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REFORMING THE WATER SECTOR TO MAXIMISE THE DELIVERY OF INVESTMENT FOR GROWTH

A REPORT FOR WATER UK

23 APRIL 2025

Contents

1 Executive summary

1.1 Purpose of this report

The task of the Independent Commission on the Water Sector Regulatory System (herein 'the Commission') is to stand back from the current system and explore potential changes to equip and reform the system to meet the challenges of the future. The aim is for its recommendations to inform a longer-term reset of the sector, with possible implications for later price controls (beyond PR24).[1]

To help inform its response to the Commission's Call for Evidence (CfE), Water UK has asked us to review the existing regulatory framework to assess the extent to which it maximises the delivery of investment and growth. Specifically, Water UK asked us to consider aspects such as the delivery models for investment, the role of the five-year price control, the financing regime, and the charging and connections regime. Water UK asked us to assess the extent to which the regime is delivering the necessary investment and to explore reforms and make recommendations that would improve the delivery of necessary investment.

Our approach to this task has been to consider where improvements can be made to the status quo, and set out practical steps that can be taken towards a system that is more effective and will deliver clear benefits relative to the current approach. As such, the recommendations we set out should be seen as a starting point, rather than an end point.

1.2 The challenge

The challenges the water sector is facing into are complex and significant. The realities of climate change, population growth and ageing infrastructure have added significant pressure to existing networks. Increasing environmental awareness has also led to raised standards for environmental protection. Water companies' contributions are also important for meeting wider government objectives on biodiversity and Net Zero. Water network capacity and resilience is required for the expansion of UK industry, and therefore enables economic growth.

Meeting these challenges will require significant long-term investment – which in this report we call 'investment for growth'. Investment is needed to deliver new connections, reinforce the network as it grows, build and expand strategic assets to increase capacity, maintain existing and new assets in the long term, improve environmental outcomes and maintain water quality standards. Over the next five years, companies are forecast to spend £104

[1] Independent Commission on the Water Sector Regulatory System (2025) Call for Evidence (herein 'CfE'), paragraphs 11-12.

billion to maintain and upgrade the system, including £44 billion of investment in new infrastructure.

The model of privately owned companies financing and delivering investment under a system of economic regulation has delivered much over the past 35 years. However, in a number of key areas the model is not working as well as it should. This paper focuses on reforms to support the delivery of investment and growth. Water UK has also commissioned a paper from Frontier Economics on reforming strategic planning in the water sector. Where relevant we cross-refer to the conclusions of that paper.

1.3 Our approach

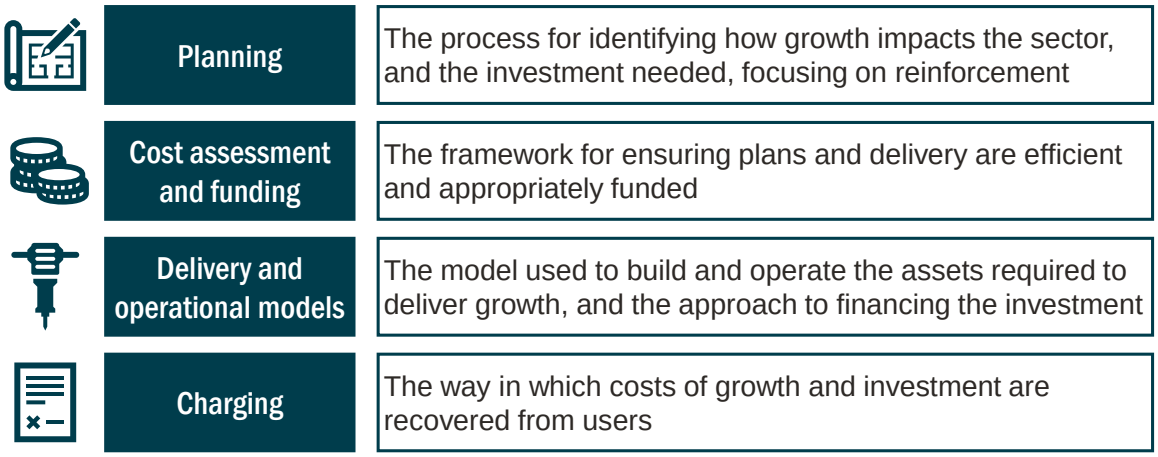
To develop a set of recommendations on how the system can be reformed to maximise the delivery of investment for growth, we:

- First, identified key areas of the regulatory framework for unlocking investment (see Figure 1 below), and reviewed the existing arrangements in each area;
- Second, identified barriers to growth and investment in each area, and key lessons learned from recent precedent;
- Third, considered options for reforming or refocusing the regulatory framework, based on experience in the water sector and beyond; and
- Fourth, assessed at a high level how feasible the options for reform are, and whether they are likely to deliver a net benefit relative to the current approach, using a theory of change-based approach.[2]

Our assessment is based on a combination of desk research and targeted case studies, alongside engagement with Water UK and its members in a dedicated workshop on this topic, and incorporating our own in-house expertise on regulation in water and other sectors.

[2] The theory of change approach is used in public policy appraisal and evaluation, and aims to step through the theory of how an intervention is expected to work, the assumptions made, the quality and strength of the evidence supporting them, and wider contextual factors. See: HMT (2020) Magenta Book: Central Government guidance on evaluation; Section 2.2.1.

Figure 1 Key areas of the regulatory framework considered

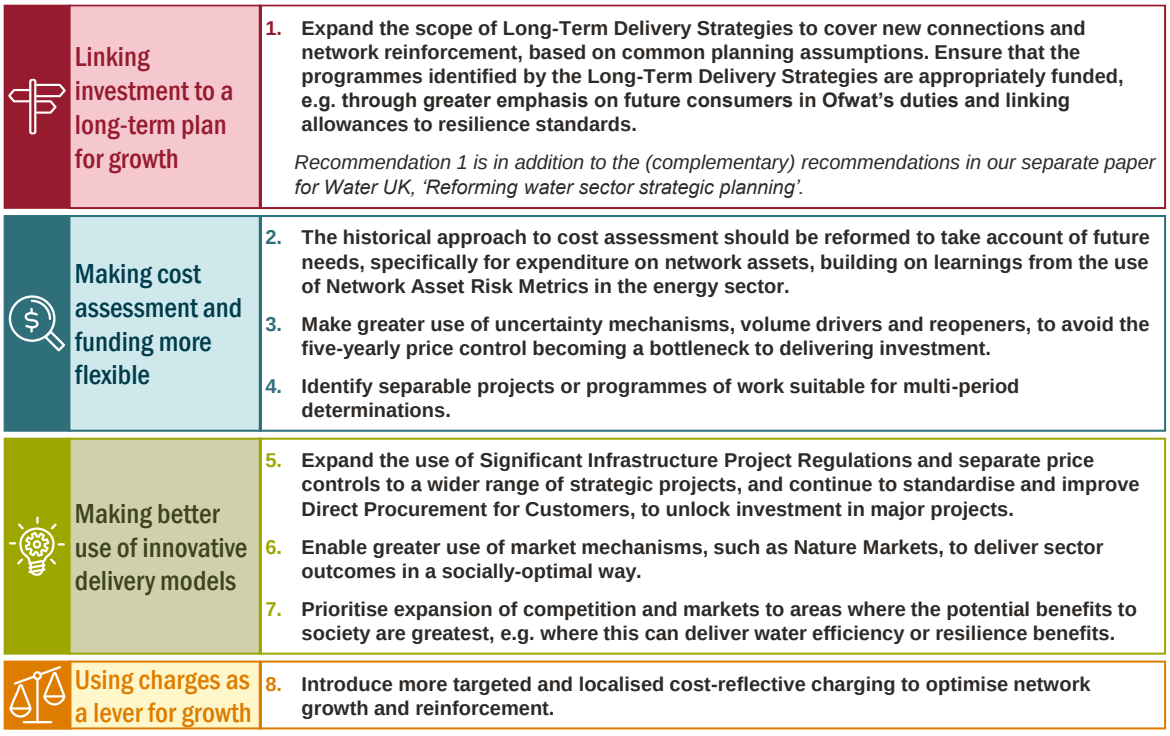


Source: Frontier Economics

1.4 Opportunities for reform

In the sections below, we outline our recommendations across each of the four areas of the regulatory framework outlined above.

Figure 2 Our recommendations at a glance



Source: Frontier Economics

1.4.1 Linking investment to a long-term plan for growth

The sector's long-term planning frameworks do not fully and consistently capture growing demands on the network. As part of PR24, water companies were required to produce Long-Term Delivery Strategies (LTDSs), which refer to 25-year plans that bring together the different long-term strategic plans (e.g. regarding water resources, drainage, etc.) to identify a core strategy or 'pathway', as well as providing a means for companies to consider alternative pathways and drivers for enhancement investment. LTDSs can therefore provide valuable information on long-term investment needs. However, there are gaps in the current method for the LTDS – for example, it does not include base expenditure and so does not fully capture the need for companies to invest in new connections and associated network reinforcement – this is discussed in more detail in the corresponding paper 'Reforming Water Sector Strategic Planning'.

Company-level network reinforcement plans are also not assessed through the regulatory process with long-term growth in mind. In particular, there are no consistent standards for network capacity or network demand resilience. This means that company plans for investment are not prepared, or assessed by Ofwat, on a consistent basis.

To overcome these issues, regulation must be more closely aligned with holistic, long-term planning for growth in the water sector. Price controls should contribute towards the delivery of long-term plans, plotting a coherent strategy for long-term investment in the sector, rather than being seen as isolated five-year periods. And wider planning processes should not stand in the way of executing sector plans.

Recommendation 1: Expand the scope of LTDSs to cover new connections and network reinforcement, based on common planning assumptions. Ensure that the programmes identified by the LTDS are appropriately funded, e.g. through greater emphasis on future consumers in Ofwat's duties and linking allowances to resilience standards.

This recommendation focuses on making better use of existing frameworks, such as LTDSs and Ofwat price controls, to deliver investment based on a long-term view of sector needs. It seeks to optimise the level of investment the sector can deliver, and ensure investment is mobilised efficiently.

1.4.2 Making cost assessment and funding more flexible

Ofwat's current approach to cost assessment is focused on a backwards-looking approach, meaning that long-term network needs may not be sufficiently captured when setting allowances. Where Ofwat takes a model-based approach to cost assessment (i.e. for the majority of base costs and a significant proportion of enhancement costs), these models are based on the relationship between costs and the cost drivers based on past data. An historical approach to setting base allowances may have contributed to network resilience issues now facing the sector, as the relationships based on past data do not fully capture

the forward-looking pressures of climate change and demand growth. The cost assessment process also focuses heavily on cost scrutiny and keeping bills low, at the expense of additional investment that could improve resilience.

Furthermore, Ofwat faces different challenges in assessing enhancement and base cost allowances – for example, enhancement programmes can be more distinct in nature, this limits comparability across companies and makes traditional model-based approaches less effective. Also much of the enhancement programme is based on projects with longer timescales, to which the five-year cycle of cost assessment is ill-suited. The proportion of the overall programme that is enhancement is increasing (at PR19 17% of total expenditure was enhancement, while at PR24 this increased to 42%) and will remain higher in future periods. This also points to the need for new tools for cost assessment.

Once allowed revenues have been set, the current approach to funding is relatively inflexible, and there is little scope for expenditure allowances to flex up and down with needs, meaning that investment needs that arise within price control periods may not be met, at least until the next price control is set.

The cost assessment and funding framework should be a key enabler for efficient investment for growth. The issues above mean that the current approach does not adequately capture the investment needs for future growth, which compromises the industry's ability to deliver the investment that is needed. Increasing the flexibility of the existing framework can help enable the step-up in investment needed going forwards. This could be achieved through incremental or more radical changes, but the focus should be on improving the framework's ability to promptly release required funding. Lessons can be learned from other sectors: for example, developing similar mechanisms to Ofgem's Network Asset Risk Metrics, which monitor energy network asset health spending based on a common framework for measuring risk, could deliver benefits to water customers by putting greater emphasis on delivering long-term outcomes for e.g. capital maintenance and reinforcement of strategic assets, rather than short-term outputs.

Recommendation 2: The historical approach to cost assessment should be reformed to take account of future needs, specifically for expenditure on network assets, building on learnings from the use of Network Asset Risk Metrics in the energy sector.

Recommendation 3: Make greater use of uncertainty mechanisms, volume drivers and reopeners, to avoid the five-yearly price control becoming a bottleneck to delivering investment.

Recommendation 4: Identify separable projects or programmes of work suitable for multi-period determinations.

Recommendations 2-4 could be implemented in isolation or collectively. They seek to increase flexibility and put a greater focus on delivering long-term outcomes. Increasing

flexibility in the framework will allow investment to be unlocked at pace where new challenges or opportunities arise. Focusing on longer-term outcomes will be vital for ensuring the sector has sufficient regulatory certainty to undertake longer-term programmes of work that are needed to deliver benefits to society in future.

1.4.3 Making better use of innovative delivery models

Major infrastructure projects and project-level financing

The water industry has delivered significant investment over the past 30 years, but one feature of the model has been the lack of major projects. For example, the Havant Thicket reservoir will be the first reservoir built in England and Wales for over 30 years. It is also clear that delivery on resilience and growth requires a significant number of major projects over the next 20 to 30 years (e.g. there are nine reservoirs in development currently).

This raises the question of how reform can support the delivery of major projects. In this context, the experience of delivery of major infrastructure projects through separate contracting and financing models has been moderately successful, and is likely to become more efficient over time, as learnings are taken on-board.

The use of Specified Infrastructure Projects Regulations (SIPRs) for Thames Tideway Tunnel (TTT) is held up as a successful example of where the design of the regulatory/licencing model for the construction phase (for example in allocation of risk between investors and government) was supportive of effective financing of a major project. The TTT SIPRs facilitated an efficient allocation of risks between companies, contractors and government, reducing costs, and more efficient cost discovery (particularly for the cost of capital) that was not reliant on regulatory judgement. However, the legal criteria for a project to be regulated under SIPRs are high and implementation of SIPRs has been limited to TTT to date.

The Havant Thicket reservoir project is being delivered by an incumbent wholesaler (Portsmouth Water), and has its own separate price control, independent of the water network-plus or water resources price control of the company. This allows specific assumptions around financing costs, timing and process of cost assessment and cost recovery to be applied to the project's specific characteristics. By having a separate price control, large infrastructure projects delivered under a more traditional capex delivery model (i.e. led by the incumbent company) can also be regulated and financed outside both individual companies' price controls and third party-led regimes like SIPR.

Direct Procurement for Customers (DPC) is similar to the SIPR regime but with less strict project eligibility criteria and no third-party licence. The DPC model is relatively new and immature in its development. In particular, there is a lack of standardisation in the documentation for DPCs and the way candidate projects are identified.

Recommendation 5: Expand the use of SIPRs and separate price controls to a wider range of strategic projects, and continue to standardise and improve DPCs, to unlock investment in major projects.

Nature-based solutions and the use of market-based tools to deliver desired outcomes

Some of the outcomes promoted in the water sector can be delivered by, or in partnership with, agents outside the water sector, such as farmers, developers and local authorities. However, coordination problems can hamper the identification of these solutions, or the partnerships required to implement them.

Market-based mechanisms, such as Nature Markets,[3] can help draw out the best-value solutions, and facilitate partnership working, where this is optimal. But while nature-based solutions (NBSs) and similar alternatives for achieving desired outcomes can be efficient from a social welfare perspective, the existing regulatory framework (with a focus on compliance and penalties) unduly encourages investment schemes with more certain performance or an established track record (even though they may have higher costs for society). This leads water companies and regulators to favour traditional solutions that may be sub-optimal.

Recommendation 6: Enable greater use of market mechanisms, such as Nature Markets, to deliver sector outcomes in a socially-optimal way.

New connections and retail

Competition has been introduced 'in the market' for non-household (NHH) retail and 'for the market' for on-site developer services, as well as in other parts of the water sector. But costly monitoring and intervention has been required to lower entry barriers and make competition more effective. Where the regulatory system has taken steps to open up segments of the industry to competition and market forces, it is important that the effectiveness of this competition is reviewed on a regular basis to ensure that it is delivering the right outcomes for society. Intervention may be needed where market forces are not delivering desired outcomes (e.g. improved water efficiency). The review process could decide to strengthen competition in some areas to improve effectiveness, but it should also be robust enough to conclude that competition should be scaled back if the evidence suggests that is the right answer. There is a growing need to weigh up the need for improved sector resilience and investment for growth when considering how to expand competition.

[3] Nature markets provide opportunities for landowners to sell the additional benefits they generate to others who want or need to buy them. See: Dan Corry (2025) Delivering economic growth and nature recovery: An independent review of Defra's regulatory landscape; page 46.

Recommendation 7: Prioritise expansion of competition and markets to areas where the potential benefits to society are greatest, e.g. where this can deliver water efficiency or resilience benefits.

Recommendations 5-7 are about focusing UK and Welsh governments' and regulators' attention on developing delivery and operational models that will maximise long-term consumer benefits. Innovative delivery models and project-specific financing for major infrastructure projects will be key to unlocking the investment required to increase network resilience and deliver growth. But incumbent-led delivery should not be obstructed where it is more efficient than third-party delivery. **Clear guidance is needed on which delivery and operational models should be deployed and when. Where new tools, such as nature-based solutions, emerge to improve sector outcomes, then it is vital that the wider regulatory framework does not hinder their application.** While it is important not to lose the efficiency benefits where competition has already been introduced, there is a need to prioritise the most effective market mechanisms going forwards, and to ensure that competition is delivering outcomes important for growth, such as improved water efficiency.

1.4.4 Using charges as a lever for growth

The existing charging framework for developer services is 'shallow'[4] and rigid: developers do not bear the full cost of their impact on the network either individually, or as a collective, and existing charges do not send meaningful locational signals that reflect the costs of using the water network in a given area.

Developer charges sit within a 'single till' framework where if revenue from developer charges is higher or lower than forecast, then a company will need to adjust its wholesale charges to comply with its overall revenue cap. This limits scope for large developers to make financial contributions towards bespoke network reinforcements needed to enable their connections, as part of the contribution would need to be shared with customers via lower wholesale charges. Similarly, where large new users have a requirement for 'deeper', more extensive, network reinforcement, companies do not have the incentive to negotiate higher rates to reflect the additional costs.

Recommendation 8: Introduce more targeted and localised cost-reflective charging to optimise network growth and reinforcement.

More cost-reflective charges will send clearer locational signals to developers, improving companies' ability to manage scarce capacity. Meanwhile removal of developer infrastructure charges from companies' single till could lower the cost to household

[4] Shallow charges recover the costs of connection assets through an up-front connection charge, and the recovery of all reinforcement costs through other charges. This differs from a deep connection charges which recover the total costs that will be incurred as a result of connection, including all costs of network reinforcement, through an up-front connection charge.

customers of long-term network enhancement by tapping into the demand of developers with higher willingness to pay for network capacity.

1.5 Conclusions and next steps

Our assessment in this report is that there is a need for reform across the regulatory regime as it relates to investment delivery, particularly to support population and economic growth. Much of this can be delivered within the existing regulatory structure. Further work is needed to develop the detail of the changes required, and to implement them.

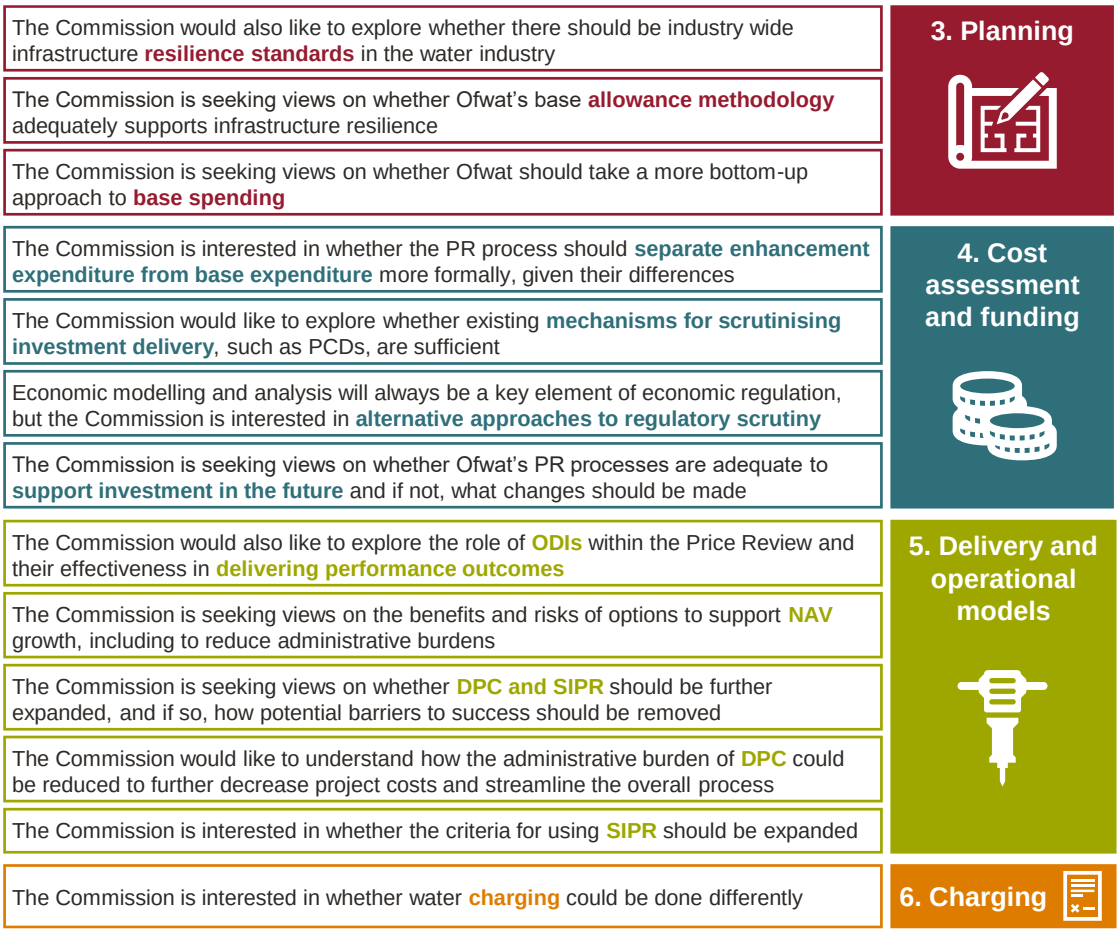
2 Introduction

2.1 The Commission's Call for Evidence

The task of the Commission is to *"stand back from the current system and explore, with an open mind, potential changes – both evolutionary and revolutionary. Its task is to make recommendations on how to equip and reform the system to meet the challenges of the future and, crucially, restore over time the trust that has been lost."*[5] The Call for Evidence (CfE), to which we are responding, is an essential part of that process.

The aim is for the Commission's recommendations to inform a longer-term reset of the sector, with possible implications for later price controls but not PR24.[6]

Figure 3 CfE questions on how the regulatory framework can better enable investment



Source: Frontier Economics; CfE

5 CfE paragraph 11.

6 CfE paragraph 12.

2.2 The challenge

Since privatisation, the demands on the water system have grown in scale and become more complex. Climate change, population growth and ageing infrastructure have added significant pressure to existing networks. We use about 14 billion litres of water per day, and will need 4 billion more by 2050.[7] Climate change is putting more stress on already scarce water resources, increasing risks of surface water flooding and sewer flooding, and impacting the work that companies need to do to protect rivers and the environment. UK consumers are (rightly) accustomed to drinking water and sanitation standards that are world-leading. Increasing environmental awareness has also led to raised standards for environmental protection. Water companies' contributions are also key to meeting wider government objectives on economic growth, biodiversity and Net Zero.

Meeting these challenges will require significant long-term investment. Investment is needed to deliver new connections, reinforce the network as it grows, build and expand strategic assets to increase capacity, maintain existing and new assets in the long term, improve environmental outcomes and maintain water quality standards. The Commission points out that over the next five years, companies are forecast to spend £104 billion to maintain and upgrade the system, including £44 billion of investment in new infrastructure.[8]

The model of privately owned companies financing and delivering investment under a system of economic regulation has delivered much over the past 35 years. However, in a number of key areas the model is not working as well as it should. This paper focuses on reforms that would support the delivery of investment and growth. Water UK has also commissioned a paper from Frontier on reforming strategic planning in the water sector. Where relevant we cross-refer to the conclusions of that paper.

2.3 How the regulatory framework unlocks investment

The water sector is characterised by natural monopolies and various positive and negative externalities. Therefore, effective regulation is needed to deliver outcomes that are optimal for society, and to unlock the optimal level of investment. In this report we consider four areas of regulation that are key to enabling required investment and growth:

- **Planning (Section 3):** the process for identifying how growth impacts the sector, and the investment needed to deliver desired outcomes. In this report, we focus on planning for new connections and network reinforcement investment, and the role of specific planning frameworks as a barrier/enabler to major infrastructure projects. We consider the wider strategic planning frameworks for the sector more fully in our separate paper for Water UK, 'Reforming water sector strategic planning'.

7 https://www.gov.uk/government/publications/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water/plan-for-water-our-integrated-plan-for-delivering-clean-and-plentiful-water

8 CfE paragraphs 78-79.

- **Cost assessment and funding (Section 4):** the framework for ensuring that company plans are efficient and appropriately funded, and deciding *how* allowed revenues should be funded, i.e. whether allowances are set ex ante (at the start of a price control, as for most costs), or if allowances are determined or adjusted during the price control using uncertainty mechanisms.

- **Delivery and operational models (Section 5):** the contracting and financing model used (for incumbent companies or third parties) to build and operate the assets required to deliver growth.

- **Charging (Section 6):** the way in which the actual costs of growth and investment are ultimately recovered from users. In this report, we focus on how companies charge developers for the work they carry out to make new connections to their networks, and the associated network reinforcement costs.

2.4 Our approach

For each of the key areas of the regulatory framework identified in Section 2.3 above, we have:

- Identified barriers to growth and investment, and key lessons learned from recent precedent;
- Considered options for reforming or refocusing the regulatory framework, based on experience in the water sector and beyond; and
- Assessed at a high level how feasible the options for reform are, and whether they are likely to deliver a net benefit to society relative to the status quo.

Our assessment of the relevant barriers, options for reform, and feasibility of reform is based on a combination of desk research and targeted review of case studies, engagement with Water UK and its members including a workshop on this topic, and our own in-house expertise on regulation in water and other sectors. With this evidence base we set out the case for recommendations that we expect to be practical steps towards addressing the barriers that have been identified.

We have then appraised, at a high level, the potential for reforms to deliver a net benefit to society uses a theory of change-based approach. The theory of change approach aims to step through the theory of how an intervention is expected to work, the assumptions made, the quality and strength of the evidence supporting them, and wider contextual factors.[9]

Based on our assessment, we have developed a set of recommendations for how the regulatory framework can be reformed to maximise the delivery of investment for growth.

[9] HMT (2022) The Green Book: Central Government guidance on appraisal and evaluation; paragraph 3.15. HMT (2020) Magenta Book: Central Government guidance on evaluation; Section 2.2.1.

3 Planning

In this Section, we consider the process for identifying how growth impacts the sector, and the investment needed, focusing on new connections and network reinforcement. We start by considering the current approach in the sector and identifying existing barriers to investment for growth. Based on the barriers we identify, we then consider the objectives and options for reform for each barrier. Our recommendation seeks to identify practical steps (from the starting point of the current arrangements) that we expect could remove or lower each barrier.

3.1 Current approach

We considered three main aspects of the current approach for identifying investment needs: long term planning frameworks prepared by companies to assess long term needs, the approach to planning and funding new connections and associated network reinforcement; and the wider framework around planning consent.

3.1.1 Long-term planning

There are three main company-level plans that together aim to identify long-term challenges and strategies, and resulting investment requirements:

- Water Resources Management Plans (WRMPs);
- Drainage and Wastewater Management Plans (DWMPs); and
- Long-Term Delivery Strategies (LTDSs).

WRMPs and DWMPs outline companies' individual 25-year strategies to secure the supply of water and protect the environment, and reduce pressures on their drainage and wastewater systems, respectively.

- In WRMPs, which are a statutory requirement, companies must forecast the supply and demand for water in their areas over the next 25-50 years. Companies select preferred programmes of work to balance long-term supply and demand based on their view of the 'most likely' future, existing government policy, and consistency with other plans such as DWMPs. WRMPs are approved by the Secretary of State.[10]

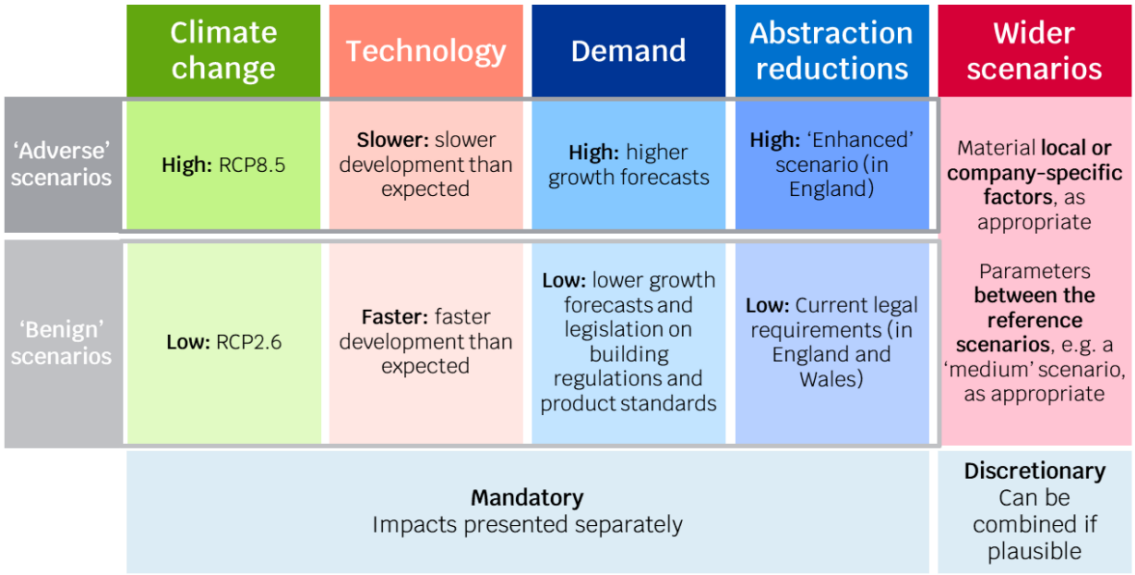
- In DWMPs, companies set out the key challenges for their systems in the future, and interventions needed to deliver resilient systems that will meet operational and other pressures. Companies use a risk-based approach to identify vulnerable catchments based on indicators such as flooding and pollution, then assess the system

[10] https://www.ofwat.gov.uk/regulated-companies/resilience-in-the-round/water-resource-planning/ https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline

performance and resilience within each catchment. Preferred programmes are identified from a set of 'best value' solution options for their most at-risk catchments.[11]

For PR24, Ofwat asked companies to set out their five-year business plans in the context of an LTDS. Ofwat envisaged that LTDSs would outline the long-term outcomes companies aim to deliver, and the key investments and activities that form the best pathways to achieving them, given future uncertainties.[12] LTDSs aim to bring together all the strategic planning frameworks (including WRMPs and DWMPs)[13] and statutory environment programmes, and enhancement activities outside of these frameworks.[14] At the heart of LTDSs is 'Adaptive Planning' – planning based on strategies or 'pathways' showing what activities will be dependent on certain circumstances, and what is required in most or all plausible futures.[15] As a starting point, Ofwat asked companies to test their LTDSs against a common set of reference scenarios, shown in Figure 4 below.[16]

Figure 4 Ofwat's expectations for LTDS scenario testing



Source: *Ofwat (2022) PR24 and beyond: Final guidance on long-term delivery strategies, page 8.*

Note: *RCP stands for 'representative concentration pathway'. RCPs were developed by the Intergovernmental Panel on Climate Change to specify different future concentrations of greenhouse gases to create a wide range of plausible future emissions scenarios (the numbering in the diagram refers to different scenarios).*

11 https://www.gov.uk/government/publications/drainage-and-wastewater-management-plans-guiding-principles-for-the-water-industry/guiding-principles-for-drainage-and-wastewater-management-plans https://www.thameswater.co.uk/about-us/regulation/drainage-and-wastewater-management/dwmp-explained

12 Ofwat (2021) PR24 and beyond: Long-term delivery strategies and common reference scenarios; page 3.

13 Other relevant strategic planning frameworks also include regional water resources plans, flood risk management plans (FRMP), river basin management plans (RBMP), and shoreline management plans (SMP).

14 Ofwat (2022) PR24 and beyond: Final guidance on long-term delivery strategies; page 5.

15 Ofwat (2022) PR24 and beyond: Final guidance on long-term delivery strategies; page 6.

16 Ofwat (2022) PR24 and beyond: Final guidance on long-term delivery strategies; page 8.

WRMPs, DWMPs and LTDSs are therefore interlinked, and should generally reflect a common set of planning principles and assumptions across companies. We discuss in detail the alignment and coordination of planning frameworks in a separate paper for Water UK, 'Reforming water sector strategic planning'. In this paper we focus on the ability of these planning frameworks to deliver investment needed for growth.

At PR24, Ofwat set enhancement allowances and the implicit base allowances to maintain and enhance the supply/demand balance it considered sufficient and adequate to enable the 2024 WRMPs[17] to be delivered in full over the 2025-2030 period, including the development of schemes needed to deliver timely benefits after 2030.[18] DWMPs and LTDSs are not statutory requirements in the same way as WRMPs, therefore Ofwat is not required to explicitly determine funding for these plans.[19] Indeed, there is little mention of DWMPs and no mention of LTDSs in Ofwat's PR24 Final Determinations Expenditure Allowances document. We also discuss the use of LTDSs by Ofwat in more detail in the separate paper for Water UK on water sector strategic planning.

3.1.2 New connections and network reinforcement planning

When new developments (including domestic properties and commercial developments such as factories) are built they need to be connected to the local water network, and the network may also need to be reinforced to ensure there is sufficient capacity across the value chain. This drives companies' workloads via a number of different activities:

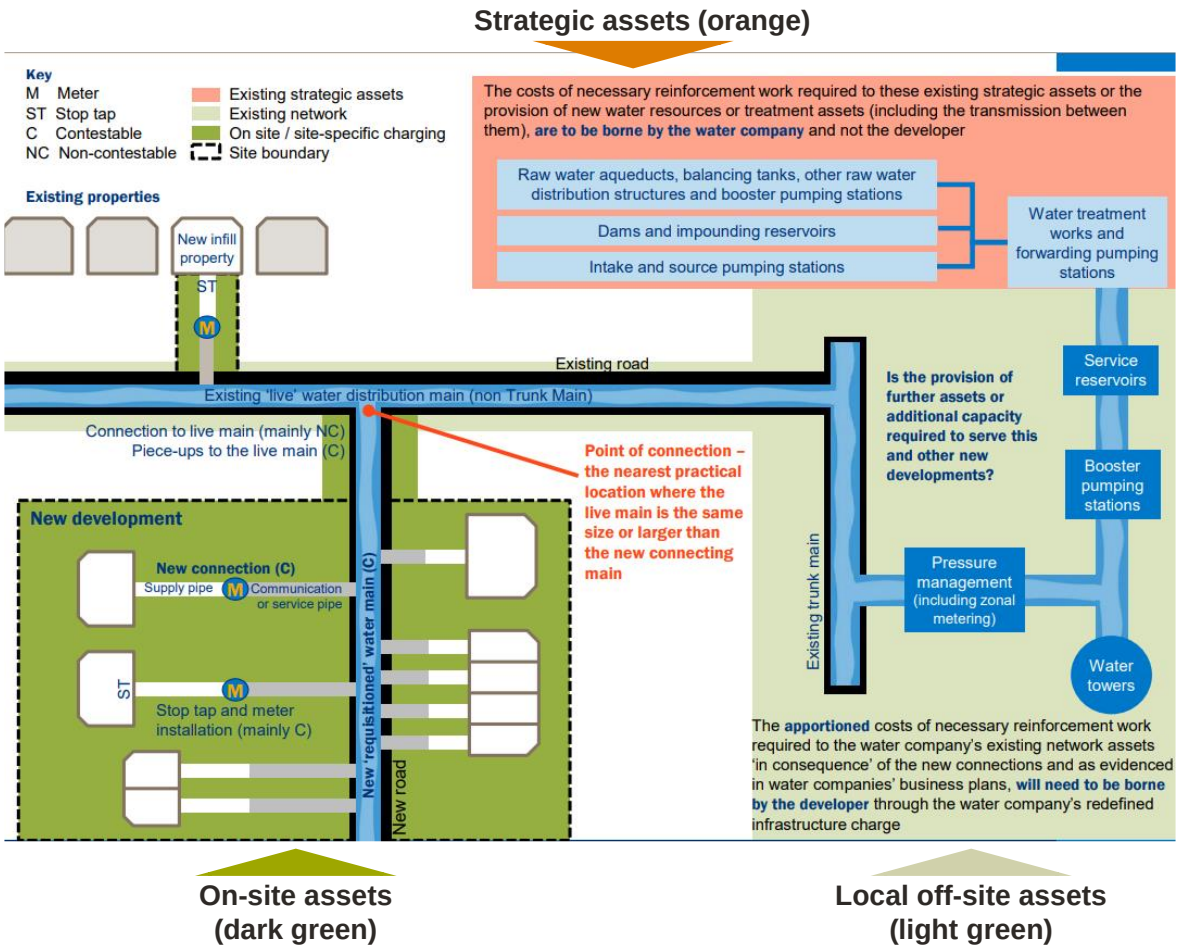
- 'On-site' work: physically connecting each new property to the local network.
- 'Off-site' work or 'network reinforcement': reinforcing or upgrading existing assets in order to accommodate the extra demand. Network reinforcement is typically thought of in two parts – reinforcement of:
    - 'Local' off-site assets; and
    - 'Strategic' assets.

17 While some WRMPs had been signed off by the Secretary of State before PR24 Final Determinations, others were in draft form (for which Ofwat used the latest draft).

18 Ofwat (2025) PR24 final determinations: Expenditure allowances; Section 3.6.

19 Ofwat is a statutory consultee for WRMPs. It needs to determine the extent to which companies can recover the costs of investments through charges to customers. https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline

Figure 5 Illustration of on-site and different types of off-site assets



Source: Frontier Economics, based on Ofwat (2017) New Connections Cost Data Straw Man; page 3.

As of PR24, on-site asset costs are not regulated through the price control process. Ofwat has decided to deregulate the provision of site-specific services to facilitate the development of competition in this market, as these are contestable activities.[20] Off-site (network reinforcement) funding is still regulated through the price control process, but **Ofwat typically assesses network reinforcement needs separately to the needs set out in WRMPs, DWMPs and LTDSs**.

There is no guidance or formal standards to decide when network reinforcement should be triggered, e.g. if storage drops below a certain threshold or if treatment works are close to their potential peak demand. Therefore, in practice, companies likely approach the issue in different ways. In particular, the specific assumptions used to establish the need for network reinforcement and the approach to e.g. anticipatory investment is likely to be inconsistent across companies.

20 https://www.ofwat.gov.uk/wp-content/uploads/2024/05/Initial-conclusions-on-changing-Ofwats-charging-rules-to-support-the-new-developer-services-framework.pdf

In Section 6, we set out how the actual costs of new connections and network reinforcement (i.e. the costs incurred in executing the works discussed above) are ultimately recovered from developers through charges, and how the charging regime could be improved.

3.1.3 The wider planning framework for major projects

Major water and wastewater projects may fall under the Nationally Significant Infrastructure Project (NSIP) regime. Since 2010, most major economic infrastructure projects have been consented through the NSIP system under the Planning Act 2008.[21] There are six stages to the decision-making process for major infrastructure projects:[22]

- Pre-application: Before submitting an application, potential applicants have a statutory duty to carry out a consultation on their proposals.
- Acceptance: The Planning Inspectorate, on behalf of the Secretary of State, decides whether or not the application meets the standards required to be accepted for examination.
- Pre-examination: The public can register with the Planning Inspectorate to become an Interested Party by making a Relevant Representation.
- Examination: The Planning Inspectorate consults on the application, holding calls to evidence and hearings of Interested Parties' representations.
- Recommendation and decision: The Planning Inspectorate prepares a report on the application to the relevant SoS, including a recommendation, which the SoS then accepts or rejects.
- Post-decision: Once a decision has been issued, there is a six week period in which the decision may be challenged in the High Court.

Government recently invited views on further action the government could take through the planning system to streamline the development of critical infrastructure, in particular NSIP, across England.[23] Assessing the scope to reform the NSIP regime in relation to water investment is outside of the scope of this report. At a high level, though, it is vital that the NSIP regime strikes the right balance between ensuring that the impacts of project are properly assessed, and ensuring the process is streamlined and decisions are timely.

3.2 Barriers to growth and investment

We have identified three broad barriers to the planning approach for delivering optimal investment for growth:

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21 https://www.gov.uk/government/publications/planning-reform-working-paper-streamlining-infrastructure-planning/planning-reform-working-paper-streamlining-infrastructure-planning#introduction

22 https://infrastructure.planninginspectorate.gov.uk/application-process/the-process/

23 https://www.gov.uk/government/publications/planning-reform-working-paper-streamlining-infrastructure-planning/planning-reform-working-paper-streamlining-infrastructure-planning#introduction

- **The sector's long-term planning frameworks do not fully and consistently capture growth:** WRMPs, DWMPs and LTDSs are based on supply and demand forecasts, but these are likely to be relatively high level and may not include explicit estimates on the number and size of new developments likely to require connection over time.[24] Therefore, these plans may only implicitly capture the need for companies to invest in new connections and associated network reinforcement. This risks introducing inconsistencies in how companies plan for network reinforcement (such as inconsistent planning assumptions), and how actual network reinforcement activities reflect longer-term plans.

- **Company-level network reinforcement needs are not assessed with long-term growth in mind:** Companies can accommodate new connections and demand by reinforcing different local or strategic assets. Funding for seemingly unrelated activities (e.g. reducing leakage from existing infrastructure) can also play an important role. Therefore, the range of activities and costs that can be involved in supporting growth in connections is broad. However, network reinforcement costs are not forecasted in the context of delivering longer-term plans, and are not linked to clear resilience or capacity standards. This can result in long-run inefficiencies, as anticipatory investments that might not be needed today, but could accommodate new connections and enable growth in future, are unlikely to be funded at price controls. Instead, price controls tend to focus more on funding reactive network reinforcement work and do not link network reinforcement expenditure with specific resilience standards (e.g. service reservoir levels). Additionally, without a consistent framework to link network reinforcement activities to clearly-defined resilience standards, there is less scope for Ofwat and companies to identify the most successful approaches to new connections and network reinforcement planning.

3.3 Recommendations

3.3.1 Recommendation 1: Expand the scope of LTDSs and ensure that LTDS pathways are appropriately funded

The scope of LTDS should be expanded to explicitly cover new connections and network reinforcement. Common assumptions and scenarios should be used to underpin planning assumptions across companies. In practice, this means requiring companies to reconcile their forecast number of new connections with their demand growth assumptions used in LTDSs.

Expanding the scope of LTDSs would ensure that network reinforcement needs (i.e. investment in both local and strategic assets) are aligned with long-term growth forecasts

[24] For example, Ofwat's guidance on LTDS growth forecasts in England states that companies should use population, property and occupancy forecasts derived from local plans published by the local council or unitary authority; and population, property and occupancy forecasts derived from ONS population and household projections. See: Ofwat (2022) PR24 and beyond: Final guidance on long-term delivery strategies, page 42.

used in other investment decisions, thereby putting greater emphasis on long-term network needs. This would also allow plans to be optimised over a wider range of projects, delivering better outcomes at lower cost. For example, work carried out to reduce leakage can also deliver network resilience benefits, and planning this work in the context of expected growth can help deliver additional capacity to enable new connections at a lower cost. If companies' long-term plans take these interactions into account, this will deliver more coherent long-term company plans for network reinforcement and resilience investments.

We note that if planning assumptions are rigidly defined, then they are less likely to accurately capture regional or company-specific circumstances. However, these trade-offs can be balanced: as an example, in the energy sector, Ofgem has sought to align planning assumptions across gas distribution and electricity transmission companies to some extent by asking them to cost their business plans based on the National Energy System Operator's 'P1 Holistic Pathway' forecast of supply and demand conditions, while allowing companies to make justified adjustments to this pathway based on sector/company circumstances.[25]

In addition, there should be a clear 'line of sight' from the LTDS pathway to the price control funding decisions. Ideally, at price control reviews, there should be a strong expectation that Ofwat will approve and efficiently fund the LTDS pathway, based on identified need for investments in the next five-year period within the context of companies' LTDS 'ambition'[26] and investment pathway. If a company undertakes a robust LTDS, then there should be well-understood criteria for any deviation in Ofwat's funding from the LTDS (e.g. cost efficiency adjustments). Where specific programmes are reduced or disallowed, this should have an explicit rationale in terms of either (i) some objective weakness in the LTDS modelling, or (ii) some new information that has emerged since the LTDS was submitted.

Ofwat could facilitate this by requiring companies to consider optionality and long-term flexibility in their approach to planning, or by introducing resilience standards and linking them with network reinforcement allowances at price controls. Explicitly valuing flexibility in investment opportunities would make companies' network reinforcement plans (and Ofwat's assessment of needs cases for network reinforcement) more transparent.[27] [28] Introducing resilience standards, for example requiring a water company to ensure service reservoir levels are maintained at a certain level, would also provide a clearer needs case for forward-

25 Ofgem (2024) RIIO-3 Sector Specific Methodology Decision – Overview Document; paragraphs 5.19-5.26.

26 In the context of the LTDS, the company 'ambition' represents the long-term outcomes and outputs which its investment pathways are designed to deliver and the pace at which this should be delivered.

27 Flexibility could refer to both the flexibility offered to management once the investment is undertaken, and the flexibility of delaying the investment through time, to acknowledge that investments can be made at different points in time. See: Ofgem (2012) Real Options and Investment Decision Making, page 4.

28 For a water company, such an approach could help value different investment options in the face of uncertainty, and may suggest increasing network capacity based on a long-term forecast of demand (i.e. to more easily accommodate future connections), rather than only increasing capacity to accommodate near-term increases in demand.

looking network reinforcement spending. For example, if a large number of new connections were forecast in a particular area and a company could demonstrate that this would lead to certain resilience standards being breached in that area, then this could simplify and speed up the process for approving and funding any required network reinforcement work.

By rooting price control decisions in the context of each company's LTDS, companies' business plans can become a waypoint in their overall strategy to deliver long-term objectives (as opposed to a full reset every five years). This approach will help give companies more certainty to undertake long-term programmes of work. Greater certainty over funding for LTDSs would reinforce companies' focus on producing coherent and robust strategies, that take a long-term view of network reinforcement needs, and are aligned with the needs set out in WRMPs and DWMPs. If LTDSs are well developed and funded, then the resilience outcomes those plans aim to deliver will be more likely to materialise.

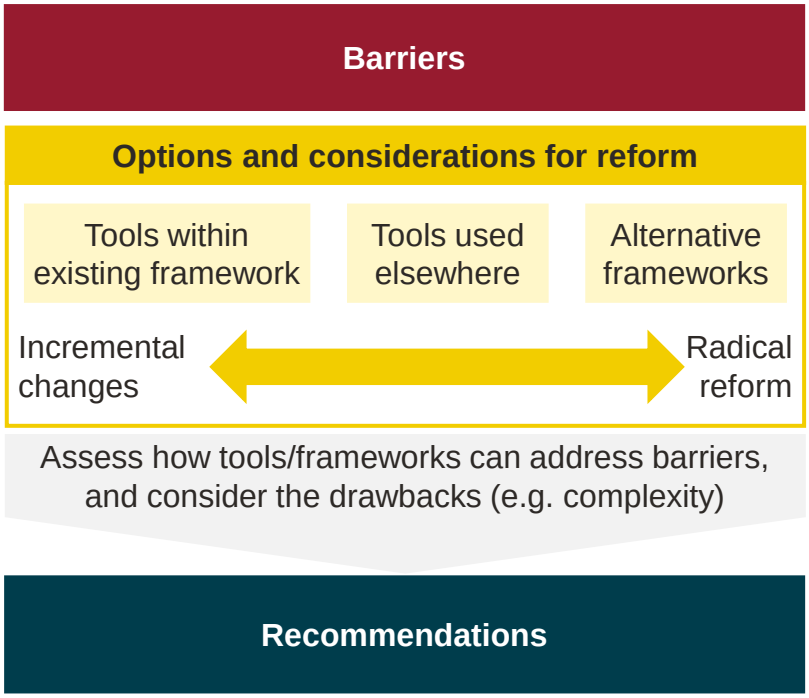
For Ofwat to fund network reinforcement based on a needs case set out in LTDSs, it may require policy direction to put a greater emphasis on long-term/future consumer welfare, or for its funding decisions on network reinforcement to be tied to clearer long-term outcomes such as companies maintaining specific resilience standards.

We also discuss this (along with broader recommendations in relation to adaptive investment, which complement those we have set out above) in a separate paper for Water UK, 'Reforming water sector strategic planning'.

4 Cost assessment and funding

In this Section, we consider the framework for ensuring plans and delivery are efficient and appropriately funded. We start by considering the current arrangements, and identify barriers to investment for growth. Given that cost assessment and funding frameworks used by regulators can be broad (covering many different tools and approaches) and varied (in terms of complexity, and the level of intervention), we then considered a range of options and considerations for reform, drawing on the existing framework and drawing on experience elsewhere. Our recommendations set out incremental changes to the existing framework that we expect would lower or remove some of the barriers we have identified; they also propose areas where more radical reform should be explored.

Figure 6 How we get to our recommendations on cost assessment and funding



Source: Frontier Economics

4.1 Current approach

In its five-yearly price controls,[29] Ofwat challenges water companies' business plans, adjusting or removing proposals it deems inefficient, and sets largely ex ante allowances to deliver the approved plans. This process is referred to as cost assessment and funding. Ofwat groups companies' costs into two main categories for cost assessment: base costs

[29] https://www.ofwat.gov.uk/regulated-companies/price-review/2024-price-review/framework-and-methodology/final-methodology/reviewing-water-for-you/

(which cover companies' day-to-day running costs and network maintenance), and enhancement costs (investments for enhancing their networks).

Ofwat also uses other mechanisms (including 'uncertainty mechanisms') to adjust companies' allowances in period, or ex post, as outturn costs and outcomes become more certain over the price control period. These mechanisms include indexation and reopeners.

Base costs assessment

Ofwat largely relies on econometric modelling when setting efficient allowances for base costs.[30] The modelling is complemented with company-specific and/or sector-wide cost adjustments and ad hoc models.[31] The exact approach used varies across the individual price controls for wholesale water, wholesale wastewater, bioresources and residential retail activities.

Econometric models estimate a relationship between cost drivers and base costs using historical data, considering some of the structural factors that may drive differences in costs (these are known as 'cost drivers' and can include for example customer numbers, network size, and population density; cost drivers are specified by Ofwat and data is provided by companies). The estimated relationships are then applied to forecast cost drivers to determine an efficient level of base costs for a particular activity. Variation in company costs from this 'efficient' level is interpreted as the company's managerial efficiency/inefficiency.

Ofwat recognises that its econometric models do not capture all of the structural reasons for variation in company costs. To address this, Ofwat makes two types of 'post-modelling' cost adjustments:

- 'Sector-wide cost adjustments' provide additional allowances for incremental change common across all companies (e.g. delivering a step-change in meter replacement); and
- 'Company-specific cost adjustments' reflect the unique circumstances of individual companies (e.g. SES Water has a statutory obligation to soften water for over 80% of its customers, leading to additional operational and capital expenditures. It submitted a cost adjustment claim to cover these unique costs).

A final category, 'unmodelled costs', which makes up a small proportion of total base costs, is not considered suitable to be included in the econometric models. These costs are therefore assessed separately. Unmodelled costs include pension deficit recovery costs, business rates, and abstraction charges.

30 Companies' operating and capital maintenance activities.

31 Ad-hoc models are used to assess 'unmodelled' base costs. These are costs Ofwat considers to be largely outside company's control, or costs driven by company-specific characteristics.

Enhancement costs assessment

Expenditure is categorised as 'enhancement' if it is to be incurred on activities which lead to permanent increases in the level of service or capacity. For example, this can be for environmental improvements to meet new statutory obligations, or improving service quality.

At PR24, the value of enhancement costs and the proportion of enhancement costs relative to total costs increased significantly compared to PR19, from 17% (c.£10bn) to 42% (c.£44bn). This was driven by new and more stringent statutory requirements and increasing external pressures from climate change and population growth.

Ofwat requires companies to allocate their proposed enhancement spend within specified categories ('enhancement lines') as much as possible, to enable comparative analysis to be undertaken. There are approximately 60 different enhancement lines covering areas such as resilience, leakage, pollution reduction, and raw water deterioration. For each line, Ofwat applies at least one of the following methodologies:

- Benchmarking: Ofwat compares historical and forecast costs for each company and each category to estimate the level of efficient cost (either via econometric benchmarking, or based on an assessment of unit costs).
- Shallow dives: light-touch reviews of enhancement cases, typically where expenditure is less than 0.5% of the water or wastewater wholesale total expenditure ('totex'), or less than £10m).
- Deep dives: Ofwat conducts in-depth reviews of evidence provided by the companies for each enhancement case against a set of criteria. It considers the strength of evidence on the need for the investment, the efficiency of the proposed costs and whether the investment represents the best option for customers. The 'deep dives' generally apply to more material enhancement cases (where the expenditure is more than 0.5% of the water or wastewater wholesale totex, or more than £10m).

Uncertainty mechanisms

Ofwat's cost allowances are not intended to address every changing circumstance companies may face during the price control period. It therefore uses a range of risk protection measures, and where uncertainty is material and the ability for companies to control the associated risks or their impacts is limited, Ofwat also includes 'uncertainty mechanisms' (UMs).[32] Ofwat's UMs mainly consist of risk-sharing mechanisms (where the

[32] Ofwat (2024) PR24 Final Determinations: In-period adjustments; page 2.

effects of forecast errors are shared between companies and consumers)[33] and reopeners (where Ofwat revisits companies' allowances in certain circumstances).[34] [35]

One notable example of a reopener-style mechanism that Ofwat used in the past was its allowance of additional funding for Green Economic Recovery schemes (see Box A below).

Box A: Green economic recovery schemes[36]

Ofwat used the green economic recovery reopener in 2020 to allow water companies to accelerate investment to deliver lasting environmental and public health benefits as part of England's post-Covid recovery. The initiative aimed to 'build back greener' by stimulating economic activity and advancing climate and ecological goals, while deferring most customer cost recovery to the post-2025 period, to support affordability. A total of £793 million was approved, with funded projects including phosphorus removal, storm overflow mitigation and lead pipe replacement, and were selected for their environmental benefits, potential to support innovation, and value in shaping planning for PR24.

Ofwat assessed each proposal against five criteria to ensure value for money and customer protection: (i) evidence of consumer and environmental benefits; (ii) incrementality vs PR19 baseline allowances; (iii) cost-benefit analysis and consideration of wider impacts; (iv) cost efficiency; and (v) customer support based on consumer engagement e.g. via the Consumer Council for Water. Ofwat also applied cost-sharing mechanisms, linked funding to delivery milestones, and introduced bespoke reporting requirements to monitor benefits and prevent double funding.

Two companies were allowed to start recovering costs in-period (i.e. during the PR19 price control period), to safeguard their financeability, otherwise the spending was added to companies' regulatory capital values (RCVs) at PR24 (adjusting for changes in forecast and outturn costs by the end of the PR19 period).

Approaches to cost assessment and funding in other sectors

Not all regulators use the same tools and approaches as Ofwat for cost assessment and funding. As we discuss in Section 4.3 below, learnings can be taken from tools and approaches developed in other sectors. In the Boxes below, we provide case studies on

33 For example, Ofwat's outturn adjustment mechanism recalibrates investor returns in the event of significant, systematic out or underperformance across the sector, providing protection for customers and companies against the potential for miscalibration of the outcomes package.

34 For example, Ofwat's cross-sector Bioresources UM allows for in-period changes in allowances, to adjust for increases in costs reasonably attributable to any new or changed legal requirements etc. in relation to the application of fertiliser derived from sludge to agricultural land. Re-openers can also be sector-specific or bespoke to an individual licensee.

35 For a list of PR24 UMs, see: Ofwat (2024) PR24 Final Determinations: In-period adjustments; Tables 1 and 3.

36 Ofwat (2021) Green Economic Recovery: Final Decisions; pages 3, 5-8, 9-11 and 13–23

specific tools that Ofgem has developed for energy network regulation, and which we draw on in our recommendations.

Box B describes the Network Asset Risk Metrics (NARMs) Ofgem uses to monitor energy network asset health spending – this is an example of a complex tool that combines elements of cost assessment and outcome incentives to ensure companies efficiently deliver desired long-term outcomes.

Box B: NARMs at RIIO-2[37]

NARMs were introduced in RIIO-2 to quantify asset-related risks (the metric used is called 'monetised risk', risk pounds or R£, although it is not actually a measure of monetary value). NARMs built on the 'network output measures' framework that was used in RIIO-1, to provide a consistent, cross-sector approach for assessing the impact of asset management activities, and monitoring delivery of those activities.

Each energy network sector applies the NARMs methodology using monetised risk as a measure of output. For each asset falling within the scope of the NARMs framework, risk is calculated as the product of the 'probability of failure' and the 'consequence of failure', which may include system impacts, safety risks, environmental damage, and direct financial costs. These monetised risk figures are then summed across all relevant assets to derive a monetised risk figure for each network.

Ex ante funding for improving network health is based on the 'Unit Cost of Risk' benefit, a measure of how much funding is allocated per unit of risk reduced. At the end of the price control period, Ofgem compares the actual level of monetised risk reduction delivered, against the level set out in business plans. If the difference falls outside a deadband, then a network must justify the deviation to avoid Ofgem clawing back some of its allowance.

The NARMs approach enables Ofgem to: (i) set measurable outputs linked to funding; (ii) compare performance across different networks and assets; (iii) support robust cost-benefit analyses and investment justifications; and (iv) hold companies accountable for outcomes, not just activity. Therefore, the introduction of NARMs reflected a shift toward outcome-based regulation for capital maintenance, where the value of risk reduction is central to evaluating company performance.

Box C describes how Ofgem has recently made targeted use of volume drivers for Secondary Reinforcement expenditure by electricity distribution network operators (DNOs). Because of significant uncertainty around the volumes of Secondary Reinforcement work required (due to the uncertain pace of electrification of heating and transport), these volume drivers release funding as volumes of work are carried out, based on a pre-determined efficient unit cost.

[37] Ofgem (2021) RIIO-2 Final Determinations NARM Annex (REVISED); pages 5-7 and 21.
Ofgem (2022) NARM Handbook v3.1; pages 6-16, 18-22, 29 and 34-36.

Box C: Secondary Reinforcement Volume Driver at RIIO-ED2[38]

DNOs carry out Load Related Expenditure to expand network capacity in response to increases in demand. Load Related Expenditure is growing at a significant rate due to the electrification of the economy, particularly due to uptake of low-carbon technologies such as electric vehicles and heat pumps, in line with the UK's decarbonisation goals. One category of Load Related Expenditure is Secondary Reinforcement, which relates to upgrading lower-voltage parts of the network, such as low-voltage and high-voltage circuits and substations.

To manage uncertainty around the pace and location of low-carbon technologies uptake, Ofgem's Secondary Reinforcement Volume Driver and Low Voltage Services Volume Driver provide funding for traditional network upgrades, as well as for flexibility services that can defer the need for reinforcement.

The two volume drivers automatically release funding based on the actual volumes of secondary reinforcement work delivered, measured in megavolt amperes capacity released. Specifically, these volume drivers ensure that allowances can increase or decrease depending on the actual megavolt amperes capacity released over the price control, rather than relying on fixed ex ante allowances.

Each type of secondary reinforcement has an associated unit rate per megavolt ampere released, which is determined through benchmarking at the start of the price control, so funding adjusts in line with the volume delivered multiplied by the relevant unit rate.

To ensure that investments funded through the volume drivers are justified and efficient, Ofgem also developed a set of monitoring metrics. These metrics allow Ofgem to identify potential cases of overinvestment or investment that is not proportionate to actual demand increases. For example, Ofgem monitors a 'Transformer Utilisation Metric', to ensure that reinforcement is focused on assets with high forecast utilisation for the year ahead (above 100%), with only a small tolerance for exceptions. If a DNO exceeds its ex ante allowance and fails any of these metrics, Ofgem can initiate a review. This can result in some or all of the excess funding being disallowed unless the company can provide strong justification for the spending.

Box D sets out how Ofgem developed its Accelerated Strategic Transmission Infrastructure (ASTI) framework to expedite the process for allocating reopener funding for certain projects, by putting greater emphasis on ex post cost assessment and delivery incentives.

[38] Ofgem (2023) RIIO-ED2 LRE Volume Drivers Governance Document; pages 5-8, 13 and 27.
Ofgem (2022) RIIO-ED2 Final Determinations Core Methodology; pages 15-17, 24-25, and 29-31.

Box D: Ofgem's ASTI framework[39]

The Large Onshore Transmission Investment (LOTI) reopener was designed to provide electricity transmission network owners a funding route for large projects that may be required during RIIO-2 to meet decarbonisation or system reliability needs.

However, in practice the LOTI framework meant that new connections could not be rolled out at pace. In the first two years of RIIO-2, it was reported that new renewable capacity would have to wait 12 years for a new connection.

As a result, Ofgem introduced the ASTI framework to circumvent the lengthy LOTI process. In essence, for eligible projects, the ASTI framework rolls back a large number of requirements under the LOTI framework, thereby streamlining decision-making and facilitating required investment in connections at pace.

ASTI exempted nearer-term projects from competition, and provided pre-construction and early-construction funding ahead of planning application submission. Therefore, ASTI postpones the full project cost assessment until after submission of a planning application.

ASTI projects involve strong incentives on timely delivery via price control deliverables (PCDs) and ODIs – i.e. rewards/penalties for early/late delivery against a target date, with rewards/penalties based on forecast constraint costs. However, Ofgem did not include an additional ex-post efficiency assessment mechanism within the ASTI framework.

4.2 Barriers to growth and investment

Long-term network needs are not sufficiently considered in price controls. As set out in Section 3.2, while Ofwat is required to fund WRMPs, it is not required to fund DWMPs and LTDSs, and network reinforcement is not assessed with longer-term growth in mind. This may lead to underfunding of long-term projects, delays to investment, and/or inefficient investment.

Ofwat's backwards-looking approach to setting base allowances will not work well when investment needs are increasing and will contribute to resilience issues in the sector. This finding is echoed in the Commission's Call for Evidence.[40] In particular, since Ofwat primarily relies on companies' historical spending when assessing base expenditure (which includes network reinforcement),[41] it will 'bake in' lower spending requirements when

39 Ofgem (2021) Large Onshore Transmission Investments (LOTI) Re-opener Guidance and Submissions Requirements Document; pages 6-10.
Ofgem (2022) Decision on accelerating onshore electricity transmission investment; pages 4-5, 22-26, 30-38 and 55-77.

40 CfE, paragraph 268.

41 At PR19 base costs included network reinforcement and new connections, at PR24 base costs included network reinforcement but new connections costs were removed from the price control. See: Ofwat (2025) PR24 final determinations: Expenditure allowances; pages 4 and 74. Ofwat (2019) PR19 final determinations: Securing cost efficiency technical appendix; page 15.

future needs are increasing due to climate change and the underlying replacement cycle for existing assets.[42] For example, past maintenance spending during the period being used in econometric models to set allowances may have been below what had been required. A similar issue may arise for enhancement allowances where Ofwat sets unit costs based on historical data that will not be reflective of the unit costs achievable going forwards (e.g. due to increasing supply chain constraints).

The existing framework is relatively inflexible. Ofwat uses a limited set of UMs, meaning that there is little scope for expenditure allowances to flex up and down with needs. Companies facing an increase in expenditure needs have to consider whether to increase spending now and accept that cost sharing rates will only fund a proportion of the extra spend, or hold off the expenditure in the expectation that future allowances are increased.

Ofwat's price control process must not focus too much on price scrutiny and keeping bills low, at the expense of longer-term resilience.[43] While customers have faced limited bill increases in recent years, stakeholders have expressed concerns to the Commission about the long-term impact of this approach on the health of sector assets.

Ofwat faces different challenges when assessing enhancement and base allowances.[44] The Commission has noted that assessing enhancement spend appears to be inherently more difficult than base, and that Ofwat is constrained in its ability to scrutinise enhancement spending by the fact that some of the requirements are set 'upstream' by the likes of the EA. Relatedly, the Commission has noted views that Ofwat's current five-year price control process may be hampering sector planning and investment.[45]

4.3 Recommendations

The cost assessment and funding framework could better deliver efficient funding in response to growth through incremental changes, or more significant reform. Below, we set out our recommendations for reform.

4.3.1 Recommendation 2: The historical approach to cost assessment should be reformed to take account of future needs, specifically for expenditure

42 We also note that historical changes in how new connections and growth costs have been assessed over time have risked causing inefficiencies/underinvestment. From PR14 to PR24, Ofwat transitioned from a 'totex' based approach to split 'base plus enhancement' based approach, and from outcomes-based regulation to a more outputs-based approach, and at PR24 introduced retrospective assessments of whether companies have already been funded for a certain activity.

43 CfE, paragraphs 264-265.

44 CfE, paragraph 267.

45 CfE, paragraphs 179, 192 and 207.

on network assets, building on learnings from the use of Network Asset Risk Metrics in the energy sector

At the very least, the cost assessment and funding framework should take a more forward-looking approach given the need for a step-up in investment in the sector. In particular, Ofwat should focus more on forward-looking needs and costs in its assessment of companies' business plans.

Needs cases for companies' planned activities, particularly for water enhancement projects, should be defined by long-term planning assumptions, so that cost assessment and funding can focus on enabling the efficient execution of, for example, LTDSs.[46] This would be consistent with Recommendation 1 (see Section 3.3.1, where we recommend expanding the scope of LTDSs and ensuring they are funded by Ofwat). Aligning needs cases with long-term plans may improve outcomes and efficiency by ensuring that networks develop optimally in light of the challenges the sector faces. It may be beneficial for needs cases to be set/assessed fully outside of the price control process, however this will require more significant reform and potentially stronger policy signals from government.

Ofwat should put more emphasis on recent and forecast cost data when assessing the efficient level of costs. It is clear that the challenges of climate change and asset resilience merit a more forward looking approach to cost assessment. Setting forward-looking allowances based on historical unit cost data will risk underfunding future investment where historical data will not be representative of actual conditions going forward. There is a heightened risk for enhancement expenditure, given the step-change in the scale of enhancement activities that will be needed over the medium to long term. Ofwat can increase the emphasis on recent and forecast costs by placing more weight on these data in its benchmarking models. While this comes with a greater risk of forecast error, Ofwat could scrutinise the forecast costs more carefully, and ensure that companies are using consistent planning assumptions. Ensuring future investment is sufficiently funded will be fundamental to addressing the water sector's challenges.

Allowances should be set based on achieving longer-term outcomes rather than shorter-term outputs. In particular, Ofwat should consider an approach similar to Ofgem's NARMs framework (see Box B in Section 4.1 above). We consider that NARMs-style mechanisms could deliver benefits to water customers, by shifting the focus of the cost assessment and funding framework towards delivering long-term outcomes for e.g. capital maintenance and reinforcement of strategic assets. However, we note that NARMs is a complex mechanism that was developed by Ofgem and the energy networks over time. Therefore, developing similar mechanisms for the water sector in the short term may take

[46] Alternatively, needs cases could be assessed separately to the price control process, for example, as part of a sector-wide strategic planning process. However, this may be harder to implement, as it would likely require a strong policy direction from government on the desirability of water network resilience relative to other considerations such as consumer bill increases.

some time (for example, developing a consistent and robust output measure on which to base the mechanism would require detailed discussions between Ofwat and companies).

4.3.2 Recommendation 3: Make greater use of uncertainty mechanisms, volume drivers and reopeners, to avoid the five-yearly price control becoming a bottleneck to delivering investment

The issues Ofwat has faced with assessing and funding enhancement expenditure (see above) mean that there is scope to use more UMs. Ofwat's current approach risks underfunding enhancement expenditure where costs are uncertain and its allowances are inadvertently too stringent, and delaying progress on enhancement projects where need is identified in-period. UMs are an effective way to fund base expenditure where there is uncertainty over the scope of 'day-to-day' activities. In particular, Ofwat should:

- **Introduce volume drivers for repeatable but uncertain volumes of work**. Volume drivers are an effective and well-established tool for unlocking funding for these sorts of activities – see Box C in Section 4.1 above. To protect consumers from networks exploiting volume drivers to unlock excessive allowances (by delivering more volumes than required), regulators can monitor outcomes and claw back volume-driver allowances where delivery is found to be unjustified. To illustrate: Ofwat could use a volume driver to allow expenditure on growth at sewage treatment works to flex with outturn population growth, but monitor treatment works' existing peak utilisation to ensure upgrades are indeed necessary.

- **Expand the use of reopeners**, to unlock investment where new enhancement opportunities/objectives arise in-period rather than making companies wait for the next price review.[47] If allowances are more closely linked with LTDSs (as we recommend in Section 3.3 and our separate paper 'Reforming water sector strategic planning'), then reopeners could be linked to change points in companies' adaptive pathways.

We recommend that Ofwat makes greater use of both volume drivers and reopeners in its price controls going forwards. However, in practice, a deliberative, consistent and targeted approach is needed to decide on what UMs would be most appropriate to introduce and for which activities / costs. We therefore do not in this report make specific recommendations on where within the price control regime (i.e. for which costs etc.) UMs should be expanded,

[47] Re-openers can be seen as a tool for allowing additional investment rounds at fixed (or uncertain) points in the price control. For example, Ofgem has proposed RIIO-3 reopeners for changes relating to meeting net zero targets which are not otherwise captured by any other RIIO-3 mechanism (Net Zero Re-opener), which could happen at any point, and a Heat Policy Re-opener to assess the implications of the government's 2026 strategic decision on the use of hydrogen for heating. See: Ofgem (2024) RIIO-3 Sector Specific Methodology Decision – Overview Document; paragraphs 4.25 and 8.13.

or how exactly they should be designed. However, Ofwat could develop an explicit, systematic framework for applying UMs at price controls, in a similar way to Ofgem.[48]

We note that developing and implementing UMs is costly and may introduce additional complexity to price controls (for example due to the need to prepare and review reopener applications, and to monitor delivery against volume drivers), relative to a counterfactual with fewer UMs. However, given the uncertainty faced by companies and Ofwat and the need for flexibility in the price control framework, we consider it is likely that expanding the use of UMs would be net beneficial to the water sector.

Ofwat should review where there are targeted areas of the cost assessment framework where more pragmatic or lighter-touch regulation could be used to counteract the additional complexity of using more UMs and ensure that regulatory resource is focused in areas where it adds the most benefit.

Lighter-touch approaches to regulation are generally used either where (i) incumbent companies face some sort of competitive constraint; and/or (ii) more intrusive regulation risks holding up critical investment (i.e. the benefits of unlocking investment outweigh the cost to consumers of less stringent price controls).[49] In the water sector, lighter-touch, or more delivery-focused regulation could take the form of:

- Greater use of ex post mechanisms for enhancement. Ex post mechanisms such as cost passthrough can be effective where project costs are uncertain but there is a strong needs case for projects to be undertaken, such as in the case of enhancement projects. Ex post cost assessment can be paired with strong output incentives to ensure that consumer benefit from the spending – one example of this is Ofgem's ASTI framework (see Box D in Section 4.1 above). An ASTI-style reopener framework for enhancement projects could play a role in unlocking investment in a timely way, to deliver the outputs required to address sector challenges.

- Reversion to CPI-X regulation for base costs. Under CPI-X, a regulator fixes a price (or series of prices) for the control period on the basis of the best information it has about the efficient cost of providing the regulated activities. Prices are then allowed to increase with some measure of inflation such as the consumer price index (CPI),[50] minus an efficiency adjustment ('X'). The regulated company has an incentive to achieve efficiencies during the control period because it will enjoy additional profits for the remainder of the period. At the next price control, the regulator benefits from the

48 See: Ofgem (2024) RIIO-3 Sector Specific Methodology Decision – Overview Document; paragraph 8.3. This was also explored by Water UK in its Positions Paper (2024) on a common framework for uncertainty mechanisms at PR24.

49 For example, the European Commission (EC) promotes lighter-touch regulation in the fixed telecommunications sector, to encourage the roll-out of very-high capacity networks and greater focus on protecting consumers where competition is weakest. See: https://digital-strategy.ec.europa.eu/en/library/recommendation-regulatory-promotion-gigabit-connectivity

50 Historically, the retail price index (RPI) was used.

information the company has revealed about its efficient costs, and takes this into account when it next sets price limits, with customers benefitting as a result.[51] CPI-X is a simpler approach than the current price control framework which additionally incorporates various other mechanisms such as outcome delivery incentives (ODIs), and could therefore reduce the administrative burden of base cost assessment on Ofwat, freeing up more time/resources to focus on the more challenging assessment of enhancement expenditure.

4.3.3 Recommendation 4: Identify separable projects or programmes of work suitable for multi-period determinations

The length of price control determinations needs to balance the timescales of the activities the price control aims to fund (providing certainty to investors) with the need for regulatory oversight to ensure investment is efficient. Given the sector's shift in focus towards enhancement projects and the associated step-change in investment required, there is a good case to set more multi-period determinations going forwards. This would increase investor certainty and facilitate greater investment. The principle of using longer-period determinations has been acknowledged for major projects, for example the 10-year price control for the Havant Thicket reservoir.

At the same time, lengthening price controls for all projects or programmes would introduce risks. For example, Ofgem set an eight-year price control in RIIO-1, but concluded afterwards that this led to disproportionate bill impacts for consumers and has since shortened this to five-year price controls for RIIO-2 onwards.[52] The introduction of an eight-year price control for RIIO-1 aimed to provide greater revenue certainty to network companies and investors, encouraging them to make decisions focused on long-term value for consumers, including investing in appropriate innovation. However, following RIIO-1, Ofgem considered some cost allowances were set too high in hindsight, and some performance targets were set too low. Ofgem acknowledged that this forecast risk is inherent in ex ante regulation, but considered that extending the price control to eight years with only a limited scope for mid-period review limited its ability to reset certain cost allowances and output targets.[53]

In line with Recommendation 3, increasing the use of UMs (such as reopeners at each price control, which could either be triggered by Ofwat or companies, or be triggered

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51 Ofwat (2015) The form of the price control for monopoly water and sewerage services in England and Wales – a discussion paper; page 11.

52 Ofgem (2017) Open letter on the RIIO-2 Framework; page 11.
Ofgem (2018) RIIO-2 Framework Decision; paragraphs 3.6-3.12.

53 As a result, at RIIO-2, Ofgem was concerned that forecast risk could harm consumers, or investors, and UMs may not sufficiently mitigate this risk. Therefore, Ofgem concluded that setting RIIO-2 allowances over a five-year period was most appropriate. In particular, Ofgem considered this still provided incentives on companies to plan and develop their networks to meet future demands, and to find innovative ways to reduce cost and improve performance

automatically under pre-defined circumstances – e.g. excessive financial out- or under-performance or material exogenous cost shifts) could help mitigate this risk.

Therefore our recommendation is that Ofwat should engage with companies to identify further projects or programmes of work that run on longer-term timescales, are separable from other projects/activities, and are therefore suitable for multi-period determinations. Separability would be important to minimise the complexity and cost of a separate regulatory treatment of these projects. This approach would allow Ofwat and companies to better address differences in the nature of projects across the sector and the challenges these projects face, which in turn could unlock investment where investors do not consider that the current framework will allow the investment required over the project lifecycle. In particular, there are options to:

- Formally split price controls between base and enhancement activities. This could reduce the administrative burden of combined price controls, and in turn provide Ofwat more time/resources for assessing enhancement costs. However, this would require a clear and time-consistent distinction between base and enhancement activities, which could be difficult to establish in practice.[54]

- Continue to assess base expenditure on a five-yearly basis, to balance the need to ensure companies are acting cost-efficiently with the need to provide certainty on allowances; but assess enhancement programmes on longer timelines (e.g. 10 years, so they are only assessed at every other price control). In particular, this would allow for longer-term cost assessments for enhancement projects, reducing the administrative burden for Ofwat and the uncertainty for companies from periodic re-assessment of enhancement expenditure, and enabling longer-term investment.

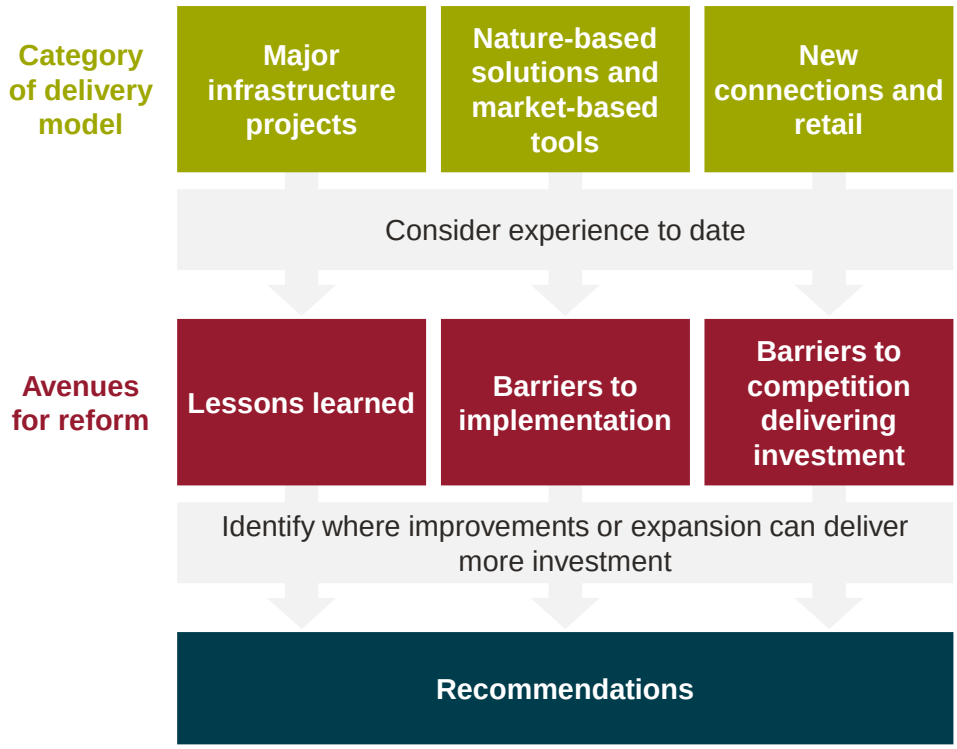
- Consider setting price controls for enhancement programmes as they arise (rather than at fixed five-yearly intervals). This would ensure Ofwat could assess costs when needs cases and cost information is more certain, and could unlock investment on a more timely basis – we note this could also be achieved through the use of reopeners.

[54] For example, network reinforcement costs are currently included in base, but could also be viewed as enhancement expenditure.

5 Delivery and operational models

In this Section, we consider the models used to build and operate the assets required to deliver growth, the approach to financing their investment, and the role of competition in delivering investment for growth. The different delivery/operational models used in the sector today vary in the types of assets and outcomes they aim to deliver. We consider different categories of delivery model separately. For each category, we consider the features/principles of the model(s), the experience to date of the model(s) and whether there are clear lessons learned or barriers to overcome to deliver investment for growth. Based on this, our recommendations set out how each category of delivery model should be refined, to improve the sector's ability to deliver investment for growth.

Figure 7 How we get to our recommendations on delivery and operational models



Source: Frontier Economics

5.1 Major projects and project-level financing

5.1.1 Existing models and lessons learned

The water industry has delivered significant investment in its network assets over the past 30 years. However, one clear feature of the model has been the lack of delivery of major projects. The Havant Thicket reservoir, currently under construction, will be the first

reservoir built in England and Wales for over 30 years. Major projects and capital-intensive programmes of work will be key to deliver increases in capacity and improve resilience in the long-term, for example, there are currently nine reservoirs in development.

This raises the question of how reform can support the delivery of major projects. Delivery[55] of these projects has multiple stages, from initial to detailed design; through procurement, financing and construction; to operation. Incumbents have historically been responsible for delivering capital projects. They have financed the delivery, and have been licensed to operate / maintain the assets once construction is complete. The construction itself has generally been undertaken by third-parties (i.e. specialist engineering / construction firms) following a competitive tendering process managed by the incumbent.[56] As we set out below, several alternative delivery models have been introduced for major projects.

Figure 8 Stages and responsibilities in major project delivery models

<table>
<tr><th></th><th rowspan="2">Traditional capex model</th><th colspan="3">Alternative models (SIPR, DPC)</th></tr>
<tr><th></th><th>Early tendering</th><th>Late tendering</th><th>Very-late tendering</th></tr>
<tr><td>Initial design</td><td rowspan="6">Incumbent-led with option to use third parties for specific stages</td><td rowspan="6">Third party</td><td rowspan="3">Incumbent</td><td rowspan="5">Incumbent</td></tr>
<tr><td>Surveys/studies</td></tr>
<tr><td>Planning/consents</td></tr>
<tr><td>Detailed design</td><td rowspan="4">Third party</td></tr>
<tr><td>Procurement</td></tr>
<tr><td>Construction</td></tr>
<tr><td>Operation</td><td>Third party</td></tr>
<tr><td>Licence</td><td>Incumbent</td><td>Incumbent (e.g. DPC) or third party (SIPR)</td><td>Incumbent</td><td>Incumbent</td></tr>
</table>

Source: *Frontier Economics*

Note: *SIPR stands for Specified Infrastructure Projects Regulations, DPC stands for Direct Procurement for Customers – see discussion below.*

Specified Infrastructure Projects Regulations (SIPRs)

SIPRs involve a third-party provider, known as an 'Infrastructure Provider', being granted its own license by Ofwat to deliver a major project and then be regulated directly. SIPRs

55 In this context 'delivery' refers to the entire capital project process from design to operation. The actual build phase is referred to as 'construction'.

56 Ex ante regulation means that incumbents have an incentive to outsource activities to third parties if these third parties will be able to carry out these activities more efficiently, since this allows the incumbent to lower its costs and improve its performance against ex ante expenditure allowances.

were introduced in 2013 but currently can only be used under strict criteria, specifically Ofwat or the Secretary of State can specify projects for SIPR if:

- The infrastructure project is of a size or complexity that threatens the incumbent undertaker's ability to provide services for its customer; and
- Specifying the infrastructure project is likely to result in better value for money than would otherwise be the case.[57]

As such, SIPRs seek to facilitate the delivery of major projects with a high / distinct risk profile attached. The aim is that the market process identifies the best combination of financing capability and specific project expertise to deliver to deliver the project in the most effective way. The process can also reveal valuable information about the best way to allocate the risks between the different parties.

To date,[58] the only project to have used SIPRs is the Thames Tideway Tunnel (TTT). Under the TTT SIPRs:

- The tendering process for the main construction contracts was run by Thames Water. Following the award of these contracts, there was a tender process to award the Infrastructure Provider that would finance and hold the licence for TTT. Potential bidders submitted a 'Bid WACC', the rate of return during the construction phase. The compliant bid with the lowest 'Bid WACC' would be successful.
- During the construction phase of the TTT, the allowed return was based on this 'Bid WACC' put forward by the Infrastructure Provider that won the tender, all expenditure up a threshold that was set out in the licence / associated documents was capitalised and remunerated in an RCV, and delays beyond a set date would lead to a reduction in the 'Bid WACC' to a lower 'Delay WACC'.
- To help manage risk (and, in particular, the risk of a material cost over-run that can be a feature of major and complex engineering projects), the regulatory arrangements included a commitment by the Government to provide contingent financial support (in the form of equity investment) in specified circumstances during the build phase.[59]
- After the construction phase, the expected model is that Ofwat will set five-year price controls, setting allowed revenues based on business plans by the Infrastructure Provider. At the first review, Ofwat will determine a new WACC to replace the Bid WACC from the construction period.[60]

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57 Ofwat (2015) Criteria for selecting specified infrastructure projects – Ofwat guidance; pages 3-4. We note that the second criterion is set out in the Regulations, not the legislation.

58 Ofwat proposed that a further 3 SIPR schemes would be brought forward (Fens Reservoir, Lincolnshire Reservoir, South East Strategic Resource Option).

59 CfE, Box 16.

60 Ofwat (2015) Ofwat guidance on approach to the economic regulation of the Infrastructure Provider for the Thames Tideway Tunnel.

After eight years of construction, the TTT is now entering the operational stage and is the UK water sector's largest infrastructure project since privatisation, estimated to have cost £5 billion. The assets are operated and maintained by TTT. At the same time they are integrated with Thames Water's wastewater infrastructure. Overflows from the existing Thames Water's sewer network enter into the Tunnel at multiple points and are conveyed through the Tunnel to Thames Water's treatment works at Beckton.

The use of SIPR for TTT successfully reduced costs to customers. Initially, the project was expected to increase Thames Water's customer bills by £70-£80 annually in the worst-case scenario.[61] The actual increase is more likely to be around £25 per year.[62] The use of SIPR for TTT is held up as a successful example of a large infrastructure project delivery model.[63] In particular, in line with the objectives of the SIPR model, the SIPRs facilitated:

- An efficient allocation of risks between companies, contractors and government, reducing costs; and
- More efficient cost discovery (particularly for the cost of capital) that was not reliant on regulatory judgement.[64]

Direct Procurement for Customers (DPC)

Introduced by Ofwat at PR19, DPC is where regulated water companies put major projects to competitive tender for the project to be designed, built, financed and/or operated by a competitively appointed provider (CAP). Ownership of the asset is transferred back to the incumbent water company after the agreed length of contract expires (25-30 years). The activities of the CAP are regulated indirectly via the contractual relationship between the CAP and the water company (i.e. the CAP does not have a licence).[65] Incumbents may bid for each other's DPC projects, but not their own.

DPCs aim to provide value in several ways, such as reducing financing or operating costs and involving new participants with innovative approaches. At PR19, Ofwat trialled procurement competition for two major projects with a whole-life totex above £100m.[66] From PR24, Ofwat has made DPC the default model for projects over £200 million, specifying 22 projects for DPCs in its final determinations.[67]

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61 CfE, Box 16.

62 See: https://www.tideway.london/about-us/ and https://www.ofwat.gov.uk/pn-11-22-thames-tideway-licence-amended-to-protect-costs-of-the-project-after-covid-19/

63 BEIS (2019) RAB Model for Nuclear: Consultation on a RAB model for new nuclear projects; Box 1.

64 CfE, paragraph 387.

65 CfE, paragraph 387.

66 Ofwat (2017) Delivering Water 2020: Our final methodology for the 2019 price review; page 116.

67 Ofwat (2025) PR24 final determinations: Major projects development and delivery; table 1.

To specify projects for DPCs,[68] Ofwat first asks companies to put forward projects suitable for DPC in business plans, for Ofwat to review and approve. As well as meeting the £200m threshold from PR24, candidate projects must be sufficiently discrete/separable from companies' other activities.

Additionally, companies must carry out a value for money (VFM) assessment of delivery by DPC versus in-house delivery. If a project or programme meets the lifetime-value criterion, the discreteness criteria[69] and 'passes' the VFM assessment, then it is considered suitable for a DPC.

Therefore, the key differences between SIPRs and DPCs are that the criteria for using DPCs are less restrictive than for SIPRs, and that DPC assets are regulated via incumbent's licences (rather than a third-party licence, as is the case for SIPR assets).

Incumbent companies receive an allowance from Ofwat for the efficient costs of running the DPC procurement process and overseeing delivery. Ofwat also sets a focused incentive package for incumbents to run a good procurement process for DPC projects. There is also an Allowed Revenue Direction enabling companies to recover costs payable to the CAP from customers.[70]

In 2020, Ofwat's lessons learned from PR19 regarding DPCs were that:

- DPCs led to greater focus on large project costs;
- VFM assessments were inconsistent; and
- The process of assessing whether projects were suitable for DPCs was disproportionate for smaller companies.[71]

For PR24, Ofwat therefore aimed to streamline its approval process for DPC projects, deferred the VFM assessment to a later stage of the process, set out a more standardised approach to risk allocation for construction risks in DPC projects, and introduced the technical separability tests.[72] Specifically, Ofwat has now set out that discreteness should be assessed based on three tests:

- Programme Scalability Test: this considers if a project is worth more than £200m either individually or when amalgamated with a wider system of assets.
- Construction Risk Test: this considers if construction risks be transferred to the CAP, or mitigated through contractual arrangements.

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68 Ofwat (2023) Direct Procurement for Customers – Technical discreteness guidance.

69 The test for discreteness has three components: a programme scalability test; a test whether construction risk can be transferred to the CAP; and a test of whether Operations and Maintenance risk can transferred to the CAP.

70 Ofwat (2023) Guidance for Appointees delivering DPC projects; page 7.

71 Ofwat (2020) PR24 and beyond: Our reflections on lessons learnt from PR19; section 9.2.4.

72 Ofwat (2023) Guidance for Appointees delivering DPC projects; pages 9, 16 and 29.

- Operations and Maintenance Risk Test: this considers if maintenance/operation of the asset be transferred to the CAP or mitigated through contractual arrangements.

In a RAPID investor workshop in 2022, investors raised additional concerns with the DPC model. Specifically, investors questioned whether DPCs could sideline the in-house knowledge and capability of water companies, and the existing level of standardisation of DPC documentation (e.g. for risk allocation, and contractual terms).[73]

We note that in cases where the CAP will design, as well as build, finance and potentially operate the relevant asset(s) will lead to inefficiency if the CAP is less capable of designing the asset than the incumbent, or if the asset is important to their resilience. This can be seen in the Offshore Transmission Owners (OFTOs) regime in the energy sector (see Box E below). In particular, electricity generators have preferred not to tender the design of simpler transmission assets connecting them to the onshore grid. This is consistent with the use of DPCs, which have generally been specified under late or very late-stage tender models.[74]

Box E: OFTOs[75]

Carrying the power offshore wind farms generate to the onshore transmission system requires substantial investment in offshore transmission assets. Ofgem has developed a regime whereby offshore generators tender, and third-party companies can bid for, licences to operate or build and operate these assets. OFTOs are the entities who hold the licences and own these transmission assets. They differ from onshore transmission owners (e.g. National Grid Electricity Transmission), though onshore transmission owners are eligible to bid as an OFTO provided they are acting as a separate entity from their onshore business. There are three versions of the OFTO delivery model: (i) the very-late generator-build model; (ii) the late OFTO-build model; and (iii) the early OFTO-build model.

Under the very-late generator-build model, the generator is responsible for the design, procurement and construction of the transmission assets. The OFTO then operates, maintains and owns the transmission assets, leasing back their use to the generator.

Under the late OFTO-build model, Ofgem runs a tender to appoint an OFTO with responsibility for constructing and operating the transmission assets. The generator then undertakes preliminary works, consenting and high level design of the assets.

Under the early OFTO-build model, the OFTO bids its approach to aspects of the preliminary works, consenting, design, procurement, financing, construction, operation,

73 RAPID (2022) FAQ Document for RAPID Investor Workshop 2022; pages 2-3.

74 Ofwat (2023) Guidance for Appointees delivering DPC projects; page 29

75 Ofgem (2014) OFTO Build: Providing additional flexibility through an extended framework; pages 2 and 9
Transmission Investment (2021) Coordinated Offshore Transmission; page 6.
Ofgem (2024) Consultation on initial proposals for an OFTO Build model to deliver non-radial offshore transmission assets; page 6.
Ofgem (2024) OFTO Build Model: Policy Update; page 1.

maintenance and decommissioning of the transmission assets and the costs associated with these activities.

To date, all tender rounds for have been conducted under the very-late generator-build model. This model has been preferred so far because of generator concerns around lack of control regarding project development and the construction activities of the OFTO that could lead to late delivery and a loss of revenue. Generators have not been willing to take this risk for the projects that have been tendered so far.

However, we note that Ofgem intends for there to be greater use of the 'early' OFTO-build model for more complex offshore transmission projects going forwards, as these more complex projects become more frequent.

Separate price controls (Havant Thicket)

Havant Thicket is a planned 8,700-megalitre winter storage reservoir being delivered by Portsmouth Water (an incumbent wholesaler) to support a bulk water transfer to Southern Water, enhancing regional water resilience and supply security.[76] Havant Thicket is still under construction, having broken ground in 2024.[77]

Ofwat introduced a bespoke, separate price control for Havant Thicket in PR19 (independent of Portsmouth's water network-plus or water resources price control) due to the project's size, early-stage cost uncertainty, and is the fact that it is funded through an 80-year bulk supply agreement with Southern Water. The separate price control applies specific parameters for the core elements of regulation including; length of price control, process for setting cost allowances, rate of return and rate of cost recovery. It seeks to ensure transparency, regulatory clarity, and investor confidence, while safeguarding Portsmouth Water's customers from direct cost exposure.[78] In the event of default or administration involving Southern Water, Portsmouth Water will remain protected, and costs will still be recoverable to maintain financial resilience.[79]

Havant Thicket's price control spans 10 years from 2020 to 2030, covering the expected design and construction period.[80] Portsmouth Water is able to recover the efficient construction, financing, and operational costs through charges to Southern Water. A full

76 Ofwat (2021) Final guidance to facilitate the development, construction and operation of the Havant Thicket reservoir; page 2.

77 https://www.geplus.co.uk/news/havant-thicket-reservoir-breaks-ground-as-compaction-trials-begin-20-09-2024/

78 Ofwat (2021) Final guidance to facilitate the development, construction and operation of the Havant Thicket reservoir; page 1-2.

79 Ofwat (2021) Final guidance to facilitate the development, construction and operation of the Havant Thicket reservoir; page 4-5.

80 Ofwat (2021) Final guidance to facilitate the development, construction and operation of the Havant Thicket reservoir; page 2.

reconciliation of costs and delivery will occur at PR29. Havant Thicket is subject to ODIs, where any penalty 'revenues' will ultimately be passed onto Southern Water's customers.[81]

Due to the project's early development stage at PR19 and the potential for significant cost variation, Ofwat also included a cost adjustment mechanism (CAM), with a commitment to revisit allowances at PR24.[82] In January 2023, following Portsmouth Water's application under the CAM, Ofwat increased the project's allowed totex from £123.6m to £310.0m (in 2017/18 prices), recognising updates from procurement and planning.[83] The revised allowance will be implemented through a mid-period determination in PR24, with an associated adjustment to Portsmouth Water's RCV from 1 April 2025.[84]

5.1.2 Recommendation 5: Expand the use of SIPRs and separate price controls to a wider range of strategic projects, and continue to standardise and improve DPCs, to unlock investment in major projects

Delivery of major infrastructure projects through separate models has been moderately successful, and is likely to become more efficient over time, as learnings are taken on-board. We recommend incremental reforms to improve the use of SIPRs, separate price controls and DPCs to unlock more efficient investment going forwards. In particular, these delivery models allow for key projects and programmes of work to be financed outside of the mainstream price control framework, avoiding issues related to the one-size-fits-all approach to the WACC, which could otherwise hold up investment where projects' risk profiles differ to that reflected in companies' determined WACC. Specifically, we recommend the following reforms.

Currently, neither the SIPR model or the DPC model allow for incumbents to bid for projects in their own network. The rationale for both models is that competition should deliver better outcomes, therefore **it would be consistent with this rationale to allow incumbents to bid directly for SIPR and DPC projects to demonstrate where they may be the most appropriate party to lead delivery and operation of the asset(s).**

In practice, this would mean making greater use of separate price controls. While the project is still ongoing, Havant Thicket's separate price control shows that large infrastructure projects delivered under a more traditional capex delivery model (i.e. led by the incumbent) can also be regulated and financed outside both individual companies' price controls and the (third party-led) SIPR/DPC regimes.

81 Ofwat (2021) Final guidance to facilitate the development, construction and operation of the Havant Thicket reservoir; page 6.

82 Ofwat (2023) Havant Thicket – Cost Adjustment: Final Decision; page 3-5, 7.

83 Ofwat (2023) Havant Thicket – Cost Adjustment: Final Decision; page 3-5, 12.

84 Ofwat (2023) Havant Thicket – Cost Adjustment: Final Decision; page 6, 13-14.

Allowing incumbents to bid directly for SIPR and DPC projects would require Ofwat or an independent body to run the tender process, combined with some ring-fencing provisions in the incumbents' teams to ensure a level playing field. However, any additional administrative costs would likely be outweighed by efficiency benefits if the existing SIPR/DPC regimes lead to third party delivery/operation of assets where the incumbent could do this more efficiently.

There is scope to expand the use of SIPRs by lowering the legal threshold for projects to be designated for SIPRs. Indeed, recently the UK government has already signalled an appetite for such an expansion.[85] The question of how to lower the threshold is a legal one. However, in principle, a move towards less stringent criteria around discreteness and risk, similar to those used for DPCs would likely widen the scope of SIPRs.

As more SIPRs are specified, **Ofwat and government should seek to establish clear and, to the extent possible, standardised frameworks for the use of risk sharing in SIPRs.** For example, SIPR-appropriate projects could be more easily identifiable if a clear framework was developed to distinguish between risks that are independently manageable by Infrastructure Providers and companies through contractual arrangements, and risks that are not. We note that lessons learned from Ofwat's streamlining of the specification process and increasing of standardisation and guidance on separability for DPCs after PR19 could also be applied to improve the expanded SIPR regime.[86]

Expanding the use of SIPRs and making greater use of separate price controls would reduce the potential role for DPC as a distinct model. In particular, the SIPR model should become the default for projects where there is a case for early-stage tendering or long-term operation by a third-party (or incumbent under a separate licence) – such as for large, complex projects with high/distinct risks.[87] Meanwhile, the traditional capex delivery model (which generally involves competitive tendering for construction phase and often the detailed design phase) or separate price controls can be used where the incumbent is best placed to lead project delivery and finance the long-term operation and maintenance of the asset.

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85 https://www.gov.uk/government/publications/a-new-approach-to-ensure-regulators-and-regulation-support-growth/new-approach-to-ensure-regulators-and-regulation-support-growth-html

86 See for example: RAPID (2022) FAQ Document for RAPID Investor Workshop 2022; page 3.

87 We note that experience with OFTOs in the energy sector suggests that later-stage delivery models may be more appropriate where projects are simpler, or more important to the resilience of the incumbent. We also note that models where a third party operates the assets following construction are only likely to be suitable for multi-party resource assets and strategic network interconnectors.

This suggests **use of the DPC model should be limited** to where the financing for the delivery would be more efficient under a third party – for example, if a specific bundle of projects delivered at scale could be more efficiently financed by a third party.[88]

Separation of the financing role can add more complexity and administration costs. At the same time, it can bring benefits in a couple of important respects. First, when there is pressure on existing financing routes (e.g. due to the scale of investment needs). This is an important and valid consideration given the scale of the investment programme during 2025-2030 and the expected programme beyond that. DPC can access financing sources that may not be available to incumbents. Second, market testing the financing can reveal the optimal risk allocation for a specific project and lead to more efficient financing.[89] This is an important benefit of SIPR but DPC can extend this to other projects, provided they have different characteristics to the typical investment programme.

Therefore to ensure the best use of DPC and that there is a clear role for it between the SIPR option and the traditional competitive tendering route, **Ofwat should issue clear guidance on which projects should be delivered under each model**. In practice, this would mean narrowing and simplifying the scope of DPCs, in line with the expansion of SIPRs and increased use of separate price controls or traditional capex delivery models.

5.2 Nature-based solutions and the use of market-based tools to deliver desired outcomes

5.2.1 Principles

Some of the outcomes promoted in the water sector can be delivered by, or in partnership with, agents outside the water sector, such as farmers, developers and local authorities. However, coordination problems can hamper the identification of these solutions, or the partnerships required to implement them.

Market-based mechanisms can help draw out the best value solutions, and facilitate partnership working where this is optimal. These mechanisms could range from a simpler procurement-type model, to a more sophisticated reverse auction-type approach,[90] and

88 For example, at PR24 Southern Water's business plan included programmes of work that it considered were not suitable for the existing DPC model but may be suitable for a 'DPC Lite' model as a CAP may be more efficient at delivering a high number of lower value, shorter life assets not distinct from the rest of the network. See: Ofwat (2025) PR24 final determinations: Major projects development and delivery; section 2.3.4.

89 Ofwat / RAPID, Understanding the views of the supply chain and investors responses, 2023, https://www.ofwat.gov.uk/wp-content/uploads/2023/07/Understanding-the-views-of-the-supply-chain-and-investors-responses.pdf

90 A reverse auction is a type of auction where sellers bid for the prices at which they are willing to sell their goods and service. In this instance, this would involve third parties who are able to improve the environment – e.g. farmers, land managers, developers, local authorities – bidding to deliver environmental services.

could eventually develop into even more sophisticated markets for permits and credits, such as the cap and trade approach which underpins the UK and EU Emissions Trading Systems.

One area where market mechanisms can clearly add value in the water sector is for promoting Nature-based solutions (NBSs), where efficient. NBSs apply natural processes to water management problems, such as improving water quality or reducing flood risk. This could include regenerating wetlands, vegetation buffers, or restoring or managing floodplains.[91] The Corry Review has pointed out that 'Nature Markets', where stakeholders can 'sell' NBSs to the likes of water companies, may present an increasing opportunity to align economic interests with nature recovery.[92]

5.2.2 Barriers to implementation

While Nature Markets and NBSs, and similar alternatives for achieving desired water sector outcomes can be efficient from an overall social welfare perspective, they are not necessarily as consistently reliable in delivering environmental obligations as 'grey' alternatives – i.e. the 'traditional', built solutions of water/wastewater companies.[93]

The key barrier to making better use of NBSs and market-based tools like Nature Markets for delivering water sector outcomes is the existing regulatory framework. This is consistent with views cited by the Commission in the CfE, which included:

- The risk of failure and non-compliance for water companies is likely to be a significant driver limiting NBS rollout where NBSs could be expected to provide (on balance)[94] greater benefits than traditional solutions;
- Time-bound targets which are too narrow or fast can risk unintended consequences, such as over-incentivising 'grey' solutions;
- The five-yearly price control process may adversely impact innovation that takes longer to have an effect, such as NBSs; and
- Some environmental regulations may be overly prescriptive on the means of implementation and therefore may limit the use of innovative and NBSs.[95]

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91 CfE, Box 28.

92 Dan Corry (2025) Delivering economic growth and nature recovery: An independent review of Defra's regulatory landscape; page 46.

93 CfE, Box 28.

94 In particular, an NBS may have more uncertain and variable performance than a traditional solution for achieving the same outcome, but a lower cost. Where the expected net benefit of the NBS – i.e. accounting for the benefits of the desired outcome, the risk that the NBS does not deliver this outcome (e.g. non-compliance fines), and the costs of the NBS – exceeds that of the traditional solution, the NBS should be used. In some cases, the net benefit of the NBS will be lower than that of the traditional solution, meaning the NBS should not be used. If penalties/disincentives for non-compliance are too high, this puts too much emphasis on the riskiness of NBSs, meaning traditional solutions will be favoured even where the net benefit of NBSs is higher.

95 CfE, paragraphs 184, 442, and 584, and Box 28.

In summary, the existing regulatory framework encourages risk averse behaviour by companies, which leads to a bias towards traditional solutions over NBSs and market-based tools like Nature Markets that involve other stakeholders in delivering desired outcomes. In particular, existing regulatory arrangements can indirectly disincentivise solutions like NBSs even in cases where they would be expected to deliver better value than traditional solutions, by providing companies with a greater monetary incentive to favour 'grey' solutions, or directly obstruct the use of NBSs etc. through prescriptive regulation. For example:

- Ofwat's ODIs may **indirectly** disincentivise the use of NBSs if the benefits of an NBS (e.g. where an NBS is more cost-efficient than a 'grey' solution to achieve a particular outcome, meaning the company can outperform its expenditure allowances by using the NBS) are passed onto customers, while the downside risk of ODI penalties if the NBS does not fully achieve the desired outcome or only does so over the longer-term (i.e. not within the current price control period) are left with the company.

- Prescriptive Environmental Agency (EA) regulations may **directly** rule-out or delay the use of NBSs (even where NBSs are most efficient), if they require a particular solution to be implemented.

5.2.3 Recommendation 6: Enable greater use of market mechanisms, such as Nature Markets, to deliver sector outcomes in a socially-optimal way

In light of the above, under the existing regulatory framework, companies are not incentivised to deliver outcomes via socially-optimal solutions. Instead, 'grey' solutions are often incentivised, at the expense of broader social welfare considerations. Reform that encourages socially-optimal solutions (which could be NBSs) will provide net benefits to society in the long run, assuming that these solutions are indeed used where they offer maximal benefit.[96]

Government and regulators should consider where NBSs and market-based tools for allocating resources across multiple sectors, such as Nature Markets, can deliver outcomes more efficiently than traditional capex-based interventions by companies. Where these alternative solutions are available, the existing regulatory arrangements should be assessed, to identify and lower barriers. For example:

- The ODIs and cost sharing mechanisms should be calibrated to ensure, as far as possible, that they do not negatively influence companies' decisions about whether to use Nature Markets/NBSs.

[96] We note that for some outcomes, there could be valid reasons to prefer 'grey' solutions, for example where there is a clear need to achieve outcomes within a fixed time period.

- EA regulations should be reviewed to identify areas where the regulations prescribe specific solutions, and the EA (or a separate independent body) should assess whether the regulations are overly prescriptive, given alternative solutions available.

The areas that the sector can identify (through engagement between companies, government, regulators and other stakeholders) where market-based tools for identifying socially-efficient solutions to deliver desired outcomes, then the relevant stakeholders should work together to develop these market mechanisms. This may require a new stakeholder forum being set up by Defra, Ofwat or the EA. Funding to incentivise 'bidders' of relevant solutions to come forward could come from water bills, or also from taxpayers/food bills, depending on the outcomes being targeted (based on a 'beneficiary pays' principle). We note that the Corry Review has also recommended that Defra should explore launching a Nature Market Accelerator to make Nature Markets more coherent and accelerate investment.[97]

5.3 New connections and retail

5.3.1 Effectiveness of competition today

Self-Lay Providers (SLPs)

Developers often have a choice between the incumbent, a Self-Lay Provider (SLP) and a new appointee (NAVs) to be the provider of pipe-laying and water/wastewater-network connection services – these are referred to as 'developer services'.[98]

SLPs have generally been a success. Ofwat's reviews of competition in the developer services market have identified many examples of good practice in support for SLPs by incumbents, and have found that the SLP market share is strong in a number of incumbents' areas. Some SLPs have developed innovative offerings such as multi-utility connections services.[99] At PR24, Ofwat revisited its regulation of new connection services, given growth in new connection services being provided by SLPs, and largely removed regulation of on-site services for new connections.[100]

New Appointees and Variations (NAVs)

NAVs compete with SLPs and incumbents to provide developer services. However, unlike SLPs, NAVs also compete with incumbents to be the company that provides water and

97 Dan Corry (2025) Delivering economic growth and nature recovery: An independent review of Defra's regulatory landscape; Recommendation 21.

98 Ofwat (2020) Review of incumbent company support for effective markets; page 5.

99 https://triconnex.co.uk/multi-utilities/

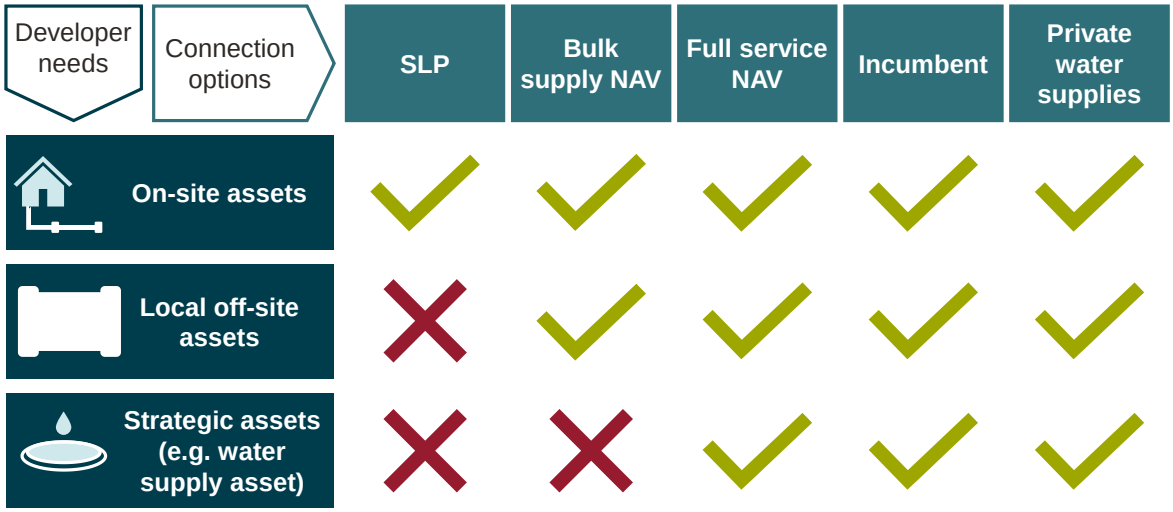
100 Ofwat (2022) Creating tomorrow, together: Our final methodology for PR24 - Appendix 3: Developer services.

wastewater services to a site, once connected. As such, NAVs represent competition 'for the market' with incumbents.

The NAV market was established in 1991 but had limited impact until the late 2010s. Most NAVs serve new housing or mixed developments, and originated as multi-utility providers of developer services. Most NAVs operate a 'bulk supply' model, buying wholesale water and wastewater services from the incumbent operator, delivered to the site boundary, and then providing and operating the 'last-mile' infrastructure on site and retail services. A smaller number of NAVs provide a 'Full service NAV',[101] which may incorporate: for water, obtaining a water source, treatment, distribution and retailing; and for wastewater, collection, treatment and sludge treatment and disposal.[102]

Figure 9 therefore sets out the broad options available to developers for connecting to the water network. NAVs are likely to be more suitable for large developments, particularly Full service NAVs.

Figure 9 Connection options for a developer



Source: Frontier Economics

In 2017, Ofwat commissioned Frontier Economics to carry out a study of the effectiveness of the NAVs market. The study identified a number of barriers preventing NAVs from competing. Ofwat and companies (via Water UK's NAV project) worked to address these barriers, and NAV licence applications have increased since then.[103] Ofwat has continued to monitor and support the development of the NAV market.[104]

101 Frontier Economics (2017) Study of the NAV Market; pages 5-6.

102 Ofwat (2023) Application guidance for new appointments and variations; page 18.

103 Ofwat (2020) Review of incumbent company support for effective markets; section 4.2.

104 https://www.gov.uk/government/publications/strategic-policy-statement-to-ofwat-incorporating-social-and-environmental-guidance/february-2022-the-governments-strategic-priorities-for-ofwat

Non-household (NHH) retail

Competition for NHH customers was first introduced in Scotland in 2008 and then in England in 2017. It represented an attempt to introduce competition 'in the market' for water services at a large market-wide scale and was expected to bring substantial benefits to NHH customers and to the wider economy.[105]

In practice, Ofwat's market monitoring has found that even after several years, the NHH retail market is not functioning as efficiently or effectively as it could. Market frictions such as poor quality data impeded delivery of improved customer outcomes.[106] And while larger customers have been engaged in the market, reaping greater benefits from competition, smaller customers have been less engaged and have much weaker incentives to engage in the market.[107] In its latest report on the NHH retail market, however, Ofwat noted that Industry has made significant progress in 2023/24 in addressing market frictions.[108]

We note that while Ofwat considers NHH retail competition is improving, this does not mean that the market can be expected to deliver strong positive outcomes for e.g. water sector resilience. For example, businesses will need to play a role in reducing water demand by e.g. improving water efficiency, however Defra has concluded that market forces alone may not drive the introduction of effective water efficiency services in the NHH retail market.[109]

5.3.2 Recommendation 7: Prioritise expansion of competition and markets to the areas where the potential benefits to society are greatest, e.g. where this can deliver water efficiency or resilience benefits

Ofwat has worked with companies and other stakeholders to introduce competition 'in the market' and 'for the market' in various parts of the water sector. However, competition has not always flourished on its own. Costly monitoring and intervention has been required to lower entry barriers and make competition more effective in some areas. Additionally, while competition can effectively incentivise improvements in some outcomes (e.g. price reductions), it is less effective at delivering others (e.g. improved water efficiency) important to growth, as set out above.

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105 Dr Christopher Decker (2022) Accelerating the transition to competition in the English retail non-household water sector; page 5.

106 Ofwat (2021) Business retail market: 2021-22 review of the Retail Exit Code – a consultation; page 2.

107 Ofwat (2021) Business retail market: 2021-22 review of the Retail Exit Code – a consultation; page 2.
Ofwat (2024) Business retail market 2023-24 update; page 4.

108 Ofwat (2024) Business retail market 2023-24 update; page 4.

109 In particular, Defra has noted that Ofwat's customer research suggests that additional value-added services, such as water efficiency measures or leakage services, are less likely to motivate customer switching than bill reduction or improved customer service. (Just 6 per cent of switchers in 2019/20 reported receiving new water efficiency or leak detection devices as a result of switching.) See: Defra (2024) Review of the Water and Sewerage Undertakers (Exit from Non-household Retail Market) Regulations 2016 Post Implementation Review; paragraphs 6.54-6.66.

Ofwat has carried out or commissioned detailed assessments of the effectiveness of competition in order to identify and remove the barriers. This has led to notable improvements in the amount of competition in areas where competition has been introduced but initially stagnated.

When considering where and how to incur regulatory and company resources in promoting competition going forwards, there is a need to consider whether and how competition can contribute towards overcoming the sector's broader challenges such as improving resilience, especially given that Ofwat has limited capacity to make these interventions. For example, interventions could focus on improving water efficiency, so that the system is robust to growth, climate change, etc. In NHH retail, government has found that competition may not deliver these outcomes on its own.

To date, the NAV market has generally relied on the bulk supply model for NAVs, but it is possible that enabling more 'Full service' NAVs could reduce the impact of new connections on existing water and wastewater networks:

- More Full service NAVs would mean more parties focused on ensuring available water capacity (e.g. spare abstraction licences) are used efficiently, though we note that there are other mechanisms for revealing this.[110]
- Full service NAVs can invest in on-site assets (e.g. storage, grey-water recycling, etc.), leveraging their experience in working closely with developers (although it would be important that their incentives to deploy and maintain such assets are aligned with sector priorities, potentially via regulation).
- It may also be that supporting Full service NAVs to enter the market could unlock economic growth, where they can provide dedicated or innovative services to large new developments (e.g. a data centre requiring dedicated water resource).

Therefore, we recommend that Ofwat prioritise expansion of competition where the potential societal benefits are greatest, e.g. where competition can improve water efficiency. Ofwat should target its interventions not only at removing barriers to competition, but also encouraging social welfare-enhancing practices such as innovation in water demand management. Similarly, where the scope of competition expands, it will be important that there is oversight of market outcomes. For example, the regulatory model should ensure that NAVs face appropriate incentives and oversight to ensure that their assets are properly maintained and provided resilient services, with the level of oversight being proportional to the size and prevalence of NAVs in the sector. Ofwat should consider the administrative costs of this oversight in its decision-making.

It is important to note that we do not recommend rolling-back initiatives for fostering competition in the sector at a general level. There are, and will be, valuable opportunities that can still be realised (such as enabling more Full service NAVs, as set out above).

110 See, for example, water resources bilateral markets: https://www.ofwat.gov.uk/regulated-companies/markets/bilateral-markets/

However, it is important that a policy and regulatory commitment to support the use of competition and markets includes a robust process to evaluate success and, where needed, to make decisions to expand, adapt or limit markets.

6 Charging

This Section considers the way in which costs of growth and investment are recovered from users through new connections charges to developers. We start by considering the current approach to charging, and considering where the regime may pose a barrier to investment for growth. We then consider whether charging and connections reform could address these barriers, based on economic theory and case studies. Our recommendation sets out that taking a more cost-reflective approach to charging has the potential to reduce barriers to investment for growth.

6.1 Current approach

Ofwat's wholesale price controls allow companies in England and Wales two sources of regulated income: wholesale charges income, funded by the end customer base; and income from developer services charges (the focus of this Section), funded by developers. Incumbents' wholesale charges are set with a forecast of developer service income. If the developer services revenue is higher or lower than forecast, then a company will need to adjust its wholesale charges in order to comply with its overall revenue cap. As a result, the overall price control operates as a 'single till'.[111]

As such, developers are charged for the connection of their developments to the water/wastewater network. These charges are based on the necessary work to connect a new development to the existing network and reinforce existing assets to accommodate increased demand (see Section 3.1.2). Historically, there have been two main charges:

- 'Connection charges' for on-site costs; and
- 'Infrastructure charges' for off-site costs.[112]

Developers historically bore the full cost of on-site services via the connection charge. However, as incumbents' on-site costs are no longer included in price controls,[113] connection charges are no longer part of companies' 'single till' – i.e. companies' expenditure on new connections does not form part of their overall allowed expenditure (and therefore allowed revenue) from PR24 onwards.

111 CEPA (2021) Approach to the regulation of developer services at PR24; page 14.

112 These are one-off charges on a unit/item basis. See for example: https://www.anglianwater.co.uk/siteassets/developers/new-content/charges/anglian-water-development-services-charging-arrangements-2025-26.pdf

113 While on-site services were partly deregulated due to increased competition, this does not mean that high levels of competition are ubiquitous. We note that Ofwat is therefore currently developing measures to protect developer services customers for whom market choice is currently limited. For example, Ofwat will introduce caps on the difference in charges for sites where competition between incumbents, SLPs and NAVs is lower and sites where competition is higher. See: Ofwat (2024) Changing Ofwat's charging rules to further protect customers in the new developer services framework.

Developers also bear the full cost of some off-site services (such as diversions of existing water mains pipes that are affected by the construction) through part of the infrastructure charge. The rest of the infrastructure charge reflects other off-site services (i.e. network reinforcement of local off-site assets).

- In Wales, developers pay for all costs of work on local off-site assets associated with their development.
- In England, these costs are shared among developers and customers.[114]

The requirement for companies to recover infrastructure charges (and connection charges, when they were part of the price control) through the single till risks distorting companies' incentives, as forecast errors in companies' allowances could make new connections unprofitable for companies. In particular, if the outturn number of new connections (and volumes of associated reinforcement) exceeds the forecasts used to set a company's allowance, then even if the company makes all new connections at efficient cost, its expenditure would exceed its allowance, reducing its overall returns under the single till model. Similarly, if a developer makes a monetary contribution to network reinforcement work, under the single till framework this contribution will be effectively classified as 'over-recovery' and would need to be shared with consumers via a reduction in wholesale charges.

The costs of reinforcing strategic assets are currently not recovered by the infrastructure charge, or indeed any other developer charge. This means that developers do not pay for these costs, and they are effectively paid for in full by other customers.

Figure 10 below summarises the current charging regime for new connections in England and Wales.

114 The Charges Scheme Rules for English companies require that charges are set such that over each period of five consecutive years cumulative revenues from infrastructure charges will recover the costs of network reinforcement that the incumbent water company reasonably incurs, before any income offset. If there is a shortfall in the costs companies recover through infrastructure charges, this is recovered from customers via the balance of charges. For the next year/period, Ofwat allows companies to include historical variances between infrastructure charge revenue and network reinforcement expenditure when setting infrastructure charges.

Figure 10 Summary of new connections charges in England and Wales

Connection cost		Who charges?	Who pays?	Cost reflection
On-site		Incumbents / NAVs / SLPs	▪ Developer pays	Actual costs
Off-site	**Local assets**	Incumbents / NAVs	▪ Wales: Developer pays ▪ England: Cost shared between Developer (via infrastructure charge) and customers	Average costs
	Strategic assets	Incumbents / Full NAVs	▪ Customers pay	Average costs

Removal of on-site costs from PR24 mitigated issues around incentives. (Socialisation of 'over-recovery' reduces incentives to connect.)

Source: Frontier Economics

Arrangements in other sectors

Box F below provides an overview of potentially relevant features of electricity network charging in GB.

Box F: Electricity network charges in GB[115]

In the **electricity distribution** sector, DNOs' one-off connection charges are 'deep'. Generators are responsible both for the direct costs of connection to DNOs' networks and also for the indirect cost. The indirect costs include elements such as the cost of necessary wider network reinforcements. However, while this means a generator connecting to the distribution network in a low-capacity area (where significant reinforcement is needed) could face significantly higher connection charges, they may receive a rebate if another generator subsequently connects to the network and benefits from the same reinforcement work. This rebate is funded through **'second-comer charges'** paid by subsequent new connections.

In the **electricity transmission** sector, transmission network use of system charges are used to send **locational signals**, as they are explicitly calculated based on the type, size, and location of connection, reducing charges for developments that are located closer to demand. We note that this is less analogous to developer service charging in the water

115 https://www.legislation.gov.uk/uksi/2017/106
https://www.ofgem.gov.uk/sites/default/files/2023-09/Open%20letter%20STC_110923.pdf

sector (where charges are one-off), but illustrates how locational charging can be used to send pricing signals to prospective developers based on existing system constraints.

The role of connections management

We note that charges are not the only tool for managing new connections. In particular, the connections process itself can also be used to manage demand. The connections process has been reformed in the energy sector to help manage and enable new grid connections as the UK decarbonises its power sector (see Box G below).

Box G: Connections reform in the energy sector[116]

Connect and Manage

Prior to 2010, the electricity network connection regime was based on a principle of 'invest then connect', under which prospective new power generators had to wait for all relevant reinforcement of the wider network to be completed before joining the network and starting to generate. This led to a substantial queue of prospective new generation, with some projects offered connection dates as late as 2025.

In 2010, the connections regime was reformed based on a principle of 'Connect and Manage'. Under the Connect and Manage approach, finished generation projects could connect to the grid in advance of the completion of wider network reinforcement works. In particular, generators could connect once 'Enabling works' were complete, where 'Enabling works' meant the physical connection to the local network as works to meet minimum reinforcement requirements defined by government.

The remaining 'Wider works' associated with a new connection, i.e. all adjustments needed to comply with Security and Quality of Supply Standards were then continuously assessed by the electricity system operator and only undertaken once managing the constraints became difficult or costly. The cost of wider works were then socialised among other network users.

NESO Connections Reform

The UK's decarbonisation targets have led to a large and growing number of renewable generation projects seeking connection to the electricity network. There is a queue for connection, which has doubled in size since 2020. NESO and Ofgem identified the current 'first come, first served' queuing system as a barrier to progressing new connections: while some projects are progressing quickly, others have been delayed, and as a result, viable projects cannot connect because they are stuck behind slow-moving ones.

116 DECC (2010) Government Response to the technical consultation on the model for improving grid access; pages 5-8, and 28-34.
NESO (2024) Great Britain's Connections Reform: Overview Document; pages 5-6.
Ofgem (2025) Summary Decision Document: TMO4+ Connections Reform Proposals – Code Modifications, Methodologies & Impact Assessment; pages 4-31.

Ofgem and NESO have therefore decided on a package of reforms named 'Target Model Option 4+' to speed up connection of viable generation projects. A key part of the reforms is a shift towards managing the connection of projects on a 'first ready and needed, first connected' basis, which will allow projects aligned with strategic criteria that are progressing quickly to 'skip' past stagnant projects in the queue.

The new measures aim to provide potential new entrants with a clear signal on what technologies to invest in, where projects should be located, and the confidence that the necessary network infrastructure will be built in parallel.

6.2 Barriers to growth and investment

The current charging regime is relatively simple and 'shallow' (i.e. only the cost of on-site and local off-site assets can be recovered from developers, not strategic assets 'deeper' in the network), particularly in England. On-site connection charges are highly granular[117] and naturally relate to the specific costs of making new connections (e.g. the cost of new pipes that need to be laid to connect to the wider network). They are no longer covered by price controls, meaning that the costs companies can recover through on-site charges are not specifically subject to regulation in advance by Ofwat. On the other hand, infrastructure charges in England only vary in practice based on the size (i.e. expected usage) of the developments requesting connection, and by water company. This limits the scope for infrastructure charges to be used as a lever to enable growth. In particular, we have identified key barriers related to infrastructure charges below.

Charges paid by developers do not include all off-site costs. If English companies' infrastructure charges do not recover the cost of local off-site reinforcement, then the remaining cost is socialised among customers. In both England and Wales, infrastructure charges do not reflect the cost of reinforcing strategic assets to account for the additional strain that new connections put on the network. To the extent that off-site costs are not included in infrastructure charges, developers will not take these costs into account when deciding where to locate new developments.

Infrastructure charges do not send meaningful locational signals. Regional variation in infrastructure charges is effectively limited to variation between company licence areas. Under current charging rules,[118] companies are technically allowed to vary infrastructure charges depending on different circumstances (e.g. across different geographical areas), but these differences in charges must be cost reflective. In practice, it is difficult to vary cost-reflective charges, as doing so would requires a detailed costing methodology and granular cost data. Given that the off-site costs that can be included in infrastructure charges are limited (see the previous paragraph), the costs of carrying out such a costing exercise is unlikely to outweigh the benefits to companies under the existing regime. Specifically,

117 See for example: https://www.thameswater.co.uk/media-library/home/developers/charges/2025/charging-arrangements-for-new-connection-services-202526.pdf

118 Ofwat (2024) Charging Rules for New Connection Services (English Undertakers); page 18.

reflecting differences in only a sub-set of off-site reinforcement costs between areas will not necessarily result in charges that send strong signals to developers. Therefore, in practice, companies' charges in England do not vary depending on where there is a greater cost of network reinforcement (of either local or strategic off-site assets). Again, this means developers will not take account of existing network constraints when deciding where to build new developments.

The single till framework limits scope for bespoke network reinforcement. While on-site costs now generally sit outside of the single till,[119] off-site costs still fall within the single till framework, which limits companies' ability and incentive to charge large new users separately (or take developer contributions) for 'bespoke' network reinforcement to enable their connection. Consider a large new user requesting specific reinforcement of off-site assets. (For example, a data centre may request additional capacity to be added to a nearby reservoir, to reduce supply risk, given that it could lose business in light of insufficient water supply for cooling.) Under the current framework, the user may be granted its request, but any 'over-recovery' against the incumbent's network reinforcement revenue allowance needs to be returned to customers. In turn, this risks incentivising the company to delay the connection to a later price control, so that the connection is made once its network reinforcement allowance has been updated to reflect the expected costs of the new user's request. It could also have the effect of incentivising the incumbent to reject the request for specific reinforcement work. As such, companies are prevented from offering/accepting bespoke network reinforcement requests, which could marginally reduce network capacity in the long term, relative to a dual or hybrid till model.[120]

6.3 Recommendations

6.3.1 Recommendation 8: Introduce more targeted and localised cost-reflective charging to optimise network growth and reinforcement

There is a strong argument, based on economic theory, that developers should generally pay for the full cost that their connection causes network companies to incur, to send

119 In England, on-site costs for both wastewater and water connections sit outside of the single till. In Wales, only wastewater on-site costs sit outside of the single till.

120 For information on dual till models see for example: https://papers.tinbergen.nl/15049.pdf

appropriate cost signals.[121] This principle of cost causation has long been recognised by regulators in other sectors, such as Ofcom.[122]

Under the current charging regime, infrastructure charges only reflect a portion of the costs caused by new connections. As a result, there is a negative externality whereby the prices paid by developers do not reflect the pressure their developments put on water networks, especially where their developments are in capacity-constrained areas, and developers cannot make direct contributions to network reinforcement.

In practice, it may be complex to set fully cost-reflective charges. Fully cost-reflective charges (i.e. fully locational, very deep charges) may also deter new connections that would otherwise contribute to economic growth (e.g. the development of a gigafactory). However, there are more practical charging reforms available that could improve the signals sent by infrastructure charges. Below, we set out three specific recommendations for how Ofwat should reform the charging regime to allow for more cost-reflective charges.

First, Ofwat should apply in England the same developer-pays principle as currently underlies the approach applied in Wales, so that developers pay for the network reinforcement costs they cause on local off-site assets.[123] As set out above, English companies' infrastructure charges will not recover the full cost of local off-site reinforcement from developers (unless there is zero error in companies' cost forecasts, which is unlikely) with customers paying some share of these costs as a result. Implementing a 'developer pays' principle would ensure developers pay charges that more accurately reflect the local off-site reinforcement costs they cause, which in turn will incentivise them to locate new developments where there is greater existing capacity in the water network.

Second, Ofwat should consider whether more network reinforcement costs for strategic assets can be recovered from developers rather than from customers (i.e. explore allowing for 'deeper' charges). Ofwat could draw on aspects of regimes in other sectors or jurisdictions – for example, the arrangements in the energy sector set out in Box F in Section 6.1 above. Ofwat's considerations should include exploring to what extent reflecting these costs in infrastructure charges would:

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121 Where specific costs can clearly be identified as being caused solely by a particular new service or additional customer, the principle of cost causation is generally recognised as appropriate as it promotes an economically efficient allocation of resources by ensuring that each user of a service pays for the additional costs incurred in providing that service. We note that it is therefore important to isolate the costs that developers cause from the costs that would have been incurred by the network companies anyway.

122 Ofcom (2005) Provision of Technical Platform Services: A consultation on proposed guidance as to how Ofcom may interpret the meaning of 'fair, reasonable and non-discriminatory' and other regulatory conditions when assessing charges and terms offered by regulated providers of Technical Platform Services; paragraph 5.6.

123 We note that in Wales, while the infrastructure charge is based on a 'developer pays' principle, in practice the infrastructure charge was fixed at £200 in 1990 and has been indexed with inflation since. This specific approach of indexing a historical estimate of the local off-site reinforcement costs developers cause to water networks should not be expanded/used in England. Instead, charges should, to the extent possible, reflect actual costs.

- Require a similar forecasting approach as is used for allocating network reinforcement costs for local off-site assets to infrastructure charges;
- Require a cost allocation exercise to assign need for certain reinforcements of strategic assets to new connections (we note this could be complex);
- Be implementable through the first-comer/second-comer approach used in electricity distribution (see Box F), noting this is likely to be more appropriate for certain types of developers (e.g. very large users), with greater ability to pay for these charges;[124]
- Use companies' LTDSs to distinguish between network reinforcement costs 'caused' to strategic assets by new connections from those costs a company expected to incur anyway (which should already be covered in a company's LTDS) – we note that Recommendation 1 (see Section 3.3.1, where we recommend expanding the scope of LTDSs and ensuring they are funded by Ofwat), would therefore complement Recommendation 8; and
- Alongside the developer-pays principle, enable infrastructure charges to vary more within licence areas, to reflect differences in network capacity across the licence area, allowing for clearer locational pricing signals.[125]

Third, Ofwat should consider removing infrastructure charges from the single till. This would prevent network reinforcement costs being socialised across customers. Instead, these costs would be recoverable only from developers, allowing for companies to vary the cost-reflectiveness of infrastructure charges, and potentially allow for greater use of developer contributions, based on developers' willingness to pay for network reinforcement.[126] Where efficient recovered costs diverge from allowances over a price control period, the difference would need to be rolled-over to the next price control period, where appropriate,[127] to be reflected in future infrastructure charges.

Implementing Recommendation 8 would lead to more optimal demand management at the margin. Developers' locational decisions are likely to be influenced by a wide range of factors, of which water/wastewater charges are only one – other factors are likely to carry

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124 We also note that the current charging regime may implicitly allow for some first-comer/second-comer charging as companies can 'oversize' network reinforcement work prompted by a single new connection, so that the relevant assets are resilient to future new connections. While the developer who prompted the work would only pay for the efficient cost of reinforcement related to their own connection, the additional (efficient) 'oversizing' work would ultimately be recovered through future infrastructure charges (to future developers).

125 We note that the impact of allowing infrastructure charges to vary within licence areas would depend on the other factors weighed up by developers (i.e. the importance of infrastructure charges in their decision-making), and the difference in demand between more/less constrained areas (if the difference is large, then there may be little impact, as the higher costs in more constrained areas would be averaged across a large number of developers, reducing the average impact on charges).

126 We note this raises an issue if additional developers are later seen to be 'free riding' on the additional network capacity/assets.

127 If efficient recovered costs were below the allowance, but volumes were at or above forecast, then companies should retain this efficiency gain (following any outperformance sharing adjustments). If efficient recovered costs were below the allowance due to volumes being lower than forecasted, then some of the allowance may need to be rolled-over to the next period. If efficient recovered costs were above the allowance due to volumes being above forecast, then the additional efficient cost would need to be recovered in the next period.

more weight (e.g. the demand for housing, land prices, etc.). However, in marginal cases, more cost-reflective charges could steer developers to build in areas of the water/wastewater network that are less capacity-constrained. In the long-run, this would likely improve resilience and water system efficiency compared to a counterfactual where charging does not send locational signals (or only sends weaker signals).

As set out in Section 6.1 above, charges are not the only tool for managing new connections. In particular, reform to the connections process can also manage demand. This could be important in the longer term, if there is an uptick in demand for new connections (e.g. if planning reform leads to a significant increase in the number of new developments).[128] Similar connections reform in the water sector as seen in the energy sector (e.g. reconsidering which works can/should take place before/after a connection, or how new connections should be prioritised where there are constraints – see Box G above) could future-proof the connections regime in case of a surge in new connections. However, we do not consider there is currently a clear need for energy sector-style reforms in the water sector, as there is unlikely to be a similar increase in demand for new connections (which in the energy sector was driven by policy).

[128] For example, the OBR considers that Government's reforms to the National Planning Policy Framework, are likely to lead to increased net additions to the UK housing stock. See: OBR (2025) Economic and Fiscal Outlook March 2025; chart 1.3.