NERA
ECONOMIC CONSULTING

# COST OF DEBT AT RIIO-2
## A REPORT FOR GAS DISTRIBUTION NETWORKS

27 SEPTEMBER 2019

GDNs, London



Insight in Economics™

# Scope of work: Model expected sector cost of debt performance over RIIO-2 under different indexation mechanisms

- On behalf of gas distribution networks (GDNs), we have been asked to (in summary):
  - Collate networks actual cost of debt
  - Forecast expected allowed cost of debt over RIIO-2, under Ofgem's proposed 11-15 year trombone, along with other trailing average methods
  - Forecast sector cost of debt over RIIO-2, taking into account assumed debt issuance
  - Consider optimal trailing average based on empirical evidence on networks' average tenor at issuance, and consider Ofgem's related comments (e.g. impact of floating rate debt)
  - Debt modelling should be on debt-weighted and unweighted basis, and including and exc. derivatives

- Structure of report:
  - Data collection and modelling assumptions
  - Optimal trailing average for RIIO-2
  - GDN sector level performance, under both simple or equally-weighted and RAV/notional debt-weighted approach, over 11-15 year trombone, 15 year and 20 year trailing averages (with 14-18 year trombone and 15-20 year trombone presented in Appendix A)

# 1 Data collection and modelling approach

# Our modelling approach broadly follows Ofgem's proposed approach for RIIO-2 in assessing companies' kD performance

## Our modelling assumptions for sector as a whole

- We have collected companies' existing and expected debt issuance, and derivative costs (drawing on R8a of RFPR)
- We assume companies issue new debt at a notional level (i.e. new debt is set equal to company RAV forecast times 60% notional gearing, as per Ofgem's Sec Decision)
- We assume companies issue new debt at iBoxx A/BBB 10Y+ rate
- For trans., liquidity, cost-of-carry, new issue premium and CPI switching related costs, we assume 68 bps for both embedded and new debt, based on the mid-point estimate set out in our "Additional cost of borrowing" report for ENA
- We assume allowance also based on A/BBB 10Y+, but no trans., liquidity etc. allowance, as per RIIO-1
- We forecast future debt issuance costs and allowances under three different iBoxx scenarios, drawing on Ofgem's iBoxx forecasts (as explained in the next slide)
  - Updating Ofgem's method to the more recent market data does not materially affect the results
- We use CPIH Inflation forecasts based on OBR's CPI forecasts, as per Ofgem Sec Decision

## We compare real cost of debt to real iBoxx allowance

- To analyse performance, we calculate the nominal interest cost both with and without derivatives, and convert to real terms for comparison with a real cost of debt allowance, that is:
  - *Calculate real cost of debt*: deflate forecast nominal cost (applies to nominal debt only) using CPIH OBR forecasts for the relevant year of RIIO-2
    - We calculate debt costs with and without derivative costs (see Appendix B for detail)
  - *Real allowance*: deflate historical and forecast nominal iBoxx with a measure of CPIH long-term inflation expectations (proxied by OBR's CPI 5-year ahead expectations), as per Ofgem's Sec Decision.

# We present sector level results based on simple average and notional debt-weighted average, both including and excluding derivatives

### We prefer simple average measures

- Sector average based on RAV/notional debt-weighted average and simple or equally-weighted of GDN groups' – i.e. based on four observations.
- We consider equally weighted analysis more relevant:
  - use of RAV-weights places disproportionate weight on the performance of large licensees
  - Ofgem uses equal company weights in other aspects of setting revenue allowances, e.g. cost benchmarking

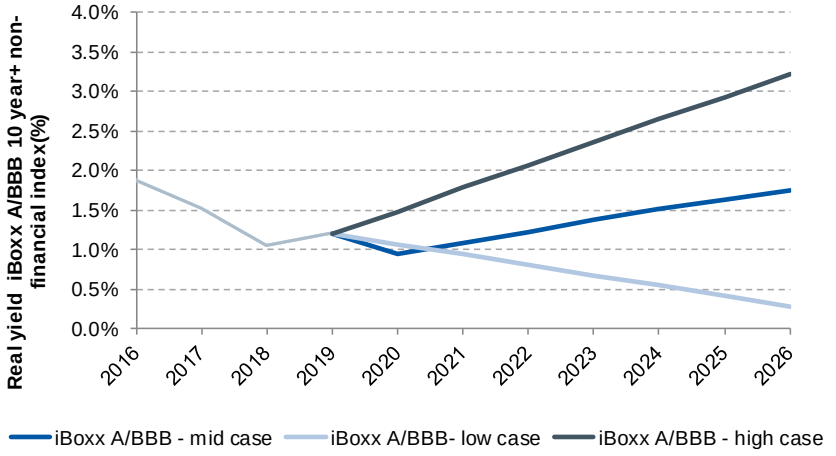
### We consider it reasonable to allow for derivatives, as integral part of companies' debt costs

- GDNs (in common with other regulated and unregulated companies) have used derivatives to manage interest rate, inflation and currency exposure of debt portfolios
  - allows companies to diversify funding sources and achieve efficient debt issuance to the ultimate benefit of customers
  - excluding hedging derivatives would ignore legitimate costs that companies have incurred in securing low costs and managing risks
- At present, GDNs' derivative portfolios represent an incremental cost to direct debt issuance, as a result of market interest rates falling over recent periods
  - in a rising interest rate environment the position could easily be reversed and we would expect these positions to be to the benefit of consumers
  - asymmetric regulatory risk if Ofgem does not recognise the incremental cost in a falling interest rate environment, but captures incremental benefit for consumers in rising interest rate environment

# We forecast iBoxx and LIBOR mid-case drawing on Ofgem's forecasts, and form scenarios of +/- 150 bps relative to mid-case

**We forecast real A/BBB iBoxx index to be 1.75% by 2026 based on Ofgem's iBoxx forecasts under our mid-case, and assume scenarios +/- 150 bps**

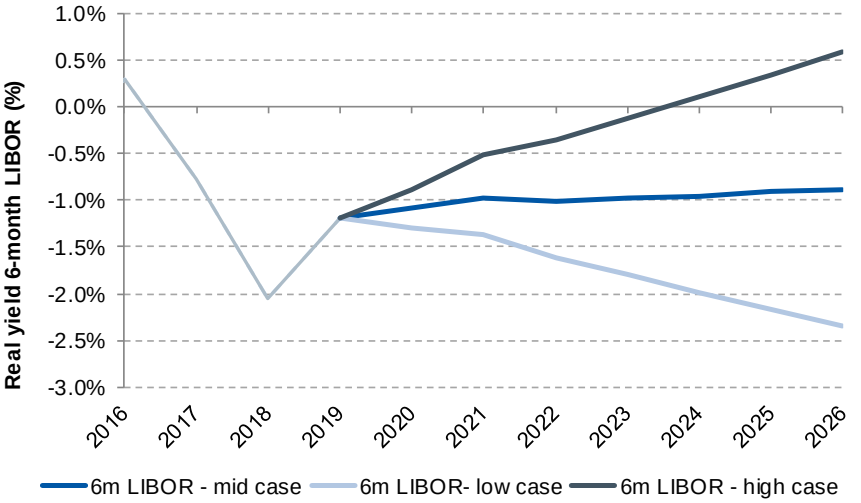
- We rely on Ofgem's Sec Decision iBoxx forecast values for the RIIO-2 period
- Our high/low scenarios assume a +/- 150 bps by the end of RIIO-2, based on historical standard deviation of iBoxx index values




*Source: NERA analysis based on Ofgem and Factset data*

**We forecast real 6m LIBOR to be -0.88% by 2026 using LIBOR forward rates, and assume scenarios +/- 150 bps**

- To forecast real 6m LIBOR we rely on Ofgem's nominal LIBOR forecasts, which we then deflate using OBR CPIH forecast
- Our high/low scenarios assume a +/- 150 bps at the end of RIIO-2

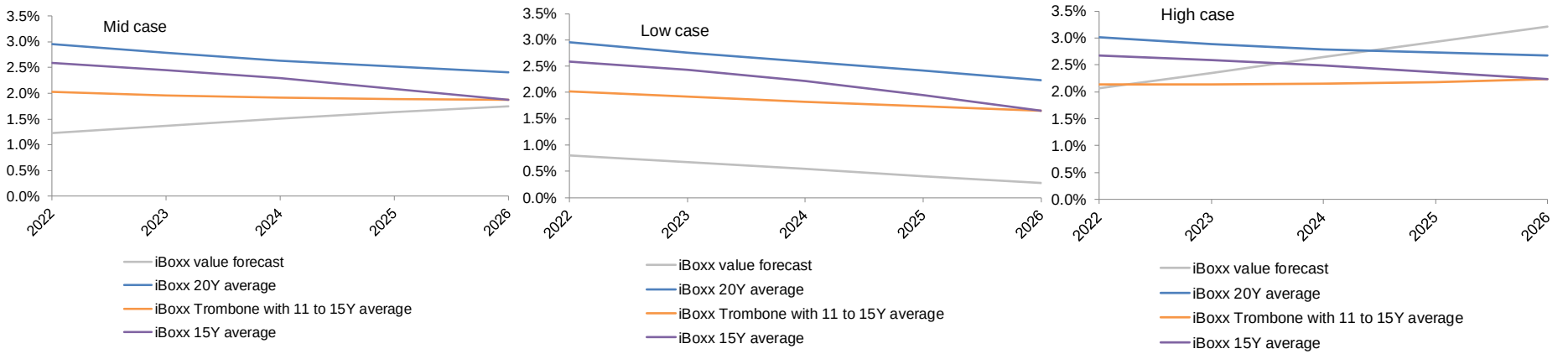



*Note: we adopted the same approach for 3m and 12m LIBOR*

*Source: NERA analysis based on Ofgem and Factset data*

# Drawing on Ofgem's iBoxx forecasts and scenarios, we model cost of debt allowance under three mechanisms: 11-15Y Trombone, 15Y and 20Y trailing averages

- 20 year trailing average (followed by 15 year trailing average) provides higher allowance as higher value historical years are retained within the index for a longer period




*Source: NERA analysis based on Factset data*

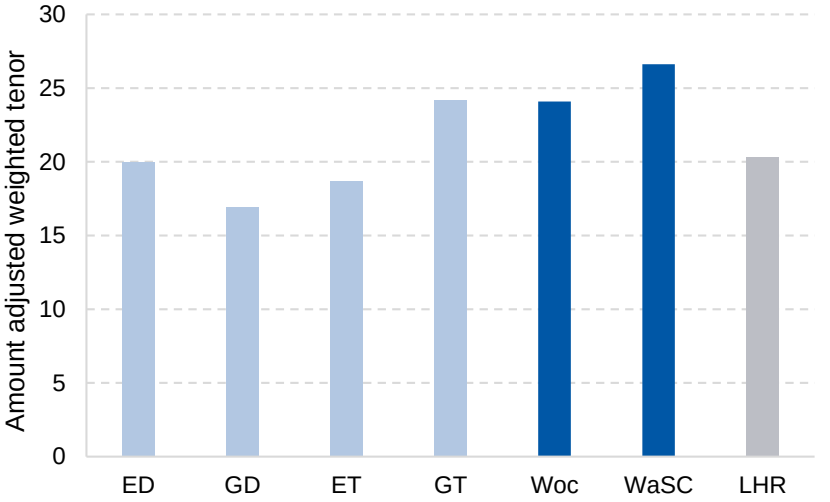
# 2 Conceptually Correct Approach to Trailing Average over RIIO-2

# The conceptually correct approach is to match trailing average to the average tenor at issuance, which is more than 15 years and on average ca 20 years in energy and other regulated sectors

## Evidence suggests an optimal tenor of more than 15 years, with strong support for 20 years

- The conceptually correct approach is to match the trailing average to the average tenor at issuance, as this would mean companies receiving an allowance equal to the efficient cost of the bond in each year of the lifetime of the bond, thus creating a reasonable prospect of recovering debt costs
- Energy networks bonds have an average tenor at issuance of around 19 years
  - 19 year tenor estimate may be downwardly biased due to companies seeking to match Ofgem's index trailing average of 10 years
  - reflects shorter tenor EIB loans which are unlikely to be available over RIIO-2, and therefore tenor likely to increase
- Other regulated sectors (not subject to this potential bias) show average tenors at issuance of around 20 (London Heathrow Airport) to 26 years (WaSCs)
- Ofgem proposes average tenor analysis should take account of 14 per cent floating rate debt, but assuming variable debt has effective tenor of 6 months makes practically no difference, e.g. reducing the average tenor by approximately one year across all sectors
  - In principle, we do not agree with adjusting tenor for floating rate debt: Decision/risk around issuing floating vs fixed rate debt should be borne by the company rather than customers – also, introduces asymmetric risk as Ofgem less likely to make such adjustment (i.e. shorten trailing average) under rising interest rate scenario

## UK energy and other regulated sectors tenors range from 17 (GDNs) to around 24 years (GT)



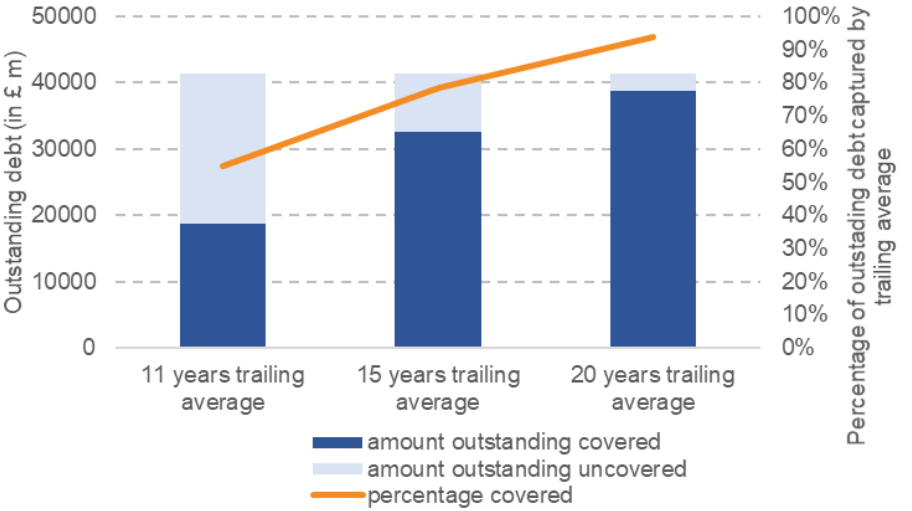

*Note: Energy sector tenors calculated based on tenor at issuance weighted by outstanding amount in 2019. Water sector bonds and London Heathrow bonds based on publicly available data.*

# An additional consideration in setting the trailing average is the energy sector's profile of issuance, which supports at least a 15 year trailing average and shows drawback of trombone starting at 11 years

### The profile of issuance supports at least 15-year trailing average

- Ofgem notes that the profile of sector new issuance should inform the analysis of the optimal length of the trailing index
  - Using an 11 year trailing average at the start of RIIO-2 would exclude around 45 per cent of the energy sector current outstanding debt
  - On the other hand, a trailing average of 15 years would cover 78 per cent of outstanding debt, while a 20 year trailing average would cover 94 per cent
- Similarly, Ofwat has stated that 10-year trailing average to compensate for embedded debt would not reflect issuance profile of the water sector, as it excluded close to half of the sectors outstanding debt. Conversely, Ofwat notes a 15 year average had the merit of covering close to 80 per cent of outstanding debt, while a 20 year average would also be feasible

### Most of the sectors outstanding debt would be covered under a 15 and 20-year trailing average




*Note: Calculated based on the outstanding amount of existing energy sector debts as in 2020/21.*

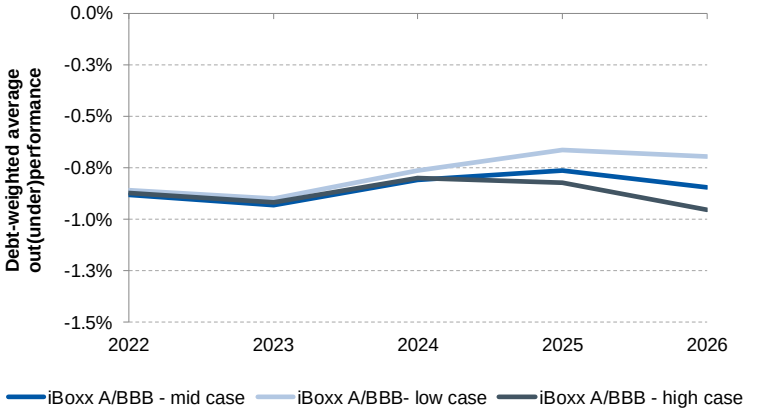
We conclude that market evidence supports an efficient tenor at issuance (and therefore a trailing average) of at least 15 years, with stronger support for 20 years. Both of these alternatives would also include most of the companies historical debt issuance, unlike an 11-year period which excludes almost half of the energy sector debt

# 3 Sector level performance over RIIO-2

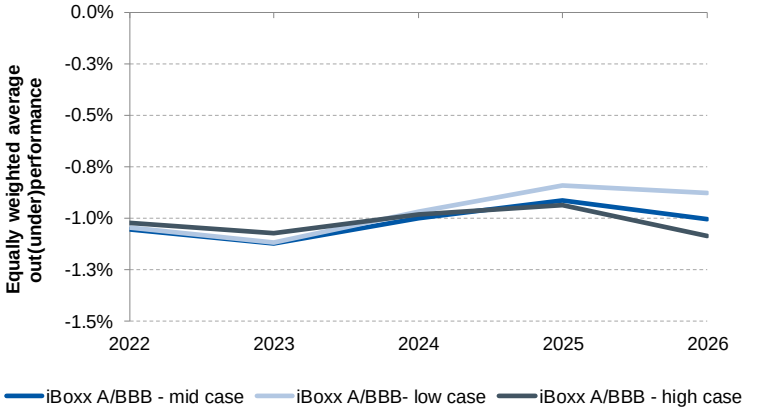
# We expect GDNs as a sector to underperform over RIIO-2 under Ofgem's proposed 11-15 year trombone mechanism, including derivatives

- Sector average based on RAV/ notional debt-weighted average and simple or equally-weighted of GDN groups' – i.e. based on four observations. Includes Cadent "cost of refinancing"
- Our analysis shows that GD sector will underperform by 85 bps over RIIO-2 under our mid case (range of -78 to -87 bps depending on interest rate scenario), based on *debt-weighted average*, including effect of derivatives
- Based on *equally-weighted average* performance, GDNs will underperform by 102 bps over RIIO-2 under our mid case (range of -97 to -102 bps depending on interest rate scenario), including derivatives
- GD sector performance is relatively invariant to the interest rate scenario as industry's embedded debt cost is largely fixed and new debt issuance is relatively low

**Sector underperforms by 85 bps in RIIO-2 (incl. derivatives) based on debt-weighted average performance, under our mid-case**



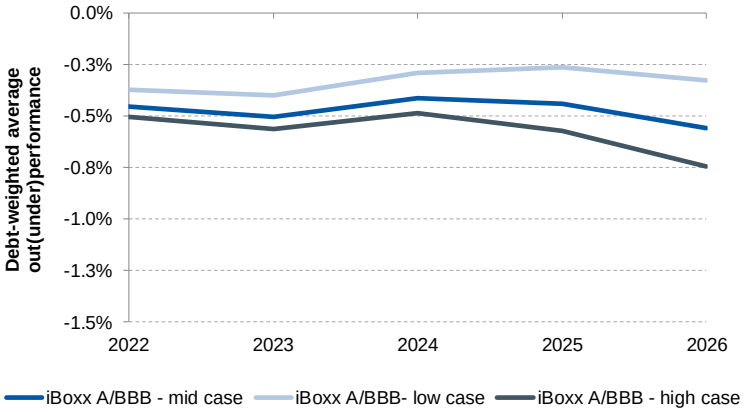

**Sector underperforms by 102 bps in RIIO-2 (incl. derivatives) based on simple average performance, under our mid case**



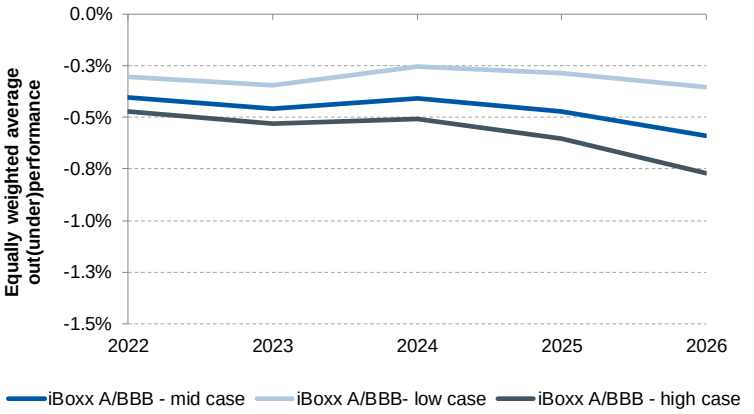
# If derivatives are excluded, we expect GDNs as a sector to underperform over RIIO-2 under Ofgem's proposed 11-15 year trombone mechanism

- If we remove the effect of derivatives, the sector would underperform the allowance by 47 bps over RIIO-2 (c.37 bps improvement), based on *debt-weighted average*.
- Using the *equally-weighted average* performance, GDNs would underperform by 46 bps over RIIO-2 (c. 56 bps improvement).

**Sector underperforms by 47 bps over RIIO-2 (excl. derivatives) based on debt-weighted average performance, under our mid-case**



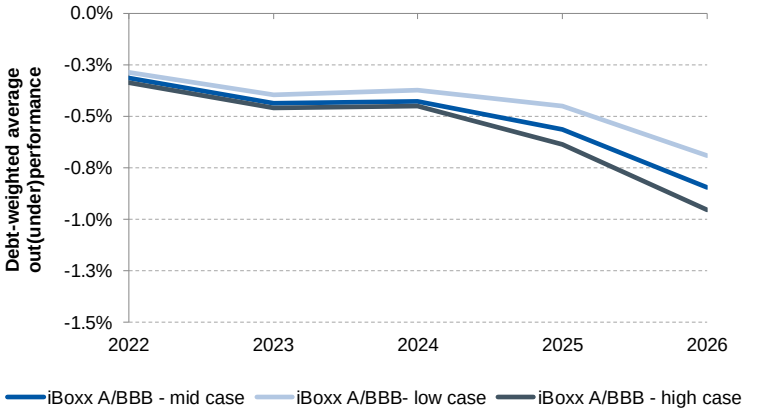

**Sector underperforms by 46 bps in RIIO-2 (excl. derivatives) based on simple average performance, under our mid case**



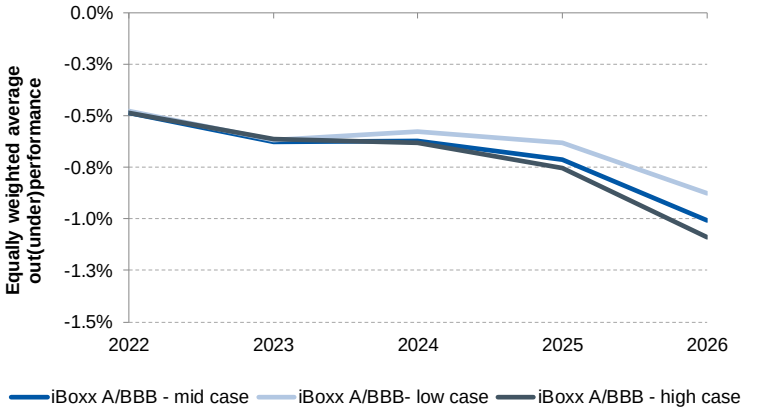
# We expect GDNs as a sector to underperform over RIIO-2 under a 15 year trailing average, including derivatives

- We have also modelled performance of GDN's over a 15 year trailing average instead of Ofgem's proposed 11-15 year trombone
- Our analysis shows that GD sector will underperform by 52 bps over RIIO-2 under our mid case (range of -44 to -57 bps depending on interest rate scenario), based on *debt-weighted average*, including effect of derivatives
- Based on *equally-weighted average* performance, GDNs will underperform by 69 bps over RIIO-2 under our mid case (range of -64 to -71 bps depending on interest rate scenario), including effect of derivatives
- The reduction in underperformance of the 15 year trailing average over the 11-15 year trombone mechanism is due to the fact that the relatively high values for the iBoxx indices for years preceding 2010 are included in our 15 year trailing average, whereas these years are not included within the 11-15 year trombone

**Sector underperforms by 52 bps in RIIO-2 (incl. derivatives) based on debt-weighted average performance, under our mid-case**



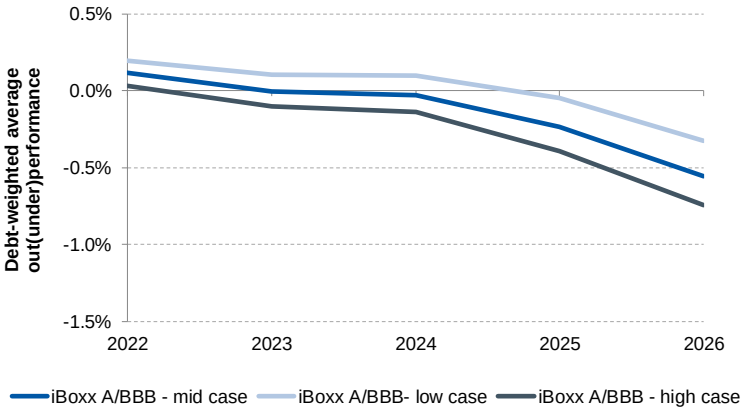

**Sector underperforms by 69 bps in RIIO-2 (incl. derivatives) based on simple average performance, under our mid case**



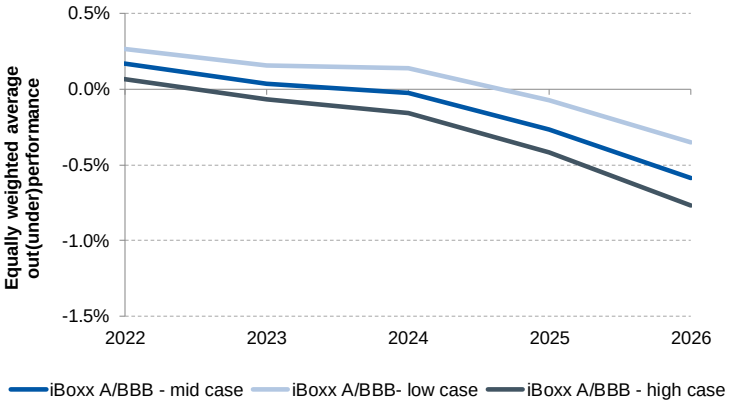
# If derivatives are excluded, we expect GDNs as a sector to underperform over RIIO-2 under a 15 year trailing average

- If we remove the effect of derivatives, the sector would underperform by 14 bps over RIIO-2 (c.37 bps increase), based on *debt-weighted average*.
- Using the *equally-weighted average* performance, GDNs would underperform by 14 bps over RIIO-2 (c. 56 bps increase).

**Sector underperforms by 14 bps in RIIO-2 (excl. derivatives) based on debt-weighted average performance, under our mid-case**



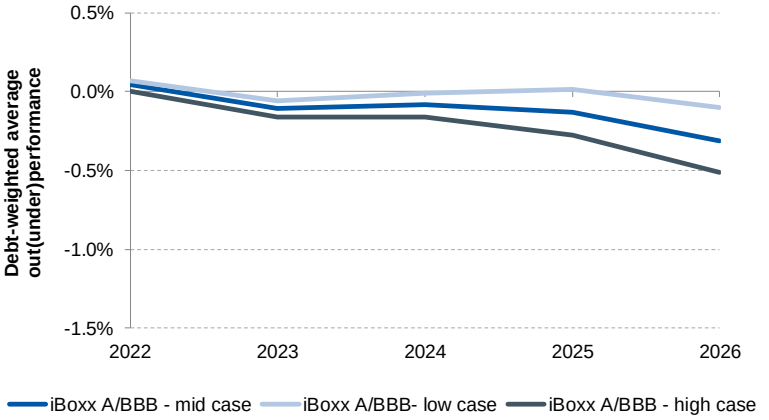

**Sector underperforms by 14 bps in RIIO-2 (excl. derivatives) based on simple average performance, under our mid case**



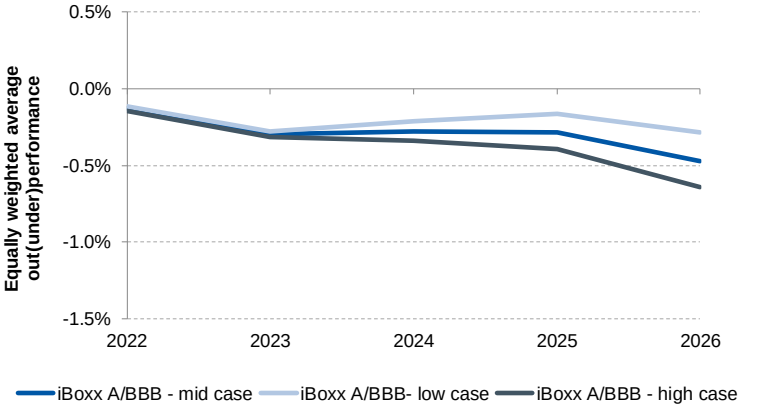
# We expect GDNs as a sector to underperform over RIIO-2 under a 20 year trailing average, including derivatives

- We have also modelled performance of GDN's over a 20 year trailing average instead of Ofgem's proposed 11-15 year trombone
- Our analysis shows that GD sector will underperform by 12 bps over RIIO-2 under our mid case (range of -2 to -22 bps depending on interest rate scenario), based on *debt-weighted average*, including effect of derivatives
- Based on *equally-weighted average* performance, GDNs will underperform by 29 bps over RIIO-2 under our mid case (range of -21 to -37 bps depending on interest rate scenario), including effect of derivatives
- Similar to the 15 year trailing average, GDNs lower underperformance on a 20 year trailing average basis when compared to the 11 to 15 year trombone can be attributed to the inclusion of years with higher iBoxx values in the former.

**Sector underperforms by 12 bps in RIIO-2 (incl. derivatives) based on debt-weighted average performance, under our mid-case**



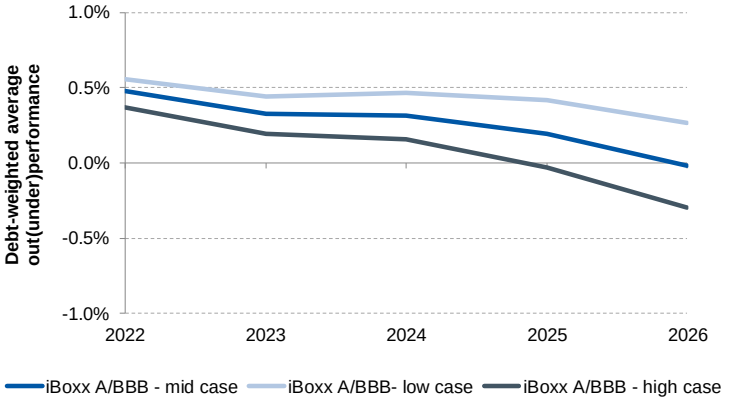

**Sector underperforms by 29 bps in RIIO-2 (incl. derivatives) based on simple average performance, under our mid case**



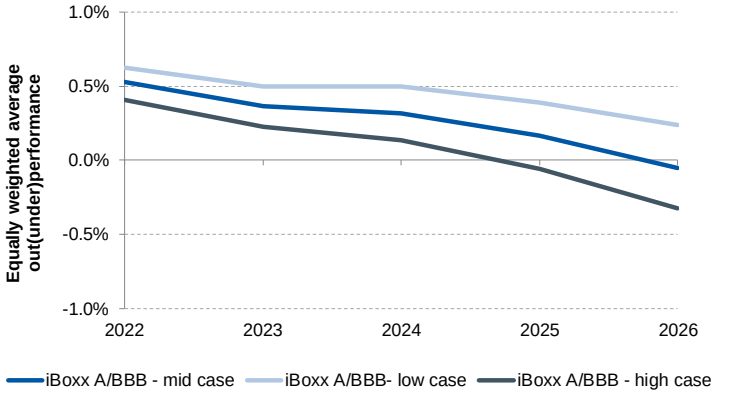
# If derivatives are excluded, we expect GDNs as a sector to outperform over RIIO-2 under a 20 year trailing average

- If we remove the effect of derivatives, the sector would outperform by 26 bps over RIIO-2 (c.37 bps increase), based on *debt-weighted average*.
- Using the *equally-weighted average* performance, GDNs would outperform by 26 bps over RIIO-2 (c. 56 bps increase).

**Sector outperforms by 26 bps in RIIO-2 (excl. derivatives) based on debt-weighted average performance, under our mid-case**




**Sector outperforms by 26 bps in RIIO-2 (excl. derivatives) based on simple average performance, under our mid case**

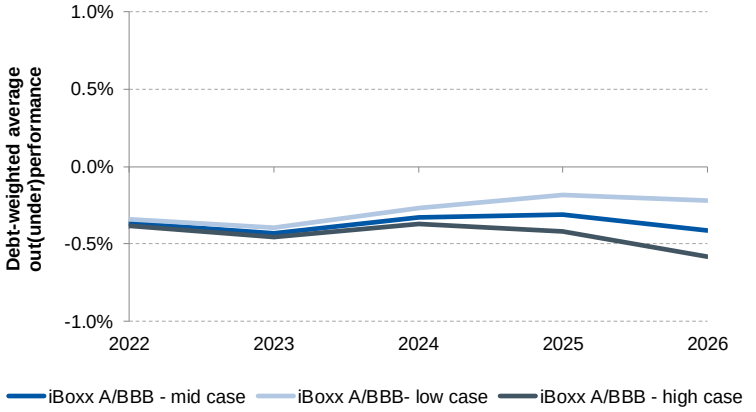


# Appendix A | Cost of Debt Modelling Under Additional Trombone Specifications

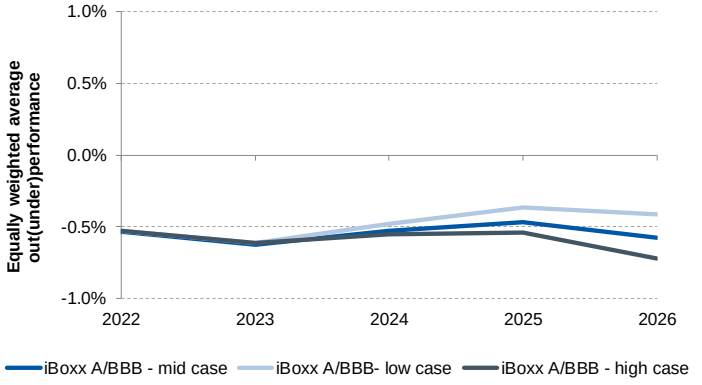
# We expect GDNs as a sector to underperform under a debt-weighted average and underperform under a simple average, over RIIO-2 under a 14-18 year trombone mechanism, including derivatives

- We have modelled GDN's performance under an alternative trombone mechanism, ranging from 14 to 18 years.
- Our analysis shows that GD sector will underperform by 37 bps over RIIO-2 under our mid case (range of -28 to -44 bps depending on interest rate scenario), based on *debt-weighted average*, including effect of derivatives
- Based on *equally-weighted average* performance, GDNs will underperform by 55 bps over RIIO-2 under our mid case (range of -48 to -59 bps depending on interest rate scenario), including effect of derivatives
- GD sector performance is relatively invariant to the interest rate scenario as industry's embedded debt cost is largely fixed and new debt issuance is relatively low

**Sector underperforms by 37 bps in RIIO-2 (incl. derivatives) based on debt-weighted average performance, under our mid-case**



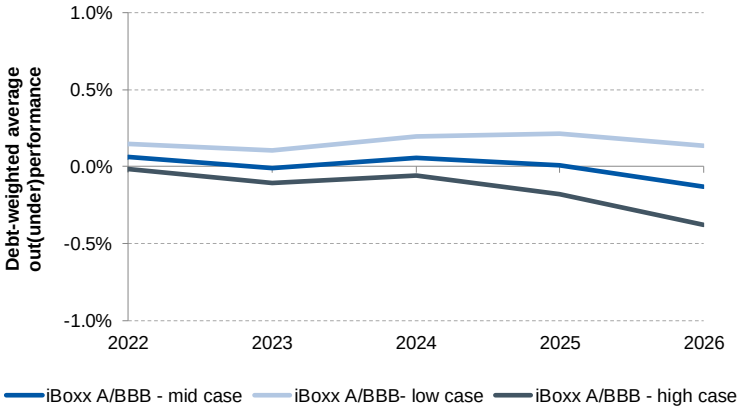

**Sector underperforms by 55 bps in RIIO-2 (incl. derivatives) based on simple average performance, under our mid case**



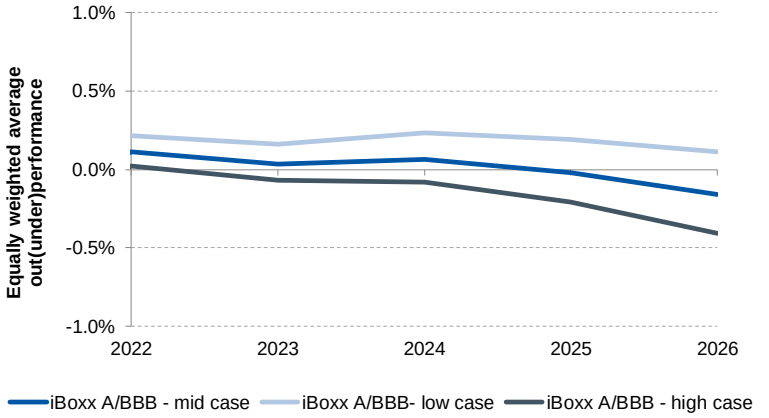
# If derivatives are excluded, we expect GDNs as a sector to perform in line with a 14-18 year trombone mechanism over RIIO-2

- If we remove the effect of derivatives, the sector would perform in line (i.e. zero outperformance) over RIIO-2 (c.37 bps increase), based on *debt-weighted average*.
- Using the *equally-weighted average* performance, GDNs would outperform by 1 bps over RIIO-2 (c. 56 bps increase).

**Sector performs in line with the allowance (zero outperformance) in RIIO-2 (excl. derivatives) based on debt-weighted average performance, under our mid-case**



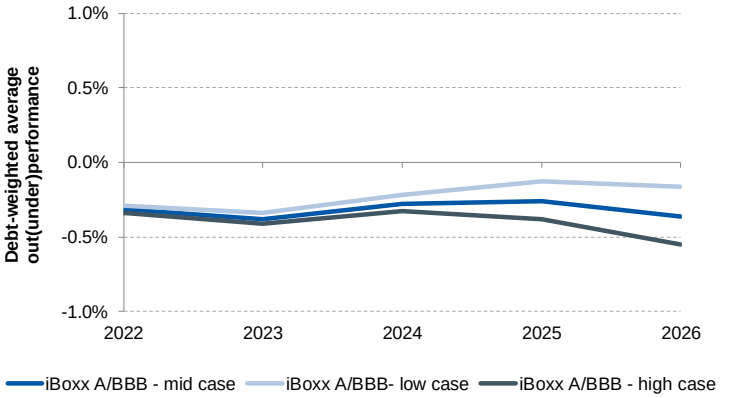

**Sector performs in line with the allowance (outperform by 1 bps) in RIIO-2 (excl. derivatives) based on simple average performance, under our mid case**



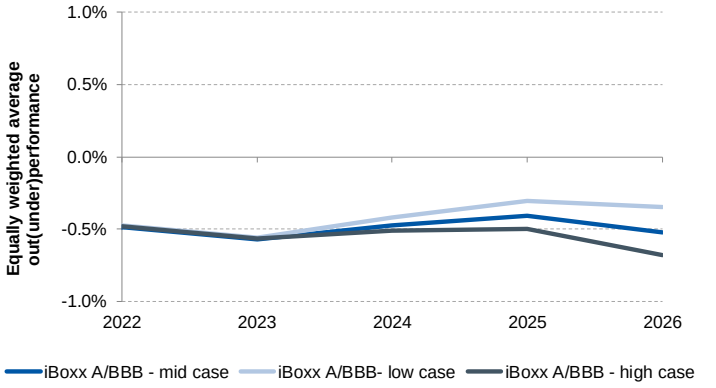
# We expect GDNs as a sector to underperform over RIIO-2 under a 15-20 year trombone mechanism, including derivatives

- We have modelled GDN's performance under an alternative trombone mechanism, ranging from 15 to 20 years.
- Our analysis shows that GD sector will underperform by 32 bps over RIIO-2 under our mid case (range of -23 to -40 bps depending on interest rate scenario), based on *debt-weighted average*, including effect of derivatives
- Based on *equally-weighted average* performance, GDNs will underperform by 49 bps over RIIO-2 under our mid case (range of -42 to -55 bps depending on interest rate scenario), including effect of derivatives
- GD sector performance is relatively invariant to the interest rate scenario as industry's embedded debt cost is largely fixed and new debt issuance is relatively low

**Sector underperforms by 32 bps in RIIO-2 (incl. derivatives) based on debt-weighted average performance, under our mid-case**



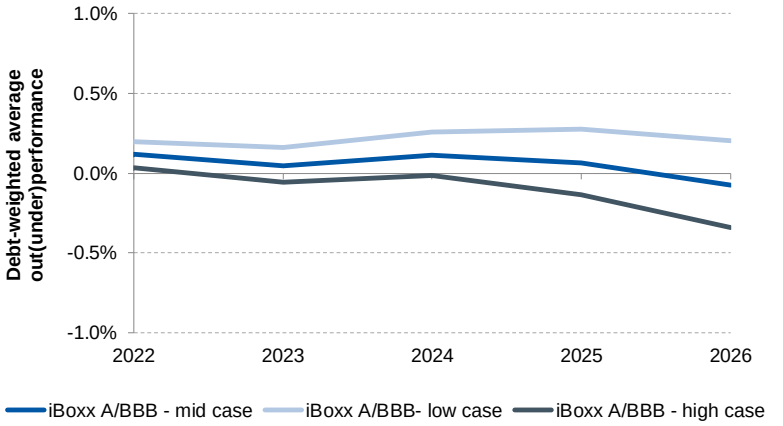

**Sector underperforms by 49 bps in RIIO-2 (incl. derivatives) based on simple average performance, under our mid case**



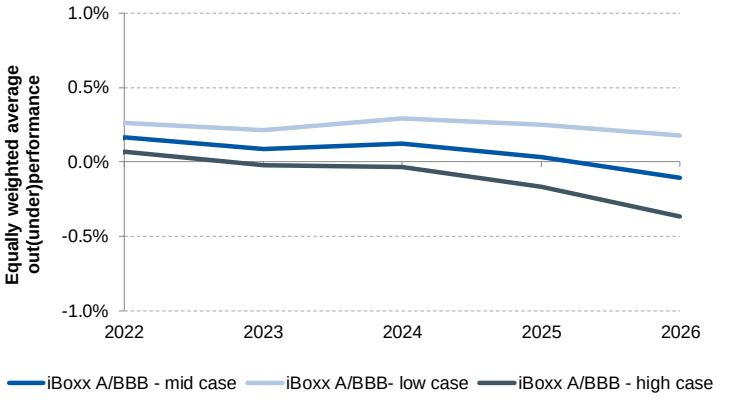
# If derivatives are excluded, we expect GDNs as a sector to outperform over RIIO-2 under a 15-20 year trombone mechanism

- If we remove the effect of derivatives, the sector would outperform by 5 bps over RIIO-2 (c.37 bps increase), based on *debt-weighted average*.
- Using the *equally-weighted average* performance, GDNs would outperform by 6 bps over RIIO-2 (c. 56 bps increase).

**Sector outperforms by 5 bps in RIIO-2 (excl. derivatives) based on debt-weighted average performance, under our mid-case**




**Sector outperforms by 6 bps in RIIO-2 (excl. derivatives) based on simple average performance, under our mid case**



# Appendix B | Calculating real cost of debt, including derivatives

# I. Our model accounts for derivatives held by the companies (both Inflation-Linked Swaps and Interest Rates Swaps) using a 3-step approach

**Step 1: Convert the nominal cost of debt (without derivatives) to a real cost of debt measure**

*nominal cost of debt (%)* $\xrightarrow{\text{Fisher Formula}}$ *real cost of debt (%)*

**Step 2: Compute swap interest rates in real terms**

**Interest Rate Swaps (IRS)**

IRS – receive leg

*nominal interest rate (%)* $\xrightarrow{\text{Fisher Formula}}$ *real interest rate (%)*

IRS – pay leg

*nominal interest rate (%)* $\xrightarrow{\text{Fisher Formula}}$ *real interest rate (%)*

IRS – net

*pay-leg real interest rate (%) - receive-leg real interest rate (%)*

**Inflation Linked Swaps (ILS)**

ILS – receive leg

*nominal interest rate (%)* $\xrightarrow{\text{Fisher Formula}}$ *real interest rate (%)*

ILS – pay leg

*real interest rate (%)*

ILS – net

*pay-leg real interest rate (%) - receive-leg real interest rate (%)*

**Step 3: Incorporate derivative interest into real cost of debt**

$$kD^{\text{with derivatives}} = kD^{\text{without derivatives}} + \frac{\text{Notional principal}}{\text{Total Nominal Debt}} * \text{net IRS interest} + \frac{\text{Notional accreted principal}}{\text{Total Nominal Debt}} * \text{net ILS interest}$$

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