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# **RIO-ED2 balance of risks**

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## Executive summary

The Energy Networks Association (ENA) has asked Oxera to assess the balance of risks in the RIIO-ED2 Draft Determinations regulatory package.<sup>1</sup>

We look at the elements of the RIIO-ED2 price control package to assess a number of categories of risk that are introduced for distribution network operators (DNOs), and to examine whether those risks are associated with a downward bias or skew (i.e. whether the outcomes are likely to materialise as a downside risk to networks, rather than as an upside). The table below summarises our findings across the individual elements of the price control which contribute to the negative skew of the balance of risks inherent in the RIIO-ED2 price control package.

### Summary of the risk assessment

Factor	Associated risks	Magnitude of the impact
TOTEX	<ul style="list-style-type: none"><li>downward bias caused by the TOTEX allowances being challenging, amplified by the low accuracy of the assessment models at this stage in the price control process. Relative to RIIO-ED1:<ul style="list-style-type: none"><li>more challenging catch-up efficiency benchmark</li><li>deterioration in statistical quality of the models</li><li>disaggregated analysis implying an efficiency benchmark beyond the frontier</li><li>little correlation between DNOs' performance in the TOTEX models and disaggregated analysis</li><li>a compounding of the effect of the challenging ongoing efficiency improvement targets over two extra years</li></ul></li></ul>	If DNOs' TOTEX overspends equal the amount disallowed by Ofgem following efficiency adjustments, the sector average RoRE would be <b>1.20%</b> lower on a post-RAMs basis
ODIs	<ul style="list-style-type: none"><li>downward bias in the balance of penalties and rewards, with the calibration of that balance being explained mostly without reference to the ability of networks to meet the threshold</li></ul>	The range of possible outcomes for ODI rewards and penalties is between <b>-4.00%</b> and <b>1.95%</b> in line with Ofgem's impact assessment, which translates to <b>-1.84%</b> and <b>0.43%</b> on a post-RAMs basis, when considered in combination with the TOTEX underspending effect

<sup>1</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations](#)', 29 June.

Factor	Associated risks	Magnitude of the impact
Network asset risk	<ul style="list-style-type: none"> <li>downward bias in the mechanism with penalties and no rewards</li> <li>downward bias due to greater monetised asset risk</li> </ul>	A penalty of 2.5% applied to NARM allowances in case of an unjustified under-delivery against the NARM requirements corresponds to <b>0.09%</b> of sector average RoRE <sup>1</sup>  NARMs expenditure accounts for 10.7% of the proposed TOTEX allowance, based on Ofgem's base case TOTEX scenario
RPEs	<ul style="list-style-type: none"> <li>downward bias if the 12% of TOTEX that is not indexed to RPEs would be indexed to a positive RPE if RPE indexation were allowed</li> <li>higher risk of under-remuneration in a high-inflation environment if indices that are used for RPE indexation do not accurately track movements in DNO costs relative to the CPIH index</li> </ul>	12% of TOTEX is not indexed to RPEs
Re-openers	<ul style="list-style-type: none"> <li>downward bias in cases where DNOs have to incur costs prior to applying for a re-opener</li> <li>risk of delay and/or suboptimal delivery in undertaking investment with consequences for TOTEX performance</li> </ul>	Unknown due to the nature of the re-openers
Volume drivers	<ul style="list-style-type: none"> <li>downward bias due to the volume driver cap and no symmetric floor</li> <li>downward bias due to the clawback</li> </ul>	Volume drivers account for 9.9% of the proposed TOTEX allowance, based on Ofgem's base case TOTEX scenario
Frequency of extreme weather events	<ul style="list-style-type: none"> <li>downward bias due to the possibility of more extreme weather events in RIIO-ED2</li> <li>downward bias due to asymmetry of the IIS and the inability of DNOs to remove the effects of all extreme weather events from their performance under the IIS</li> <li>downward bias due to the likely asymmetry of ex post efficiency assessments conducted as part of the TOTEX variant allowance</li> </ul>	Unknown, but see para. 2.76 for a discussion on expenditure borne by networks in relation to weather-related events

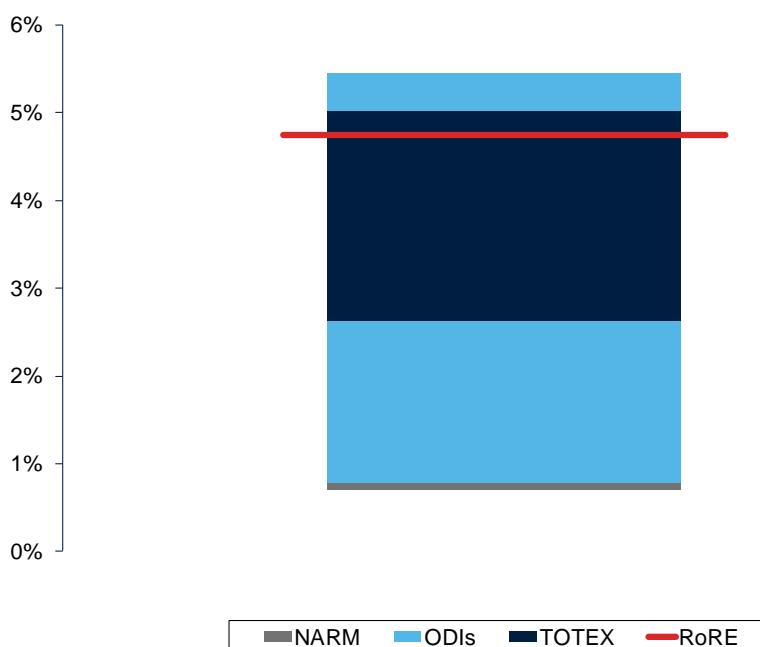
Note: ODIs—output delivery incentives. RPEs—real price effects. <sup>1</sup> The magnitude of the impact of a penalty on the NARMs expenditure is not affected by the application of the RAMs as, in line with Ofgem's financial model, we have applied the RAMs thresholds (3% and 4%) to only ODIs and TOTEX.

Source: Oxera.

The figure below illustrates the potential impact of the risks associated with TOTEX allowances, output delivery incentives (ODIs) and the Network Asset Risk Metric (NARM) penalty. These are elements of the price control which we have analysed in this report and where we have been able to quantify an impact for networks in the RIIO-ED2 period, assuming sector-average performance. The figure does not explicitly reflect the impact of the factors that

we have not quantified, including the drivers of any downward biases, greater risks and/or inability to fully mitigate the risks<sup>2</sup> that are associated with RPEs, re-openers, volume drivers and the frequency of extreme weather events. The figure presents the impact of risks post the effect of the Return Adjustment Mechanisms (RAMs), which would narrow the RoRE range. However, the downward bias of such risks remains unaddressed.

### Illustration of the impact of asymmetric risks on RoRE—post-RAMs



Note: The figure does not include the impact of bespoke ODIs. The chart is based on sector-average data. The figure shows the impact of a +/- 10% deviation in the TOTEX expenditure relative to a central expectation that assumes that the DNOs will overspend the same amount disallowed by Ofgem as a result of the efficiency adjustment.

Source: Oxera analysis of Ofgem data.

The best way to address the issues identified with specific elements of the price control is to address them at source. However, where the negative skew is not addressed at source, it leads to expected returns on equity being below the cost of equity allowance, i.e. below the required return on equity as assessed by Ofgem. Therefore, DNOs require a compensation that would allow them to earn investors' required return in the base case.

A practical way of redressing such a negative skew in returns is to choose a point estimate of the return on equity above a mid-point of its range—i.e. to

<sup>2</sup> Inability to fully mitigate the risks refers to the fact that uncertainty mechanisms are designed to deal with uncertainty and risks.

'aim up' on the regulatory allowed cost of equity. Given that we have identified multiple sources of downward bias in the price control, we consider that aiming up on the return on equity is required in the RIIO-ED2 price control to restore the balance of risk and return.

## 1 Framework

- 1.1 The ENA has commissioned Oxera to assess the balance of risks in the RIIO-ED2 Draft Determinations regulatory package.<sup>3</sup> We note at the outset that this assessment is specific to the Draft Determinations and may not remain relevant for the Final Determinations, as the specifics of the proposed price control package may change.
- 1.2 If a price control package is unbalanced—specifically, if it exhibits a negative skew)—it leads to the expected returns on equity being below the cost of equity allowance, i.e. below the return required by investors as per Ofgem's assessment. Therefore, DNOs with a negatively skewed price control package require a compensation that would allow them to earn investors' required return in the base case. A practical way of structuring a compensation to redress a negative skew in the outcomes to which investors are exposed is to choose a point estimate of the return on equity above the mid-point of its range—i.e. to 'aim up' in determining a regulatory allowed cost of equity.
- 1.3 During the RIIO-GD2/T2 appeals process, Ofgem accepted this principle:

GEMA submitted that it accepted, in principle, that material net asymmetric risk in a price control settlement would warrant a degree of aiming up on the allowed return on equity.<sup>4</sup>
- 1.4 The CMA has recently applied the principle of aiming up to compensate for the price control package downward bias in the PR19 redetermination:

Based on the analysis above, we consider that asymmetry continues to be potentially relevant to the choice of a point estimate for the cost of capital. [...] The overall degree of structural asymmetry in the ODIs, and otherwise in the determination, should be reflected in the choice of point estimate of the cost of capital.<sup>5</sup>
- 1.5 In this report, we assess a number of RIIO-ED2 price control elements that contribute to the overall negative skew of the package, to identify whether aiming up is required in order to compensate investors for this. We do not focus on other reasons to aim up in this report, although we note that there may be some (e.g. in relation to addressing financeability risks).

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<sup>3</sup> Ofgem (2022), 'RIIO-ED2 Draft Determinations', 29 June.

<sup>4</sup> CMA (2021), 'Cadent Gas Limited, National Grid Electricity Transmission plc, National Grid Gas plc, Northern Gas Networks Limited, Scottish Hydro Electric Transmission plc, Southern Gas Networks plc and Scotland Gas Networks plc, SP Transmission plc, Wales & West Utilities Limited vs the Gas and Electricity Markets Authority. Final determination. Volume 2B: Joined Grounds B, C and D', 28 October, para. 5.837.

<sup>5</sup> CMA (2021), 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations. Final report', 17 March, para. 9.1344.

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- 1.6 In the rest of this section, we set out the framework for our assessment, outlining the potential sources of downward bias.
- 1.7 As follows from the RIIO-GD2/T2 Determinations and the subsequent appeals to the CMA, we note that a wide margin of discretion is accorded to Ofgem when determining each element of the price control. Consequently, Ofgem is able to set all key parameters of the price control at levels that minimise consumer bills for RIIO-ED2, provided that such parameters are not deemed ‘unreasonable’ given the available evidence. The nature of the appeal regime increases the potential for misalignment across the balance of risk and reward, in two ways.
  - Individual parameters (e.g. an ongoing efficiency assumption) could be set at levels that do not reflect a balanced interpretation of the evidence.
  - The cumulative impact of multiple individual parameters may be such that the package is not set in a balanced way; although each parameter is within a reasonable range, the overall balance of risk and reward could be skewed to the downside.
- 1.8 As a result, by construction, within the appeals-based regime for the energy sector, Ofgem has the newly realised ability to set a price control where expected returns are below the cost of equity and returns are skewed to the downside. This newly realised ability is in contrast to the preceding regime in the UK energy sector where the CMA undertook redeterminations, in which the overall balance of the risk and reward in the price control would be assessed.
- 1.9 In addition to Ofgem’s ability to set individual parameters towards one end of the reasonable range for those parameters, depending on what leads to lower bills for consumers (e.g. where the ongoing efficiency assumption is set towards the upper end of the reasonable range), there could be more explicit sources of a negative skew in regulatory mechanisms such as penalty-only incentives or clawback mechanisms, which we also review in this report.
- 1.10 We assess the elements of the RIIO-ED2 price control to identify the risks that they introduce for DNOs. For each element, we check:
  - whether the DNOs’ associated **risks are symmetric**—i.e. whether DNOs have an equal ability to out- and underperform under a specific mechanism or allowance;

- whether there is evidence of **higher risks** in RIIO-ED2 than in RIIO-ED1—even if they are symmetric.
- 1.11 A specific case which we assess in terms of changes in risk is uncertainty mechanisms (UMs). UMs are designed to reallocate risks away from networks if the risks are outside the networks' control. The regulatory intent in using such mechanisms is that Ofgem can protect consumers from paying for networks' potential windfall gains and protect networks from potential windfall losses. The risks to which networks are exposed under UMs are:
- residual risks left from imperfect de-risking by UMs;
  - additional regulatory risk, where the regulator is required to make decisions outside the price control review process (e.g. a re-opener or an ex post evaluation). This risk is associated with uncertainty over the level of ex ante revenue allowances (which affects networks' ability to plan their investments effectively) and/or ex post revenue recovery.
- 1.12 In sections 2 and 3, we undertake the following assessment:
- we review individual parameters of the RIIO-ED2 Draft Determinations regulatory package to assess potential sources of downward bias in outcomes for networks (section 2);
  - we summarise the review and discuss implications (section 3).

## **2 Risk assessment by the element of the price control**

2.1 In this section, we review individual elements of the RIIO-ED2 Draft Determinations regulatory package for downward bias, including the following:

- TOTEX allowances;
- ODIs;
- NARM;
- RPEs;
- re-openers;
- volume drivers;
- frequency of extreme weather events.

2.2 We assess whether we see sources of risk asymmetry, drawing on the comparison with RIIO-ED1 evidence where possible and relevant.

### **2A TOTEX allowances**

2.3 In the RIIO-2 appeal, the CMA determined that Ofgem could set some regulatory parameters within a ‘margin of appreciation’. This would imply that Ofgem could set parameters towards the upper or lower end of a ‘reasonable range’, providing that the reasonable range was justified by evidence. Evidence shows that Ofgem’s TOTEX allowances are currently below reasonable central estimates.

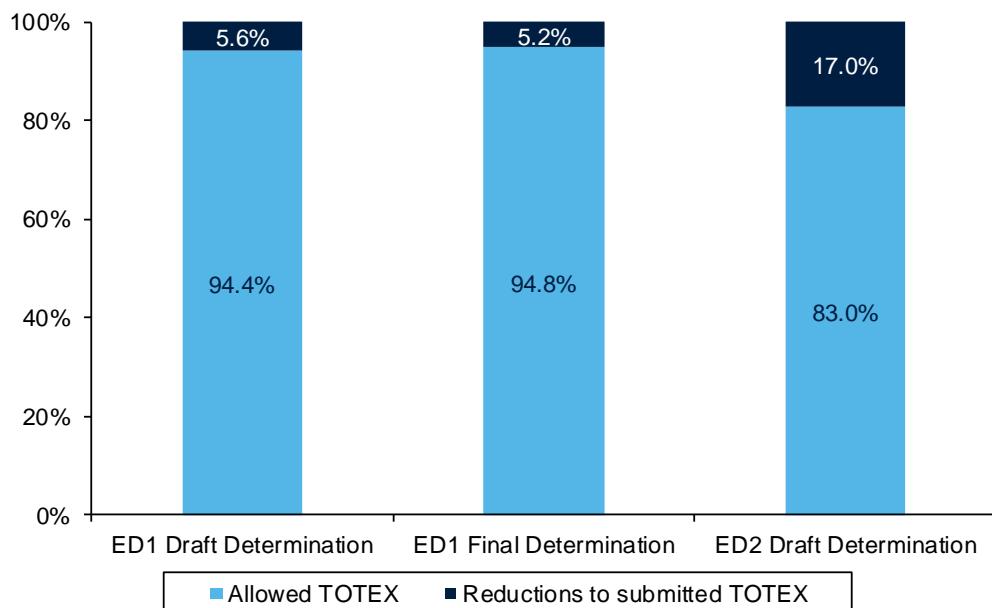
2.4 For example, the headline 17.0% of the baseline TOTEX that Ofgem proposes to disallow relative to the networks’ requests in their business plans in its Draft Determinations for RIIO-ED2 substantially exceeds the 5.6% that Ofgem proposed to disallow in the RIIO-ED1 Draft Determinations, and the 5.2% in the RIIO-ED1 Final Determination.<sup>6</sup> The reduction in estimates is likely to be affected by the significantly greater uncertainty that is faced by networks in relation to the required investments in the RIIO-ED2 period compared with RIIO-ED1—for example, Ofgem rejected some TOTEX requests because it

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<sup>6</sup> The estimates include WPD even though it was fast-tracked in RIIO-ED1 (i.e. WPD’s TOTEX submission was not challenged). Note that Ofgem’s headline figure of 17% compares companies’ submitted costs excluding ongoing efficiency with the overall allowance, which includes ongoing efficiency. Therefore, the 17% reduction presented by Ofgem overstates the actual reduction.

disagreed with the volume of work or the demand scenario used by DNOs.<sup>7</sup> However, there were other factors that drove a reduction in the expenditure allowances, such as disagreements on the catch-up efficiency and ongoing efficiency, as discussed further below. Figure 2.1 below illustrates the scale of the reductions.

**Figure 2.1 Reductions to the submitted baseline TOTEX**



Note: The estimates include WPD, which was fast-tracked in RIIO-ED1 (i.e. WPD's baseline TOTEX submission was not challenged).

Source: Oxera analysis, based on Ofgem data from Ofgem (2017), '[Guide to ED1](#)', p. 80; Ofgem (2014), '[RIIO-ED1: Draft determinations for the slowtrack electricity distribution companies](#)', p. 13; and Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', p. 222.

- 2.5 In Table 2.1 below we provide the details behind the reductions to the TOTEX submitted by each Group of DNOs for the RIIO-ED2 and the RIIO-ED1 Draft Determinations stages. As the table shows, relative to the RIIO-ED1 price control review, in RIIO-ED2 Ofgem proposes materially larger reductions to the submitted TOTEX for all Groups of DNOs.

<sup>7</sup> Ofgem (2022), '[Consultation - RIIO-ED2 Draft Determinations – Overview Document](#)', Figure 3.

**Table 2.1 Ofgem's reductions to the submitted TOTEX by DNO at the Draft Determinations stage in RIIO-ED1 and RIIO-ED2 (£m)**

	<b>RIIO-ED1</b>	<b>RIIO-ED2</b>
ENWL	-4.4%	-18.6%
NPG	-7.7%	-17.9%
UKPN	-8.9%	-11.1%
SPEN	-8.2%	-13.8%
SSEN	-6.5%	-22.3%
WPD	0.0%	-19.2%
<b>Total</b>	<b>-5.6%</b>	<b>-17.0%<sup>1</sup></b>

Note: <sup>1</sup> Ofgem's headline figure of 17% compares companies' submitted costs excluding ongoing efficiency with the overall allowance, which includes ongoing efficiency. Therefore, the 17% reduction presented by Ofgem overstates the actual reduction. All figures are stated in 2012/13 prices. Allowances in ED1 are based on an eight-year period, while allowances in ED2 are based on a five-year period. We note that the comparison may not be entirely like-for-like. For example, ED1 TOTEX includes RPEs and other adjustments, while the ED2 TOTEX is before the effect of those. Using ED2 TOTEX that includes RPEs and other adjustments results in a -19.3% reduction of submitted to proposed TOTEX.

Source: Oxera analysis, based on Ofgem data from Ofgem (2014), '[RIIO-ED1: Draft determinations for the slowtrack electricity distribution companies](#)', p. 13; and Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', p. 222.

- 2.6 In addition to observing the TOTEX allowance cuts, we find a number of challenges inherent in the approach to efficiency modelling, which have also become more pressing in RIIO-ED2 relative to RIIO-ED1 (and partly explain the allowance cuts). If we use RIIO-ED1 TOTEX modelling approaches as a benchmark, the RIIO-ED2 allowances suggest an asymmetric risk to the DNOs—i.e. the DNOs are more likely to underperform than outperform TOTEX allowances.
- 2.7 First, Ofgem has raised the efficiency benchmark, introducing a three-year glide path from the 75th to the 85th percentile, compared with the 75th percentile applied in RIIO-ED1. Moreover, we note that, in RIIO-ED1, Ofgem included IQI interpolation when assessing efficient costs, which gives 25% weight to the DNOs' own cost expectations.
- 2.8 The RIIO-ED2 models are currently not as robust in terms of statistical quality as the RIIO-GD2 models—the adjusted R-squares for the RIIO-ED2 models (0.80–0.86)<sup>8</sup> are lower than the adjusted R-square for the RIIO-GD2 model (0.93).<sup>9</sup> The RIIO-ED2 R-squares are also below those of the RIIO-ED1 models (0.87–0.88).<sup>10</sup> That is, the deterioration in model quality for RIIO-ED2

<sup>8</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', 29 June, Table 90.

<sup>9</sup> Ofgem (2021), '[RIIO-2 Final Determinations – GD Sector Annex \(REVISED\)](#)', 3 February, para. 3.85.

<sup>10</sup> Ofgem (2014), '[RIIO-ED1: Final determinations for the slow-track electricity distribution companies](#)', 28 November, Table A4.2.

relative to both RIIO-GD2 and RIIO-ED1 would warrant a less stringent benchmark rather than an increase in the efficiency challenge.

- 2.9 Second, the disaggregated TOTEX approach that Ofgem proposes to use in RIIO-ED2 shows every DNO to be inefficient.<sup>11</sup> Indeed, the most efficient DNO in the industry according to the disaggregated analysis (SPMW) is estimated to be 2% inefficient. This has the effect of setting the efficiency benchmark beyond the frontier (i.e. beyond the most efficient DNO), which appears to be unprecedented.
- 2.10 Moreover, there appears to be no correlation between a DNO's performance in the TOTEX models and its performance in the disaggregated analysis (an assessment of individual cost lines). For example, the most efficient DNO in the TOTEX modelling is the second least efficient DNO in the disaggregated analysis. Not only does this highlight the overall uncertainty in Ofgem's approach to cost assessment, but Ofgem's approach to combining the TOTEX and disaggregated models also leads to all DNOs being assessed as inefficient.
- 2.11 Third, the ongoing efficiency challenge for RIIO-ED2 is set at 1.2% p.a., above the range deemed appropriate by the CMA in the RIIO-GD2/T2 appeals (0.95%–1.05%),<sup>12</sup> where it removed the innovation uplift and kept the core ongoing efficiency computed by Ofgem (0.95% for CAPEX and 1.05% for OPEX), which was based on growth accounting analysis. 1.2% is also substantially above the efficiency challenge included in each DNO's cost allowance in RIIO-ED1 (0.8%–1.1%).<sup>13</sup>
- 2.12 Ofgem's 1.2% p.a. does not appear to be based on a balanced consideration of the empirical evidence. For example, the 1.2% p.a. target is based on a single point estimate from a range derived by Ofgem's consultants, which itself is based on an incorrect application of the standard growth accounting

<sup>11</sup> Oxera analysis of Ofgem (2022), 'CostAssessment\_File.xlsx', tab 'Cal\_Efficiency', rows 545–564.

<sup>12</sup> CMA (2021), 'Cadent Gas Limited, National Grid Electricity Transmission plc, National Grid Gas plc, Northern Gas Networks Limited, Scottish Hydro Electric Transmission plc, Southern Gas Networks plc and Scotland Gas Networks plc, SP Transmission plc, Wales & West Utilities Limited vs the Gas and Electricity Markets Authority. Final determination. Volume 2B: Joined Grounds B, C and D', 28 October, para. 7.764.

<sup>13</sup> Ofgem (2014), 'RIIO-ED1: Final determinations for the slowtrack electricity distribution companies', para. 4.42.

methodology.<sup>14</sup> Moreover, the 1.2% p.a. could be supported only by substantial changes to the growth accounting analysis between RIIO-ED2 and RIIO-GD2.<sup>15</sup> Therefore, combined with the relevant precedent outlined in para. 2.11 above, it is likely that Ofgem's analysis overstates the potential for ongoing efficiency improvements in RIIO-ED2.

- 2.13 Ofgem also applies the higher 1.2% ongoing challenge two years before the start of the RIIO-ED2 regulatory period.<sup>16</sup> In this way, Ofgem is compounding the effect of the ongoing efficiency improvements for two extra years, resulting in an additional 2.3% challenge.<sup>17</sup>
- 2.14 Overall, Ofgem has calibrated a significant challenge for DNOs in terms of TOTEX allowances—a conclusion consistent with Moody's, which observes:

Sizeable cuts to requested cost allowances but more stringent cost efficiency assumptions pose greater risk<sup>18</sup>

The challenge represents a material source of asymmetric risk to the DNOs, further amplified by the models and net zero uncertainty.

## **2B Output delivery incentives**

- 2.15 For the RIIO-ED2 regulatory period, Ofgem proposes the use of seven common financial Output Delivery Incentives (ODI-F) and two bespoke ones, which are addressed to ENWL and LPN respectively (see Table 2.2).

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<sup>14</sup> The 1.2% p.a. target is based on: (i) an inappropriate measure of productivity growth; (ii) an inappropriate time period of assessment; and (iii) an inappropriate mapping and weighting of comparator sectors. We expect that companies will raise these issues in more detail in their responses to the Draft Determinations.

<sup>15</sup> For example, Ofgem's consultants introduced two new comparator sectors that exhibited strong productivity growth in the modelling period, which increased the overall target by c. 0.4 percentage points. The consultants also considered productivity growth over a different time period, which further increased the estimated ongoing efficiency target.

<sup>16</sup> Oxera analysis of Ofgem (2022), 'Allowances\_File\_ED.xlsx', tab 'Cal\_FrontierShift'.

<sup>17</sup> In particular, the cumulative 1.2% p.a. ongoing efficiency challenge over five years is on average 3.5% without the cumulative effect of starting two years earlier, and 5.8% with that cumulative effect.

<sup>18</sup> Moody's (2022), 'Draft decisions for RIIO-ED2 slightly tougher than expected', 1 July.

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**Table 2.2 Common and bespoke ODI-F in RIIO-ED2**

	Type	Max reward	Max penalty	Symmetry
		(% of RoRE)	(% of RoRE)	
Customer Satisfaction Survey	Common	0.40%	-0.40%	Symmetric
Complaints Metric	Common	0.00%	-0.20%	Asymmetric
Time to Connect	Common	0.15%	-0.15%	Symmetric
Major Connections Incentive	Common	0.00%	-0.35%	Asymmetric
Consumer Vulnerability Incentive	Common	0.20%	-0.20%	Symmetric
DSO	Common	0.20%	-0.20%	Symmetric
Interruptions Incentive Scheme	Common	1.00%	-2.50%	Asymmetric
<b>Total for common ODIs</b>		<b>1.95%</b>	<b>-4.00%</b>	
Dig, Fix and Go	Bespoke	0.20%	-0.20%	Symmetric
Collaborative Streetworks	Bespoke	0.20%	0.00%	Asymmetric

Note: RoRE—return on regulated equity.

Source: Oxera, based on Ofgem data.

- 2.16 ODIs tie rewards or penalties to the delivery of specific outputs, which are linked to the DNOs' performance in terms of customer service, network reliability or network flexibility. However, as highlighted in the table above, Ofgem's proposed balance of rewards and penalties related to ODIs is asymmetric, i.e. it implies a greater risk of losses than rewards for the DNOs.
- 2.17 Specifically, as shown in Table 2.2, three of the common ODIs present greater penalties than rewards (whereas only one of LPN's bespoke ODIs presents a reward-only incentive capped at 0.20% of RoRE). The overall balance of rewards and penalties for common ODIs is thus skewed downwards, as the maximum allowed penalty (-4.0% RoRE) is 2.05% higher than the maximum allowed reward (+1.95% RoRE).
- 2.18 In comparison, the range of incentives is markedly wider than in RIIO-GD2, where regulated companies face a maximum penalty of -2.56% RoRE and an allowed reward capped at 2.14% RoRE, with the maximum penalty being 0.42% higher than the allowed reward.<sup>19</sup>
- 2.19 Relative to RIIO-GD2, RIIO-ED2 also presents a penalty–reward balance that carries materially higher downside risk (-4.0% in ED2, and -2.56% in GD2), and is also tilted more significantly towards the downside (the asymmetry towards the penalty is 2.05% in ED2, but only 0.42% in GD2).

<sup>19</sup> Ofgem (2021), 'RIIO-2 Final Determinations – Finance Annex', 3 February, Table 31.

2.20 Ofgem presents the following rationale for the asymmetries in the reward structures.

- In the case of the penalty-only Major Connections Incentive, the decision is driven by Ofgem's desire not to distort potential competition in the market, as some connections are contestable. Ofgem suggests that competitors would not be eligible for the rewards and therefore DNOs should not be eligible for them either.<sup>20</sup> The proposed targets for the Major Connections Incentive are derived as the mean average of the DNO target scores. These scores are composed of stakeholder input and DNOs' historical performance, and have been endorsed by the DNOs' relevant CEGs.<sup>21</sup>
- Concerning the Interruptions Incentive Scheme, the choice of a greater maximum penalty is justified partly by the greater cost for consumers of a small deterioration in reliability performance, compared to an equivalent increase.<sup>22</sup> Concerning the target-setting methodology, for CML Ofgem has moved from the RIIO-ED1 approach based on lower quartile performance, to the average individual DNO performance in RIIO-ED2 (consistent with the CI methodology), thus setting a more ambitious target for DNOs for the new regulatory period. Despite this, Ofgem has stated that the probability of underperformance is lower than the probability of outperformance.
- Lastly, in the case of the penalty-only Complaints Metric, Ofgem does not provide any explicit rationale for the asymmetric incentive structure, although we note that it is consistent with the methodology adopted both in RIIO-ED1 and in DPCR5. The target is fixed and is based on average performance data from the last four years of RIIO-ED1, allowing for the improved performance that customers have experienced in RIIO-ED1 to be embedded into a business-as-usual level of service for RIIO-ED2.

2.21 Accordingly, except for the judgement on how probable the underperformance on the Interruptions Incentive Scheme is, Ofgem's reasons for asymmetric incentives provided in the Draft Determinations are driven largely by factors unrelated to DNOs' (historical or expected) performance. Ofgem does not provide a measure that would offset the revenue risk stemming from the

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<sup>20</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', 29 June, para. 5.168.

<sup>21</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', 29 June, para. 5.152.

<sup>22</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', 29 June, para. 6.33.

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downward bias in financial incentives. As a result, DNOs face a downward-skewed risk from the delivery of ODI-Fs.

## 2C Network asset risks

- 2.22 In the RIIO-ED2 regulatory period, Ofgem will use the NARM to evaluate companies on the elements of their investment activities, and set the corresponding allowances. As explained below, NARM is a measure of the monetised risk relating to the condition of a network's asset base.
- 2.23 Specifically, DNOs' asset management activities, referred to by Ofgem as 'intervention', affect their network asset risks (i.e. the cost of network assets' failure and the probability of such a failure occurring). Maintaining, replacing and refurbishing network assets is costly to DNOs, but unless these activities are carried out, the probability of network assets failing will increase over time, as will the monetary cost of the consequence of failure to consumers. To keep network asset risk within reasonable bounds, DNOs are funded to carry out asset management activities such as replacement or refurbishment.
- 2.24 DNOs quantify the forecast monetary impact of the failure of network assets as the Monetised Long Term Risks if they carry out intervention activities on their network assets, and if they do not. The risk of potential failure, as a combination of the probability and cost of failure, is lower with intervention than without, reducing the expected monetary impact of fault repair and reflecting a benefit to consumers.
- 2.25 The NARM model includes a penalty mechanism, whereby Ofgem proposes to apply ex post penalties to DNOs that under-deliver on the NARM output measure, and are unable to justify this under-delivery.<sup>23</sup> However, Ofgem does not propose a symmetric reward.
- 2.26 Therefore, this mechanism within the NARM framework arguably represents an asymmetric, and adverse, risk for DNOs, given that it holds out the prospect of penalties to DNOs (in case of unjustified under-delivery), with no prospect of rewards (in case of unjustified over-delivery, i.e. performing more replacing and refurbishing activities than expected).

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<sup>23</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', p. 196.

- 2.27 Over the RIIO-ED2 period, NARMs expenditure accounts for 10.7% of the proposed TOTEX allowance, based on Ofgem’s base case TOTEX scenario<sup>24</sup>—a substantial proportion of the proposed TOTEX allowance.
- 2.28 Finally, the NARM mechanism may also not be able to capture the residual risk of additional expenditure to networks to fund the consequences of failures. This risk arises from the fact that, at the start of the RIIO-ED2 period, the portfolio of network assets held by most DNOs appears to be older, and in a riskier condition, than the portfolio at the start of the RIIO-ED1 period.<sup>25</sup> As such, the deterioration of the condition of DNOs’ network assets in RIIO-ED2 would be compounded by the deterioration that had already taken place in RIIO-ED1. Ageing network assets are at greater risk of failure, potentially associated with additional costs to networks to fund the consequences of failures.
- 2.29 In Table 2.3 below we show that, even *with* intervention, all six Groups of DNOs expect their Monetised Long Term Risks to remain the same or increase over the RIIO-ED2 regulatory period.<sup>26</sup> In other words, the DNOs’ network assets will become, over the course of RIIO-ED2, increasingly riskier, such that the financial cost to DNOs in the event of network asset failure becomes correspondingly higher, or more probable.

**Table 2.3 Monetised Long Term Risks in DNOs’ final Business Plans**

	NARM measure in RIIO-ED2 opening position (£bn)	NARM measure in RIIO-ED2 closing position with intervention (£bn)	Percentage change from opening to closing RIIO-ED2 position
ENWL	1.8	1.9	0.3%
SPEN	3.8	4.0	5.3%
UKPN	7.3	7.6	4.7%
SSEN	4.7	5.3	12.7%
WPD	6.6	6.8	3.0%
NPG	n/a	n/a	2.8%

Note: Figures for SSEN are approximate, as the exact NARM measure was not stated in the SSEN BP. The NPG BP provides only the percentage change in the NARM measure from the opening position to the closing position in RIIO-ED2, but not the exact amounts.

<sup>24</sup> This refers to the base case TOTEX scenario in the Ofgem price control financial model.

<sup>25</sup> Ofgem (2022), ‘RIIO-ED1 Network Performance Summary 2020-21 - Supplementary Data File’, tab ‘Ch2 - Network Asset SDs’.

<sup>26</sup> The Monetised Long Term Risk is a risk value associated with NARM Assets as derived in accordance with the relevant network company’s NARM Methodology from a combination of the probability of failure of network assets and the consequence of failure of these network assets. See Ofgem (2021), RIIO-2 Final Determinations NARM Annex (REVISED), pp. 38–39. UKPN (2021), ‘RIIO-ED2 Business Plan 2023 – 2028’, p. 10.

Source: Oxera analysis, based on DNOs' final Business Plans; Ofgem (2021), '[RIIO-2 Final Determinations NARM Annex \(REVISED\)](#)', p. 38.

## 2D RPE indexation

- 2.30 RPEs are used to index costs incurred by DNOs to inflation indices that are deemed to better reflect DNO expenditure than CPIH, which is the default inflation index used by Ofgem to index DNO revenues. Under RIIO-ED2, Ofgem will first estimate allowed TOTEX based on the expected level of the RPE, and then apply an ex post adjustment on an annual basis if the RPE turns out to have been different from expectation.<sup>27</sup>
- 2.31 We have identified that the move to index RPEs in RIIO-ED2 has not eliminated the inflation risk exposure of networks. We consider there to be two primary reasons for this.
- 2.32 First, in RIIO-ED2, 88% of TOTEX is covered by RPEs, while under RIIO-ED1 we understand that all of TOTEX was covered by RPEs.<sup>28</sup> Specifically, between RIIO-ED1 and RIIO-ED2 Ofgem has decided not to apply RPEs to expenditure on Plant and Equipment, Transport, or 'Other' cost categories. It appears that the reason for this is Ofgem's decision to apply RPEs only to 'material' cost items.<sup>29</sup> As part of the scope of this report, we have not estimated what the RPEs for the 12% of TOTEX that is not indexed to RPEs should be. However, we note that (i) the RPEs for labour and materials are positive; and (ii) the ex ante level of RPE awarded by Ofgem to the DNOs at the start of RIIO-ED1 was also positive.<sup>30</sup> If this is also true for the RPEs that would be estimated in RIIO-ED2 for the proportion of TOTEX that is not covered by RPEs, the RIIO-ED2 methodology would result in lower TOTEX allowances than the RIIO-ED1 methodology.
- 2.33 Second, as RIIO-ED2 is likely to be a period of relatively high inflation, with the Bank of England forecasting CPI inflation to hit 13% in Q4 2022 and remain high throughout 2023 before falling back towards the 2% target only in 2025,<sup>31</sup> any reductions in the extent to which the cost base is indexed are likely to have a compounded financial effect. This is because if CPIH is relatively low, say at

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<sup>27</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', para. 7.458.

<sup>28</sup> Ofgem (2014), '[RIIO-ED1: Final determinations for the slowtrack electricity distribution companies Business plan expenditure assessment](#)', paras 12.51–12.54. Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', Table 68.

<sup>29</sup> See, for example, Ofgem (2020), '[RIIO-ED2 Sector Methodology Consultation: Annex 2 Keeping bills low for consumers](#)', para. 6.14.

<sup>30</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', Table 68. Ofgem (2014), '[RIIO-ED1: Final determinations for the slowtrack electricity distribution companies Overview](#)', para. 4.43.

<sup>31</sup> Bank of England (2022), '[Bank Rate increased to 1.75% - August 2022](#)'.

2%, and Ofgem chooses not to take into account an RPE that in general is 50% higher than CPIH, then DNOs would lose TOTEX equal to 1% of the costs that were not indexed to an RPE. By contrast, if inflation is relatively high, say at 6%, and that RPE is again 50% higher than CPIH, then DNOs will lose TOTEX equal to 3% of the costs that were not indexed to an RPE.

- 2.34 As Ofgem is making decisions for RIIO-ED2 in a higher-inflation environment than the decisions it made for RIIO-ED1 (CPI was c. 2% in 2013/14<sup>32</sup>), we consider that, notwithstanding the move to indexation, (a) failing to apply the index to all costs that experience real price movements; and/or (b) potentially choosing an index or indices that do not accurately reflect the inflation that networks are experiencing, would leave some inflation risk exposure. In other words, not calibrating the mechanism for indexation precisely against the cost base of the networks could remain a source of risk in RIIO-ED2.

## **2E Re-openers**

- 2.35 Re-openers are one of the UMs that Ofgem has used in previous price controls and is planning to continue using in RIIO-ED2. They allow for DNO allowances to be increased or decreased to reflect changes in costs that are covered by the scope of the re-opener (e.g. a rail electrification re-opener only allows for increased or decreased costs associated with rail electrification to be recovered), and can be triggered either by the DNO or Ofgem, depending on the design of the re-opener.
- 2.36 We consider that the overall levels of risk associated with the expenditure covered by re-openers represent asymmetric risk to DNOs, as explained below.
- 2.37 Re-openers are designed to manage the expenditure uncertainty caused by a large number of types of unexpected expenditure. During the RIIO-ED2 period, there may be large amounts of additional expenditure associated with decarbonisation, digitalisation, and the future roles that DNOs will play in managing the system. Ofgem has introduced a number of re-openers that are designed to deal with these uncertain expenditure areas, such as the environmental, net zero, digitalisation, distribution system operator (DSO), and

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<sup>32</sup> ONS (2022), '[CPI ANNUAL RATE 00: ALL ITEMS 2015=100](#)', accessed 12 August 2022.

Coordination Adjustment Mechanism re-openers.<sup>33</sup> In total, Ofgem has introduced fourteen re-openers in RIOO-ED2, versus six in RIOO-ED1.<sup>34</sup>

- 2.38 Dealing with cost uncertainty through re-openers relative to other mechanisms such as pass-through allowances increases the risks that DNOs face because DNOs are at risk of incurring costs prior to applying for a re-opener,<sup>35</sup> and Ofgem generally rejects—partially or fully—the costs requested through re-openers. We do not consider that it is possible for us to adjudicate whether Ofgem’s historical rejections have been reasonable, although, we observe (in Table 2.4 below), that only c. 1/6th of the funding requested by DNOs in re-openers was approved by Ofgem in RIOO-ED1. Thereby, from the perspective of DNOs, having more of their cost base rely on a mechanism that (during RIOO-ED1) never remunerated them for the entirety of their proposed expenditure represents a risk. This risk is accentuated when the re-opener can be triggered only by Ofgem, as is the case with the environmental, net zero, and DSO re-openers, as there is a risk that Ofgem may not trigger a re-opener when the DNO needs it.<sup>36</sup>

**Table 2.4 Outcomes of triggered RIOO-ED1 re-openers**

Re-opener	DNO	Funding requested (£m)	Decision allowance (£m)	Reason for decision
Enhanced Physical Site Security Costs	NPgN	0.92	0.88	Inefficient costs
Enhanced Physical Site Security Costs	NPgY	2.09	2.06	Inefficient costs
Rail Electrification Costs	SEPD	17.20	16.00	Inefficient costs
Rail Electrification Costs	SPMW	12.06	—	Request did not satisfy licence conditions

<sup>33</sup> For a full list of RIOO-ED2 re-openers, see Annex A1.

<sup>34</sup> Ofgem (2013), ‘Strategy decision for the RIOO-ED1 electricity distribution price control: Uncertainty mechanisms’, 4 March. Ofgem (2022), ‘RIOO-ED2 Draft Determinations – Overview Document’, 29 June.

<sup>35</sup> Our understanding is that, within a price control period, re-openers can be requested against expenditure that has already been incurred as well as expected future expenditure, although we do not know the extent to which DNOs come to Ofgem with re-opener requests based on expenditure that has already been incurred. In RIOO-ED1, Ofgem implied that most requests are based on expenditure that has already been incurred, stating that the ‘IRM [Innovation roll-out mechanism re-opener] is different to the other re-openers described in this chapter in that DNOs apply for funding before spending any money’. Ofgem (2013), ‘Strategy decision for the RIOO-ED1 electricity distribution price control: Uncertainty mechanisms’, 4 March, para. 3.73.

<sup>36</sup> See Table A1.1.

Re-opener	DNO	Funding requested (£m)	Decision allowance (£m)	Reason for decision
<b>Specified Street Works Costs</b>	ENWL	10.30	9.70	Some activities disallowed and efficiency adjustment applied
<b>Specified Street Works Costs</b>	NPgN	5.20	–	Some activities disallowed and efficiency adjustment applied
<b>Specified Street Works Costs</b>	NPgY	9.30	8.90	Some activities disallowed and efficiency adjustment applied
<b>Specified Street Works Costs</b>	SPMWB	21.30	8.20	Some activities disallowed and efficiency adjustment applied
<b>Specified Street Works Costs</b>	EPEN	10.20	9.90	Some activities disallowed and efficiency adjustment applied
<b>Specified Street Works Costs</b>	WMID	24.50	–	Some activities disallowed and efficiency adjustment applied
<b>Specified Street Works Costs</b>	EMID	20.70	–	Some activities disallowed and efficiency adjustment applied
<b>Specified Street Works Costs</b>	SWEST	11.00	–	Some activities disallowed and efficiency adjustment applied
<b>High Value Projects</b>	SPD	42.00	–	(1) Does not relate to a single scheme of works; (2) does not comply with requirements of licence; (3) contains inefficient expenditure; (4) need for activity has not been established; (5) submission does not contain appropriate measurable outputs
<b>High Value Projects</b>	SPMW	35.13	–	(1) Does not relate to a single scheme of works; (2) does not comply with requirements of licence; (3) contains inefficient expenditure; (4) need for activity has not been established
<b>High Value Projects</b>	SPD & SPMW	70.07	–	(1) Need for project not established; (2) measurable outputs not provided; (3) contains inefficient expenditure
<b>High Value Projects</b>	SHEPD	30.00	–	Solution is not economic and efficient, and SPEHD may need to undertake this expenditure anyway in order to comply with its licence conditions
<b>Total</b>		<b>321.97</b>	<b>55.64</b>	

Note: All values are in a 2012/13 price base.

Source: Various Ofgem reports on the decision on RIIO-ED1 price control re-openers (submissions made during the 2019 window). See Ofgem (2019), '[Decision on RIIO-ED1 price control reopeners \(submissions made during May 2019 window\)](#)', 18 October.

- 2.39 In addition, it appears that Ofgem rejected more bespoke re-openers (we have seen 14 examples<sup>37</sup>) prior to the start of RIO-ED2 than it did prior to the start of RIO-ED1 (we have seen one example<sup>38</sup>). Of the bespoke re-openers rejected for RIO-ED2, Ofgem explained that eight would be funded through existing re-openers, leaving six that it rejected because they were either fully or partially covered by baseline TOTEX allowances.<sup>39</sup> In RIO-ED1, the one rejected bespoke re-opener was deemed to be unnecessary and therefore effectively also covered by baseline TOTEX.<sup>40</sup>
- 2.40 In the event that any expenditure is incurred prior to applying for a re-opener, there is a risk of under-recovery against such expenditure, and this risk would be likely to be asymmetric. This is because, in the event of any ex post assessment of cost recovery, especially where the expenditure is in relatively untested and uncertain areas such as net zero and digitalisation, it will tend to be easier to identify areas of inefficiency ex post (and disallow costs) than to identify areas where efficiency has been achieved (and allow additional revenues). This is largely supported by Table 2.4 above, as Ofgem did not allow DNOs to recover an amount equal to or exceeding their proposed expenditure in any of the re-openers.
- 2.41 In relation to the ex ante re-opener applications, potential rejections mean that, when remunerated through a re-opener, DNOs face different sources of uncertainty in relation to cost allowances and/or cost recovery relative to a counterfactual where investment expenditure is approved at the start of the control.
- 2.42 When expenditure is approved at the start of the price control period, the delivery of expenditure against the plans can be phased, procured and scheduled. By contrast, the usage of a re-opener mechanism within a price control period will not allow for the same ex ante planning and delivery

<sup>37</sup> Ofgem (2022), 'RIO-ED2 Draft Determinations ENWL Annex', 29 June, Table 27. Ofgem (2022), 'RIO-ED2 Draft Determinations SPEN Annex', 29 June, Table 23. Ofgem (2022), 'RIO-ED2 Draft Determinations SSEN Annex', 29 June, Table 29. Ofgem (2022), 'RIO-ED2 Draft Determinations UKPN Annex', 29 June, Table 28.

<sup>38</sup> Ofgem (2013), 'Assessment of the RIO-ED1 business plans', 22 November, paras 1.33–1.34.

<sup>39</sup> The six that were rejected because they were either fully or partially covered by baseline TOTEX are: (1) ENWL's Net zero and reopener development Fund; (2) two re-openers related to SSEN's Subsea cables; (3) SSEN's Wayleaves and Diversions; (4) SSEN's Ash dieback removal; and (5) UKPN's UMF Diversions. Ofgem (2022), 'RIO-ED2 Draft Determinations ENWL Annex', 29 June, Table 27. Ofgem (2022), 'RIO-ED2 Draft Determinations SPEN Annex', 29 June, Table 23. Ofgem (2022), 'RIO-ED2 Draft Determinations SSEN Annex', 29 June, Table 29. Ofgem (2022), 'RIO-ED2 Draft Determinations UKPN Annex', 29 June, Table 28.

<sup>40</sup> Ofgem (2013), 'Assessment of the RIO-ED1 business plans', 22 November, paras 1.33–1.34.

process. There is thereby some risk of delay and/or suboptimal delivery in undertaking investments via re-openers, which could be important for decarbonisation or changes in market design, to facilitate net zero pathways in the 2023–28 period. These issues make it more challenging to achieve the target ongoing efficiency improvements because the lack of ex ante planning may lead to a sub-optimal procurement process, implying higher expenditure or lower quality of services. Consequently, DNOs may spend more than they would if remunerated under an ex ante mechanism.

## 2F Volume drivers

- 2.43 Volume drivers are one of the UMs Ofgem proposes to use in RIIO-ED2. Volume drivers are used to adjust allowances in line with the actual volume of work, where the volume of work is uncertain but the cost of each unit is stable. Over the RIIO-ED2 period, volume drivers account for 9.9% of the proposed TOTEX allowance, based on Ofgem’s base case TOTEX scenario<sup>41</sup>—this therefore represents a considerable amount of expenditure allowances to networks in the context of the proposed TOTEX allowance.
- 2.44 Ofgem proposes to use three volume drivers for RIIO-ED2: (i) secondary reinforcement, (ii) low voltage (LV) services, and (iii) polychlorinated biphenyls.<sup>42</sup>
- 2.45 Volume drivers are designed to reduce forecast risk—networks are protected from windfall losses, while consumers are protected from having to pay for networks’ windfall gains if the volume of work deviates from the forecast.
- 2.46 We have identified two sources of asymmetric risks in Ofgem’s volume driver policy:
- a volume driver cap;
  - a prospective clawback.

### 2F.1 Volume driver cap

- 2.47 To protect consumers from the risk of misuse of the volume driver, Ofgem proposes to include a cap on the total allowance under the secondary

<sup>41</sup> This refers to the TOTEX scenario in the Ofgem price control financial model.

<sup>42</sup> Ofgem (2022), ‘RIIO-ED2 Draft Determinations – Overview Document’, 29 June, Table 4.

reinforcement volume driver. Ofgem proposes to set the cap on an aggregate basis, limiting the allowances for all assets combined, with the cap applying to allowances across the full RIIO-ED2 price control period rather than being set on an annual basis, as different amounts may be required in different years.<sup>43</sup>

The cap will be calculated using the Climate Change Committee (CCC) Balanced Pathway scenario reflecting an upper-bound of expenditure for each DNO, and will be reviewed mid-period with the option to be revised upwards, or downwards, or to be removed.<sup>44</sup>

- 2.48 The volume driver cap presents a source of downward bias to DNOs. Unlike, for example, the TOTEX incentive mechanism, which rewards DNOs for outperformance and penalises DNOs for underperformance, the cap on volume drivers holds out the prospect of penalty if volumes are higher than planned, but does not reward DNOs if volumes are lower than planned.<sup>45</sup>
- 2.49 The mid-period review of volume drivers may adjust the cap to reflect the newly available information on the potential volumes more accurately. However, the review does not change the downward bias of the cap by construction. Moreover, the review process introduces uncertainty—i.e. DNOs risk not being able to undertake the planned works if the cap is reduced, or not being able to undertake further required work if the cap is not increased.
- 2.50 A mitigating factor to the downward bias is that DNOs have a degree of discretion in undertaking proactive secondary reinforcements and delivering LV services. For example, if a DNO expects to incur costs that are higher than the allowed unit cost, or if it is in danger of going beyond the cap due to additional volumes of work, it can choose not to proactively undertake these activities. However, there are also certain reactive activities, which DNOs have to pursue. For example, when households request DNOs to unloop LV services, DNOs have to satisfy the request.<sup>46</sup> Therefore, there is still a risk that the delivery of reactive activities could cause DNOs to breach the volume driver cap.

<sup>43</sup> Ofgem (2022), ‘RIIO-ED2 Draft Determinations – Core Methodology Document’, 29 June, para. 3.79.

<sup>44</sup> Ofgem (2022), ‘RIIO-ED2 Draft Determinations – Core Methodology Document’, 29 June, p. 39.

<sup>45</sup> Ofgem has emphasised its priority of avoiding inefficiency and overinvestment, including a mid-period review, in its approach towards setting caps on the volume driver mechanism. Therefore, it is unlikely that DNOs will have volumes below the volume driver cap. See Ofgem (2022), ‘RIIO-ED2 Draft Determinations – Core Methodology Document’, 29 June, paras 3.78–3.87.

<sup>46</sup> See, for example, ENWL (2021), ‘Our plan to lead the North West to Net Zero: 2023-2028’, p. 73.

## 2F.2 Prospective clawback

- 2.51 In addition to the volume driver cap, Ofgem proposes four metrics against which DNOs must justify investment activities on an annual basis in order to be reimbursed for the delivered volumes of work under the volume drivers. These are:<sup>47</sup>
- transformer utilisation—this checks whether reinforcement works occur within ‘high’ utilisation bands or areas of projected high utilisation, where ‘high’ utilisation bands are to be defined via a threshold;<sup>48</sup>
  - circuits utilisation proxy—this check compares outturn circuit volumes against the expected volumes based on a predefined relationship between the transformer and circuit reinforcement, and highlights any significant deviation from the ratio beyond a set threshold;
  - low-carbon technologies (LCT) growth—this check compares ex ante forecast LCT volumes with outturn volumes to determine a change in growth expectations, to indicate if there is a growth trend beyond the baseline; and
  - a Broad Measure of Load Growth—this check measures annual load growth from a baseline derived in the first year of the price control using a representative sample of installed LV monitors.
- 2.52 Ofgem checks annually if the DNOs’ investments are within the ‘tolerable range’ given by the metrics.<sup>49</sup> If not, Ofgem may consider a clawback of allowances.<sup>50</sup>
- 2.53 The clawback increases an asymmetric downside risk to DNOs, as it gives Ofgem discretion in relation to the level of allowances to provide, and how much allowance not to provide if DNOs go outside of the ‘tolerable range’. A downward bias in outcomes can arise because an investment that may seem efficient ex ante (to the DNO) could turn out to be inefficient in Ofgem’s view ex post. There is no corresponding source of upside—Ofgem has not proposed to disburse rewards for better-than-expected performance.<sup>51</sup>

<sup>47</sup> Ofgem (2022), [‘RIIO-ED2 Draft Determinations – Core Methodology Document’](#), 29 June, para. 3.76.

<sup>48</sup> Ofgem proposes to allow only a limited amount of tolerance for capacity additions to occur in ‘low’ utilisation bands, for instance in cases where it is beneficial to avoid an incremental approach to investment.

<sup>49</sup> Ofgem (2022), [‘RIIO-ED2 Draft Determinations – Core Methodology Document’](#), 29 June, para. 3.74.

<sup>50</sup> Ofgem (2022), [‘RIIO-ED2 Draft Determinations – Core Methodology Document’](#), 29 June, para. 3.78.

<sup>51</sup> Ofgem (2022), [‘RIIO-ED2 Draft Determinations – Core Methodology Document’](#), 29 June, p. 39.

## **2G Frequency of extreme weather events**

- 2.54 The frequency of extreme weather events could result in a downward skew in the balance of risks if (i) it is true that extreme weather events are increasing in frequency; ii) dealing with extreme weather events is a source of higher costs or greater penalties to networks (without conferring any corresponding upside); and (iii) adjustment has not been made by Ofgem to fully mitigate this risk or remunerate the cost.
- 2.55 In this subsection we explain why the number of extreme weather events may increase in the short term (section 2G.3), and why Ofgem's regulatory approach exposes DNOs to more downside risk than upside potential (section 2G.4). We acknowledge that it is difficult to comment with certainty on changing weather patterns, but note that Ofgem leaves open the possibility that there will be increases in extreme weather events during RIIO-ED2 (as explained below). Despite this, Ofgem's adjustments to the regulatory regime do not appear to counterbalance this higher level of risk in full.

### **2G.3 The likely impact of extreme weather on DNOs in RIIO-ED2**

- 2.56 There are a number of extreme weather events that can cause disruption to the operation of distribution networks, such as storms, snowfall, flooding, ice coating, and wildfires.<sup>52</sup> Within the UK, the main risks to distribution networks that Ofgem cites are storms and flooding.<sup>53</sup>
- 2.57 In recent years, there has been an increase in the number of extreme weather events, as shown in Figure 2.2 below, which contains all extreme weather events reported by the Met Office from 2005 until 2021.

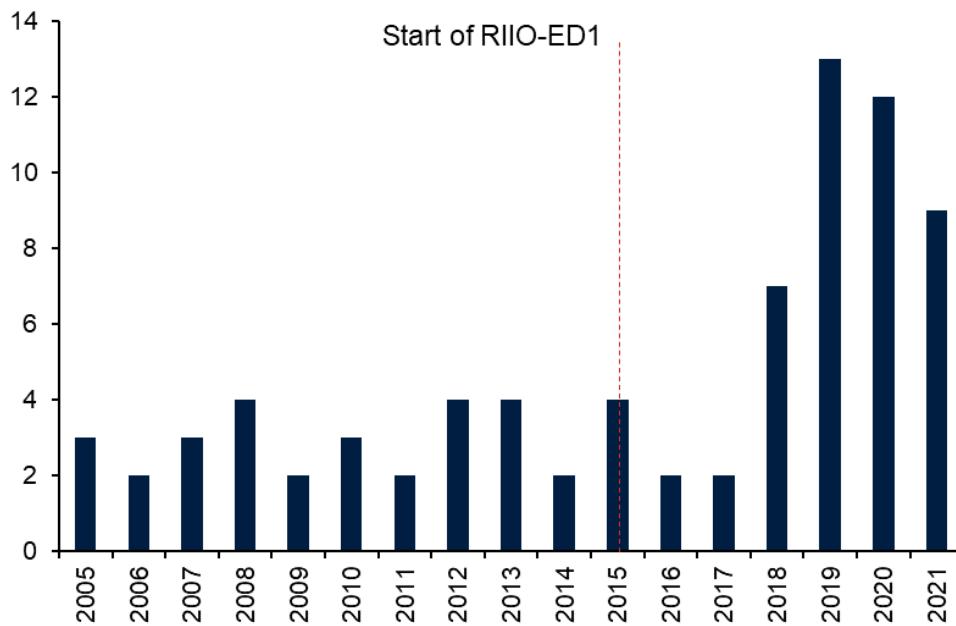
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<sup>52</sup> Shi, Q., Liu, W., Zeng, B. and Hui, H. (2022), 'Enhancing distribution system resilience against extreme weather events: Concept review, algorithm summary, and future vision', *International Journal of Electrical Power & Energy Systems*, **138**:15, June. Forssén, K., Mäki, K., Räikkönen, M. and Molarius, R. (2017), 'Resilience of Electricity Distribution Networks Against Extreme Weather Conditions', *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems Part B: Mechanical Engineering*, **3**:2, January.

<sup>53</sup> Ofgem (2022), 'RIIO-ED2 Draft Determinations – Core Methodology Document', 29 June, para. 6.4.

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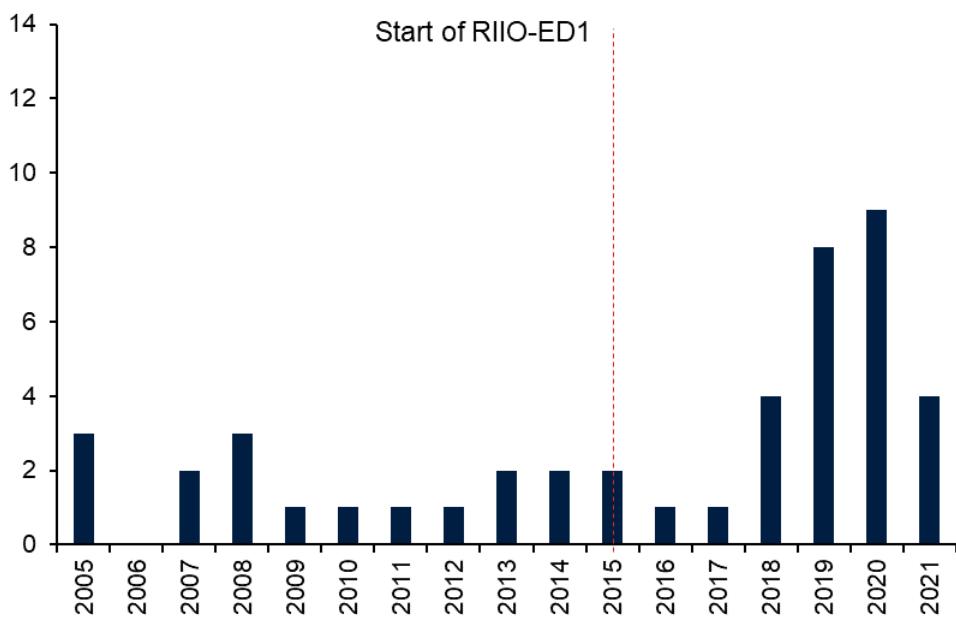
**Figure 2.2 Severe weather events by year**



Source: Met Office, '[Past weather events](#)'.

- 2.58 This pattern of increased extreme weather events remains when we adjust the above graph to only focus on events related to storms, flooding, and strong wind, which are likely to be most relevant to DNO network operation. We show this in Figure 2.3 below.

**Figure 2.3 Extreme weather events related to storms, floods, and strong wind per year**



Source: Met Office, '[Past weather events](#)'.

- 2.59 The recent increases in the incidence of extreme weather events could imply that Ofgem should take greater account of risks from extreme weather events in future price control periods, including RIIO-ED2.
- 2.60 In its Draft Determinations, Ofgem states that ‘the frequency and impact of severe weather are not expected to significantly increase over the course of RIIO-ED2’.<sup>54</sup> As evidence for this, Ofgem cites a paper by the Met Office which explains that most of the impacts of climate change will be felt towards the end of the 21st century,<sup>55</sup> as well as an academic paper that Ofgem says shows that there is no trend in UK storminess.<sup>56</sup>
- 2.61 We agree with Ofgem’s interpretation of the academic paper, but the conclusion that is drawn from the Met Office report does not appear to be directly supported. The Met Office paper does not clearly state that climate impacts will be seen only towards the end of the century. The fact that weather change will tend to be more severe towards the end of the century does not preclude the possibility of nearer-term changes. The Met Office paper highlights a number of areas where it has either observed recent increases in extreme weather, or expects future increases (and does not specify the timelines of these). Specifically, the paper says that:
- there have been increases in rainfall in recent years and that in the future, levels of winter rainfall are expected to be considerably higher than is currently the case;<sup>57</sup>
  - the likelihood of extreme rain events is going to increase,<sup>58</sup> and that users of the information published by the Met Office may wish to take a precautionary approach that predicts that the levels of precipitation may be higher than forecast.<sup>59</sup>
- 2.62 Ofgem says that the frequency and severity of extreme weather is not ‘expected’ to increase ‘significantly’ over the course of RIIO-ED2.<sup>60</sup> In the framing of this conclusion, Ofgem is leaving open the possibility of increases in

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<sup>54</sup> Ofgem (2022), ‘RIIO-ED2 Draft Determinations – Core Methodology Document’, 29 June, para. 6.174.

<sup>55</sup> Met Office (2021), ‘UK Climate Projections: Headline Findings’, July.

<sup>56</sup> Kendon, M., McCarthy, M., Jevrejeva, S., Matthews, A., Sparks, T., Garforth, J. and Kennedy, J. (2021), ‘State of the UK Climate 2020’, *International Journal of Climatology*, 42:1, Royal Meteorological Society, July.

<sup>57</sup> The report also says that rainfall will be lower in summer, but as we understand that current summer rainfall levels do not tend to be the cause of flooding, we therefore do not consider this to be a countervailing factor that reduces the risks of flooding.

<sup>58</sup> Met Office (2021), ‘UK Climate Projections: Headline Findings’, July, para. 3.2.6.

<sup>59</sup> Met Office (2021), ‘UK Climate Projections: Headline Findings’, July, para. 3.2.7.

<sup>60</sup> Ofgem (2022), ‘RIIO-ED2 Draft Determinations – Core Methodology Document’, 29 June, para. 6.174.

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the number of extreme events, which is consistent with the evidence discussed in this subsection. Despite this, as we explain below, Ofgem's adjustments to its regulatory approach do not appear to significantly mitigate risks or anticipate costs in relation to severe weather events.

#### 2G.4 Ofgem's regulation of extreme weather events

2.63 Under the regulation faced by DNOs in RIIO, there are three ways in which DNOs can be affected by extreme weather events:

- first, extreme weather events that cause interruptions to the supply of electricity will have an adverse impact on DNOs through the Interruptions Incentive Scheme (IIS), which financially rewards and penalises DNOs if their number of Customer Interruptions (CIs) or Customer Minutes Lost (CMLs) deviates from the target;<sup>61</sup>
- second, extreme weather events could cause DNOs to need to pay out more in failing to deliver Guaranteed Standards of Performance (GSOP);<sup>62</sup>
- third, DNOs will need to pay for any repairs to their networks that are caused by extreme weather events.

2.64 We show below that the RIIO-ED2 framework in respect of all of the above tends to expose DNOs to more downside than upside risk. Therefore, if the impact and frequency of severe weather events increases in RIIO-ED2—while the level of risk mitigation is not enhanced—the net effect would be to increase the potential weather-related costs to which networks are exposed in RIIO-ED2 relative to preceding price control periods.

#### The IIS mechanism

2.65 Under RIIO-ED2, the IIS scheme is asymmetric, with a 100bps cap and a 250bps collar.<sup>63</sup> We note that in RIIO-ED1 the IIS scheme had a symmetric allowance.<sup>64</sup> This means that, under RIIO-ED2, to the extent that severe weather events increase the number of CIs or CMLs, there is more scope for them to drive DNO returns below the central estimate. In RIIO-ED2, Ofgem has

<sup>61</sup> Ofgem (2022), 'RIIO-ED2 Draft Determinations – Core Methodology Document', 29 June, Chapter 6.

<sup>62</sup> Ofgem (2022), 'RIIO-ED2 Draft Determinations – Core Methodology Document', 29 June, paras 5.178–5.180.

<sup>63</sup> Ofgem (2022), 'RIIO-ED2 Network Price Control Draft Determinations Impact Assessment Annex', 29 June, para. 2.11.

<sup>64</sup> Ofgem (2017), 'Guide to the RIIO-ED1 electricity distribution price control', 18 January, para. 11.15.

set the targets for CIs and CMLs in line with DNOs' historic performance on CMLs.<sup>65</sup> This means that, in order to achieve the same levels of outperformance as in RIIO-ED1, DNOs will need to continue improving the reliability of their networks at the same rate as in RIIO-ED1. It does not therefore appear that a less challenging target has been calibrated to compensate for the asymmetry in the penalty and reward balance in the IIS scheme.

- 2.66 Under the IIS regime, DNOs are also allowed to raise claims related to exceptional events. If such claims are successful then the impact that an exceptional event has on a DNO's performance under the IIS is ignored (e.g. CMLs caused by an extreme storm are excluded from the CML count).<sup>66</sup> These claims can fall under the Severe Weather Exceptional Events (SWEE) or Other Exceptional Events (OEE) mechanisms.
- 2.67 Under RIIO-ED2, the DNOs are not allowed to make weather-related claims under the OEE mechanism.<sup>67</sup> Therefore, any weather-related damage that does not meet the threshold of a SWEE but still causes a substantial number of faults will be included in the calculation of the DNOs' CMLs and CIs. The effect that this will have on DNO remuneration in practice is hard to gauge, as DNOs only made two weather-related claims under the OEE in RIIO-ED1.
- 2.68 It is unclear whether Ofgem typically accepts or will tend to accept SWEE claims. However, to the extent that Ofgem does not accept all SWEE claims, the potential increase in severe weather events is likely to increase the total amount of risk that DNOs face under RIIO-ED2.
- 2.69 Overall, a combination of the downward skew in the penalty and reward balance of the IIS, and the fact that not all extreme weather events would be removed from the assessment of DNO performance under the IIS, creates an asymmetric, and adverse, risk for DNOs.

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<sup>65</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', Figure 15.

<sup>66</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', 29 June, Table above para. 6.75. Ofgem (2022), '[Interim report on the review into the networks' response to Storm Arwen](#)', 17 February, p. 33.

<sup>67</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', 29 June, para. 6.87.

## Guaranteed Standards of Performance

- 2.70 GSoPs are a series of 12 service level standards that DNOs need to meet.<sup>68</sup> One of the standards that DNOs need to meet relates to the restoration of electricity supply after an outage, including a weather-related outage.<sup>69</sup> Ofgem has not changed the GSoPs for RIIO-ED2, except to increase the penalties that DNOs have to pay in line with CPIH inflation.<sup>70</sup>
- 2.71 As the penalties have increased in line with CPIH, we consider this to reflect an updating of the existing regulatory regime and therefore not to represent an increase in risk for DNOs by design. However, to the extent that the risk of extreme weather events increases in RIIO-ED2, this would tend to lead to an increase in total risk for DNOs.
- 2.72 Given that the GSoP mechanism is penalty-only, this constitutes a source of downside bias in returns to the networks.

## Repairs for weather-related damage in a severe weather 1-in-20 event

- 2.73 Under RIIO-ED2, DNOs will be remunerated for their expenditure on repairs in response to Severe Weather 1:20 events through a TOTEX variant allowance. This allowance will let DNOs recover the efficient costs that Ofgem considers should have been incurred on a particular repair.<sup>71</sup>
- 2.74 As with re-openers, we consider that this approach helps DNOs to mitigate but not eliminate risk; DNOs remain exposed to some risk on expenditure allowances, and that risk is likely to be negatively skewed. This is because the efficiency assessments conducted by Ofgem tend to reduce the allowed costs for DNOs:<sup>72</sup> they would allow DNOs to outperform the benchmark only if Ofgem assessed the efficient level of expenditure to be higher than the expenditure undertaken by DNOs, which is unlikely. This risk is further highlighted by the fact that, in the Draft Determinations for RIIO-ED2, Ofgem cited that the TOTEX variant allowance should allow DNOs to recover 'some'<sup>73</sup> of their costs, which may imply that Ofgem will disallow an element of severe

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<sup>68</sup> Ofgem, '[Quality of Service Guaranteed Standards](#)'.

<sup>69</sup> Ofgem (2022), '[Interim report on the review into the networks' response to Storm Arwen](#)', 17 February, p. 32.

<sup>70</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', 29 June, paras 5.178–5.180.

<sup>71</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', 29 June, para. 6.172.

<sup>72</sup> Of the disallowed costs requested as part of re-openers in RIIO-ED1 and listed in Table 2.4, all but one contains inefficient costs as a reason for disallowed expenditure.

<sup>73</sup> Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', 29 June, para. 6.172.

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weather-related expenditure, based on its efficiency assessment. Therefore, the regulatory regime is exposing DNOs to an asymmetric risk in an environment where the impact of extreme weather may be increasing.

### Concluding remarks

- 2.75 In summary, the adjustments to the RIIO-ED2 framework in respect of the IIS mechanism, the GSOPs and the repairs for weather-related damages have tended to keep the level of risk exposure of networks at broadly the same level. Thereby, if the impact and frequency of severe weather events increases in RIIO-ED2—while the level of risk mitigation is not enhanced—the net effect would be to increase the potential weather-related costs to which networks are exposed in RIIO-ED2 relative to preceding controls.
- 2.76 While data is not available to precisely quantify the impact of Ofgem's approach, as this would require simulating the impacts of highly uncertain weather events on DNOs, we note that the impacts of severe weather on DNOs can be substantial. We provide examples below.
- Between 2015 and 2021, DNOs earned c. £919m through the IIS scheme.<sup>74</sup> Therefore, to the extent that extreme weather events reduce their ability to earn revenues through the IIS, this will have a substantial impact on their revenues. This is a negatively skewed risk in RIIO-ED2 given that the targets for CIs and CMLs have not been set to be less challenging than in RIIO-ED1 while the penalty and reward range has been revised to be asymmetric (i.e. with a higher penalty than reward range).
  - Payments made in respect of GSOPs can be substantial, with £44m paid out in respect of damages as a result of Storm Arwen alone, and a further £8m following the Christmas storms in December 2013.<sup>75</sup>
  - The costs that DNOs can incur in response to extreme weather events can be substantial, which means that any under-recovery of these costs could have a

<sup>74</sup> Calculated as the sum of £160.43m, £159.7m, £138m, £142.6m, £160.4m and £157.5m. Ofgem (2017), 'RIIO-ED1 Annual Report 2015-16', Table 3.1. Ofgem (2017), 'RIIO-ED1 Annual Report 2016-17', Table 2.2. Ofgem (2019), 'RIIO-ED1 Annual Report 2017-18', Table 2.2. Ofgem (2020), 'Network Performance Summary 2018-19', p. 4. Ofgem (2021), 'RIIO-ED1 Network Performance Summary 2019-20', p. 5. Ofgem (2022), 'RIIO-ED1 Network Performance Summary 2020-21', p. 5.

<sup>75</sup> Ofgem, '[Ofgem publishes full report following six-month review into networks' response to Storm Arwen](#)', accessed 12 August 2022.

material impact on DNO returns. Specifically, DNOs have forecast expenditure of £87m during RIIO-ED2.<sup>76</sup>

- 2.77 Consequently, we consider that the current regulatory framework for dealing with weather impacts does not adequately mitigate the increased risk exposure of DNOs from the potential increase in the frequency and severity of extreme weather events, in the RIIO-ED2 period and beyond.

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<sup>76</sup> Calculated as the sum of submitted TOTEX by DNOs under severe weather 1-in-20 cost activity. Ofgem (2022), '[RIIO-ED2 Draft Determinations ENWL Annex](#)', 29 June, Table 23. Ofgem (2022), '[RIIO-ED2 Draft Determinations NPg Annex](#)', 29 June, Tables 19–20. Ofgem (2022), '[RIIO-ED2 Draft Determinations SPEN Annex](#)', 29 June, Tables 17–18. Ofgem (2022), '[RIIO-ED2 Draft Determinations SSEN Annex](#)', 29 June, Tables 23–24. Ofgem (2022), '[RIIO-ED2 Draft Determinations UKPN Annex](#)', 29 June, Tables 22–24. Ofgem (2022), '[RIIO-ED2 Draft Determinations WPD Annex](#)', 29 June, Tables 18–21.

### 3 Overall balance of risks and implications

- 3.1 In this section, we summarise our findings and discuss options to address the identified downward skew in the RIIO-ED2 balance of risks.

#### 3A Summary and quantification

- 3.2 Table 3.1 summarises our findings across the individual elements of the price control that we have examined in this report. In addition, Table 3.1 includes an estimate of the impact of the risks, in terms of RoRE, associated with TOTEX allowances, ODIs and the NARM mechanism. In particular, we have estimated the impact of these risks as follows.

- With respect to the TOTEX allowances, we have calculated the possible impact on RoRE by assuming that the DNOs expect to overspend the TOTEX allowances by the same amounts as disallowed by Ofgem as a result of the efficiency adjustments—i.e. we do not account for the adjustments related to the demand scenario assumed by Ofgem. In particular, for each DNO we have considered the percentage haircut applied by Ofgem as a result of the efficiency adjustments, and applied the corresponding percentage to Ofgem's RIIO-ED2 price control financial model in order to obtain the impact of a TOTEX overspend on the DNO's RoRE.<sup>77</sup> Our estimate potentially represents the upper bound of the expected DNOs' overspend—there may be categories of expenditure that DNOs may avoid undertaking following Ofgem's rejection. Our calculations result in the expectation that DNOs will be 2.92% of RoRE below Ofgem's baseline on a pre-RAMs basis and 1.20% on a post-RAMs basis.<sup>78</sup>
- Regarding ODIs, as illustrated in Table 2.2 Ofgem provides an estimate of the maximum impact of ODIs on the RoRE. In particular, the range of maximum rewards and penalties that DNOs can be exposed to under common ODIs

<sup>77</sup> As illustrated in Ofgem (2022), '[RIIO-ED2 Draft Determinations – Overview Document](#)', Figure 3, Ofgem applied the following adjustments to the TOTEX submitted by the DNOs: benchmarking and volume adjustment, demand driver adjustment, catch-up efficiency adjustment and ongoing efficiency adjustment. We understand that the benchmarking and volume adjustment is used by Ofgem to normalise the TOTEX submitted by the DNOs and is a process that includes both efficiency and volume adjustments. For simplicity, we have included the entire amount related to the benchmarking and volume adjustment under the haircut applied by Ofgem to the TOTEX allowance as a result of the efficiency adjustments. In particular, we have relied on the TOTEX cost assessment breakdown reported in Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', Table 22, and calculated the efficiency adjustment for each DNO as the sum of the catch-up efficiency adjustment, the ongoing efficiency adjustment and the difference between the submitted and modelled TOTEX—i.e. the benchmarking and volume adjustment discussed above.

<sup>78</sup> Ofgem's headline figure of 17% compares companies' submitted costs excluding ongoing efficiency with the overall allowance, which includes ongoing efficiency. Therefore, the 17% reduction presented by Ofgem overstates the actual reduction.

ranges from -4.00% to 1.95%, which translates to -1.84% and 0.43% on a post-RAMs basis, when considered in combination with the TOTEX underperformance effects.

- With respect to the NARM mechanism, we have calculated the possible impact of the source of the negative skew in terms of RoRE by applying the 2.5% penalty envisaged by Ofgem in case of unjustified under-delivery against the NARM Asset Replacement and NARM Asset Refurbishment allowances proposed by Ofgem. In particular, we have divided the penalty amount by the equity portion of the NPV-neutral RAV proposed by Ofgem for each DNO.<sup>79</sup> As discussed in section 2C, in addition to the penalty, DNOs would be running the risk of not being remunerated against expenditures associated with the consequences of potential faults. However, we have not quantified the impact of such risk as this would require a detailed review of the state of the assets of each DNO in order to assess the magnitude of such extra expenditures.

**Table 3.1 Summary of the risk assessment**

Factor	Associated risks	Magnitude of the impact
TOTEX	<ul style="list-style-type: none"><li>downward bias caused by the TOTEX allowances being challenging, amplified by the low accuracy of the assessment models at this stage in the price control process. Compared with RIIO-ED1:<ul style="list-style-type: none"><li>more challenging catch-up efficiency benchmark</li><li>deterioration in statistical quality of the models</li><li>disaggregated analysis implying an efficiency benchmark beyond the frontier</li><li>little correlation between DNOs' performance in the TOTEX models and disaggregated analysis</li><li>a compounding of the effect of the challenging ongoing efficiency improvements targets over two extra years</li></ul></li></ul>	If DNOs' TOTEX overspends equal the amount disallowed by Ofgem following efficiency adjustments, the sector average RoRE would be <b>1.20%</b> lower than the baseline on a post-RAMs basis

<sup>79</sup> In line with Ofgem's methodology, we have calculated the regulated equity on the basis of the average between the Opening RAV (after transfers) and the discounted closing RAV multiplied by  $(1-g)$ , where  $g$  is the notional gearing proposed by Ofgem.

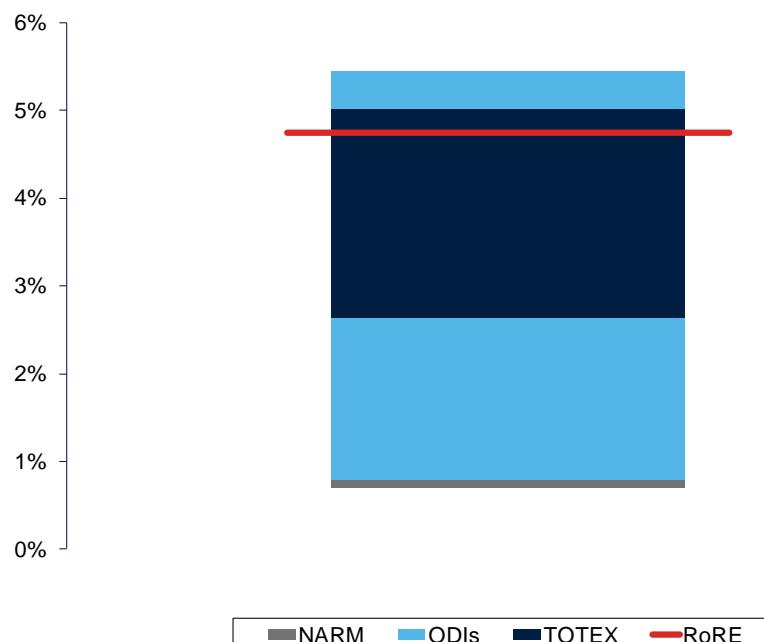
Factor	Associated risks	Magnitude of the impact
ODIs	<ul style="list-style-type: none"> <li>downward bias in the balance of penalties and rewards, with the calibration of that balance being explained mostly without reference to the ability of networks to meet the threshold</li> </ul>	The range of possible outcomes for ODI rewards and penalties is between <b>-4.00%</b> and <b>1.95%</b> in line with Ofgem's impact assessment, which translates to <b>-1.84%</b> and <b>0.43%</b> on a post-RAMs basis, when considered in combination with the TOTEX effects
Network asset risk	<ul style="list-style-type: none"> <li>downward bias in the mechanism with penalties and no rewards</li> <li>downward bias due to greater monetised asset risk</li> </ul>	A penalty of 2.5% applied to NARM allowances in case of an unjustified under-delivery against the NARM requirements corresponds to <b>0.09%</b> of sector average RoRE <sup>1</sup>  NARMS expenditure accounts for 10.7% of the proposed TOTEX allowance, based on Ofgem's base case TOTEX scenario
RPEs	<ul style="list-style-type: none"> <li>downward bias if the 12% of TOTEX that is not indexed to RPEs would be indexed to a positive RPE if RPE indexation were allowed</li> <li>higher risk of under-remuneration in a high-inflation environment if indices that are used for RPE indexation do not accurately track movements in DNO costs relative to the CPIH index</li> </ul>	12% of TOTEX is not indexed to RPEs
Re-openers	<ul style="list-style-type: none"> <li>downward bias in cases where DNOs have to incur costs prior to applying for a re-opener</li> <li>risk of delay and/or suboptimal delivery in undertaking investment with consequences for TOTEX performance</li> </ul>	Unknown due to the nature of the re-openers
Volume drivers	<ul style="list-style-type: none"> <li>downward bias due to the volume driver cap and no symmetric floor</li> <li>downward bias due to the clawback</li> </ul>	Volume drivers account for 9.9% of the proposed TOTEX allowance based on Ofgem's base case TOTEX scenario
Frequency of extreme weather events	<ul style="list-style-type: none"> <li>downward bias due to the possibility of more extreme weather events in RIIO-ED2</li> <li>downward bias due to asymmetry of the IIS and inability of DNOs to remove the effects of all extreme weather events from their performance under the IIS</li> <li>downward bias due to the likely asymmetry of ex post efficiency assessments conducted as part of the TOTEX variant allowance</li> </ul>	Unknown, but see para. 2.76 for a discussion on expenditure borne by networks in relation to weather-related events

Note: ODIs—output delivery incentives. RPEs—real price effects. <sup>1</sup> The magnitude of the impact of a penalty on the NARMS expenditure is not affected by the application of the RAMs as, in line with Ofgem's financial model, we have applied the RAMs thresholds (3% and 4%) to only ODIs and TOTEX.

Source: Oxera.

- 3.3 In Figure 3.1 below, we illustrate the potential impact of the asymmetric risks associated with TOTEX allowances, ODIs and the NARM penalty; these are the elements of the price control for which we quantified the potential financial impact on networks. To reflect the impact of potential TOTEX overspend, we moved the central expectation of DNOs' performance from 0% impact on RoRE to -1.2% (the estimation of which is explained above). For its RoRE chart, Ofgem shows a +/-10% range of TOTEX out- and underperformance—we have not changed that range.
- 3.4 As reported in the figure, the proposed RIIO-ED2 framework exposes the DNOs to a potential downside risk that is only partially mitigated by the possible upside. In addition, the figure does not explicitly reflect the impact of the factors that we have not quantified, including the downward biases and greater risks associated with RPEs, re-openers, volume drivers and the frequency of extreme weather events.
- 3.5 The figure also reflects the impact of the RAMs thresholds (3% and 4%), which help to reduce the effect of these risks by limiting the potential deviation from the baseline RoRE. However, the downward bias of such risks remains unaddressed even after the application of the RAMs thresholds.

**Figure 3.1 Illustration of the impact of asymmetric risks on RoRE—post-RAMs**



Note: The figure does not include the impact of bespoke ODIs. The figure is based on sector-average data. The figure shows the impact of a +/- 10% deviation in the TOTEX expenditure

relative to a central expectation that assumes that the DNOs will overspend the same amount disallowed by Ofgem as a result of the efficiency adjustment.

Source: Oxera analysis of Ofgem data.

### **3B Implications and options to balance the risks in RIIO-ED2**

- 3.6 The best way to address the issues identified with specific elements of the price control is to address them at source. In other words, Ofgem should provide sufficient TOTEX allowances to ensure that the companies can fund their efficient expenditure requirements over the period, eliminate the downside skew apparent in the ODI penalties and rewards package, introduce symmetric floors to the mechanisms that are subject to caps, etc.
- 3.7 Where the negative skew is not or cannot be addressed at source, it leads to expected returns on equity being below the cost of equity allowance, i.e. below the required return on equity as assessed by Ofgem. Therefore, DNOs require a compensation that would allow them to earn investors' required return in the base case. A practical way of structuring a compensation like this is to choose a point estimate of the return on equity above a mid-point of its range, i.e. to 'aim up' in determining the regulatory allowed cost of equity. As explained in section 1, both Ofgem and the CMA accept this principle.
- 3.8 Given that our assessment of the RIIO-ED2 price control package demonstrates a number of sources of downward bias, and to the extent that this downward bias cannot be addressed at source, we consider that aiming up on the allowed return on equity is required to restore the balance between price control risks and returns.
- 3.9 For completeness, we note that a downward bias is not the only reason for a regulator to aim up on the allowed return of equity. In the PR19 redeterminations, the CMA concluded that a higher cost of equity allowance could be used to address financeability risks:

We have also concluded that a decision to set a point estimate above the middle of the range will address the risks to financeability which would increase from setting the cost of equity at lower levels within the range.<sup>80</sup>

- 3.10 Also, the cost of equity is calculated using multiple data sources estimated with error. A regulator is therefore presented with a range of possible cost of equity

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<sup>80</sup> CMA (2022), 'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations. Final report', 17 March, para. 9.1402.

estimates and must select one for a point estimate to use in its regulatory price controls.

- 3.11 Selecting the point estimate within the range requires striking a balance between higher consumer prices in the short term and reducing the risk of underinvesting in assets that deliver the consumer benefits of network resilience and enhancement. Such underinvestment risks can result in supply problems (e.g. delayed connections or an increase in outages) and threaten the delivery of the energy transition—corresponding to significantly higher social costs and consumer bills in the future. A regulatory allowed cost of capital at the middle of the range of estimates risks being below the true cost of capital and hence risks undercompensating investors for the level of risk that they assume. To mitigate such risks, the point estimate of the allowed return on equity should be above the midpoint of the range of cost of equity estimates.

## A1 RIIO-ED2 common re-openers

Table A1.1 RIIO-ED2 common re-openers

Re-opener	Purpose	Triggered by	Trigger Window
<b>Coordinated Adjustment Mechanism</b>	To enable more coordination between network companies to maximise benefits across the whole energy system	DNO and TSO	Annual applications in May
<b>Environmental re-opener</b>	To accommodate environmental legislative changes within period that require a material change in the approach to DNOs' EAPs	Ofgem	Any time throughout price control period
<b>LRE - General</b>	Enable the price control to react in an agile, flexible manner to changes in demand. Ensure networks have sufficient funding to enable net zero and protect consumers from paying higher costs than necessary	DNO	Year three of the price control (April 2025)
<b>Net zero re-opener</b>	To introduce an increased level of adaptability into the RIIO-ED2 price control by providing a means to amend the price control in response to changes relating to the meeting of the net zero carbon targets, which affect the costs and outputs of network licensees	Ofgem	Any time throughout the price control period
<b>Digitalisation re-openers</b>	To introduce an increased level of adaptability into the RIIO-ED2 price control by providing a means to amend the price control in response to changes relating to the data and digitalisation roles and responsibilities	DNO and Ofgem	For DNOs, between 24 January 2026 and 31 January 2026 For Ofgem, any time throughout the price control
<b>DSO re-opener</b>	To introduce an increased level of adaptability by providing a means to amend the RIIO-ED2 price control in response to changes to the roles, responsibilities and governance arrangements for DSO functions, which could have an effect on the costs and outputs of licensees	Ofgem	Any time throughout the price control period
<b>Storm Arwen</b>	Provides DNOs with the opportunity to apply to adjust their baseline allowances where they identify a change to the scope of work they expect to deliver, as a result of the Energy Emergencies Executive Committee (E3C's) or Ofgem's recommendations from the Storm Arwen review	DNO	Between 22 January 2024 and 26 January 2024

Re-opener	Purpose	Triggered by	Trigger Window
<b>Physical site security</b>	To adjust revenues following Government mandated changes to network site security requirements	Change to DNO's scope of work which is caused by: <ul style="list-style-type: none"> <li>• a change in CNI status of a DNO site</li> <li>• change in Government requirements or policy relating to physical site security</li> </ul>	Between 24 January 2026 and 31 January 2026, and between 24 January 2028 and 31 January 2028
<b>Electricity system restoration</b>	To adjust revenues following any changes to network requirements for Electricity System Restoration	DNO and Ofgem	For DNOs, between 24 June 2024 and 28 June 2024 For Ofgem, anytime outside the re-opener window
<b>Cyber resilience OT and IT</b>	To reduce risk, improve cyber resilience and response outcomes on the networks and comply with relevant regulations	DNO	In year 1 between 1 April 2023 and 7 April 2023, and in year 3 between 1 April 2025 and 7 April 2025
<b>Streetworks costs</b>	Relates to activities that enable and support works in the public domain, such as permits and inspections relating to working in the highway and in footpaths	DNO	Unspecified
<b>Rail electrification</b>	Relates to rail electrification of an existing railway line. The activity is in connection with diversions, where the installation of rail electrification equipment requires the relocation or re-routing of DNO apparatus	DNO	Unspecified
<b>High value projects</b>	To help mitigate the risk associated with large, high value projects	DNO	Between 22 January 2026 and 26 January 2026
<b>Tax review</b>	To make adjustments to allowances for any material differences between DNOs' tax liability as measured by them versus as measured by Ofgem	Triggered by the existence of a material difference between DNOs' tax allowances as measured by them and as measured by Ofgem	Any time throughout the price control period

Note: TSO—transmission system operator. CNI—Critical National Infrastructure.

Source: Ofgem (2022), '[RIIO-ED2 Draft Determinations – Overview Document](#)', 29 June. Ofgem (2022), '[RIIO-ED2 Draft Determinations – Core Methodology Document](#)', 29 June. ENWL (2021),

'Annex 29: Uncertainty Mechanisms', pp. 45 and 53. Ofgem (2021), 'RIIO-2 Final Determinations – Finance Annex (REVISED)', paras 7.56–7.63.



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