards.*
- *Being amongst the top performing network companies in customer service.*
- *Improving service to poorly served customers & playing a role in addressing energy social issues.*
- *Preparing the network for low carbon technologies.*
- *An appropriate and efficient financial package that delivers long term value for customers and stakeholders.*

*In addition to our business plan we will make further investments to deliver additional customer value, which will be rewarded by Ofgem through incentive mechanisms*

## RIIO ED1 Timetable

The table below lays out the next stages of the RIIO-ED1 process:

Phase	Year	Month	Milestone
Initial Business Plan Assessment and Fast-Track Decision	2013	July	We will submit and publish our business plan. Invitation for comments (4 weeks)
		September	We will meet with the Consumer Challenge Group and other interested parties to present our business plan.
		November	Ofgem will publish their initial assessment and draft determination of whether our business plan is suitable for fast-track. (8 weeks consultation)
Draft and Final Determinations and Launch	2014	February	Ofgem publish their final fast-track determination. If we achieve fast-track at this stage, we will focus our attentions on preparing to deliver our investments.
		March	If we do not achieve fast-track, we will resubmit & publish an updated business plan.
		November	Ofgem will publish their non-fast-track final determination
	2015	April	Wednesday 1st — new price control (RIIO-ED1) commences.

### Your Feedback

We hope that you have found our plan readable and informative. Please tell us what you think:

**By email to:**

RIIOED1Consultation@spenergynetworks.com

**By letter to:**

RIIO-ED1  
EN Communications  
New Alderston House  
Dove Wynd  
Bellshill  
ML4 3FF

**Via our website:**

For more information on RIIO-ED1 and details of our stakeholder events, visit: [www.spenergynetworks.co.uk](http://www.spenergynetworks.co.uk) and click on 'Have Your Say'

### Interested in finding out more about SP Energy Networks?

You can find more information about SP Energy Networks at

**Our website:**

<http://www.spenergynetworks.co.uk>

**About us:**

[http://www.spenergynetworks.co.uk/about\\_us](http://www.spenergynetworks.co.uk/about_us)

**Serving our customers:**

[http://www.spenergynetworks.co.uk/serving\\_our\\_customers](http://www.spenergynetworks.co.uk/serving_our_customers)

**Power loss & emergencies:**

[http://www.spenergynetworks.co.uk/power\\_loss\\_emergencies](http://www.spenergynetworks.co.uk/power_loss_emergencies)

**Our online community:**

[http://www.spenergynetworks.co.uk/serving\\_our\\_customers/online\\_community.asp?NavID=1&SubNavID=5](http://www.spenergynetworks.co.uk/serving_our_customers/online_community.asp?NavID=1&SubNavID=5)

**Safety & social responsibility:**

<http://www.spenergynetworks.co.uk/safety>

**Connecting to our network:**

[http://www.spenergynetworks.co.uk/connecting\\_to\\_our\\_network](http://www.spenergynetworks.co.uk/connecting_to_our_network)

**Innovation:**

<http://www.spenergynetworks.co.uk/innovation>

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## We are part of the worldwide Iberdrola group

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SP Energy Networks are part of the Iberdrola Group, one of the world's top energy companies. In this chapter we briefly explain how we make the most of being part of this worldwide group, in particular the scale of UK investments and how innovation plays a significant part of our future plans.

### In this chapter:

- Overview
- Innovation at Iberdrola



# Overview

## Making the most of being part of the Iberdrola group

SP Energy Networks is part of the Iberdrola Group, one of the world's top energy companies, a multinational company with Distribution, Generation, Renewables and Engineering operations in 40 countries worldwide.

In 2012 Iberdrola was identified as the 5th most innovative utility in Europe by the European Commission, and were the only utility with a UK network presence to feature in the top 300 companies.

Iberdrola currently make 42% of their total investment in the UK and 59% of their worldwide investment on electricity Networks.

Last year Iberdrola created 2,000 new jobs worldwide and invested €3.2 billion, mainly in networks and renewables.

In the UK, investments totalled €1.3 billion last year, reflecting the Group's decision to focus investments in this country in the 2012-2014 Outlook announced in London last year.

The 42% of total Group investments for 2012-2014 — amounting to €4.4 billion — made in the UK predominately supports Networks and Renewables and effectively doubles ScottishPower's investment levels made prior to the integration with Iberdrola.

In 2013, capital investment in the UK will amount to €1.7 billion — a record for ScottishPower. Investment in transmission networks alone is creating 1,500 jobs across our supply chain.

Ignacio Galan, Chairman of Iberdrola and ScottishPower: "As a global energy company, our operations are focused in the UK, US, Brazil, Mexico and Spain — with Scotland and the UK being a key focus for our investment plans. We are investing £4 billion between now and 2014 in the UK, representing 40% of our global investments, with two-thirds of this investment planned for Scotland. On the back of our long-term investment plans, we are creating 4,000 jobs in our networks business alone, which will see our company continue to grow and help to boost the Scottish economy.

'It is vital that we have the office infrastructure in place to support our teams who will be delivering this investment. We are delighted to be expanding our presence in Hamilton International Park, as well as committing to remain Headquartered in Glasgow, a city that has been home to ScottishPower for decades.'

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*First Minister of Scotland Alex Salmond and Iberdrola chairman Ignacio S. Galán meet trainees at our training centre in Cumbernauld.*

# Innovation at Iberdrola

SP Energy Networks are part of the Iberdrola Group, one of the largest energy companies in the world. The group prides itself on its commitment to innovation. Across the group:

- *in excess of €145 million was invested in R&D in 2012*
- *over €50 million of the investment was associated with networks.*
- *innovation involves a variety of R&D across distribution and transmission*
- *investment includes funds leveraged from a variety of sources including European Framework programmes, government funding, and stakeholder investment.*

This impressive investment demonstrates Iberdrola's commitment to innovation.

We want to make the most of being part of this highly innovative group. We collaborate extensively with other areas of the Iberdrola group, looking at all elements of networks, led by an international steering group for Smart Grids. To give three examples:

In our ED1 business plan the design and deployment of light current technology was informed by experiences of our Iberdrola colleagues in Spain (specifically the substation protocol standardisation to IEC 61850). This has allowed us to contact a greater variety of suppliers, thereby increasing competition and reducing costs.

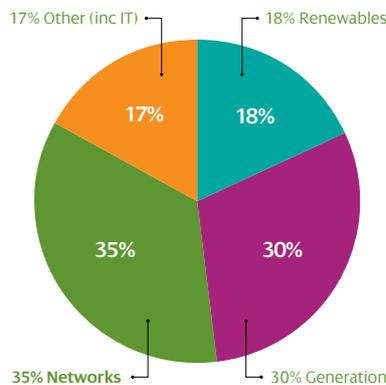
Iberdrola's experience of smart metering in the USA and Spain, and the data this creates, has helped us to plan our IT strategy and refine our requirements for the IT systems we will purchase over the ED1 period.

Iberdrola also have a collaborative electric mobility programme in Spain with SEAT to obtain and share data on the actual operating conditions of electric vehicles. Our access to this data will improve our understanding of the impact of this technology on our network.

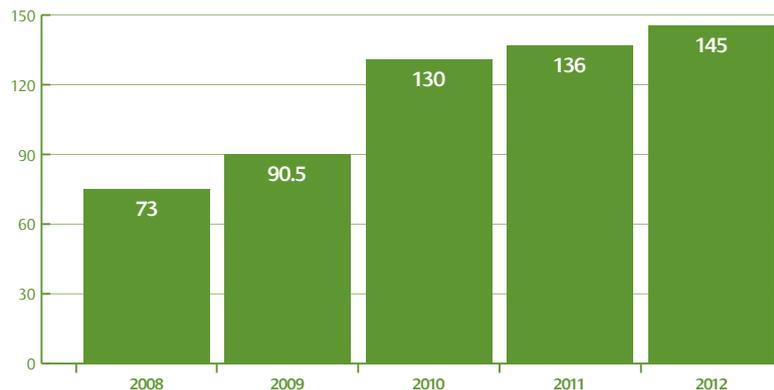
*In 2012 Iberdrola was identified as the 5th most innovative utility in Europe by the European Commission. Iberdrola were the only utility with UK network presence to feature in the top 300 companies*

Source: Iberdrola 2012 Innovation Report

R&D investment in 2012 across Iberdrola



Iberdrola R&D investment (€m)



Summary of key information for our stakeholders – Our vision for ED1 and our plans to deliver our vision.

1. Executive summary

Our business plan is written with our readers in mind, takes into account the things that make us unique and is underpinned by a robust process.

2. A guide to this document

3. About us

4. Process of creating our business plan

Our plans to meet the challenges of the ED1 period are informed by extensive stakeholder engagement and the consideration of alternative and innovative methods.

5. Meeting our challenges

6. Learning from our stakeholders

7. Our innovation strategy

Our clear and comprehensive output commitments are underpinned by a robust, deliverable and efficient programme of expenditure.

8. Our outputs and incentives

9. Our expenditure forecast

10. Business readiness

Our plans are resilient to uncertainty, efficiently financed and minimise the impact on our customers.

11. Uncertainty

12. Financing our plan efficiently

13. Our revenues and customer impact

Our plans enable us to help shape the energy future and our continual improvement is informed by enduring stakeholder engagement

14. Looking to the future

15. We are part of the Iberdrola group

16. Glossary

Our supporting annexes give additional detailed information to support our plans.

Volume 1 – Stakeholder, customer & IT

Volume 2 – Engineering

Volume 3 – Finance and expenditure

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## Glossary

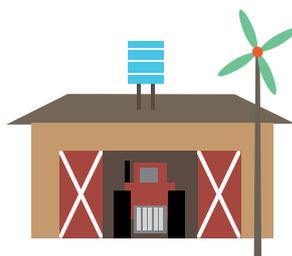
### Industry-specific terms explained

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We want to help our stakeholders and customers to understand our Business Plan, therefore, in this chapter we have provided an alphabetical list of industry-specific terms and their explanations.

#### In this chapter:

- Glossary of industry terms
- Table of acronyms



# Glossary of terms

## A

### Allowed revenue

The amount of money that we can earn on our regulated business.

### Annual iteration process

The process of annually updating the variable (blue box) values in the price control financial model and running the model in order to provide updated MOD values.

### Areas of Outstanding

#### Natural Beauty (AONB)

Areas protected by legislation due to their visual or environmental qualities. Ofgem provide DNOs with an allowance for undergrounding overhead lines in these areas.

## B

### Base revenue

Base revenue is the amount of revenue that we are allowed to recover as agreed up-front with Ofgem.

### Benchmarking

The process we use to compare our performance (e.g. our costs) to that of best practice or to average levels within the sector.

### British Telecom 21st Century (BT 21 CN)

British Telecom are currently upgrading their telecommunications systems to a more flexible system which can send messages through both traditional hard-wire routes and the internet. This programme has implications for the protection and control systems we use to manage our network.

### Broad Measure of Customer Satisfaction (BMCS)

This is an industry wide survey of the views of our customers on our levels of service.

It covers customer satisfaction, social obligations, complaint handling and how we engage with our stakeholders. It both rewards and penalises performance against the targets.

### Business Carbon Footprint (BCF)

The BCF scheme is a reputational incentive to encourage DNOs to be proactive in measuring and reducing the carbon impact of their operations.

### Business support costs

Business support costs are related to functions that are not core to provision of network services but that are required for us to run our business. These include costs associated with running our finance department, human resources, and central IT systems.

## C

### Capital Asset Pricing Model (CAPM)

A theoretical model that is widely used to estimate the cost of equity. This derives the cost of equity by adding the company or sector risk premium to the risk free rate. The risk premium is calculated by applying a measure of relative risk, known as the "beta" factor to the risk premium for the stock market as a whole.

### Capital expenditure (Capex)

The money we invest in tangible distribution assets, such as underground cables, overhead electricity lines and substations.

### Carbon Plan

The UK government has made a commitment to cut UK carbon emissions by at least 80% of 1990 levels by 2050. The Carbon Plan sets the UK plans for achieving the first 20 years of emissions reductions.

### Cost Benefit Analysis (CBA)

Where there are two or more options that we could invest in, cost benefit analysis allows us to weigh up the long term costs

and benefits for each option and select the one that gives the greatest benefit balanced against long term value for money.

### Cost of Debt

The interest rate that a company pays for its loans.

### Cost of Equity

The rate of return on investment required by a company's shareholders.

### Customers Interrupted (CI)

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

### Customer Minutes Lost (CML)

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

## D

### DECC

The Government Department of Energy and Climate Change.

### Defined Benefit Scheme

A pension scheme where the benefits that accrue to members are normally based on a set formula taking into account the final salary and accrual of service in the scheme. It is also known as a final salary pension scheme.

### Defined Contribution Scheme

A pension scheme where the benefits that accrue to members are based on the level of cash contributions made to an individual account; the returns on those funds are used to provide a cash amount to purchase an annuity on retirement.

**Demand side management (DSM)**

Demand side management (or load management) is any mechanism (both social and mechanical) that allows a customer's demand to be intelligently managed in response to events on the power system. Such events would include lack of network capacity or insufficient generation.

**Depreciation**

Depreciation is a measure of the consumption, use or wearing out of an asset over the period of its economic life.

**Distributed Generation (DG)**

Generation connected to the distribution network, such as wind turbines, domestic solar panels, photo-voltaic farms, hydro-electric power and biomass generators.

**Distribution Network Operators (DNOs)**

DNOs are the organisations that look after the networks transporting electricity to end users such as homes and businesses. In England and Wales, DNOs manage the network from 132,000 down to 230 volts. In Scotland, DNOs manage the network from 33,000 volts to 230 volts. The UK distribution network is divided into 14 distribution areas and these are managed by 6 DNOs.

**Distribution Price Control Review 5 (DPCR5)**

To encourage competition and ensure that the industry is regulated effectively, each DNO periodically sets its commitments and agrees its expenditure with Ofgem. This process is called a price control review. Once the commitments and expenditure have been agreed, the DNO carries out its commitments and is measured on its performance. DPCR5 is the current price control period, running from 2010 to 2015 and it will be followed in 2015 by ED1.

**Distribution Use of System (DUoS)**

These are the costs that customers pay to DNOs via their energy suppliers, typically 15-20% of a customer's bill. The amount of DUoS charged is determined with Ofgem at each price control review.

**Dividend Growth Model (DGM)**

A theoretical model that is widely used, in the United States and elsewhere, to estimate the cost of equity. This derives the cost of equity as the discount rate which sets the present value of projected future dividends equal to the current share price.

**E****EA Technology**

This is a research company engaged jointly by all DNOs to develop and maintain the Transform model to assess the cost of the impact of low carbon technologies on the network.

**ED1**

This is a prefix/suffix designating an item relevant to the RIIO-ED1 (electricity distribution) price control review which will be applicable for the eight years running from 1 April 2015.

**ED1 Price Control Financial Model (PCFM)**

The model of that name:

*(a) that the Authority will use to determine ex ante base revenues; and*

*(b) that the Authority will use to calculate appropriate changes to the licensee's base revenue through an Annual Iteration Process that will determine the value of the term MOD.*

**Electricity, Safety, Quality and Continuity Regulations 2002 (ESQCR)**

These govern the standards of safety and the quality and reliability of electricity supply that our customers can expect. The regulations were updated in 2006 to include a requirement for resilience tree cutting.

**Equity risk premium (ERP)**

The market Equity Risk Premium (ERP) measures the additional return required by investors to compensate them for the risk of holding a widely diversified portfolio of equities over and above the risk-free rate.

**Extra High Voltage (EHV)**

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

**F****Fast money**

Fast money is the revenue that is recovered in the year of expenditure; the proportion of Totex which is not added to the licensee's RAV balance and is effectively included in the licensee's revenue allowance for the year of expenditure.

**Financeability**

We use financial models to determine whether we are capable of financing our necessary activities and earning a return on our regulated asset value (RAV). This financeability is assessed using a range of different financial ratios.

**G****Gearing**

A ratio describing the extent to which a company is financed through borrowing.

**Guaranteed Standards of Performance (GSOPs)**

These are the minimum levels of service to be met across a range of customer-facing activities, including how we manage power cuts, connections and customer complaints. If we fail to provide the level of service required, we make a payment to the customer affected. There can be certain exemptions to these compensation payments, for example during extreme weather events.

**H****Health Index (HI)**

A system for collecting and tracking condition (health) information of distribution assets.

**Health and Safety Executive (HSE)**

The government body responsible for enforcing health and safety legislation.

**High voltage (HV)**

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

**I****Incentive on Connections Engagement (ICE)**

This is a new incentive in RIIO-ED1 designed to encourage DNOs to improve the way they communicate with major connections customers.

**Incentive Strength**

The incentive strength represents the percentage that a licensee bears in respect of an overspend against allowances or retains in respect of an underspend against allowances.

### Information Quality Incentive (IQI)

This incentive encourages DNOs to forecast their costs accurately and maximise long term value for money for their customers by ensuring that their activities are carried out in the most efficient and cost effective way.

### Innovation Funding Initiative (IFI)

A funding scheme designed to encourage network companies to invest in appropriate research and development activities to enhance technical development of the networks and to deliver value (i.e. financial, supply quality, environmental, safety) to end customers.

### Inspections and Maintenance (I&M)

The activities we carry out to check and maintain the condition of our assets.

### Interruption Incentive Scheme (IIS)

The Interruptions Incentive Scheme (IIS) sets targets for planned and unplanned electricity power cuts. Performance is measured by both number and duration of power cuts. The mechanism both rewards outperformance and penalises underperformance against the targets.

### ISO 9001

An international standard for quality management systems.

### ISO 14001

An international standard for environmental management systems.

## K

### Kilowatt hours (kWh)

A kilowatt is a measure of energy equal to one thousand watts; a kilowatt hour is a measure of energy consumed over time.

## L

### Load Index (LI)

This is a measure of the extent to which our substations are utilised against their total capacity. The load index is used to measure the effect of load related investment.

### Load-related expenditure

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

### Low carbon economy

An economy which has a minimal output of greenhouse gas emissions.

### Low Carbon Networks Fund (LCNF)

This funding mechanism encourages DNOs to prepare for their role in the UK transition to a low carbon economy through the use of innovative technologies and approaches. This fund enables DNOs to innovate and trial new technologies and operational and commercial processes and is granted at two tiers:

- *Tier one funds small innovation projects*
- *Tier two funds significant innovation projects*

The LCNF will be replaced by the Network Innovation Allowance (NIA) and the Network Innovation Competition (NIC) during RIIO-ED1.

### Low Carbon Technology (LCT)

Technologies designed to reduce the amount of carbon we use, including electric vehicles, heat pumps, wind turbines and solar panels.

### Low Voltage (LV)

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

## M

### MOD Term

The term represents the incremental change to base revenue for the Relevant Year concerned. The value of the MOD term is calculated through the annual iteration of the ED1 Price Control Financial Model and is specified in a direction given by the Authority by 30 November in each Relevant Year.

## N

### Net Present Value (NPV)

Net present value is the discounted sum of future cash flows, whether positive or negative, minus any initial investment.

### Net Present Value (NPV) neutral

Alternative revenue profiles are net present value neutral if they have the same NPV. This term is usually used in the context of spreading revenues over time (i.e. a price control period) where the costs that they represent have already been incurred, or in comparing different profiles of allowed revenue.

## O

### Office of Gas and Electricity Markets (Ofgem)

Ofgem regulate the gas and electricity markets in the UK, encouraging competition to raise standards of service and give customers long term value for money.

### OHSAS 18001

International standard for the management of occupational health and safety.

### Operating expenditure (Opex)

Expenditure on operating and maintaining the network, e.g. fault repair, tree cutting, inspection and maintenance, engineering and business support costs.

### Outputs

The things which our customers directly value, such as reliability of supply, safety and excellent customer service.

## P

### PAS55

Publicly Available Specification for the management and optimisation of physical assets.

### Pension Protection Fund

The fund, established under the provisions of the Pensions Act 2004, to provide compensation to members of eligible defined benefit pension schemes, when there is a qualifying insolvency event in relation to the employer, and where there are insufficient assets in the pension scheme to cover the Pension Protection Fund level of compensation.

### Pension Scheme Administration

The range of activities that pension scheme trustees are required by legislation to undertake or commission in running the pension scheme. It includes, without limitation, the keeping of scheme records, scheme management and administration,

scheme policy and strategy, the provision of information to scheme members, the calculation and payment of benefits and liaison with tax and regulatory authorities, and the preparation of valuations. It does not include investment management fees which are remunerated by deduction from investment returns; or any activities which are the responsibility of the licensee, such as advisors to the licensee on managing or advising it on any and all aspects of its relationship with the trustees including recovery plans.

#### **Pension scheme established deficit**

The difference between assets and liabilities, determined at any point in time, attributable to pensionable service up to the end of the respective Cut-Off Dates and relating to Regulated Business Activities under Pension Principle 2. The term applies equally if there is a subsequent surplus.

#### **Pension scheme incremental deficit**

The difference between the assets and liabilities, determined at any point in time, attributable to post Cut-Off Date pensionable service and relating to Regulated Business Activities. The term also applies equally where there is a surplus for the post cut-off date regulated Notional incremental deficit sub-fund

#### **Price control (control)**

The control developed by the regulator to set targets and allowed revenues for network companies. The characteristics and mechanisms of this price control are developed by the regulator in the price control review period depending on network company performance over the last control period and predicted expenditure in the next.

#### **Priority Service Register (PSR)**

Our register of vulnerable customers, enabling us to provide additional support when required.

## R

#### **Real Price Effects (RPE)**

Increase in prices, of materials, direct staff or contract labour, over and above increases in the Retail Price Index.

#### **RAV — Regulatory Asset Value**

A financial balance representing expenditure by the licensee which has been capitalised under regulatory rules.

The licensee receives a return and depreciation on its RAV in its price control allowed revenues.

#### **Relevant Year**

##### **A year beginning on 1 April.**

#### **Resilience Tree Cutting**

This is the removal or extensive cutting of trees to ensure that they cannot cause damage to nearby power lines in the event of severe weather.

#### **Retail Prices Index (RPI)**

The RPI is an aggregate measure of changes in the cost of living in the UK. It differs from the CPI in that measures changes in housing costs and mortgage interest repayments, whereas the CPI does not, they are calculated using different formulae and have a number of other more subtle differences.

#### **Return on Regulatory Equity (RoRE)**

The financial return achieved by shareholders in a licensee during a price control period from its out-turn performance under the price control. The return is measured using income and cost definitions contained in the price control regime (as opposed to accounting conventions) and is expressed as a percentage of (share) equity in the business. Importantly, in the calculation the gearing (proportions of share equity and debt financing in the RAV) and cost of debt figures used are those given as the 'assumed' levels in the relevant price control final proposals. The aim of the RORE measure is to provide an indication of the return achieved by the owners of a licensee which can be compared to the cost of equity originally allowed in the price control settlement and to the return achieved by other licensees on an equivalent basis.

#### **Revenue = incentives + innovation + outputs (RIIO)**

Ofgem introduced a new regulatory framework in 2010 replacing previous RPI-X regime. It places more emphasis on incentives to drive the innovation needed to deliver a sustainable energy network at value for money to existing and future consumers.

#### **RIIO Electricity Distribution 1 (RIIO-ED1)**

The price control period that will run from 1 April 2015 to 31 March 2023. It is the first electricity distribution price control that will use the RIIO framework for setting allowances.

#### **RIIO Electricity Distribution 2 (RIIO-ED2)**

The electricity distribution price control period that will run from 1 April 2023 to 31 March 2031.

#### **RPI-X**

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

## S

#### **Secondary Deliverables**

Indicators of performance which may be used in support of the companies' required primary outputs

#### **Slow money**

The proportion of Totex which is added to the licensee's RAV balance on which the licensee receives a revenue allowance to cover finance (WACC) and depreciation costs.

#### **Smart Grid**

A generic term for a range of measures that are used to operate electricity networks allowing more generation or demand (load) to be connected to a given electricity circuit without the need for traditional reinforcement (or upgrade) of that equipment.

#### **Smart Grid Forum (SGF)**

The Smart Grid Forum was established by Ofgem and DECC in early 2011 bringing together key opinion formers, experts and stakeholders involved in the development of smart grids, with the aim of providing strategic input to help shape Ofgem's and DECC's thinking and leadership in smart grid policy and deployment.

#### **Smart metering**

Advanced gas and electricity metering technology that offers customers more information about, and control over, their energy use (such as providing information on total energy consumption in terms of value, not only volume), and/or allows automated and remote measurement.

#### **Stakeholder**

Anyone with an interested in, or affected by our operations.

### Sulphur Hexafluoride (SF6)

A potent greenhouse gas widely used in transmission and distribution equipment.

### Supervisory Control and Data Acquisition (SCADA)

This is the term used for the systems used to monitor and control distributed assets. It comprises the remote terminal units, communication infrastructure and human interface within central control rooms.

## T

### Time Value of Money Adjustment

A multiplier used when the award or application of a financial value, attributable to a particular year, is deferred until a later year, even where the deferral is routine and in accordance with a price control mechanism.

In basic terms, for any one year, the multiplier is  $(1+X)$  where:

- *X is the WACC for the licensee applicable to the period of deferral*

### Totex

The aggregate net network investment, net network operating costs and indirect costs.

### Totex Capitalisation Rate

The percentage of Totex which is added to RAV (slow money)

### Totex Incentive Mechanism (TIM)

TIM is the financial reward (or penalty) that companies are given in allowances for under or over spend on Totex. For RIIO-ED1 Final Proposals opening base revenues will be modelled on the basis that actual Totex expenditure levels are expected to equal allowed Totex expenditure levels (allowances). If actual (outturn) expenditure differs from allowances, for any Relevant Year during the Price Control Period, the TIM provides for an appropriate sharing of the incremental amount (whether an overspend or underspend) between consumers and licensees.

### Transform Model

The model — developed by EA Technology — which uses a representation of the network and calculates the investment needed to accommodate LCTs using either smart grid solutions or traditional network reinforcement.

The smart solutions include 'demand side response' as well as additional technology to move load around the network and utilise the full capacity of assets.

### Triennial Valuation

An actuarial valuation of a pension scheme which has been carried out to meet the requirements of Section 224(2)(a) of the Pensions Act 2004 and which details in a written report, prepared and signed by the Scheme Actuary, the value of the scheme's assets and Technical Provisions. Actuarial valuations are usually produced triennially but the term may also refer equally to any full actuarial valuation that is not an Updated Valuation.

### Turnkey

This is a contractual arrangement where the design and construction of a project is handed over to a third party.

## U

### Uncertainty mechanisms

Uncertainty mechanisms allow changes to the base revenue during the price control period to reflect significant cost changes that are expected to be outside the company's control. Examples include revenue triggers and volume drivers.

## V

### Vanilla Weighted Average Cost of Capital (Vanilla WACC)

This is the combined cost rate of funding calculated using a pre-tax cost of debt and post-tax cost of equity weighted by notional gearing.

### Vulnerable Customers

Customers who are medically dependent upon electricity, have special communication requirements or have other special needs with a dependence upon electricity (e.g. stair lift).

## W

### WACC

The Vanilla Weighted Average Cost of Capital is Ofgem's preferred way of expressing the rate of return allowed on the Regulatory Asset Values (RAV) of price controlled network companies. The use of Vanilla WACC means that the company's tax cost is

separately calculated as a discrete allowance so that only the following have to be factored in:

- *the pre-tax cost of debt — ie the percentage charge levied by lenders, and*
- *the post tax cost of equity — ie the percentage return equity investors expect to actually receive, weighted according to the price control gearing assumption.*

"Real Vanilla WACC" is used which gives a lower percentage than "Nominal Vanilla WACC" would (when inflation is positive). This is because inflation isn't taken into account in the determination of the Real Vanilla WACC percentage since revenue allowances (which include the Vanilla WACC return) are separately RPI indexed.

### Worst Served Customers

Customers who experience 15 or more higher voltage interruptions over a three year period, with a minimum of three in any one year.

# Table of acronyms

Acronym	Country	Definition
BR	UK	Base Rate
Capex	All	Capital Spending
DECC	UK	Department of Energy and Climate Change
DG	All	Distribution Generation
DNO	UK	Distribution Network Operator
DPCR	UK	Distribution Price Control Review
ESQCR	UK	Electricity Supply Quality and Security Regulations
GEMA	UK	Gas and Electricity Market Authority
IQI	UK	Information Quality Incentive
LCNF	UK	Low Carbon Networks Fund
NBV	UK	New Book Value
MEAV	UK	Modern Equivalent Asset Value
Ofgem	UK	Office of Gas and Electricity Markets
Opex	All	Operating Expenses
QoS	All	Quality of Supply
RAV	UK	Regulatory Asset Value
RIG	UK	Regulatory Instructions and Guidelines
RIIO	UK	Revenue = Incentives + Innovation +Outputs
ROE	All	Return on Equity
RPI	UK	Retail Price Index
RRP	UK	Regulatory Reporting Pack
Totex	UK	Opex & Capex
WACC	All	Weighted Average Cost of Capital







# SP ENERGY NETWORKS

## **SP Energy Networks**

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