RIIO-GD1 Fifth Year Annual Report

Year ended:
31 March 2018

WALES&WEST UTILITIES

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Strategic Performance Overview

1.0 Continuing to deliver for our customers

During 2017/18 my organisation experienced the harshest spell of weather since inception, significant political focus and a review of the RIIO framework. It is against this backdrop, that I am pleased to present our latest strategic performance report.

As the use of our network expands to new user groups in a changing energy system we're continuing to build on our successes to deliver for all our customers – including the most vulnerable across our region.

Some of our 2017/18 performance headlines include:

- Project Freedom – We have delivered one of the most ambitious and innovative projects to support the decarbonisation of heat in the UK. 75 hybrid heating systems with smart functionality are now live in a town in South Wales delivering lower cost, lower carbon and more secure energy for those most in need.
- We now have 18 biomethane sites delivering low carbon gas into our network, which provides enough heat, light and power for over 90,000 homes, more than three times the amount the Swansea barrage would have produced at a fraction of the cost.
- We now have 31 power generation sites which generate 2GWh electricity, providing the flexibility required as renewable electricity sources increase their proportion within the energy mix.
- Customer bills – 19% reduction from £149 at the start of GD1, to £132 in 2016/17 to £121 in 2017/18 (all in 2017/18 prices).
- Forecast bill at the end of RIIO GD1 – we remain on track to have a lower bill at the end of RIIO GD1 compared to the start of the control – outperforming our business plan commitment of a slight increase.
- Totex costs – as a result of our continuous focus on cost control we have once again delivered all our Outputs for less cost than our allowances, thereby returning to consumers their share of this saving. Despite this, there is significant cost pressure starting to appear, in particular as competition for labour increases.
- Physical Site Security Upgrades – We have largely delivered a comprehensive and efficient upgrade to all sites as identified by the Centre for the Protection of National Infrastructure (CPNI).
- Simplification of shareholder capital – during the year we have significantly simplified the structure of our shareholder capital deployed.

Our focus on putting customers first has brought significant success, as well as helping us meet our Outputs which we have delivered year to date and are on track to deliver for the full eight years.

Once again our efforts have been recognised across the board with:

- a world first “ROSPA Gold” award for the fifth year in a row from the Health and Safety Executive;
- the company of the year award at the IGEM / EUA national awards;
- reaccreditation by the Institute of Customer Service at Distinction level; and
- Investors in People Silver Status at the first attempt.

You will also recall that we became the first gas network to meet the requirements of British Standard 18477 for the support we provide to vulnerable customers.

We are very proud of all of these achievements as we continually seek to further improve the service we provide to customers.

Looking ahead

Whilst RIIO is clearly delivering for our customers, it is frustrating that network returns for the organisation are overstated through the use of Ofgem’s incomplete “RORE” measure. This has in turn generated interest from political and customer groups.

We are already thinking about the next price control period, speaking to our stakeholders about the future regulatory environment and what matters to them.

As Ofgem contemplates changes to the RIIO framework we must ensure it continues to deliver for customers but also provides a stable and sustainable environment for investment.

We’re committed to working closely with all stakeholders to make sure that we continue to deliver the value for money services that energy consumers want and need.

At the heart of our success are our people - from the front line to back office support. The outstanding value for money service we continue to provide is very much down to them. Our values driven culture, recently accredited by Investors in People, supports and challenges our people to deliver for customers in an effective, innovative way.

Leading Wales & West Utilities remains a great privilege for me. I want to thank colleagues, customers and all our stakeholders for their continued support, and I look forward to continuing to work with you all. I trust you find this report of interest.

Graham Edwards,

Chief Executive

Wales & West Utilities

Board Statement

Our ambition is to continue to deliver outstanding levels of gas safety, reliability, and customer service so that we are trusted and valued by the millions of people we serve every day – now and into the future.

The Company's vision of success is to be consistently recognised as a top performing company by our stakeholders and regulators.

Underpinning this strategy is a strong compliance culture which the Board directly monitors through its Health Safety & Environment, Audit and Treasury committees. Incentive arrangements for the senior management team are directly linked to safety, customer and efficiency targets. These targets are updated annually.

I am pleased to report that the Company has met all the output targets agreed as part of the RIIO-GD1 price control in 2017/18 and is on track to deliver the output targets across the remainder of the RIIO-GD1 price control. The Company has again demonstrated strong customer service and safety performance during a challenging year.

The focus of the Board is to support the strategy through significant investments and innovations aimed at improving the performance of the business.

The principal risks associated with the business and the associated mitigations are regularly reviewed by the Board and remain largely unchanged over the course of the year. These include breach of legal & regulatory obligations, health and safety failure, network asset performance failure, employee retention and financial risks associated with interest rates, liquidity and credit. Further details are set out in the Regulatory Accounts of the Company.

The long term future of the business is directly linked to the role of gas networks in meeting the UK's decarbonisation targets. The expanding role of the gas network, as highlighted by the increase in green gas connections and peaking power plants, shows significant opportunity for energy customers from increased integration of the gas and electricity networks, together with increased renewable gas and renewable electricity. In the home, Project Freedom (the use of hybrid appliances and smart controls) may well play a significant part in delivering the low carbon, low cost and secure heat required beyond 2050.

More generally it is important the UK government and Ofgem recognises and fully understands the current and future role of gas networks in meeting the energy needs of the UK.

The reported returns through the Ofgem RORE mechanism significantly overstate the cash returns received by the shareholders; this is largely because the current debt index used in RIIO-GD1 to fund the interest costs of the Company does not adequately fund our efficiently incurred cost of debt. The next price control period (RIIO 2) is a clear opportunity for the regulator to address such issues and support and stimulate efficient investment in the gas network to help support the key government ambitions in Wales and Great Britain.

As a Company we will continue to influence policy makers by making the case for effective use of the gas grid and decarbonised gas as essential elements of a low cost, low carbon and sustainable energy system.

Andrew J Hunter

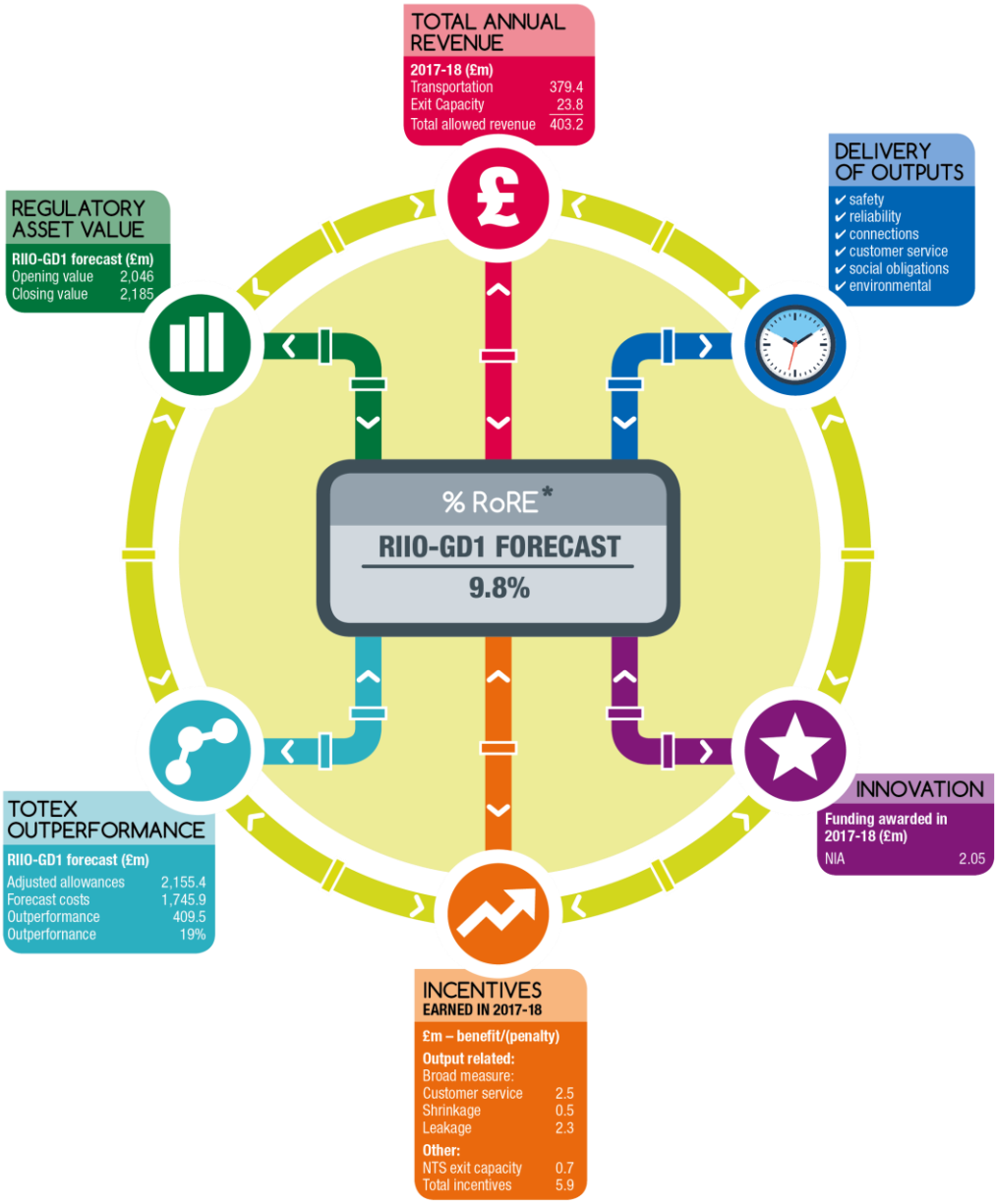
Chairman of the Board

2.0 Strategic Performance Overview

2017/18 Summary Performance

*Customer bill impact in constant 2017/18 prices

RIIO GD1 Forecast Performance

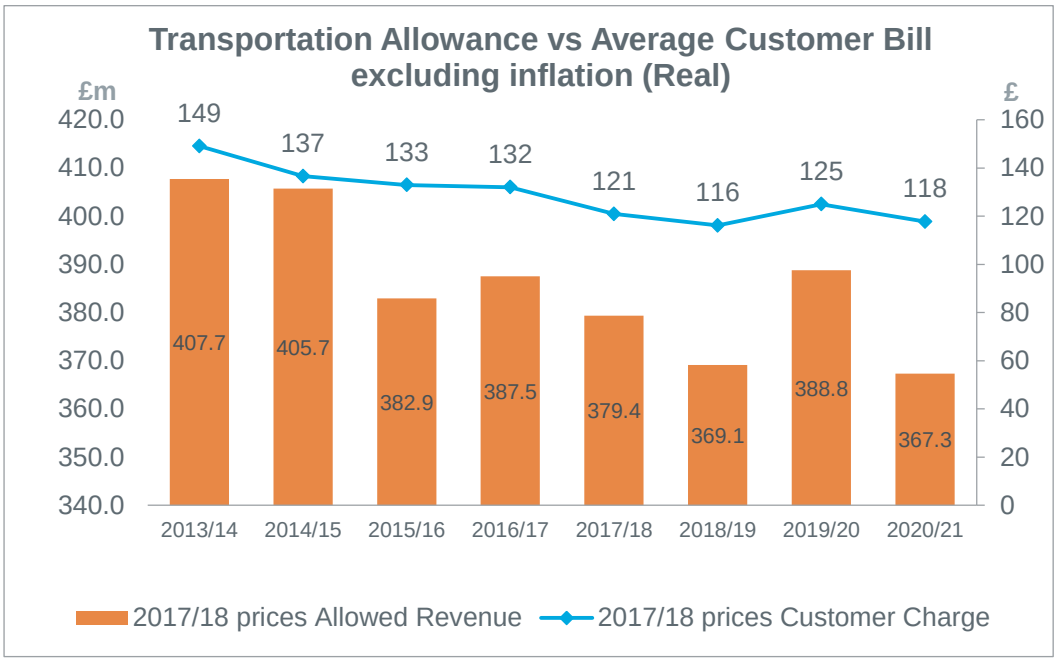


*Using a more inclusive measure of RORE than the Ofgem RORE calculation (Ofgem's calculation would be 11.8%)

2.1 Customer Bill Update

We have seen a further reduction in the customer bill of 8% between 2017/18 (£121) and 2016/17 (£132) and from £149 (19% reduction) at the start of GD1 (all in 2017/18 prices), consumers only benefit if passed on by shippers.

From the start of the price control the domestic customer bill (excluding inflation) has steadily fallen. This, in part, reflects the Totex underspend being shared through the MODt term which impacts from 2015/16 onwards. In 2019/20, the cost true up for business rates increases the allowed revenue for WWU. This has a corresponding increase in charges for the customer. The same was true for 2018/19 however was compensated by the negative 'k' from the over collection in 2016/17 which reduced the allowed revenues.

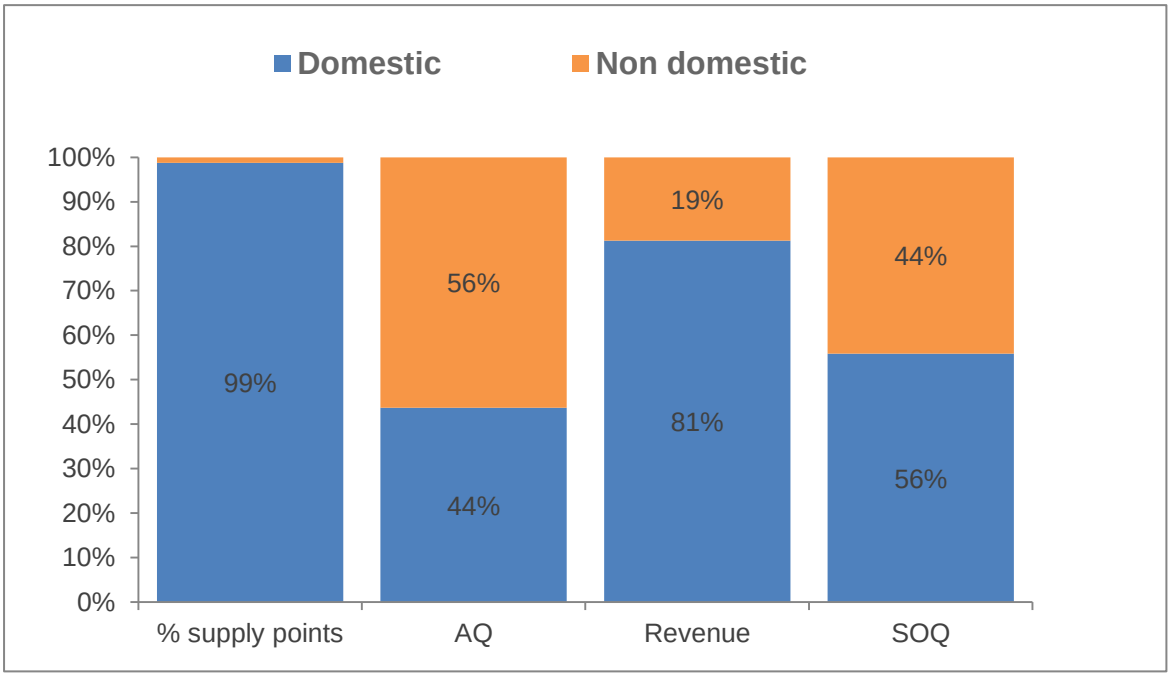


Figures exclude NTS exit capacity charges

Our network composition has continued to marginally grow over the past 12 months and we continue to supply over 2.5m connections.

Domestic loads make up over 98% of our connections but account for only 44% of the annual throughput, however 81% of our revenue is paid by domestic customers. This is due to the fact that large customers pay a lower unit rate on transportation charges, which is based on where

they are situated within the network. A smaller customer is more likely to be at the end i.e. gas flows through more of our pipes to get to the customer. Large customers are more likely to be closer to the start of the network i.e. using less of our pipes. The unit rates are weighted so that customers that use more of the network bear more of the cost of maintaining it.

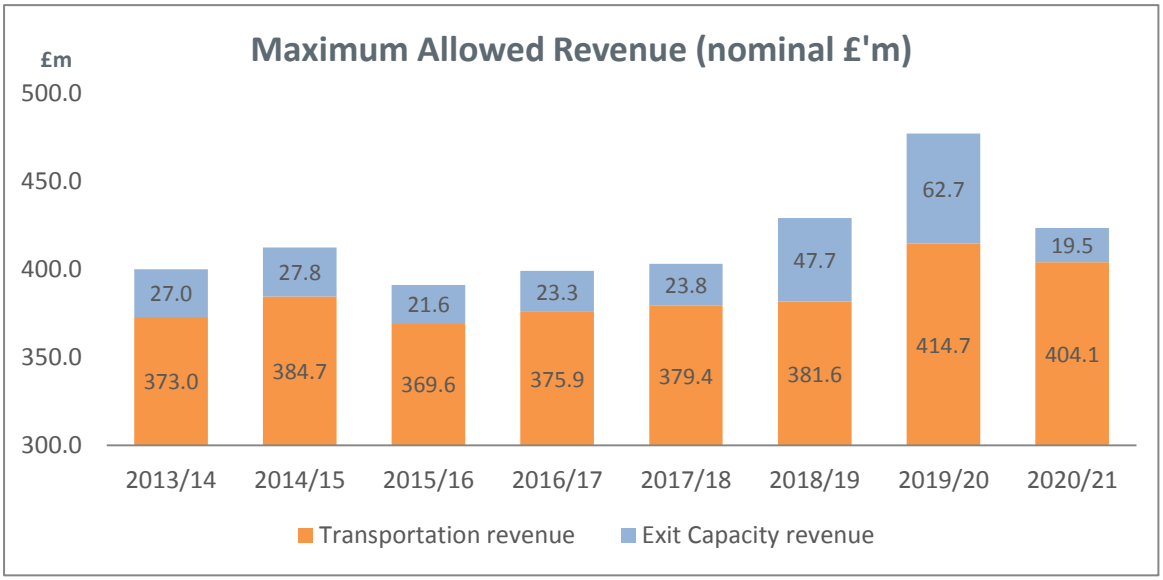


AQ = Annual quantity of gas transported

SOQ = Peak capacity usage (system offtake quantity)

The current average domestic consumer on our network uses an average AQ of 12,316 kWh of gas. The use of the average AQ is important, as the unit rates charged in any one year will reflect these. If a network's allowance remained constant throughout the price control, but its users required less capacity year on year, there would be a corresponding increase in unit rates in order to collect the allowance permitted.

2.2 Forecast Maximum allowed revenue over the price control



The latter years of the RIIO price control show total allowances increasing above those in the first six years. Two key reasons behind the changes are:

1. The NTS Exit Capacity costs, the amount we are charged by National Grid for them to get gas to our 17 offtakes, which WWU incur have increased dramatically from those forecast at Final Proposals (and to which our allowances were set). This results in the large increases in allowance (from £23.8m in 2017/18 to a forecast of £62.7m in 2019/20).
2. Business Rate charges, which are a pass through item, increased significantly at the latest valuation effective 6th April 2017 and which Ofgem deemed efficient after the network operators challenged the rating authorities. This increased annual costs from £27.5m in 2016/17 to £42.7m by 2020/21.

2.2.1 Allowed vs collected for 2017/18 (excluding exit capacity)

The allowed revenue collected in 2017/18 was £379.4m. In this period we actually collected slightly more at £380.1m (a difference to allowance of 0.19%).

This small over collection was driven by the assumption on chargeable base. We assume that each year the annual quantity (AQ) falls as the average connection becomes more efficient from new technology.

One of the benefits which Project Nexus (the new billing system within Xoserve) delivered is the rolling AQ and concept of a charging AQ. This removes the risk of future October changes impacting on collection.

We remain within the tolerances for revenue collection which are embedded within the licence.

2.2.2 Forecast performance in 2018/19

Forecast allowed revenue for 2018/19 is £381.6m, compared with a forecast collected revenue of £380.7m. This would result in an under recovery of £0.9m. The revenue adjustment "k", is subject to a two year lag and so will be reflected in the pricing decision for 2020/21. The forecast under collection is a result of the warmer weather in the summer months of 2018 than was anticipated at the time of price setting.

2.2.3 Forecast for allowances in 2019/20

The allowance in 2019/20 includes the relevant adjustments for the out turn for 2017/18 (the T+2 true up). These include:

- MODt which will pass back to the consumer the share of Totex underspend reported. MODt will further pass back to the consumer the element of saving from the lower cost of debt allowance and adjust for known reopeners.
- Incentives, which remain similar to the levels from 2018/19, reflect the strong performance against Outputs achieved. At the point of RRP submission the score for Stakeholder is not known, it has been forecast at no worse than the prior year however we are confident that lessons were learnt through the process and a higher score is anticipated.
- Pass Through Costs have increased by £11.0m due to an increase in NTS exit capacity and Business Rates charges in 2017/18 as detailed above.
- Cost True Up of our outperformance of totex allowances in 2017/18.
- 'k' which as noted above supresses allowance.

2.2.4 Future forecast to the end of RIIO GD1

The key variability over the future forecast remains within the cost true ups and exit capacity costs which have seen significant volatility over the last four years.

Business rates increased significantly in 2017/18 with the marginal increase against allowance being borne by the consumer in 2019/20 onwards. When taking exit capacity costs in addition to transportation, the scale of non-controllable cost pressures become ever more evident. If WWU is exposed to the same level of volatility in RIIO GD2, our ability to operate a safe, reliable and efficient gas network will be severely affected. Pass through costs are now at a level that exceed operating costs in the P&L statement.

2.3 Return on Regulatory Equity

Regulatory equity is based on the notional gearing of 65% as set out in Final Proposals, which results in an equity proportion of 35% of RAV for each GDN.

The rest of this section assumes the notional gearing level of 65% as set out in Final Proposals.

Using the methodology published by Ofgem so far this control, with which we disagree, we forecast our average eight year RORE for the RIIO-GD1 control to be 11.8% (2016/17 11.67%).

The calculated return represents the post-tax return of notional equity set at Final Proposals together with revenue adjustments. These include:

- all Outputs to be delivered within the eight year price control period,
- the calculation includes incentives forecasted to the end of the control for the above categories based on the report performance within the RRP, and
- includes a forecast for Discretionary Reward and Stakeholder Incentive (part of the broad measure incentive) at no worse than the last award.

The marginal improvement of 0.13% is in line with our actual and forecast Totex outperformance improvements since the 2016/17 RRP submission.

Ofgem's methodology for determining an allowance for the cost of debt, using a trailing 10 year iBoxx index, does not cover the efficient cost of debt finance incurred by WWU. This means that the published RORE overstates the return on equity on a notional basis for WWU.

Further the cash received by shareholders each year has been less than the allowed return on equity of 6.7%. This is expected to continue until the end of this control to 2021.

We continue to encourage Ofgem to develop a better calculation of RORE on an 'earned' basis and also on a cash distribution basis to shareholders. A suite of measures to judge company performance would be more appropriate than solely focussing on one measure.

Adjusting for the shortfall in the allowance for our efficient debt costs net of tax, we have calculated a revised RORE of approximately 9.8%. That adjusted % would be even lower for WWU if RORE would reflect only cash distributions to shareholders – in fact less than the allowed return of 6.7%.

2.4 Totex Summary

2.4.1 Our regulatory costs

We are forecasting to deliver our eight year Outputs at a saving of 19% of the controllable allowance we received. There are no silver bullets to our performance, just a continual focus on every aspect of spend that we can control.

- In 2013/14 we delivered a step change in our cost base.
  - This was achieved through tough decisions on internal resources and contract negotiations with our partners which ensured that resources were focussed on delivery of the right Outputs, and that costs were appropriately managed for that delivery.
  - The voluntary severance schemes and the introduction of revised terms and conditions for new employees along with our continued focus on productivity has significantly contributed to the success in WWU's cost base step change.
- We continue to win 3rd party metering and asset maintenance contracts that reduce the cost of the emergency service (including repairs) to customers.
- 90% of our controllable external spend is tested and tendered externally and continues to ensure competitive costs for our customers.
- Our leading asset management strategy that strives for lowest whole life totex cost is maintaining the health of our assets at efficient levels.
- Our broad stakeholder engagement and partnership approaches ensure costs such as unnecessary street works costs are avoided and services to vulnerable and fuel poor communities are delivered by those best placed to do so.
- We continue to update and develop our process management and systems to ensure effective support costs to our front line services. The leading external accreditations provide external verification of this strategy.
- Our wide-ranging people strategy from "hire to retire" provides the framework to support our colleagues as we deliver for our customers.
- The use of innovative daily performance information (Insight) at team level ensures continual focus on all key aspects of the business.

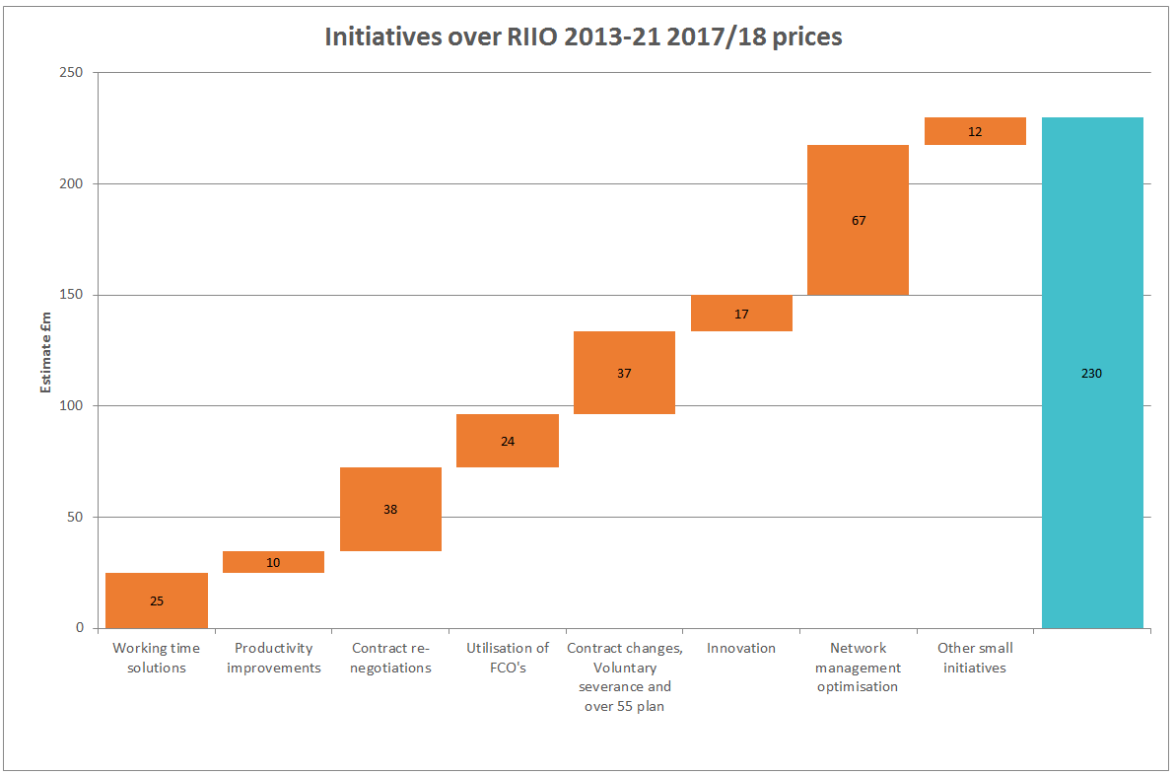
- The minimal roll out of smart meters to date has not allowed us to estimate costs associated with Smart Meters within the forecast.
- All of the factors above resulted in the first five years of RIIO delivering our Outputs at an average of 81% of the allowance we received.

2.4.2 Looking ahead

The continuation of the revised contract within our Repex programme is forecast to achieve our Outputs at a total of 81% of the allowance we received. It should be noted that this performance in GD1 was the result of the one off restructuring to the way works are delivered, and the contracts in place with our partners.

Similar savings are unlikely to be present in future controls, a reflection of the benefits which the certainty of a longer eight year price control provided the networks in negotiating with their contractors and suppliers.

A high level waterfall of cost movements is provided below



A summary table of totex versus allowance is highlighted below.

Forecast costs (2017/18 Prices)	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 F'cast	2020 F'cast	2021 F'cast	Forecast RIIO Total	RIIO-GD1 Allowance
Load related capex	27.1	23.0	30.7	26.4	25.6	30.5	25.6	26.8	**215.7**	309.3
Non load related capex	28.6	23.4	21.1	23.6	23.9	16.3	19.3	19.5	**175.7**	165.8
Controllable opex	102.0	96.1	88.0	89.3	77.9	90.4	92.3	94.8	**730.8**	860.5
Non controllable opex	80.5	80.6	80.3	105.0	116.0	91.3	96.5	90.2	**740.4**	642.6
Replacement expenditure	78.7	82.9	81.6	80.0	67.5	75.0	79.1	78.9	**623.7**	819.8
Total funded costs - including uncertainties	**316.9**	**306.0**	**301.7**	**324.3**	**310.9**	**303.5**	**312.8**	**310.2**	**2,486.3**	**2798.0**
RIIO-GD1 Allowance	362.8	356.0	352.0	348.4	346.3	343.8	345.5	343.2	**2,798.0**	

Whilst controllable costs continue to be delivered, we are also exposed to a number of costs which are considered outside of its control. You will note that our non controllable costs are now higher than our controllable costs.

2.4.3 Non Controllable costs

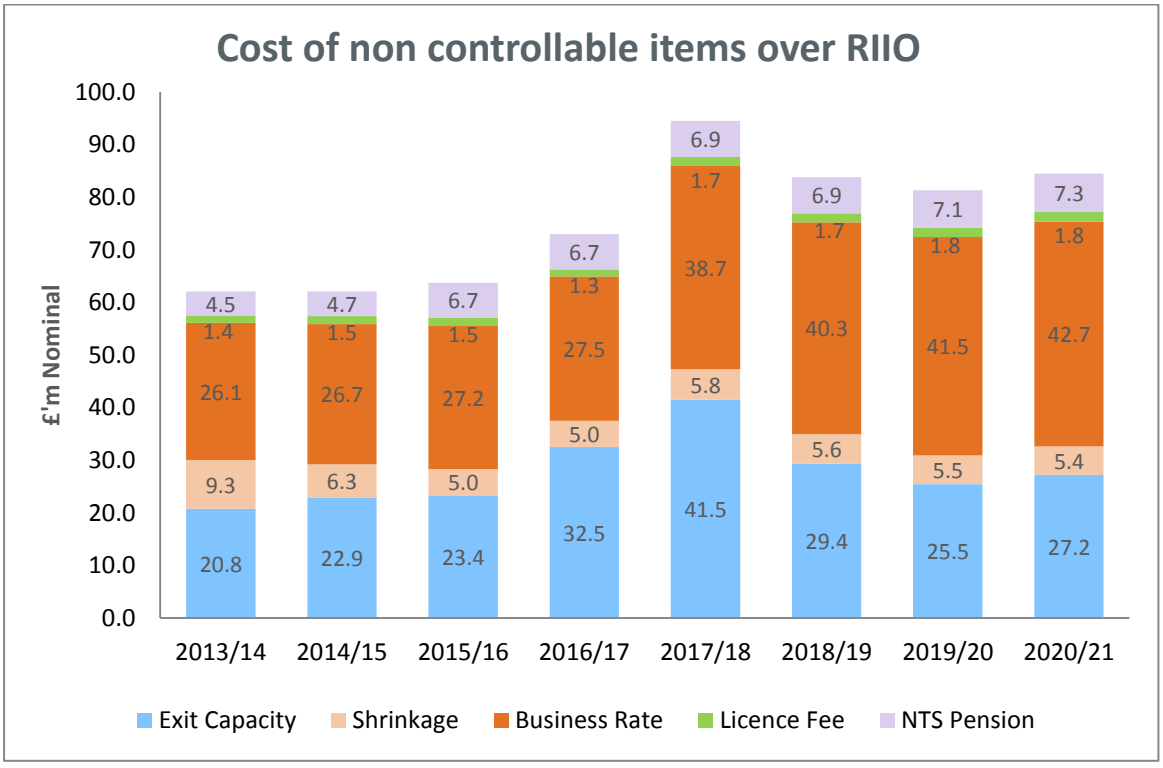
In addition to our focus on controllable totex, we are working hard to influence and minimise short and long term non controllable costs that are impacting our customers.

During 2017/18 this has included extensive engagement with Ofgem, National Grid, Shippers and other networks in relation to modification 621 proposed by National Grid NTS to amend the Gas Transmission Charging regime, so as to avoid unnecessary costs being passed through to

the end consumer on our network. The modification seeks to change the calculation of Exit Capacity charges by network.

WWU incurred an additional £9m cost increase between 2016/17 and 2017/18 regulatory years. This comprised an increase in Exit Capacity costs which WWU is charged for the capacity provided at each one of its 17 offtakes from the NTS.

The impact of these increased non controllable costs is that the benefits which are being passed back to the consumer through the Totex sharing mechanism of our controllable cost outperformance are being eroded by the necessity to pass on the increases in these non controllable costs (two years after they are incurred).



2.4.4 NTS exit capacity revenue and charges

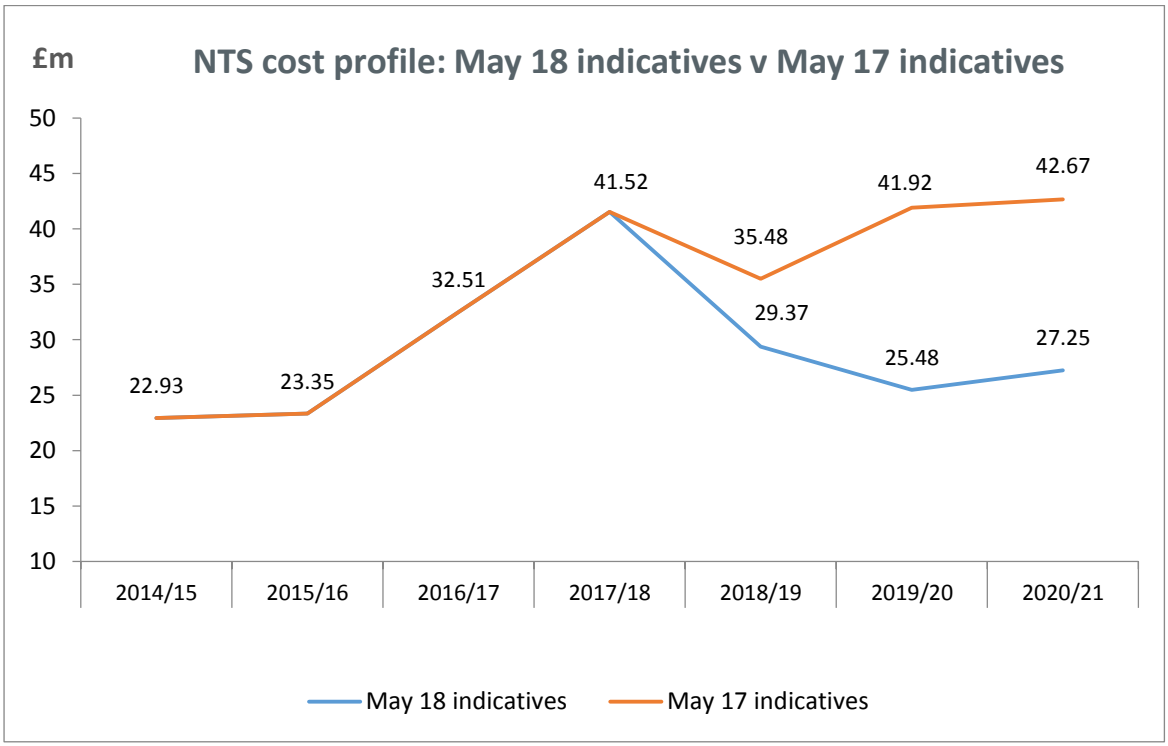
For RIIO GD1 WWU has been faced with dramatically changing costs at a number of its offtakes. The first of these changes occurred in the October of 2016/17 however the forecasts from NTS at T-3, T-2 and T-1 had not signposted these changes. Consequently allowances

were set too low for the cost incurred which results in a cost true up in 2017/18 and also 2018/19.

In 2016/17 the NTS forecast going forward showed that the increase to WWU would be enduring. Therefore, in line with our licence we requested, and Ofgem approved, an amendment to WWU's allowance reflecting NTS forecasts in T-3. This resulted in the allowance in 2018/19 and 2019/20 being increased to £41.9m and £46.5m in nominal prices respectively. The latest indicative prices published by the NTS now show a complete reversal in the costs being levied on WWU. Consequently allowances for 2018/19 and 2019/20 will exceed the costs to be incurred, which in turn will reduce allowances in their respective T+2s.

WWU is looking to voluntarily reduce its prices during 2018/19 to ensure consumers are not paying more than they need to. This requires Ofgem approval.

The cost profile for WWU demonstrates the volatility imposed by the NTS through their charging:



From 2019 NTS pricing must comply with the EU Tariff rules and therefore an industry modification (MOD 621) has been raised to amend the pricing methodology in place. WWU

has been engaged in this process from its outset in arriving at a solution that provides its ultimate customers with more stable and predictable prices than currently in place. This includes being the only network to raise an Alternative Modification (MOD0621D) which seeks to address the cross subsidy created by the Short Haul Tariff, and resolve some of the consequences the Capacity Weighted Distance (CWD) model creates by using a reduced weighting on the distance element of CWD.

The costs forecast above are all reflective of current published NTS forecasts made on the current regime within the UNC. Any changes which result from MOD 621 and its implementation will further compound the effect caused by a cost profile misaligned with the allowance profile for the networks. WWU remains committed to working with Ofgem, and its customers to arrive at a solution which is considered most equitable for all industry parties.

There are a number of options that would enable a more consistent and predictable profile of costs, revenues and charges to customers. These are as follows:

- A direct charge from NTS to shippers, i.e. exit capacity is no longer a pass through cost for GDNs reverting to the position in place before RIIO GD1.
- A faster true up mechanism, i.e. T+1 rather than T+2.
- Alignment of revenue timing between NTS and GDNs.
- Publication of final NTS exit capacity prices two years in advance to align to our allowance adjustment.

2.4.5 Theft of Gas

WWU continued to focus on identifying and investigating cases of theft of gas in 2017/18 in order to return this money to users through a lower allowed revenue charge. The net benefit to the consumer in 2017/18 was £328k.

In year prices £'000s	Gross payments received	Recovery Net of VAT	Associated Costs	Net benefit/(cost) to the consumer
2014/15	0.0	0.0	29.3	(29.3)
2015/16	496.8	415.4	95.6	319.8
2016/17	857.4	754.9	124.1	630.8
2017/18	540.2	489.8	161.8	328.0
Total	**1,894.4**	**1,660.1**	**410.8**	**1,249.3**

The number of theft of gas investigations carried out by WWU in 2017/18 has increased to 297 from 247 in the previous year. However the overall volume and value of gas illegally consumed has decreased when compared to 2016/17 affecting the overall recovery value. Consequently, we will request a pass through for £328k which will result in a reduction to our allowances in the regulatory year 2019/20.

2.5 Innovation and the Future of Energy

2.5.1 Changing shape of the network

With more than 80% of heat and power at peak times met by the gas network in the UK, we're planning for the future – to make sure we continue to deliver reliable energy at affordable costs for customers, whilst helping the UK meet decarbonisation targets.

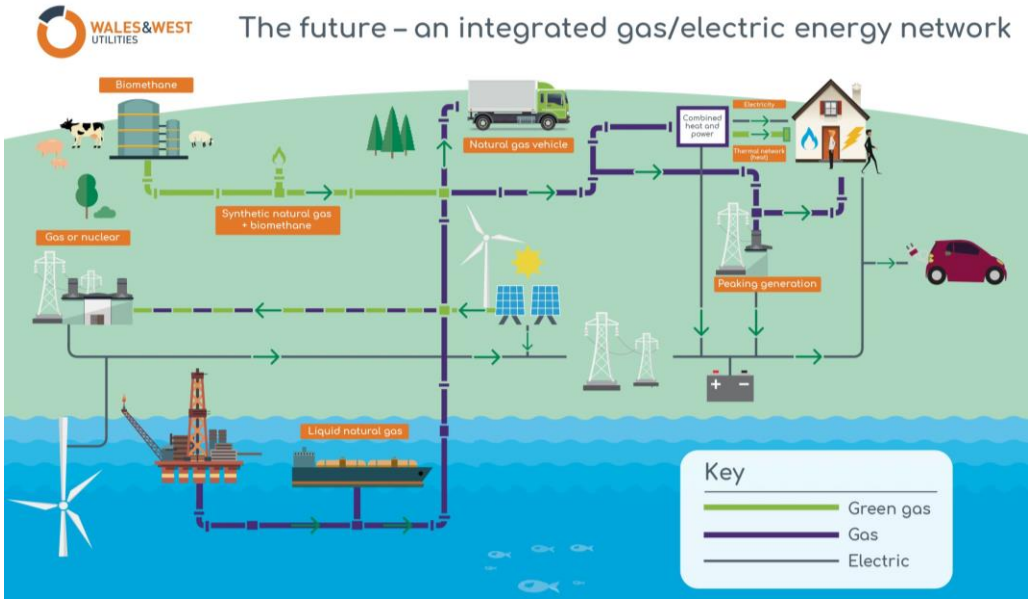
The facts

- There has been a shift change in the interaction between the gas and electricity networks – which is set to continue in the move to create a dynamic, flexible, integrated energy system to support a green energy UK.
- Gas and electricity are now increasingly intertwined at distribution level due to CHP, power generation and gas fired heat networks.
- After 40 years of investment we now have a 70% PE network.
- More electric vehicles are charged with intermittently-generated renewables, this creates larger demand swings on the electricity network, affecting demand on the gas distribution system as gas peaking plants respond to maintain capacity on the electricity network.
- Green gas entry has expanded rapidly from concept to practical BAU – further expansion needs investment.
- People are starting to realise that storage is key, not just for minutes, but hours/days/months, and across seasons – gas provides this at the cheapest cost. The gas network is already a storage battery.
- Intermittent renewables continue to be supported by gas – the energy system would not work without this balance.

Our response to date

- ✓ We have delivered a unique study on the benefits and issues with most heating options that exist today – The Bridgend Study. This study also looked at the willingness and ability of people to pay for changes to their existing systems.
- ✓ We've built a unique energy simulator 'Pathfinder 2050' that models future energy supply and demand – and its conclusions are clear. To make sure we have a secure supply of affordable and sustainable energy for future generations, we must continue to invest in and use the gas network. This model has generated significant interest from external parties who are planning to make use of it in developing their own scenarios. We are looking to make it available on our website in the near future, but have already shared an early version with Regen who have used it in the project they are undertaking for the Institute of Welsh Affairs, 'Re-Energising Wales'.
- ✓ We have completed a trial to test the network and customer benefits / challenges of a hybrid head system with smart controls – Freedom Project. This work was carried out in collaboration with Passive Systems, Western Power Distribution, Delta EE and other partners. The project has proven that through optimisation of hybrid heating systems, significant reductions can be made to CO2 emissions from domestic heating without significant investment in electricity networks and renewable generating capacity which would only add value at times of significant demand.

We continue to pro-actively share the outcomes from our work to ensure it is visible and challengeable. We are delighted that key decision makers within BEIS and Welsh Government are engaging with us on the outcomes and usefulness in their future plans.



2.5.2 Green gas

Green Gas injection in the lower pressure tiers of the gas network has reached a level at which we will have a requirement to compress gas back up through the network, effectively operating parts of the network in reverse. Establishing compression as a workable solution has the potential to remove a number of existing barriers to entry where Green Gas suppliers want to connect to parts of the network where there is insufficient demand available to take their gas. In 2017/18 we undertook preliminary works to assess the feasibility of installing compression in the part of our network which is most constrained. We have also been considering how other options such as dynamic pressure control and storage may help meet this requirement.

We are now defining a project which will consider how these optimisation technologies will work together to provide a robust assessment and recommendation of the best approach to take.

We now have 18 green gas connections with a maximum connected capacity of 1,585 GWh/year. If all of this gas was used for efficient electricity generation it would be enough to provide heat, light and power to approx. 90,000 homes more than three times the Swansea Bay barrage would have produced at a fraction of the cost.

2.5.3 Embedded power generation

We continue to receive enquiries for small generation plants and have connected a further seven sites this year which provide an additional 120 MW electricity output from our network. These small power stations play an important role in offering balancing services to the power networks, effectively using storage in our network to provide flexible generation to the electricity network. Power generation on our network is now 2GWh (vs Hinckley C 2.3GWh).

The levels of connection seen to date have not required additional storage investment on our Network. However, given the continued loss of coal and nuclear generation over the next few years, along with increasing power requirements for new loads such as electric vehicles and interconnectors, we are forecasting that peaking generation requirements will increase and storage investment on our network will become necessary in the near future.

This year we are also booking additional NTS Flat capacity in South West LDZ to meet the increase in gas demand associated with power generation. In Wales this has not been necessary as it has been offset by reductions in other industrial demands.

2.5.4 Investing in our future

In 2017/18 we invested £1.8m (2016/17: £1.8m) on the 22 (2016/17: 34) Network Innovation Allowance (NIA) projects we undertook, which reflects a decrease in project volumes and a higher average project cost - driven by the investment in Project Freedom during this year.

Our annual “Network Innovation Allowance Activity Summary” which details how we, and our innovation partners, have used the fifth year NIA, is available on our website.

The key headlines are:

- ✓ We took part in 22 innovation projects (21 NIA and 1 NIC project).
- ✓ 14 (2016/17: 21) of these projects have been worked on collaboratively with one or more of the other Network Licensees. We were the lead GDN on five (2016/17: four) of these projects.
- ✓ We maximise our innovation activities through collaboration. We are proud that 67% of our NIA project portfolio, since 2013, has been delivered in collaboration with one or more network licensees - this sets us apart from the sector average of just 23% driving our average project cost lower than that of our GDN partners.
- ✓ To date our innovation portfolio has delivered benefits of £9.2 million (£0.6m through NIA and £8.6m self-funded innovation).

- ✓ We reviewed our processes and have developed an innovation toolkit to assess, promote, share and enable efficient roll out of innovation – 53% of our total projects are implemented to business as usual status.
- ✓ We have participated in projects with over 100 unique partners - since 2013 we have nurtured relationships with over 335 organisations, business of all sizes and academia.
- ✓ We have completed a range of research projects to help support the UK's future energy requirements. Our projects support delivery of key priorities:
    - 10 projects Demanding Safety Always,
    - 2 projects Driving Outstanding Service,
    - 12 projects Delivering Value for money,
    - 12 projects Providing a Reliable Gas supply & Promote Sustainability, and
    - 9 projects designing for our Future.

Some examples of how we have achieved this are outlined below:

- Our three year, Eye in the Sky project brings together key industry bodies, the Department of Transport through the Transport Systems Catapult and the Civil Aviation Authority and both the gas and electricity networks to explore and develop, through field testing, an industry standard for beyond visual line of sight drone flights to inspect critical network infrastructure pipelines and overhead lines.
- The Permanent Leak Repair Clamp project has completed its first two phases and explores both current and new methods of repairing the above 7 bar pipeline network to deliver a lower cost and risk solution. It will develop a consistent method of assessing the operating life of a temporary repair clamp and deliver a new, more efficient way to repair leaks on our high pressure network. We have gained support from all UK gas networks for this project.
- We have looked to SGN's NIA project – 'Self amalgamating Tape' for inspiration to solve the issue of how to temporarily repair pipework and reduce cut-offs. The innovative sealant 'Duraseal' replaces the use of traditional products, which required constant monitoring and was often not appropriate anyway. In field trials, Duraseal proved safer, quicker and more effective, meaning we can reduce disruption of supply to customers and save money too. More than 600 of our engineers will be trained to use this method of repairing above-ground pipes on our network before Winter 2018.

- ✓ We developed an innovation roadmap built from feedback on problems and challenges from colleagues across our business identifying areas where we could improve our performance; this has been collectively assessed and prioritised by many of our senior management / team to create a dynamic innovation programme to 2021.
- ✓ Since 2013, we have completed 56 NIA projects with a total investment of £6.6m. Our portfolio has a range of operational efficiency innovation and future of energy exploration.
- ✓ During the year 2017, we not only used media channels to share and promote our innovation project findings, we took to the podium at over 50 events presenting our latest project findings and participated in over 170 events such as the IGEM annual conference, Utility Week Live and the NJUG conference.
- ✓ We actively review the implemented gas NIA project portfolio to highlight the projects that we want to adopt, the projects that we want to learn more about, and the projects that have limited benefit for our network due to differences that exist, for example in our asset base or in the geography or demographics of our network area.
- ✓ To date, we have assessed trialled and adopted 39% of projects implemented by other GDN's. We adopted five technology solutions from other networks' NIA projects examples include Cadent's Fence Feet, SGN's Osprey Pressure validators and Duraseal, NGGT's Minilog stray current monitoring devices for Cathodic Protection and NGN's Stub end abandonment project.
- ✓ We identified seven more that are due to be rolled out by other UK gas networks that we want to adopt. We'll be working closely with those networks to review these projects such as Cadent's Serviboost that can reduce the impact of customers gas supply being interrupted from poor pressure problems.

Looking ahead, we plan further investment and research aligned to tackling today's challenges and developing a sustainable future.

2.6 Summary of Output Performance

The headline is that we continue to deliver the commitments measured annually and across all of RIIO GD1. 2017/18 has been a testing year with some of the worst weather ever experienced across our geography albeit only for a short period. As we look ahead to the end of RIIO GD1 our key concerns and challenges are:

- Fuel Poor connections. The change to the eligibility criteria after we agreed a 20% increase to our RIIO GD1 commitments will make achieving the additional 20% very tough.
- Secondary workload deliverables – metallic service replacements. We have been engaged with the Ofgem Cost & Output team to highlight our strategy and approach. In simple terms we are not seeing the target mix of work to deliver the numbers anticipated ahead of RIIO GD1. We will deliver our committed Network Output Measures (NOMs) targets and will use this measure to demonstrate that the lower level of metallic services workload has been risk traded off against more efficient work.
- Interruptions targets – WWU was the only GDN which chose not to resubmit targets as part of the MPR+ review of interruptions. We are committed to our original challenging targets and intend to deliver these within RIIO-GD1 rather than weaken these targets.
- Smart Meter rollout – The supplier led programme has been delayed and we will see the mass rollout over the remaining RIIO GD1 period and possibly into RIIO GD2. We are engaged locally and nationally with the suppliers and will continue to play our role to support our customers.
- The development and delivery of the RIIO GD1 close out process – we would welcome early engagement on this.
- RIIO-GD2 Outputs – we have already started our stakeholder engagement processes and look forward to engaging with Ofgem and all relevant stakeholders to deliver a suite of Outputs and Outcomes that stakeholders require.

2.6.1 One Year Outputs

Primary Output	Deliverable	Units	FP target	2017/18	2016/17	2015/16	2014/15	2013/14
Connections	Guaranteed Standards of Performance		✓	✓	✓	✓	✓	✓
Environmental	Shrinkage	GWh	409	371.5	378.5	381.1	394.8	417.4
Safety (emergency response)	97% Controlled gas escapes	% attended within 1 hour	97%	98.60%	99.40%	99.60%	99.60%	99.49%
	97% Un-controlled gas escapes	% attended within 1 hour	97%	98.00%	98.50%	98.60%	98.50%	98.30%
Safety (management of repairs)	"GS(M)R 12 hour escape repair requirement"		✓	✓	✓	✓	✓	✓
	Management of repairs (Repair risk)		✓	✓	✓	✓	✓	✓
Safety (major accident hazard prevention)	GS(M)R safety case acceptance by HSE		✓	✓	✓	✓	✓	✓
	COMAH safety report reviewed by HSE		✓	✓	✓	✓	✓	✓

Primary Output	Deliverable	Units	FP target	2017/18	2016/17	2015/16	2014/15	2013/14
Customer service	Planned interruptions survey	Scores out of 10	8.5	8.74	8.62	8.72	8.68	8.59
	Emergency response and repair survey	Scores out of 10	9	9.53	9.55	9.55	9.44	9.14
	Connections survey	Number	8.4	9.19	9.17	8.88	9.01	8.34
	Complaints metric	Number	11.57	2.8	2.83	4.43	6.93	7.39

2.6.2 Forecast Eight-Year Outputs

Primary Output	Deliverable	Units	FP target	2017/18	GD1 to Date	Forecast to end of GD1
Connections	Introduce distributed gas entry standards			✓	✓	✓
Social Obligations	Fuel poor connections 2	# connections	12,590	1,051	8,499	12,590
	Carbon monoxide awareness		✓	✓	✓	✓
Environmental	Shrinkage (leakage)	GWh	381.2	350.4	350.4	323.6
	Provide biomethane connections	Total Connected Capacity KWh	✓	✓	✓	✓

Primary Output	Deliverable	Units	FP target	2017/18	GD1 to Date	Forecast to end of GD1
	information					
Reliability (loss of supply)	Duration of planned supply interruptions	Million minutes	92	7	53	77
	Duration of unplanned supply interruption	Million minutes	45	4	29	44
	Number of planned supply interruptions	#	451,235	35,461	234,812	352,316
	Number of unplanned supply interruptions	#	90,169	8,302	48,038	77,840
Reliability (network capacity)	Achieving 1 in 20 obligation		✓	✓	✓	✓
Reliability (network Reliability)	Maintaining operational performance		✓	✓	✓	✓
Safety (mains replacement)	Iron mains risk reduction (based on MPRS)		98,727	10,317	89,144	105,802
	Sub-deducts networks off-risk		✓	✓	✓	✓

2.7 Performance against Primary Outputs

2.7.1 Connections

Exit connections

In year output	Deliverable	2017/18	2016/17	2015/16	2014/15	2013/14
Connections	Guaranteed standards performance	✓	✓	✓	✓	✓

We have once again maintained our performance in Guaranteed Standards well above the benchmark levels set by Ofgem.

We are committed to providing our customers with the best customer experience at an affordable cost. We have expanded the mediums used to engage with our customers, with specialist social media resources enabling us to reach a wider audience with relevant up to date information.

Entry Connections

In year output	Deliverable	Units	FP Target	2017/18	2016/17	2015/16	2014/15	2013/14
Connections	Introduce distributed gas entry standards	Total Live connection (#)	N/A	18	16	12	2	1

We continue to believe in a future integrated energy network and have introduced distributed gas entry standards to support the connection of distributed Biomethane gas. We have also connected a number of peaking generation plants within our network as well as a connection to supply gas for a fleet of city buses. These elements are all demonstrating that the future is already here.

Injecting gas into the distribution network directly helps both achieve climate change targets (reducing reliance on fossil fuels) and improve security of supply. We continue to support

potential and existing connections through the complex accession process to ensure a reliable, clean and safe supply of gas into our network.

We now have 18 green gas connections with a maximum connected capacity of 1,585 GWh/year, with enquiries for a further 57 potential connections (including 2 for coal bed methane). If all of this gas was used for efficient electricity generation it would be enough to provide heat, light and power to approx. 90,000 homes. In 2019, we are hoping to connect our first synthetic gas entry site at Swindon utilising gas from domestic black bin bag waste.

2.7.2 Environmental

In year output	Deliverable	Units	FP Target	2017/18	2016/17	2015/16	2014/15	2013/14
Environmental	Shrinkage	GWh	409	371.6	378.5	381.1	394.8	417.4

8 year forecast	Deliverable	Units	FP Target	2017/18	2016/17	2015/16	2014/15	2013/14
Environmental	Shrinkage (leakage)	GWh	398	350.4	357.9	363.0	376.0	398.0
	Provide biomethane connections information	Total Connected capacity (KWh)	✓	123,292	108,125	86,125	35,208	5,400

Our primary impact on the environment is gas lost to atmosphere during transportation through our network.

Utilising pressure control systems and reinforcing our network we actively manage system pressures down to a minimum and therefore also minimise emissions. We invested heavily in pressure control systems in previous price controls, saturating our network where it could be justified through cost benefit analysis. This investment has significantly benefitted today's consumers.

We performed this work in advance of the other GDNs and have therefore already realised the opportunity which those other GDNs still have to further reduce emissions through installing new control systems.

Therefore, for us mains replacement is the most significant contributor to reducing emissions, delivering over 90% of the reduction in RIIO-GD1 to date. This equates to a reduction of 269,000 tonnes of carbon dioxide equivalent (CO_{2e}) saved over RIIO-GD1 to date, and a total of 606,000 tonnes CO_{2e} forecasted to be saved over the current pricing period. Without mains replacement we would fail to meet our emissions targets.

A further aspect of our role in the environment is in supporting wider decarbonising strategies.

We now have 18 DN entry sites connected to our network, one within Wales and the remainder in the south west. These sites produce 'green gas', for use by our customers, having a direct impact on their decarbonisation without the need for expensive works within the homes.

Our support of new peaking generation plants and changes to the contracts with existing power stations means that power can be generated on a more flexible basis by power stations within our network. This is supporting the decarbonisation of the power grid by ensuring that intermittent sources can be accommodated with no risk to the reliability of those networks.

We are also proud of our environmental achievements and again maintained certification to ISO 14001 environmental management. By utilising and developing industry-wide best practices, we have reduced our environmental impact. Key areas of focus have been climate change, the reduction in disposal of waste to landfill and the use of quarried stone. Protecting the environment is a key focus for us going forward, and we are constantly looking for ways to minimise the environmental impact of our past, present and future activities.

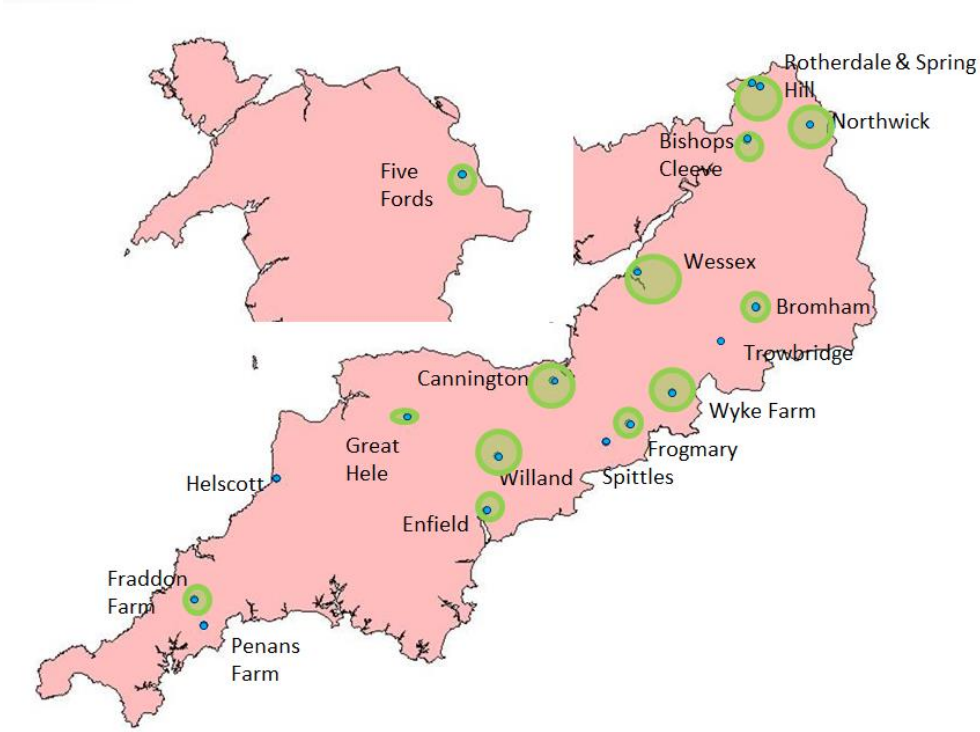


Figure 1 showing location and relative size of connected sites within our region

These sites have the capacity to supply over 90,000 domestic homes with heat, light and power, a contributor towards the Government's 2020 renewable heat targets.

Uncertainty on future biomethane connections has been introduced by the changes to the Renewable Heat Incentive (RHI) scheme for future plants. However we continue to work with potential connectees to support and encourage this growth which we believe is a positive development in the future viability of the energy network.

2.7.3 Social

8 year forecast	Deliverable	Units	FP Target	GD1 to date	Forecast to end of GD1
Social obligations	Fuel Poor Connections	# connections	12,590	8,499	12,590
	Carbon Monoxide awareness	Increase awareness	✓	✓	✓

Fuel Poor Connections

We completed 1,051 fuel poor scheme funded connections in 2017/18, down from 1,596 in 2016/17. Five organisations have obtained funding from the Cadent Warm Homes fund in our network but phasing means that only a little of this work was delivered in 2016/17. A lack of funding from the Welsh Government NEST scheme and the end of the DECC CHF combined with no direct funding of heating systems from ECO2T, and a restricted ability for social housing to be funded under the FPNES all contributed to this reduction.

Carbon Monoxide awareness

Stakeholders continually place raising the awareness of carbon monoxide (CO) as their top priority. Feedback from a range of stakeholders said we should make sure we target CO awareness and alarm installation to those most at risk. As a result, last year:

- More than 4,500 CO alarms were distributed
- 2,600 (56%) CO alarms were installed by our partners as soon as they identified a vulnerability
- 96% of our CO alarms went to those most affected, compared to 33% during 2016/17

We also adopted the Safety Seymour initiative from Cadent in 2018, targeted at Year 2 pupils, and have reached more than 90 children so far.

In early 2017 we developed a new online CO safety initiative in the form of an online game, called 'Crack the COde' (http://www.wwutilities.co.uk/crack-the-code/). More than 590 people 'Cracked the COde' during 2017/18 and we've followed this with three short animated films, targeting people at specific and relevant times of the year – such as holiday season when

people are camping and using BBQs – to help spread awareness. These animations have been viewed more than 300,000 times.

Vulnerable Customers

We are fully committed to supporting the most vulnerable and fuel poor across our geography.

Gas Safety Ambassadors

Stakeholders at regional workshops told us we should continue to raise CO awareness among children, one of the groups most affected by this poisonous gas. We've utilised 20 existing staff members on a voluntary basis to become colleague Gas Safety Ambassadors (GSAs) who go into schools and other groups such as Brownies to raise awareness of CO safety.

CO awareness sessions are tailored for Key Stage 1 and Key Stage 2 children and we've reached more than 550 pupils since introduction in early 2018.

"*Really positive, a good way of introducing the harmful nature of CO – a nice day of activities*." (Teacher, primary school)

Community Energy Champions

Following the success of our Fuel Poor Reduction Hubs in 2016/17, and to support the shift in stakeholder focus to prioritise people in vulnerable situations (regional workshops and CFP members), we launched the Community Energy Champions (CEC) project in partnership with our fuel poor partner, Warm Wales.

CECs offer a range of advice on debt and benefit, home and personal safety, tariff switching, energy efficiency and health and wellbeing. They identify 'hard-to-reach' vulnerable and fuel-poor households through Foundation Data for Robust Energy Strategies (Fresh) mapping, which layers data on poor health, poverty, poor housing and over-65s so we know where we need to focus our resources.

We've targeted three different approaches in south Wales, north Wales and Cornwall, working with key support services in local authorities and helping lift people out of fuel poverty in ways other than simply providing a gas connection. We're committed to this approach and will be trialling telephone referrals through organisations such as Citizens Advice and Centre for Sustainable Energy in future.

Increasing access to Priority Services Register (PSR) support

In line with our stakeholders' feedback to continue to focus on people in the most vulnerable situations, we aim to maximise our interactions with the thousands of people we come into contact with every day through our work in local communities.

Last year, we provided vulnerability training to all our 1,250 customer facing colleagues, and created four Vulnerability Champions to whom other colleagues can refer with questions about customer vulnerability.

We're training more Vulnerability Champions this year.

"*Now I've had the training, I feel in a much better position when I meet someone with dementia – I know what to do.*"

Emergency Engineer, Wales & West Utilities

Stakeholders at our Stronger Together conference told us about the importance of increasing the number of people on the PSR and regional stakeholders suggested an online form.

We've increased the number of people on the PSR by using targeted social media, online forms and our partnerships. As a result, we had more than 3,500 referrals in 2017/18, a 62% increase on 2016/17.

- 25% PSR referrals from partners – 559% increase on 2016/17
- Facebook social media targeting achieved 296 referrals

We were the first network to get data-sharing agreements with a DNO and a water company for PSR referrals. We've shared this agreement template and our partnership process with the Safeguarding Customer Working Group.

Now all Distribution Network Operators (DNOs) will data share with water companies in their area, helping increase the number referred to the PSR and making it an easier experience for customers.

2.7.4 Customer

In year output	Deliverable	Units	2017/18	2016/17	2015/16	2014/15	2013/14
Customer Service	Planned interruptions survey	Score of out of ten	8.74	8.62	8.72	8.68	8.59
	Emergency response repair survey	Score of out of ten	9.53	9.55	9.55	9.44	9.14
	Connection survey	Score of out of ten	9.19	9.17	8.88	9.01	8.34
	Complaints metric	#	2.8	2.83	4.43	6.93	7.39
	Stakeholder engagement	Metric score	5.0	6.0	6.05	7.05	6.3

Stakeholders told us we should continue to benchmark ourselves against organisations outside our industry. So we've continued to have our customer service independently evaluated by the Institute of Customer Service (ICS), which awarded us its ServiceMark with Distinction in 2017 for meeting its demanding national customer service standard. We achieved a customer satisfaction score of 90.4, for our whole business, considerably higher than the utility sector benchmark of 73.3 and the all-sector benchmark score of 77.4.

Jo Causon, Chief Executive at The Institute of Customer Service said:

"Achieving ServiceMark once is a sign Wales & West Utilities is determined to demonstrate a commitment to continuously improve customer service standards and constantly evolve plans for service improvement. Achieving it again demonstrates a determination to meet customer needs as their preferences constantly change and evolve. By continuing to respond to the demands of their customers, Wales & West Utilities will be in a stronger position to offer them what they want, when they want and how they want it."

We gained the British Standard for Inclusive Service Provision (BS 18477) in 2016/17 and, thanks to work we've done and initiatives we've introduced and evolved since, such as our Customer Support Officers, the standard has been verified again. We're the first gas network to gain this accreditation. Our whole business was audited, not just our Customer Service team, confirming our processes and practices are evolving to maintain the highest standards.

One significant impact we have on our customers comes from interruptions.

Our average planned interruption time for 2016/17, the most recent comparative information available, was the best of all GDNs at 200 minutes per interruption, a significant improvement of half an hour per interruption compared to our previous year's performance. This compared with an industry average of 316 minutes and the worst performing GDN at 392 minutes. We've held this leading position since 2008/9.

"There is strong support from our stakeholders for Live Insertion on the basis that one interruption is better than two (even if the scenario is one long versus two short)"

Our performance in unplanned interruption times is equally low. Again in 2016/17 (the latest available comparative information), our average unplanned interruptions time was 492 minutes per interruption, vs an industry average of 1,947 minutes. These times represent significantly shorter periods without gas, benefiting the customer and their overall satisfaction with WWU as a customer focussed business.

WWU is proud of its performance which continually exceeds the benchmarks set out by Ofgem. In order to maintain these levels of performance we regularly test best practice against our current processes and seek to continually improve what we do and how we do it.

Unplanned interruptions are typically higher in the winter months when repeated freezing and thawing of the ground weakens pipes. The 2017/18 winter saw severe weather conditions not experienced in RIIO-GD1 to date. Our winter preparedness plan stood up to the test of the 'beast from the east' and we maintained a frontier interruptions performance despite covering the area of the UK worst hit by the extreme weather.

We scored 9.15/10 for overall customer satisfaction this year in the Ofgem surveys. This is an improvement on the 9.11 scored in 2016/17. Planned work saw the biggest improvement in scores. This is largely attributed to acting on customer feedback from focus groups. An example being the trial of recruiting Customer Support Officers (CSO) to improve communication with customers before, during and after our works. The success of this trial has resulted in a wider recruitment of nine CSOs located around the network. CSOs visit homes and businesses to talk to customers before projects start and find out about vulnerabilities and

potential problems, such as holidays. They're on site while we're working and follow up with customers once we've completed. As a result, queries have reduced by 35% and complaints by 20%. Focus on the impact of team working practices has also assisted on reducing interruption times.

Our overall complaint handling score is 2.8 this year compared to 2.83 last year (the lower the better as Ofgem's target is <11.57). Our complaints resolution improved during the year, 83% of complaints were resolved within 24 hours of receiving them during 2017/18, a 2% increase on 2016/17. Overall complaints were 1,555 on 260,000 customer interruptions. Four years earlier we had 2,519 complaints at the start of the control.

2.7.5 Reliability

8 year forecast	Deliverable	Units	8 year FP Target	8 year forecast
Reliability	Duration of planned supply interruptions	Millions of minutes	92	77
	Duration of unplanned interruptions	Millions of minutes	45	44
	Number of planned supply interruptions	#	451,235	352,316
	Number of unplanned supply interruptions	#	90,169	77,840
Reliability (network capacity)	Achieving 1 in 20 obligation	Capacity booked	✓	✓
Reliability (network reliability)	Maintaining operational performance	To maintain	✓	✓

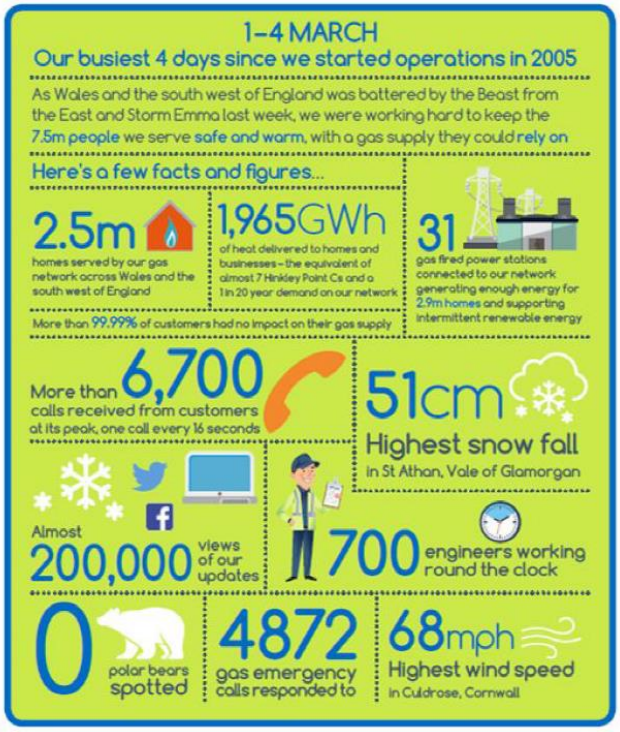
The Ofgem MPR+ review of interruptions targets concluded in 2017/18 with Cadent, NGN & SGN having targets reset. WWU chose not to submit revised targets through this process. We consider our targets most challenging of all GDNs but our stakeholders tell us this is important to them so we aim to achieve the targets set in GD1 Final Proposals.

We continue to use live insertion where appropriate which minimises disruption by being able to undertake work without isolating supplies and therefore keeping the consumer "on gas" for longer. We have sought to share this practice with the other gas networks to help identify if other networks could utilise this technique further which we continue to see as a key success in the way we manage our repex programme.

The 2017/18 winter gave us severe weather conditions not seen since 2010/11. The combination of exceeding our 1:20 peak demand and the extreme snow fall and temperatures significantly tested our network and our winter preparedness plans.

Weathering the storm – Storm Emma

During Storm Emma and the Beast from the East, we handled more than 1,200 gas emergency calls a day (on an average winter's day we'll receive around 300), many of which related to frozen gas boiler condensate pipes, something we weren't able to resolve. However on Christmas day 2017 we only received 24 calls, making planning of resources to ensure standards are met, very difficult.



Social media was full of people wondering why their boilers weren't working. In total we received more than 6,700 calls – one every 16 seconds at its peak. To help people resolve their problems and reduce the volume of these calls, we created a social media plan to reach a wide audience quickly. We:

- proactively contacted influential stakeholders in our network, such as MPs and AMs, to update them and ask them to share our pre-constructed social media status updates

- created a short film, presented by our Director of Operations, to tell customers what to do if they suffered a loss of gas supply or suspected CO poisoning. Our film was viewed more than 48,000 times and more than 99.99% of the customers we serve saw no impact on their gas supply.

2.7.6 Safety

In year output	Deliverable	2017/18	2016/17	2015/16	2014/15	2013/14
Safety (management of repairs)	GSMR 12 hour escape repair equipment	✓	✓	✓	✓	✓
	Management of repairs (repair risk)	✓	✓	✓	✓	✓
Safety (major accident hazard prevention)	GS(M)R Safety case acceptance by HSE	✓	✓	✓	✓	✓
	COMAH safety report reviewed by HSE	✓	✓	✓	✓	✓
Safety (emergency response)	97% Controlled gas escapes attended inn 1 hour	✓	✓	✓	✓	✓
	97% Uncontrolled gas escapes attended in 1 hour	✓	✓	✓	✓	✓

8 year forecast	Deliverable	Units	2017/18	2016/17	2015/16	2014/15	2013/14
Reliability (network capacity)	Achieving 1 in 20 obligation	Capacity booked	✓	✓	✓	✓	✓
Reliability (network reliability)	Maintaining operational performance	-	✓	✓	✓	✓	✓

8 year forecast	Deliverable	Units	2017/18	2016/17	2015/16	2014/15	2013/14
Safety (mains replacement)	Iron mains risk reduction (based on MPRS)	Risk reduction	✓	✓	✓	✓	✓
	Sub deducts networks off risk	#	✓	✓	✓	✓	✓

We're taking great strides to make sure colleague and stakeholder safety remains top of our agenda, and that we have rigorous safety systems and processes and a commitment to continuously improve our record.

Royal Society for the Prevention of Accidents (RoSPA)

As may be expected of a company like ours, safety is, of course, our number one priority. The RoSPA Awards are among the most prestigious in the sphere of health and safety.

We were awarded the RoSPA Gold Award for our H&S performance again in 2018; this is our fifth such award in a row. No other UK gas network has achieved this and we are immensely proud of the success. This message of safety achievement is a welcome reassurance to the people, organisations and interest groups who rely on us for a high quality and very safe service.

Last year, we achieved accreditation for the first time in an audit for the international standard OHSAS 18001 for health and safety management systems. This four-day audit examined all aspects of our health and safety management systems, mirroring Health & Safety Executive (HSE) guidance HSG65, to make sure it's used throughout our operations.

Keeping people safe

We have robust systems to deal with a major loss of gas supply, understanding our stakeholders want to see us reviewing and testing those systems regularly. During 2017/18, we held a Local Gas Supply Emergency (LGSE) workshop to share best practice among the other GDNs, Institution of Gas Engineers & Managers (IGEM) and the Department for Business,

Energy and Industrial Strategy (BEIS) to improve supply restoration processes in the event of a major incident.

Key findings were the importance of planning ahead and a fast mobilisation alert system. Attendees also shared best practice on stakeholder engagement and supporting customers in vulnerable situations.

We led the industry on a major incident planning and testing exercise in May 2017, involving a simulated scenario where 65,000 consumers nationwide lost gas supply and running through the options, procedures and challenges this posed. This was crucial as we had never before practised how we would respond together on this kind of scale.

Feedback from the exercise identified a number of areas for improvement, including how to make sure older, more vulnerable people had food and heating.

We've since revised some of our procedures and are proposing partnering with agencies such as the Red Cross to help better support priority customers. We're also developing an app to give us quicker access to crucial information about people in vulnerable situations so we can respond quicker to their needs. We learned the approach taken is scalable, so can be used to help us deal with smaller-scale emergencies in future.

3.0 Totex Cost Summary

3.1 Introduction

In delivering the Outputs and innovation described within this document we have incurred the costs set out in this section.

The current RRP tables detail RIIO-GD1 actual expenditure into separate Opex, Repex and Capex categories. Outputs delivered are generally specified on separate RRP tables with no, or limited, linkage to the associated cost information.

Section 5 provides the analysis of our Totex spend by asset class/output, which in our view provides a more informative understanding of costs incurred.

As an illustration of this point, the Ofgem analysis identifies a "Capex" underspend of £8.8m for LTS and storage in 2017/18. We review the best means of maintaining the health of our infrastructure assets and consequently we have identified that the cheapest whole life solution is to perform less Capex and more Opex work, and have carried out £7.6m of "Opex" interventions specifically related to this asset category.

To properly understand our approach, and the associated cost, of maintaining the integrity of the infrastructure asset for which we are responsible, it is appropriate to review spend by asset category on a Totex basis.

In summary, without the full Totex cost analysis linked to Outputs, the headline cost variances, and hence comparisons of network performance, can be quite misleading.

Within this section we provide a high level cost analysis using the traditional Opex, Repex and Capex basis. This includes both current year and cumulative price control to date analysis.

We continue to encourage Ofgem to move to full Totex reporting, linked to specific Outputs and asset intervention activity, to facilitate a better understanding of the decisions we make to maximise intervention benefits and therefore return for our stakeholders; and in particular the trade-offs between the types of spend considered.

Unless stated to the contrary, all financial values within this report are stated in 2017/18 prices.

The summary position of actual expenditure against allowances is set out below:

£m 2017/18 Prices	2017/18 Actual	2017/18 Allowance	2017/18 Variance Fav/ (adv)	RIIO-GD1 to date Actual	RIIO-GD1 to date Allowance	RIIO-GD1 to date Variance Fav/ (adv)
Controllable Opex	77.9	106.5	**28.6**	453.2	543.2	**90.0**
Repex	67.5	104.1	**36.6**	390.7	513.5	**122.8**
Capex	49.5	55.5	**6.0**	253.3	305.7	**52.4**
Totex (excluding Pass through and Shrinkage)	**194.9**	**266.1**	**71.2**	**1,097.2**	**1,362.4**	**265.2**
Innovation costs	2.0	-	**(2.0)**	7.2	-	**(7.2)**
Pension Deficit payment	18.4	9.2	**(9.2)**	77.4	45.4	**(32.0)**
Pension admin and PPF	0.9	1.0	**0.1**	5.3	5.1	**(0.2)**
Total Controllable spend	**216.2**	**276.3**	**60.1**	**1,187.1**	**1,412.9**	**225.8**

No allowance/recovery of cost included for Innovation which is 90% funded by the customer through an adjustment to the maximum allowed revenue. In order to efficiently deliver the RIIO-GD1 Outputs within a Totex regime, we manage the business by asset class and output delivery rather than by type of spend.

In January 2013 we implemented an updated governance structure. We operate under four committees that focus on specific operational areas of our business. Attendees at each of the four committees are from a number of different departments and across management levels.

All four committees feed into our executive committee to ensure effective overall delivery.

The four committees and a brief overview of their responsibilities are:

- **Network Management –** pro-active delivery of asset health across all asset categories utilising a range of timely interventions,
- **Replacement –** delivers the key iron mains safety risk reduction targets. Attendees include representatives from across our alliance: Morrison, Wood plc (previously AmecFW) and Wales & West Utilities,
- **Emergency and Repair –** manages the reactive work required to deliver an efficient and effective emergency service and also ensure appropriate repairs to our network assets, together with connections and reinforcement; work driven by customer requests, and
- **Business Operations –** responsible for all other areas of Opex and Capex, notably, work management, back office (including IT, Fleet and Property) and Xoserve.

Sub-committees and Interfaces – we have a number of sub-committees and interfaces that focus specifically on key areas such as customer service, innovation and stakeholder to name a few.

The rest of this section provides some high level narrative of our Totex performance during the fifth year of RIIO-GD1 on the "traditional basis" to allow comparisons to the Final Proposals. It also shows the cumulative position against the allowances for the control period to date.

Continuous improvement– we continued to look at the way we operate the business and how we could make it more efficient. During 2017/18 we further implemented some of the findings from the trial of utilising our staff and resources better by combining the management of our direct labour repair and replace workforce with our Replacement contractor workforce and our emergency response workforce with our network services workforce. We conducted operational trials in two areas of our network to establish what the future opportunities of this type of operating model could be. Some key results that have been imbedded are:

- Use of a single manager to effectively manage the Mains Replacement programmes in North Wales and West Wales allowing for the delivery to be more effective and efficient.
- An element of the emergency workforce is now competent to support network maintenance activities which increase the productivity of the workforce and allow us to meet the maintenance workload demands.
- Network services have resources trained in key areas across the network to assist with the demand on the emergency workforce through peak workload periods. This also allows for further support on emergency activities while Smart Metering workload is completed.
- The training of network services resources to assist our emergency department became a reality in the winter of 2017/18 when the "Beast from the East" was upon us enabling us to draw on the additional trained resources to ensure standards and the reliability of the gas supplies were maintained throughout the period.

3.2 Controllable Opex

£m	2017/18			RIIO-GD1 to date		
2017/18 Prices	Actual	Allowance	Variance Fav/(adv)	Actual	Allowance	Variance Fav/(adv)
Work management	19.6	22.3	**2.7**	98.0	112.2	**14.2**
Emergency	9.9	16.9	**7.0**	51.0	84.3	**33.3**
Repair	7.9	13.7	**5.8**	48.2	70.8	**22.6**
Maintenance	15.4	13.8	**(1.6)**	86.4	68.2	**(18.2)**
Other direct activities (exc Xoserve)	3.7	3.5	**(0.2)**	18.1	18.9	**0.8**
Voluntary severance & other staff management	-	-	**0.0**	18.2	-	**(18.2)**
Xoserve	3.3	3.5	**0.2**	20.5	26.9	**6.4**
Holder demolition	-	0.6	**0.6**	3.0	2.9	**(0.1)**
Land remediation	0.1	1.4	**1.3**	8.2	10.2	**2.0**
Business support	14.4	25.4	**11.0**	87.8	124.1	**36.3**
Training & apprentices	3.6	5.0	**1.4**	13.8	22.8	**9.0**
Sub-deducts	-	0.4	**0.4**	-	1.9	**1.9**
Total Controllable Opex	**77.9**	**106.5**	**28.6**	**453.2**	**543.2**	**90.0**

Controllable Opex decreased year on year by £10.4m, in constant prices. We underspent the allowance by £28.6m in the year.

This outperformance was partly achieved by:

- The introduction of Working Time Solutions in December 2012 to our operational workforce, which has optimised working patterns and reduced the ongoing overtime bill.
- Continued significant changes to reactive leakage workload as a result of the continuing unseasonably warm weather, with reduced external materials, reinstatement costs and direct labour time, allowing us to utilise industrials on more planned work whilst also reducing unproductive time.
- Training all of our first call operatives (FCOs) to carry out Smart Metering Non Formula work transferred FCO labour time from our base emergency costs. In the year of 2017/18 we incurred £1.3m of costs for workload and training relating to this activity which was offset by Non Formula Revenue.
- Significant cost reductions in the year relate to the following:-
  - A change was made in 2017/18 to WWU's IBNR provision resulting in a £3.5m credit in 2017/18 as the IBNR accrual was reduced.
  - A review of the charges being accounted for on National Grid sites which reduced costs by £1.7m.

We have seen some cost increases in the year, of which a few highlights are below:-

- Four large one off gas incidents during the year resulted in additional cost of £0.5m
- We have incurred costs of £0.4m in the year relating to smart metering related network workload and £1.0m over the past three years.

3.3 Repex

£m 2017/18 Prices	2017/18 Actual	2017/18 Allowance	2017/18 Variance Fav/(adv)	RIIO-GD1 to date Actual	RIIO-GD1 to date Allowance	RIIO-GD1 to date Variance Fav/(adv)
Mains replacement programme	59.3	96.8	**37.5**	345.8	476.4	**130.6**
Multi-occupancy buildings	1.5	0.5	**(1.0)**	9.9	3.0	**(6.9)**
Sub-deducts	-	0.4	**0.4**	-	1.9	**1.9**
Relay following escape	6.7	6.4	**(0.3)**	35.0	32.2	**(2.8)**
Repex	**67.5**	**104.1**	**36.6**	**390.7**	**513.5**	**122.8**

We had a successful fifth year of RIIO-GD1, building on our performance in the first four years, in the management of our mains and services population. We delivered on our promises whilst driving efficiency and thus benefiting consumers. We aim to continue to deliver our stakeholder driven outputs through effective decision making, innovation and a focus on efficiency.

We have significantly driven down mains replacement delivery costs in the first five years of RIIO-GD1 through a number of innovations, some of which enable enduring efficiencies, others sustainable only in the short term. In 2017/18 the cost incurred for Repex activities was £67.5m against an allowance of £104.1m.

We have achieved the outperformance in the year by:

- Removal of the requirement for secondary mains to be those that will be seed pipes within five years.
- This has created, in the first part of RIIO-GD1, the opportunity to design mains replacement schemes that are significantly larger than was possible in the past.
- As a result, we were able to implement a successful 5/6 man team model that produced a level of performance beyond that which we forecast.
- This 5/6 man model enabled reductions in support services such as grab lorries/pick-ups, minimised depot numbers and reduced mobilisation/demobilisation costs.
- However, the opportunity for such large schemes has been largely exhausted. As the proportion of 8” abandonment and Tier 2 abandonment has begun to increase we see

scheme sizes reducing to a size similar to that experienced in GDPCR1. As scheme sizes have reduced, so have team sizes.

During the year, we continued to experience significant turnover of resources due to other GDNs offering above market rate deals to our workforce to enable them to recover their Repex programmes. This has resulted in disruption to our programme, particularly in North Wales and Plymouth and has the potential to impact delivery within RIIO-GD2.

To reduce the influence of other GDNs on our performance in the coming years, we continue to accelerate our apprenticeship and management trainee programmes.

We are continuing to experience adverse cost pressures as previously reported:

- Going forward, the opportunity to design larger mains replacement projects will be exhausted, we will see project sizes reduce significantly and the number of main to main connections we will undertake will be higher on a "per metre" basis.Consequently we expect lower outputs from our delivery teams and more frequent mobilisation and demobilisation of projects. Aligned with this we expect a reversal of the cost reductions made in support services such as grab lorries, pick-up trucks and reinstatement costs.
- We are continuing to experience labour market rate demand increases due to limited availability of skilled labour in a growing market. There are major programmes in water, electricity (particularly Hinckley C and rail electrification in our area) and the telecoms industries.
- Remuneration demands from the resources we have managed to retain, are growing against a background of increases in RPI. The ramp up of the smart-meter programme is also creating a pull on our skilled resource.

For the remainder of RIIO-GD1, we will deliver a mains replacement programme consisting of more 8" mains and Tier 2 mains, resulting in the abandonment profile consistent with that included in our Business Plan and subsequently the Final Proposals.

Our alliance partners are incentivised by a KPI suite which includes financial risk and reward mirroring our regulatory commitments. These include, but are not limited to:

- Primary Output – level of Risk Removed;
- Total Mains Replacement length;
- Completion of 8" mains abandonment within Tier 1 programme; and
- Completion of Tier 2 and Tier 3 mains abandonment.

3.3.1 Metallic service replacement

Our approach to management of services provides an appropriate balance of risk and cost benefit analysis (CBA) and is as follows;

- Replacing all steel services when the parent main is replaced,
- Delivering a bulk service replacement programme based on a 'hotspot' analysis of metallic service failures,
- Replacing steel services when they are found to be leaking or have visible condition issues that indicate a high probability of failure, and
- Cutting off services found to be no longer in use.

This approach to the management of services is supported by the HSE and, with the exception of the detailed hotspot calculation, is consistent across GDNs.

The table below shows the number of services forecast to be intervened on in GD1 vs the Final Proposal numbers.

	RIIO-GD1 forecast
Metallic	179,431
PE	137,112
Total services worked on	**316,543**

There is no financial betterment to us through the change of ratio of transfers to relays. Whilst relays are more expensive than transfers the difference is marginal with excavations, time on job and overhead being very similar for both types of work.

In summary, we are working on broadly the Final Proposal number of services but the mix of PE and metallic is not as forecast. This is primarily due to the volumes of services and relay to transfer ratios experienced on mains replacement work and the mild winters resulting in low numbers of relay after escapes. Please refer to section 2.6.

3.4 Capex

£m 2017/18 Prices	2017/18 Actual	2017/18 Allowance	2017/18 Variance Fav/(adv)	RIIO-GD1 to date Actual	RIIO-GD1 to date Allowance	RIIO-GD1 to date Variance Fav/(adv)
LTS & storage	7.5	16.3	**8.8**	45.2	80.5	**35.3**
Mains reinforcement	4.6	10.0	**5.4**	19.7	49.9	**30.2**
Governors	1.0	3.6	**2.6**	9.9	16.3	**6.4**
Connections	12.6	10.0	**(2.6)**	58.1	47.6	**(10.5)**
IT	7.9	7.5	**(0.4)**	36.8	31.3	**(5.5)**
Xoserve	0.6	(0.2)	**(0.8)**	8.3	6.6	**(1.7)**
Vehicles	2.2	2.4	**0.2**	22.9	29.9	**7.0**
Other capex	13.1	5.9	**(7.2)**	52.4	43.6	**(8.8)**
Capex	**49.5**	**55.5**	**6.0**	**253.3**	**305.7**	**52.4**

The following points briefly outline the key drivers to the variances against the allowances.

3.5 LTS & storage

The lower than allowed spend is a result of the following key points:

- Effective totex intervention decisions to undertake an increased level of Opex refurbishment, a total for 2017/18 of £1.4m.
- As seen in previous years, by continuing to utilise an innovative solution for nitrogen sleeve end-seal replacement (rather than wholesale relay) we have now realised a five year cost efficiency giving a lower whole life cost to the end user whilst still delivering network capacity and reliability Outputs. We completed refurbishment of a further nitrogen sleeve in 2017/18 and to date have restored the integrity of 20 sleeves in total.

- Further reductions against anticipated spend can be attributed to an alternative approach to maintaining the integrity of our pipeline network, in that we continue to implement an “As Low As Reasonably Practicable” (ALARP) methodology in assessing options available to us to identify the most cost effective method of minimising the societal risk associated with pipelines, specifically targeting high consequence areas.

To manage pipelines in this way requires high quality data and analytics. To support this we have digitised our entire high pressure pipe network (2,364km) into short sections to better assess consequence of failure. Previously we had 199 pipeline routes. This has now become 10,785 pipeline sections. This took a team of 4 staff 18 months to deliver and has resulted in a very detailed assessment of risk dependent on the people, property and infrastructure in the vicinity of each pipeline section.

This will achieve the greatest risk reduction for the minimum expenditure in preference to wholesale replacement of pipelines.

3.6 Mains reinforcement

As we continue to see growth in housing, WWU has seen the growth in reinforcement of the network. This is mainly from the domestic market but also we have experienced not just a large number of requests for peaking generation sites but also several examples of reinforcement required due to these types of connections being made. Although we aim to reduce the need for expensive open cut reinforcement solutions we have seen a marked increase in the length of network reinforcement required. Some of the innovative solutions we have used are renegotiation of agreed pressures on the network, replacement of iron and steel to allow network pressure elevation and combining design and delivery to ensure the cheapest cost option are put forward.

3.7 Governors

The £2.6m lower capex spend than the allowance of £3.6m in 2017/18 is the result of our effective strategy of an increased level of refurbishment resulting in a lower Totex cost whilst delivering the same reliability output illustrated by overall average health and risk.

The district governor intervention plan for 2017/18 resulted in wholesale capital replacement of 11 governors, 5 ready to be installed, capex refurbishment of 24 governors and purchase of 17 kiosks in readiness for completion in 2018/19. This has been driven by their Health and Risk

indices as determined from the Condition Based Risk Management (CBRM) model and also taking account of the recently developed Monetised Risk models (e.g.NOMs).

The net effect on the average overall Health Index of the district governor population previously reported would have been a slight deterioration from 2016/17 to 2017/18 and a marginal increase in overall Risk Index over the same period - this is in line with the committed Outputs for this asset group for this price control.

We remain on target to deliver our Outputs over the RIIO-GD1 period as reported against the common NOMs methodology.

3.8 Connections

The net capex for Connections in 2017/18 was £12.6m, which is £2.6m higher than the allowance. The increase in cost against the allowance is mainly due to a revenue adjustment of £0.7m on fuel poor vouchers received and a change in the apportionment of IT costs to an activity based costing method.

3.9 Other Capex

Spend in the year was £8.2m more than the allowance of £15.7m. This is largely due to the inclusion of spend relating to the physical security upgrade project (PSUP) project of £8.0m.

The additional development costs of the industry's supply point system (UK Link) also resulted in additional costs for the networks to bear. Project Nexus successfully went live on 1st June 2017 having proved to be more complex, and ultimately more expensive than envisaged at Final Proposals.

3.10 Cost pressures

We continue to face external cost pressures; both in terms of availability and cost of the skilled workforce and the materials, products and services which we require to complete our essential work:-

- In terms of our skilled workforce, we are expecting the recent turbulence in the labour market to continue, leading to increasing delivery costs within our sector. Resulting

from other GDNs' striving to bring their repex programmes back on track. Further afield, outside the GDNs, we are facing pressure from other competitive sectors including nuclear, telecommunications, water, smart metering, rail and electricity as their workloads increase.

- HS2 has created over 150 gas diversions, putting pressure on the availability of qualified resources in the UK.
- The approval of Hinkley Point has created localised inflation as the nuclear industry looks to ramp up investment in the SW of England.
- The rollout of the national Smart Metering programme has resulted in additional network costs being incurred. This is expected to increase as the programme develops.
- The introduction of the Apprentice Levy has increased payroll costs by 0.5%. We are trying to recover what we can on this through the training of our apprentices along with upskilling other employees as appropriate.
- Recent low oil prices have helped achieve our outperformance of the allowance over the first few years of the RIIO-GD1 price control. However, external forecasts indicate that these low prices will not be sustainable in the future. There are already signs of increases, the obvious example being the increase in fuel pump prices from a low of below £1.15/litre to over £1.25/litre during 2017/18; an increase in excess of 10%.
- The recovering economy is starting to drive up prices as general demand within the economy increases.
- Whilst little impact has been seen to date, the recent Brexit vote in favour of Great Britain leaving the EU is also likely to add to future uncertainty. Future impacts may include:-
  - Reduced immigration leading to increased demand for scarce labour resources,
  - EU Legislation ceasing to apply in Great Britain and its replacement with alternative domestic legislation,
  - Increased cost of purchases from Europe Stock market and property market impacts affecting RPI and pension valuations.

To help mitigate these cost pressures we have engaged in a number of specific activities, these include;

- The South West procurement hub to utilise the combined purchasing power of utility businesses in Wales & South West England.

4.0 Totex cost summary – how we manage the network

- Leveraging the combined purchasing power of the wider group of companies in the UK with common shareholder interests. Operating across utility sectors and across the UK.
- Market test all controllable costs over 3-5 year programme of procurement events.
- Utilising framework contracts and mini-competition events to drive lowest cost solutions for the majority of the work we outsource.
- Identifying alternative sources of supply for materials and products, including overseas sourcing.
- Giving our Repex contractor workforce longer-term visibility of the projects available to them, to encourage stability and a longer term working relationship built on mutual trust.
- Maintaining, since our inception in 2005, a largely insourced operating model, providing resource stability and enabling retention of corporate experience and knowledge.
- Continuing with our apprenticeship programme, which we started in GDPCR1, to ensure skills levels are maintained in line with workload for the future.
- We are bringing innovative solutions and techniques to fruition. We are constantly sourcing new technologies to ensure an efficient, safe and reliable delivery programme.
- We are also reviewing our delivery model to review the possibility of a more efficient structure for organising and performing our work.
- We have good working relationships with the trade unions with focus on an insourced resource model.
- Increasing workload programmes to offset the risk of losing key resources in the future. We face significant issues with workforce being attracted to similar companies offering higher pay in the short term.

Whilst we will continue to mitigate cost pressures where we can, we expect costs to grow at more than inflation in the future.

To demonstrate how we manage on a Totex basis, we set out below a summary table across the four committees under which we operate.

The spend within each of Opex, Repex and Capex has been regrouped by operating committee to better reflect how we manage the network.

For the 2017/18 Regulatory year:

2017/18 Totex	Actual cost				Allowed cost				Variance
£m (2017/18 Prices)	Capex	Repex	Opex	Totex	Capex	Repex	Opex	Totex	Fav/ (adv)
Network management	8.5	-	15.5	**24.0**	19.9	-	15.7	**35.6**	**11.6**
Repex	-	60.8	-	**60.8**	-	97.3	-	**97.3**	**36.5**
Emergency & repair	17.2	6.7	17.8	**41.7**	20.0	6.8	31.0	**57.8**	**16.1**
Business operations	23.8	-	44.6	**68.4**	15.6	-	59.8	**75.4**	**7.0**
Totex	**49.5**	**67.5**	**77.9**	**194.9**	**55.5**	**104.1**	**106.5**	**266.1**	**71.2**

The position at mid-point of the RIIO-GD1 price control period, in constant 2017/18 prices, is:

£m (2017/18 Prices)	Actual cost				Allowed cost			Variance	
	Capex	Repex	Opex	Totex	Capex	Repex	Opex	Totex	Fav/ (adv)
Network Management	55.1	-	97.5	**152.6**	96.9	-	81.2	**178.1**	**25.5**
Repex	-	355.9	-	**355.9**	-	479.3	-	**479.3**	**123.4**
Emergency & Repair	77.8	34.8	99.4	**212.0**	97.5	34.1	157.2	**288.8**	**76.8**
Business Operations	120.4	-	256.3	**376.7**	111.3	-	304.9	**416.2**	**39.5**
Totex	**253.3**	**390.7**	**453.2**	**1,097.2**	**305.7**	**513.5**	**543.2**	**1,362.4**	**265.2**

5.0 Forecast

5.1 Outputs, Totex costs and workloads

The forecasted costs and workloads included within this section aim to efficiently deliver the Outputs as defined within the RIIO-GD1 Final Proposals. That said we must highlight some key uncertainties that continue to impact the forecast cost and workloads submitted within this RRP return:

- Roll out of Smart Meters ~ the minimal roll out to date has not allowed us to estimate costs associated with Smart Meters within the forecast.
- Review of Network Output Measures ~ in relation to health reporting ~ whilst the methodology for calculating monetised risk is now approved and in place, the target risk removal value has not been approved by Ofgem for RIIO-GD1. As there is no agreed position at this time, we will clearly need to reflect any changes in future forecasts. At this point, we have not included any change (positive or negative) from the outcome of this work.
- Winter severity ~ we experienced a number of mild winters in recent years with the last sustained cold winter being 2010/11. However we did experience a significant cold spell in February and March 2018. The first five winters of the current RIIO-GD1 period have been some of the mildest in history but we clearly need to plan for a 1 in 20 winter and therefore our future resource forecasts (through the implementation of our winter contingency plan and the use of reservists etc.) reflect this requirement. However, it should be noted that our cost forecasts continue to assume an average winter.
- The economy ~ the economic downturn in the first few years of RIIO GD1 has impacted some specific workloads, for example general reinforcement and non-rechargeable Diversions. The indications are that the UK as a whole is now growing and again our future forecasts reflect a level of workload more aligned to a growing economy as opposed to a declining economy.
- Fuel poor connections ~ in the five years of RIIO-GD1 we successfully connected 8,499 customers who were in fuel poverty. Following the Ofgem review of the Fuel Poor Network Extension Scheme, a revised Output target of 12,590 connections, up from 10,800, over the eight year period was agreed with Ofgem in September 2015. Ofgem has directed further changes to the scheme including the removal of the IMD criteria reducing the number of connections qualifying as fuel poor. We believe this alongside a lack of funding in ECO2T and from other sources will make meeting our output target very challenging.
- Resources ~ we are seeing a significant decline in the number of resources we are able to recruit to replace the ageing workforce we current have. Along with increasing market rates the cost and level of recruitment remains a concern and impact on cost for WWU.

The table below provides a "Totex" overview of the forecast costs against the RIIO-GD1 Final Proposals.

In headline terms, the controllable costs were lower in 2017/18 than usual levels due to a number of one off releases but forecast performance is likely to be similar to the first four years of RIIO-GD1 (subject to the points above). There is however, clearly less certainty the further into the future we forecast.

Forecast costs (2017/18 Prices)	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 F'cast	2020 F'cast	2021 F'cast	Forecast RIIO Total	2016/17 view
Total Capex	55.7	46.4	51.7	50.0	49.5	46.8	44.9	46.3	**391.3**	386.6
Total Repex	78.7	82.9	81.6	80.0	67.5	75.0	79.1	78.9	**623.9**	638.5
Total Controllable Opex	102.0	96.1	88.0	89.3	77.9	90.4	92.3	94.9	**730.8**	766.4
Total non-controllable Opex	80.5	80.6	80.3	105.0	116.0	91.3	96.5	90.2	**740.3**	778.1
Total funded costs - including uncertainties	**316.9**	**306.0**	**301.7**	**324.3**	**310.9**	**303.5**	**312.8**	**310.2**	**2,486.3**	2,569.6
2016/17 view	316.9	306.0	301.7	324.3	318.8	331.2	338.5	332.2	2,569.6	

- Future uncertainties related to Smart Metering and streetworks are excluded from the above table

The decrease in future non-controllable costs reflects:-

- Updated Exit Capacity charges following May 2018 forecast from NTS, coming down to the historic levels we saw at the start of GD1, offset by the higher rates bills following the 2017 Valuation Office Agency review which OFGEM has confirmed continue to be pass through.

5.1.1 Controllable Opex

Forecast costs (2017/18 Prices)	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 F'cast	2020 F'cast	2021 F'cast	Forecast RIIO Total	2016/17 view
Work Management	24.8	21.7	21.8	20.6	19.7	21.2	22.0	23.3	**175.1**	176.4
Emergency	10.7	11.0	9.5	10.0	9.9	9.3	9.2	9.5	**79.1**	83.6
Repair	10.5	10.6	9.0	10.2	7.9	8.9	8.9	9.1	**75.1**	80.5
Maintenance	15.5	19.1	18.0	18.4	15.4	16.2	16.2	16.5	**135.4**	140.9
Other Direct Activities	20.9	14.7	7.3	7.0	7.0	5.5	5.7	6.2	**74.3**	84.1
Total Direct Opex	82.4	77.1	65.6	66.3	59.9	61.1	61.9	64.7	**539.0**	565.5
Total Indirect Opex	19.6	19.0	22.4	22.9	18.0	29.4	30.3	30.2	**191.8**	200.9
Total Controllable Opex	**102.0**	**96.1**	**88.0**	**89.2**	**77.9**	**90.5**	**92.3**	**94.9**	**730.8**	766.4
2016/17 view	102.0	96.1	88.0	89.2	94.5	98.5	99.1	99.0	766.4	

The forecast costs reflect the following:-

- Repair workloads forecast in line with the deterioration assumptions and profile of mains replacement over the 8 year period.
- Increased investment in enablers such as more reliable vehicles and better tooling has increased productivity levels.
- As productivity levels of direct labour resources increase availability of those resources increases allowing them to pick up additional Mains Replacement & Capital workloads; reducing the need for external resources. This reduces unproductive costs in Opex.

- The forecast reflects an improved succession plan, taking into account retirees, Apprentice intake, different pension arrangements and grade changes.
- Updates to management initiatives and new processes are now reflected in the forecast i.e. Working Time Solution benefits.
- The forecast takes into account any updates in external costs i.e. Xoserve.
- We have not included any additional costs at this stage for the rollout of Smart Meters, due to ongoing uncertainty over timing and involvement.
- As the economic climate improves, we expect to see wage and contractor rates increase, noting that customers have benefitted from suppressed rates during the economic downturn.

Metering and Smart metering work

Since its creation in 2005 WWU has maximised non-regulated meter work to minimise the inevitable amount of unproductive time created by having to respond to a PRE anywhere across the large geographic network within which we operate. Most of this work has been delivered through contracts with On-stream and National Grid Metering ("NGM").

This has enabled us to keep the critical mass of First Call Operative required to maintain a safe, efficient network 24 hours a day, 365 days a year.

Over the years the changes in the metering arena has seen the workload provided by these contracts greatly reduce as events such as metering separation and more recently Smart Metering have eroded the volumes available via the contract with NGM.

To mitigate the impact of this reduction, which is still forecast to disappear in 2020, we successfully bid for a Smart metering contract with NGS and we installed the first Smart meter in December 2016. The ability to install and maintain electricity and gas Smart meters will give us the ability to deal with smart meters into the future. Workloads have so far been lower than anticipated. However with the deadline remaining for a full rollout by the end of 2020 we expect to see workload significantly increase over the coming two years.

There are multiple benefits in obtaining this work over and above the obvious ones of improving efficiency and offsetting the stranded cost increases associated with the disappearance of traditional meter work.

- Nationally there is expected to be a significant shortage of gas engineers to deliver this work and it is forecast that there will need to be over 10,500 additional gas engineers at the peak of the Smart Meter rollout programme. We have skilled and experienced gas engineers who can assist in delivering the Smart Metering targets within the UK.

- The work will also give us an in-depth knowledge of the issues created by Smart Meters as well as increasing the knowledge and understanding of our engineers when it comes to giving advice to customers regarding things like energy efficiency and the use of in house display units.
- The introduction of Smart Metering will be confusing for some customers and we will without doubt be the first call to many of these issues and we are committed to making sure our First Call Operatives can deal with as many of the customer concerns as they can and maintain our reputation for delivering outstanding levels of Customer Service.

5.1.2 Repex

Forecast costs (2017/18 Prices)	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 F'cast	2020 F'cast	2021 F'cast	Forecast RIIO Total	2016/17 view
HSE driven mains & services	70.4	63.3	60.3	60.9	52.4	63.4	68.3	68.0	**507.0**	525.9
Non-HSE driven mains & services	6.6	16.9	19.1	17.2	13.6	10.2	9.4	9.6	**102.6**	97.7
Risers	1.7	2.7	2.2	1.9	1.5	1.4	1.4	1.4	**14.2**	14.9
Total Repex	**78.7**	**82.9**	**81.6**	**80.0**	**67.5**	**75.0**	**79.1**	**79.0**	**623.8**	638.5
2016/17 view	78.7	82.9	81.6	80.0	74.7	79.0	80.4	81.2	638.5	

The forecast Repex costs reflect the following impact on expenditure levels:

- Continued delivery of our key Iron Mains abandon targets utilising our existing alliance contract which has now been signed for the entire eight year RIIO period giving more certainty to costs.
- The cost of delivery is impacted by the size and type of project that we can efficiently design in any one year to meet our risk targets. To deliver significant customer benefit in the last three years, we have been able to target the most efficient size projects. Future year's costs will therefore proportionately be higher as we need to meet risk targets but may not be able to design projects that reflect the last three years.

- We are continuing to experience labour market rate demand increases and are balancing costs with retaining experienced resource in a competitive sector including water, electricity and rail.
- Introduction of innovative products are now reflected in our forecast such as ductile iron cutting tool, mobile apps and single flow stopping equipment. This is mitigating some of the cost pressures we expect to see in the future.
- Work will become more dispersed in future years and we will start to incur a higher delivery cost in terms of both support and delivery costs.
- Our current insertion ratio following design is better than we have historically achieved but analysis shows this will drop significantly through RIIO-GD1 and through the remainder of this programme to 2032 and will have an adverse impact on the cost of the mains replacement programme.
- Continued focus on efficient delivery, which supports the on-going outperformance.

5.1.3 Capex

Forecast costs (2017/18 prices)	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 F'cast	2020 F'cast	2021 F'cast	Forecast RIIO Total	2016/17 view
LTS, storage and entry	9.3	6.7	11.8	9.6	7.4	8.5	7.8	9.1	**70.2**	78.5
Connections	11.2	10.2	12.6	11.5	12.6	11.3	11.9	12.0	**93.3**	97.0
Mains Reinforcement	4.1	3.8	3.6	3.7	4.6	4.4	4.0	3.8	**32.0**	30.6
Governors (Replacement)	2.5	2.3	2.6	1.6	1.0	1.9	1.9	1.9	**15.7**	16.5
Other Capex	28.6	23.4	21.1	23.6	23.9	20.7	19.3	19.5	**180.1**	164.0
Total Capex	**55.7**	**46.4**	**51.7**	**50.0**	**49.5**	**46.8**	**44.9**	**46.3**	**391.3**	386.6
2016/17 view	55.7	46.4	51.7	50.0	46.0	45.1	45.4	46.3	386.6	

The forecast Capex costs reflect the following impact on expenditure levels:

- Continued delivery of our key reliability Outputs targets, adjusting them where appropriate for changes to workload assumptions, e.g. fuel poor connections.
- Connections service workload is expected to be similar to 2017/18 through to the end of RIIO-GD1. However, the unit cost of delivering the fuel poor connections is expected to rise as we need to do more work to promote the fuel poor schemes and gather evidence of eligibility face to face rather than as a desktop exercise. We also expect to see a continuation of the volumes of small scale power stations generating peak electrical power and biomethane sites connecting to our network.
- Specific reinforcement workload (pipes and district governors) is forecast to be higher than previous years with an increase in the number of new housing schemes given planning permission and developers starting to build homes and take gas. Specific reinforcement will also be required to support some of the small gas fired power stations as well as CHP plants at Industrial sites and District Heat networks around our network along with biomethane injection points.
- Continued implementation of the ALARP methodology for LTS pipelines which has reduced capital costs.
- Continued investment in a programme to replace boilers which have reached the end of their asset life with new efficient boilers and this will also reduce our ongoing Opex costs i.e. taking a totex approach.
- We will see CPNI reduce from 2018/19 onwards following completion of the security upgrade projects by the end of the calendar year 2018.
- Updated detailed asset plans specifying size and location of installations/refurbishments allowing greater accuracy for future years planning.
- Continued focus on efficient delivery which supports the on-going outperformance.

5.1.4 Workload Forecast

The forecast workloads are reflective of our current view and the changes from the 2016/17 view are detailed below;

Opex

Forecast workload	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 F'cast	2020 F'cast	2021 F'cast	Forecast RIIO Total	FPs
Opex										
Mains condition reports	5,636	6,424	5,569	6,421	6,052	6,660	6,531	6,569	**49,862**	71,694
Service condition reports	6,317	5,417	5,943	5,621	5,249	5,777	5,664	5,697	**45,685**	37,518
No. of holders removed	2	7	1	-	-	-	-	-	**10**	c. 7-8

Both mains and service repairs are below the level in Ofgem's FPs but those were based on an average winter severity. So far, this control has seen exceptionally mild winters resulting in lower than forecast repairs. We estimate a severe winter could add at least 2,000 mains repairs and 1,000 service repairs to our workload. Whilst report numbers are used in preference to repair numbers in table 2.3, our view remains that repairs are a better measure as many people can call in one escape but the repair drives the cost.

We have accelerated and exceeded the requirements for holder demolition with 10 delivered to date against a target of 7-8 over the whole control. The opportunity to remove more risk on this group was taken following a review of ongoing opex costs, safety risk and the opportunity for an efficient delivery programme. We have not found risk to be as high as expected on other asset groups following survey results (e.g. Service governors) so the decision was made to invest in the holder programme.

Capex

Forecast workload	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 F'cast	2020 F'cast	2021 F'cast	Forecast RIIO Total	FPs
Total mains reinforcement	11.3	13.4	9.8	12.6	17.6	18.4	18.4	18.4	**119.9**	200
Total reinforcement Governors	-	-	4	-	1	4	4	4	**17**	128
Total connection services	11,498	11,294	11,640	11,933	11,074	11,039	10,531	10,178	**89,186**	98,060
- New housing services	2,898	3,595	3,878	4,463	4,370	4,249	4,227	4,060	**31,740**	21,355
- Existing housing services	5,381	5,508	5,563	5,235	4,998	5,080	4,994	4,908	**41,666**	59,760
- Non-domestic services	587	530	640	639	655	610	610	610	**4,881**	6,145
- Fuel poor services	2,632	1,661	1,559	1,596	1,051	1,364	1,364	1,364	**12,590**	12,590
Governor intervention	94	90	35	24	16	12	12	12	**295**	514

Reinforcement lengths have been less than forecast in the early years of RIIO-GD1 but have returned to the forecast levels in the last few years. This is a result of the steady recovery in the housing market and an increase in connections of small peaking power plants. These 'peakers' are required to balance supply and demand on the electricity network with the increase in intermittent wind and solar generation. We are currently engaging with the DNOs to understand the future requirement for peakers and ensure the overall energy network is optimally balanced with storage on the gas network enabling intermittent green energy generation on the electricity network.

Connections workload is clearly customer driven and is circa 10% lower than forecast. The forecast service fuel poor number is dependent on customers who qualify for the warm house assistance programme being able to access funding.

The governor intervention forecast only includes capex replacement. Our totex intervention plan for governors is also focused on capex refurbs and opex life extensions. As such, a simple count of the capex work vs FP is not an indication of the delivery of the asset health and risk Outputs. Our current forecast submitted in table 7.3 shows our totex plan delivers the output requirement for this asset group.

Repex

Forecast workload	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 F'cast	2020 F'cast	2021 F'cast	Forecast RIIO Total	FPs
T1 length decommissioned	332.5	365.6	345.1	336.2	302.5	338.0	323.0	323.0	2,666.0	2,638
T2 length decommissioned	21.7	20.7	20.9	30.7	34.3	35.1	35.1	35.1	233.6	237
T3 length decommissioned	1.4	1.7	0.8	1.1	2.8	1.0	1.0	1.0	10.8	1
Steel length decommissioned	64.8	66.8	100.3	84.6	69.9	64.7	64.7	64.7	580.7	571
Other length decommissioned	29.4	26.2	8.9	18.5	9.9	9.8	9.5	9.5	121.6	56
No. of services transferred	19,750	20,361	17,308	17,354	14,043	16,098	16,098	16,099	137,112	132,102
No. of services relaid	22,851	23,770	21,642	23,268	18,083	23,272	23,272	23,272	179,431	210,329

We plan to deliver the repex programme as per FPs, exceeding length targets in some categories. As we deliver this programme we replace all metallic services and transfer all PE services encountered. As can be seen in the table, the relays and transfers are not as forecast and we explain this in detail in the repex of this document.