

Watt's the plan?

Renewing utilities regulation for the net zero era

Mary Starks
November 2023



Steering Economic Change

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As the UK is buffeted by the economic shocks and challenges of the 2020s, The Economy 2030 Inquiry, a collaboration between the Resolution Foundation and the Centre for Economic Performance at the London School of Economics (LSE), funded by the Nuffield Foundation, is setting out a new economic strategy. To feed into this process we are publishing a series of externally-written policy essays. Each aims to provoke public debate on a specific policy area, and sketch out an agenda that will contribute towards the wider goal of the UK becoming a higher growth, lower inequality economy.

The essays cover topics ranging from the role of smarter regulation in supporting economic growth, ensuring that the goal of 'good jobs' is embedded in our national industrial strategy, and the role of the higher education sector in providing the skills needed to power our services dominated economy.

They are written by a range of leading economists and policy experts, and reflect the views of the authors rather than those of the Resolution Foundation, the LSE or The Economy 2030 Inquiry.

They have been commissioned and edited by Gavin Kelly (Chair of the Resolution Foundation and member of the Economy 2030 steering group) and various members of The 2030 Economic Inquiry team.

The Economy 2030 Inquiry

The Economy 2030 Inquiry is a collaboration between the Resolution Foundation and the Centre for Economic Performance at the London School of Economics, funded by the Nuffield Foundation. The Inquiry's subject matter is the nature, scale, and context for the economic change facing the UK during the 2020s. Its goal is not just to describe the change that Covid-19, Brexit, the Net Zero transition and technology will bring, but to help the country and its policy makers better understand and navigate it against a backdrop of low productivity and high inequality. To achieve these aims the Inquiry is leading a two-year national conversation on the future of the UK economy, bridging rigorous research, public involvement and concrete proposals. The work of the Inquiry will be brought together in a final report in 2023 that will set out a renewed economic strategy for the UK to enable the country to successfully navigate the decade ahead, with proposals to drive strong, sustainable and equitable growth, and significant improvements to people's living standards and well-being.

Foreword

The Resolution Foundation asked me to write an essay on economic regulation of infrastructure for the Economy 2030 Inquiry. The Inquiry has identified slow growth and high inequality as big problems facing the UK. I take as my starting point that infrastructure to power and connect economic activity is necessary to support growth. And that who benefits, and who pays, matters both of itself and for continued public support for infrastructure programs.

This essay looks ahead to the challenges of reforming and renewing UK infrastructure in the coming years. It also looks back at the experience of over three decades of economic regulation in the UK, following the wave of privatisations in the 1980s and 1990s. It argues that the job of infrastructure regulation is changing, from controlling what citizens pay private operators to run and maintain mature networks, to overseeing system transformation on a new scale. It identifies the difficult trade-offs ahead, and argues that navigating these requires new institutional frameworks. It concludes that there remains a critical role for economic regulators in assuring the 'promise' to private investors of cost recovery and a reasonable return, and in controlling costs on behalf of customers. But that the job of deciding what gets built should move elsewhere.

Many others have written on this topic in greater depth than I have managed here. My target audience is those relatively new to the subject, for whom I lay out the main debates and point to a way forward. Should you get the bug, there is plenty more to read in the publications cited here from the National Infrastructure Commission and others.

My focus is on private sector infrastructure, since that is the focus of most economic regulators (Office of Rail and Road excepted); getting the right balance between public and private investment is a huge topic and I have not grappled with it here. Lastly, my own experience of economic regulation is mainly in energy; I have covered some of the challenges in water, communications and transport as well, but a different author would have done them more justice.



Mary Starks, October 2023

Executive Summary

The UK has major infrastructure challenges ahead. We need to decarbonise our energy and transport systems, adapt to a changing climate (temperature extremes, drought and heavier rain), keep up with our insatiable demand for data, and accept that we are finally reaching the limits of our Victorian-built sewers and railways. This requires a huge increase in investment, which will be challenging to deliver and costly to pay for – some household bills could double.

The regulatory framework designed in the UK at privatisation has until now offered a strong climate for private investment in infrastructure. The basic model for utility price controls offers operators revenues sufficient to recover efficient costs and a rate of return on any asset approved by the regulator. This pricing regime, administered by a politically independent regulator, has proven attractive to investors. The framework has also kept a lid on costs for customers, with household bills fairly stable since privatisation (at least until the recent energy crisis) and modest by international comparisons.

Regulators must strike a balance between giving investors assurance over returns and giving customers confidence that they are not over paying; in the years since privatisation, they have come under fire from both sides for failing to get that right. Now, at a point where the UK's investment needs are increasing but (from an investor perspective) its economic and political conditions have worsened, there is growing concern that regulators are not doing enough to support investment. At the same time many households are struggling with bills under severe cost of living pressures. This leaves regulators in a tight spot, under ever more pressure to approve necessary investment spending, but reject unnecessary cost. Given the uncertainties involved, the job of telling the difference is harder than ever.

There is increasing discussion of the need for a new type of institution – a 'guiding mind' – for infrastructure planning. The idea is to create an entity which doesn't stand to profit from over-building, but has the expertise to take strategic decisions about what needs to be built. This is, obviously, much easier said than done. There are also calls to depoliticise, and thus stabilise, infrastructure policy, and to reform the planning regime – such that infrastructure needs identified can become real-life projects quickly and cost effectively.

Economic regulators remain well placed to ensure that investment is made efficiently and that costs are recovered fairly, standing in for the customers who ultimately pay for all this. While regulators like to say that they take do technocratic work while decisions on redistribution belong to elected governments, in practice, regulatory decisions on cost allocation have significant distributional impacts and regulators should be accountable for these.

I therefore recommend three changes to the institutional framework:

- A greater role for system operator, or 'guiding mind', institutions in deciding what gets built;
- A greater role for expert advisory bodies in challenging 'wishful thinking', supporting long-term plans, and holding government and regulators to account for delivery; and
- More transparency from economic regulators in deciding how costs are recouped over time and how common costs are allocated between user groups.

Designing and delivering infrastructure transformation at scale and pace – in the face of major uncertainties and interdependencies, during a cost of living squeeze, facing a tight and structurally deteriorating fiscal position, and on a small and crowded island – could never be easy. But to meet the challenges of net zero, clean beaches and rivers, and physical and virtual connectedness, the UK must raise its game in delivering infrastructure investment. Getting regulatory frameworks right is an integral part of this challenge.

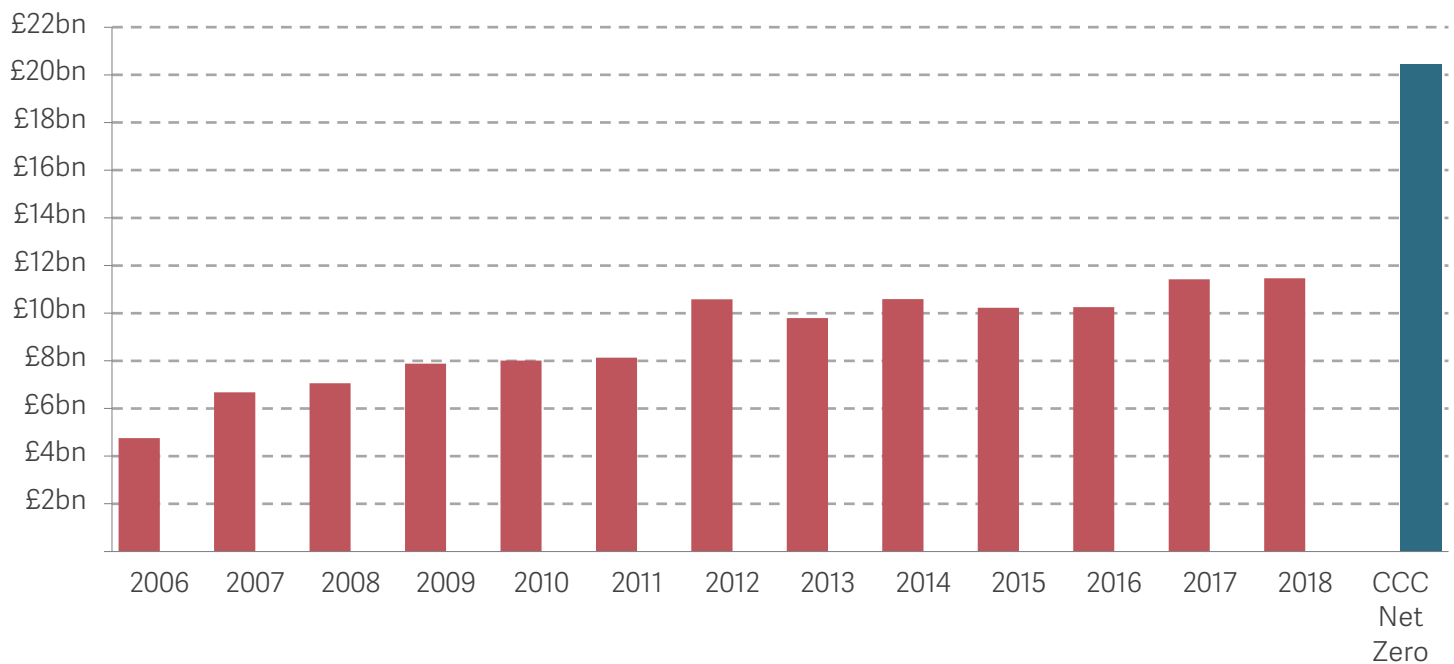
Introduction: UK infrastructure - what we need to build (and demolish) between now and 2050

The UK has major infrastructure challenges ahead. We need to decarbonise our energy and transport systems, adapt to a changing climate (temperature extremes, drought and heavier rain), keep up with our insatiable demand for data, and accept that we are finally reaching the limits of our Victorian-built sewers and railways.

This requires a huge increase in investment. For example, the Committee on Climate Change has estimated we will need to double the rate of investment into the power sector to meet the target of net zero by 2050.

FIGURE 1: The CCC estimates that investment in power needs to double to meet net zero

Annual power investment and CCC estimate of value investment required for net zero: UK, 2006-2018



NOTES: Outturn investment in 2018 prices, using GDP deflator.

SOURCE: NIC, Strategic Investment and Public Confidence, 2019; NIC calculations using ONS data; Committee on Climate Change, Net Zero: The UK's contribution to stopping global warming, 2019.

Economy-wide, the Government estimates a need for £50-60 billion capital investment per year through the late 2020s and 2030s, mostly from the private sector.¹ This compares to perhaps £15 billion per year in infrastructure networks since privatisation,² and includes a total of £200 billion for heat and buildings, £220 billion for transport,³ a further £100 billion for the water sector.⁴ The National Infrastructure Commission estimates that overall investment needs to increase from around £55 billion per year over the past decade to around £70-80 billion per year in the 2030s and £60-70 billion per year in the 2040s.⁵

It also requires new approaches to infrastructure delivery – coordinated planning of transport and power systems, and novel business models for delivering first-of-a-kind projects in areas such as hydrogen or carbon capture and storage.

The specifics differ between energy, water, communications and transport – as explored in the first half of this paper. But in all sectors infrastructure delivery will require decisions that are higher value and more interconnected than those which regulators were set up to take following privatisation. They are also more closely entwined with other aspects of Government policy, blurring what was historically a clear line between policy and regulation. This raises questions about institutional frameworks and performance – addressed in the second half of the paper.

Section 1: investment requirements in infrastructure

Energy investment needs to rise sharply, putting pressure on the planning system

Reaching net-zero emissions requires the replacement of gas-powered electricity generation with zero-carbon sources (renewables or nuclear). It also requires us to generate much more electricity as we switch from gas to electricity for heating our homes, and from petrol and diesel to electricity in road and rail. We need new grid capacity to transport this power, partly because wind turbines will be mainly located in the North Sea, a long way from where people want to use it.

The UK has made a strong start on reducing CO₂ emissions (see Figure 2). However this early progress largely reflects the removal of highly polluting coal from the electricity generation mix, as well as off-shoring much heavy industry. The harder yards are ahead, with little progress as yet in decarbonising heating or transport (see Figure 3).

1 BEIS, Net Zero Strategy: Build Back Greener, October 2021.

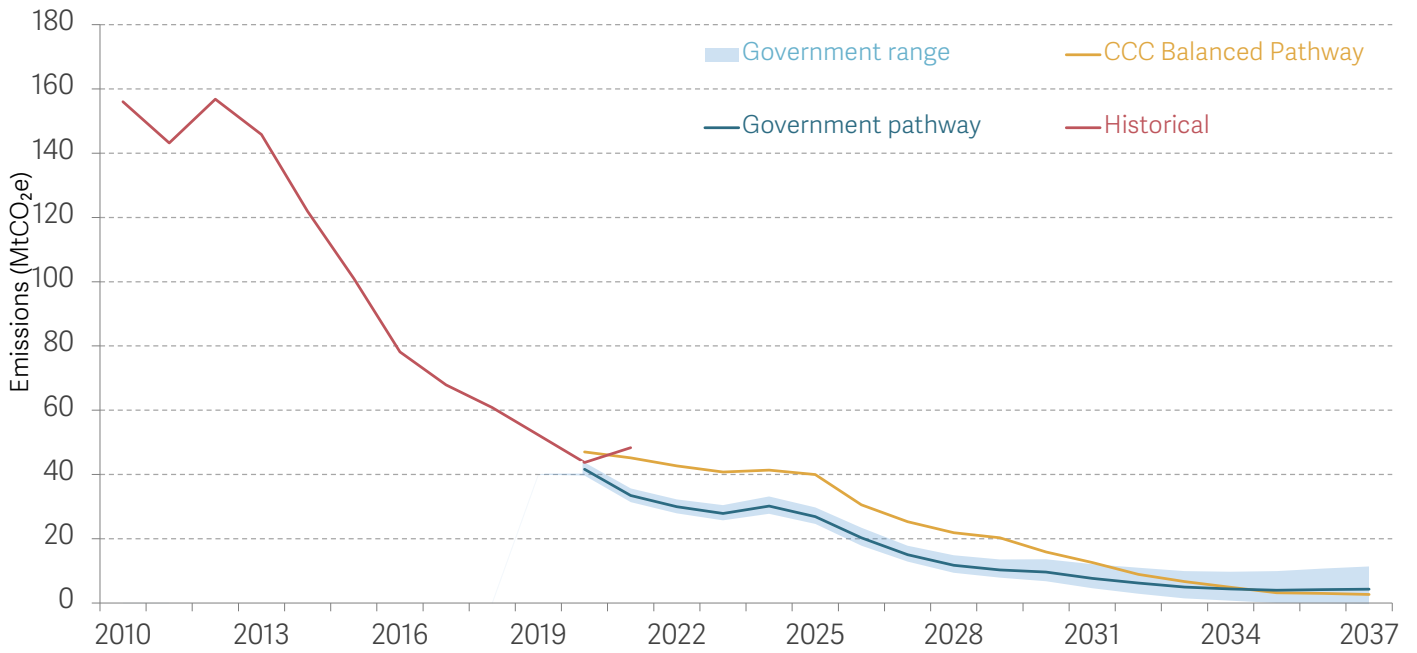
2 The Government estimates there has been £450 billion of private investment in infrastructure networks since privatisation. BEIS, [Economic Regulation Policy Paper](#), January 2022

3 BEIS, Net Zero Strategy: Build Back Greener, October 2021.

4 Barclays, Equity Research: UK Water: positive hydrostatic pressure, March 2023.

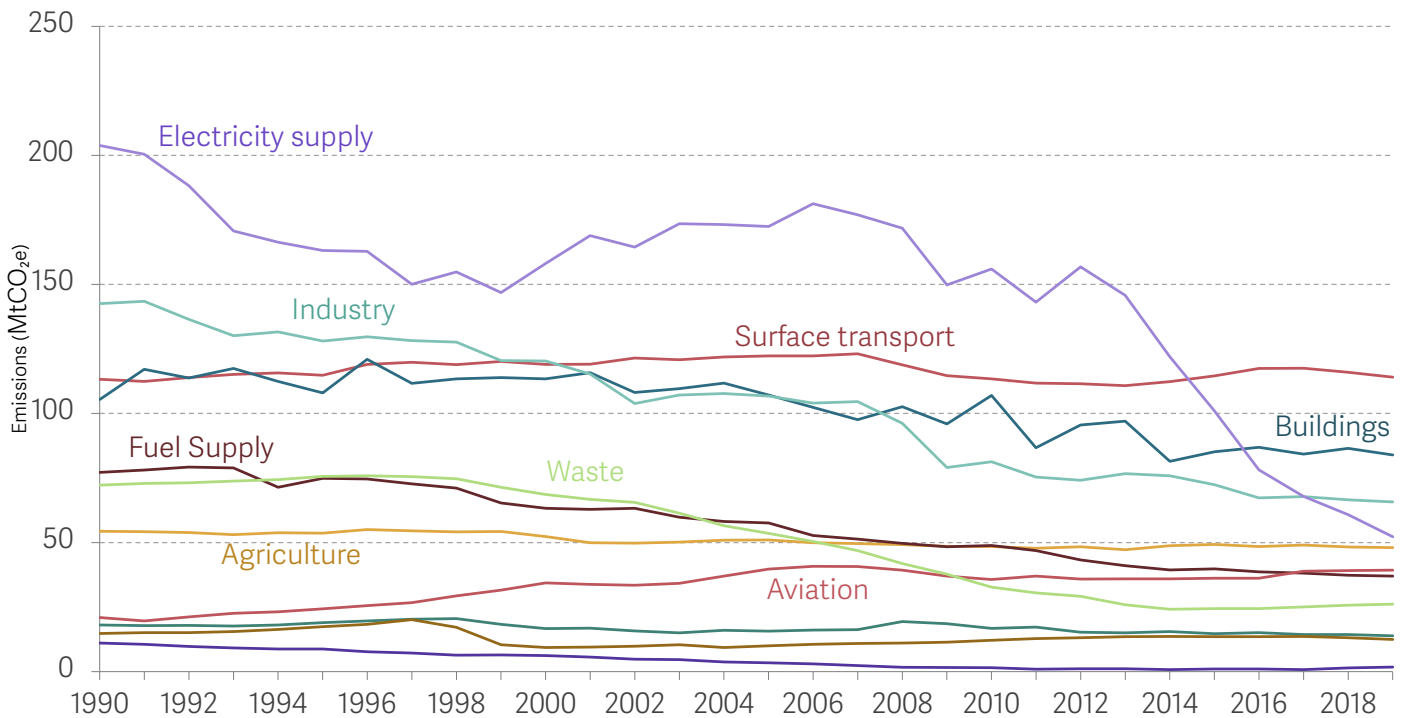
5 National Infrastructure Commission, [Second National Infrastructure Assessment](#): Chapter 5, October 2023.

FIGURE 2: The UK has made a strong start reducing CO₂ emissions
 Net Zero Strategies and emission pathways, MtCO₂e: UK, 2010-2037



SOURCE: CCC 2022 Progress in Reducing Emissions (June) 2022 Report to Parliament.

FIGURE 3: Progress in reducing emissions has not been balanced across sectors
 Greenhouse gas emissions by pollution source, MtCO₂e: UK, 1990-2019



NOTES: Created using data from 2022 CCC Progress in reducing emissions report to Parliament (Figure 2).
 SOURCE: DESNZ (2023) Provisional UK greenhouse gas emissions national statistics 2022; BEIS (2023) Final UK greenhouse gas emissions national statistics: 1990 to 2021.

We know how to do some of what is needed. Wind and solar are now broadly cost-competitive with fossil-fuel generation. But there are challenges in doing enough, quickly. The Government wants to increase wind capacity from around 10GW to 40GW by the end of this decade but faces challenges with grid connections and planning consent;⁶ some projects face a 10-15 year wait for a connection.⁷ The Government has pledged to relax national planning restrictions and is exploring ways to help local communities benefit with a view to easing local restrictions as well, but planning reform is politically and legally difficult.

Other aspects are even more daunting. We need to retrofit the UK's housing stock with insulation and low-carbon heating (primarily electric heat pumps). We also need to choose – and soon – the delivery model for retrofit: should households decide when to upgrade, encouraged by grants or other incentives, or would a national conversion program (akin to the switch from town to natural gas in the 1960s and 1970s) be more effective? Both options are fraught with consumer-protection risks.

Much of the gas network will become redundant as we stop using natural gas for domestic heating and industrial uses. The regulator will need to manage the twin challenges of stranded assets and phasing out an essential service.

With renewables intermittent and nuclear power inflexible, we cannot feasibly operate without *any* gas in the generation mix by 2050. To reach net zero we will therefore need to remove carbon from the atmosphere to offset our residual, hardest-to-abate emissions. Carbon capture technology is controversial when seen as a ruse to extend the life of fossil fuel assets, but viewed pragmatically it is an essential part of the UK's net-zero pathway: the CCC envisages the need to capture, remove and store up to 175 MtCO₂ annually by 2050, either by capturing emissions at source or by removing CO₂ directly from the atmosphere. The regulator will have a role approving the amount of capital expenditure on CCUS infrastructure, and how the costs are recovered from users of the system.

For all this to happen at speed, we need to shift away from decentralised investment decisions towards more robust and coordinated planning. The Government plans to bring this about through the creation of an enhanced and independent 'future systems operator' (FSO), building on the existing Electricity Systems Operator (part of National Grid) but with new responsibilities for strategic planning for electricity and gas systems, and potentially for new technologies such as hydrogen or carbon capture and storage.⁸ This will change the role of both the network companies and the regulator in determining what gets built.

For now, responsibility for system planning lies with network companies, who propose capital expenditure plans to the regulator to approve or reject. Capital spending that has been approved by the regulator is guaranteed to earn a rate of return, so network companies have a strong incentive to create new assets. However the cost is ultimately recovered from customers, who only want to pay for infrastructure that is really needed. The regulator's role in approving capex, in other words, is to ensure that network companies spend their customers' money wisely. However, the regulator's expertise in infrastructure planning and operation is much shallower than that of the companies it regulates. Looking ahead, as the volume and complexity of capital spend increases, this problem becomes more acute. The idea behind the FSO is to create an entity which doesn't stand to profit from overbuilding,

6 BEIS, Net Zero Strategy: Build Back Greener, October 2021.

7 BBC, [Renewable energy projects worth billions stuck on hold](#), May 2023.

8 BEIS & DESNZ, [Energy Security Bill factsheet: Future System Operator](#), September 2023.

but has the expertise to take strategic decisions about what needs to be built. However, much remains to be decided about its institutional form – including its ownership and whether it should operate for profit or not. Equally much remains to be tested in practice about its ability to attract and retain the necessary expertise, and its institutional incentives – including under political or other stakeholder pressure.

Lastly, the energy crisis of 2022 highlighted the affordability challenge. Energy is an essential service and a significant and volatile component of household bills. While last year's record prices reflected exceptional events, we may face structurally higher energy prices going forward (currently expected to be around £2,000/year for a typical household, roughly double the pre-crisis level). The crisis revealed weaknesses in the policy toolkit around affordability, and the Government was obliged to spend around £40 billion on broad-based subsidies for households and businesses. Fresh thinking is needed on how to target assistance to those who need it most.

Water investment: coping with climate change and cleaning up rivers and beaches

While the energy sector looks to transform to limit climate change, the water sector must also transform to adapt to its weather effects. Longer, drier summers threaten the availability of drinking water, making leakage reduction more urgent and requiring the building of new reservoirs. At the same time, more frequent and intense rainstorms will strain the sewage and wastewater system beyond capacity, meaning the 'emergency' discharge of sewage into rivers and the sea has become a regular occurrence.

Stakeholders debate whether the industry, constrained by its regulator, has been guilty of historic underinvestment. Supporters of the sector point to more than £5 billion invested on average per year since privatisation and the UK's strong record on drinking-water quality, while detractors point to the £57 billion in dividends paid to shareholders and the sector's underwhelming performance on leaks.^{9,10} While beaches and rivers became much cleaner after privatisation (partly thanks to tough EU standards), public expectations are rightly higher 30 years on and pollution is a high profile public concern.

Regardless of the verdict on historic investment, there is a strong consensus that the water system now needs significant investment, and that this will be costly, potentially doubling an average household's annual bill (currently around £450). There is also a strong case for investment in the wider built environment to reduce the problem of surface run-off (for example more green surfaces to absorb water). This requires a holistic approach to local planning and development.

Regulatory oversight of the water sector is split between the Environment Agency (EA) and Ofwat. The EA sets standards in relation to pollution, and the water companies are required to invest to meet these. Ofwat approves investment plans, and sets an allowed rate of return on water sector assets; it has a duty to protect the interests of consumers in so doing. The result of this is arguably a lack of focus on cost by the EA and an over-sensitivity to consumer bills on the part of Ofwat; stakeholders have called for clearer and better integrated sectoral planning.¹¹

9 Ofwat, [Investment in the water industry](#), March 2022.

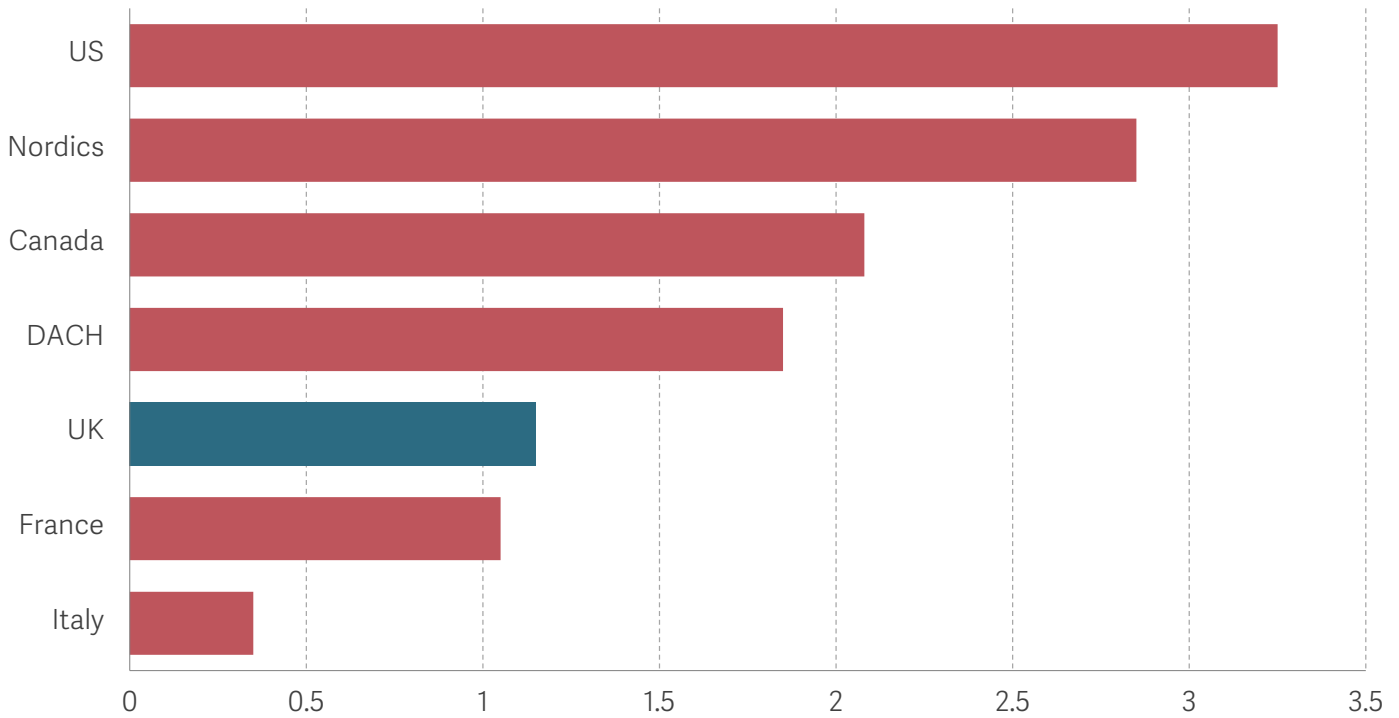
10 Guardian, [England's privatised water firms paid £57 billion in dividends since 1991](#), July 2020.

11 GIIA, [Regulating for Investment](#), 2022.

It is estimated that 70 per cent of English water assets are owned by overseas financial investors.¹² Water investors have engaged in financial engineering (complex and highly geared company structures) since privatisation; with interest rates on the rise the strains from gearing are starting to show, most visibly in the case of Thames Water.¹³ There is now widespread public and political concern about water companies being run as financial investments for overseas pension funds, rather than by and for the people of the region.¹⁴

On top of this backlash, perceptions of political risk in the UK have increased significantly recently, following Brexit, the threat of nationalisation under Jeremy Corbyn, and last autumn's political and economic turbulence. This has shaken international investors' confidence in the UK as a stable investment climate, as suggested by Figure 4.¹⁵

FIGURE 4: Infrastructure investors are not optimistic about the British investment environment
Attractiveness of major economies to infrastructure investors: GIIA Members, 2023



NOTES: Survey of Global Infrastructure Investor Association (GIIA) members. Respondents asked to rank economies on scale of -5 to +5. Nordics include Sweden, Norway, Finland and Denmark. DACH includes Germany, Austria and Switzerland.
SOURCE: GIIA with Alvarez and Marsal, Pulse Survey Q2 2023.

This combination of circumstances presents a major challenge for the sector: the sector needs significant new capital to fund the investment needed to upgrade its ageing infrastructure, yet international investors are cooling on the UK as a place to invest. There is a strong political desire to support more UK investment in infrastructure, and new structures have been created to facilitate this (e.g. the long-term asset fund, LTAF¹⁶) but domestic capital has yet to materialise in significant volumes.

¹² Guardian, [Revealed: more than 70 per cent of English water industry is in foreign ownership](#), November 2022.

¹³ FT, [Thames Water travails threaten to plunge privatised sector into crisis](#), June 2023.

¹⁴ See for example quotes from a range of stakeholders in this speech by the then Chair of Ofwat: [Jonson Cox speech at Water Industry City Conference](#), March 2018.

¹⁵ GIIA, [Investing in the Future](#), May 2023.

¹⁶ FCA, [FCA authorises first Long Term Asset Fund](#), March 2023.

Ofwat has historically been neutral about the source of capital for the sector – it has a duty to ensure that suppliers can finance the investment needed to meet demand, but no obligation or ability to discriminate between types of investor or sources of capital. It has, however, begun to express stronger expectations about water companies fulfilling a public as well as financial purpose.¹⁷

New communications' regulation is less about cost and more about content

The National Infrastructure Commission estimates that the UK needs to invest £1.3 billion a year for 5G by 2027 and £2.2 billion more for full fibre by 2033.¹⁸ Although these are significant sums, they are much smaller than for energy or water, and the sector's record on delivering physical network investment is strong (the challenges of rural broadband notwithstanding) and there is nothing strikingly new or different about how these investments will need to be delivered.

There is, however, a live debate about whether broadband networks in particular should be paid for by customers (as is currently the case), or content providers. Telco operators (particularly in the EU) argue that the (predominantly US) providers of social media, streaming services and other content should contribute a 'fair share' towards the cost of building and maintaining the networks that deliver content to customers. On the other side of the debate, supporters of the principle of 'net neutrality' believe that this would open the door to content providers with deeper pockets being able to pay for preferential distribution, distorting customers' access to content.

Instead, the biggest changes in communications regulation between now and 2050 may not be around who pays for investment, or how much is needed, but rather the regulation of content and data, as well as how to regulate artificial intelligence and cloud computing. Concerns about AI and cloud are wide-ranging (including issues such as privacy, bias, and national security) but in terms of economic regulation of infrastructure, the primary focus is on competition and resilience.

On competition, economies of scale and first-mover advantages in the provision of cloud infrastructure have shaped a highly concentrated market of 2-3 "hyperscalers" in the UK: Amazon Web Services (AWS) and Microsoft have a combined market share of 60 per cent to 70 per cent, while Google is in third place with 5-10 per cent of the market.¹⁹ Ofcom and the Competition and Markets Authority are actively thinking about the need for intervention to boost competition and protect consumer choice.

High concentration also raises questions about resilience. Financial regulators are concerned that a significant failure at one of the hyperscalers could pose a serious risk to the financial system, and have plans to recognise cloud providers as 'critical third parties' and bring them within scope of financial regulation.²⁰

Electrification of transport means more generation, transmission and charging points

To a large extent the story in transport converges with the story in energy outlined above. To reach net zero by 2050 we must electrify light road vehicles – a huge task – as well as converting heavy vehicles

¹⁷ See for example: Ofwat, [Keynote address from Jonson Cox Utility Week City Conference](#), March 2020.

¹⁸ National Infrastructure Commission, [Strategic Investment and Public Confidence](#), 2019.

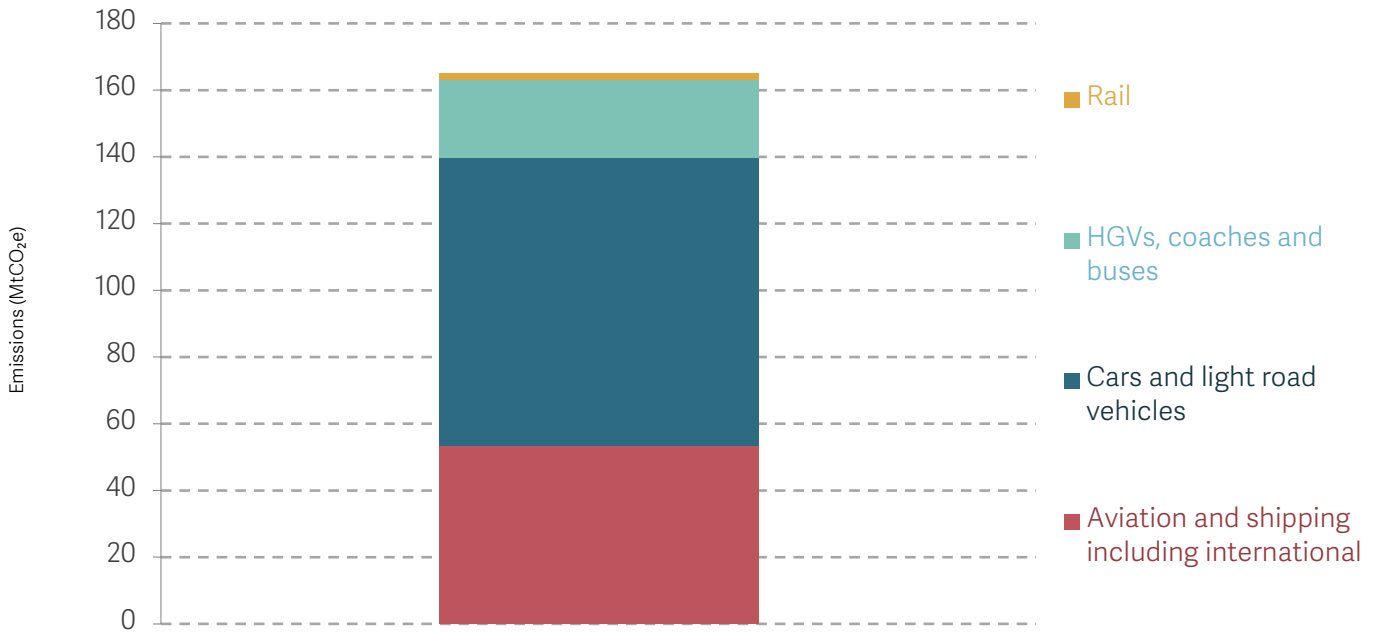
¹⁹ Ofcom, [Cloud Services Market Study Interim Report](#), April 2023.

²⁰ Bank of England, [DP3/22 – Operational resilience: Critical third parties to the UK financial sector](#), July 2022.

to hydrogen, solving the problem of clean aviation and shipping, and electrifying rail. Figure 5 shows the equivalent carbon emissions of different transport modes.

FIGURE 5: Road transport accounts for over two thirds of transport emissions

Annual greenhouse gas emissions by transport mode, MtCO₂e: UK, 2019



SOURCE: Final UK Greenhouse gas emissions national statistic 1990-2021, BEIS & DESNZ, 2023.

As well as the huge increase in capacity of the power system this electrification will require, the other challenge in electrifying transport is to create a network of charge points. It is unclear how new technology and behaviour change will come together in the coming decades – will we mostly charge our cars at low voltage overnight at home, or will there be significant demand for high voltage fast-charging on motorways, or in supermarkets?²¹ Will the traditional model of private car ownership persist or will we come to rely on a commercial fleet, possibly of self-driving vehicles, that charges at depots? These questions highlight the uncertainty around making the right investments in the right place at the right time. And while charge points can in principle be installed on a commercial basis, decisions about where to reinforce the grid to support charging (especially higher voltage fast charging) require planning and regulatory approval. It is partly with such uncertainties in mind that Ofgem is overhauling its approach to investment approval for the period from 2028 onwards, including how it approaches investment ahead of demand.²²

There are other big challenges facing the transport sector, notably finding a fiscally sustainable footing for the rail sector, addressing pollution in city centres, addressing economic inequality between regions, and developing clean aviation fuel. However these largely sit beyond the scope of economic regulation and this paper.

²¹ An EV charged on public chargers can save around £1,100 over petrol or diesel cars, but the savings are even greater for those with off-street parking and low-cost overnight energy tariffs. For more on the problems posed by disparities in access to greening our transport systems and homes, and the associated financial gains, see: A Corlett & J Marshall, [Shrinking Footprints: The impacts of the net zero transition on households and consumption](#), Resolution Foundation, March 2022.

²² Ofgem, [Consultation on frameworks for future systems and network regulation: enabling an energy system for the future](#), March 2023.

In this section I have given a very brief overview of some of the main challenges facing each sector. In practice, a number of the issues are relevant to more than one sector. The table below summarises the position across sectors.

	Energy	Water	Transport	Telecoms
Climate change	Investment needed to meet net-zero commitment	Investment needed to adapt to weather extremes – both flood and drought	Investment needed to meet net zero (electrification) and adapt (resilience of rail and road networks)	
Infrastructure resilience	New challenges from intermittent renewable generation	Ageing Victorian infrastructure facing increasing weather extremes	Ageing Victorian infrastructure facing increasing weather extremes (rail)	Concerns about dependency on a small number of players (cloud)
Concerns about UK as investment destination	Yes – given recent UK political instability and greater support available in US and EU	Yes – given recent UK political instability and reputational issues for the sector	Yes – given recent UK political instability and nationalisation of franchises during covid	Some – given recent UK political instability
Affordability challenges	Yes – energy bills are a major and cost for households, and can move up and down unpredictably	Some – water bills relatively modest and stable	Yes – transport is a significant cost for households, and for taxpayers	Some – telecoms bills significant but relatively stable

Section 2: The role of regulation

In this section I look across sectors at some key themes in economic regulation. I review the regulatory model introduced at privatisation, and consider what has changed since then. I look at some of the trade-offs between the objectives of speed, affordability and fairness in infrastructure delivery. I then turn to the institutional framework that governs how trade-offs are made, including planning, private capital, and the significance of regulators' objectives and duties, where big changes may be needed. Finally, I consider how economic regulation has performed over the past 30 years.

At the time of privatisation, the task was to lower costs and prices for mature utilities networks

At the time of privatisation the UK's utilities were mature networks – nearly every household had mains electricity, water and a phone line; most had mains gas. The primary focus was on improving operational efficiency, and privatisation was designed to introduce commercial incentives and freedoms to drive down costs, including through workforce reform. Improving access to capital, which had been constrained under public ownership, was also a goal but primarily with a view to network upgrades and maintenance, rather than investment or transformation at scale.

The post-privatisation model of economic regulation was known as “RPI-X” or the “regulated asset base” (RAB) model. There were two central economic ideas:

- Utilities would be allowed to earn a rate of return based on the estimated cost of capital on assets included in the RAB
- Over time prices would move upwards in line with inflation (RPI) less a factor (X) representing efficiency gains

The specifics of the model varied by sector but in all cases the regulator was responsible for approving the assets to be included in the RAB, including new capital expenditure; setting the allowed rate of return; and setting 'X'. Most did this on a five-year cycle.

The model needed to offer stability and predictability to private investors, who were being asked to put their money into sunk assets (you can't move or repurpose a gas network) in exchange for a promise of future revenues. Since the promise needed to last the lifetime of the assets (which could be 30-50 years) it needed to withstand electoral cycles and outlast individual governments. The third big idea, therefore, was that regulators should be set up to take their decisions independent of political influence.

The new task: supporting the renewal of networks

The fundamental purpose of economic regulation of infrastructure networks has not changed: to create the conditions to support private-sector investment at reasonable cost to customers. The risks of getting it wrong have not changed either: regulators fail in one direction if investors make excessive profits at customers' expense, and in the other if investors are reluctant to put in capital and require a high premium to do so.

The balance of those risks has shifted in the years since privatisation. Through the early price-control cycles there was a premium on proving that the model worked, that investors could rely on the promise. But as time went on, investors felt more confident and found ways to use the model to

maximise earnings; there were signs (high dividend payouts, transaction values at high premia to RAB) that the model was working better for investors than for customers. The focus on customer outcomes intensified in the years following the global financial crisis, particularly as it became apparent that retail markets were working better for some customers ('savvy shoppers') than others ('vulnerable consumers'). Regulators felt increasing public and political pressure to deliver better value, particularly for those struggling to pay bills.

In parallel came the growing realisation of the scale of new investment needed, discussed in the first part of this paper. This leaves regulators in a tight spot. To bring forward investment at scale and speed, the model should tilt towards generosity on risk-adjusted returns and a greater tolerance for uncertainty around anticipatory investment and project delivery; but with inflation recently in double digits and rising housing costs, it is a difficult time to load new cost onto household bills.

Who should build what, and where?

As well as striking this fraught balance, a major challenge for regulators between now and 2050 is helping to determine what gets built, where and when. In mature networks, capital expenditure decisions are relatively straightforward, involving proven technology and limited external dependencies; now, however, the overhauls needed in energy and water in particular involve huge uncertainties (how far will the cost of battery storage fall?) and significant dependencies on other systems (will new housing developments have better surface drainage?).

This means two big changes in how regulators approach the job of approving new capital expenditure, and setting the allowed rate of return and efficiency targets.

First, regulators can no longer anticipate with reasonable confidence what needs to get built over a future five-year period, and what it will cost. Regulators have introduced re-openers and uncertainty mechanisms into price controls which can cope with uncertainty up to a point. But a more fundamental reassessment is needed – both of the quantum of risk necessary to deliver new infrastructure at scale and at speed, and of the apportionment of that risk between investors, bill payers, and taxpayers (current and future).

Second, regulators can no longer operate largely in isolation from other institutions, including central and local government. A much higher degree of institutional coordination is needed to deliver a 'whole system' approach to infrastructure planning.

Striking the balance: trading off speed, cost and fairness

Even assuming strong public and political consensus on the outcomes we want our infrastructure to deliver (a zero-carbon energy system, clean beaches and rivers), there are trade-offs between delivering these outcomes quickly, cheaply, and fairly.

Speed

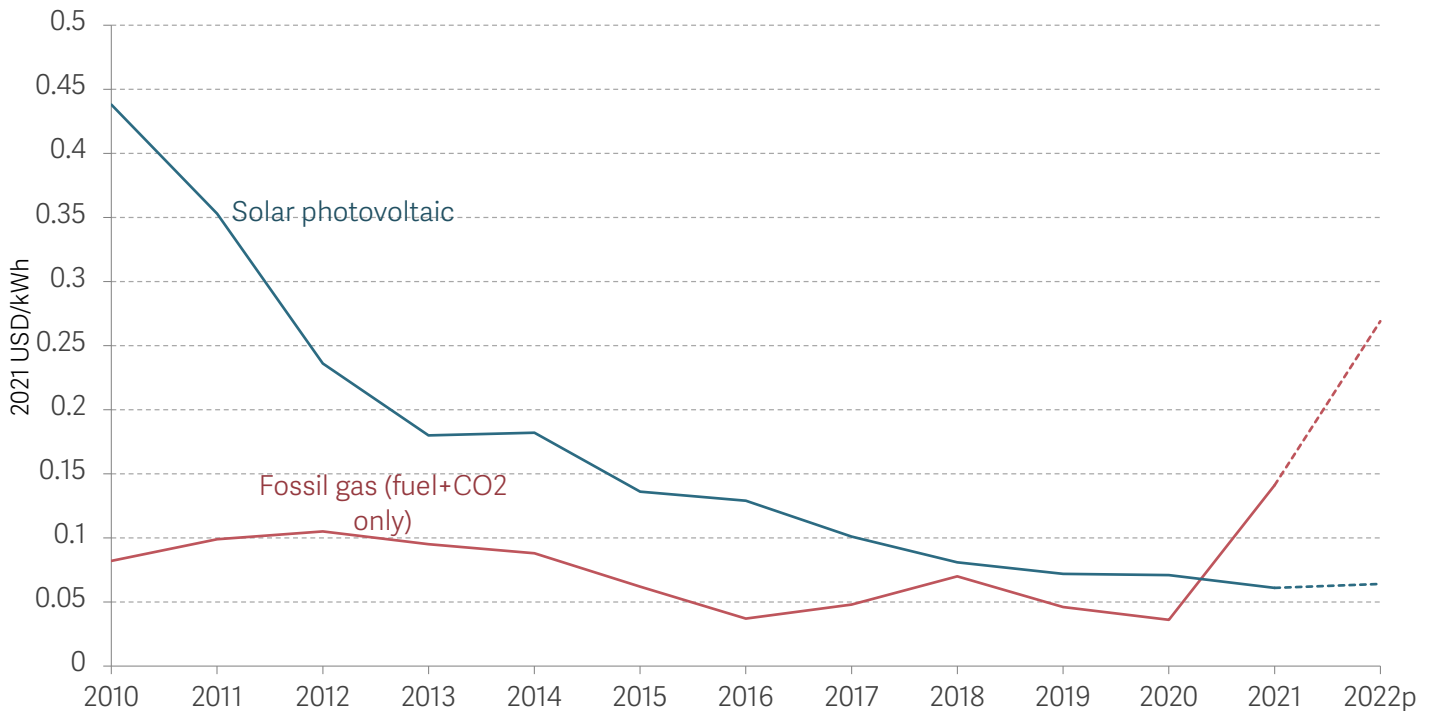
Climate scientists have long argued that the longer we leave it to invest in climate change mitigation, the more it will cost.²³ That view implies there is no trade-off between speed and cost when it comes to tackling climate change.

²³ This was the primary conclusion of the landmark Stern Review. Nicholas Stern, [The Economics of Climate Change: The Stern Review](#), 2006.

However, at the level of specific policies and projects, there are trade-offs. Allowing anticipatory investment in the grid (ie building ahead of demand) entails some risk that unnecessary infrastructure gets built – or that assets sit idle for an unexpectedly long period before demand materialises. This is costly.

It also takes time to discover the optimal technology path. The history of wind and solar suggests that learning by doing can and will drive down unit costs dramatically, but not necessarily overnight, as shown in Figure 6.

FIGURE 6: The costs of newly installed renewable energy have fallen over the past 12 years
Weighted average LCOE of utility scale solar compared to fuel and CO2 cost for gas: Europe



NOTES: Projection for 2022 due to midyear publication of data on July 13th 2022.
SOURCE: IRENA Renewable Power Remains Cost-Competitive amid Fossil Fuel Crisis (2022).

Had the UK installed 40GW of wind at 2012 prices, that capacity would now require very significant subsidy support, whereas 40GW installed between now and 2030 should not.

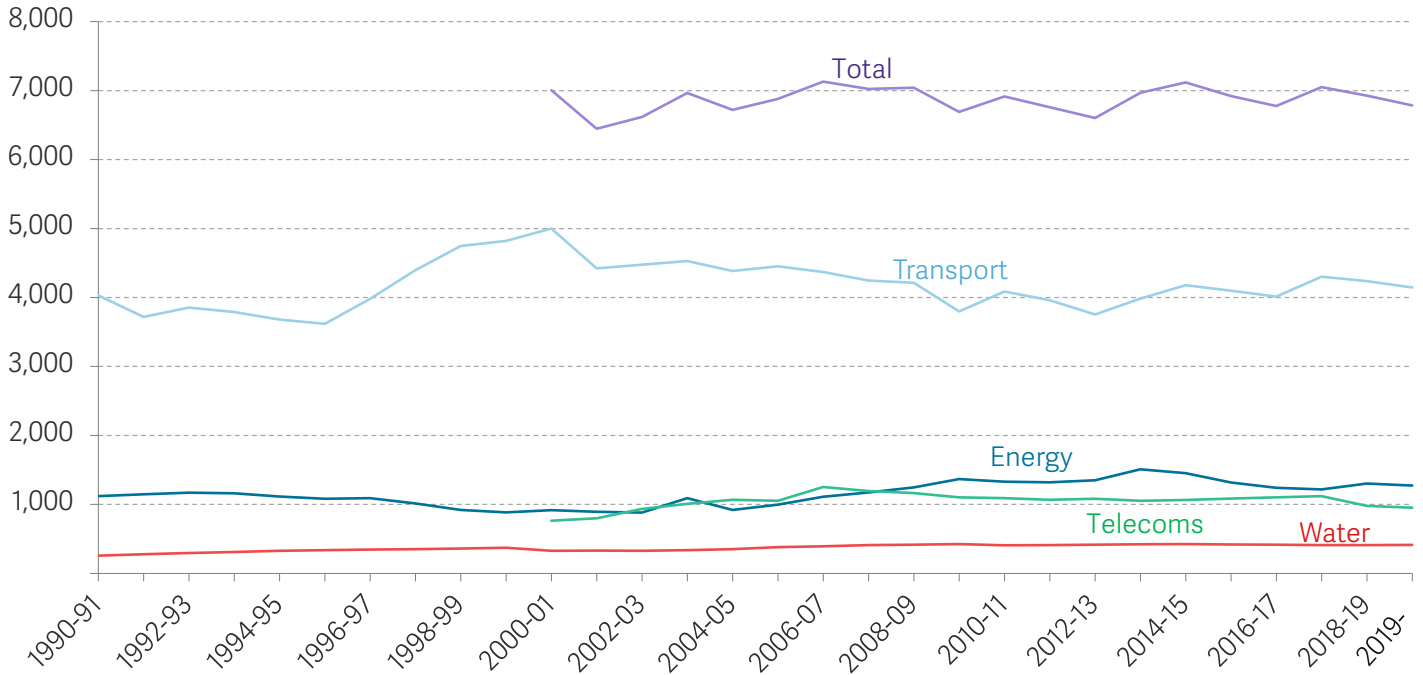
The main barrier to speed in infrastructure projects in the UK is planning consent. The need for Thames Tideway, London’s ‘super sewer’, was identified towards the start of the millenium; planning was not approved until 2014, and the project will not complete until 2025. High Speed 1 (HS1), the channel tunnel rail link, was beset by similar delays; the comparison with speed of delivery on the French side is striking. I return to the topic of infrastructure planning below.

Affordability

For UK households, the costs of infrastructure networks have been broadly stable since privatisation (see Figure 7), and relatively low compared to other European countries (Figure 8).

FIGURE 7: Infrastructure costs for households were stable since privatisation, up to 2020

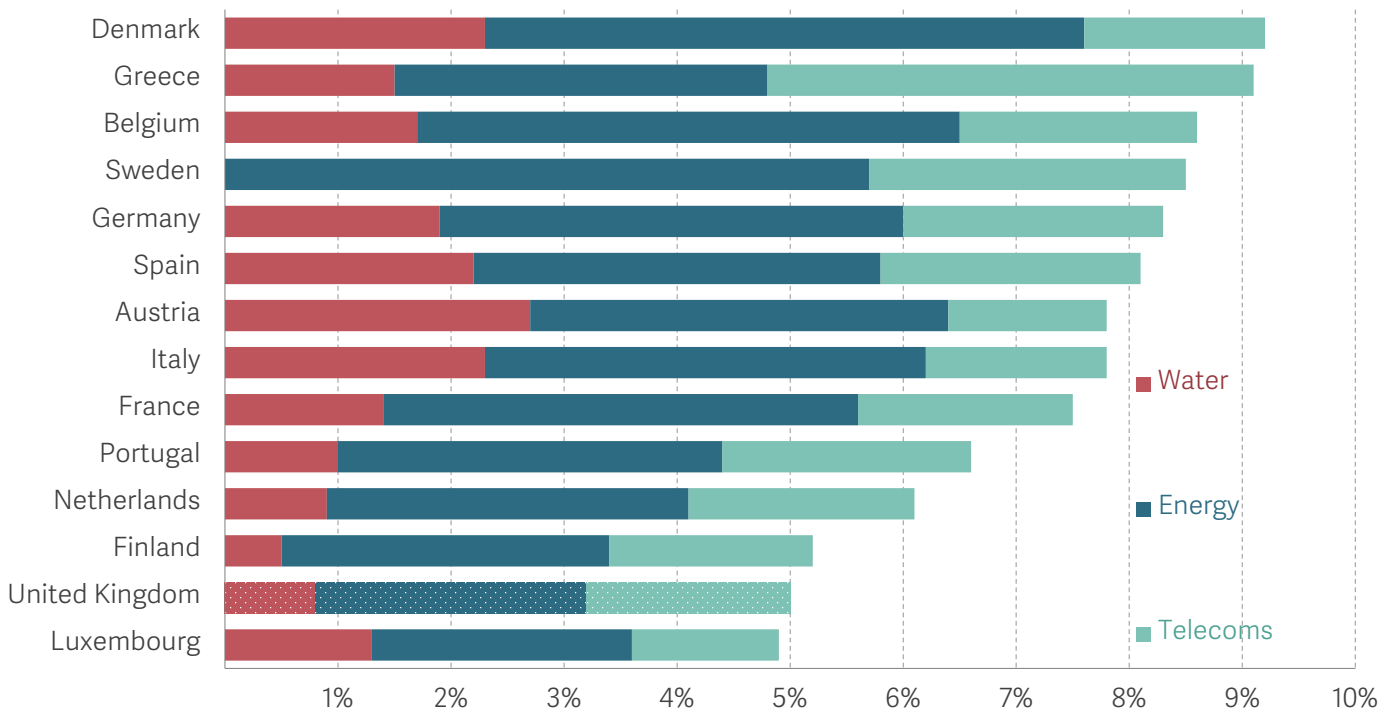
Average annual household expenditure: UK, 2019-2020 prices in £



SOURCE: NIC Second Infrastructural Assessment baseline data, Ofwat average bills data.

FIGURE 8: The UK has had low utility costs relative to other European countries in recent times

Proportion of total household consumption expenditure on water, energy and telecoms: UK and EU-15 countries, 2017



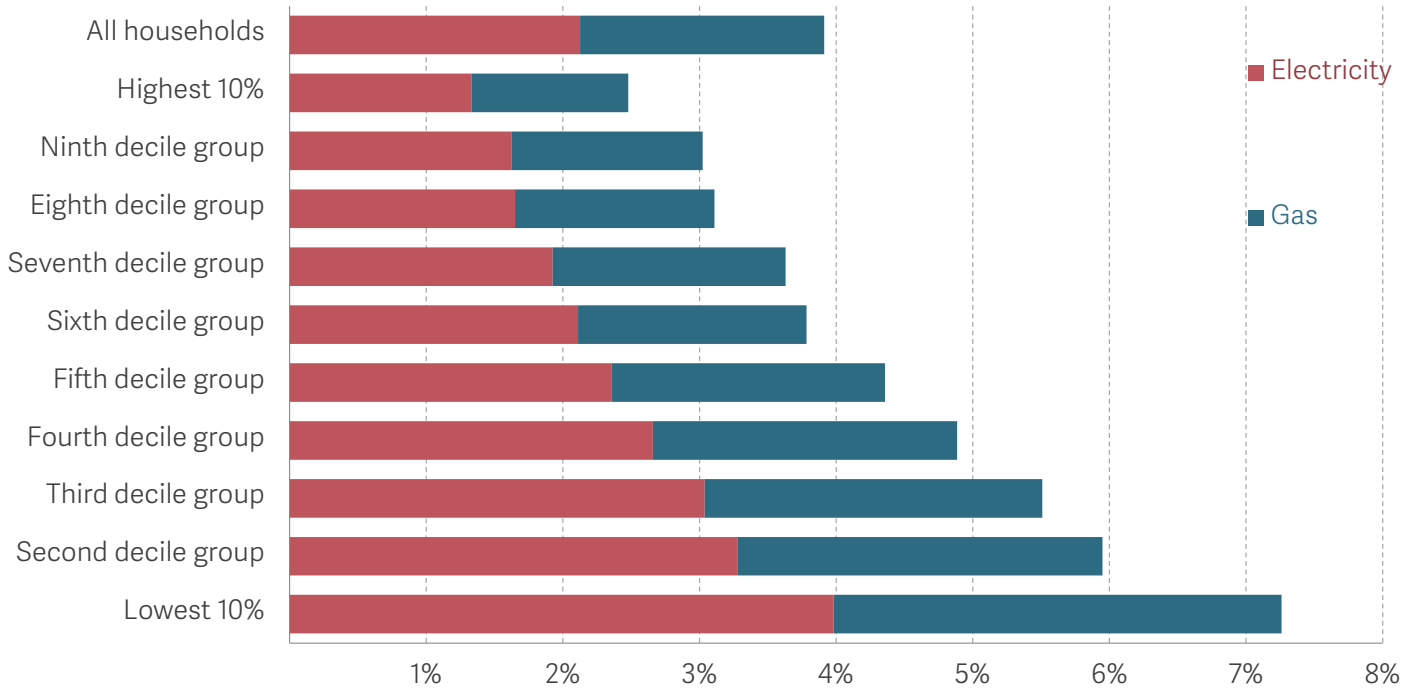
NOTES: 2019-2020 prices in sterling, CPI deflated. EU-15 countries excluding Ireland, due to missing telecoms data.

SOURCE: NIC, Strategic Investment and Public Confidence, 2019. Eurostat, Final consumption expenditure of households by consumption purpose (COICOP 3 digit).

However, while there may be some headroom for UK customers to shoulder higher bills, headroom is slim to non-existent for lower-income households. Energy alone accounted for over 7 per cent of household expenditure for the lowest income group before the recent crisis (see Figure 9); it could be double that by now.

FIGURE 9: Poorer households are far more affected by energy prices rising, and falling

Detailed household expenditure on energy as a percentage of total expenditure by equivalised disposable income decile group: UK, 2020



SOURCE: ONS, Energy prices and their effect on households, February 2022.

Creating public and political consensus around acceptance of higher costs will not be easy. People’s willingness to bear additional cost will be conditional on believing that the burden is shared fairly. Government and regulators must maintain public confidence that infrastructure costs are appropriately shared across different groups (e.g. businesses vs households, urban vs rural, north vs south), and ensure that those who cannot shoulder more cost are shielded. As noted above, last winter’s energy price crisis revealed serious shortcomings in the system’s ability to target assistance where it is needed most.

Fairness

While a ‘fair’ distribution is important for public acceptance of cost, fairness is easier said than defined or achieved. Infrastructure has high fixed costs which have to be allocated between infrastructure users according to some methodology, usually determined by the regulator. While regulators like to say that they do technocratic work while decisions on redistribution (e.g. subsidy policies) belong to elected governments, in practice regulators take decisions with very significant distributional consequences. Historically regulators have approached these on a primarily economic basis (for example, seeking to minimise the demand impact by allocating fixed costs where demand is least elastic). Looking forward, however, as costs increase regulators can expect more scrutiny of these decisions. In parallel, there is growing interest in developing approaches to compensating local

communities for hosting infrastructure such as windfarms or overhead power cables.²⁴ Such decisions could call for skills and processes beyond the realm of technocratic economic analysis.

Regulatory decisions also have a huge impact on intergenerational fairness: regulators determine the time profile of cost recovery for major infrastructure projects, which drives the allocation of costs across different generations of bill payers. While there are obvious political attractions to 'smoothing' the incidence of cost increases (i.e. spreading them out over time), the more back-loaded the cost-recovery profile, the riskier this is from an investor point of view and thus more costly in the long run.

Paying for infrastructure through household bills is relatively regressive – people pay on the basis of usage rather than income, and these are only weakly correlated (many poorer households have high energy needs, for example those with a sick or disabled family member who are at home full time and may need specialist equipment). Given competing fiscal pressures, governments will never be keen to cover more infrastructure cost from general taxation. However, if affordability pressures mount, the debate about paying for infrastructure through bills vs taxes could reignite.

Other objectives

There are of course other important policy objectives (national security, regional policy, industrial strategy, quality jobs) which lie outside regulators' remits but which future governments will need to incorporate in infrastructure policy, and which will also have an impact in terms of cost, speed and fairness.

The institutional framework must evolve to manage these tradeoffs in a new environment

The institutional framework affects how trade-offs between policy objectives are reached. The key institutions for infrastructure in the UK currently are government departments, regulators, planning authorities, expert advisers, and the major infrastructure companies themselves.

In energy, this framework is changing, with the plans to create a Future Systems Operator (FSO) spun out of National Grid and taking on some functions from Ofgem. Similarly in rail, proposals have been put forward to create a 'guiding mind' for the system in the shape of Great British Rail.²⁵ To deliver the kind of infrastructure upgrades discussed in the first part of this paper, further progress in this direction may be needed.

Planning must be quicker and more holistic

Planning is currently the most widely cited barrier to building infrastructure at speed (although others, such as supply-chain constraints, are emerging). Major planning delays such as those experienced by Thames Tideway and HS1 are incompatible with delivering a net-zero energy system by 2050; already there are reports that renewable projects face a 10 year wait to connect to the grid,²⁶ and attention has turned to speeding up electricity network deployment.²⁷

24 See, for example, Recommendation 13 on community benefit, from the [Electricity Network Commissioner's report](#), August 2023.

25 DFT & Williams Rail Review, [Great British Railways: The Williams-Shapps Plan for Rail](#), May 2021.

26 FT, [Renewables projects face 10-year wait to connect to electricity grid](#), May 2022.

27 DESNZ, [Accelerating electricity transmission network deployment: Electricity Network Commissioner's recommendations](#), August 2023.

The UK has in the past created expert advisory institutions, most notably the National Infrastructure Commission but also the Committee on Climate Change and – temporarily – the Airports Commission, whose purpose is to provide transparent, technocratic input to major infrastructure plans and decisions, while leaving ultimate responsibility with elected decision-makers. It was hoped that public, authoritative advice from experts would facilitate controversial decisions such as the new runway at Heathrow or HS2, but in some cases it has proven impossible to take the politics out. Balancing the role of independent, technocratic expertise with local democratic legitimacy in planning remains a fundamental tension.

The challenges outlined in the first part of this paper have brought a renewed focus on taking a ‘whole system’ approach to developing next generation infrastructure.²⁸ Under this philosophy, future needs for heat, power, gas and transport are considered together, at national, regional and local levels.²⁹ However there are significant institutional barriers to such an approach – not only deeply siloed government departments and regulators for energy and transport, but also a patchwork of devolution responsibilities (see table).³⁰

FIGURE 10: **Devolved administration responsibilities, by infrastructure sector**

	Northern Ireland	Scotland	Wales
Digital	Reserved	Reserved	Reserved
Energy	Devolved, except nuclear	Reserved, except energy efficiency	Devolved
Flood Risk	Devolved	Devolved	Devolved
Transport	Devolved, except aviation and maritimes	Largely devolved, except aviation and maritimes	Road transport largely devolved, most rail, aviation and maritime reserved
Waste	Devolved	Devolved	Devolved
Water and wastewater	Devolved	Devolved	Devolved

The planning system must be coordinated and streamlined to deliver infrastructure upgrades at the scale and pace needed. Legislative reform will be needed to adjust the balance of power towards planning authorities and away from local or special interests, and this may be politically feasible only with improved mechanisms to compensate those affected by projects with acute local costs and diffuse public benefits. Even then, infrastructure planning and delivery in a small, crowded island will always be challenging.

²⁸ See for example work on whole systems modelling by the [Energy Systems Catapult](#).

²⁹ See, for example, Energy Systems Catapult on [Local Area Energy Planning](#).

³⁰ National Infrastructure Commission, [Delivering net zero, climate resilience and growth: Improving nationally significant infrastructure planning](#), April 2023.

Utilities need lots more private capital, coming in different forms

As discussed above, the post-privatisation institutional framework was explicitly designed to give comfort to private capital that long-term commitments to pay for sunk assets would be honoured. There were price control periods in which investors did well, triggering public concern that consumers were overpaying, and in response regulatory settlements became less generous. Now, against this backdrop and in the wake of the political and economic instability that has followed Brexit, investor concern about the UK environment is rising.³¹

On the basis that current and structural fiscal pressures rule out paying for large scale new infrastructure entirely from the public purse, the UK must remain attractive to private capital. But for this to be anything other than a government accounting trick (keeping citizen commitments off balance sheet), risk must be optimally allocated between private investors and the state. Blended finance and business models in which certain risks are publicly underwritten will be needed, particularly in novel technologies and markets (for example, carbon capture and storage).

In parallel there is a debate about sources of capital, with different sources good at different things: venture-capital funds early stage technologies (e.g. direct capture of CO₂); private equity looks for growth opportunities (e.g. technology to support EV charging); internal capital within major corporates brings new technologies to market (e.g. first generation offshore wind projects); pension-fund capital looks for predictable returns from proven technologies in established markets (e.g. later generation wind and solar projects). There is particular concern that UK pension funds are not participating in UK infrastructure to the same extent as overseas pension funds (though this phenomenon has its roots in the idiosyncracies of UK pensions policy rather than the infrastructure challenges covered in this paper).

The basics of what private capital needs from government and regulators is well understood: political stability and the rule of law; policy clarity; a risk-return offer that is competitive with other options (including internationally); the removal of tail risks outside private investor appetites; and institutional arrangements that deliver 'contingent predictability'. It is this last point that is most relevant to economic regulation: neither investors nor governments know whether costs will go up or down, but in a robust economic regulation framework both know how prices will be determined whatever happens.

Regulators' need guidance to manage conflicting objectives and duties

How regulators exercise their powers within the overarching institutional framework is driven by their statutory objectives and duties, and the mechanisms through which government transmits policy steers.

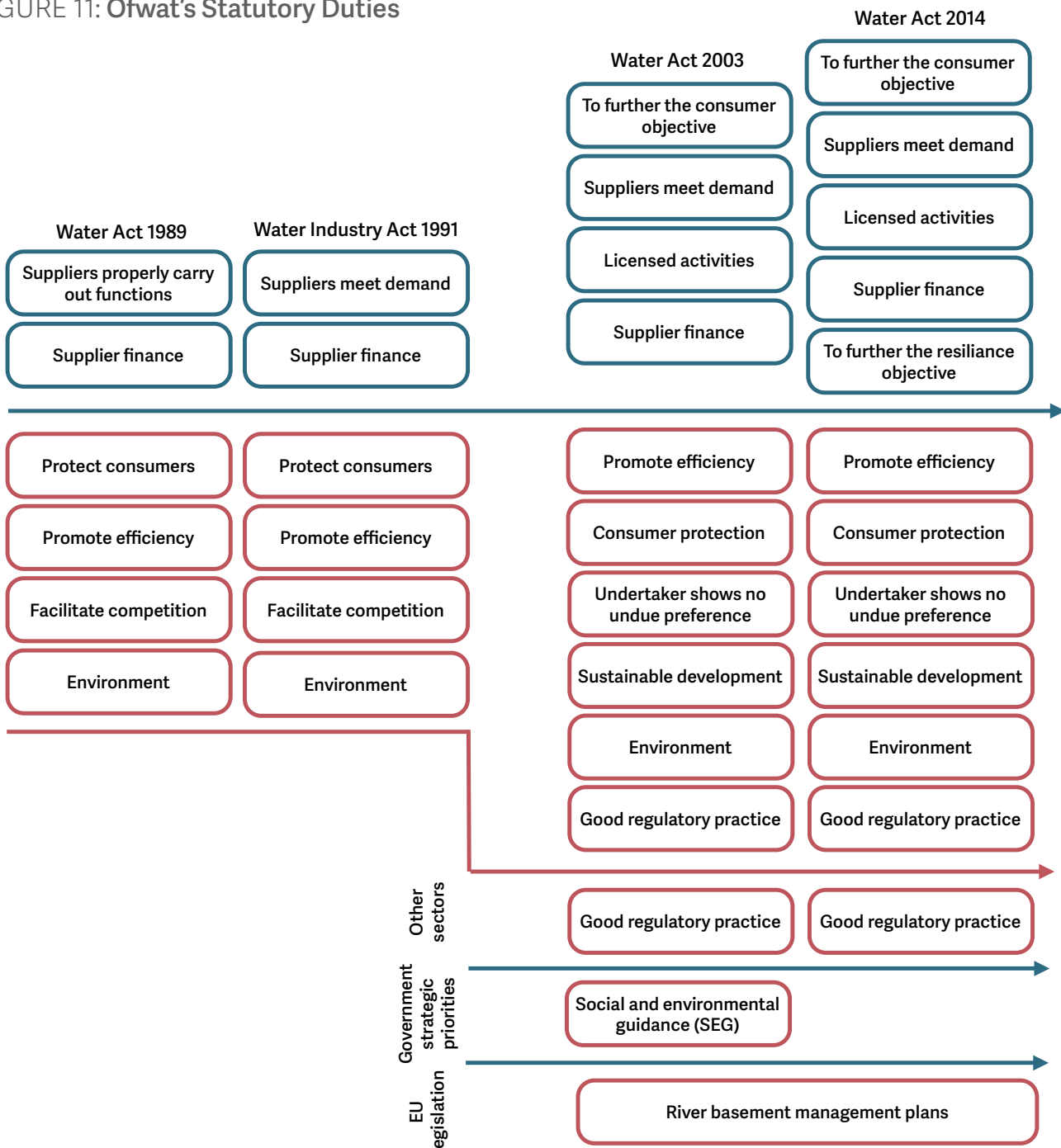
Economic regulators' core objectives and duties require them to protect the long-term interests of consumers while ensuring investors are willing to finance new investment. This requires regulators to keep a lid on bills by ensuring prices are in line with costs, while ensuring investor returns reflect the cost of capital for infrastructure investment, and are sufficiently predictable to keep that cost down.

³¹ GIIA, [Pulse Survey Q2 2023: Europe](#), May 2023.

However, there are other things that governments want from infrastructure. For example, the Energy Security Bill will give Ofgem a net-zero duty.³² And the government is consulting on giving both Ofgem and Ofwat a growth duty.³³ While asking regulators to take account of such policy goals sounds uncontroversial, there is a limit to how many goals regulators can sensibly pursue, given the limited instruments available to them. There is also a question mark over delegating difficult policy trade-offs to unelected technocrats.

The statutory objectives and duties of both Ofwat and Ofgem have proliferated since privatisation (see Figure 11 and 12).³⁴

FIGURE 11: Ofwat's Statutory Duties

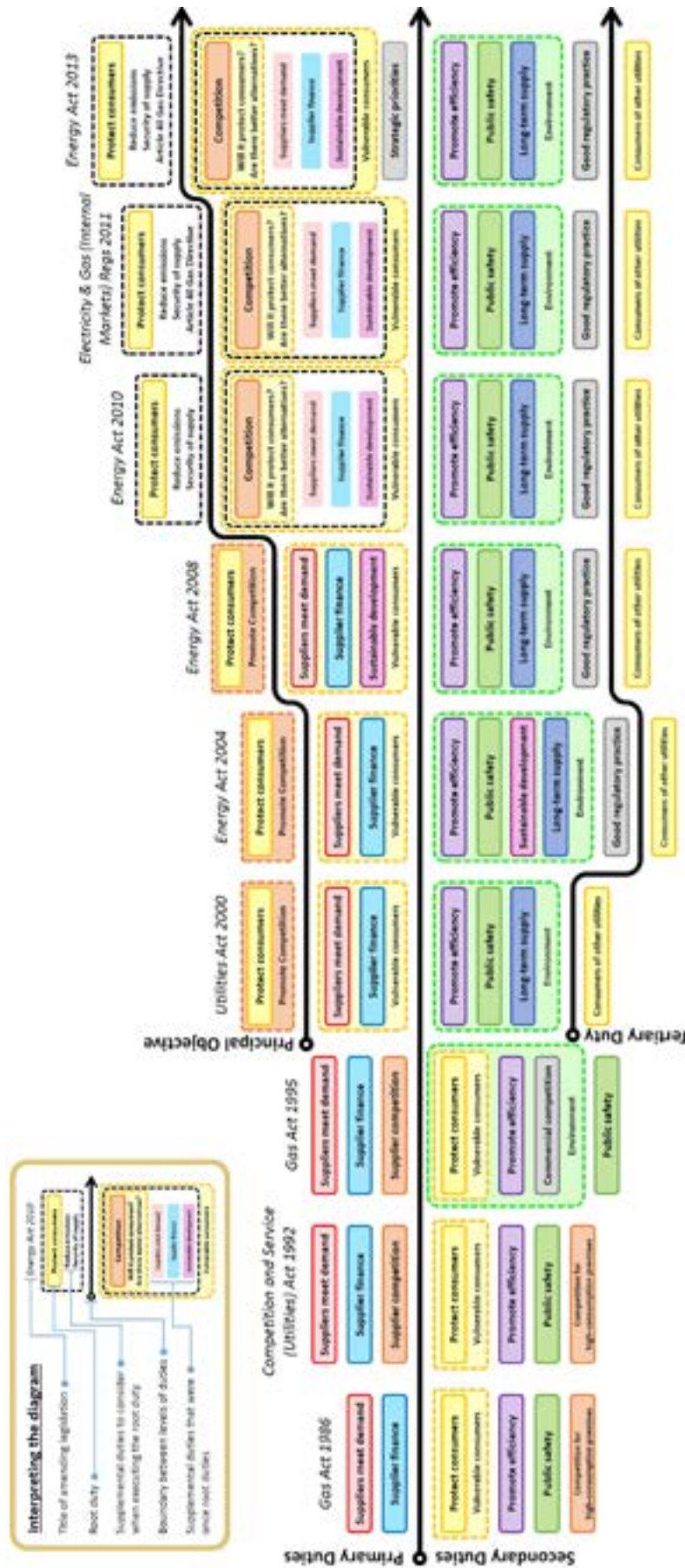


32 BEIS & DESNZ, *Energy Security Bill Factsheet: Ofgem net zero duty*, September 2023.

33 DBT, *Smarter regulation: extending the growth duty to Ofgem, Ofwat and Ofcom*, August 2023.

34 BEIS, *Economic Regulation Policy Paper*, January 2022; Centre for Competition Policy, *Fairness in Retail Energy Markets? Evidence from the UK*, 2018.

FIGURE 12: The evolution of the GB energy regulator's duties in respect of gas, 1986-2018



SOURCE: Collation of documentary evidence by Harker and Reader, 2018B

Changes to the institutional framework, notably the creation of the FSO in energy, create an opportunity to revisit regulators' statutory objectives and ensure they are coherent and appropriate.

The existing framework also provides for the government to issue 'strategic policy steers' to the regulators – these are intended to be an overt mechanism for the Government to signal policy direction to regulators, without cutting across regulatory independence.³⁵ These steers have not been consistently used in practice to date, although the Government has signalled appetite to do so going forward.³⁶

The National Infrastructure Commission has also argued for an over-arching infrastructure strategy to support independent regulators in the delivery of major transformational change, in particular to address coordination challenges, set national standards, promote public interests beyond the consumer interest, and counter regulatory caution about investments whose benefits are not proven.³⁷

Again, rethinking the institutional framework – including the FSO – also creates an opportunity to revisit mechanisms for navigating the interface between government policy and independent regulation. The goal should be to ensure that regulators work with the grain of long-term government policy, while sheltering private investors from short-term political opportunism.

The regulatory system performed quite well in the past

The UK has had independent economic regulation for almost four decades now. What have we learned that matters for the coming decades?

The National Infrastructure Commission has concluded that the predictability of the price control process and the independent regulatory system has enabled stable and efficient large-scale investment in infrastructure: together energy, water, and telecommunications account for around four per cent of UK GDP, but over 13 per cent of total UK private-sector investment. Figure 13 shows capital investment in energy, water, sewerage and waste since 1950, showing a clear increase in investment after privatisation in the mid-1980s.

Infrastructure performance has also improved. Compared to 1992, the frequency of mains bursts has fallen by 28 per cent, sewer flooding incidents by 75 per cent, and the rate of properties experiencing low water pressure by almost 99 per cent. Over the same period the number of power cuts fell by 59 per cent and the length of power cuts decreased by 70 per cent.

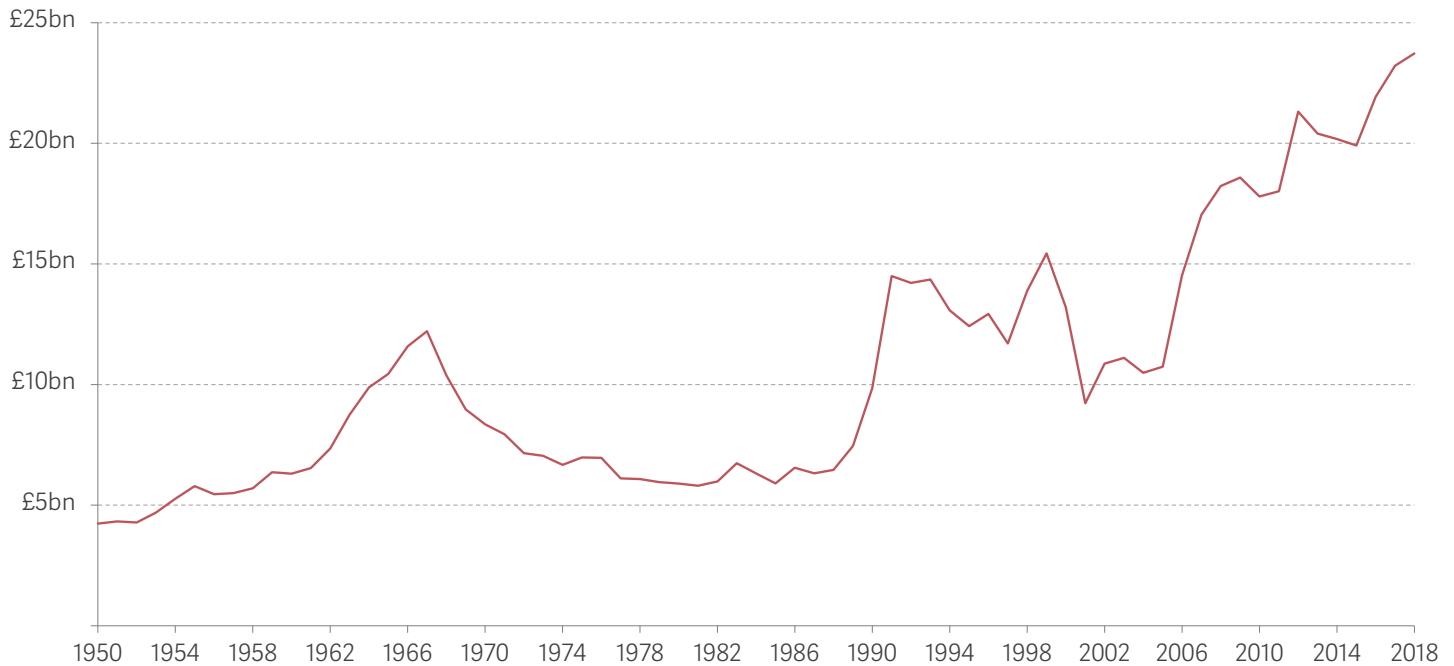
³⁵ See for example: DCMS, [Statement of Strategic Priorities for telecommunications, the management of radio spectrum, and postal services](#), October 2019.

³⁶ BEIS, [Economic Regulation Policy Paper](#), January 2022.

³⁷ National Infrastructure Commission, [Strategic Investment and Public Confidence](#), 2019.

FIGURE 13: Investment in infrastructure grew substantially after privatisation

Gross fixed capital formation in energy, water, sewerage and waste, 2018 prices: UK, 1950-2018



NOTES: Industries used are Section D (Electricity, Gas, Steam and Air Conditioning Supply) and Section E (Water Supply; Sewerage, Waste Management and Remediation Activities). 2018 prices, using implied gross-fixed capital formation deflator.
SOURCE: NIC, Strategic Investment and Public Confidence, 2019; ONS, Gross fixed capital formation – industry by asset.

This track record suggests that the fundamental model – privately financed infrastructure paid for by customers at prices determined by independent regulators – may still be the best way to bring forward infrastructure investment. The primary risk to this model is an increasing nervousness among investors about the political and regulatory environment in the UK. The regulatory model for the coming decades must deliver robust contingent predictability.

As discussed above, the UK's track record on speed of project delivery is much less impressive by international standards, particularly where challenges with planning and institutional coordination arise.

In recent years regulators have been accused of being reluctant or slow to address matters of fairness.³⁸ While protection of vulnerable consumers is a formal objective for Ofgem (as shown above), fairness per se has never been a part of regulatory remits. This came to the fore in the debate between Ofgem and the Government over the introduction of the energy retail price cap, which Ofgem insisted it did not have a mandate to introduce unless explicitly required under primary legislation. Over the coming decades, distributional concerns could become more acute if affordability pressures mount, and/or mechanisms for compensating particular groups of customers proliferate. It will be important for government to give regulators more clarity over which aspects are within their remit, and which not.

Lastly, regulators have a mixed track record on supporting innovation. The more innovative sectors have tended to be more competitive (notably telecommunications), and Ofgem has placed

38 See, for example, the [Citizens Advice supercomplaint on 'loyalty penalty'](#), September 2018.

considerable emphasis on competitive provision of infrastructure going forward.³⁹ Despite early ambition,⁴⁰ progress on delivering open data has been slow; yet compatible and accessible systems data is likely to be an important plank for 'whole systems' approaches to infrastructure development going forward, for example, integrating storage solutions into the energy system.

Section 3: The way forward

The challenge for infrastructure regulation between now and 2050 is to support the sector in delivering new and upgraded infrastructure as fast as it is needed, consistent with maintaining public support – both nationally and locally. There will be trade-offs between different policy goals, and navigating these requires a refreshed, explicit and credible 'contract' between the various institutions involved, including regulators. This contract must address both the division of responsibilities and mechanisms for coordination that support 'whole system' approaches.

On division of responsibilities, I have three recommendations:

First, a greater role for system operator or 'guiding mind' institutions in deciding what gets built (e.g. the Future Systems Operator, Great British Rail). The current process whereby private companies propose projects and economic regulators approve them if convinced they are necessary has been described as 'just in time' investment.⁴¹ Going forward, institutions charged with whole-system planning should decide what infrastructure is necessary over a longer-time horizon, and economic regulators should ensure these projects get built at lowest cost. We cannot wish away the difficulties of incentives, expertise gaps, and decision-making under uncertainty described above; we must address them explicitly in designing such institutions.

Second, a greater role for expert advisory bodies in challenging 'wishful thinking', supporting long-term plans, and holding Government and regulators to account on delivery. The National Infrastructure Commission should have a formal role in assuring that infrastructure plans are realistically deliverable (analogous to the Office for Budget Responsibility's role in assuring fiscal assumptions) while accepting a level of risk around imperfect decisions made in the face of uncertainty. The intention would be to depoliticise infrastructure decisions and mitigate the risk that long-term infrastructure policies and plans chop and change with Governments or ministers – though experience shows the difficulty of taking the politics out of major infrastructure decisions in practice.

And third, a more explicit and transparent role for economic regulators in deciding how costs are recouped over time and in allocating common costs between user groups, which involves distributional judgements including about inter-generational fairness. Regulators should be required to explain how they approach these judgements, and monitor outturn distributional impacts. However, subsidy policy, which goes beyond cost allocation and into the reallocation of resources from one group to another, should remain the preserve of elected governments. Nonetheless regulators should be empowered and obliged to speak out publicly when they believe it is no longer tenable for costs to be borne entirely by users, for example, as customers migrate off the natural gas grid and the cost of keeping it going falls on a dwindling group.

39 Ofgem, [Consultation on frameworks for future systems and network regulation: enabling an energy system for the future](#), March 2023.

40 For example [midata](#) and the [Energy Data Taskforce](#).

41 See for example National Infrastructure Commission, [Second National Infrastructure Assessment](#), October 2023.

I have suggested an overall division of responsibilities between types of institution in the Annex.

Developing coordination mechanisms is the harder task, requiring coordination between institutions both within and across sectors, at both national and local level. Coordination mechanisms may need to be hardwired into legislation, and could include requirements on regulators to consult with other institutions, have regard to policy in other sectors, to comply or explain with recommendations from expert advisory bodies, or ex-officio cross-membership of decision-making boards. There could also be an enhanced role for cross-sector institutions such as the NIC and CCC in challenging Government departments and sector regulators to address coordination failures.

Underpinning all this, I suggest three important principles against which to test policy proposals and new institutional arrangements:

- 1. To finance new investment at reasonable rates, private investors must believe in the regulatory contract around long-term revenues.** This means major decisions over what gets built, and how much customers are asked to pay, must be fully insulated from short-term political winds. But also that the contract must be rooted in a broadly stable public consensus about the role of private capital in infrastructure. Regulation cannot deliver that consensus, but regulators can help sustain it through being alert to issues that threaten public support (for example fairness in pricing) and willing to work closely and constructively with government to address these.
- 2. To support increased infrastructure spend, the public must believe that the costs are necessary, efficiently incurred, and fairly spread.** They must also enjoy robust consumer protection where needed, notably around upgrades in the home. Mechanisms to shield specific user groups from cost or to encourage local communities to host infrastructure must succeed in strengthening public acceptance of infrastructure policy rather than creating new divisions or sources of discontent. Lastly, since taxpayer funding is significantly more progressive than user funding, it is an obvious route for asking those who can afford it to contribute more.
- 3. To build good value infrastructure in good time, much more effective coordination is needed across sectors and between national and local institutions.** This requires more attention to the interface between policy, planning and regulation. Regulators must maintain their independence from political influence in core areas (notably price-setting) but be accountable for strategic alignment with long-term government policy goals and infrastructure plans.

None of this is easy, particularly during a cost of living squeeze. Facing a tight and structurally deteriorating fiscal position, on a small and crowded island. But to meet the challenges of net zero, clean beaches and rivers, and physical and virtual connectedness, the UK must raise its game in delivering infrastructure investment. Getting regulatory frameworks right is an integral part of this challenge.

Annex: Overall division of responsibilities between institutions

	Government (central and devolved)	System operator (e.g. FSO, GB Rail)	Regulator (e.g. Ofgem, Ofwat)	Planning authority	Expert advisory body (e.g. NIC, CCC)
Overall role	All relevant policy: tax and spend, growth, environmental, labour, regional and sector policy	'Guiding mind' in system design and planning	Ensuring that customers pay no more than efficient cost for infrastructure, investors are appropriately rewarded for risk	Ensuring infrastructure location is locally optimal	Supporting and challenging elected Governments to deliver on policy goals that span multiple-electoral cycles
Setting policy goals	Setting overall policy goals, e.g. net zero, cleaner rivers, better intercity rail connectivity				Expert advice on deliverability of long-term policy goals; challenge to 'wishful thinking'
Delivering policy goals	Delivering detailed policy to deliver goals, e.g. timing of and mechanism for phasing out natural gas in home heating		Day-to-day consumer protection		Monitoring progress towards long-term goals and holding Government to account
Determining what gets built		System planning (nationally and locally) Project approval (greenlight specific projects)	Cost approval (including via approval of competitive process) Methodology for revenue collection	Local planning (e.g. location of new housing) Input into system planning Approval of specific project location	Advice on what is needed to meet long-term strategic goals Coordination, looking across sectors
Deciding who pays, how and when	Decides balance of taxpayer vs customer funding Sets policy on subsidy for low-income or other vulnerable groups Sets policy on local compensation		Allocation of fixed costs across different user groups (including generations) Potential role in administering subsidy schemes	Potential role in administering local compensation schemes	

Steering economic change: how policy can promote stronger growth and shared prosperity

As the UK is buffeted by the economic shocks and challenges of the 2020s, The Economy 2030 Inquiry, a collaboration between the Resolution Foundation and the Centre for Economic Performance at the London School of Economics (LSE), funded by the Nuffield Foundation, is setting out a new economic strategy. To feed into this process we are publishing a series of externally-written policy essays. Each aims to provoke public debate on a specific policy area, and sketch out an agenda that will contribute towards the wider goal of the UK becoming a higher growth, lower inequality economy.

The essays cover topics ranging from the role of smarter regulation in supporting economic growth, ensuring that the goal of 'good jobs' is embedded in our national industrial strategy, and the role of the higher education sector in providing the skills needed to power our services dominated economy.

They are written by a range of leading economists and policy experts, and reflect the views of the authors rather than those of the Resolution Foundation, the LSE or The Economy 2030 Inquiry.

They have been commissioned and edited by Gavin Kelly (Chair of the Resolution Foundation and member of the Economy 2030 steering group) and various members of The 2030 Economic Inquiry team.