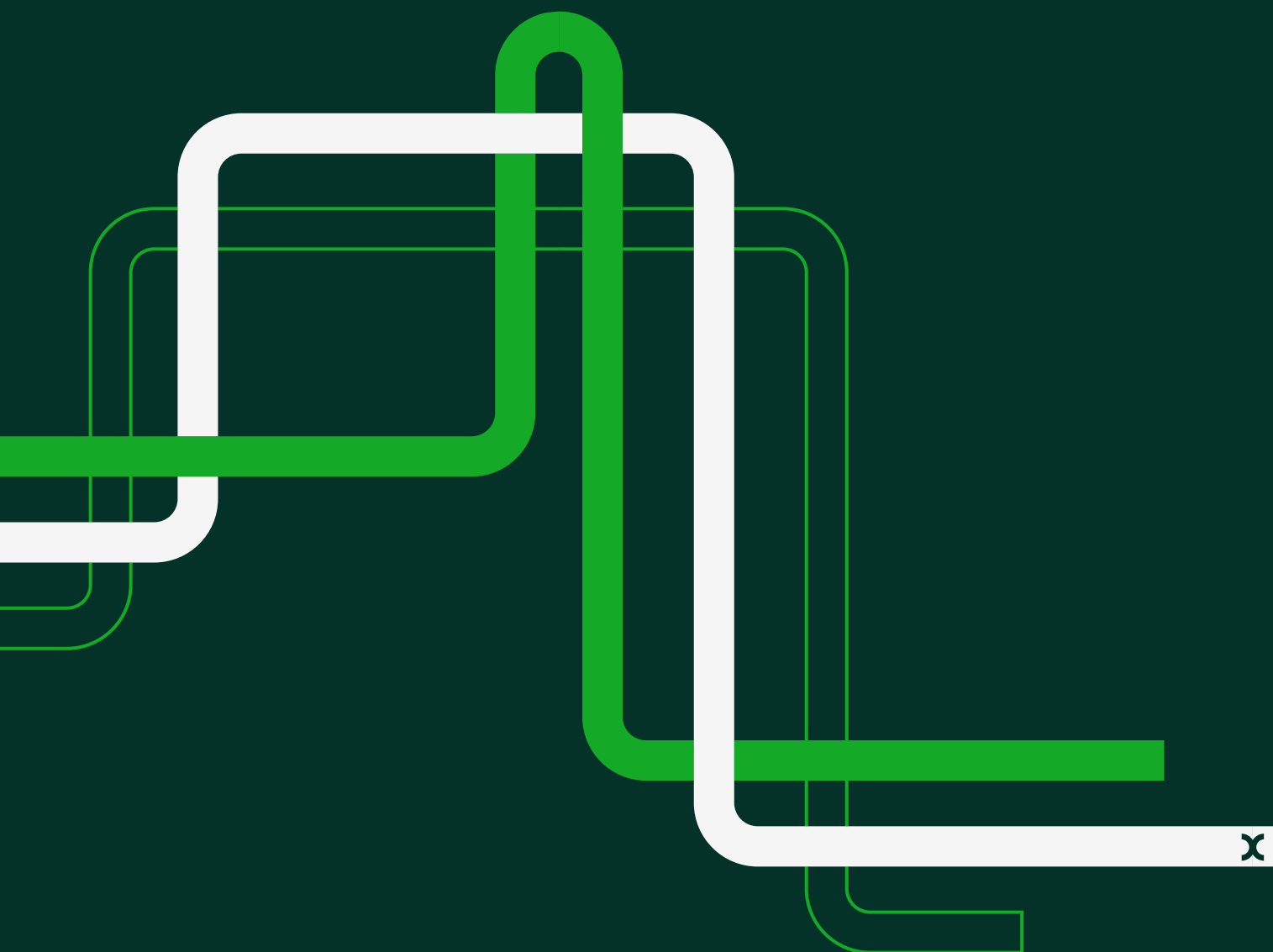


Regulatory precedents on inflation treatment and WACC allowance

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Executive summary

Following some of the challenges that have recently emerged around the use of the gross fixed assets deflator (the '*deflatore degli investimenti fissi lordi*' or '*deflatore*') as part of the tariff process, ARERA is considering possible alternatives to the treatment of inflation as part of its price controls for regulated energy networks.¹

In this context, ARERA has asked Oxera to undertake an assessment of relevant international regulatory precedents on the treatment of inflation in other price controls, with a specific reference to the approach taken to account for inflation in the Regulatory Asset Base (RAB).

Table 1 below provides an overview of how other regulators, primarily in the energy sector, set the weighted average cost of capital (WACC) allowance, specifically highlighting whether they use a real or a nominal rate of return. Moreover, the table summarises the treatment of inflation, with specific reference to whether the RAB is updated for inflation and indicating which index is used, where a real WACC is applied. More details on each of the regulatory precedents are provided in section 2.

¹ For more details, see ARERA (2024), 'Documento per la consultazione 340/2024/R/com', 30 July. See also Oxera (2024), 'Indicizzazione della RAB: principi e indici disponibili nel caso italiano', 30 July.

Table 1 WACC allowance and inflation treatment by country—regulatory precedents

Country	WACC allowance	Inflation treatment
Italy	Real, pre-tax	Revalued historical cost approach, with the RAB updated for inflation based on the gross fixed assets deflator (<i>'deflatore degli investimenti fissi lordi'</i>)
Great Britain ²	Real, vanilla	Regulatory Asset Value (RAV) based on historical cost approach, with full indexation to CPIH ³
Germany ⁴	<ul style="list-style-type: none"> • A nominal allowance applies to new assets (those capitalised after 2006) and debt-financed (old) assets • The cost of equity (Ke) for self-financed old assets is defined in real, pre-tax terms 	<ul style="list-style-type: none"> • Following an accounting reform, new assets (those from 1 January 2006) are added to the RAB based on their accounting value, and a nominal return applies • No adjustment for inflation for 'new' assets. Self-financed assets added to the RAB before 2006 are valued using a replacement cost approach (multiplying the historical values by specific inflation indices) and receive a real rate of return, while debt-financed assets are valued using their historical costs

² Ofgem (2021), '[RIIO-2 Final Determinations – Finance Annex \(REVISED\)](#)', February. Ofgem (2022), '[RIIO-ED2 Final Determinations Finance Annex](#)', November.

³ CPIH stands for Consumer Price Index including Housing costs, i.e. it includes a measure of owner-occupiers' housing costs.

⁴ Bundesnetzagentur, '[Beschlüsse Eigenkapitalzinssatz](#)'. DNV (2023), '[Study on the Regulation of Electricity & Gas System Operators](#)', 7 April. Bundesministerium der Justiz (2007), '[Ordinance on the incentive regulation of energy supply networks \(Incentive Regulation Ordinance - ARegV\)](#)', October. For electricity networks, see '[Verordnung über die Entgelte für den Zugang zu Elektrizitätsversorgungsnetzen \(Stromnetzentgeltverordnung - StromNEV\)](#)'. For gas networks, see '[Verordnung über die Entgelte für den Zugang zu Gasversorgungsnetzen \(Gasnetzentgeltverordnung - GasNEV\)](#)'.

Country	WACC allowance	Inflation treatment
France ⁵	<ul style="list-style-type: none"> GT, GD and storage: in the new regulatory periods (2024–27), a nominal, pre-tax WACC will apply for 'new' assets (those entering into operation after 1 January 2023 for GT and gas storage, and after 1 July 2023 for GD).⁶ A real, pre-tax WACC was applied to all assets in the previous regulatory periods (which just expired in mid-2024)⁷ and continues to apply for 'old' assets in the current periods ET and ED: nominal, pre-tax WACC for the current regulatory periods, expiring in July 2025. A nominal margin on RAB applies for ED 	<ul style="list-style-type: none"> GT, GD and storage: an historical cost approach, with the RAB updated for inflation on the basis of the consumer price index (CPI) excluding tobacco applied in the previous regulatory periods.⁸ In the latest price controls, this approach remains in place for 'old' assets, while new assets (i.e. those entering into operation after 1 January 2023 for GT and storage, and after 1 July 2023 for GD) will be added to the RAB based on their book value ET and ED: accounting RAB

⁵ CRE (2024), '[Deliberation no. 2024-22. Deliberation of the French Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the natural gas transmission networks of GRTgaz and Teréga](#)', 30 January. CRE (2024), '[Délibération N°2024-40. Délibération de la Commission de régulation de l'énergie du 15 février 2024 portant décision sur le tarif péréqué d'utilisation des réseaux publics de distribution de gaz naturel de GRDF](#)', 15 February. CRE (2024), '[Deliberation no. 2024-21 Deliberation of the French Energy Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the underground natural gas storage infrastructures of Storengy, Teréga and Géométhane](#)', 30 January. CRE (2021), '[DELIBERATION N°2021-12. Deliberation of the French Energy Regulatory Commission of 21 January 2021 deciding on the tariffs for the use of public transmission electricity grids \(TURPE 6 HTB\)](#)', 21 January. CRE (2021), '[DELIBERATION N°2021-13. Deliberation of the French Energy Regulatory Commission of 21 January 2021 on the tariffs for the use of public distribution electricity grids \(TURPE 6 HTA-BT\)](#)', 21 January.

⁶ According to the approach used by the CRE, assets are 'conventionally' added to the RAB on 1 January (for GT and gas storage) or on 1 July (for GD) of the year after the one they entered into operation.

⁷ For GT and gas storage, the regulatory period expired on 31 March 2024. For GD, the regulatory period expired on 30 June 2024.

⁸ Specifically, the CRE uses the '[indice 1763852 des prix à la consommation hors tabac, pour l'ensemble des ménages résidant en France](#)'. INSEE, '[Indice des prix à la consommation - Base 2015 - Ensemble des ménages - France - Ensemble hors tabac](#)', March.

Country	WACC allowance	Inflation treatment
Netherlands ⁹	<ul style="list-style-type: none"> GT and GD: nominal, pre-tax (from 2022). In its latest price controls (2022–26), the ACM switched from a real to a nominal regulatory system (for the whole RAB), as one of the tools to manage asset-stranding risk ET and ED: real-plus, pre-tax WACC (from 2022), derived by removing half of the estimated inflation from the nominal WACC¹⁰ 	<ul style="list-style-type: none"> GT and GD: no inflation indexation for the RAB from the latest price controls ET and ED: the RAB is updated for inflation based on the CPI, based on half of the forecast CPI for the period 2022–26,¹¹ instead of outturn CPI as done until 2021
Spain ¹²	<ul style="list-style-type: none"> GT, ET, ED: nominal, pre-tax GD: no explicit WACC applied¹³ 	<ul style="list-style-type: none"> GT, ET and ED: no updates for inflation for the RAB GD: no RAB in the regulatory framework
Portugal ¹⁴	Nominal, pre-tax rate of return (RoR)	RAB valued at the acquisition cost of the assets (historical cost approach), with no indexation to inflation
Ireland ¹⁵	Real, pre-tax allowance, derived using a mix of German inflation (for the cost of debt and the risk-free rate) and eurozone inflation (for the total market return)	Replacement cost approach, with historical costs indexed for inflation, based on the Irish HICP ¹⁶

⁹ ACM (2023), '[Gewijzigd methodebesluit GTS 2022-2026](#)', 14 December. ACM (2023), '[Gewijzigd methodebesluit regionale netbeheerders gas 2022-2026](#)', 14 December. ACM (2023), '[Gewijzigd methodebesluit transporttaken TenneT 2022-2026](#)', 14 December. ACM (2023), '[Gewijzigd methodebesluit regionale netbeheerders elektriciteit 2022-2026](#)', 14 December.

¹⁰ In other words, 50% of inflation is compensated through the WACC, and 50% through the RAB.

¹¹ The ACM clarified that the estimated CPI will not be updated with outturn CPI when this will be available.

¹² CNMC (2019), '[Circular 2/2019](#)', 12 November. CNMC (2021), '[Circular 9/2019](#)', 12 December. CNMC (2020), '[Circular 4/2020](#)', 31 March. CNMC (2019), '[Circular 5/2019](#)', 5 December. CNMC (2019), '[Circular 6/2019](#)', 5 December.

¹³ The regulatory framework does not consist of a RAB–WACC model. Revenues for GD operators are set looking at different building blocks, e.g. base remuneration (RDE), revenues for market development (RDM) and transitional distribution revenue (RTD).

¹⁴ ERSE (2021), '[Parâmetros de regulação para o período 2022 a 2025](#)', December. ERSE (2019), '[Parâmetros de regulação para o período de 2020 a 2023](#)', May. ERSE (2023), '[Parâmetros de regulação para o período de 2024 a 2027](#)', June.

¹⁵ CRU (2020), '[Price Preview 5 \(PR5\) – 2021-2025. Distribution System Operator Revenue for 2021-2025. Draft Determination Paper](#)', 22 July. CRU (2020), '[Price Review Five \(PR5\) – 2021-2025, TSO and TAO Transmission Revenue for 2021 – 2025, Draft Determination Paper](#)', 22 July. CRU (2023), '[Gas Transmission Tariffs Article 30 Tariff Network Code Information 2023/2024, Information Paper](#)', 8 September. CRU (2023), '[Decision on October 2022 to September 2027 Distribution Revenue for Gas Networks Ireland, Decision Paper](#)', 20 December.

¹⁶ Harmonised Index of Consumer Prices.

Country	WACC allowance	Inflation treatment
Northern Ireland ¹⁷	<ul style="list-style-type: none"> • GT: CPI-real, vanilla WACC for GNI (UK)¹⁸ • GD: CPIH-real, pre-tax, for PNGL¹⁹ and firmus; CPIH-real, vanilla for SGN²⁰ • ET and ED: RPI-real, pre-tax, for Northern Ireland Electricity Networks, for the current regulatory period (2017–25), while the Utility Regulator has proposed using a CPIH-real vanilla WACC for the next control period (2025–31). For SONI,²¹ a CPIH-real WACC applies 	<ul style="list-style-type: none"> • GT: capital allowances for GNI (UK) subject to a separate methodology, treated outside of the price control (because of a peculiar regulatory framework for GT) • GD: the RAB is adjusted for inflation based on CPIH (in the previous control period GT17, the general measure of inflation was the RPI) • ET and ED: for Northern Ireland Electricity Networks, the closing RAB at the end of a given year is updated for inflation, based on RPI for the current regulatory period, but the regulator has proposed to transition to a CPIH indexation for the next control period. SONI has a RAB indexation based on CPIH
Austria ²²	<ul style="list-style-type: none"> • GT: nominal, pre-tax WACC for 'new' assets (those built from 2021). For 'old' assets (those built until the end of 2020) there is a distinction between: (i) debt-financed assets, which are subject to a nominal allowance; and (ii) equity-financed assets for which a real, pre-tax cost of equity applies • GD, ET and ED: nominal, pre-tax WACC allowance 	<ul style="list-style-type: none"> • GT: accounting RAB for new assets and old debt-financed assets. For the remaining subset of old assets (equity-financed), the RAB is updated for inflation. This appears to be done using the same inflation rate used for the WACC • GD, ET and ED: no update for inflation for the RAB

¹⁷ UR (2022), '[Price Control for Northern Ireland's Gas Transmission Networks GT22. Final Determination](#)', 20 May. UR (2022), '[GD23 - Gas Distribution Price Control 2023-2028. Final Determination – Main Report](#)', October. UR (2023), '[Northern Ireland Electricity Networks Ltd Transmission and Distribution 7th Price Control \(RP7\). Draft Determination – Main Report](#)', November. UR (2017), '[Northern Ireland Electricity Networks Ltd Transmission & Distribution 6th Price Control \(RP6\). Final determination](#)', 30 June. UR (2020), '[SONI price control 2020-2025. Final Determination](#)', 21 December.

¹⁸ GNI (UK) indicates Gas Networks Ireland, the Transmission System Operator active in Northern Ireland.

¹⁹ PNGL indicates Phoenix Natural Gas Limited.

²⁰ SGN indicates Scotia Gas Networks Natural Gas Northern Ireland Ltd.

²¹ SONI is the operator of the transmission network, which is responsible for planning and operating the transmission system in Northern Ireland.

²² E-Control, '[METHODOLOGY PURSUANT TO SECTION 82 GASWIRTSCHAFTSGESETZ \(GAS ACT. GWG\) 2011 FOR THE FOURTH PERIOD FOR TRANSMISSION SYSTEMS OF AUSTRIAN GAS TRANSMISSION SYSTEM OPERATORS \(TSOS\)](#)'. E-Control (2022), '[Gas DSO regulatory regime for the fourth regulatory period 1 January 2023 – 31 December 2027](#)', 4 November. E-Control (2022), '[Regulierungssystematik für die Strom-Übertragungsnetzbetreiber 1. Jänner 2023 - 31. Dezember 2028](#)', 17 November. E-Control (2018), '[Electricity Distribution System Operators 1 January 2019 - 31 December 2023 Regulatory Regime for the Fourth Regulatory Period](#)', December. E-Control (2023), '[Regulierungssystematik für die fünfte Regulierungsperiode der Stromverteilernetzbetreiber 1. Jänner 2024 - 31. Dezember 2028](#)', 31 October.

Country	WACC allowance	Inflation treatment
New Zealand ²³	Nominal, pre-tax	<ul style="list-style-type: none"> GD, GT and ED: the RAB is annually updated based on the CPI forecast inflation, however a mechanism is in place to avoid double-counting inflation (forecast revaluation of the RAB is not included in the allowed revenues). When rolling forward, the RAB is then revalued by using actual instead of forecast inflation ET: for the next price control (RCP4, starting in April 2025) the RAB will be treated with the same mechanism applied for the other sectors. Currently, Transpower's RAB is not indexed to inflation
England and Wales—water ²⁴	Real, pre-tax WACC allowance	Regulatory Capital Value (RCV) indexed to outturn inflation. In PR19 (the current price control), Ofwat moved away from RPI, adopting CPIH as its inflation index, and decided to implement the change with a phased transition. Therefore, the indexation is done using (i) RPI for 50% of the existing RCV as of 1 April 2020, and (ii) CPIH for the remaining share of the existing RCV and all new assets added from 1 April 2020

Note: GT indicates gas transmission, GD indicates gas distribution, ET indicates electricity transmission, and ED indicates electricity distribution.

Source: Oxera analysis based on various regulatory determinations. More details on the various precedents are provided in the remainder of this report.

²³ NZCC (2023), ['Cost of capital topic paper. Part 4 Input Methodologies Review 2023 – Final decision'](#), 13 December. NZCC (2016), ['Input methodologies review draft decisions. Topic paper 1: Form of control and RAB indexation for EDBs, GPBs and Transpower'](#), 16 June. NZCC (2023), ['Financing and incentivising efficient expenditure during the energy transition topic paper. Part 4 Input Methodologies Review 2023 – Final decision'](#), 13 December.

²⁴ Ofwat (2019), ['PR19 final determinations: Overview of companies' final determinations'](#), December. Ofwat (2019), ['PR19 final determinations: Allowed return on capital technical appendix'](#), December.

1 Introduction

In light of recent challenges that have emerged around the use of the gross fixed assets deflator (the '*deflatore degli investimenti fissi lordi*' or '*deflatore*') as part of the tariff process, in particular given the relevance of most recent revisions of historical data carried out by the *Istituto Nazionale di Statistica* (Istat),²⁵ ARERA is considering possible alternatives to the treatment of inflation as part of its price controls for regulated energy networks.

In this context, ARERA has asked Oxera to undertake an assessment of international regulatory precedents on the treatment of inflation in other price controls, with a specific reference to the approaches used to ensure that inflation is taken into account in the Regulatory Asset Base (RAB).

In the remainder of this report, we provide an overview of how other energy regulators set the weighted average cost of capital (WACC) allowance for energy networks in Europe, specifically highlighting whether they use a real or a nominal rate of return. Moreover, we summarise the treatment of inflation, with a specific reference to whether the RAB is updated for inflation and indicating which index is used for the indexation, where a real WACC is applied.

Finally, we examine case studies of regulators deciding to transition from a real to a nominal WACC allowance or to change the inflation index used to update the RAB. Given the relevance in this respect, we review two additional precedents beyond European energy networks: the approach used for energy networks in New Zealand and for water networks in England and Wales. The different international precedents are examined in turn in the remainder of this report.

²⁵ For details, see ARERA (2024), 'Documento per la consultazione 340/2024/R/com', 30 July.

2 Review of key regulatory precedents

This section provides an overview of the approach taken by different regulators to account for inflation in their price controls for regulated networks. In general, there are two options:

- adopting a real WACC, applied to a RAB indexed for inflation (e.g. on the basis of a revalued historical cost approach);
- adopting a nominal WACC, applied to a RAB expressed at its accounting value (e.g. historical cost).

The remainder of this section discusses the treatment of inflation, with a specific reference to the RAB, for energy networks in (i) Great Britain (sub-section 2.1), (ii) Germany (sub-section 2.2), (iii) France (sub-section 2.3), (iv) the Netherlands (sub-section 2.4), (v) Spain (sub-section 2.5), (vi) Portugal (sub-section 2.6), (vii) Ireland (sub-section 2.7), (viii) Northern Ireland (sub-section 2.8) and (ix) Austria (sub-section 2.9). Moreover, it provides an overview of the regime applicable to energy networks in New Zealand (sub-section 2.10) and water networks in England and Wales (sub-section 2.11).

2.1 Great Britain: Ofgem

2.1.1 WACC allowance and inflation treatment

In the current regulatory period (RIIO-2),²⁶ **Ofgem defines the WACC allowance in real terms.** The Regulatory Asset Value ('RAV') is therefore indexed to inflation. Specifically, **the RAV is defined on the basis of a historical cost approach, with full indexation to CPIH** (Consumer Price Index including owner-occupiers' housing costs).²⁷

2.1.2 Transition from RPI to CPIH

While the indexation of the RAV had been in use in previous price controls, in 2018, Ofgem decided to **move away from the Retail Price Index (RPI) as an inflation index and use CPIH** instead for the calculation of the RAV and allowed returns.²⁸ The transition occurred at the beginning of the RIIO-2 price controls for all energy networks, i.e. from April 2021 for electricity

²⁶ RIIO stands for Revenue = Incentives + Innovation + Outputs.

²⁷ Ofgem (2021), '[RIIO-2 Final Determinations – Finance Annex \(REVISED\)](#)', 3 February. Ofgem (2022), '[RIIO-ED2 Final Determinations Finance Annex](#)', 30 November.

²⁸ Ofgem (2018), '[RIIO-2 Framework Decision](#)', July, p. 49. Ofgem (2021), '[RIIO-2 Final Determinations – Finance Annex \(REVISED\)](#)', 3 February, section 9.

transmission (ET), gas transmission (GT) and gas distribution networks (GD), and from April 2023 for electricity distribution networks (ED).²⁹

This move was primarily a result of the Office for National Statistics' decision to move away from the RPI and adopt the CPIH as its headline measure for inflation. Ofgem's decision was also informed by other UK regulators, such as Ofwat, which had previously signalled a shift from RPI to CPIH as the inflation index for its price controls (see also section 2.11).

The Consumer Price Index (CPI), which is very similar to the CPIH but without the imputed housing costs, had also been considered by Ofgem as a substitute for the RPI, especially because it was already being used as the key inflation index by other UK regulators such as the Office of Communications (Ofcom), the Office of Rail and Road (ORR) and the Water Industry Commission for Scotland (WICS).³⁰ Moreover, at the time of the Framework decision, HM Treasury was setting the inflation target for the Bank of England using the CPI. While both the CPI and CPIH have evolved similarly over time and were numerically very close at the time of the Framework Decision, Ofgem finally decided to adopt CPIH instead of CPI as the former is a more comprehensive measure of household inflation.³¹

As part of this indexation change, Ofgem had proposed two options for the transition in its Framework Consultation:

- an **immediate, point-in-time switch** at the beginning of the RIIO-2 period;
- a **phased transition**, similar to the one followed by Ofwat when transitioning to CPIH in PR19.³² Ofwat's chosen methodology was to index revenues to CPIH from the beginning of PR19 while the indexation of the Regulatory Capital Value ('RCV') would be indexed in phases—50% of the RCV as of 1 April 2020 would be indexed to RPI with the remaining 50%, and all new RCV, to be indexed to CPIH.³³

²⁹ The current price control for the ET, GT and GD sectors and the electricity system operator (ESO) covers the period from 1 April 2021 to 31 March 2026, while the current price control for ED networks covers the period from 1 April 2023 to 31 March 2028.

³⁰ Ofgem (2018), '[RIIO-2 Framework Decision](#)', July, paras 6.88–6.90.

³¹ *Ibid.*, paras 6.98–6.99.

³² Ofgem (2018), '[RIIO-2 Framework Consultation](#)', March, para. 7.98. CEPA (2018), '[Review of cost of capital ranges for Ofgem's RIIO-2 for onshore networks](#)', February, pp. 83–84.

³³ Ofwat (2016), '[Water 2020: our regulatory approach for water and wastewater services in England and Wales](#)', May, p. 5.

Ofgem's final decision was to adopt an immediate switch to CPIH.³⁴ First, Ofgem highlighted that an immediate switch would contribute to offsetting a step reduction in equity cost allowances which would otherwise lead to a significant reduction in the cash flows available to the companies (since CPI/CPIH was lower than the RPI by around 100 bps). Second, over the entire RIIO-2 period, the upward pressure on consumer charges as a result of the switch to CPIH would be offset by a downward pressure due to the lower cost of capital allowances. Therefore, Ofgem considered that the increased benefit to consumers from a phased transition was not high enough to justify it.

During the consultation phase, energy networks raised a number of issues and concerns, including the following.

- **Net present value neutrality.** Some networks highlighted that switching between inflation indices should be done in a way that would ensure net present value (NPV) neutrality, i.e. the present value of future (net) cash flows should be equivalent under CPIH as they would have been under RPI.³⁵ For assets with long useful lives, changing the inflation index significantly changes the timing of future cash flows, and hence affects the valuation of the company in the intervening time. This might not be aligned to the interests of the company's current investors.
- **Potential impact on the cost of equity.** If there is a stronger investor preference for RPI-linked securities as compared to CPIH-linked securities, a shift from RPI to CPIH could result in a higher cost of equity for networks. In light of this, some networks considered that a premium should be applied on the allowed cost of equity to offset this effect.
- **Liquidity of gilt and bond market.** Some networks argued that moving to CPIH in the absence of a liquid CPIH-linked gilt and bond market would create difficulties.³⁶
- **Potential impact on hedging strategies.** Considering that networks held a large amount of RPI-linked debt in order to hedge against RPI-linked allowed revenues, some operators highlighted that shifting to CPIH for the calculation of allowed revenues would make this strategy ineffective and would leave networks with a large volume of RPI-linked debt which they might find difficult to service with their CPIH-linked allowed revenues.³⁷

³⁴ Ofgem (2018), '[RIIO-2 Sector Specific Methodology Annex: Finance](#)', 18 December, para. 6.6. Ofgem (2021), '[RIIO-2 Final Determinations – Finance Annex \(REVISED\)](#)', 3 February, p. 110.

³⁵ Ofgem (2018), '[RIIO-2 Framework Decision](#)', July, para. 6.92.

³⁶ Ofgem (2018), '[RIIO-2 Sector Specific Methodology Annex: Finance](#)', 18 December, para. 6.7.

³⁷ *Ibid*, paras 6.8–6.9.

However, Ofgem disagreed with these concerns, primarily on the basis of the increased benefit to consumers in terms of financeability of the sector as a result of moving to CPIH. Additionally, it estimated that less than 30% of total network company debts were RPI-linked and therefore did not form a major portion of the entire debt. Furthermore, Ofgem did not consider that the transition from RPI to CPIH would have a material impact on the networks' ability to hedge their cash flows.³⁸

The implications of Ofgem's decision to shift from RPI to CPIH had impacts on the allowed returns through changes in the allowed cost of debt (K_d) and cost of equity (K_e), as well as the RAV indexation. These are discussed further in Box 2.1 below.



Box 2.1 Changes in the cost of capital and RAV treatment to facilitate a shift to CPIH

Cost of equity. The transition to CPIH affected the following parameters:

- **risk-free rate (RFR):** an RPI–CPIH wedge (using the difference between RPI and CPI forecasted by the Office for Budget Responsibility as a proxy) was used to convert the RPI-real RFR estimate to CPIH-real terms;³⁹
- **total market return (TMR):** CPIH-real TMR of 6.25%–6.75% was calculated;⁴⁰
- **beta:** there was no effect on the beta estimation.

Cost of debt. A total additional allowance of 5 bps was given for new CPIH debt issuance and embedded debt based on:⁴¹

- an additional allowance for new CPIH debt based on the assumption of 30 bps additional cost of debt multiplied by a 30% index-linked debt (ILD) debt assumption multiplied by the average portion of new debt over RIIO-2;

³⁸ Ofgem (2018), '[RIIO-2 Sector Specific Methodology Annex: Finance](#)', 18 December, paras 6.8–6.9. For a similar discussion on the potential impact of transitioning from RPI to CPI/CPIH for water networks see also Oxera (2016), '[Indexation of future price controls in the water sector](#)', 31 March.

³⁹ Ofgem (2018), '[RIIO-2 Sector Specific Methodology Annex: Finance](#)', 18 December, para. 3.47.

⁴⁰ Ibid., para. 3.84.

⁴¹ Ofgem (2021), '[RIIO-2 Final Determinations – Finance Annex \(REVISED\)](#)', 3 February, paras 2.24–2.25.

- a second allowance to manage basis risk between RPI and CPIH debt. This is calculated as 10–15 bps multiplied by 30% ILD debt assumption multiplied by the average portion of embedded debt over RIIO-2.

Regulated Asset Value. The following parameters were affected.

- **RAV:** the RIIO-2 opening balances were determined on the basis of the RIIO-2 closing balances (a provisional closing balance was used until the final RIIO-1 closing RAV balances were settled).⁴² The only change for the RAV calculation was in the shift from using RPI to CPIH for the indexation starting from 2021.
- **Depreciation:** there was no change to the depreciation policy, which would continue to be done on the basis of economic asset lives.

Source: Oxera based on Ofgem (2018), '[RIIO-2 Sector Specific Methodology Annex: Finance](#)', 18 December. Ofgem (2021), '[RIIO-2 Final Determinations – Finance Annex \(REVISED\)](#)', 3 February.

2.2 Germany: Bundesnetzagentur (BNetzA)

2.2.1 WACC allowance and inflation treatment

For energy networks in Germany there is a distinction between old and new assets, which are subject to different treatments, both for the allowed return and the calculation of the RAB.

Specifically, assets capitalised before 1 January 2006 are referred to as 'old assets', while assets capitalised from 1 January 2006 onwards are referred to as 'new assets'.⁴³ This distinction is a result of an accounting reform that took place in 2006.⁴⁴

For new assets, the depreciation is computed on the basis of the assets' historical costs. For old assets, there is a distinction between:

⁴² Ofgem (2021), '[RIIO-2 Final Determinations – Finance Annex \(REVISED\)](#)', 3 February, p. 118.

⁴³ For electricity networks, see [Verordnung über die Entgelte für den Zugang zu Elektrizitätsversorgungsnetzen \(Stromnetzentgeltverordnung - StromNEV\), § 6](#), para. 1. For gas networks, see [Verordnung über die Entgelte für den Zugang zu Gasversorgungsnetzen \(Gasnetzentgeltverordnung - GasNEV\), § 6](#), para. 1.

⁴⁴ DNV (2023), '[Study on the Regulation of Electricity & Gas System Operators](#)', 7 April, p. 73.

- **self-financed assets**, for which depreciation is computed based on a replacement cost approach. The replacement cost is derived by multiplying the historical value by specific inflation indices published by the Federal Statistical Office.⁴⁵ Different and usually composite indices apply depending on the asset types (e.g. buildings, cables, overhead lines, stations, other assets for electricity networks).⁴⁶ More details on the specific indices used for electricity networks are provided in Box 2.2;
- **debt-financed assets**, for which depreciation is computed on the basis of the assets' historical costs.⁴⁷



Box 2.2 Inflation indices used to derive the replacement cost of self-financed (old) assets—electricity networks

Different (usually composite) indices apply depending on the asset types: (i) buildings, (ii) cables, (iii) overhead lines, (iv) stations or (v) other assets. The indices used for the different asset types are described below.

Land and buildings. The 'commercial buildings, construction work on buildings, excluding VAT' index is used.

Cables. A composite index is used. This is derived by combining (i) the 'local sewers, construction work on buildings (civil engineering), excluding VAT' index (with a weight of 70%), and (ii) the 'other electrical conductors for a voltage of more than 1,000 volts' index (with a weight of 30%).

Overhead lines. A composite index is used. This is derived by combining (i) the 'local sewers, construction work on buildings (civil engineering), excluding VAT' index (with a weight of 50%), (ii) the 'other electrical conductors for a voltage of more than 1,000 volts' index (with a weight of 15%), and (iii) the 'towers and pylons, made of iron or steel' index (with a weight of 35%).

Stations. A composite index is used. This is derived by combining (i) the 'local sewers, construction work on buildings (civil engineering), excluding VAT' index (with a weight of 35%), and

⁴⁵ [StromNEV, § 6](#), paras 2–3. [GasNEV, § 6](#), paras 2–3.

⁴⁶ [StromNEV, § 6a](#). [GasNEV, § 6a](#).

⁴⁷ [StromNEV, § 6](#), para. 2. [GasNEV, § 6](#), para. 2.

(ii) the producer price index for the whole industry (excluding petroleum products) (with a weight of 65%).

Other assets. The producer price index for the whole industry (excluding petroleum products) is used.

StromNEV, § 6a also provides guidance on the indices that need to be used in cases where the indices listed above are not available for the relevant years.

Source: Oxera based on [StromNEV, § 6a](#).

Similarly, this distinction is reflected in the approach used to set the allowed return. In particular, **a different cost of equity (K_e) applies for new and old assets**. The K_e values are defined in the specific decisions for electricity and gas networks. The K_e for new assets is defined in nominal, pre-tax terms, while the K_e for old assets is defined in real, pre-tax terms.

Based on the methodology described in the most recent decisions, the K_e for old assets is derived by adjusting the nominal K_e applied to new assets for inflation, specifically by removing the average rate of price change over the last ten calendar years (based on the CPI published by the *Statistischen Bundesamt*, the Federal Statistical Office) and adjusting this value for corporate tax.⁴⁸

2.3 France: Commission de régulation de l'énergie (CRE)

In the current regulatory periods (starting in 2024 for four years for gas networks, and starting in 2021 for four years for electricity networks), different methodologies are in place for the calculation of the WACC and the treatment of the RAB for gas and electricity networks in France.

For gas networks (transmission, distribution and storage), assets that enter the RAB from 2024 onwards are valued at their book value, a nominal WACC is applied and they are not indexed to inflation; for old assets, i.e. those that entered in the RAB before 2024, a real WACC is applied and they are

⁴⁸ [StromNEV, § 7](#), para. 4. [GasNEV, § 7](#), para. 4. BNetzA (2021), '[Beschluss für die vierte Regulierungsperiode für Elektrizitätsnetzbetreiber \(BK4-21-055\)](#)', October, pp. 48–49. BNetzA (2021), '[Beschluss für die vierte Regulierungsperiode für Gasnetzbetreiber \(BK4-21-056\)](#)', October, pp. 48–49.

indexed to inflation. For electricity networks, a nominal WACC is used and the whole RAB is not indexed to inflation.

2.3.1 Gas networks (transmission, distribution and storage)

WACC allowance and inflation treatment

In the current regulatory regime for GT, GD and gas storage in France, a different WACC is used to remunerate the assets, depending on the date on which they are added to the RAB.⁴⁹ Specifically, **a real pre-tax WACC is applied for assets added to the RAB before 2024**, these are therefore indexed for inflation. **A nominal WACC applies for assets that enter the RAB from 2024 onwards**, with no indexation of the RAB.

This is different from the methodology used in the previous regulatory periods, where a real WACC was used with the full RAB being indexed to inflation. Additionally, the process of calculating the allowed rate of return (WACC) was also changed in the latest regulatory periods.⁵⁰

In its final decisions for the current periods, i.e. ATRT8 (for GT, starting from 1 April 2024), ATRD7 (for GD, starting from 1 July 2024), and ATS3 (for gas storage, starting from 1 April 2024), all lasting four years, the regulator, CRE, announced that it was changing its WACC calculation methodology to take into account more recent economic data.⁵¹ The real WACC would be

⁴⁹ CRE (2024), '[Deliberation no. 2024-22. Deliberation of the French Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the natural gas transmission networks of GRTgaz and Teréga](#)', 30 January, p. 3. CRE (2024), '[Délibération N°2024-40. Délibération de la Commission de régulation de l'énergie du 15 février 2024 portant décision sur le tarif péréqué d'utilisation des réseaux publics de distribution de gaz naturel de GRDF](#)', 15 February, p. 4. CRE (2024), '[Deliberation no. 2024-21 Deliberation of the French Energy Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the underground natural gas storage infrastructures of Storengy, Teréga and Géométhane](#)', 30 January, p. 3.

⁵⁰ Specifically, the WACC methodology has been adjusted to take into account also short-term fluctuations, instead of only relying on the average of rates observed over the last ten years as done in previous regulatory periods. CRE (2024), '[Deliberation no. 2024-22. Deliberation of the French Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the natural gas transmission networks of GRTgaz and Teréga](#)', 30 January, p. 3. CRE (2024), '[Délibération N°2024-40. Délibération de la Commission de régulation de l'énergie du 15 février 2024 portant décision sur le tarif péréqué d'utilisation des réseaux publics de distribution de gaz naturel de GRDF](#)', 15 February, p. 3, CRE (2024), '[Deliberation no. 2024-21 Deliberation of the French Energy Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the underground natural gas storage infrastructures of Storengy, Teréga and Géométhane](#)', 30 January, p. 4.

⁵¹ CRE (2024), '[Deliberation no. 2024-22. Deliberation of the French Regulatory Commission of 30 January 2024 on the decision on the tariff for the used of the natural gas transmission networks of GRTgaz and Teréga](#)', 30 January, p. 3. CRE (2024), '[Délibération N°2024-40. Délibération de la Commission de régulation de l'énergie du 15 février 2024 portant décision sur le tarif péréqué d'utilisation des réseaux publics de distribution de gaz naturel de GRDF](#)', 15 February, p. 3, CRE (2024), '[Deliberation no. 2024-21 Deliberation of the French Energy Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the underground natural gas storage infrastructures of Storengy, Teréga and Géométhane](#)', 30 January, p. 3.

calculated as a weighted average of the long- and short-term historical parameters (weighted on the basis of the share of historical and new assets) to better reflect the conditions estimated to prevail in the new regulatory period. By taking into account only long-term historical data as done in the previous regulatory period, CRE considered that the WACC would not have accurately reflected the financing costs for new assets in the conditions expected over the new regulatory period. Therefore, the new methodology of taking into account both short- and long-term data was considered to be more appropriate.

Transition from real to nominal WACC for new investments

In its decisions for the latest regulatory periods for GT (ATRT8), GD (ATRD7) and gas storage networks (ATS3),⁵² CRE has highlighted that the key challenge that gas networks are expected to face going forward is the continued reduction of natural gas consumption, while the size of the necessary infrastructure will only partially decrease in comparison. Moreover, further developments on the gas networks may be necessary to accommodate the transition to renewable and low-carbon gases.⁵³ As a result, the costs associated with gas networks are not expected to decline as much or as rapidly as the consumption of gas. This would therefore translate into higher costs that would need to be borne by a smaller user base (the 'scissor effect'). Moreover, CRE highlighted how a reduction in gas demand could also lead to asset-stranding risks.⁵⁴ In order to mitigate this risk, CRE presented three options as part of the public consultation process:

- moving from a real WACC to a nominal WACC, which in turn would imply that the RAB is no longer indexed to inflation;
- switching to a declining balance depreciation method (which is higher in the beginning and then reduced in later years) in order to

⁵² The ATRT8 price control for gas transmission networks started on 1 April 2024, covering the calendar years from 2024 to 2027. The ATRD7 price control for gas distribution networks started on 1 July 2024, covering the period 2024–27. The ATS3 price control for gas storage networks started on 1 April 2024, covering the period 2024–27.

⁵³ CRE (2024), '[Deliberation no. 2024-22. Deliberation of the French Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the natural gas transmission networks of GRTgaz and Teréga](#)', 30 January, pp. 13–14. CRE (2024), '[Délibération N. 2024-40. Délibération de la Commission de régulation de l'énergie du 15 février 2024 portant décision sur le tarif péréqué d'utilisation des réseaux publics de distribution de gaz naturel de GRDF](#)', 15 February, p. 18. CRE (2024), '[Deliberation no. 2024-21 Deliberation of the French Energy Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the underground natural gas storage infrastructures of Storengy, Teréga and Géométhane](#)', 30 January, pp. 12–14.

⁵⁴ CRE (2023), '[Tarifs 2024–2028 des infrastructures de gaz Atelier n 4 Accompagner la décroissance de la consommation de gaz par un cadre de régulation adapté](#)', 23 June, (published as part of the annexes) p. 29.

align the depreciation of allowances with declining gas consumption;

- reducing the period over which certain assets are depreciated, i.e. reducing their useful economic life.

In its final decisions, CRE established that **new assets**, i.e. those being added to the RAB from 1 January 2024 for GT and gas storage, or from 1 July 2024 for GD,⁵⁵ will be **logged to the RAB based on their book value and will be subject to a nominal WACC**. Therefore, these will no longer be indexed to inflation. CRE decided to distinguish between new and existing assets as the application of the three proposed measures to the whole RAB would have resulted in a significant tariff increase for consumers.⁵⁶

For existing assets, i.e. those that had already been added to the RAB on or before a pre-defined date (1 January 2023 for GT and gas storage; 1 July 2023 for GD, in light of the convention used to add assets to the RAB), **the previous indexation mechanism will remain in place and a real WACC will be applied**.⁵⁷ Specifically, assets are conventionally logged to the RAB on 1 January (for GT and storage) or 1 July (for GD) after they enter into operation. **These assets are added to the RAB at their historical cost and are then revalued for inflation**. Old assets are revalued on 1 January to account for the inflation from July to July and a real WACC is applied to them.

The distinction between old and new assets has been introduced in the latest control periods (in 2024). Previously, since 2016, the RAB was updated for inflation using the CPI excluding tobacco as calculated by the INSEE⁵⁸ for all households in France (INSEE reference index 1763852).⁵⁹ The same

⁵⁵ According to the approach used by the CRE, assets are 'conventionally' added to the RAB on 1 January (for GT and gas storage) or 1 July (for GD) of the year after the one they enter into operation.

⁵⁶ CRE (2024), '[Deliberation no. 2024-22. Deliberation of the French Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the natural gas transmission networks of GRTgaz and Teréga](#)', 30 January, pp. 13–14. CRE (2024), '[Délibération N. 2024-40. Délibération de la Commission de régulation de l'énergie du 15 février 2024 portant décision sur le tarif péréqué d'utilisation des réseaux publics de distribution de gaz naturel de GRDF](#)', 15 February, p. 18. CRE (2024), '[Deliberation no. 2024-21 Deliberation of the French Energy Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the underground natural gas storage infrastructures of Storengy, Teréga and Géométhane](#)', 30 January, p. 13.

⁵⁷ Ibid.

⁵⁸ *Institut national de la statistique et des études économiques*.

⁵⁹ *Indice 1763852 des prix à la consommation hors tabac, pour l'ensemble des ménages résidant en France*. CRE (2024), '[Deliberation no. 2024-22. Deliberation of the French Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the natural gas transmission networks of GRTgaz and Teréga](#)', 30 January, p. 20. CRE (2024), '[Délibération N. 2024-40. Délibération de la Commission de régulation de l'énergie du 15 février 2024 portant décision sur le](#)

index is currently used to update for inflation old assets, remaining unchanged from the previous regulatory periods (ATRT7 for GT, ATRD6 for GD and ATS2 for storage),⁶⁰ while new assets are not indexed to inflation and a nominal WACC applies to them.

Along with changes to the WACC methodology, CRE made updates to the depreciation policy for certain assets. In particular, for GT, the asset life of new 'gas pipelines and connections' was reduced from 50 to 30 years, such that they will be depreciated over a shorter period of time.⁶¹ For GD, while asset lives remained unchanged in the current regulatory period, the economic life of 'connections and pipes' was reduced from 45 to 30 years in the previous period (ATRD6).⁶² For gas storage, the depreciation lifespan of 'wells, caverns and collection' was shortened from 50 to 30 years.⁶³

2.3.2 Electricity networks (transmission and distribution)

In the current regulatory period **for ET (TURPE 6 HTB)**, which started on 1 August 2021 for (approximately) four years, a **nominal WACC** is used.⁶⁴ Therefore, **the RAB is not indexed to inflation and is calculated as the net book value of the assets** in operation, with assets conventionally entering the RAB on 1 January following their commissioning.⁶⁵ This methodology has

[tarif péréqué d'utilisation des réseaux publics de distribution de gaz naturel de GRDF](#)', 15 February, p. 25. CRE (2024), '[Deliberation no. 2024-21 Deliberation of the French Energy Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the underground natural gas storage infrastructures of Storengy, Teréga and Géométhane](#)', 30 January, p. 13.

⁶⁰ CRE (2020), '[DELIBERATION NO 2020-012. Deliberation by the French Energy Regulatory Commission of 23 January 2020 deciding on the tariffs for the use of GRTgaz's and Teréga's natural gas transmission networks](#)', 23 January, p. 16. CRE (2020), '[DÉLIBÉRATION N°2020-010. Délibération de la Commission de régulation de l'énergie du 23 janvier 2020 portant décision sur le tarif péréqué d'utilisation des réseaux publics de distribution de gaz naturel de GRDF](#)', 23 January, p. 62. CRE (2024), '[Deliberation no. 2024-21 Deliberation of the French Energy Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the underground natural gas storage infrastructures of Storengy, Teréga and Géométhane](#)', 30 January, p. 13.

⁶¹ CRE (2024), '[Deliberation no. 2024-22. Deliberation of the French Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the natural gas transmission networks of GRTgaz and Teréga](#)', 30 January, pp. 14–15.

⁶² CRE (2024), '[Délibération N. 2024-40. Délibération de la Commission de régulation de l'énergie du 15 février 2024 portant décision sur le tarif péréqué d'utilisation des réseaux publics de distribution de gaz naturel de GRDF](#)', 15 February, p. 20. CRE (2020), '[DÉLIBÉRATION N°2020-010. Délibération de la Commission de régulation de l'énergie du 23 janvier 2020 portant décision sur le tarif péréqué d'utilisation des réseaux publics de distribution de gaz naturel de GRDF](#)', 23 January, p. 11.

⁶³ CRE (2024), '[Deliberation no. 2024-21 Deliberation of the French Energy Regulatory Commission of 30 January 2024 on the decision on the tariff for the use of the underground natural gas storage infrastructures of Storengy, Teréga and Géométhane](#)', 30 January, pp. 13–14.

⁶⁴ CRE (2021), '[DELIBERATION N°2021-12. Deliberation of the French Energy Regulatory Commission of 21 January 2021 deciding on the tariffs for the use of public transmission electricity grids \(TURPE 6 HTB\)](#)', 21 January, p. 53.

⁶⁵ Ibid., p. 14.

not changed from the previous regulatory period (TURPE 5 HTB), spanning from 1 August 2017 to 31 July 2021.

In the current regulatory period **for ED (TURPE 6 HTA-BT)**, a distinction is made between Linky smart meters and other assets.⁶⁶ The allowed rate of return includes a **nominal margin on the RAB**, a remuneration rate for regulated equity, and a remuneration rate on financial borrowings (excluding Linky).⁶⁷ Non-Linky assets are added to the RAB on 1 January of the year after they enter into operation and are valued at their net book value.⁶⁸ The Linky RAB corresponds to the net book value, as of 1 January of each year, of assets commissioned under the Linky framework between 1 January 2015 and 31 December 2021.

2.4 The Netherlands: Autoriteit Consument en Markt (ACM)

2.4.1 WACC allowance and inflation treatment

In the current regulatory regime, a nominal WACC is applied for GT and GD with the standardised asset value (GAW) not being indexed to inflation.⁶⁹ For ET and ED, a real-plus WACC is applied, which takes into account half of the estimated inflation with the other half being accounted for in the GAW valuation. These approaches differ from the previous regulatory regimes for both electricity and gas networks, in which a real WACC was used and the entire GAW was indexed to inflation.

2.4.2 Gas networks (transmission and distribution)

Transition from a real to a nominal WACC

In 2021, ahead of the new regulatory periods for GT and GD (covering the years 2022–26), the ACM, the regulatory authority for electricity and gas networks in the Netherlands, introduced a change to the treatment of inflation for gas networks. Specifically, the ACM announced that it would **move from a real WACC system to a nominal WACC system and that the RAB (or GAW) would no longer be indexed to inflation.**⁷⁰ The ACM's decision

⁶⁶ A Linky meter is a type of smart meter, which was introduced with the objective of aiding the development of smart grids and, ultimately, efficient energy transition. At the initiative of CRE, Enedis ran a Linky replacement project from 2007 to 2021. See CRE (2023), '[Report on the performance of system operators in the development of a smart electricity grid](#)', 7 December, p. 22.

⁶⁷ CRE (2021), '[DELIBERATION N°2021-13. Deliberation of the French Energy Regulatory Commission of 21 January 2021 on the tariffs for the use of public distribution electricity grids \(TURPE 6 HTA-BT\)](#)', 21 January, p. 48.

⁶⁸ Ibid., p. 15.

⁶⁹ The gestandaardiseerde activawaarde (GAW) indicates the RAB.

⁷⁰ ACM (2023), '[Gewijzigd methodebesluit GTS 2022-2026](#)', 14 December, paras 79 and 152. ACM (2023), '[Gewijzigd methodebesluit regionale netbeheerders gas 2022-2026](#)', 14 December, para. 158.

to transition from a real to a nominal WACC was mostly driven by the anticipated decline in gas demand.⁷¹

Under stable conditions, where gas demand remains broadly constant, both real and nominal compensation systems are theoretically NPV-neutral, ensuring that current consumers pay an amount equivalent to future consumers, considering inflation. However, in the expected scenario of declining gas network usage, a real-terms compensation system would shift costs to future consumers, resulting in them paying more than current consumers. Therefore, the ACM considered that continuing to use a real WACC, with its associated intergenerational implications, would not work well given the expected decrease in gas consumption.

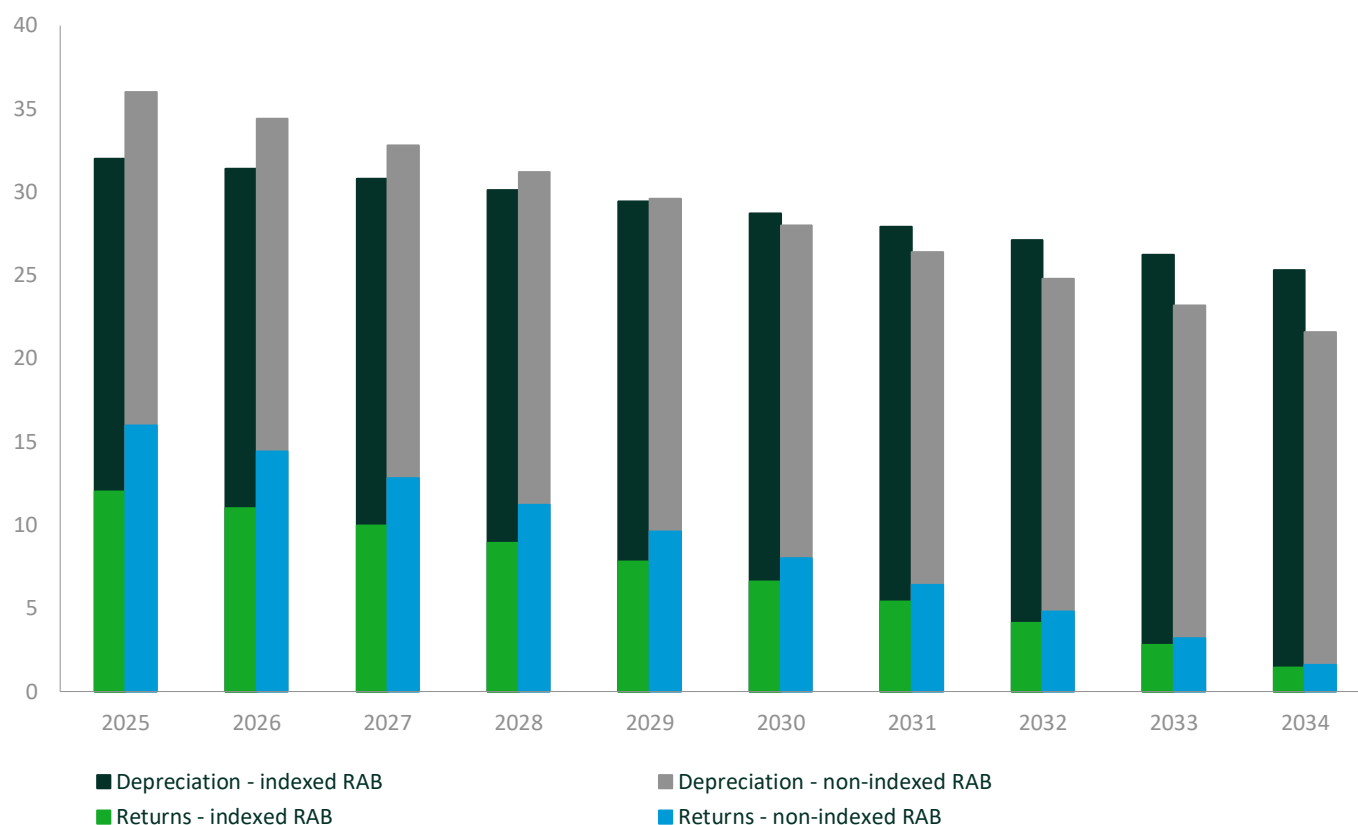
A nominal WACC system was considered to be more appropriate since it includes an inflation component which ensures that the inflation compensation demanded by investors in a given year (t) is captured in the cost of capital and allowed revenues for gas networks and is borne by consumers in the same year (t). Therefore, it eliminates the pass-on effect to future consumers inherent in a real WACC methodology. In light of this change, the ACM also revised its depreciation and GAW policy, deciding not to index these to inflation, ensuring that inflation is not double-counted in the calculation of allowed revenues.

Under the new regulatory regime, expected efficient costs are affected by the changes in the WACC estimation methodology and depreciation policy.⁷² Changing from a real to a nominal WACC will have an upward pressure on estimated costs (as the nominal WACC is higher than the real WACC). On the other hand, eliminating the inflation indexation from the GAW and depreciation will have a marginal downward pressure in the short term, which will increase gradually with time. Overall, this will result in a decrease in the expected efficient costs in later years. Eliminating the inflation indexation will therefore lead to higher capital charges in the short term (due to a higher WACC), with the difference gradually decreasing over time, as the assets depreciate faster with an unindexed RAB regime. This is shown in the stylised example in Figure 2.1.

⁷¹ ACM (2023), '[Gewijzigd methodebesluit GTS 2022-2026](#)', 14 December, paras 148–155. ACM (2023), '[Gewijzigd methodebesluit regionale netbeheerders gas 2022-2026](#)', 14 December, paras 154–160.

⁷² ACM (2023), '[Gewijzigd methodebesluit GTS 2022-2026](#)', 14 December, para. 155. ACM (2023), '[Gewijzigd methodebesluit regionale netbeheerders gas 2022-2026](#)', 14 December, para. 161.

Figure 2.1 Evolution of capital charges with an indexed RAB as opposed to an unindexed RAB



Notes: Assuming a unique investment of €200, entering in operation in 2024 (and therefore being added to the RAB in 2025), a 10-year asset life, a real WACC of 6%, (converted to a nominal WACC of 8%) and an inflation rate of 2%.

Source: Oxera.

For depreciation, while the ACM did not make any changes in the economic useful lives of the assets, it shifted to a declining balance policy from the straight-line depreciation that was used in previous control periods.⁷³ The rationale behind this change was the expected decline in gas network usage, with a lower number of consumers connected to the network, which would reduce the intensity with which gas assets were expected to be used in the future, but not their actual economic lives. Therefore, a declining balance method was considered more appropriate to ensure that a larger portion of capital costs is recovered in the earlier years and a smaller portion in the later years. More details on the ACM's choice are provided in Box 2.3 below.

⁷³ ACM (2023), '[Gewijzigd methodebesluit GTS 2022-2026](#)', 14 December, paras 157–160. ACM (2023), '[Gewijzigd methodebesluit regionale netbeheerders gas 2022-2026](#)', 14 December, paras 164–169.



Box 2.3 Methodologies considered for declining balance depreciation

When defining the exact method to apply a declining depreciation balance, the ACM considered two options, as follows.⁷⁴

- **Variable declining balance method**, where the part of the asset value that is depreciated each year is calculated based on an acceleration factor. For example, for an asset of €1m with an economic life of 10 years and an acceleration factor of 3, 300% of straight-line depreciation is depreciated in the first year (€0.3m) and the same percentage (30%) of the remaining balance is depreciated each year. When depreciation based on the variable declining balance method is lower than if the remaining asset value were depreciated according to a straight-line depreciation pattern, the method switches to straight-line depreciation until the asset is fully depreciated.
- **Sum of digits method**, which assumes a depreciation period in which the figures of the years are added. The remaining lifespan and the sum of the years then determine the proportion that is depreciated annually.

The variable declining balance methodology was finally adopted by the ACM. This means that the ACM derives the 'additional' depreciation by looking at the difference between the amount derived through the variable declining balance method and through a straight-line depreciation. In the specific case of Gasunie Transport Services B.V. (GTS), this additional depreciation is then reduced by 10%, in line with the percentage of the network that the ACM expects will be repurposed for transporting hydrogen.⁷⁵

For the current periods, the ACM defined an acceleration factor of 1.3 for GT and 1.2 for GD.⁷⁶ These figures could be revised in

⁷⁴ ACM (2023), '[Gewijzigd methodebesluit GTS 2022-2026](#)', 14 December, para. 162. ACM (2023), '[Gewijzigd methodebesluit regionale netbeheerders gas 2022-2026](#)', 14 December, para. 170.

⁷⁵ This does not apply in the case of gas distribution companies. ACM (2023), '[Gewijzigd methodebesluit GTS 2022-2026](#)', 14 December, para. 166.

⁷⁶ ACM (2023), '[Gewijzigd methodebesluit GTS 2022-2026](#)', 14 December, para. 163. ACM (2023), '[Gewijzigd methodebesluit regionale netbeheerders gas 2022-2026](#)', 14 December, para. 171.

subsequent regulatory periods. The ACM highlighted how this approach allows for flexibility in changing the acceleration factor based on emerging insights into gas consumption trends and therefore gives the regulator the ability to adjust the depreciation accordingly.

The variable declining balance method of depreciation is also applied to existing assets that have not been completely depreciated by 2022. Overall, this was expected to lead to an increase in the expected efficient costs for gas networks as compared to the previous straight-line depreciation policy; however the ACM expected that the change would lead to lower capital charges in the following years under the assumption that asset depreciation would be larger than investments.

Source: Oxera based on ACM (2023), '[Gewijzigd methodebesluit GTS 2022-2026](#)', 14 December, para. 162. ACM (2023), '[Gewijzigd methodebesluit regionale netbeheerders gas 2022-2026](#)', 14 December.

2.4.3 Electricity networks (transmission and distribution)

Transition from a real to a real-plus WACC

The WACC methodology for electricity networks was also changed ahead of the 2022–26 period. The ACM announced a **transition from a real WACC to a real-plus WACC**, which is a blend of a nominal and real WACC and is **calculated by removing half of the estimated inflation from the nominal WACC and updating the GAW for half of the inflation**.⁷⁷

Differently from the rationale behind the change approved for gas networks, where the transition from a real to a nominal WACC was prompted by the expected decline in gas consumption, the shift for electricity networks was based on consultation responses from electricity operators. In their consultation responses, regional grid operators and TenneT requested a switch to a nominal WACC system, arguing that it would provide an anticipation of certain revenues compared to a real WACC system. This in turn would facilitate the financing of critical infrastructural investments necessary for the energy transition.

⁷⁷ ACM (2023), '[Gewijzigd methodebesluit transporttaken TenneT 2022-2026](#)', 14 December, para. 70. ACM (2023), '[Gewijzigd methodebesluit regionale netbeheerders elektriciteit 2022-2026](#)', 14 December, para. 67.

However, since the ACM considered that a real WACC system allows for a more equitable distribution of capital costs across current and future consumers, the regulator agreed to adopt a blended WACC method, i.e. the real-plus WACC. According to the ACM, this approach achieves the dual objectives of maintaining short-term affordability while increasing the revenues that electricity networks can recover in the current regulatory period.⁷⁸ With the real-plus WACC, the GAW is indexed to inflation using a factor of half the estimated inflation, based on CPI.⁷⁹ In the previous regulatory periods, the GAW was indexed to outturn CPI inflation. However, in the new regulatory period, the ACM clarified that the estimated CPI would not be updated with the outturn CPI when this will be available (as opposed to the use of outturn CPI inflation used in the previous regulatory period).

2.5 Spain: Comisión Nacional de los Mercados y la Competencia (CNMC)

2.5.1 WACC allowance and inflation treatment

The CNMC sets a nominal WACC allowance for electricity and gas networks in Spain.⁸⁰ The only exception is GD, for which the regulatory framework is not based on a RAB–WACC model and therefore no explicit WACC applies.⁸¹

Inflation is therefore already taken into account in the WACC allowance and **the RAB itself is not indexed for inflation**. For GT, ET and ED, cost allowances for capital costs (CAPEX), i.e. the amount that can be added to the RAB, are generally set on the basis of reference costs. Depending on the sector, different sharing rates are applied to out- and underperformance on CAPEX, to take into account differences between actual and reference costs.⁸²

⁷⁸ ACM (2023), '[Gewijzigd methodebesluit transporttaken TenneT 2022-2026](#)', 14 December, paras 145–149. ACM (2023), '[Gewijzigd methodebesluit regionale netbeheerders elektriciteit 2022-2026](#)', 14 December, paras 152–157.

⁷⁹ ACM (2023), '[Gewijzigd methodebesluit transporttaken TenneT 2022-2026](#)', 14 December, para. 194. ACM (2023), '[Gewijzigd methodebesluit regionale netbeheerders elektriciteit 2022-2026](#)', 14 December, para. 166.

⁸⁰ CNMC (2019), '[Circular 2/2019](#)', 12 November.

⁸¹ Revenues for GD operators are set based on different building blocks, e.g. base remuneration (RDE), revenues for market development (RDM) and transitional distribution revenue (RTD). See CNMC (2020), '[Circular 4/2020](#)', 31 March.

⁸² For more details, see CNMC (2021), '[Circular 9/2019](#)', 12 December. CNMC (2019), '[Circular 5/2019](#)', 5 December. CNMC (2019), '[Circular 6/2019](#)', 5 December.

2.6 Portugal: Entidade Reguladora dos Serviços Energéticos (ERSE)

2.6.1 WACC allowance and inflation treatment

In Portugal, a nominal, pre-tax rate of return (RoR) applies for both electricity and gas networks.⁸³ The RAB is valued at the acquisition cost of the assets (historical cost approach) and is not indexed to inflation.⁸⁴ For ET, certain assets are added to the RAB based on their actual (historical) costs, while others are valued at their reference costs.⁸⁵

2.7 Ireland: Commission for Regulation of Utilities (CRU)

2.7.1 WACC allowance and inflation treatment

In Ireland, the Commission for Regulation of Utilities (CRU) follows a similar approach for both gas and electricity transmission and distribution networks. **CRU measures the cost of capital using a real pre-tax WACC, while the RAB is indexed to the Irish Harmonised Index of Consumer Prices (HICP).**

The indexation of the RAB follows the replacement costs approach (i.e. the indexation of the RAB represents a proxy of the current costs of replacing the assets). CRU has been following this approach since the first price controls for both the electricity⁸⁶ and gas sectors.⁸⁷ The rationale for this choice is that, according to CRU, this approach "is more likely to result in the correct level of network investment".⁸⁸ In fact, according to CRU, this approach allows costs, and hence prices, to be in line with new entrant or economic prices. Failing to value assets at their current replacement cost could result, according to CRU, in tariffs that may be higher or lower than under competitive conditions, which would promote inefficient consumption and investment. On the contrary, CRU highlights how prices derived from a replacement cost approach would (i) provide appropriate signals for demand, including the location of new demand; (ii) allow fair competition

⁸³ Gas networks also include liquified natural gas (LNG) regasification and gas storage networks.

⁸⁴ ERSE (2021), '[Parâmetros de regulação para o período 2022 a 2025](#)', December, p. 235. ERSE (2019), '[Parâmetros de regulação para o período de 2020 a 2023](#)', May, p. 169. ERSE (2023), '[Parâmetros de regulação para o período de 2024 a 2027](#)', June, p. 180.

⁸⁵ ERSE (2021), '[Parâmetros de regulação para o período 2022 a 2025](#)', December, p. 17.

⁸⁶ CRU (2020), '[Price Preview 5 \(PR5\) – 2021-2025. Distribution System Operator Revenue for 2021-2025, Draft Determination Paper](#)', 22 July, p. 83. See also CRU (2020), '[Price Review Five \(PR5\) – 2021-2025, TSO and TAO Transmission Revenue for 2021 – 2025, Draft Determination Paper](#)', 22 July, p. 70.

⁸⁷ Commission for Energy Regulation (CER) (2012), '[Decision on October 2012 to September 2016 transmission revenue for Bord Gáis Networks](#)', 23 November, p. 30. CER is the former name of CRU. See also CRU (2023), '[Gas Transmission Tariffs Article 30 Tariff Network Code Information 2023/2024, Information Paper](#)', 8 September 2023, p. 20. CRU (2023), '[Decision on October 2022 to September 2027 Distribution Revenue for Gas Networks Ireland, Decision Paper](#)', 20 December, p. 101.

⁸⁸ See CRU (2020), '[Price Preview 5 \(PR5\) – 2021-2025. Distribution System Operator Revenue for 2021-2025, Draft Determination Paper](#)', 22 July, p. 83.

for new entrants, where practical; and (iii) minimise the risk of stranded assets.⁸⁹ In subsequent regulatory periods, CRU explained that while the possibility to maintain regulatory certainty played a role in the decision of retaining the replacement cost approach, the transparency and investment signals of this approach would still provide a good motivation.⁹⁰

2.7.2 Transition from CPI to HICP

In the electricity sector (for both ET and ED), the RAB used to be indexed to CPI until 2010,⁹¹ while in the gas sector CRU switched from CPI to HICP at the end of 2007.⁹² CRU then moved to HICP on the basis that "HICP is likely to be less volatile than the CPI, leading to more stable revenues which would be of benefit to both the final customer and transmission utilities",⁹³ and it did not implement any transition period.

CRU's guiding principles in choosing the inflation index are that "the index used should be the best reflection of the increases in prices faced by the transmission utilities, such as wage inflation or materials inflation etc. Also, the index needs to be practical to implement, robust and transparent".⁹⁴

The WACC components are deflated to real terms using a mix of German inflation (for the cost of debt and the risk-free rate) and eurozone inflation (for the TMR).⁹⁵ The choice of using the eurozone and German inflation rather than the Irish one is based on (i) the greater availability of data, (ii) the hypothesis that eurozone countries' inflation should converge in the long term, and (iii) the assumption that investors have options to invest in a basket of eurozone utilities rather than just Irish ones.⁹⁶

However, in the most recent price controls for electricity (PR5) and gas (PC5), CRU recognised the possibility of differences in inflation

⁸⁹ See for example CER (2001), '[Determination of Distribution Allowed Revenues](#)', 28 September, pp. 2–3.

⁹⁰ See, for example, CER (2010), '[Decision on 2011 to 2015 distribution revenue for ESB Networks Ltd](#)', 19 November, p. 40.

⁹¹ See CER (2010), '[Decision on 2011 to 2015 distribution revenue for ESB Networks Ltd](#)', 19 November, pp. 140 and 153–154.

⁹² See Commission for Energy Regulation (CER) (2012), '[Decision on October 2012 to September 2017 transmission revenue for Bord Gáis Networks](#)', 23 November, pp. 118–119.

⁹³ See CRU (2020), '[Price Review Five \(PR5\). TSO and TAO Transmission Revenue for 2021-2025, Draft Determination Paper](#)', 22 July, p. 88.

⁹⁴ *Ibid.*, p. 88.

⁹⁵ See Cambridge Economic Policy Associates (CEPA) (2020), '[PR5 cost of capital estimation. Commission for Regulation of Utilities \(CRU\)](#)', 14 July, pp. 19–21, 24 and 39. CEPA (2023), '[PC5 Allowed Return. Commission for Regulation of Utilities \(CRU\)](#)', 30 June, pp. 15, 20 and 22–24.

⁹⁶ See CEPA (2020), '[PR5 cost of capital estimation. Commission for Regulation of Utilities \(CRU\)](#)', 14 July, p. 8. CEPA (2023), '[PC5 Allowed Return. Commission for Regulation of Utilities \(CRU\)](#)', 30 June, p. 10.

expectations between Ireland and Germany/eurozone. Since the RAB is indexed to Irish HICP, but the WACC is deflated using German and eurozone inflation, this difference might lead to under-remuneration of the network operators. Therefore, in both price controls, CRU granted an uplift to the WACC for the differences in inflation expectations, to ensure that the methodology achieves the financial capital maintenance principle.⁹⁷

Finally, CRU has started the consultation process for the new price control for ET and ED (PR6), which will start in 2026, covering the period 2026–30. However the strategy document published by CRU does not indicate whether it plans to move away from its traditional approach in relation to RAB indexation and WACC.⁹⁸

2.8 Northern Ireland: Utility Regulator (UR)

In Northern Ireland, a real WACC is applied and the RAB is indexed to inflation for all energy networks (for GT, capital allowances are subject to a separate methodology). However, different inflation indices are currently used in the different sectors—i.e. CPI for GT, CPIH for GD and SONI, and RPI for ET and ED (with a view to transition to CPIH in the next control period)—and various changes have been implemented (or are planned) in recent price controls.

2.8.1 Gas transmission

WACC allowance and inflation treatment

In the current regulatory period for GT, GT22 (covering the period October 2022–September 2027), **a real vanilla WACC is applied** for Gas Networks Ireland (GNI UK) **and CPI is used as the inflation index**.⁹⁹ In order to allow comparisons with other regulated sectors, the UR also published a table comparing the vanilla WACC expressed using CPI and then using RPI.¹⁰⁰

Given the peculiarity of the sector in Northern Ireland, allowances for capital costs are subject to a separate methodology and are treated

⁹⁷ See CEPA (2020), '[PR5 cost of capital estimation. Commission for Regulation of Utilities \(CRU\)](#)', 14 July, p. 8. CEPA (2023), '[PC5 Allowed Return. Commission for Regulation of Utilities \(CRU\)](#)', 30 June, pp. 10–11. See also CRU (2023), '[Decision on October 2022 to September 2027 Distribution Revenue for Gas Networks Ireland, Decision Paper](#)', 20 December, pp. 72–74. CRU (2023), '[Decision on October 2022 to September 2027 Transmission Revenue for Gas Networks Ireland, Decision/Information Paper](#)', 20 December, pp. 79–81.

⁹⁸ See CRU (2024), '[Price Review Six. Strategy Paper, Discussion paper](#)', 24 April.

⁹⁹ The WACC does not apply for the 'Mutual Energy Limited' (MEL) companies, as these are financed through the issuance of long maturity bonds; and bond payments are included in the calculation of their allowed revenues. UR (2022), '[Price Control for Northern Ireland's Gas Transmission Networks GT22. Final Determination](#)', 20 May, para. 9.1.

¹⁰⁰ *Ibid.*, p. 70.

outside of the price control in the case of GNI (UK) and West Transmission Ltd ('WTL').¹⁰¹ For the North-West and South-North Pipelines operated by GNI (UK), the 'capital revenue requirement' for each year is determined using the asset value (which includes capital expenditure and a pain/gain factor—i.e., an efficiency sharing mechanism) re-evaluated by inflation (measured using the CPI), and a real vanilla WACC.¹⁰²

2.8.2 Gas distribution

WACC allowance and inflation treatment

For GD, in the current regulatory period, GD23 (covering the period 2023–28), **a CPIH-real WACC is applied and the RAB (called 'Total Regulatory Value' or TRV) is indexed to inflation.**¹⁰³

Transition from RPI to CPIH

As part of this regulatory period, the UR decided to **transition from using the RPI as its inflation index to CPIH**, on the basis of recommendations from the UK Statistics Authority (UKSA) to move away from RPI, because of concerns around its robustness. While the UR did consider a phased transition to CPIH based on the UKSA's plan to introduce multiple changes to the RPI calculation, uncertainty about when they would occur incentivised it to finalise an 'immediate' transition to CPIH.¹⁰⁴ Moreover, the UR considered that using CPIH would be more equitable for both current and future consumers and improve financeability of gas distribution networks.¹⁰⁵

At the beginning of the current price control, the calculation of the opening TRV for GD23 was done in a way that ensured that the application of CPIH to future revenues and tariffs, which are determined at 2020 prices, accurately reflects the inflation of the TRV up to the end of the GD17 period using RPI.¹⁰⁶

¹⁰¹ The other two licence holders, i.e. Premier Transmission Ltd ('PTL') and Belfast Gas Transmission Ltd ('BGTL') have purchased existing assets so, according to the UR, they are not required to finance capital expenditures. UR (2022), '[Price Control for Northern Ireland's Gas Transmission Networks GT22. Final Determination](#)', 20 May, paras 1.18–1.19.

¹⁰² See UR (2022), '[Gas conveyance licence for GNI \(UK\) Ltd.](#)', 21 July, section 2.2.5 and annex A.

¹⁰³ The WACC is defined on a real, pre-tax basis for Phoenix Natural Gas Limited (PNGL) and firmus, while on a real, vanilla basis for Scotia Gas Networks Natural Gas Northern Ireland Ltd (SGN). UR (2022), '[GD23 - Gas Distribution Price Control 2023-2028. Final Determination - Main Report](#)', October, paras 2.14, 2.16 and 10.10.

¹⁰⁴ *Ibid.*, para. 2.20.

¹⁰⁵ *Ibid.*, p. 4.

¹⁰⁶ *Ibid.*, pp. 22–23, paras 220–225.

2.8.3 Northern Ireland Electricity Networks Ltd (transmission and distribution)

WACC allowance and inflation treatment

In the current regulatory period for ET and ED (RP6), effective from 1 October 2017 for 6.5 years, **a real, pre-tax WACC is applied and RPI is used as the inflation metric to index the RAB** and set the allowed revenues.¹⁰⁷

Planned transition from RPI to CPIH

For the upcoming period (RP7, spanning from April 2025 to March 2031), a real vanilla WACC will be used with the RAB continuing to be indexed to inflation.¹⁰⁸

However, **for RP7, the UR has proposed to shift from RPI to CPIH as its measure for inflation**, since it considers that it better reflects the price levels that consumers are exposed to.¹⁰⁹ When proposing to transition to CPIH, the UR highlighted that it:¹¹⁰

- computed a real WACC on a CPIH basis;
- computed the frontier shift based on CPIH;
- ensured that the opening RAB for RP7 continued to consider RPI during the whole RP6 period.

The regulator is also considering an adjustment factor for inflation forecasting risk, but has not confirmed yet its final decision in this regard.¹¹¹

2.8.4 Electricity transmission (SONI)

WACC allowance and inflation treatment

For the current regulatory period applicable to the independent Transmission System Operator, SONI, (1 October 2020–30 September

¹⁰⁷ UR (2017), '[Northern Ireland Electricity Networks Ltd Transmission & Distribution 6th Price Control \(RP6\). Final determination](#)', 30 June, pp. 22, 226 and 246.

¹⁰⁸ UR (2023), '[Northern Ireland Electricity Networks Ltd Transmission and Distribution 7th Price Control \(RP7\). Draft determination – main report](#)', November, paras 13.38 and 13.44.

¹⁰⁹ Ibid., pp. 2–3.

¹¹⁰ Ibid., para. 13.7.

¹¹¹ Ibid., paras 13.44–13.49.

2025),¹¹² a pre-tax real WACC is applied for the calculation of allowed revenues along with a RAB indexation.¹¹³

Transition from RPI to CPIH

In the final determination ahead of the current regulatory period, the UR confirmed that it would switch from RPI to CPIH as an inflation index.¹¹⁴ The process that the UR implemented for the transition was as explained below:¹¹⁵

- uplifting the closing RAB as of 30 September 2020 (in nominal terms) by the ratio of the CPIH in April 2021 to the CPIH in April 2020;
- applying a CPIH-real WACC to the RAB to calculate the allowed return component. The CPIH forecast used to calculate the WACC is consistent with the CPIH forecast used to index the RAB.

This approach was considered to be effective since it increases the closing RAB (in nominal terms) by a full year of forecast CPIH growth and since SONI would earn a return calculated using a CPIH-real WACC for every year of the 2020–25 price control period. The UR highlighted how this approach results in the same allowed return for investors of retaining the RPI indexation with an RPI-real WACC.¹¹⁶

2.9 Austria: E-Control

In Austria, the WACC allowance is defined in nominal terms for ET, ED and GD networks. Therefore inflation is accounted for in the WACC and the RAB is not indexed for inflation. For GT, depending on whether assets are new or old and whether they are debt- or equity-financed, a nominal or real WACC applies.

¹¹² While Northern Ireland Electricity Networks (NIE Networks) is the owner of the transmission network, therefore developing, constructing and maintaining the network, SONI is the operator of the transmission network, which is responsible for planning and operating the transmission system.

¹¹³ UR (2020), '[SONI price control 2020-2025. Final Determination](#)', 21 December, pp. 7 and 66.

¹¹⁴ Ibid., para. 7.13.

¹¹⁵ UR (2020), '[Technical annex: SONI RAB. Draft Determination, Annex 8](#)', 6 July, p. 23. UR (2020), '[Technical annex: Risk and return. Final determination, Annex 5](#)', 21 December p. 118.

¹¹⁶ Ibid.

2.9.1 Gas networks (transmission and distribution)

WACC allowance and inflation treatment

For **GD**, a nominal WACC is applied, and the RAB is not indexed for inflation.¹¹⁷

For **GT**, there is a distinction between assets built from 2021 ('new assets') and those built in previous years ('old assets'). For new assets, a nominal WACC is applied to an accounting RAB (i.e. the RAB is not updated for inflation). For old assets, there is a further distinction between:¹¹⁸

- debt-financed assets, which are subject to a nominal cost of debt allowance; and
- equity-financed assets, for which a real, pre-tax K_e applies.

For the latter—i.e. old, equity-financed assets—the RAB is updated to take inflation into account, determining the adjusted replacement values of these assets through an 'appreciation factor'. For the latest regulatory period (1 January 2021–31 December 2024), this appears to be done using the same inflation rate used for the WACC, i.e. 0.82%.¹¹⁹ Apart from the difference in the allowed returns, equity-financed assets are treated in the same way as debt-financed assets.

2.9.2 Electricity networks (transmission and distribution)

WACC allowance and inflation treatment

For both ET and ED networks, **E-Control sets a nominal WACC allowance**,¹²⁰ therefore the RAB is not updated for inflation.¹²¹ However, it is important to note that a real WACC is used when calculating the 'annuity' to standardise the CAPEX benchmark for deriving the efficiency scores, which are then

¹¹⁷ In the fourth regulatory period (2023–27), two separate WACC rates are applied to the assets based on whether they entered the RAB before or after 2022. E-Control (2022), '[Gas DSO regulatory regime for the fourth regulatory period 1 January 2023 – 31 December 2027](#)', 4 November, pp. 50–51.

¹¹⁸ E-Control, '[METHODOLOGY PURSUANT TO SECTION 82 GASWIRTSCHAFTSGESETZ \(GAS ACT, GWG\) 2011 FOR THE FOURTH PERIOD FOR TRANSMISSION SYSTEMS OF AUSTRIAN GAS TRANSMISSION SYSTEM OPERATORS \(TSOS\)](#)', pp. 3–5.

¹¹⁹ Ibid., p. 5–6. For the current control period, this inflation rate appears to be different from the network operator price index (NPI), which is used for OPEX. This is derived as a weighted average of the CPI and the index of collectively agreed wages and salaries (WSI), each with a weight of 50%.

¹²⁰ Two different rates apply depending on when investments are made, i.e. there is a distinction between 'old' and 'new' assets.

¹²¹ E-Control (2022), '[Regulierungssystematik für die Strom-Übertragungsnetzbetreiber 1. Jänner 2023 - 31. Dezember 2028](#)', 17 November, pp. 12–15. E-Control (2018), '[Electricity Distribution System Operators 1 January 2019 - 31 December 2023 Regulatory Regime for the Fourth Regulatory Period](#)', December, pp. 10 and 38. E-Control (2023), '[Regulierungssystematik für die fünfte Regulierungsperiode der Stromverteilernetzbetreiber 1. Jänner 2024 - 31. Dezember 2028](#)', 31 October, p. 76.

used to set efficiency targets (this is because the efficiency potential of each network company is derived through an efficiency benchmarking exercise).¹²²

2.10 New Zealand: New Zealand Commerce Commission

2.10.1 WACC allowance and inflation treatment

In New Zealand, **the New Zealand Commerce Commission (NZCC) applies a nominal WACC, updates the price-path for inflation, and uses the actual inflation to revalue the RAB, with a mechanism to ensure that inflation is not double-counted in the regulatory framework.**¹²³

Specifically, for electricity distribution businesses (EDBs) and gas pipeline businesses (GPBs, including both transmission and distribution), the RAB is indexed to actual inflation.¹²⁴ This methodology has remained unchanged from the previous Input Methodologies (IMs) published in 2016.¹²⁵ The overall price-setting mechanism is as follows.

- A nominal WACC is used, which incorporates inflation expectations at the time it is computed.
- The RAB is revalued annually according to the forecast inflation (CPI) for each year of the regulatory period.
- Forecast revaluation of the RAB is treated as a form of income and hence is not included in the annual allowed revenues (this ensures that the EDBs and GPBs are not compensated for inflation twice).
- When rolling forward, the RAB is revalued using actual, not forecast, inflation. Hence, at the time of the next price review, real-term values of the opening RAB have been maintained.

According to the NZCC, this methodology to index the RAB “provides an *ex-ante* expectation of real returns (or real FCM [financial capital maintenance]), and delivers an *ex-post* real return.”¹²⁶

In the current regulatory period (2020–25), **for ET (Transpower), a nominal WACC is applied and the RAB is not indexed to inflation.** For this reason, the RAB revaluation is not deducted from the allowed revenues and the RAB is

¹²² E-Control (2018), ‘[Electricity Distribution System Operators 1 January 2019 - 31 December 2023 Regulatory Regime for the Fourth Regulatory Period](#)’, December, para. 6.2.1, section 6.

¹²³ NZCC (2023), ‘[Cost of capital topic paper. Part 4 Input Methodologies Review 2023 – Final decision](#)’, 13 December, para. 2.15.

¹²⁴ *Ibid.*, para. 2.15.

¹²⁵ NZCC (2016), ‘[Input methodologies review draft decisions. Topic paper 1: Form of control and RAB indexation for EDBs, GPBs and Transpower](#)’, 16 June, para. 241.

¹²⁶ *Ibid.*, para. 240.

not updated for inflation.¹²⁷ This stemmed from NZCC's 2010 consideration that a nominal WACC was preferable in order to front-load the capital recovery and support Transpower's large investment needs.¹²⁸

In the price-setting input methodology that was finalised in December 2016, EDBs and GPBs argued that any mismatch between the NZCC's inflation forecast and either (i) the market's expectation of inflation at the time the WACC allowance is set or (ii) the outturn inflation would imply an exposure to inflation forecasting risk.¹²⁹ In response, the NZCC clarified that it would retain its approach since it considered that the indexation of the RAB protects both suppliers and consumers from inflation risk by delivering real returns.

Moreover, the NZCC highlighted that network operators did not propose an alternative approach to RAB indexation that would ensure the same inflation protection as the current approach while also removing the risk of forecasting errors. Finally, the risk of inflation forecast mismatch was not considered to justify a change in the approach, considering both the lack of evidence on the fact that the inflation forecast used by the NZCC is systematically biased, and the likelihood that forecasting errors cancel out over the long periods.¹³⁰

2.10.2 Potential changes to the inflation treatment discussed

In the 2023 IMs, the NZCC considered addressing this inflation forecast risk by applying different 'wash-up' mechanisms. First, it considered including a 'cost of debt wash-up' ('CODW') to address the difference in the risk-free rate, and hence the WACC, as a result of the difference between forecast and actual inflation which would ultimately affect the financing costs of the networks. Second, it proposed introducing a 'revenue wash-up' for the first year of a regulatory period when the forecast inflation is different from actual inflation. Third, it suggested changing the 'general wash-up' mechanism to include an ex ante indexation of the revenue path using two years of inflation data, in order to reduce the delay for the wash-up mechanism to take effect. After the consultation process, the NZCC decided not to include the CODW but to implement the two other

¹²⁷ NZCC (2016), '[Input methodologies review draft decisions. Topic paper 1: Form of control and RAB indexation for EDBs, GPBs and Transpower](#)', 16 June, paras 227 and 255.

¹²⁸ *Ibid.*, para. 227.

¹²⁹ NZCC (2016), '[Input methodologies review decisions. Topic Paper 1: Form of control and RAB indexation for EDBs, GPBs and Transpower](#)', 20 December, paras 244 and 256–258.

¹³⁰ *Ibid.*

suggestions, as the latter were deemed more effective in protecting both consumers and suppliers from inflation risk.¹³¹

At the 2023 IMs draft decision stage, the NZCC acknowledged the possibility of asset-stranding risk for GPBs and that removing the RAB indexation could mitigate the risk and make inter-generational cost allocation more effective.¹³² However, in its final decision, the NZCC retained the RAB indexation for GPBs and decided to consider other factors such as asset-life adjustments and changes to the depreciation method to address the asset-stranding risk, independently of RAB indexation.¹³³ The RAB indexation mechanism was retained for EDBs as well.

2.10.3 Transition to an indexed RAB for ET

In 2023, the NZCC also proposed starting to index Transpower's RAB to inflation from the upcoming regulatory period (RCP4, starting on 1 April 2025 for the following 5 years).¹³⁴ Based on its estimation of Transpower's financeability and the importance of matching its revenues to investment needs, the NZCC proposed the following approach:¹³⁵

- indexing Transpower's RAB to inflation;
- allowing Transpower to apply a different depreciation profile.

Specifically, in light of the expected evolution of investment needs and demand, the NZCC considered that the indexation of the RAB for Transpower would offer a better protection from inflation risk and would result in electricity tariffs that are more consistent with allocative efficiency.¹³⁶

Ultimately, as part of the latest price review (RCP4), the NZCC decided to apply RAB indexation to Transpower starting from RCP4, similar to EDBs and

¹³¹ NZCC (2023), '[Financing and incentivising efficient expenditure during the energy transition topic paper. Part 4 Input Methodologies Review 2023 – Final decision](#)', 13 December, paras 4.159, 4.178 and 4.181.

¹³² *Ibid.*, paras X12–13, 3.278–3.282, 3.298 and 3.426–3.429.

¹³³ These alternative instruments can also be activated on a company-specific basis.

¹³⁴ NZCC (2023), '[2020-2025 Transpower individual price-quality path](#)', October. NZCC (2023), '[Financing and incentivising efficient expenditure during the energy transition topic paper. Part 4 Input Methodologies Review 2023 – Final decision](#)', 13 December, para 3.4.3.

¹³⁵ NZCC (2023), '[Financing and incentivising efficient expenditure during the energy transition topic paper. Part 4 Input Methodologies Review 2023 – Final decision](#)', 13 December, paras X14–X18, 3.4.3 and 3.62–3.67.

¹³⁶ *Ibid.*, paras 3.62–3.67.

GPBs, i.e. revaluation gains would be treated as income and RAB would be rolled forward using actual inflation.¹³⁷

2.11 England and Wales: Ofwat

2.11.1 WACC allowance and inflation treatment

In the current price control (PR19), **Ofwat defines the WACC allowance in real terms. The RCV is therefore indexed to inflation,**¹³⁸ specifically to outturn inflation. While in the previous price control, the whole RCV was indexed to RPI, in PR19 Ofwat introduced a gradual transition to CPIH, so part of the RCV is indexed to RPI, with the rest (including new investments) indexed to CPIH.¹³⁹

2.11.2 Transition from RPI to CPIH

In 2017, the Water Services Regulation Authority (**Ofwat**), the regulatory body for water and sewerage services in England and Wales, **announced that it would change its inflation index from RPI to CPIH for the upcoming PR19 price review, spanning from 2020 to 2025.**¹⁴⁰

The transition was initially announced in 2016 when Ofwat confirmed that it would be moving away from RPI but did not make a decision on whether it would switch to CPI or CPIH.¹⁴¹ In the consultation published in 2017, Ofwat proposed using CPIH (subject to its redesignation as a national statistic before the publication of the final methodology) and not CPI as its measure for inflation to index the RCV and the allowed revenues.¹⁴²

The decision to move away from RPI stemmed from its declining legitimacy and robustness, as it tended to overstate inflation. Consequently, as also highlighted by Ofwat, other regulators had also transitioned away from RPI. Additionally, in November 2016, the Office for National Statistics had ceased using RPI as its preferred measure, subsequently adopting CPIH as its headline measure of inflation in March 2017. Despite CPI's longer

¹³⁷ NZCC (2023), '[Financing and incentivising efficient expenditure during the energy transition topic paper. Part 4 Input Methodologies Review 2023 – Final decision](#)', 13 December, para. 3.4.3.

¹³⁸ The initial RCV was set on the basis of the average market value of equity of each water and sewerage company for the first 200 days after privatisation, plus the total value of debt at privatisation. A proxy of the initial market value was used for the water-only companies that were not privatised. See, for example, Oxera (2015), '[Options for future treatment of the regulatory capital value](#)', June.

¹³⁹ Ofwat (2019), '[PR19 final determinations: Allowed return on capital technical appendix](#)', December, p. 8.

¹⁴⁰ Ofwat (2017), '[Delivering Water 2020: Our final methodology for the 2019 price review](#)', December, p. 16.

¹⁴¹ Ofwat (2016), '[Water 2020: our regulatory approach for water and wastewater services in England and Wales](#)', May, p. 5.

¹⁴² Ofwat (2017), '[Delivering Water 2020: Consulting on our methodology for the 2019 price review](#)', July, pp. 192 and 211–212.

historical data availability, Ofwat decided to use CPIH for its comprehensiveness, as it includes housing prices, providing a more holistic view of price levels.¹⁴³

Additionally, since the CPIH is a more stable index than the RPI, this move was expected to significantly reduce the volatility of consumer bills. In their response to the consultation, water networks were generally supportive on the shift away from RPI to CPIH.¹⁴⁴

The following changes and arrangements have been introduced to transition to the new inflation indexation mechanism.

- **Regulated Capital Value (RCV) indexation.** Ofwat decided that 50% of the existing RCV as on 1 April 2020 would be indexed to RPI. The remaining RCV and all new assets added to the RCV from 1 April 2020 onwards would be indexed to CPIH.¹⁴⁵
- **Cost of capital.** Given the RCV indexation mechanism, the allowed returns are computed in nominal and real terms. Since the RCV is indexed to both RPI and CPIH, the allowed returns are computed both in RPI-real and CPIH-real terms, and are applied to the respective 'shares' of the RCV. Specifically, the base cost of capital is calculated on the basis of CPIH, while an RPI-based cost of capital is calculated taking into account an RPI–CPIH wedge which is then applied to the RPI tranche of the RCV.¹⁴⁶ Ofwat assumed a long-term CPIH inflation of 2% and an RPI inflation of 3%, implying a long-term difference of 100 bps (the 'RPI–CPIH wedge').¹⁴⁷ Some specific arrangements have also been made to account for the change. For example, the cost of debt has been calculated differently for embedded and new debt, with a fixed cost being set for embedded debt and new debt being indexed to a market index.¹⁴⁸ The cost of embedded debt is calculated as the 15-year average of the benchmark index, adjusted for outperformance

¹⁴³ Ofwat (2017), ['Delivering Water 2020: Consulting on our methodology for the 2019 price review'](#), July.

¹⁴⁴ Ofwat (2017), ['Delivering Water 2020: Our final methodology for the 2019 price review'](#), December, pp. 58 and 158.

¹⁴⁵ *Ibid.*, p. 110.

¹⁴⁶ *Ibid.*, p. 171–179.

¹⁴⁷ The RPI inflation (3%) is based on a CPI estimate of 2% and the Office for Budgetary Responsibility's estimate of a long-term RPI–CPI wedge of 1.0%. Ofwat (2019), ['PR19 final determinations: Allowed return on capital technical appendix'](#), December, p. 8. Ofwat (2017), ['Delivering Water 2020: Our final methodology for the 2019 price review'](#), December, p. 172.

¹⁴⁸ Ofwat (2017), ['Delivering Water 2020: Our final methodology for the 2019 price review'](#), December, p. 157.

(25 bps).¹⁴⁹ The cost of new debt includes an initial allowance based on the benchmark index, an outperformance wedge (15 bps), and a reconciliation mechanism to adjust for outturn values of the index.

- **Reconciliation.** In order to ensure that the transition to CPIH is NPV-neutral for investors, in PR19 the allowed revenues and/or the RCV will be reconciled as part of PR24 (the next control period) with an adjustment factor to account for the differences between outturn and estimated values of the RPI–CPIH wedge.¹⁵⁰

In PR19, companies were allowed to make changes to their pay-as-you-go (PAYG) and RCV rates, taking into account the effect on expenditures, investments, consumer preferences and consumer bills, both in the short and the long term. These financial levers represent a tool to smoothen revenues or address potential financeability concerns on the notional capital structure.¹⁵¹ Proposals made by two water networks to adjust their PAYG and RCV run-off rates in order to accelerate the transition to CPIH were accepted by Ofwat.¹⁵²

During the consultation phase, water networks raised a number of issues and concerns, including the following.

- **Estimation of the risk-free rate using RPI-based gilts.**¹⁵³ Water companies argued that if RPI were to be discredited as a legitimate measure of inflation, it would be inconsistent to use RPI-linked gilts to estimate the risk-free rate for the cost of capital, arguing that nominal gilts should be used instead. Ofwat explained that while it agreed that the RPI was no longer being considered as a robust inflation index, the fact that nominal gilts included some inflation risk premium made it unsuitable for risk-free rate estimation and,

¹⁴⁹ The benchmark index was an average of the A and BBB rated IHS Markit iBoxx non-financial 10 years+ indices. See Ofwat (2019), '[PR19 final determinations: Allowed return on capital technical appendix](#)', December, pp. 72–73, 78, 83 and 85.

¹⁵⁰ Ofwat (2019), '[PR19 final determinations: Allowed return on capital technical appendix](#)', December, p. 8.

¹⁵¹ The PAYG represents the share of the total expenditure (TOTEX) in a given year, which is recovered in the same year, it is the equivalent of the fast-money component. The TOTEX share that is not included in the PAYG is added to the RCV and is recovered over a longer period of time, in line with certain run-off rates (the depreciation profile). Companies can adjust the PAYG and RCV run-off rates to shift the recovery of costs across different generations. See Ofwat (2019), '[PR19 final determinations: Aligning risk and return technical appendix](#)', December, pp. 44–66 and 83–87.

¹⁵² *Ibid.*, pp. 51 and 83–87. Specifically, Severn Trent and United Utilities requested an increase in the RCV run-off rates to accelerate the transition to CPIH indexation.

¹⁵³ Gilts refers to bonds issued by the UK government.

therefore, it would continue to set the risk-free rate on the basis of RPI-linked gilts, in the absence of CPI- or CPIH-linked gilts.¹⁵⁴

- **Use of the Bank of England's CPI index for calculating the TMR.** Companies contended that the Bank of England's CPI series was unreliable for deflating the historical TMR and suggested using RPI or the Credit Suisse Global Investment Returns Yearbook's Cost of Living Index (COLI) instead. Ofwat clarified that RPI's structural changes and its status as a 'protected index'—which prevents updating historical values following methodological changes—rendered it unreliable for this purpose. Additionally, using COLI would overstate the required return because it understates inflation for 1914–47, inadequately deflating the historical TMR.¹⁵⁵
- **Inconsistency arising from using CPI to deflate the historical TMR and CPIH to index the allowed returns.** Using the CPI to deflate the historical TMR would lower the allowed return on equity and go against Ofwat's commitment to transitioning to CPIH in an NPV-neutral way. Ofwat considered that the use of CPI to deflate the historical TMR was simply based on the availability of data for the 1914–47 period for which CPIH or RPI data is not available and that it would still adopt this index even if it had retained the RPI indexation for allowed returns and RCV.¹⁵⁶

A further aspect that was assessed during the transition related to whether the market for CPI-linked financial products was sufficiently developed to enable companies to match interest payments to allowed returns. However, Ofwat ultimately determined that this was unlikely to be problematic, also based on Oxera analysis which highlighted that there could be an increasing demand for CPI-linked assets from pension funds.¹⁵⁷

¹⁵⁴ Ofwat (2019), '[PR19 final determinations: Allowed return on capital technical appendix](#)', December, p. 33.

¹⁵⁵ *Ibid.*, pp. 44–46.

¹⁵⁶ *Ibid.*, p. 47.

¹⁵⁷ While recognising that the CPI-linked debt market was not as developed as the RPI-linked debt market, Oxera's analysis also found that water companies could benefit from a potential first-mover advantage, which could help unlock the CPI market more rapidly than had been observed historically and at lower costs. See Oxera (2016), '[Indexation of future price controls in the water sector](#)', 31 March.



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