



Annex

A20.15 Opex Annex

December 2019

As a part of the NGGT Business Plan Submission

nationalgrid

Overview

Our operating costs are the costs we incur on an ongoing basis to maintain and operate our business. As such they contribute to almost all of the stakeholder priorities in our RIIO-2 plan with only business support costs not mapped directly to a priority. Collectively, they make up 31% of our totex expenditure for the RIIO-2 period and, because they relate to the day to day running of our business and occur year after year, it is particularly important that we can demonstrate these costs are efficient.

Our business plan puts forward operating costs of £172m per annum for RIIO-2, on average £5m per annum lower than our costs in RIIO-1. The efficiencies we expect to deliver from our organisational restructure, plus an ambitious 1.1% per annum productivity target on our RIIO-2 costs means that our underlying cost base will be £36m per annum lower than in RIIO-1 (equivalent to £20m lower when looking only at the first six years of actual expenditure in RIIO-1). These savings will more than offset higher costs in areas of IT, as we make investments to modernise and protect our IT systems, recruitment and training new talent into our field force to deliver a reliable network in the future, and insuring our operations and staying compliant as a regulated business.

As an owner and operator of the UK's Gas Transmission network we are being asked by governmental bodies to do more than ever to protect this critical national infrastructure from external threats of physical and cyber attack. Our plan for RIIO-2 proposes costs of £20m per annum to extend 24 hour monitoring on our most critical sites and enhance protection of our IT operational systems and data from cyber threat. Whilst we have included only costs that are efficient and certain based on current requirements in our baseline plan, we recognise that requirements may change in the future and so have proposed uncertainty mechanisms to ensure that we will only be funded for work that is needed.

Figure 20.01 Our core operating costs are reducing by £5m per annum in RIIO-2

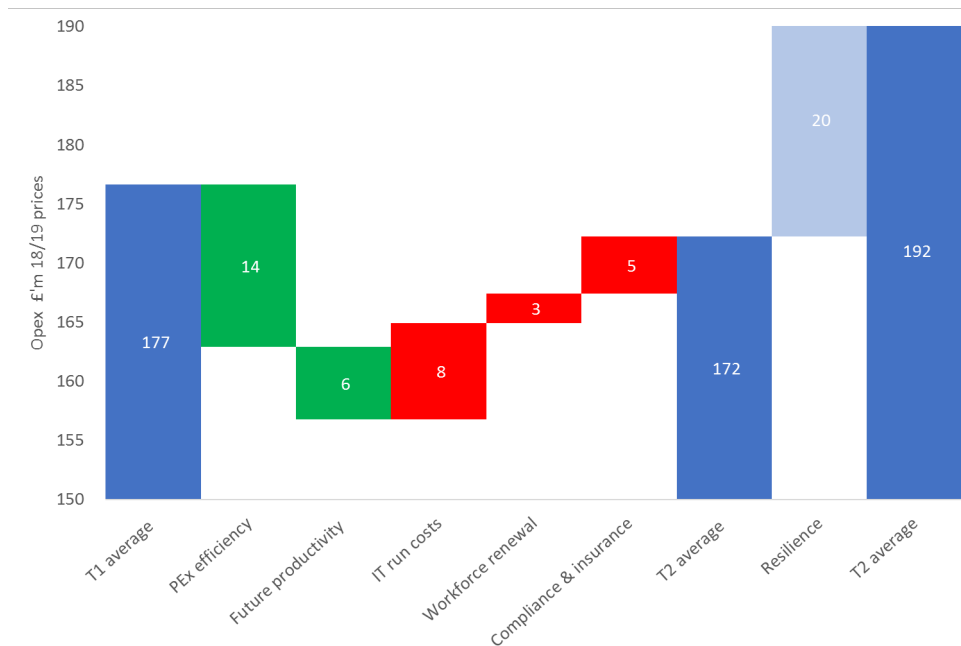


Figure 20.01 sources: BPD 2.02, 2.05, 2.06, 3.06b, 3.09b

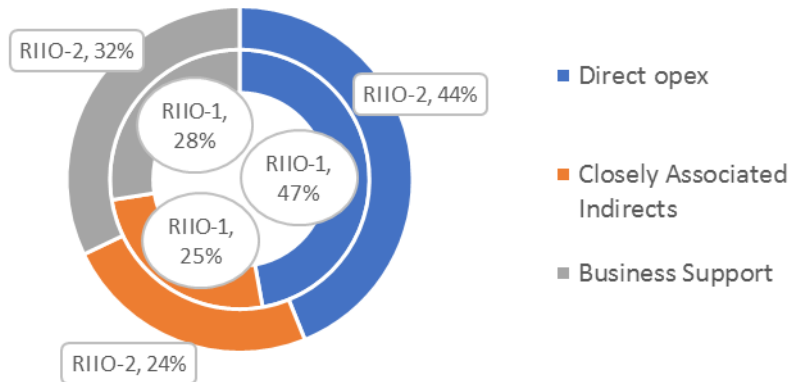
Note 1: RIIO-1 average opex, based on six year actuals corrected for one off provision movement, data centre operating costs (approved in 2018 reopener and not included in six year average), and adjusted for ongoing asset data and analytic capability requirements.

Note 2: RIIO-2 average operating costs before incremental resilience costs of cyber and physical security compliance

Our operating costs support our ongoing activities

We typically spend around £177m per year on our operating costs. Just under half of these costs are spent on activities that directly impact our assets, such as maintenance activities and asset inspections. The other half is spent on indirect activities such as those related to planning network changes, IT support costs for our asset management systems, the running of the Gas Control Suite and associated applications, and support functions such as HR and finance.

Figure 20.02 - how our operating costs are made up



The mix of our operating cost base has changed over time as the result of business decisions and the need to respond to external challenges. As we entered the RIIO-1 period, we were facing growing maintenance requirements from an ageing asset base as well as a shortage of adequately trained workers. The level of opex allowances received for the RIIO-1 period did not fund these upward pressures and consequently gave us a dual challenge of delivering the increasing workload whilst reducing our costs.

Against this backdrop, we reset our operating model at the start of the RIIO-1 period and restructured our business to realign accountabilities, introducing performance excellence (lean) capabilities and optimising our support functions for additional operational workload. This allowed us to mitigate some of the upward pressures in workload and reduce our workforce by over 100 roles.

As we started to deliver our asset health programme in RIIO-1 we found that we needed to get a greater understanding of our asset condition and make more interventions than anticipated. We invested in asset and asset condition data management systems, as well as the resources and capability to analyse and assess the data we collected. This enabled more informed decision-making around asset interventions, reducing capex costs.

From an indirect opex perspective, IT costs increased because of the IT systems we invested in to support our asset condition data and as we developed our capability in identifying and managing the increasing cyber threat to our operations. We also needed to increase the scope of our financial control activities to respond to increasing compliance requirements and focus. The benchmarks that set our allowances did not take these increased activities into account and we were not able to contain these costs within our allowances.

Overall, we have consciously overspent opex allowances in RIIO-1, current forecast indicates by £93m in total, because this was the efficient level of costs required to support the Gas Transmission business. These costs continue into RIIO-2 with further efficiencies offsetting the IT and compliance costs. These and other lessons inform our business plan.

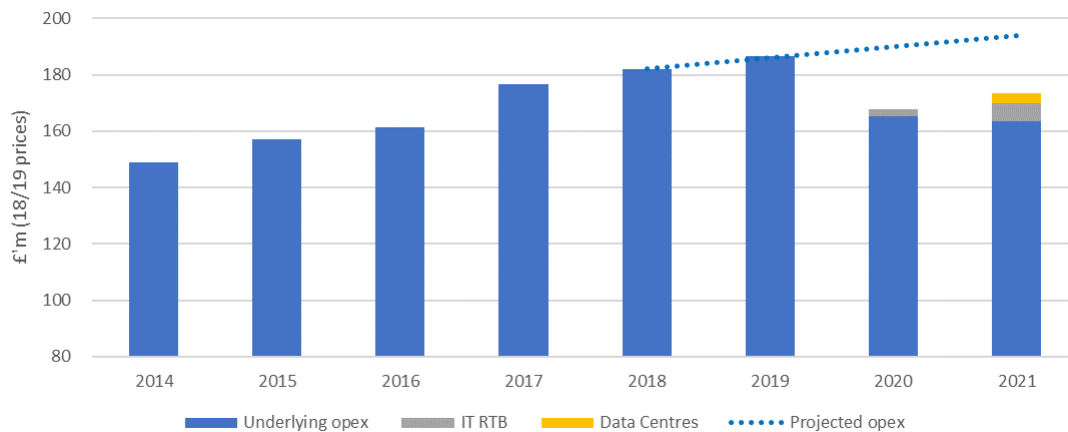
Our embedded opex efficiencies make us fit for the RIIO-2 period

Building on the experiences and capabilities we developed in the first half of RIIO-1, we have recently reshaped our business in readiness for the changing needs of our customers over the next five years. This was delivered through the Performance Excellence (PEX) value programme. Through this, we have undertaken an ambitious, bottom-up review of our business which enables us to bring in new skills and capabilities and reduce costs. We have identified a suite of co-ordinated initiatives which will deliver the savings including realigning processes using lean techniques, replacing our financial systems to improve and streamline controls and introducing more flexible field force arrangements.

Commitment to reducing our cost base by £30m a year

The resulting re-shaped organisation and cost base make us fit for delivery in the RIIO-2 period. Our pay is comparable with peer companies and savings bring our business support costs in line with or better than benchmarks. By moving to our new operating model in advance of the start of the next price control we can be transparent with our stakeholders about our future operating cost base. These changes will deliver savings of £30m against our projected costs for RIIO-1 by March 2021, which will flow into all years of RIIO-2 making a total consumer benefit of £150m over the next price control period.

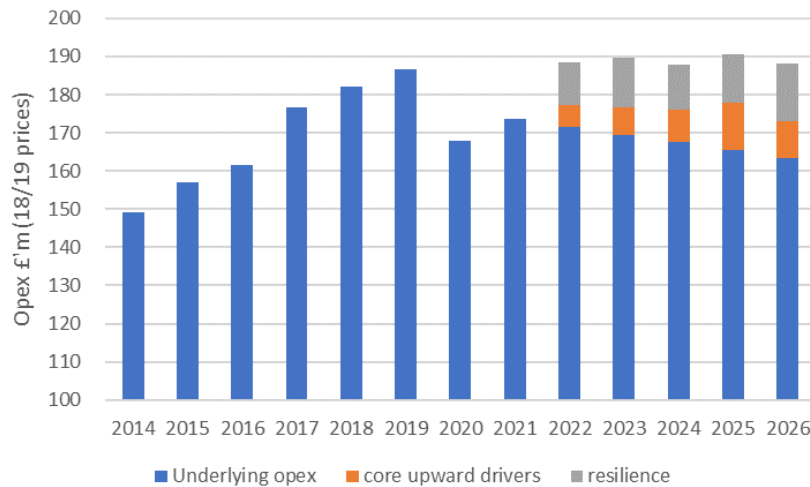
Figure 20.03 Our PEX value programme will deliver savings of £30m against projected underlying opex costs by 2021



Commitment to £31m productivity improvement

On top of these efficiencies, we are challenging ourselves to deliver more value in RIIO-2. We have embedded 1.1% per annum of productivity into our underlying opex cost base which is nearly three times the current UK trend for productivity. This translates into a saving of £31m across the period. We do not yet know how we will deliver much of this productivity but, in total, this means our underlying opex cost base is forecast to reduce by 11% or £20m between 2019 and the end of RIIO-2. The figure below shows the impacts of these on our underlying cost base, including the forecast for a number of upward cost of pressures (orange bars).

Figure 20.04 £20m reduction in underlying operating costs by 2026



RIIO-1 cost drivers will continue into RIIO-2 period

We expect the opex pressures we have experienced in the RIIO-1 period to continue into RIIO-2, and they will offset the underlying savings we forecast. The three key drivers are:

IT run costs - The costs of supporting our IT systems has grown through RIIO-1 as we have made investments in asset data management systems and built our capability to respond to an escalating cyber risk. Average spend for the early part of RIIO-1 was £21m per annum, however our IT costs are forecast to reach £29m by the end of RIIO-1 as we expand our cyber resilience activities and support investments we are making to make our transactional business support functions more cost efficient. Independent benchmarking experts Gartner have confirmed that our IT operating costs are efficient as we enter RIIO-2.

IT operating costs show further growth in the first few years of RIIO-2 as we make further investments to support key business processes and modernize shared IT infrastructure and hosting capabilities. Increased use of hosted IT solutions, rather than traditional built and owned solutions, are also driving up our opex but with an associated decrease in capex and with the benefits of increased flexibility and scalability for the IT solution. However, as the impact of our 1.1% per annum future productivity improvements builds up, operating costs start to fall again. Overall, this results in IT costs that are £8m per year higher, on average, than RIIO-1. We give more detail on the drivers for this transformation in our IT strategy annex A20.03.

Workforce renewal - We have structured our field-based workforce in line with ISO55000 asset management standards and in doing so have the capability to manage changes in asset maintenance policy or the impact of customer behaviour without an increase in resource in RIIO-2. However, our strategic workforce planning process has identified that over 20% of this workforce are due to retire in the period 2020-2030 and we need to act now to recruit and train a new workforce and pre-empt the loss of experienced personnel. The additional headcount and training costs will result in an average £3m per year increase in opex over RIIO-2. Our sustainable workforce strategy annex A20.02 provides more detail on these challenges and how we are responding.

Compliance and insurance – We have overspent allowances in meeting regulatory and financial compliance activities through RIIO-1 with the additional requirements and scrutiny that followed the move to a more outputs and incentive based regulatory regime and increased focus on controls from external auditors. These pressures will build into RIIO-2 with more complex mechanisms being introduced which will reduce the potential for windfall gain or loss but add £4m opex per year. In addition, insurance market premiums are increasing due to external pressures. Whilst we are forecasting an additional £1m per annum in respect of these premiums our market testing shows that our captive insurance model still represents best value for consumers, with premiums that are around 23% lower than those available from the commercial insurers.

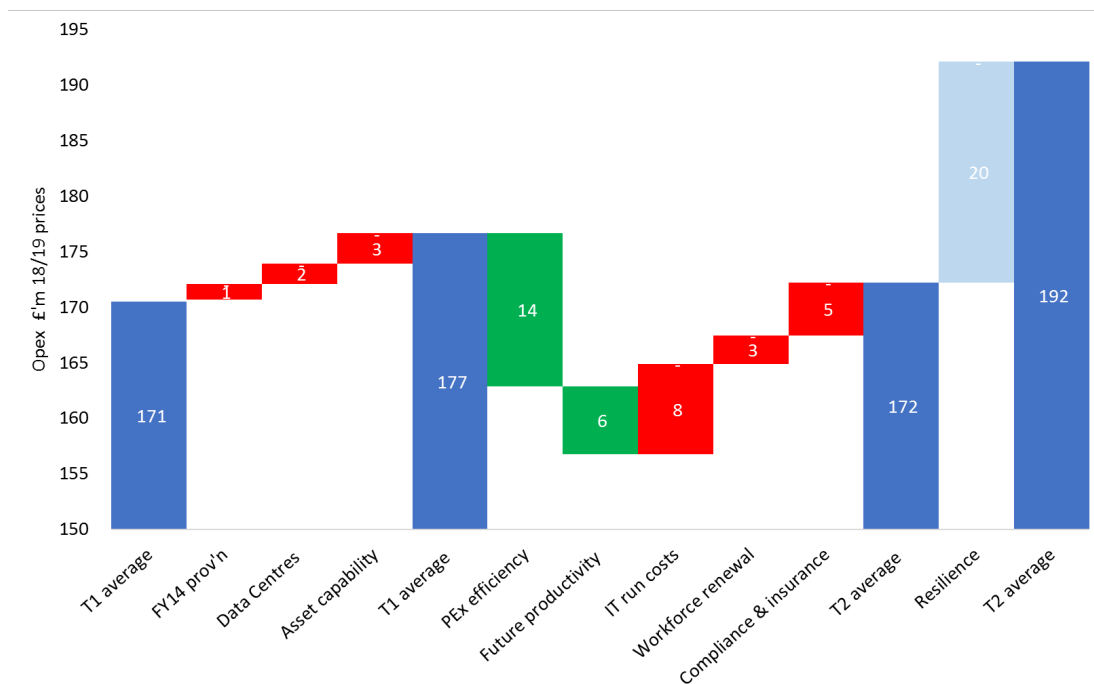
In addition to our core operating activities, we are being asked to do more to respond to the emerging threat around deliberate cyber and physical interference with our operational assets. We have invested in cyber resilience during RIIO-1 but there is more to do as we enter RIIO-2. Government bodies are guiding developments in our approach to cyber and this will necessitate both new investment and ongoing operating costs. We have included opex of £20m per year in our RIIO-2 plan for our cyber and physical security activities. For external threats, whether physical or cyber, uncertainty mechanisms allow us to adjust our plans should we be asked by the external competent authorities to do more to ensure we can deliver a highly reliable and resilient service. More information on our cyber resilience plans can be found in annex A20.02.

The waterfall chart in the figure below shows how these drivers, combined with the efficiencies we are committing to, impact our operating cost base for the RIIO-2 period. Consistent with a request from the RIIO-2 Challenge Group, we compare RIIO-2 average operating costs of £172m per year with the equivalent average based on the first six years of RIIO-1 costs. However, we have adjusted the RIIO-1 average for three key items:

- i) The impact of a pension equalisation provision release (in 2013/14), which would otherwise suppress the RIIO-1 average by £1m each year
- ii) The additional costs of operating data centre enhancements which were funded through a RIIO-1 reopener (in 2018/19), and scrutinised by Ofgem as part of that process, contributing £2m per year of additional costs for the remainder of RIIO-1.
- iii) The full costs of the step up in asset data management capability, which we invested in towards the second half of RIIO-1.

We are proposing to move two previously uncertain costs (quarry and development, and physical security enhancements) in baseline totex for RIIO-2 and so we have restated RIIO-1 as if these cost items had been in baseline to aid comparability between periods. The waterfall chart demonstrates how, even after the impact of the three underlying opex cost drivers are factored into our plan, operating costs will fall by an average of £5m each year thanks to our efficiency commitments.

Figure 20.05 Our core operating costs are reducing by £5m per annum in RIIO-2



Sources: BPD 2.02, 2.05, 2.06, 3.06b, 3.09b

Note 1: RIIO-1 average opex, based on six year actuals corrected for one off provision movement, data centre operating costs (approved in 2018 reopener and not included in six year average), and adjusted for ongoing asset data and analytic capability requirements. Inclusive of RIIO-1 quarry

and loss and physical security uncertainty mechanism costs (proposed as baseline for RIIO-2 and so retrospectively treated as baseline costs in RIIO-1 for comparability)

Note 2: RIIO-2 average operating costs before incremental costs of NIS and PSUP compliance

Upward cost drivers in our plan

The table below shows how these drivers impact the different categories of opex in our plan. The rest of this annex considers each category of opex in turn, providing more details on costs for RIIO-2, key drivers of those costs as well as presenting our efficiency evidence. As our IT costs are reported in both closely associated indirect and business support categories we consider IT costs jointly for the two areas.

Figure 20.06 How cost drivers and efficiencies impact different categories of opex

Opex category	Average per annum							
	RIIO-1	Pex efficiencies	1.1% productivity	IT costs	Workforce renewal	Compliance & insurance	Resilience	RIIO-2
Direct opex	£76m	(£7m)	(£1m)		£2m			£69m
Closely Associated Indirects	£44m	(£3m)	(£1m)	£1m	£1m			£41m
Business Support	£49m	(£2m)	(£4m)	£8m		£5m		£55m
Other opex (note 1)	£8m	(£2m)					£20m	£26m
Total	£177m	(£14m)	(£6m)	£8m	£3m	£5m	£20m	£192m

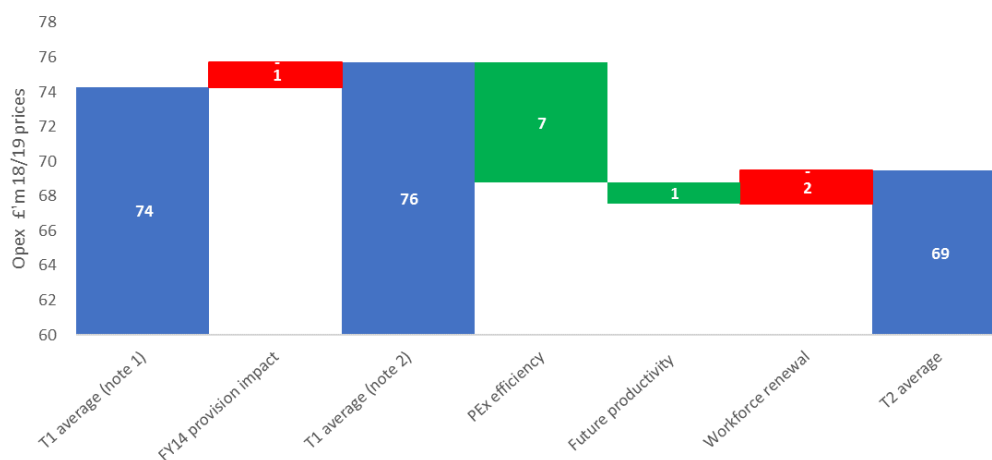
Sources: BPD 2.02, 2.05, 2.06, 3.06b, 3.09b

Note 1: Other opex includes quarry & loss, physical security and Cyber IT operating costs

Direct opex

Our direct opex costs will reduce by £7m per annum on average over RIIO-2, after rebasing for the one off impact of the provision movements in FY14 (now treated as non totex). Whilst the new structure we are embedding towards the end of RIIO-1 will mean we are resilient to changes in asset health drivers the increasing attrition through retirement in our transmission business field force will mean we need to bring more people in now to maintain the resilience of our workforce.

Figure 20.07 Direct opex is reducing by £7m per annum in RIIO-2



Sources: BPD 2.02, 2.05, 2.06

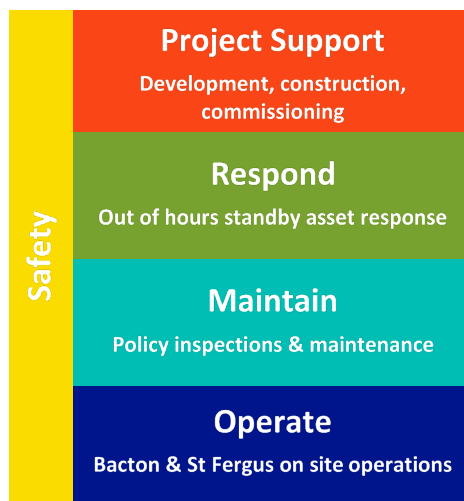
Note 1: RIIO-1 average opex

Note 2: RIIO-1 average opex, based on six year actuals adjusted for one off provision movement

Transmission Owner

In our Transmission Owner (TO) business, our direct opex costs relate to our field-based workforce who are responsible for delivering asset steward responsibilities, in line with our ISO5500 compliant asset management-based organisational structure. The field force are accountable for a range of asset steward activities, with resource flexing across multiple activities in the ordinary course of their work.

Figure 20.08 direct field force accountabilities



The volume of work is driven differently for each of the following areas:

Operate – includes two shift teams, one at each of the Bacton and St Fergus Terminals where the assets are configured on site rather than remotely by the Gas National Control Centre (GNCC). These teams configure the assets, flow paths and other site parameters based on customer demand and flows as well as the wider network requirements from the GNCC. In addition, as a result of asset issues or adverse weather conditions, compressor sites may require manning to maintain availability based on specific flow requirements. This requirement is triggered by network criticality requirements in order that gas flows are maintained and the network unconstrained. When sites are specifically manned, the teams on site may operate the assets where they cannot be controlled remotely or undertake activities, e.g. snow clearance, in order that the assets remain operationally available. No additional cost has been included to cover these requirements, the duration for manning sites is constrained by the level of available resource and extended periods will impact other services offered (i.e. potential reduction in maintenance and project support services) with resources coordinated to support at critical locations across the network.

Maintain: our maintain activity is split into two areas; Policy Driven Maintenance and Reactive Maintenance / Repair:

Policy Driven Maintenance – directly aligned to maintenance policy requirements which are based on the assets, original equipment manufacturer (OEM) recommendations and an interpretation of broader legislation. Work is scheduled based on these outputs through our planning and scheduling processes, using tools such as Ellipse and SAP Work Manager

Reactive Maintenance / Repair – aligned to defects identified through normal activities or where asset condition is not as expected and further maintenance or repair activities are required. Dependant on the scale of the defect found, different processes are followed, some delivered directly through Operations while others will fall into Asset Health and

are delivered through a project. The level of reactive maintenance or requirement for repair has been assumed to continue at its current level based on the asset health investments managing the asset risks and level of reliability and availability.

Respond – this is driven through a number of routes and is supported by out of hours standby rotas for compressors and pipelines. These standby rotas are fulfilled by our Supervisor and Technician population and are designed to maintain a minimum of 1 in 4, i.e. each individual is on standby one week in every four. This level of standby is supported by our human resources policy and trade union discussions and allows for acceptable periods of increased regularity based on annual leave, sickness or attrition. These rotas have been designed based on the geographical footprint of our assets based on responding to the following:

- Compressor Trip / Breakdown: based on Network operational requirements and asset issues. Response is to make safe and make available if possible, cross discipline rotas
- Site Alarms: based on alarm response requirements for asset protection, operational and customer requirements, driven by asset issues
- Aerial Sightings: to investigate reports of third party interference and asset protection. Based on categorisation this drives an immediate or next calendar day response
- Third party request / complaint: determined by the categorisation of the request, from emergency to planned works and minor work requests
- Contractual requirements: Network Exit Agreements (NExA) which have contractual obligations to respond and report

Structuring our field force in this way builds a level of resilience into our direct opex costs, as we are able to flex utilisation of resource depending on need. For example, increased productivity in delivering planned inspections and maintenance enables more in-house support for response and project support work. It also means that increases in inspections volumes can be accommodated within the same resource, within a certain range. For example, trends in customer behaviour means that, for certain sections of our network, there will be insufficient gas flows to support in line inspections (ILI) and instead we will need to switch to on line inspections (OLI) which require increased resource to support. We are able to contain these trends within our existing direct opex costs through increased utilisation of the existing resource needed to safely cover our national geography.

System Operator

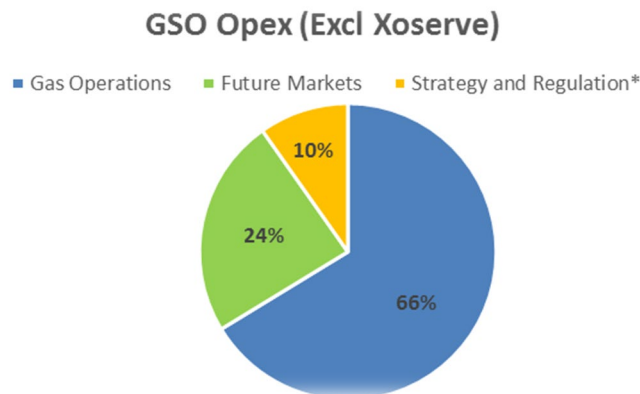
Our System Operator (SO) business can be broken into three core functional pillars where we will focus on the gas element, with legal separation splitting the SO into ESO and GSO – as per figure 20.09:

Operations – Operating our system securely by ensuring efficient operation of all the gas systems such as network plan and real-time operations. This area also is responsible for system connections as well as work with future markets to implement changes to processes and systems. Gas Operations actively delivers value for customers by providing the transmission capacity and flexibility they need when it is safe and efficient to do so and provide them with critical information and data to allow them to make effective and efficient decisions for their businesses.

Strategy and Regulation – Setting the direction of the SO through strategy development, strategic business planning and helping shape future energy policy. By setting a clear direction for the future, we can anticipate the necessary changes and prioritise our activities across the SO in the most efficient and effective manner. This in turn enables maximum value for our customers, consumers and shareholders.

Future Markets – Drives change across the energy markets through developing gas and electricity market propositions and frameworks and implementing plans to influence and facilitate key market changes in both the EU and UK. Through PEx value, the GSO have taken a more strategic view of change, which is what is being asked of us by industry, as well as becoming better and more streamlined at executing our existing code responsibilities.

Figure 20.09 proportional split of GT SO core functional pillars



There is a long-term future of gas and the Transmission Network however the exact pathway for gas is uncertain, so we need to ensure we keep options open for the future. There is more value we can provide stakeholders and consumers from the existing network so we must invest to maintain the health of the network we have. The high-level target over the remaining RIIO-1 and future RIIO-2 periods is to sustain the same level of safe and reliable operation which has allowed our customers and stakeholders the flexibility to put gas on and off the network how, when and where they want.

The outputs therefore are broadly consistent across both RIIO-1 and RIIO-2 periods, with the main challenges relating to increasing supply/demand uncertainty, variability and volatility; against a backdrop of an ageing NTS and external environmental drivers. Where overall operating costs are reduced this in turn reduces cost recovery and should reduce cost of delivered energy to the end consumer.

In conjunction with the systems it is essential we have the right people and resources, for example to maintain control room continuity and meet the challenges we face with the changing energy landscape. To perform most efficiently, a continued level of FTEs is required in RIIO-2 to support real-time operational strategy, support 'Online Simone' system to keep it live, accurate and current as the criticality of forward simulation increases as well as to increase data provision, visualisation and reporting. With more scenario analysis, a need for greater real-time operational strategy and risk management through harnessing of intelligence and data handling has been identified. This will require a different skill set and approach and whilst the longer-term ambition is to use enhanced data analytics and new technology in the form of automation and machine learning this will be a transition over the RIIO-2 period and beyond.

Xoserve

Xoserve is a not for profit business whose sole purpose is to act as a Central Data Service Provider (CDSP) for the gas industry. About 30% of its revenue comes from shippers in return for services provided directly to them. The remaining 70% is funded by transporters (Distribution and the GSO), with these costs forming part of the RIIO allowances to ensure Xoserve can operate efficiently. For GSO, these costs are within our direct opex.

Xoserve was formed as a result of the sale of the gas distribution networks in 2005 from National Grid to deliver transportation transactional services on behalf of all the network transportation companies. Xoserve provides a single, consistent, service point for the gas shipper companies, thereby meeting transporters' obligations for efficient, contestable, and transparent service provision to the gas industry. It undertakes much of this role using an IT system called Gemini¹.

Xoserve provide the CDSP services to the industry as a whole. It is efficient that one party holds this role as service provider to enable economies of scale can be leveraged, consistency to be achieved and to ensure there is no

¹ As part of the gas distribution network sales National Grid Gas Transmission retained ownership of the Gemini system because of its accountability for the capacity processes supported by the system

duplication. CDSP service provision needs to be agile and responsive to customer feedback, develop new services or amend existing service provision to drive greater benefits for consumers. This capability will be particularly vital in the future as the gas industry transforms itself to meet the challenges of the next decade. Having one party as the CDSP service provider ensures a holistic view of industry development can be taken to increase the efficiency of Xoserve's customer's businesses and therefore likely to translate into consumer benefit.

Within RIIO-1, Xoserve and Gemini costs have largely been funded as a fixed allowance. For RIIO-2 we are proposing a continuation of that approach, with only the opex costs for the provision of core, non-Gemini CDSP services, we continuing to follow the current pass-through funding mechanism. This recognises the changes implemented within RIIO-1 to the way Xoserve is funded and governed. This approach would likely give Xoserve greater flexibility to propose and implement new services or new ways of providing existing services for the benefit of the industry, and ultimately end consumers. Xoserve's costs, in relation to core CDSP services, face a high degree of scrutiny through their annual business planning process and ultimately, by the Xoserve Board.

Direct opex cost driver: Workforce renewal

Whilst our preparations for RIIO-2 mean that we have a workforce that we believe is resilient to future changes in asset maintenance activities and can continue to manage gas operations in an uncertain future landscape, we do have to act now to recruit and train people in advance of workforce retirement post RIIO-2. Our annual strategic workforce planning process has identified over 20% of gas maintenance workers will retire from their roles in the 10 years from 2020. We manage the impact of this attrition on our workforce resilience through a combination of inexperienced and semi-experienced hires, providing apprenticeship training through our Ofsted Excellent Academy facility in Eakring, Nottinghamshire and more on the job training through job shadowing with our existing workforce. We will need to bring new people into our organisation from 2022 to pre-empt the loss of experienced personnel and enable effective knowledge transfer, resulting in an average £2m per annum increase in direct opex and a further £1m per annum increase in operational training costs (which are categorised as closely associated indirect opex). Our workforce planning annex A20.02 provides more details on our people strategy for the RIIO-2 period.

Benchmarking our direct costs

External benchmarking of our direct costs can be problematic. We are the only UK Gas Transmission business and the sole Gas System Operator of the UK, which prevents direct comparison with other networks operating in similar geographical and regulatory conditions. Comparisons with networks in other geographies require careful interpretation to ensure factors that are not within the control of the transmission business do not skew cost comparisons. Nevertheless, in line with our commitment to deliver efficient and affordable services to our consumers we regularly participate in GTBI benchmarking studies which compare the opex and capex costs of member networks and provide qualitative insight into cost efficiency. We also participated in the 2019 CEER benchmarking study at the request of Ofgem. Whilst the methodology of this benchmarking study limits the abilities of networks to evaluate drivers of the findings and so limits the weight we can place on these studies, the 2019 study found Gas Transmission to be upper quartile efficient in the delivery of its activities, a result which is consistent with earlier iterations of this benchmarking study. Finally, in the Ofgem commissioned study of network productivity through TPCR-4 and RIIO-1 price controls, EPRG found Gas Transmission to have delivered the most rapid productivity growth of the network sectors over the period. Whilst each comparison is limited by methodological issues, collectively these studies indirectly support the cost efficiency of Gas Transmission costs.

IT opex

Our RIIO-2 plan includes spend of around £27m per annum on IT run costs to support our IT systems and infrastructure. We report our IT costs in both closely associated indirect and business support categories depending on whether they relate to the support of operational or non-operational systems, however as both types of systems are managed by our IT function and are subject to the same drivers in RIIO-2 we have combined these costs when discussing them here. We discuss the cost of RIIO-2 cyber activities in our other opex session, consistent with how we have been asked to disclose these in the business plan data tables.

The costs of supporting our IT systems has grown through RIIO-1 as we have made investments in asset data management systems and built our capability to respond to an escalating cyber risk. Average spend for the early part of RIIO-1 was £21m per annum, however our IT costs are forecast to reach £29m by the end of RIIO-1 as we expand our cyber resilience activities and support investments we are making to make our transactional business support functions more cost efficient. In preparation for our RIIO-2 submission we invited independent benchmarking experts Gartner to examine our IT operating costs and they confirmed that our IT operating costs are at an efficient level as we enter RIIO-2 (see Business Support section for further detail).

We have set an ambitious productivity growth target of 1.1% per annum across our RIIO-2 operating costs, including our IT costs. Whilst we do not have specific plans around how we will deliver this target we expect that there will be additional opportunities to engineer lower running costs in the future as we rationalise our shared IT infrastructure and systems. This has driven an additional £2m average opex efficiency per annum in our IT and Telecoms costs and helps to offset the incremental opex costs associated with the investments we are making in RIIO-2.

We have tested the efficiency of our IT costs

We have modelled the incremental “run-the-business” costs (RTB) of supporting new investments in RIIO-2 based on our own historic analysis of the cost impacts in RIIO-1. Typical ongoing costs include ongoing help desk support, operational licences for users of the system, periodic software upgrade, cyber security and access management. The level of new RTB costs is dependent on the complexity of the IT and whether similar IT is currently supported. For example the introduction of a new system to our architecture will add materially more opex cost than the replacement of an existing system. Each project will vary, however for planning purposes our historic experience is that three classes of IT capital can be used to estimate the nature of future RTB costs.

Figure 20.10 Incremental IT run the business cost assumptions used in our RIIO-2 plan

Investment type	Definition	Per annum assumption
Run	Investments in systems used to continue running the business as currently structured	0.5% project value
Grow	Investments in systems targeted on growing business activities or capabilities	2.5% project value
Transform	Investments in systems expected to fundamentally alter the way we do business	4.5% project value

These assumptions include the compensating decrease in costs associated with the decommissioning of any existing system supporting the capability and are gross of any future productivity or efficiency.

The majority of run the business services are procured by third party service providers and are therefore subject to robust market testing. Taking into account contract extension periods, around 75% of our IT operating costs are contracted for the RIIO-2 period, giving us a high degree of certainty over our cost base.

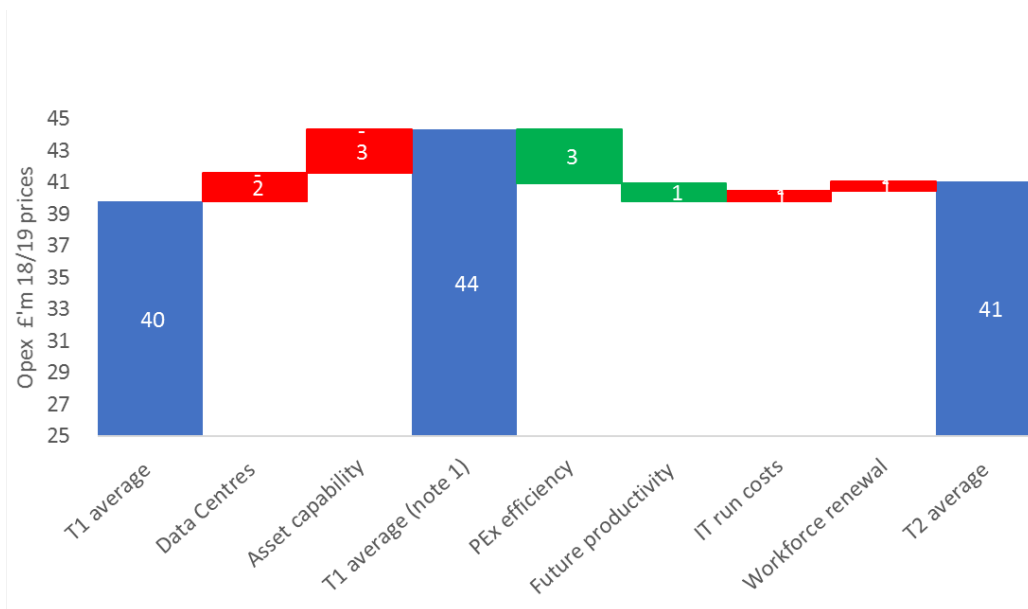
Closely Associated Indirect (CAI) opex

The CAI costs in our business plan support our load and non load activities without a linear relationship to them. They include a broad range of teams including specialist engineers, asset policy experts, customer teams and a host of other costs including training and operational IT. These activities are essential to the operating of our network and enable us to deliver for consumers and customers. Some of this expertise supports our capital projects and accordingly costs are treated as capex and form part of our unit costs. Here, we focus on the remaining opex costs.

Our closely associated opex costs will decrease by an average of £2m in RIIO-2 as the efficiencies we are delivering in RIIO-1 and our future productivity commitment offset increases in operational IT & telecoms run costs and the operational training element of our workforce resilience strategy. Our average RIIO-1 opex is based on the first six

years of RIIO-1 and does not include the additional costs of operating the data centre enhancements we secured through a RIIO-1 reopener (in 2018/19), nor does it fully reflect our asset data and capability costs, which we invested in towards the second half of RIIO-1 and so we show an adjusted RIIO-1 cost in our waterfall analysis for comparability.

Figure 20.11 Our CAI costs for RIIO-2 will decrease by £3m per annum on average



Sources: B PDT 2.02

Note 1: RIIO-1 average opex, based on six year actuals adjusted for data centre operating costs (approved in 2018 reopener and not included in six year average), and ongoing asset data and analytic capability requirements.

Future modelling of expected retirement dates has identified a peak of retirement in the early years of RIIO-3 and high competition for technical competencies in the sector, combined with reduced interest in STEM (Science, Technology, Engineering & Maths) careers from school leavers means that we cannot rely on recruitment of skilled employees to replace those future retirements. We have an Ofsted Excellent training Academy where we train apprentices and part qualified employees in the capabilities, competencies and authorisations we need to operate our business, and we combine this technical training with shadowing and knowledge transfer from our existing skilled workforce. We are forecasting to bring in an additional 22 apprentices and other hires from the start of RIIO-2 to ensure our workforce continues to deliver maintenance, operate the network, provide local support for capital projects into the future.

£1m of the average annual IT opex increase (as detailed in the IT section above) relates to operational IT and telecoms systems and are included here.

As we progressed through RIIO-1 we have invested in asset and condition data management systems and analytical capability within our organisation to better inform the decision making around asset interventions. This has involved investing in the end to end processes and systems in three key areas

1. Efficient Project Delivery - areas of focus included optimising our procurement and contracting and ensuring we have effective policy and technical specifications
2. Asset Strategy and Planning – focussed on embedding the asset management end to end process, ensuring we have captured and recorded the right asset information data, developed asset management strategy and planning, asset management lifecycle delivery and asset management risk and review
3. Modernising Our Operation – develop our services and understand the workload drivers, effective planning and scheduling of work, effective and efficient execution of work

One of the early outcomes of this ongoing work has contributed to delivering our revised organisational structure.

RIIO-1 cost efficiency and new operating model

During RIIO-1, we set an ambitious target to reduce overall operating costs and think about efficiency through the lens of the customer. This journey commenced in FY18 with a number of performance programmes to address specific local challenges in entities and functions. We have already realised savings in creating this new structure and will continue to embed ways of working and supporting initiatives until the end of RIIO-1 to achieve the projected efficiency.

Building a sustainable business for the future

Supported by industry leading consultants (KPMG), we embarked on a journey to review the way we work and improve the experience for the customer. We did this by exploring whether we are doing the right type of work, managing the right kind of processes or developing the right kind of capabilities that customers need from us in the future. Teams across the UK organisation have conducted a detailed and thorough re-evaluation of every activity within our business using a zero based budgeting approach. These teams, who know their processes best, looked for efficiencies by identifying responsible changes to how we work, whilst maintaining and improving the service provided to our customers and bill payers.

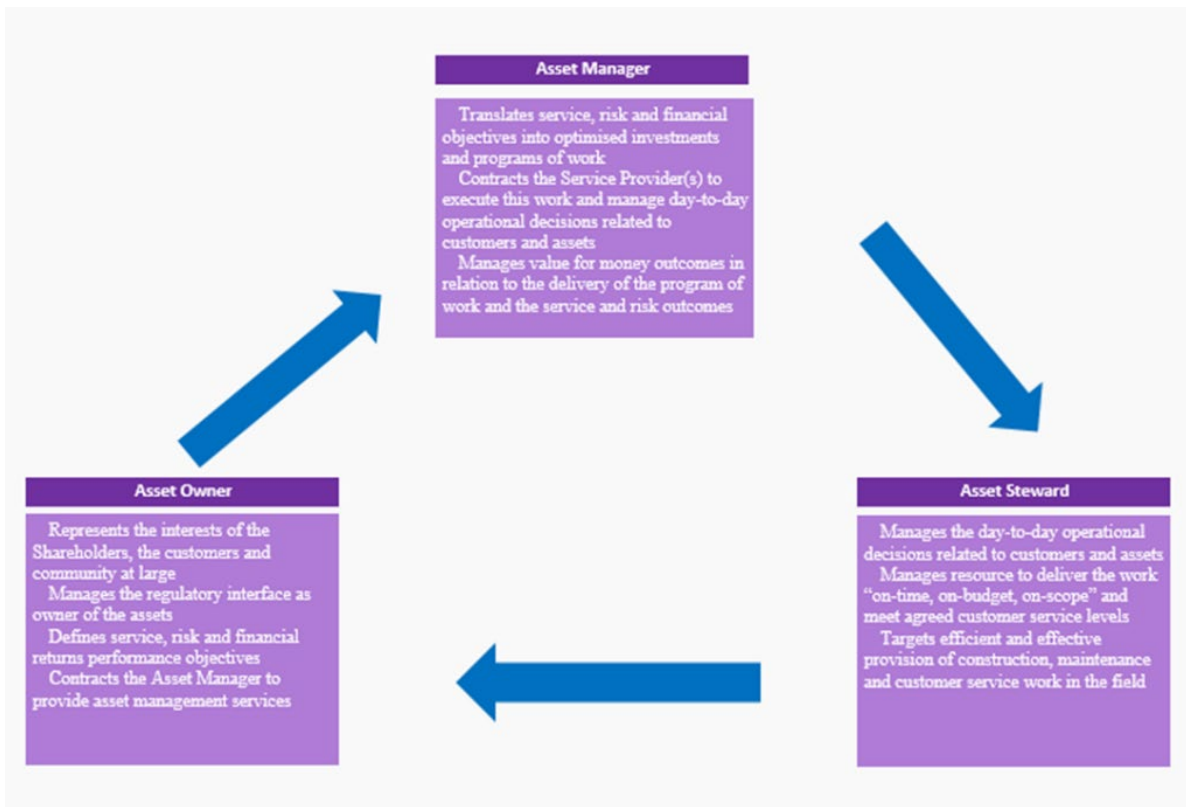
We preserved all activities that are legal, safety or regulatory requirements or directly affect reliability or resilience of our networks. In some areas, we have chosen to enhance what we do and respond faster and better to the changing world around us. We applied the most scrutiny around work we would class as discretionary, to identify what we could stop or reduce. By doing this, we will be able to implement best practices, streamline our processes and reduce the services provided internally in cases where we can no longer afford them, where they are no longer relevant, or where they create only marginal value.

We have also reviewed our organisational structures by questioning if they are set up to be efficient, agile and affordable whether that is through the lens of spans and layers, or whether they are managing the processes and capabilities we need in the future. Our structures should empower people, should ensure that accountabilities are in the right place and we have the right skills to deliver what our customers want and need, both now and in the future.

Structure and activity of closely associated indirect teams

As an effective asset manager, we have a duty to ensure the safety of our staff and the public while making sure we are efficient and affordable in keeping our network fit for our customer's needs. Our teams work together to form an effective asset management system. To implement an effective asset management system as defined in ISO55000, we structured the organisation around the functions of Asset Owner, Asset Manager and Asset Steward. This structure is seen in many other regulated utilities. Our industry has evolved so asset management is now our core function. The operating model allows for clarity of responsibilities across Gas Transmission. Figure 20.12 details the activities for the Asset Owner and Asset Manager functions.

Figure 20.12 Activities and linkage between the Asset Owner, Asset Manager and Asset Steward functions



An effective asset management system is required to ensure the safety of our assets and that we're efficient and affordable in enabling the network to meet our customers' and consumers' needs. ISO55000 is the Asset Management standard authored by the Institute of Asset Management (IAM) and is considered best practice for utilities to follow. Figure 20.13 illustrates the scope of asset management as defined by the IAM in ISO55000. Figure 20.12 shows where the three core functions in Gas Transmission map onto the IAM scope of Asset Management:

Figure 20.13 Gas Transmission core functions : Asset Management

Service	Strategy and Planning	Asset Management Decision-Making	Lifecycle Delivery	Asset Information	Organisation and People	Risk and Review
Asset Owner	Core			Core		Core
Asset Manager	Supports	Core	Supports	Supports		Supports
Asset Steward			Core		Core	

Pay benchmarking

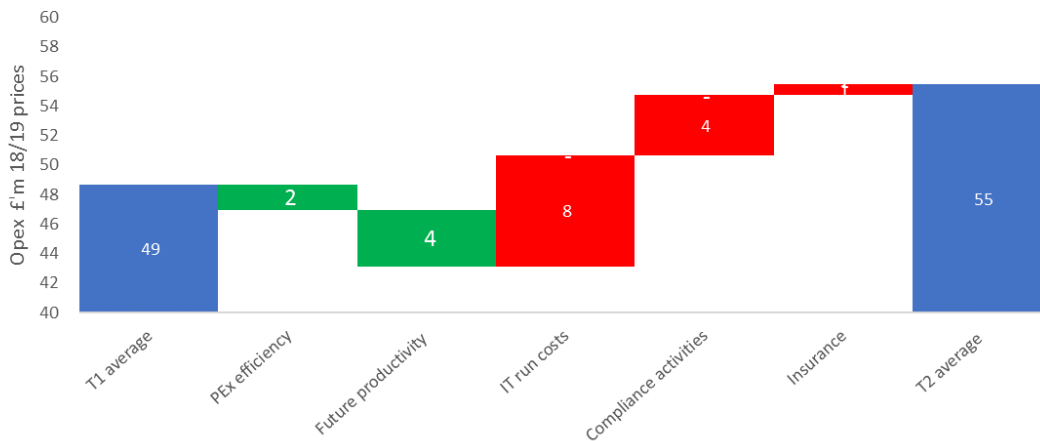
We test our pay deals against our peer group and regularly benchmark our employee remuneration to ensure it remains in line with the market. Our annual pay awards are benchmarked against those of network companies and other competitors in the skills market. We ensure that any deal we put in place with our trade unions or annual pay rise for managers is in line with our peers, so we do not fall out of step with the market but, equally, we do not become a higher than market payer.

From a broader benchmark perspective, we undertake periodic assessments of our total pay packages, with the latest review completed in 2018 by Korn Ferry (a people and organisational consultancy). We adopt a single pay framework across our UK regulated businesses. This means that all of our employee (both direct and support function) costs have been recently benchmarked. In summary, total cash remuneration was in line with median pay for a comparator of 130 entities in the utilities, oil and gas and chemical sectors.

Business Support Opex

The cost of most of the business support functions will decrease in RIIO-2, thanks to the efficiencies delivered in RIIO-1 and our commitment to a 1.1% per annum productivity growth through RIIO-2. However, overall business support costs will increase due to a higher level of regulatory and compliance activities than in RIIO-1, and an increase in the premiums we pay to insure our business. Business Support costs also include a proportion of the increasing IT operating costs as we have outlined above in the IT section. Overall these factors will see costs increase by an average of £6m per annum when compared with the first six years of RIIO-1.

Figure 20.14 Supporting the businesses IT investments, and increased compliance and insurance costs drive an £6m per annum business support cost increase in RIIO-2



Source: BPDT 2.02

There are three key upward cost drivers of business support costs in our plans for RIIO-2:

IT run costs - £8m of the total IT cost increase (see IT costs section above) relates to non-operational IT and telecoms and is shown in business support costs

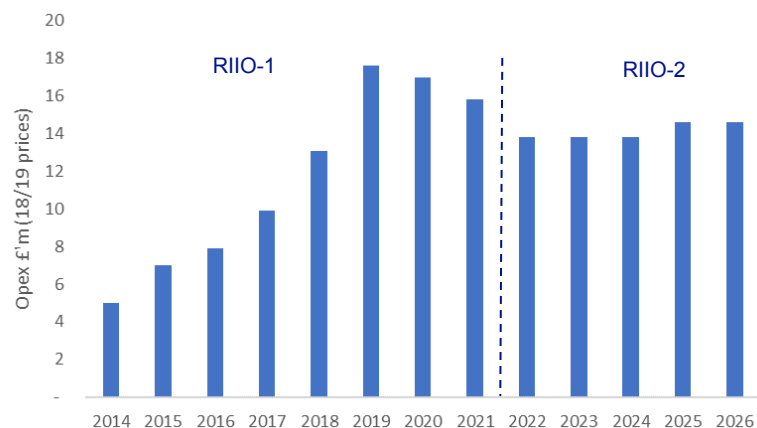
Compliance activities We have experienced an increase in financial and regulatory requirements over the RIIO-1 period and evidence points to this trend continuing into the RIIO-2 period. This gives rise to a £4m per annum underlying upward pressure in these costs over the RIIO-1 and RIIO-2 period, gross of efficiencies.

From a RIIO-1 perspective, there have been two main drivers for increasing costs:

- *Regulatory pressures:* We have faced a growing requirement for cost, output and operational information to understand and manage performance internally and to maintain transparency externally. This was triggered by the change in regulatory approach from RPI-X into RIIO, but was added to during the period by increased scrutiny around our activities from external commentators. Whilst this focus is understandable, it creates a further regulatory and financial burden that was not in place in previous control periods.
- *Financial control compliance:* Over the same period, there has been an increased focus on financial controls and compliance activities from audit firms following high profile audit issues. This has required us to increase our assurance and compliance activities and spend ~£5m per annum more than the early years of RIIO-1. We are investing in our financial systems to mitigate some of this increase by the start of RIIO-2 but costs of our controls work will remain above the levels at the start of RIIO-1.

The impact of these pressures can be seen in the phasing of FAR costs over the period:

Figure 20.15 Trend in finance, audit and regulation costs over RIIO-1 and RIIO-2 periods



The cost pressures from RIIO-1 will continue into the RIIO-2 period, with additional requirements being added by the RIIO-2 framework. The resulting £4m upward pressure between the average of the first six years of RIIO-1 and RIIO-2 relates to:

Increasing detail in regulatory reporting - Ofgem's business plan data tables for RIIO-2 introduce additional requirements for reporting of our costs and asset information that were not in existence during RIIO-1. We are expecting this information will be required through the RIIO-2 period. Much of the new information is not readily available in our financial and operational systems so will require bespoke work to produce and assure, both for the annual reporting packs but also through the year. The current cost of our Regulatory Reporting Pack (RRP) process is £3m per annum. Based on the additional information required we estimate that an additional 10 FTEs are required to support the process across our business. This will add £1m per annum to our FAR costs. We have considered alternative approaches to delivering this requirement through updates to IT systems or reducing assurance around the work however these either involve increased costs or increased risk of mis-reporting so are not preferred.

Greater complexity of RIIO-2 framework - the RIIO-2 framework as set out by Ofgem, incorporates more regulatory mechanisms and within period adjustments than RIIO-1. These include items such as indexation of Real Price Effects (RPEs), Return Adjustment Mechanisms (RAMS) as well as additional reopeners for uncertain costs such as those related to cyber. The mechanisms are introduced to reduce the risk of windfall gain or loss by networks (and consumers) but they do involve additional processes to operate. At the start of RIIO-1, we added approximately 10 FTEs to our operating model to manage the new regulatory framework. We also brought in additional resource of about the same level to manage and respond to reopener discussions during the period. These were placed both within our regulatory function and the broader business, particularly in the asset management areas. We have used these experiences to size the forecast for the impact in RIIO-2, resulting in an additional £1.5m upward pressure.

RIIO-3 preparations - Our forecasts for 2024/25 and 2025/26 are higher than the other three years of RIIO-2, as we have included £1m per annum for the start of work preparing for RIIO-3. These are based on the costs of preparing for RIIO-2, which we are spending now and are included in 2019/20 and 2020/21 of the RIIO-1 period forecasts. These costs show as an upward pressure on the waterfall because the starting point is the first six years of RIIO-1 rather than average costs for the full price control period.

Insurance - Sustained losses due to events such as natural catastrophes, wildfires, etc are driving increases in insurance premiums globally. Whilst we insure our businesses via a captive insurer arrangement (where National Grid effectively self-insures) this arrangement can only mitigate some of the external pressures from the commercial insurance market. These pressures will drive an increase in insurance premiums of £1m on average through our RIIO-2 plan, compared with RIIO-1 average costs. We have tested the premiums offered by our captive insurance arrangement with those available on the commercial market to ensure that our costs are efficient, the results of this analysis is presented later in this annex.

Our business support costs are efficient

We regularly use external benchmarking data to assess the value that our business support functions deliver. Benchmarking data provides some information about the level of efficiency of our costs, however this approach does not wholly determine the efficient cost of the activities our support functions undertake to support our transmission business. For example, our IT spend as a percentage of revenue or number of IT users in the business will be higher than many companies because IT systems are integral to our operations, and because we face a higher cyber threat due to our role as an electricity transmission business. A pure benchmarking approach to determining efficient costs does not take into account the different extents in which businesses invest in support functions in order to drive lower cost in other cost areas. Nevertheless, in preparing our plan we wanted to understand how the business support costs in our RIIO-2 business plan compared with those of similar-sized companies.

We commissioned studies to test the efficiency of our HR, finance, audit and regulation, procurement, property management, CEO & group management and Business support IT costs. We did not include health and safety costs or insurance costs, as the varying levels of risk between businesses means comparisons are limited in these areas.

We invited The Hackett Group, a global business benchmarking organisation, to perform a high-level benchmarking assessment for our combined business support costs for electricity transmission, gas transmission and electricity system operator businesses. We asked them to compare our costs with those of similar-sized companies from outside the utility sector. This is because businesses in the utility sector are typically regulated and we wanted to understand the efficient costs of businesses in competitive markets. This approach was also consistent with how Ofgem benchmarked network business support costs when setting allowances in RIIO-1, however this approach means that, when interpreting the benchmarking results activities performed by us as a regulated entity that are additional to non-regulated businesses need to be taken into account, such as regulatory and critical national infrastructure compliance.

For our IT costs, we also engaged Gartner (an industry-recognised specialist in IT benchmarking) to perform a more detailed analysis of our operational and non-operational IT costs, comparing costs for each of key activity (e.g. application support, networks, storage, end-user computing) with those of other companies in their database, adjusting for workload (i.e. number of applications, number of services, number of users). We did this because simplistic comparisons of total IT costs between companies do not account for factors such as the number and level of availability of business applications supported.

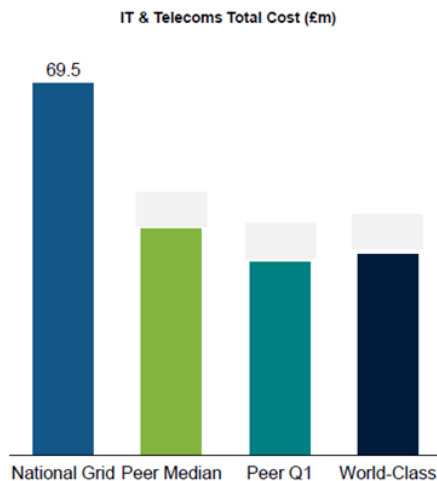
Using Ofgem's business support function definitions, Hackett identified comparable activity categories within their database. We asked Hackett to compare our costs to as many companies from the group as Ofgem had used for RIIO-1 business support benchmarking for which Hackett still had current data, a total of 19 companies from across multiple sectors. Hackett performed the comparison to peer group using a single metric for each business support area, such as costs as a percentage of revenue, or cost per full-time equivalent (FTE) employee. Although this is a simplistic approach that averages out key differences (for example, how embedded IT is into an organisation's operations), it provides a reasonable foundation to start analysing and adjusting for more complex areas of our support costs. Hackett provided three measures to compare against;

- The median cost of function from the comparator group
- The upper quartile cost of function from the comparator group

- The cost of function from world class performers – defined as organisations on a function level that are upper quartile in both efficiency of cost and effectiveness of delivery. World class metrics are taken from companies across different sectors and of different sizes

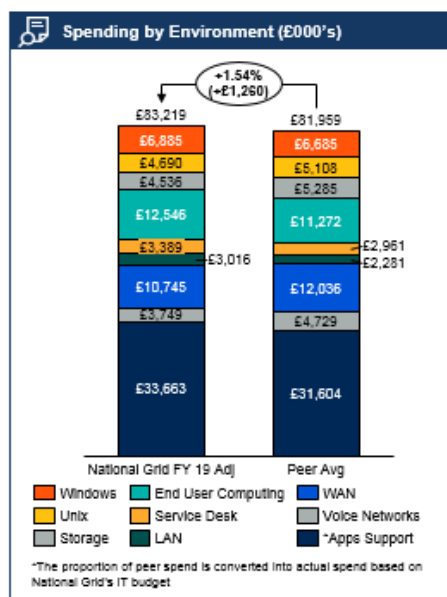
On a cost per end user basis, Hackett found our IT costs to be higher than those of similar-sized organisations. This is consistent with extent to which we use and are reliant on IT systems to operate and monitor the Gas and Electricity transmission networks which is independent of the number of IT users in our organisation.

Figure 20.16 IT spend/user for National Grid UK regulated businesses versus non-regulated comparator group and Hackett world class (extract from Hackett Group benchmarking report A20.08)



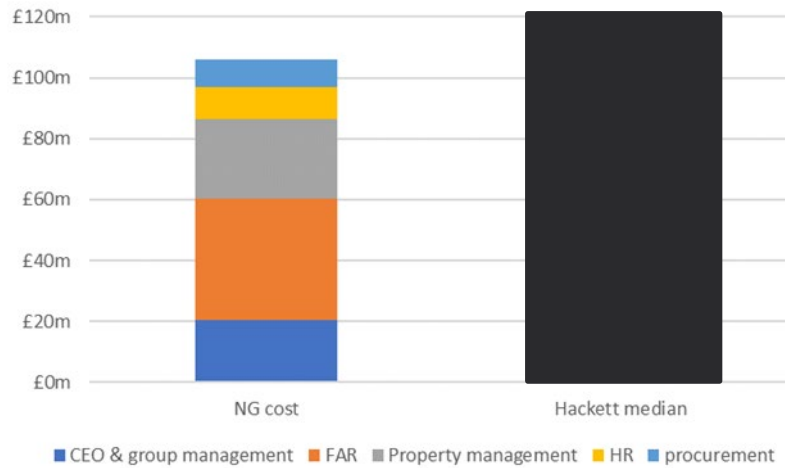
Gartner’s more detailed analysis found that, after adjusting for levels of workload, our IT costs were in line with peers whilst delivering higher levels of system availability. In some areas, such as our WAN network and servers, our costs were best in class efficiency (defined by Gartner as within the 50th and 25th centiles of cost). In other areas, Gartner found we spend more than our peers on maintaining our networks (LAN) and in supporting applications and end users. The proposed IT infrastructure investment plan for RIIO-2 will support us in achieving best in class efficiency across our IT costs, as well as improving cyber security and will bring our IT costs to upper quartile efficiency by the end of the RIIO-2 period.

Figure 20.17 IT spend by activity for National Grid UK regulated businesses versus Gartner database (annex A20.19)



For the other business support functions Hackett benchmarked, we forecast spend of £105m across the UK regulated businesses (i.e. GT, ET and ESO) at the start of the RIIO-2 period. The equivalent median spend on these activities in the non-regulated peer group was £131m, meaning National Grid business support costs were 20% lower than median even before adjusting for activities not included in the benchmark (such as regulatory activities, and our obligations as operators of Critical National Infrastructure Sites).

Figure 20.18 non-IT business support costs for National Grid UK regulated businesses versus non-regulated comparator group median cost

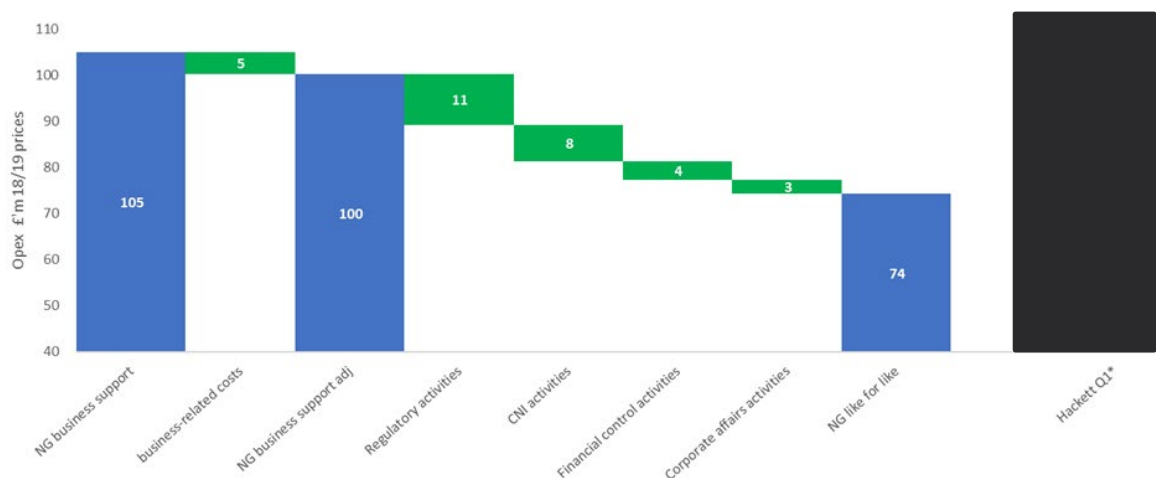


In the RIIO-1 price control our business support allowances were set at the upper quartile efficient level, plus normalisations for activities not in the comparator groups or where we could show additional efficiency evidence (for example that we spent a higher amount of money in a function in order to generate greater benefits elsewhere). We wanted to test the efficiency of our business support costs against this upper quartile cost view. Hackett caution that no company is upper quartile in every function, and that upper quartile cost performance may come at the expense of effectiveness, and so to account for this we also looked at the costs of functions Hackett defined as “world class” in efficiency and effectiveness.

The upper quartile efficient cost based on Hackett benchmarks was £131m. We used world class metrics for HR, finance and procurement functions; we rely on effective HR function to set and monitor our people strategy; effective finance and procurement functions supports the decision making and implementation of innovations that have reduced our capital costs through RIIO-1. The combined impact of using world class metrics for these three functions was £6m.

After normalisations for activities not included in the comparator group, our business support costs were £74m, 20% lower than the Hackett benchmark.

Figure 20.19 non-IT business support costs for National Grid UK regulated companies versus non-regulated comparator group upper quartile cost



*Upper quartile costs of comparator group adjusted for world class effectiveness costs for HR, procurement and Finance, Audit and regulation

Normalisations

We identified four areas of activity that were not included in the comparator group costs and so required adjustment to reach a like for like comparison of costs:

Regulatory activities – we chose a non-regulated comparator group so that we could identify upper quartile efficient costs of companies operating in competitive markets and have access to more benchmark information. This does mean that we have to adjust for the costs of operating in a regulated environment. We have a regulation team who support compliance with our licence obligations, price control submissions and other mechanisms within the framework. We also need finance and legal resource to support these activities and to prepare the annual Regulatory Reporting Packs (RRPs) to Ofgem. In our 2021 forecasts, the costs of these activities within the FAR and CEO and other categories is £11m. This breaks down as £7m in our regulation team, £3m in finance functions and £1m in legal. These costs are forecast to be lower in 2021 than they are today due to the efficiencies we have included for our PEx value programme.

CNI activities – At some of our key sites we have additional requirements around repairs & maintenance and security costs. This is particularly the case at the locations where our Electricity and Gas system operator control centres are located. This is in part due to the fact that parts of these buildings house operational assets and CNI systems, requiring enhanced physical security measures. It also drives a higher level of services for these sites, to support round the clock critical operations, in turn driving higher costs than typical non-operational office sites.

Financial control activities – maintaining financial control is critical to ensure that our internal and external reporting is consistent, accurate and compliant. Whilst this applies to all companies, the requirements are higher on National Grid than others due to the combination of being a FTSE listed company, regulated in nature and having a US listing which brings with it requirements to maintain Sarbanes Oxley requirements. These drivers add scrutiny and detail to our reporting and controls environment which increases transparency but does add cost to our finance function compared to peers. We are reducing these costs from today through the introduction of more preventative, systematised controls in our new finance systems (part of our PEx value work). However, we have estimated that the additional activities required add at least £4m per annum to 2021 costs which are not included in comparator companies.

Corporate Affairs activities – National Grid is seen as a key public institution and faces greater scrutiny from the public than typical companies. Our corporate affairs and communications functions play a vital part in discharging that role, as highlighted with the August 2019 power cut, and we have higher than typical resource levels in this area to support with this role. In adjusting our CEO and other costs down to benchmark we have

not reduced the costs further as we believe that this would be to the detriment of our customers and the broader energy industry given the nationally important role that we play in the industry.

Our insurance costs are 23% lower than commercial market premiums

We insure our businesses through our captive insurance company, wherever it is efficient to do so. Under this arrangement, insurance is provided by a licenced insurance company owned by the group, set up specifically to underwrite insurable risks of our business operations. We periodically use external consultants to review the premiums considered achievable in the commercial market for our risks, to compare these against the premiums charged and forecast by the captive. We last did this in 2019, using Aon Global Risk Consulting and RKH Specialty, who estimated the commercial market premiums would be over 23% more than our proposed premiums for RIIO-2. This equates to around £6m of savings to consumers for the RIIO-2 period.

Other opex

In preparing our business plan submission Ofgem provided separate tables for operating costs that either:

- i) Had been allowed under an uncertainty mechanism in RIIO-1, such as quarry and loss development costs
- ii) Are incurred as part of our meeting external requirements by governmental agencies e.g. BEIS to mitigate external threats, such as IT cyber costs incurred under the NIS directive, or physical security costs incurred as part of BEIS's physical security upgrade programme.

Figure 20.20 Other opex costs

£'m	RIIO-1 (6 yr)					RIIO-2	
	average	2022	2023	2024	2025	2026	average
Quarry & loss	3.6	3.9	3.9	4.0	2.5	2.5	3.4
Physical security	4.2	6.2	6.2	7.0	7.3	7.3	6.8
Cyber operational technology	-	5.3	6.8	8.3	12.6	16.2	9.8
Cyber Information technology	0.2	5.9	6.1	5.9	6.0	6.5	6.1
Total	7.9	21.3	23.0	25.2	28.4	32.5	26.1

Note, that the increase in average costs from RIIO-1 to RIIO-2 is £18m which is the net impact of a £20m cost driver and a £2m efficiency

Figure 20.20 sets out the average RIIO-1 expenditure per year, and our forecast costs for each year of the RIIO-2 plan and covers the following areas:

1) Quarry and development costs - Quarry and Loss Development Claims (Q&L) arise from losses suffered by land owners due to the presence of a gas transmission pipeline affecting the productivity or limiting utilisation of their land. These cover a range of land uses, including farming, quarrying and property developments. We remunerate claimants for their financial losses once the case has been proven. RIIO-1 allowances did not include any amounts for quarry and loss payments and we recovered these costs through a reopener mechanism. Going forward, we have a better understanding of the cadence and size of these payments and have included them within our baseline funding request. Our forecasts costs of £3.4m per year for RIIO-2 are broadly in line with the amounts we paid for RIIO-1.

2) Physical security costs - The Secretary of State initiated the Physical Security Upgrade Programme (PSUP) and it is now governed by the Department for Business, Energy and Industrial Strategy (BEIS). It is a national programme to enhance physical security at CNI sites. Requirements arising from this programme have been a key driver of our activity both before and during the current regulatory period. The number of sites in scope of PSUP will more than [redacted] from [redacted] at the start of the RIIO-1 period to [redacted] by the end of the RIIO-2 period. In addition to capital cost enhancements, operating costs are incurred to support the following activities:

Enhanced Physical Site Security Service and Support Costs – This being our forecast of costs for Planned Preventative Maintenance and reactive maintenance on our Enhanced Physical Site Security assets, and costs associated with 24/7 monitoring of these sites including alarm and video signals through a shared service Alarm Receiving Centre (ARC), for which costs are allocated to NGGT in proportion to the number of sites monitored.

Site N Security Costs – This being our forecast of costs associated with contracted security services at our Category 5 CNI Site N site. These services being provided by [REDACTED] Ltd.

Operating costs associated with these activities are forecast to increase by £2m per year on average in the RIIO-2 period primarily driven by the increase in number of sites falling into the scope of PSUP.

3) **Cyber operational (OT) and information (IT) technology** - Our network is part of Great Britain's Critical National Infrastructure (CNI) and we need to do more than ever to protect the operation of this network from escalating cyber threat. NIS Regulations have been brought in to standardise and co-ordinate efforts to minimise the risk of cyber-attack and the resulting impact on UK CNI, the economy and consumers. Under the regulations we are a designated operator of essential services (OES), and work jointly with BEIS and Ofgem in their joint role as Competent Authority. Our proposed costs for RIIO-2 cover projects that address cyber security threat on both the operational technologies used to control industrial processes and equipment, and our IT systems (used for data-centric computing). Due to the high sensitivity around these plans we can only share a limited amount of information on our business plans in public and non-confidential forums. We have agreed that we will share the required information directly with Ofgem to allow them to assess our business plans in this area. These plans do result in an average £15.9m of opex each year of RIIO-2. More information on our plans can be found in Chapter 15 "I want you to protect the transmission system from cyber and external threats".

We have included all but £16m of the £130m RIIO-2 expenditure for these activities within our opex baseline. This is because, although determined by external requirements, the scope of our work is well defined, with clear, ring-fenced, outputs that can be recorded in confidential price control deliverables. Including costs within our baseline costs drives a strong performance incentive on us that will drive benefits for consumers. We are proposing reopeners at the start of the RIIO-2 period, the mid-point, and the end of RIIO-2 to adjust allowances for scope changes.

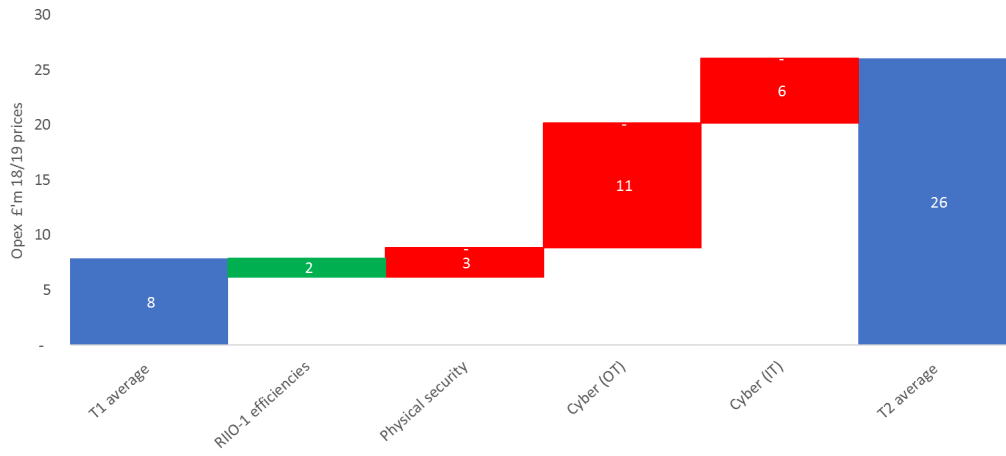
Efficiencies

Throughout the evolution of the Enhanced Physical Site Security Service and Support service National Grid has undertaken a "lessons learnt" process in respect of its existing service agreements for its First, Second and Third line services. One of the improvements identified was the insourcing of services from our PSUP Service and Support service providers. We undertook insourcing of our first line support function during 2016. This support function now addresses circa 35% of all PSUP solution faults without recourse to second line support. Following the successful insourcing of our first line support function the Second Line support was brought in house in November 2017. Our unit rate forecast for Enhanced Physical Site Security solutions in RIIO-2 reflects these efficiencies. This being [REDACTED] per site per annum costs.

Independent benchmarking by Gartner has been completed within our United States regulatory submissions as cyber legislation is more mature there. Our unit costs in this area are based on this benchmark. An operational technology RTB of 6% is included. This is driven by network security, license costs, frequency of anti-virus, frequency of patching, cyber related hardware and software maintenance, intelligence and Security Information and Event Management systems.

Figure 20.21 shows the impact of the PSUP unit cost efficiency and the RIIO-2 drivers we have set out above on other opex costs.

Figure 20.21 our response to NIS and PSUP requirements will increase costs by £18m per annum in RIIO-2



Sources: BPDT 2.05, 2.06, 3.06b, 3.09b