UK Regulated Infrastructure

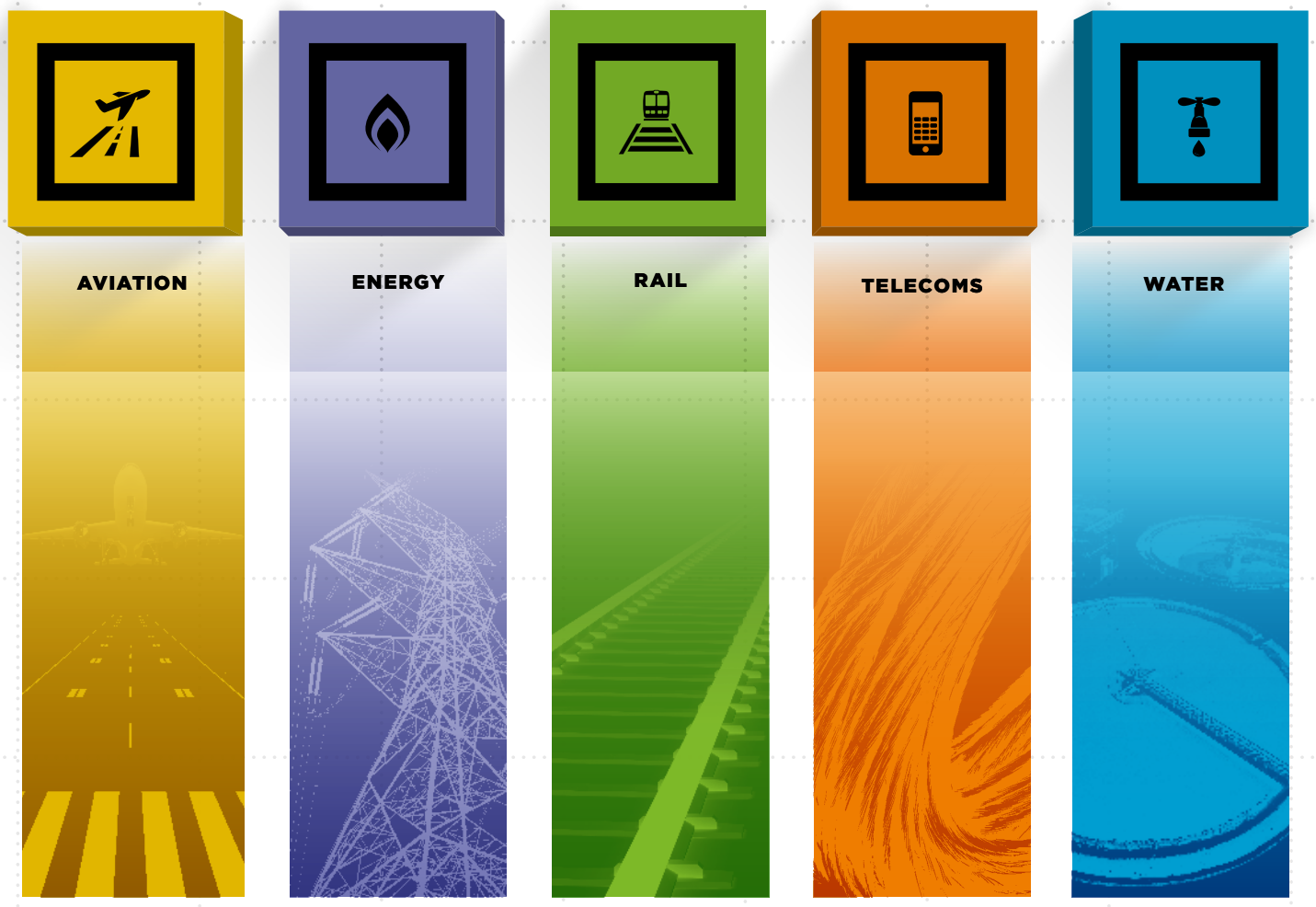
An Investor Guide

December 2014

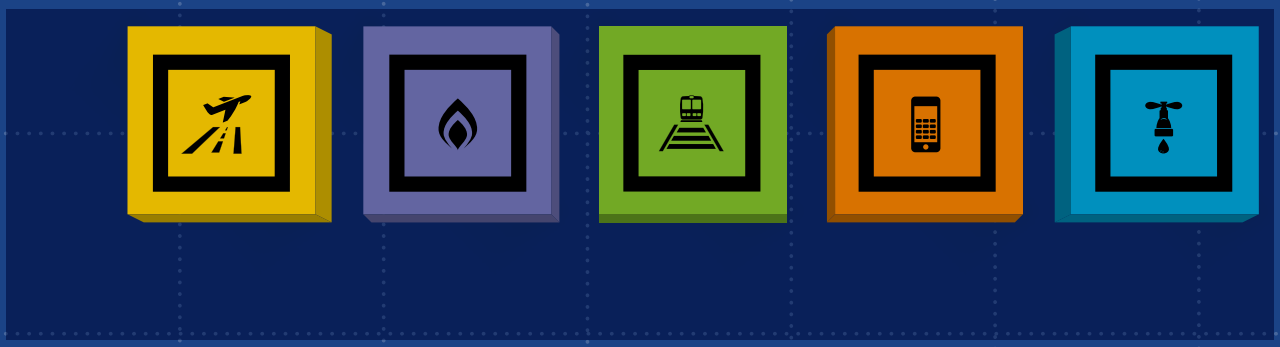
UK Regulators Network

Prepared by:

KPMG
cutting through complexity



ofgem
Making a positive difference for energy consumers
ORR RAIL REGULATION
Ofcom
OFWAT
Utility Regulator



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CAA's economic regulation work is focused on improving choice and value for aviation consumers now and in the future by promoting competitive markets, contributing to consumers' ability to make informed decisions and protecting them where appropriate.

Ofgem is committed to making a positive difference for energy consumers by ensuring Britain's wholesale and retail energy markets are competitive and by regulating the natural monopolies that exist in distribution and transmission networks.

ORR's role is to ensure the rail network operates safely, reliably and provides value for taxpayers and customers.

Ofcom is committed to a thriving communications sector where companies can compete fairly and businesses and customers benefit from the choice of a broad range of services.

Ofwat's job is to make sure that water companies provide consumers with a good quality service at a fair price.

The Utility Regulator is responsible for regulating the electricity, gas, water and sewerage industries in Northern Ireland, promoting the short- and long-term interests of consumers.

FOREWORD

For over 25 years, regulated utilities in the UK have attracted investment from around the world to build and maintain our essential infrastructure and to ensure the provision of vital services. The role of independent economic regulation, designed to protect the interests of consumers whilst providing a clear and transparent regulatory framework for investments, has been key to that success.

Utility sectors in the UK, supported by our standard-setting regulatory regimes, have been viewed as models for other countries. But they are subject to changing requirements with an evolving economic and social context and significant levels of new investment required. The financial landscape is also evolving, with a more diverse and widely spread investor base interested in investing in the UK.

In 2014, the economic regulators in the UK came together to form the UK Regulators Network (UKRN). It comprises, amongst others, economic regulators for the energy, water and wastewater, aviation, rail and telecommunications sectors. Its objectives include the maintenance of a positive environment for continued investment, which across these sectors is expected to exceed £100 billion in the next five years alone.

The UKRN decided that one of its first activities in coming together should be to maximise transparency of how these regulated sectors operate and summarise the range of information that might be relevant to both new and existing investors in considering and managing investments. We therefore commissioned this independent investor guide to regulated infrastructure.

Through the eyes of expert, independent advisers, this guide is intended to provide an easily accessible, high-level overview of regulated utilities' infrastructure in the UK, the key characteristics common across sectors, and the main elements of associated economic regulation, as applied by sector regulators, that are of interest to investors. The guide also sets out the ways in which investors may ordinarily access the sectors as well as presenting some of their key rights and obligations.

The guide is not a statement of regulatory policy current or future and is not intended to provide a comprehensive description of all forms of regulation or to cover all segments of the regulated infrastructure sector – it is an introduction with suggestions for further reading. Since regulated utilities differ from each other across sectors, sometimes in a material way, this guide makes certain simplifications about the details of the regulatory regime in each case to achieve greater transparency. In particular, it is mostly focussed on investments in infrastructure subject to economic regulation. There is substantial variation between sectors in the extent to which infrastructure is subject to economic regulation: in some sectors where there is a high degree of competition large parts of infrastructure investment are unregulated.

As part of an ongoing process of engaging with investors and looking at key cross-regulatory aspects, our wider UKRN work programme will also be looking at cost of capital. This work will consider the potential for, and approaches to, a common framework across sectors.

We recognise that the views of regulators and investors will not always be aligned, particularly during the challenges brought by economic and financial downturn. However, this in itself reinforces the importance of an independent and transparent overview of how UK regulated sectors work in general, the fundamental principles underpinning market regimes in these sectors and how regulators seek to deliver positive outcomes for consumers.

We hope you find this investment guide to be a valuable reference document. Regulation in the UK has an enviable track record that has delivered significant benefits for consumers, but we know that it must remain attractive to secure the investment required to meet our infrastructure needs, and consumers' expectations on quality and value for money. We believe that engaging fully and openly with investors will maintain a positive climate for investment and help ensure we deliver best-value outcomes for UK consumers.

Richard Price

Richard Price, Chair UK Regulators Network

ABOUT UKRN

The UK's economic regulators have joined together in the UK Regulators Network (UKRN) to ensure effective cooperation between sectors. UKRN will strengthen work across sectors without cutting across the independence or specific goals of each regulator. It will explain and take account of the differences between sectors, while maximising coherence and shared approaches in the interests of consumers and the economy.

ABOUT THE AUTHORS

KPMG LLP is a leading provider of professional services including advisory, audit and tax consulting services across a range of clients and industries. KPMG's specialists in regulated infrastructure provide advice to investors, companies and the public sector on financial, regulatory, operational and economic issues, including competition, corporate finance, modelling, and regulatory strategy advice.

EXECUTIVE SUMMARY

This concise Investor Guide to UK Regulated Infrastructure aims to help potential and existing investors understand, at a high level, the nature of the assets and activities involved, how the market and regulatory regimes are set up and how they function in practice, based on underlying economic principles, market observations and their track record to date.

ofgem Making a positive difference for energy consumers

ORR RAIL REGULATION

Ofcom

OFWAT

Civil Aviation Authority

Utility Regulator ELECTRICITY GAS WATER

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cutting through complexity

EXECUTIVE SUMMARY

Open and mature private market for essential public services

The wave of privatisations in the 1980s and 1990s in the UK brought to the market for the first time a new asset class – regulated infrastructure companies providing essential public services across a range of sectors, including energy, water and wastewater, aviation, rail and telecommunications. Since then, the companies, markets and regulatory regimes in these sectors have developed into the mature environment of UK regulated infrastructure, with exposure to these assets keenly sought by both domestic and international investors.

Significant opportunities for investment

There has been a very significant inflow of private capital into the UK regulated infrastructure sectors since privatisation of almost half a trillion pounds, which allowed the large capital expenditure needed to renew and enhance assets and improve services to customers. There is, however, a need for significant further investment to ensure that the continued supply of these services remains fit for purpose, both now and in the future, and that policy objectives are met. The National Infrastructure Plan estimates that more than £100 billion of investment is required in the next five years alone across five infrastructure sectors subject to economic regulation, and that this investment need is expected to continue in the following decades.

Multiple routes to market available to investors

This demand for capital supported by innovation and best-in-class management presents a major business opportunity and an investment requirement, which is not time bound and can be fulfilled through a number of channels. The 'routes to market' include equity investment and ownership (in both private and listed companies), fixed income securities, primary market offerings and financing of specific project developments. These multiple options for entry and exposure to the sectors are matched by the wide variety of financial structures adopted in the market, which is enabled by an active and liquid secondary market.

Regulation driven by consistent application of core principles

Developments in technology, society and business requirements have driven a continuous evolution in regulated infrastructure, but the core principles of successful regulation in the sectors have remained the same. Central to these principles and the successes of UK regulated infrastructure to date is fulfilling the objective of protecting customers through the application of regulation based on underlying values of transparency, independence and commerciality, which are designed to ensure efficient and targeted regulation. There is recognition that companies and investors should be able to recover their efficient costs and earn a reasonable return on the capital employed, commensurate with the risks faced when operating an efficient, well-run company.

Independence and oversight

Regulators in the UK are independent, non-political bodies, with significant sector expertise and specific regulatory objectives in each sector. They have the power, typically bestowed on them by legislation, to control prices and corporate activities in order to protect consumers, prevent operators from exploiting market power and remedying other market failures. Their role is to simulate competitive market conditions (where necessary and appropriate) and enable efficient private delivery and investment in these sectors, free from day-to-day political interference.

Incentives for outperformance and efficiency, risks and rewards shared with customers

At its core, the UK regulatory model for assets and services is an incentives-based regime, designed to promote efficient performance while improving customer service quality levels. Most infrastructure regulation contains transparent mechanisms to encourage efficiency of investment and delivery with additional, well-defined rewards for strong performance and penalties for failure to meet the required standards. If companies outperform the targets set up front, they are allowed to keep some gains from this outperformance alongside sharing them with customers. Regulators aim to allocate risk to companies where they and their investors are best placed to manage that risk; this helps to provide the right incentives for efficient risk mitigation and risk management.

Transparent rules and extensive engagement

UK regulation is based on public consultations prior to decisions. Interested parties can assess details of regulators' approaches and can respond to consultations and/or take part in stakeholder workshops to discuss their views with the relevant regulator. Companies have recourse to a well-defined appeals process in the event of disagreement, which can include reviews by both the judicial system and by independent competition authorities.

This guide includes:

- An overview of regulated infrastructure markets in the UK
- Explanation of the legal aspects of the regulatory framework and how they operate in practice
- Drivers of investment needs in each of the five sectors

IN THIS SECTION

- What is the scope and remit of this investor guide?
- What are the document's objectives, coverage and limitations?

1

INTRODUCTION

1. Introduction

The UK Regulators Network (UKRN) is committed to improving understanding of UK regulated infrastructure and the environment for investment in the UK market to meet the expectations of consumers. In this context, UKRN has commissioned KPMG to prepare this independent 'Investor Guide' to help investors to navigate these sectors. The preparation of this guide comes against a background of a large and growing investment pipeline, new opportunities for innovation, new channels and types of financing as well as continued evolution of the regulatory environment with the opening of some new segments of the regulated value chain to new entrants and competition.

This guide is intended to provide a high-level overview of regulated infrastructure in the UK as well as a summary of the key information for those interested in the operation of and investment in these sectors.

The guide is aimed principally at those who are relatively new to the sectors, but should be also of interest to those already involved in different aspects of regulated infrastructure and want to learn more about this market. Investors and analysts should find the guide particularly useful, but it is designed to be accessible to any other party with a general interest in UK regulated infrastructure.

This document is not an investment prospectus, but is intended to help interested parties understand the nature of the sectors as well as the principles and basic structures of economic regulation applied to UK regulated infrastructure. The guide can be also used as a starting point for exploring different market and regulatory regimes in more detail.

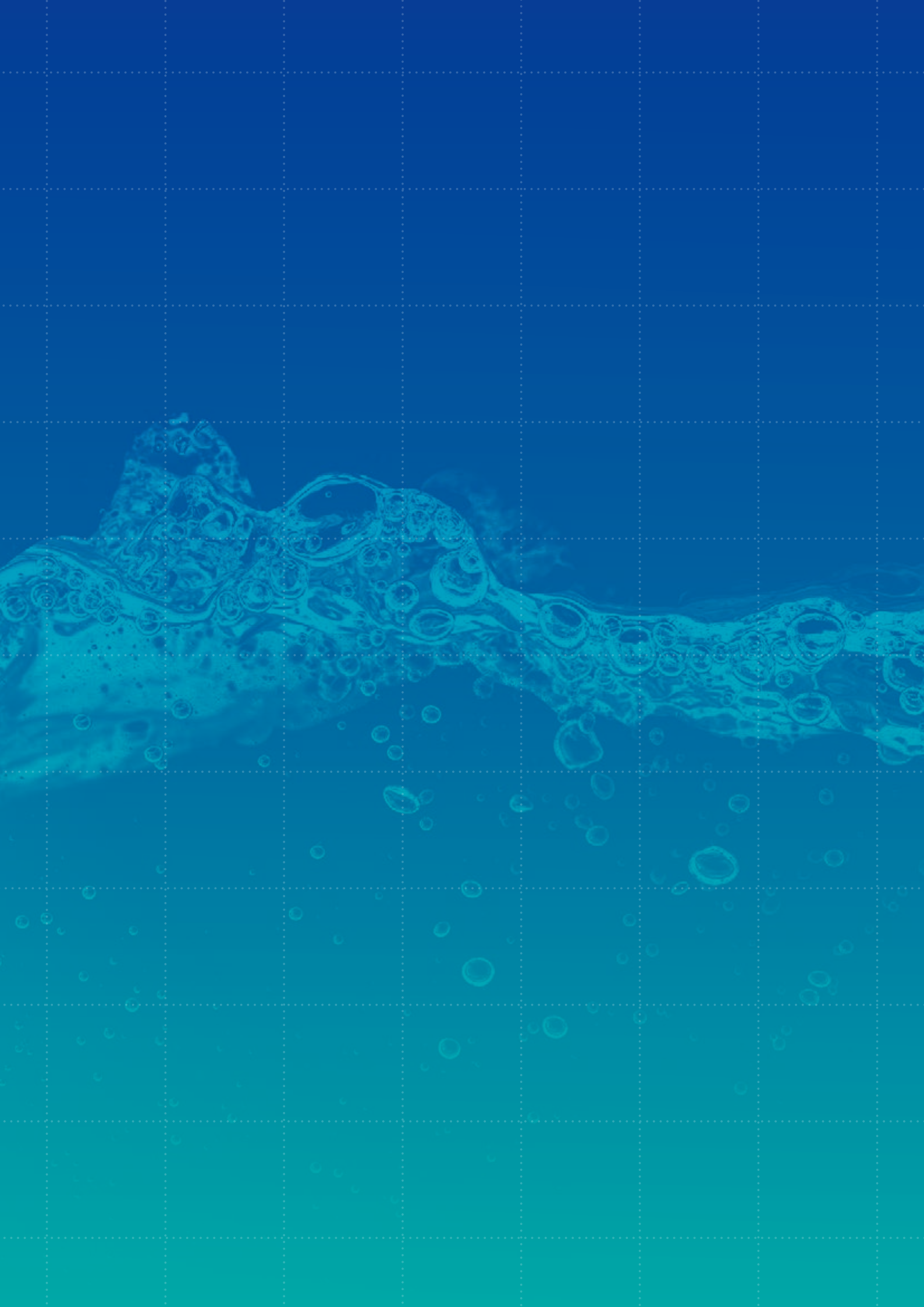
The regulated infrastructure covered in this guide includes the relevant segments of the aviation, energy, rail, telecommunications, water, and wastewater sectors. It covers, therefore, sectors regulated by the Civil Aviation Authority (CAA[1]), the Office of Gas and Electricity Markets (Ofgem[2]), the Office of Rail Regulation (ORR[3]), the Office of Communications (Ofcom[4]) and the Water Services Regulation Authority (Ofwat[5]). It is also relevant to the work of the Northern Ireland Authority for Utility Regulation (NIAUR[6]) and Water Industry Commission for Scotland (WICS[7]).

This guide focuses on the key parts of the value chain that are subject to economic regulation, i.e. where operator charges or revenues are subject to approval by an independent regulatory authority. In practice, this implies a focus on networks and other traditional, infrastructure-heavy parts of the value chain, where, currently, normal market forces and competition tend to be either absent or insufficient for ensuring efficient economic outcomes, and only covers the remainder of the value chain at a high level. For some sectors, such as telecoms, greater parts of the value chain are open to competition, which may mean that this only represents a part of the overall market and hence only some investment needs and opportunities.

The guide is not a statement of policy or regulatory objectives and should not be relied upon as a statement of future regulation or potential future evolution of these sectors—investors need to form their own view of future risks and potential returns. It also does not replace other initiatives carried out by regulators, companies and other stakeholders to enhance understanding of particular sectors, but is intended to complement them. The guide does not discuss all forms of regulation and in some places the presentation simplifies the actual situation to ensure greater accessibility.

This document is part of the wider programme of work being carried out by UKRN, which also includes work on the cost of capital.

[1] http://www.caa.co.uk/
[2] https://www.ofgem.gov.uk/
[3] http://orr.gov.uk/
[4] http://www.ofcom.org.uk/
[5] http://www.ofwat.gov.uk/
[6] http://www.uregni.gov.uk/
[7] http://www.watercommission.co.uk/



IN THIS SECTION

- What are the key characteristics of UK regulated infrastructure?
- How is each sector structured and which sub-sectors are subject to economic regulation?
- What is the role of the private sector in delivering these services?
- What are the investment opportunities and how can you enter/exit the market?

2

MARKET OVERVIEW

2. Market overview

Regulated infrastructure

Regulated infrastructure in the UK is largely privately owned and has attracted significant amounts of private capital over the past 25 years. Broadly speaking, twice as much capital has been invested as has been paid back to investors to date and significant amounts have been reinvested, resulting in a fundamental transformation of the regulated infrastructure sector assets and operations.

There is also a significant requirement for further investment in UK regulated infrastructure, which relies on the private sector to finance and deliver this investment. Over £100 billion is estimated to be required over the next five years alone[8] across the five regulated sectors, which creates a major opportunity for investors. Sizeable investments are also required in those same sectors in infrastructure that is not subject to economic regulation.

2.1 Characteristics of UK regulated infrastructure

Economies and societies rely on a number of essential services in order to function. Although many of these services, such as energy, communications and transport, can be provided to customers via a competitive market (e.g. by competing energy supply companies), the companies providing these services themselves rely on unique and extensive infrastructure including, in particular, networks or other large physical assets, to deliver their services to consumers. This infrastructure and networks often span national or regional geographies.

After a long period of underinvestment, the public entities that operated the infrastructure necessary for providing essential services were privatised in the UK. This predominantly took place during the 1980s and 1990s, with the aim of bringing in the necessary capital to renew and enhance existing assets, build new assets, improve efficiency of operations and provide better service, and better value to customers.

Common characteristics of regulated infrastructure sectors

These now privatised and regulated businesses differ somewhat across sectors, but have many common characteristics, such as their provision of essential services or large asset bases, which cannot be easily or efficiently replicated. Some of these characteristics make them particularly attractive for investment, but also create the need for economic regulation to remedy potential market failures associated with their market power or other industry characteristics that can give rise to inefficient market outcomes.

The essential nature of network infrastructure means that, in general, demand for utilities infrastructure services is relatively stable over time and that the price elasticity of demand (i.e. how demand changes with price) tends to be low (though there are exceptions to this, for example in the aviation sector).

There is also continuous need for large-scale investments over long time horizons due to long, effective economic lives of the underlying assets such as pipes or runways. This means that payback periods on these investments are also long and require stable regimes, regulatory frameworks or contracts that investors can rely upon to be able to recover efficient investments many years after they originally committed their capital.

Network infrastructure, which represents a significant part of economically regulated infrastructure, tends to exhibit economies of scale due to its sheer size and the nature of the underlying assets. There is also no economic case for duplication of most of these networks because widespread infrastructure is prohibitively expensive to recreate and because it might lead to significant, inefficient overcapacity. This means that direct, head-to-head competition 'in the market' between different infrastructure providers is often not feasible or economically desirable. These infrastructure assets are often referred to as 'natural monopolies'.

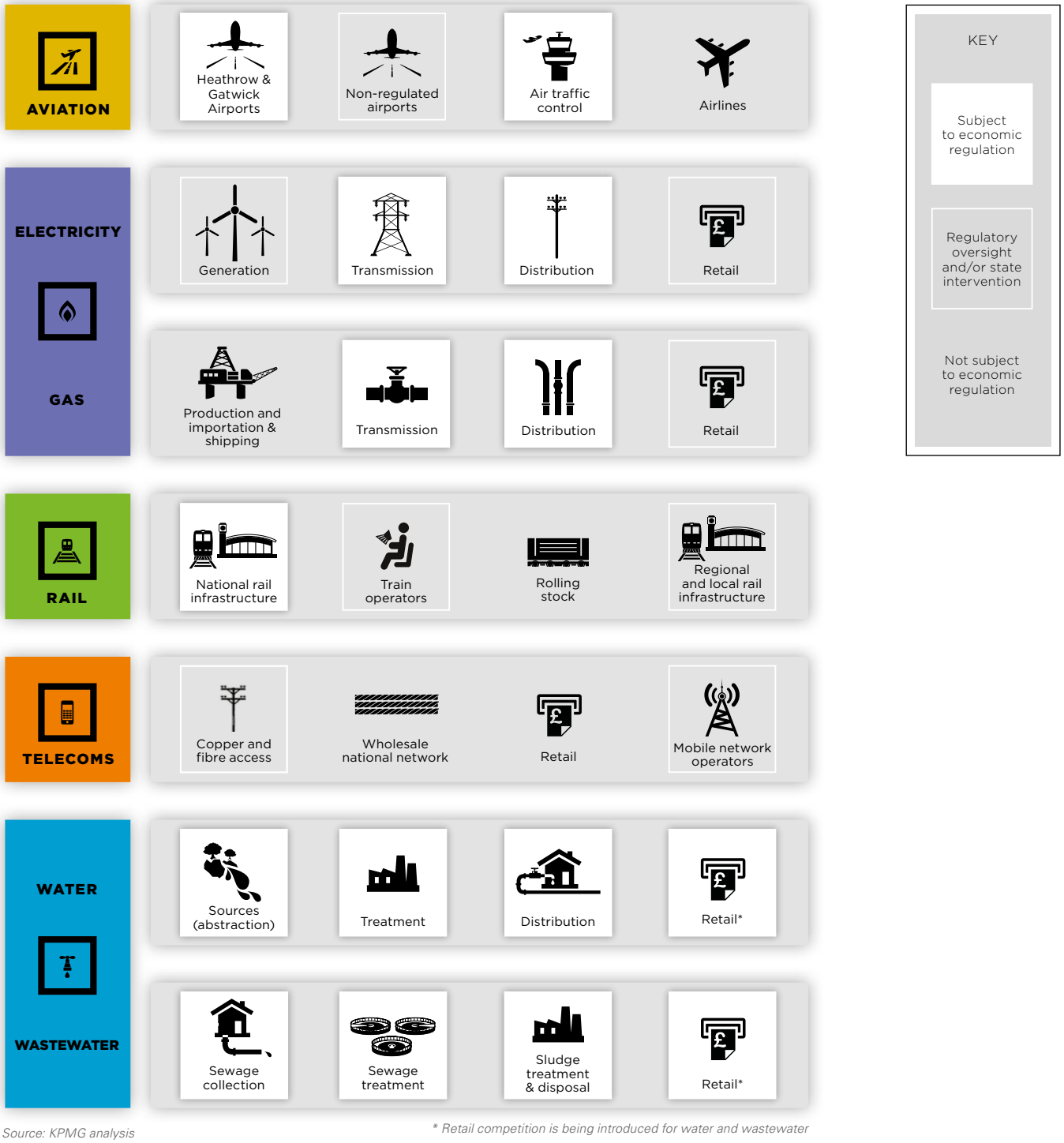
Business characteristics and their societal role creates a case for regulation

Infrastructure services, in general, are also characterised by a high public impact of failure, for example, in terms of service disruptions. This means that their operational robustness and resilience are critical from the public interest perspective, and there is a case for regulatory and policy intervention to ensure continuity of supply in all circumstances.

Economic regulation is intended to protect consumers from the adverse effects of companies having significant market power. Such regulation aims to simulate market outcomes while, at the same time, ensuring conditions for private sector provision, such as an adequate return on investment

[8] National Infrastructure Plan (2014) and National Infrastructure Pipeline (2014), see https://www.gov.uk/government/collections/national-infrastructure-plan

Figure 1: Which sectors are subject to economic regulation?



Source: KPMG analysis

** Retail competition is being introduced for water and wastewater*

for efficient companies. Economic regulation is distinct from health and safety, environmental and other types of regulation to which all infrastructure activities are subject.[9]

While the precise form of economic regulation varies by sector, the general approach has been to link prices to the required returns on investments made at a market cost of capital, commensurate with the risks involved, while at the same time incentivising progressively more efficient operations.

The aim of regulation is also to ensure necessary service quality levels to facilitate the appropriate level of investment required to secure supply and to ensure that prices to customers do not include abnormal returns to private sector providers.

Introduction of competition and deregulation

The scope of economic regulation in the infrastructure sector has evolved over time as market development and technology have made the introduction of competition 'for the market' or even 'in the market' feasible in some segments of the value chain. For example, two of the four originally designated airports have now been deregulated and there is competition for some energy network assets (e.g. Offshore Transmission Owners).[10] Technology and regulation have helped facilitate the liberalisation of telecoms and competition is now gradually being introduced to some extent into other sectors, e.g. water retail services.[11]

This trend is likely to continue and economic regulation is likely to evolve as competition might become feasible in other parts of the value chain supported by policy to give it a greater role in these sectors. There is likely to be a fine balance, however, in some market segments between the benefits of competition and the costs of introducing complex market rules to enable a genuine marketplace to emerge. There are clear limits to this for parts of the value chain where it is not possible to introduce competitive market forces, i.e. the core 'pipes and wires' network infrastructure, constituting the bulk of asset bases. In these segments, where the infrastructure has inherent monopoly characteristics, economic regulation will have to continue to be employed.

Regulatory framework for investments

The approach to the economic regulation of infrastructure adopted to date has been such that returns on private investments in networks largely depend on the size and efficiency of these investments. Returns are typically calculated on the basis of the regulated asset base (RAB), which records these investments, plus an allowance for other costs, to determine allowed revenues and prices.

Economic regulation creates scope for returns to investors to vary somewhat depending on operating cost performance, achievement of agreed outputs and performance against regulatory incentive schemes, which are often geared to improving outcomes for customers. Over time, economic regulators have become increasingly keen to make use of such incentives to ensure better outcomes for consumers and enable the best companies to outperform and demonstrate the potential for improvement to others.

2.2 Sector overview

Infrastructure represents a rich and complex marketplace combining competitive, regulated and state-owned segments of the value chain across the economically regulated sectors. These sectors are diverse in nature and, in each case, have a number of distinct sub-sectors with different business and market characteristics. All sectors and almost all sub-sectors within them are open to private investment in different forms.

The structure of regulated industries and the organisation of economic regulation also vary across the UK. In the case of telecoms, the industry structure is UK wide. In other sectors, different arrangements may apply for England, Scotland, Wales or Northern Ireland. For example, in the case of water and wastewater, the arrangements for Scotland and Northern Ireland differ from those for England and Wales with different sector regulators. In general, however, similar regulatory principles and practices apply across geographies, even where precise regimes structures and institutions are slightly different. This is supported by the presence of UK-wide appeal bodies, i.e. the Competition and Markets Authority (CMA[12]) and the Competition Appeals Tribunal (CAT[13]).

Figure 1 on the previous page provides a high level overview of the infrastructure value chain in each of the five sectors covered in this guide (it excludes corporate supply chains). The activities subject to economic regulation are highlighted, and it is these activities that form the primary focus of this guide.

In some parts of the value chains, a degree of competition has been introduced, as shown above. However,

[9] Some sector regulators are also the health, safety and environmental regulators for their respective sectors. The primary regulatory body for health and safety in the UK is the Health & Safety Executive, see http://www.hse.gov.uk/ for more information.

[10] See https://www.ofgem.gov.uk/publications-and-updates/offshore-transmission-investor-perspective-update-report for more information on the OFTO regime.

[11] For more information on water market reforms and the introduction of retail competition, visit http://www.open-water.org.uk/

[12] See https://www.gov.uk/government/organisations/competition-and-markets-authority

[13] See http://www.catribunal.org.uk/

many of these competitive activities remain under regulatory oversight or are subject to a degree of regulatory intervention to ensure ongoing consumer protection and efficient operation of the industry given the essential nature of utilities infrastructure services. A table listing the main entities that provide regulated infrastructure services in the UK is provided at the end of this report.

2.2.1 Aviation

The UK airport market is characterised by multiple airport ownership structures, including wholly private ownership, local government ownership, and a number of forms of public-private ownership with major opportunities for investments.

The Civil Aviation Authority (CAA) is the independent aviation regulator in the UK, with responsibility for economic regulation, airspace policy, safety regulation and consumer protection. The CAA is responsible for the economic regulation of **Airport Operators** and **Air Navigation Service Providers** (ANSPs).

The vast majority of airports in the UK are not subject to economic regulation. Only two of around 60 airports in the UK are regulated in that sense via a licence. Most of the airports are also privately owned and some are part owned by the local authorities.[14]

While there are many airports that are individually owned, there are also now several airport operator groups in the UK. For instance, Global Infrastructure Partners (GIP) own Gatwick, London City and Edinburgh airports, while Manchester Airports Group (MAG) owns Manchester, Stansted, East Midlands and Bournemouth airports. Heathrow, Gatwick and Stansted airports, along with four others in the UK, were owned by BAA plc between 1987 and July 2006. In March 2009, the Competition Commission's (CC) BAA Airports Market Investigation found that BAA's common ownership of airports in the South East of England and in lowland Scotland caused an adverse effect on competition.[15] As a result, BAA (now Heathrow Airport Holdings) sold Gatwick airport to GIP in 2009, Edinburgh airport to GIP in 2012 and Stansted airport to MAG in 2013.

There is a need for new runway capacity in the South-East of England and the Government has appointed an independent Airports Commission to determine the best option to meet this requirement.[16] There is an expectation that between £7.4-18.6 billion will be required to deliver this investment according to the Airports Commission draft findings.

The provision of en route Air Navigation Services (ANS) in UK airspace is the responsibility of NATS En Route Plc (NERL). NERL is part of NATS (Holdings) Plc (NATS), which is a public private partnership. The Government holds 49 percent and a golden share, 5 percent is held by the NATS staff and 4 percent by LHR Airports Limited (formerly BAA), while the remaining 42 percent is controlled by the Airlines Group. In 2014, USS Sherwood Ltd purchased 49.9 percent of the Airlines Group, and the remainder is held by a number of different airlines.

The provision of **terminal air navigation services** (TANS) is undertaken by a range of providers including NATS via NATS Services limited (a wholly owned non-regulated subsidiary), airports self-supplying and other third party operators. NATS Services limited is by far the largest provider in terms of air transport movements controlled and value.

Airlines and providers of ground handling services at airports are not subject to price regulation and are free to determine the price and quality offering to consumers in order to meet their own individual business objectives.

2.2.2 Energy

The businesses in the energy sector are all privately owned, either through listed companies or privately held entities, creating significant opportunities for private sector investments.

The energy sector is regulated by the Gas and Electricity Markets Authority (GEMA), which was established by section 1 of the Utilities Act 2000. GEMA is supported by Ofgem, the Office of Gas and Electricity Markets, in delivering its duties. Ofgem was formed by the merger of the Office of Electricity Regulation (Offer) and Office of Gas Supply (Ofgas) in 2000.

Electricity transmission assets in Great Britain are currently owned by three monopoly transmission operators (TOs), although Ofgem has recently reiterated a desire to introduce competition into the provision of new assets, which might create an opportunity for new market entrants. National Grid Electricity Transmission (NGET) plc, a subsidiary of National Grid, is by far the largest of the

[14] In 2010, the OFT published a detailed database of the ownership and control structures of large infrastructure operators in the UK, including airports, see http://webarchive.nationalarchives.gov.uk/20140402142426/http://www.oft.gov.uk/shared_oft/market-studies/ownership-control-mapping/OFT1290.pdf

[15] For more information on CAA airport market power assessments, see http://www.caa.co.uk/default.aspx?catid=78&pagetype=90&pageid=12275

[16] For more information on the Airport Commission and new UK runway developments, see https://www.gov.uk/government/organisations/airports-commission

existing monopolies, covering England and Wales. Scottish Power Transmission owns the network in Southern Scotland and Scottish Hydro Electric Transmission owns the network in Northern Scotland and the Scottish Islands. National Grid also performs the system operator role on behalf of the Scottish networks to enable effective management of a single British electricity network.

Gas transmission assets in Great Britain are all owned and operated by National Grid Gas, a subsidiary of National Grid.

Energy distribution assets in Great Britain currently consist of 14 regional electricity distribution networks (owned by six companies) and eight gas distribution networks (owned by four companies) as well as a number of smaller independent distribution network operators and independent gas transporters. The energy distribution companies are a mixture of privately-held companies and subsidiaries of listed companies.

The onshore energy network businesses in the UK are regulated under the RIIO (Revenue = Incentives + Innovation + Outputs) framework (see section 4.4 for details[17]), and their revenue is received by charging users for access to the network (i.e. generators and suppliers).

The **Offshore Transmission Owner** (OFTO) regime regulates the high-voltage electricity transmission cables connecting offshore wind farms to the onshore network. The ownership of the transmission assets is separated from ownership of the wind farms, in line with EU unbundling requirements, and taken on by OFTOs through a process of competitive tendering. There are currently around ten OFTOs in the UK[18] but this will continue to grow over the next decade in line with the expansion of offshore wind generation.

There are also four **electricity interconnectors** and three **gas interconnectors** that connect Great Britain to international markets, facilitating cross-border trading and the creation of an EU Single Electricity Market[19]. The interconnector market is also subject to ongoing expansion.

Electricity generation is a competitive activity, as is **gas production and shipping**. In principle, the energy prices that generators and wholesalers can charge are not determined by the regulator but by the market, although there is also significant government intervention in the market both through the unbundling requirements of the EU Third Energy Package and incentives for certain generation technologies.

Supply businesses, including retail activities, are competitive in both gas and electricity and thus are not price-regulated, though extensive standards of conduct are in place for these sub-sectors. Ofgem recently referred the energy retail market to a review by the CMA.

The Energy Act 2013 introduced measures for Electricity Market Reform (EMR)[20] in England, Wales and Scotland. The Contracts for Difference (CfDs) mechanism allows participating operators of certain low-carbon generation technologies to achieve a fixed, long-term power price, as they obtain the difference between the market price and the contracted and indexed strike price. EMR is also introducing a mechanism for operators of conventional electricity generators to receive a long-term fixed price for making capacity available. The EMR mechanisms represent competition for the market in that operators bid for the contracts, but ensure that they are less exposed to changes in market prices. EMR has been designed and introduced by the Government.[21]

The Northern Ireland Authority for Utility Regulation (NIAUR) is responsible for regulating the energy (electricity and gas) industries in Northern Ireland. The wholesale electricity market on the island of Ireland is regulated by the Single Electricity Market Committee, which is also a statutory committee of both NIAUR and the Commission for Energy Regulation in the Republic of Ireland.

2.2.3 Rail

The UK rail market is one of the most liberalised in Europe following a process of privatisation in the 1990s and is open to investors at different levels.

The economics of rail means that it stands out from other economically regulated UK infrastructure as being the only one to receive significant government subsidy rather than relying on customers to pay directly for all its costs and services.

The rail sector is regulated by the Office of Rail Regulation (ORR), but the Government is a direct and active stakeholder with extensive involvement in setting detailed policy and strategic direction. In rail, the Government directly specifies and funds many of the investments in the rail infrastructure.

[17] More information on the RIIO model can be found on Ofgem's website at https://www.ofgem.gov.uk/network-regulation-%E2%80%93-riio-model

[18] See https://www.ofgem.gov.uk/publications-and-updates/offshore-transmission-investor-perspective-update-report for more information on the OFTO regime.

[19] More information on electricity interconnection in GB can be found at https://www.ofgem.gov.uk/electricity/transmission-networks/electricity-interconnectors, and at https://www.ofgem.gov.uk/gas/transmission-networks/gas-interconnectors for gas interconnectors.

[20] Further information on the Energy Act 2013 can be found at https://www.gov.uk/government/collections/energy-act

[21] Further information on EMR and the associated policy mechanisms can be found at https://www.gov.uk/government/policies/maintaining-uk-energy-security--2/supporting-pages/electricity-market-reform

The market composition of the rail sector is complex and involves a number of public and private entities. Overall, there are four key elements to the GB rail sector:

- The **public transport authorities** (Department for Transport, Transport Scotland and some metropolitan authorities such as Transport for London), which specify, let and manage operating contracts and provide a significant proportion of the funding for infrastructure maintenance and enhancement to Network Rail.
- Privately owned and operated **Train Operating Companies** (TOCs) and **Freight Operating Companies** (FOCs). TOCs operate under Franchise or Concession Agreements let by the authorities mentioned above. The concessions are typically competitively tendered every 7 to 15 years. Service levels are determined during the franchising competitions and around half of fares are regulated by the Government. FOCs are wholly commercial with competition in the rail market and with other modes.
- Unregulated and privately-owned and financed **rolling-stock companies** (ROSCOs), which lease rolling stock to the TOCs and are supported by several financial investors.
- The regulated **national rail infrastructure**, owned and operated by **Network Rail**, a government body originally created as a company limited by a guarantee following the restructuring of its private sector predecessor, Railtrack, in 2002.

  Most stations on the national rail network are owned by Network Rail but operated by TOCs. There are some exceptions to this. The major London terminals and some other major stations are both owned and operated by Network Rail and a limited number of other stations are both owned and operated by TOCs.
- As well as the national rail infrastructure, there are also **High Speed** and **international rail** infrastructures, i.e. the High Speed 1 (HS1) rail infrastructure[22] and the Channel Tunnel infrastructure connecting Britain to the European continent.

Network Rail's assets do not include the tracks and stations of the London Underground network, which are owned by London Underground Limited, a subsidiary of the Transport for London, or the HS1 line between King's Cross St. Pancras and the Channel Tunnel, and the Channel Tunnel itself, which are both privately operated under long-term concession agreements by High Speed 1 Limited and Eurotunnel, respectively.

It is possible to trade in Network Rail's existing debt issued prior to 1 September 2014, which is underwritten by a Government guarantee. It is not possible, however, to invest in Network Rail equity or new debt. Going forward, all Network Rail new debt will be borrowed directly from the Government.

Network Rail has also begun a process of decentralisation and regionalisation, where some assets, such as infrastructure related to certain routes, are managed separately and more closely with the train operating companies and other stakeholders. This might result in a different structure or management model of rail infrastructure in the future, which could open additional opportunities for investment.

2.2.4 Telecommunications

Telecommunications networks in the UK are fully privately owned with no participation from the state and have attracted significant private capital.

There are effectively two types of network:

- **Core network**, consisting of very high capacity fibre cables (or other high-speed links such as microwave backhaul for mobile towers) that connect exchanges, masts or network aggregation points; and
- **Consumer-facing 'last mile' networks**, which can consist of copper, fibre and co-axial (cable) networks or mobile masts.

Core networks

There are a number of significant network providers in each of the fixed and mobile market segment, though the distinction between the two segments has been reducing due to the evolution of fixed-mobile convergence. This effect is driven, in part, by the delivery of data and broadband services over multiple and competing network platforms, but there is still an important distinction between fixed and mobile and this is likely to persist for at least the next few years. The services provided by competing core network operators range from fixed and mobile voice services to households and businesses, over conventional and new technologies, to provision of broadband via a range of methods, to high bandwidth data services delivered to the business market.

In both the fixed and mobile market segments there are a number of companies that own a core network.

[22] See http://www.highspeed1.com for more information

2. Market overview (continued)

In the fixed line segment, there are numerous network companies that can provide both long distance and local services, within and between the larger cities and conurbations. The extent of coverage and technology choices are determined by commercial considerations and all companies can supplement their network capabilities with access to BT's core network where necessary.

The fixed segment is still dominated by BT at both the "core network" and "last mile" levels and hence BT generally has to provide such access on an equivalent basis, i.e. the terms on which such access is given have to be the same for other service providers as for BT Retail, BT's downstream division. In the core network area, services are provided by BT to other operators either on the basis of specific network components where other operators may not possess network, or fully operational services that are priced on wholesale terms.

There are also a number of specialist providers of network services, such as those that provide high quality connectivity and bandwidth between mobile masts, media centres and broadcasting masts.

Last mile networks

In the 'last mile' segment, the largest operator is Openreach, a division of BT Group, the UK's Universal Service Provider. Despite the continuing dominance of Openreach, about half UK homes have the option of an alternative supplier of last mile access, using cable network technology to provide voice, broadband, TV and mobile services. This alternative cable network is not subject to specific economic regulatory control by Ofcom.

Openreach is subject to detailed regulation of the way it provides telecoms retailers access to the last mile network (including all of BT's divisions that are downstream of it). The prices it can charge for most forms of access to its network fall within the scope of economic regulation. In addition, BT has given a series of legally binding 'Undertakings' that commit BT and Openreach to selling the main products and services to other communications providers on the same terms as to BT's own lines of business. In order to deliver these Undertakings, Openreach is functionally and operationally separate from the rest of BT Group.

The basis for much of the retail competition in fixed telecoms and broadband for consumers is provided by Local Loop Unbundling (LLU), which allows companies other than BT to install their telecoms equipment in the local BT exchange. These companies can then offer their own direct phone or broadband services to consumers. Communications providers, who use BT's copper network to provide telephone and broadband services to homes and businesses, are required to pay Openreach a fee to access the network for the provision of various wholesale telecoms services. The wholesale charge for such services is regulated by Ofcom where BT has been found to have significant market power in the delivery of these services.

In and around the city of Kingston upon Hull in East Yorkshire, KCOM plc owns and operates the last mile infrastructure for historical reasons and is economically regulated in ways analogous to the regime applied to Openreach.

Openreach's fibre last-mile network, which mainly runs to BT's street cabinets from its exchanges, can deliver high-speed internet broadband services, and access to this network is not currently subject to price regulation in the same way as LLU. However, it is subject to a number of non-price restrictions that are designed to ensure fair access.

In addition, Openreach manages the "last mile" access to higher bandwidth networks exclusively operating over fibre, notably those running Ethernet-based data services that provided high band width point to point services for businesses, or that supplement other operators' core networks. These services, up to and including 1Gbit/s services are also provided on regulated terms to other operators.

- **Mobile networks** refer to the masts and associated infrastructure used to provide cellular network coverage. This infrastructure includes backhaul, the core network required by mobile network operators (MNOs) to transport information (voice or data) around.

There are four mobile networks in the UK, each of which owns and manages network infrastructure, and each of which now provides a 4G mobile data service the roll out of which also requires significant investment. In addition, there are operators of virtual mobile networks that buy in network service from other operators. Mobile telecoms account for the majority of connections in the UK.

- **Retail services –** Retail in the telecommunications industry are providers of voice, data and/or television services to retail consumers. The combination of core and last mile networks, either owned or bought in on regulated terms, is used by all operators to provide retail communications services. There is extensive competition for retail services in fixed and mobile.

Mobile networks and retail telecommunications services include elements of telecommunications infrastructure but differ in their investment profile from traditional regulated infrastructure sectors, so are not discussed here in detail but

mentioned for completeness, given their substantial role in the overall telecommunications industry.

2.2.5 Water & wastewater

The UK water and wastewater sector consists of privately held companies, which own water and wastewater networks as well as related infrastructure assets rather than through time-bound concessions, as in many other jurisdictions.

Water and wastewater services in England and Wales are currently mainly delivered by 18 regional monopolies. There are also a number of other providers (new appointees and water supply licensees) at specific sites, but they represent a negligible proportion of the total supply.

The companies vary significantly in size: 10 larger companies supply both water and sewerage services (WaSCs) and eight smaller ones supply water only (WoCs), although some of the largest WoCs are almost the size of the small WaSCs. All these companies are fully privatised, some listed and some privately held, and one company is owned by a not-for-profit company (Dwr Cymru or Welsh Water). A single state-owned company supplies both water and wastewater services in Scotland (Scottish Water).[23]

The market for retail water and wastewater services in England and Wales is largely not competitive at the moment, i.e. all customers within a specific geographical location are supplied by the incumbent supplier, which is also the owner of the local network. However, water retail competition is to be introduced in England in 2017 for non-household customers, which means that business, charity, and public sector customers will be able to choose their water retailer.

Retail competition for non-household customers is already in place in Scotland. As the competitive retail market has developed, the Scottish water regulator (Water Industry Commission for Scotland or 'WICS') has gradually reduced economic regulation of Scottish Water's retail business but retains control over certain areas such as licensing, setting default tariffs and default levels of service. Economic regulation remains in place for the asset-intensive network and upstream activities.

If England follows the same pattern as in Scotland, 5 percent of revenues could be subject to competition in the retail market. To facilitate this, Ofwat will set separate price controls for wholesale water, wholesale wastewater, household retail and non-household retail in the PR14 price review that will cover the period 2015-20.

Much of the asset-heavy wholesale network, which represents by far the greatest part of the value chain, will remain a regulated monopoly activity. However, following the Water Act 2014,[24] Ofwat and other stakeholders in the sector are considering how market mechanisms can play a greater part in upstream activities, particularly in respect to water trading.

In Northern Ireland, water and wastewater services are provided by Northern Ireland Water which is regulated by the Northern Ireland Authority for Utility Regulation (NIAUR).

2.3 Private sector investment and delivery

In the UK, most regulated infrastructure assets are owned by private companies. Therefore, responsibility for the supply of services (including operations and capital investment) generally sits with these private companies. This is distinct from the public ownership and concession models that are common in other jurisdictions, under which ownership of assets remains in the public sector with some private companies operating under time-bound concessions.

The UK ownership model arguably offers greater transparency, but also greater control to the private sector, and hence ensures provision of long-term, private capital. However, there are still some entities, such as the water companies in Scotland and Northern Ireland and Network Rail, which are publically-owned.

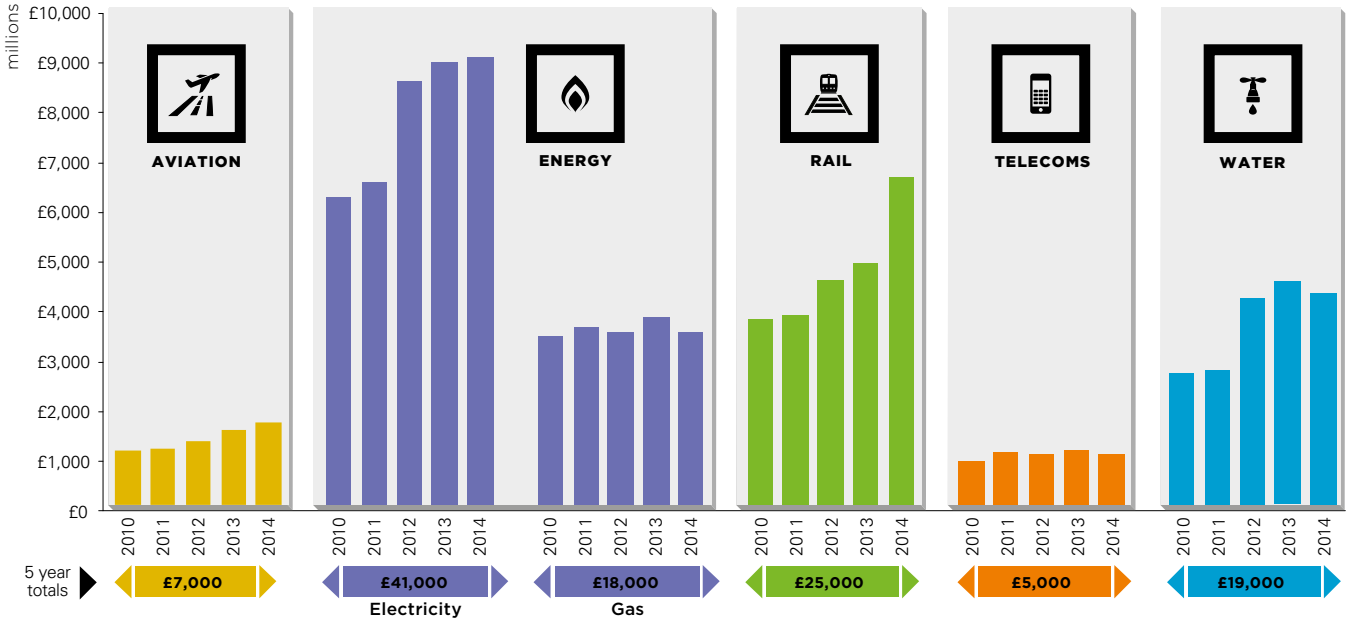
Figure 2 on the following page demonstrates the significant and growing private investment in UK regulated infrastructure over the past five years. This is the investment made by the companies subject to economic regulation discussed in this guide and not the total investment in these sectors, which can be significantly higher. This is particularly true for sectors such as telecoms, where only a small part of the value chain constitutes infrastructure that is subject to traditional price regulation.

Since the vast majority of infrastructure in the UK was privatised 20 or 30 years ago, the private ownership model of operations and associated economic regulation has a level of maturity, stability and track record rarely seen in other jurisdictions. The provision of essential services by privately owned and regulated companies is generally accepted by the public at large, with

[23] An overview of licenced water and wastewater companies can be found on Ofwat's website at http://www.ofwat.gov.uk/industrystructure/licences/
[24] For details of the Water Act 2014, see http://services.parliament.uk/bills/2013-14/water.html

2. Market overview (continued)

Figure 2: Capital expenditure in GB on infrastructure subject to economic regulation (2010-14)



Source: Company regulatory accounts and financial statements. Estimates used where data was unavailable.

the debate focused more on the nature and results of regulation rather than the concept of private ownership itself.

The structure of regulated infrastructure in the UK has been largely stable with limited changes over time. Some of these changes have resulted from regulatory intervention, as in the case of the break-up of BAA following a market investigation, or the separation of energy transmission from generation, which followed the adoption of EU directives.[25]

Some structural change, such as potential sector consolidation in the water sector, which might have been otherwise expected, has not occurred to date on a large scale due to specific statutory barriers – in this case the existence of the water-specific merger regime and arguments around keeping a sufficient number of independent companies to ensure effective cost benchmarking for regulatory purposes.

Other corporate structures in regulated infrastructure have resulted from changes post-privatisation initiated by the private sector. This includes, for example, consolidation in electricity distribution networks, although the networks under common ownership still operate under separate licences with separate regulatory accounts. Further structural changes in these sectors could occur in the future, although in case of consolidation regulators are likely to seek to ensure sharing of potential cost savings and synergies with consumers.

While market structures and regulatory practices have evolved over time, the inherent stability of the market arrangements and the overall regime to date, as well as the low risk nature of the underlying business activities themselves, have enabled significant capital raising at low prices compared with other sectors of the economy. This is evident, for example, from the amount of debt capital invested in UK regulated infrastructure since privatisation, in absolute terms and relative to equity, which includes the period of the financial crisis.

The quantum of fixed income securities issued by UK regulated infrastructure companies over the past decade per sector is shown in Figure 3 opposite. Since regulated companies have ongoing investment commitments, they are required continuously to tap capital markets for new funding or refinancing. Figure 3 opposite illustrates this point and that they have been able to do continuously over the past decade.

Confidence in UK regulated infrastructure is further evidenced by the appetite displayed by investors to enter the

[25] Notably, the Third Energy Package. For more information, see http://ec.europa.eu/energy/gas_electricity/legislation/third_legislative_package_en.htm

market, which has been consistently strong following the initial tranche of primary market offerings. This has resulted in a large volume of transactions on the secondary market.

Figure 4 on the following page shows the number of transactions per year. This underscores the secondary market's liquidity and desirability of these assets to investors from across the world.

The total value of transactions in regulated infrastructure has fluctuated year by year, but there has been an overall upward trend over the past decade. There has been a steady flow of transactions in water and energy reflecting a large number of entities supplemented by more occasional trades in rail and aviation assets. In the telecoms sector, Openreach has remained a part of the BT Group, but there has been significant corporate activity in the wider telecommunications market including, in particular, in mobile telecommunications, which is not included in the summary data presented in figure 4.

Long asset lives, real returns where the inflation component is capitalised rather than recovered immediately, and the consistent need for partial reinvestment of capital in the business have all meant that, to some extent, private owners rely on the secondary market for recovery of invested capital in the short to medium term. An active and vibrant secondary market for regulated assets is therefore an important part of the overall business case for investment in regulated infrastructure utilities.

2.4 Significant opportunities for investment

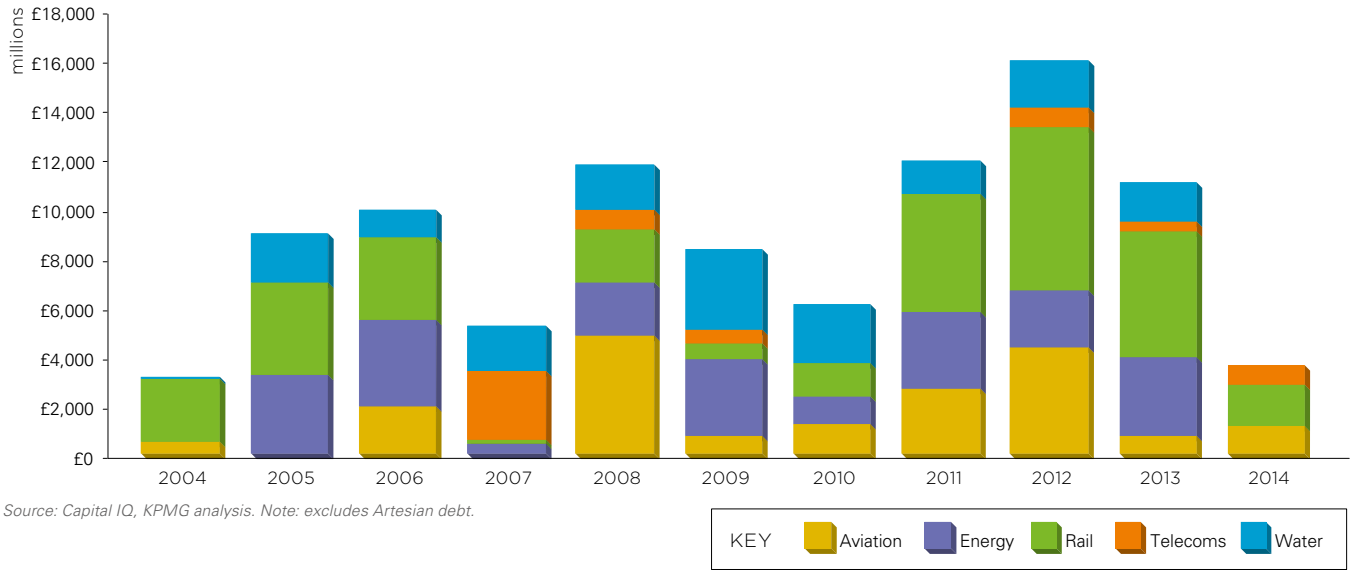
There is a significant pipeline of future investments required in UK infrastructure creating major opportunities for private debt, equity capital and private sector delivery. Across regulated infrastructure sectors, there is a recognised investment requirement not only to maintain and replace existing infrastructure, but also to upgrade and build new facilities, while at the same time optimising the balance of capital and operational expenditure spent to ensure efficiency.

Energy is one of the UK's priority investment areas given the importance of energy security and the need to respond to climate change. The ageing state of UK energy plants is also driving a significant need for investment in the sector. The electricity sector, in particular, has a large investment pipeline, with increasing renewable energy generation capacity being developed, new generation connections and reinforcement of the onshore transmission and distribution network being required.

Offshore transmission is also a key growth area driven by ongoing investment in offshore wind generation and a need for increased interconnection capacity between British and neighbouring electricity markets. Significant investment is also required to reinforce the network for electrification of transport.

There are also significant investment needs in water to ensure sector resilience

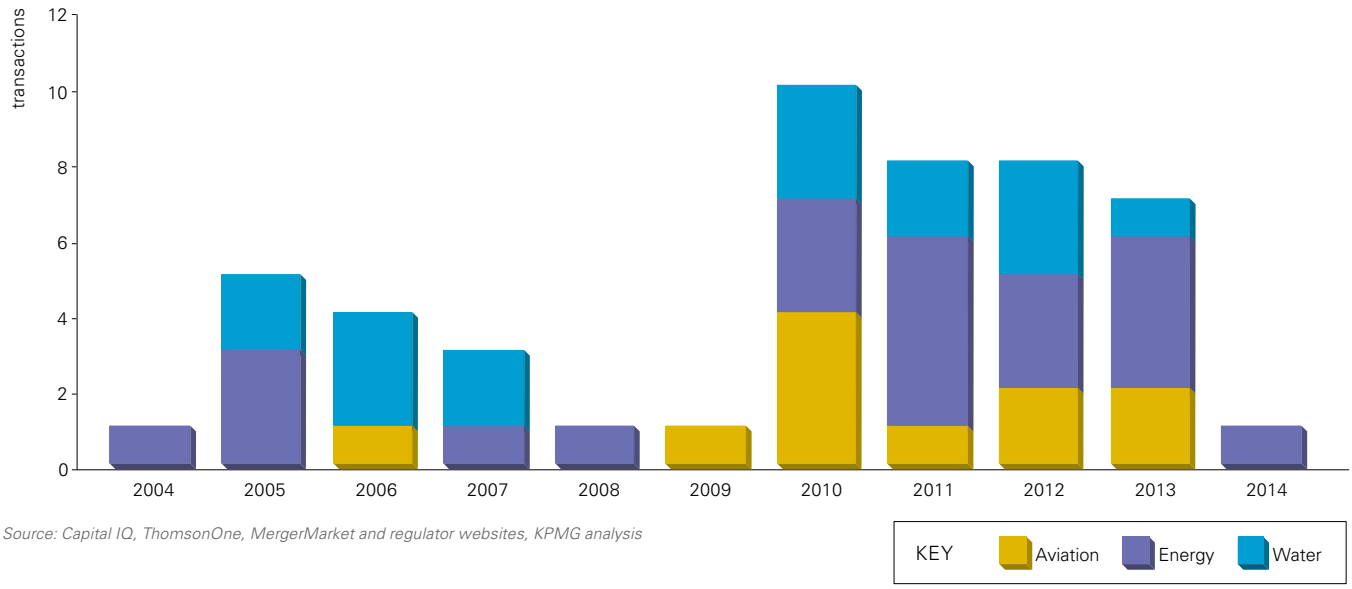
Figure 3: Fixed income securities issued by regulated infrastructure companies (2004-2014)



Source: Capital IQ, KPMG analysis. Note: excludes Artesian debt.

2. Market overview (continued)

Figure 4: Transactions in selected regulated infrastructure sectors – total number of transactions by year[26]



Source: Capital IQ, ThomsonOne, MergerMarket and regulator websites, KPMG analysis

and future supply in the presence of climate change. While over £100 billion has been spent in the water sector on upgrading existing infrastructure, there is a need for large new assets such as Thames Tideway Tunnel and increasing water storage capacity and resilience schemes to ensure future supply.[27]

In rail, the High Speed 2 (HS2) programme will practically double the Government's annual spending on rail infrastructure.[28] In telecoms, a number of providers have been rolling out superfast broadband and mobile network operators are rolling out 4G, while in aviation there is a need for a new runway in the South East of England as well as airport capacity expansion and other airport investment.

The estimated total spending on regulated infrastructure to 2020 is illustrated in Figure 5 opposite. The middle chart shows the total estimated spending, with a breakdown of spending by regulated infrastructure companies in each sector and spending on new projects. The circle on the left breaks down company spending by sub-sector, and the circle on the right breaks down new project spending by type of project.

In practice, the requirement for some of this spend will depend on policy priorities, affordability, market signals and public needs (for example, requests for electricity transmission from generator connections). However, for much of regulated infrastructure, investments are relatively certain, for example upgrades to energy and water networks or electrification of rail routes, because they are essential to securing future supply.

The projects accounted for in Figure 5 are at various stages of development. The pipeline of investments includes projects that are still in the planning stage, such as Crossrail 2[29], as well as projects that are now procuring financing and entering delivery stage such as Thames Tideway Tunnel. This is reflected in the National Infrastructure Plan published by the Government, which captures current investments but not all future opportunities that are yet to be converted into viable business projects.[30]

2.4.1 Current issues and trends: priorities and pipeline

The five sectors have different investment cycles, but all have continuous requirements for investment in the future reflecting the general growth trend of the GB economy. This investment will come to market in three forms: (1) investments by incumbent

[26] This data only includes transactions in the regulated infrastructure sectors, and does not capture significant additional market activity in the non-regulated subsectors of the telecoms and airports industries, which are not subject to economic regulation.
[27] For more information on Thames Tideway Tunnel, see http://www.thamestidewaytunnel.co.uk/
[28] For more information on HS2, see http://www.hs2.org.uk/
[29] For more information on Crossrail 2, see http://crossrail2.co.uk/
[30] For more information on UK infrastructure projects, visit KPMG's Interactive Infrastructure portal at http://www.kpmg.com/uk/en/industry/buildingandconstruction/pages/interactive-infrastructure.aspx

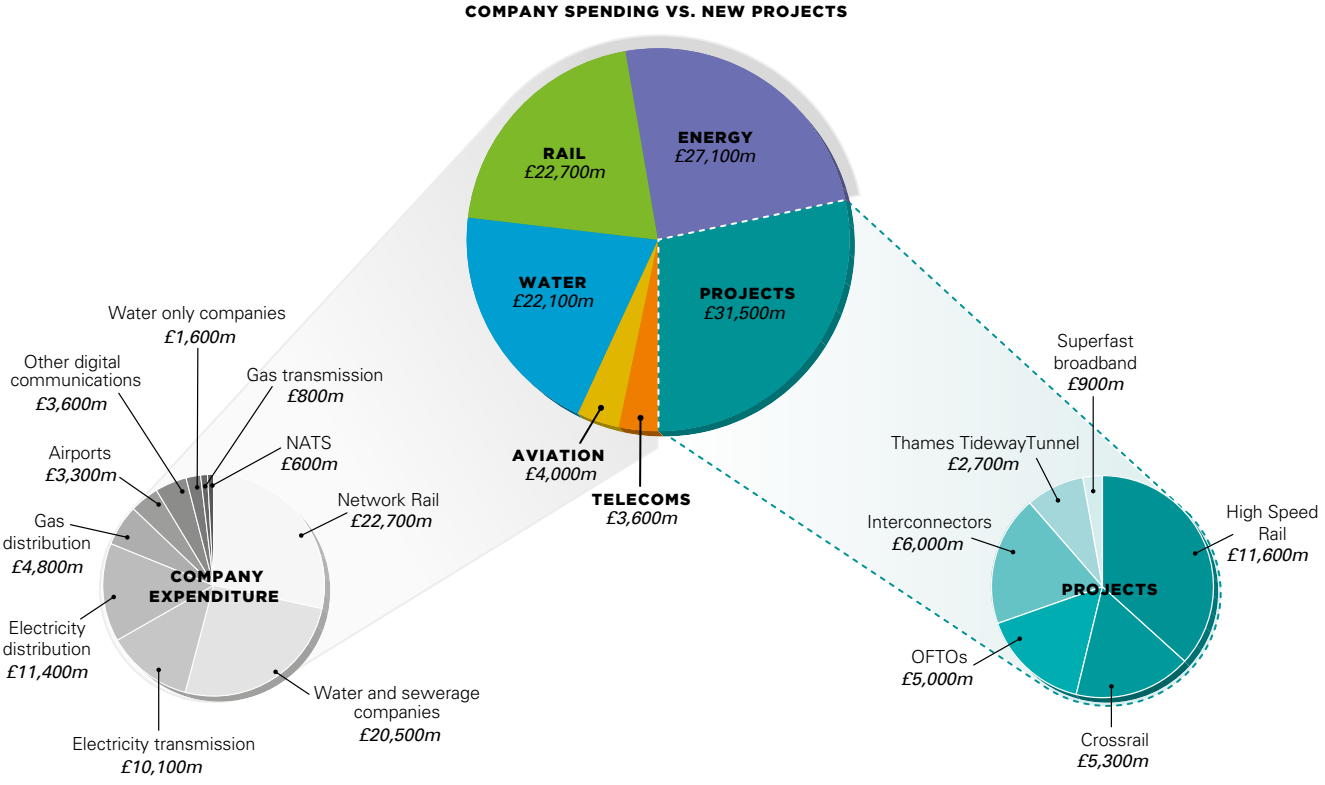
regulated infrastructure service providers; (2) infrastructure investment opportunities that are competitively tendered (including primary market opportunities), which could be provided by regulated incumbents or third parties; and (3) stand alone, developer-led projects.

1. Investments by incumbent regulated infrastructure service providers

The National Infrastructure Plan, company business plans, regulatory determinations and other publications outline specific investment needs in each sector. The following estimates for future investment requirements have been sourced from the National Infrastructure Plan except where otherwise specified.

- In **electricity transmission**, approximately £10 billion of investment is required in the transmission networks between 2015-2020 both to replace ageing lines and also to connect new sources of generation, particularly renewables. Some of this investment is to facilitate the connection of offshore wind farms.
- In **electricity distribution**, investment is required to roll out smart grids, reinforce the networks to support increased renewable generation and enable future electrification of transport and replace old infrastructure. Approximately £11 billion of investment is potentially required over 2015-2020.
- In **gas networks**, approximately £6 billion is required to reinforce the network as sources of gas change as well as to continue replacing old cast iron gas mains with plastic over 2015-2020.
- In **water and wastewater**, companies expect to make investments of more than £22 billion over 2015-20 to upgrade and enhance infrastructure and improve future resilience.
- In the **rail sector**, over £20 billion is required to upgrade stations and tracks, and construct new tracks and tunnels over 2015-2020.
- In **aviation**, approximately £4 billion of investment is required to upgrade

Figure 5: Planned capital expenditure in regulated infrastructure sectors (2015-2020)



Source: National Infrastructure Pipeline, Ofgem, KPMG analysis. Note: 2012/13 prices.

the existing infrastructure at Heathrow and Gatwick over 2015-2020, in addition to an estimated £7.4-18.6 billion required for new runway capacity and associated terminal and other infrastructure.[31]

- In **fixed-line telecommunications**, approximately £4.5 billion could be required to complete the roll-out of superfast broadband and other general digital communication investment over 2015-2020.

Contestability

Most of the infrastructure providers mentioned in this guide operate in licensed, localised monopolies, which means that investment within a given area, which could be nation-wide, typically comes under the remit of the incumbent operator.[32] Increasingly, however, some discrete projects are being put out to tender and opened to other providers. Examples of this include OFTOs and Thames Tideway Tunnel. In aviation, there is effective competition between different airport operators to secure a recommendation from the Airports Commission for new runway capacity. In energy networks, Ofgem is also considering how feasible it might be to introduce competition for some new assets of the onshore networks as part of its ITPR project (Integrated Transmission Planning and Regulation).[33]

2. Competitively tendered infrastructure investment opportunities (including primary market)

OFTOs – The licences to design, build, own and operate OFTOs are awarded via a competitive tendering process run by Ofgem. OFTOs receive an availability-based revenue stream over the useful economic life of the asset. Nearly £2 billion pounds have been invested in OFTOs since the regime's commencement[34] and approximately £5 billion of investment is potentially required over 2015-2020. Ofgem has also recently reiterated its intention to deliver greater competition in the delivery of new onshore electricity transmission, which may lead to opportunities similar to OFTOs in this space.

Thames Tideway Tunnel (TTT) – This is a project to construct the 25km, 7m diameter wastewater tunnel running through central London under the river Thames planned by Thames Water. A new bespoke special projects regime has been developed for TTT, which will see the ownership, construction and final development to be carried out by a new company following a competitive tender process. Total costs for the project are currently estimated to be around £4 billion, and construction is expected to commence in 2016 and finish around 2023. The same regime with tailored treatment could be applied to other major water projects in the future.

High Speed 2 – A second UK high-speed rail line is planned to link London to the Midlands and Northern England. The project is managed by a company established and guaranteed by the Government, and is due to become operational in two phases, with the first phase to Birmingham completed in 2026. A future government may choose to recover part of the estimated total project cost of around £50 billion through private investment, as happened with High-Speed 1 through the competitive letting of an operating concession in 2010.

3. Stand alone, developer-led projects

These opportunities can include either merchant or regulated projects, but tend not to include large network-based assets. Examples include electricity and gas interconnectors and LNG importation terminals, for which the degree of regulatory oversight will vary depending on the exact nature of the project and sector.

In particular, there is a need for additional electricity interconnection between the UK and other markets, to allow the trading of energy between jurisdictions. Approximately £6 billion of investment is potentially required over 2015-2020 to increase interconnection capacity of GB and the UK with multiple projects under consideration linking the UK to other jurisdictions.[35]

2.5 Investment entry and exit

2.5.1 Routes to investment

There are multiple investment routes to enter into the UK regulated infrastructure sectors. Debt and equity markets are open to participation, though both are not always available for every project or asset class.

There has been a growing share of debt participation in the overall financing mix of regulated infrastructure as the actual financial structures have caught up with the higher achievable debt capacities

[31] The interim report from the Airports Commission into airport capacity and connectivity in the UK can be found at https://www.gov.uk/government/publications/airports-commission-interim-report
[32] The telecoms sector does not have an incumbent operator.
[33] For more information on Ofgem's ITPR project, see https://www.ofgem.gov.uk/electricity/transmission-networks/integrated-transmission-planning-and-regulation
[34] Ofgem 2014 estimates
[35] Ofgem 2014 estimates.

given the nature of regulated assets, the need for investment and the large free cash flows available to support it. However, not all regulated infrastructure utilities have adopted high leverage, with a number of publicly listed companies retaining lower gearing; many companies also pay high distributions to meet investors' appetite for strong dividend flow given the nature of the assets. Public debt capital markets are used to access investment grade bond financing in a relatively liquid market.

Structured finance solutions are also commonly used to tap different investor groups and market segments and to maximise leverage. Corporate securitisations in the form of Whole Business Securitisations (WBS), popular in the water sector, have become more widely spread combining low cost of debt financing and high leverage by ensuring tight cash management and limiting managerial discretion through a range of covenants. These typically include establishment of a financial 'ring-fence' around the licenced business which corresponds to the regulatory ring-fencing provisions such that revenues and assets of regulated activities are clearly separated from those for non-regulated activities (ring-fencing is discussed in more detail in the next section).

Some hybrid securities have also been issued in the sector in the past. There is also a significant amount of bank financing supplementing publicly issued debt, which can offer companies bespoke solutions and additional financial flexibility.

With the exception of Network Rail, none of the regulated infrastructure debt is guaranteed by the Government and regulators have consistently taken the view that financial structures and risks are for private owners to assume and manage. Regulatory intervention in relation to financing is therefore limited to setting the allowed rate of return, ensuring financeability under a notional financial structure assumed reasonable by the regulator, and monitoring investment grade requirements to limit the likelihood and potential costs of a company entering financial distress.

On the equity side there are also a number of investment channels. In the secondary markets, shares in publically listed companies are freely traded and are very liquid. Additionally, many companies operating in these sectors are privately owned. Stakes in these businesses can be negotiated, as can full acquisitions. In both listed and private companies the level of control purchased can be flexible from small minority to full control.

In the primary markets, there are also parts of the infrastructure sector, currently in public hands, that could potentially be privatised in the future. Projects are also put out to tender periodically either by the relevant regulator or through another mechanism. This includes development of the new markets to bid for CfDs and at capacity auctions under EMR. The standalone projects tend to be either significant one-off developments, such as Thames Tideway Tunnel, or in market segments where there is a regular pipeline of new projects, such as for offshore electricity transmission tendering or electricity generation capacity auctions. The projects tend to go through a competitive selection process, focused heavily, though not solely, on costs.

The point in the project lifecycle at which these projects are offered to tender varies. Some projects, such as OFTOs, can be offered both pre- and post-construction, whereas others, such as Thames Tideway Tunnel, are offered solely pre-construction. There are also projects being offered while still in development. As a result, there are projects that should fit with differing investment styles and risk appetites. In the future, competitive tendering for new infrastructure might be more widely adopted, opening up new opportunities for direct investments.

2.5.2 Exiting the market and consolidation

The regulatory regimes allow for the repayment of invested capital through allowed depreciation, but due to the long economic lives of the assets, capitalisation of the inflation component of the return and significant reinvestment needs, this route is primarily attractive to long term investors such as pension funds.

In the short term, exit from the market is to some extent dependent on the entry route. Freely traded bonds or shares can clearly be sold on in the same markets. Exit from privately held companies or projects acquired through the primary market is generally possible through active secondary markets, though the exact nature of the process will vary from case to case and can include tenders or privately negotiated sales.

Market structures in regulated infrastructure vary from a very high degree of concentration, as in the case of rail, to fragmentation along horizontal (water) or vertical (energy) lines. There has been some consolidation in energy networks to date, but it has been limited in the water sector to the smaller companies. The break-up of BAA has meant a greater fragmentation and diversification of the airports market than was previously the case. In general, market structures in these sectors evolve over time albeit slowly.

IN THIS SECTION

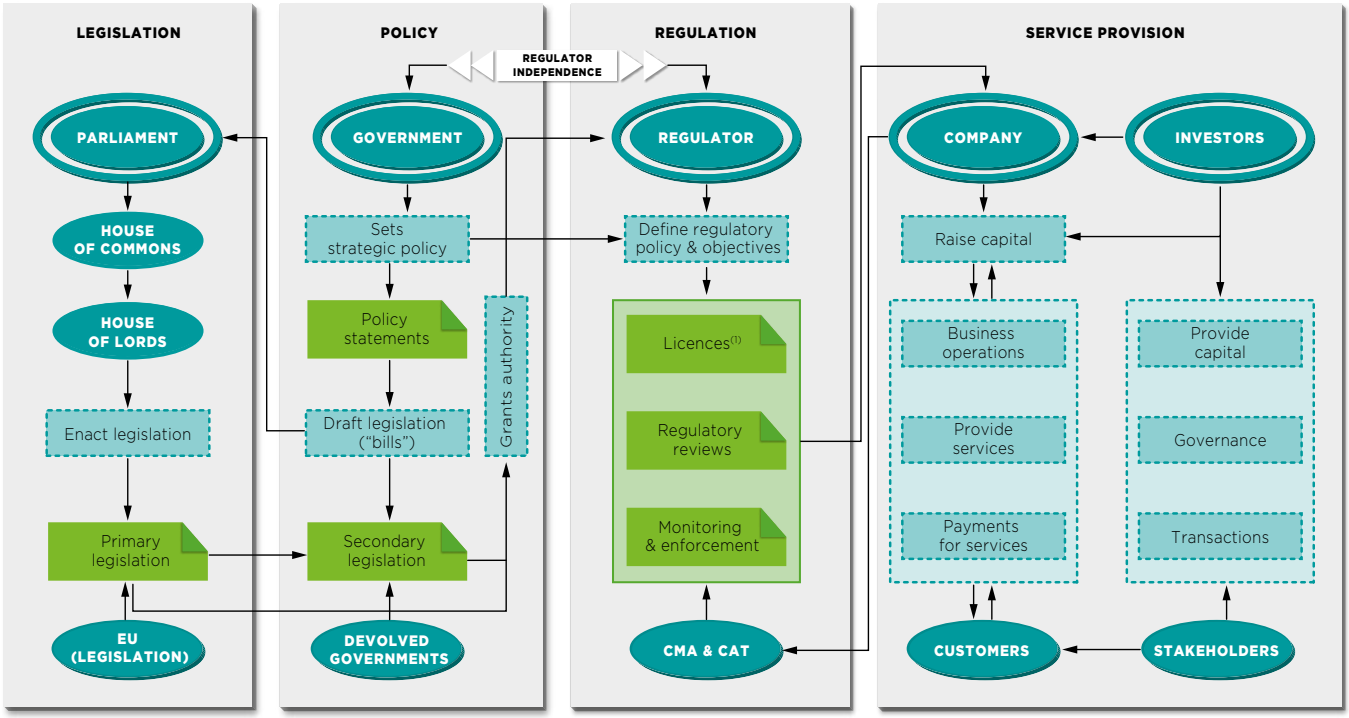
- How is the sector regulated and what is the overall legal and governance structure?
- What entities/documents/processes are involved in the regulatory framework?
- What rights/obligations do investors have?

3

REGULATORY FRAMEWORK

3. Regulatory framework

Figure 6: Regulatory framework overview: key structures and duties



Source: KPMG analysis

** Licence grant not applicable in the telecoms sector, where operators are granted a 'General Authorisation' (see section 3.2.1).*

3.1 Laws, licences and regulations

There are several levels of governance and regulation over regulated infrastructure companies, with the authority and duties divided amongst a number of entities. One of the key features of the overall regime is the separation and independence of the processes and institutions involved in legislation, policy and regulation, which ensures the clear division of roles and enhances transparency.

Figure 6 above presents a simplified overview of the key entities, interactions and activities constituting the overall market regime for regulated infrastructure, with their respective powers and responsibilities.

The Government prepares draft legislation proposals ('bills') and defines the overall policy for each industry. Based on these proposals, Parliament enacts primary legislation where sector-specific or general Acts of Parliament define market regimes and delegate powers and authority. These Acts confer powers on ministers to provide details

The working dynamics of market regimes and regulatory frameworks vary across industries, but share common themes.

of implementation through secondary legislation and set more detailed policy direction. Legislation also defines powers and responsibilities of independent regulators who grant and enforce licences, which in turn define regulated companies' rights and obligations.

Like any other sector in the economy, regulated infrastructure companies are also subject to general competition law at the UK and EU levels[36] and sector regulators have concurrent powers with competition authorities to apply competition law in these sectors. Regulators set detailed regulatory objectives and methodologies as well as implement and enforce regulations. Regulatory decisions can be appealed to competition market authorities.

Subsequent discussion explains how the different entities and duties interact in more detail.

3.1.1 Government policy

The Government has a number of roles in relation to regulated infrastructure:

- The Government is responsible for developing the overall market regime, including the general regulatory framework that applies to each industry. In doing so, it considers public objectives and, effectively, defines the overall market structure, regulatory duties and enforcement powers that it believes are required to meet public policy objectives.
- The government policy is reviewed by Parliament, which is responsible for enacting it as legislation.[37] Such legislation is passed infrequently and so the resulting framework can be expected to endure for many years. In contrast to other sectors with limited state intervention, this effectively implies development of a 'market by design' rather than just by free market forces.
- The Government also has wider, national policy and European legislation responsibilities, which include areas of key importance for regulated infrastructure. In certain cases, the market regime embodied in the legislation may enable the Government to give individual regulators specific policy guidance or set direction, for instance on environmental matters.
- More generally, the Government may set wider public policy, for instance in relation to climate change or airport location, which effectively creates parameters within which regulators must work. It also provides 'steers' via white papers and strategic policy statements which set out priorities for the industry.
- Investments in infrastructure, like all other investment in other sectors of the economy, are also affected by the Government's general economic and social policies and the market principles embodied in the relevant legislative framework. Government's broader policies, such as those for taxation, employment and other areas, directly affect infrastructure companies as they do the rest of the economy.

[36] As per the Competition Act 1998, see http://www.legislation.gov.uk/ukpga/1998/41/contents

[37] For more information on the process for enacting bills into legislation, see http://www.parliament.uk/business/bills-and-legislation

3. Regulatory framework (continued)

3.1.2 Legislation

Legislation plays a central role in the formulation of the market regime for regulated infrastructure. It endows sector regulators with the power to issue licences, to introduce and enforce specific regulations, and to ensure compliance, which could include taking legal action and imposing fines across a sector.

The legislative framework in a given sector is built on the basis of a main Parliamentary Act, which can be revised to address developments in the industry and is supplemented by secondary legislation.

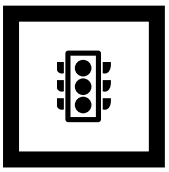
The Houses of Parliament (the UK House of Commons and House of Lords) alongside the devolved legislatures in their respective jurisdictions, are responsible for reviewing draft legislation ('Bills'), proposed by the Government, for enactment into law. Legislation passed by Parliament can take the form of an 'Act of Parliament', and in the regulated sectors is often referred to as primary legislation or statute.

The main Act typically specifies the overall market regime and long term policy objectives. It can set the overall structure for the industry, define access to the market, extent of competition, conditions for the provision of the services, as well as the rights of consumers or users of the services. The main Act also forms the basis for the enactment of secondary or 'enabling' legislation.

Secondary legislation could include regulations or a licence, and guidance published to clarify aspects of the legal or technical framework. This is interpreted and implemented by independent regulatory bodies that work within their mandates specified by legislation and operate independently of the Government.

Legislation establishes the overall market framework as well as regulators' powers and statutory duties. These duties include, for example, a duty to ensure the provision of regulated services by the relevant operators and to protect consumers, often through promoting competition. In doing so, the regulators are typically required to ensure that operators are able to make a return such that they can finance their ongoing operations and new investments.

Finally, the main Act typically includes provisions for the review of the regulator's decisions and practices.



3.1.3 Regulatory independence

This legislative remit enables regulatory bodies to conduct themselves independently of the Government. They recruit and manage their own staff, and are able to develop sector-specific expertise. The aim is to enable regulators to take well-informed decisions free from day to day political control and according to long term objectives embodied in legislation. This provides investors in regulated infrastructure with a number of advantages: expert analysis and decision making; a longer term approach to regulatory policy; and processes that are distinct from political timetables and pressures. The resulting regulatory predictability and credibility should provide a degree of assurance to investors in long-lived assets.

Regulatory independence, however, is exercised within a number of parameters and constraints, which serve to ensure that economic regulators are both accountable for their decisions and take appropriate account of broader policy development.

The most important parameters are those contained in the relevant legislation itself. The general duties of the economic regulator are typically set out in primary legislation. For example, all sector regulators covered have some form of

duty to protect consumers and promote competition (depending on the nature of the sector). A key point for investors is that most regulators also have a duty to ensure that regulated companies can finance their operations. Even when that duty is not present, for instance in telecoms, the economic regulator sets the pricing framework in a way that ensures that a reasonable return can be earned by investors on a forward-looking basis.

> Sector regulators in the UK now have a long-standing track-record of setting independent price controls without government intervention, except in limited and pre-defined circumstances where Government exercises their specific powers under the legislation.

Several EU directives, including the original directives that drove the liberalisation of the main regulated infrastructure markets to competition, require the establishment of independent sector regulators in different markets. They supported the development of a single EU internal market for different services and are still important and influential today in many respects, including in the interpretation of the national legislation that the UK regulators are empowered to apply and enforce. This includes EU legislation that regulates areas associated with the provision of regulated infrastructure services such as environmental protection or technical standards.

Examples of relevant EU legislation shaping up the industries and market regimes include the Third Energy Package, which stipulates that ownership of generation assets or retail operations is 'unbundled' from ownership of transmission and distribution assets[40], the EU Telecoms Framework Directives[41], which drives much of the regulation in the telecommunications sector, or the EU Single European Sky programme in aviation.[42]

> Economic regulation of infrastructure companies is undertaken by regulatory bodies, a different regulator for each sector, each of which is governed by an independent board. Each board's task is to conduct the regulatory functions according to the legislation passed by Parliament.

Regulatory accountability and Judicial Review

There are a number of mechanisms whereby regulators are accountable for their decisions. They are expected to act in a transparent and predictable way, providing all stakeholders with timely opportunities to comment on the development of regulatory thinking and a reasoned basis for decisions. Failures in such processes are potentially reviewable by the courts through a legal process known as *Judicial Review.*[38]

The merits of regulatory decisions, which result in amendments to existing licences, can be appealed to the CAT or CMA. The most frequent such decisions are those that concern the periodic changes in licence conditions relating to price and service (price controls).

The CMA and CAT are expert professional bodies with the experience and power to amend or overturn regulatory decisions. They are independent from central government, which is an important safeguard against their decisions being vulnerable to lobbying by special interest groups.[39]

Generally speaking, decisions by sector regulators and the CMA made under the competition laws can be appealed to CAT, whereas price review decisions of sector regulators are appealed to the CMA. Right of appeal to these bodies provides a degree of protection for companies and investors from arbitrary or mistaken regulatory decisions and is a key element of regulatory accountability.

Regulators are also accountable to Parliament and may be interrogated by Select Committees about any aspect of their remit.

[38] More information on the Judicial Review process can be found at http://www.judiciary.gov.uk/you-and-the-judiciary/judicial-review
[39] For more information on the duties of the CMA, see https://www.gov.uk/government/organisations/competition-and-markets-authority see http://www.catribunal.org.uk/
[40] For more information, see http://ec.europa.eu/energy/gas_electricity/legislation/third_legislative_package_en.htm
[41] For information on the UK's transposition of EU telecoms directives, see http://stakeholders.ofcom.org.uk/international/telecoms/framework-review
[42] For information on the Single European Sky programme see http://ec.europa.eu/transport/modes/air/single_european_sky/

3.1.4 Concurrent powers

A number of regulators have a specific role in promoting or facilitating competition within their sectors and have the power to apply the Competition Act 1998 (CA98) concurrently with the CMA and alongside the competition primacy duty placed on regulators through the Enterprise and Regulatory Reform Act 2013.[43] This means that sector regulators have the authority to enforce competition legislation within their sectors, thereby allowing the integrated use of sector regulation and competition law and the application of sector regulators' industry expertise and ongoing surveillance to competition cases.

In March 2014, the CMA published guidance on the concurrent application of competition law to regulated industries.[44] This guidance sets out how concurrency will work in practice, including the workings of the UKCN (UK Competition Network) and the principles for case handling, complaints and information sharing. An annual concurrency report is to be published by the CMA giving an assessment of the way concurrency arrangements have worked in the previous year.

3.2 Companies' and investors' rights and obligations

Regulated infrastructure companies usually operate under the basis of a licence, which is awarded by the regulator. There are some exceptions to this, e.g. in the telecoms sector. The licence is a legally binding document, which sets out undertakers' rights and obligations with regard to providing services and charging users. It is effectively a form of a contract governing companies' activities in a regulated setting.

In most cases, the licence defines the required service levels and the means of providing services to consumers. It also effectively determines a company's market condition given that no one else can provide the same services without a licence. The licence also establishes the basis for calculating the operator's allowed revenue in line with regulatory determinations. In some sectors, the licence itself includes the price or revenue limits set by the regulator as amended at the time of the review.

Special administration and the provider of last resort arrangements

The regulators have set out requirements under certain licence conditions to reduce the risk of financial failure of licensed companies providing essential public services. These requirements include the need to maintain an investment grade credit rating and ring-fencing the activities of the licensed company (see p. 37 for more information on ring-fencing). However, financial and operational shocks could still arise that cause financial distress to a licenced entity.

Where licenced entities do get into financial distress, regulators have additional powers, which can include enforcement action or re-opening of a price control settlement with the aim of mitigating the financial distress when it is in customers' interests. Ultimately, some regulators also have the power to instigate special administration and some regulators can also appoint a provider of last resort in order to ensure the continuous provision of related service to customers.

Special administration enables the appointment of an administrator of the licensed company in the event of financial distress, insolvency or other specific circumstances. The powers are governed by the relevant Acts setting out the regulators' powers and duties. The special administrator would oversee the operation of the licenced entity while it was transferred to new ownership and the governing Acts make provisions that differ from and take precedence over the usual laws governing insolvency. This is to enable continued provision of services to customers while financial and/or ownership restructuring takes place. Financial distress or insolvency of regulated utilities is rare, and special administration powers have been used only occasionally, but they exist as a backstop to protect the interests of customers.

[43] A duty is imposed on each sector regulator to consider whether a more appropriate way of proceeding would be under the Competition Act before using its sector-specific powers. Details of the Enterprise and Regulatory Reform Act 2013 can be found at http://www.legislation.gov.uk/ukpga/2013/24/contents/enacted. Details of the Competition Act 1998 can be found at http://www.legislation.gov.uk/ukpga/1998/41/contents

[44] The CMA's guidance document can be found at https://www.gov.uk/government/publications/guidance-on-concurrent-application-of-competition-law-to-regulated-industries

3.2.1 Conditions of the licence

Licences generally provide a company with the right to carry out regulated activities within a given sector in a specific geography. They typically allow the company to own, construct and maintain assets to provide a service to its customers and sets out the charging methodology and prices that it may charge for doing so.

The licence sets out the scope of the services that must be provided, gives the holder necessary rights to be able to provide them, identifies when the licence applies, sets any limitations on ownership or transfer of ownership and any geographic restrictions that apply to the operations (as well as any other applicable restrictions).

The licence is normally held by a public limited company (plc) or other limited liability company. That company is then the entity that owns the regulated assets and receives the associated revenues. Licences can also be held by a subsidiary of holding companies rather than the listed plc or ultimate parent company or equity investor. Licences themselves tend not to be time bound in the UK, but clauses are usually updated periodically, particularly in line with price control periods.

In general, there are no restrictions on who can own a licence. However, the owner may have to meet certain tests and standards to ensure that they are 'fit and proper', relating, for example, to their ability to finance the licensed activity. Such standards are set out by the regulator before a licence is granted and continue to apply afterwards. As a result, in extreme circumstances the license can be revoked.

Subject to the tests mentioned above, the ownership of the company holding the licence can change hands and a variety of different ownership forms are possible. For example, some water companies are still quoted on the London Stock Exchange following a stock market flotation at privatisation, while most are now privately held. Several companies are 100 percent owned by overseas industrial corporations and some are owned by financial investors, either 100 percent by a single owner or by multiple owners. Financial owners can be pension funds, infrastructure funds and sovereign wealth funds.[45]

Licences for regulated airports have only been introduced recently. Furthermore, Ofcom, the telecommunications regulator, does not issue any licences. Operators in telecoms are instead subject to a 'General Authorisation' regime, set out in the primary legislation.[46] However, this General Authorisation is subject to a set of 'General Conditions'. These conditions apply to all persons providing electronic communications networks and services. Individual providers may be subject to additional conditions, such as SMP conditions (imposed as a result of a finding of Significant Market Power by the regulator), access related conditions or conditions imposed as a consequence of a provider being designated as a universal service provider.

> Stakes in these privately held companies can and do change hands on the secondary market. This demonstrates that, while the content of the licence (and performance against it) is always carefully controlled by the regulators, ownership of the licence itself is only lightly regulated.

In other sectors licences are set geographically. Water companies, for example, have a licence that grants the operator a geographic monopoly for providing the services, although the retail market for non-household customers is opening to competition in April 2017. In other sectors, the licences do not explicitly grant the operator the right to provide services on a geographic basis, but the scope for competitors to enter the market might be otherwise limited. In some sectors, licences might also constrain the extent of competitive market entry. This gives more visibility about the nature of potential competition in the sector.

[45] Further information on ownership structures in the water and wastewater sector can be found on Ofwat's website at http://www.ofwat.gov.uk/industrystructure/ownership/

[46] Further information on the General Authorisation Regime can be found at http://stakeholders.ofcom.org.uk/telecoms/ga-scheme/

3. Regulatory framework (continued)

3.2.2 Licences obligations

Licences set out obligations on the company, which it must adhere to. These may include minimum standards of service, quality of outputs, activities within the regulatory 'ring fence' and the implications of failing to deliver these obligations. There are also obligations in regard to regulatory reporting, which will be likely to include preparing regulatory accounts and other compliance statements at least annually.

An important aspect of infrastructure utilities regulation is the regulatory 'ring-fence' around the licenced business such that assets and revenues of regulated activities are clearly separated from those of non-regulated activities.

Regulators are given powers by the licence to enforce such conditions, and they have powers to impose sanctions such as fines and enforcement orders. Since regulated companies will, by definition, either be monopolies or possess significant market power, and since regulators have a duty to protect consumers of the service, penalties for non-compliance with the licence can be significant.

Regulated companies must also comply with general competition law, notably the Competition Act 1998, EU articles 101 and 102[47], and the Enterprise Act 2002.[48]

3.2.3 Investor rights and expectations

Investors have certain rights that protect their interests. The property rights and contracts can be enforced in courts and the UK legal regimes are generally viewed as one of the most established, independent and transparent in the world. English law is often used as the preferred jurisdiction for commercial transactions more generally.

Sector regulation is also based on a set of fundamental principles, which underpin regulators' obligations and define regulatory best practice. These principles were identified by the Better Regulation Task Force and together with general market practices are discussed in more detail in section 4.

One of these principles, which is of paramount importance to investors, is transparency—the basis for regulations has to be explained and decisions taken only after public consultation, including appropriate explanation and justification. In response to the consultation, all interested parties, including the regulated company, can make representations that need to be considered. Decisions, reasoning and evidence supporting them are made public.

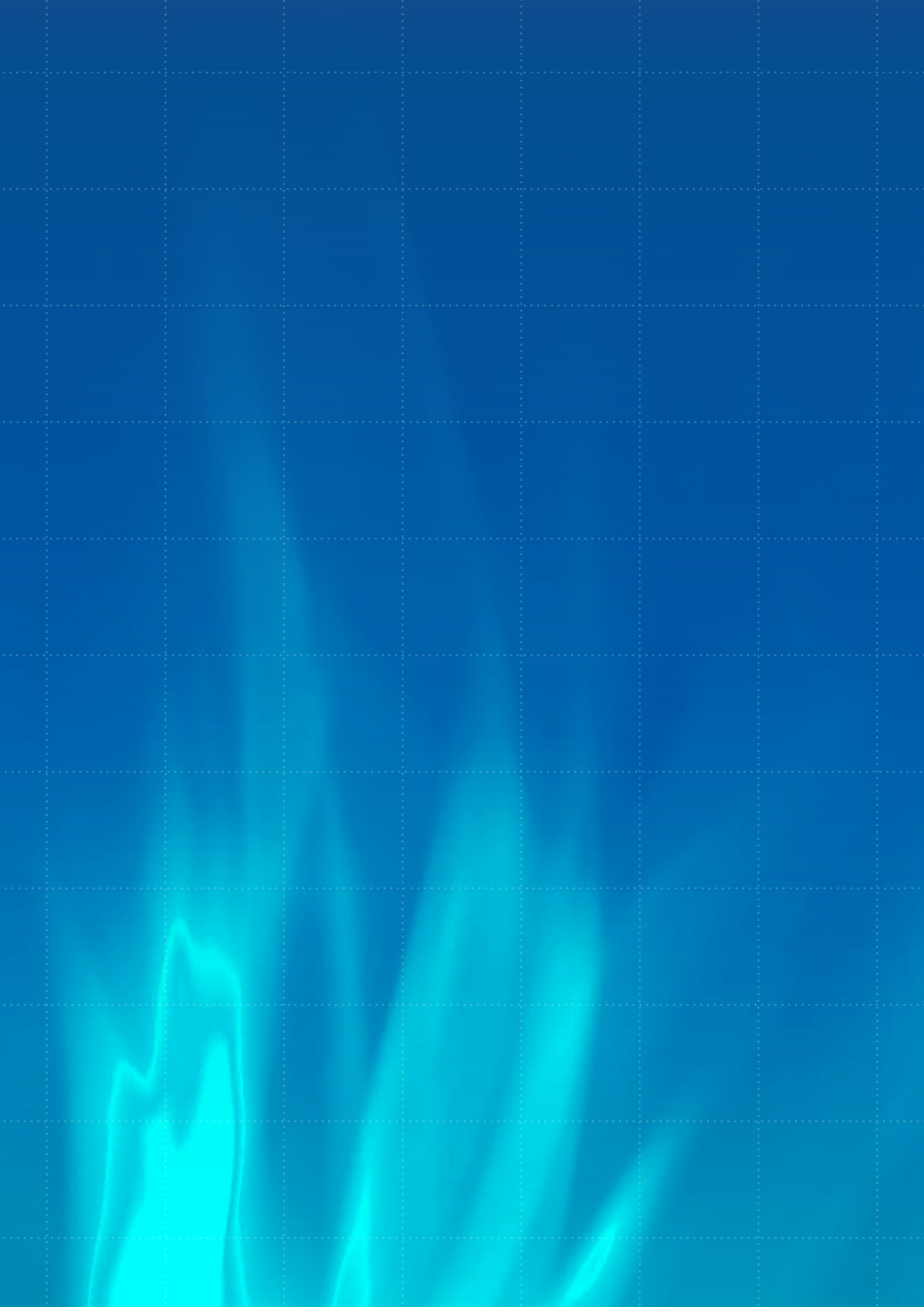
Companies also have rights to appeal important regulatory decisions, such as price controls, 'on merit' (with some exceptions). This means that they can argue to an independent body that the regulator is in error and has incorrectly interpreted the facts of a case or has taken inappropriate action under its duties. Regulated infrastructure companies generally appeal in the first instance to the CMA whereas decisions under the competition powers are appealed to the CAT. The right to appeal is an important safeguard for investors and is usually, though not always, set out in the licence.

[47] Details of EU articles 101-106 can be found at http://ec.europa.eu/competition/antitrust/legislation/articles.html
[48] Details of the Enterprise Act 2002 can be found at http://www.legislation.gov.uk/ukpga/2002/40/contents

Ring-fencing

Ring-fencing of regulated activities is a key feature of the regulatory regime. It is a set of provisions which seek to protect consumers from being exposed to risks, including financial risks, associated with activities that are carried out by other, unregulated activities and entities within the same corporate group as the parent of the infrastructure provider. The regulated entity is required to be separate and distinct from other entities within the corporate group with no cross-subsidisation. The licensed activities and assets sit within the ring fence and cannot be transferred out, nor can non-regulated assets and activities typically be transferred in without regulator's consent.

Regulatory ring-fencing aims to ensure that there is no cross-subsidy from regulated to unregulated activities so that companies' other market activities do not draw undue advantage from the regulated company's market power. This is also designed to protect the licensed activities should the parent company or any of its other subsidiaries become distressed, to ensure that customers benefit from the investments they pay for, and not to allow the regulated activities to confer a competitive advantage to the non-regulated activities. The regulatory ring fence often corresponds to the financial ring-fence, which controls cash flows, assets and activities of regulated entities and their parent companies from the financing and control perspectives.



IN THIS SECTION

- What are the key principles and objectives of infrastructure regulation in the UK?
- What are the key costs/revenues and how does cash flow?
- How are the key economic regulation principles applied in each sector?

4

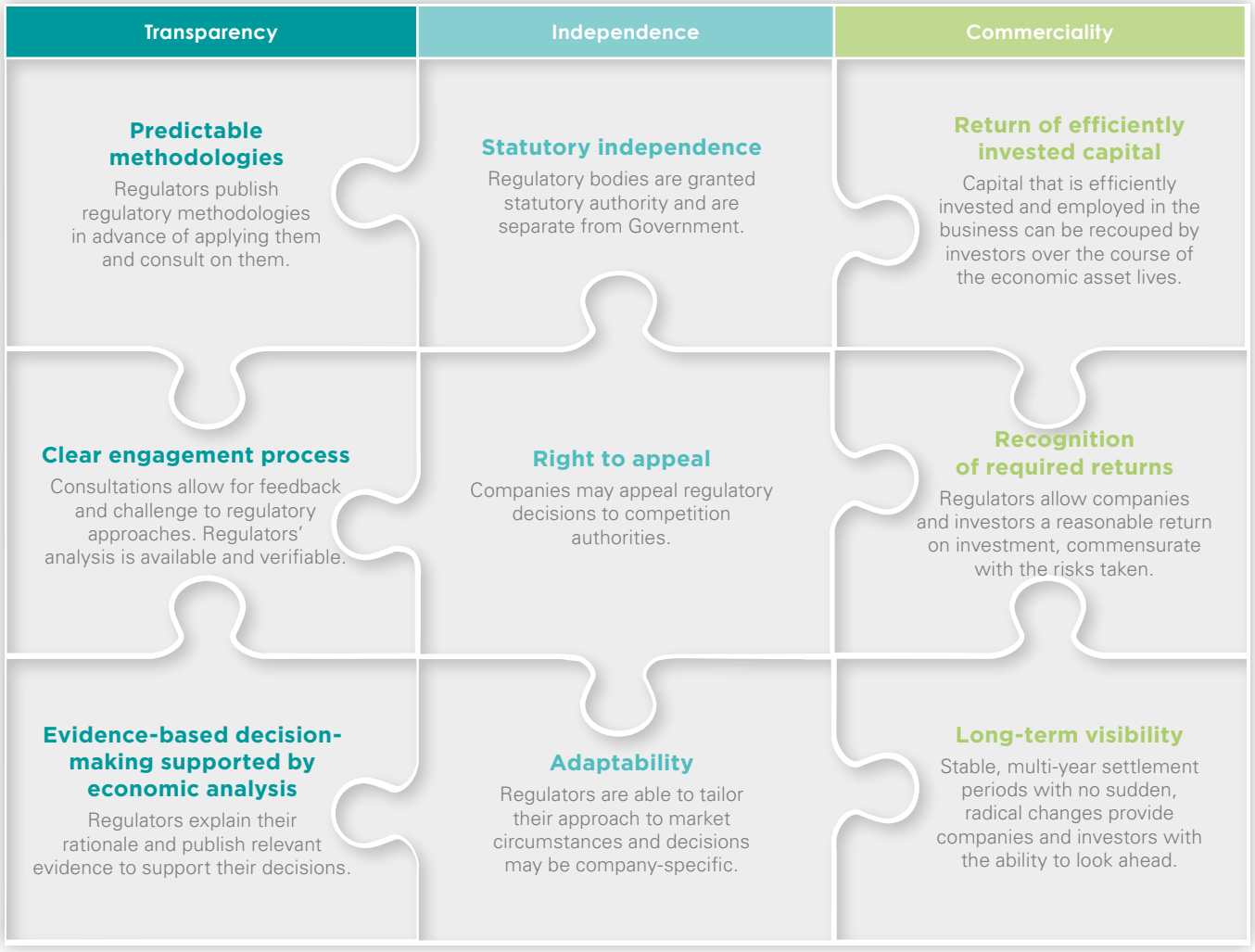
REGULATORY PRACTICE

4. Regulatory practice

The long track-record of applying economic regulation to infrastructure sectors in the UK has resulted in a set of high level principles of regulatory practice, which have been generally followed since privatisation. Some of these principles are explicitly stated but many are also effectively implied by the way in which sector regulators have approached the price and output setting process. They are important because they underpin investors' confidence in regulation and, ultimately, in the infrastructure sectors at large.

Regulatory methodologies and price reviews are applied in practice based on the high level principles mentioned above and discussed in more detail below. The most prevalent, but not exclusive, form of infrastructure regulation can be illustrated using a simple, generic version of the RAB-based approach used to set prices for regulated infrastructure. This includes the basic building-blocks process used for setting allowed revenues and prices. This generic, high level model can then be broken down into its key constituent parts to explain some of the main differences across sectors and what these differences mean for companies and investors in terms of risks and returns.

Figure 8: Selected principles of regulatory practice



4.1 Objectives and principles of UK economic regulation

4.1.1 Consumer protection

The primary role of the regulator is to protect consumers, who in the absence of regulation would bear the costs of market failure, e.g. from excessive prices or from underinvestment. This role can take a number of forms, which vary depending on the nature of the market failure that the regulator has to remedy and hence the type of regulation applied in a given market. For most regulators, this includes the promotion of competition, but competition might not be possible or effective in all markets where companies have significant market power.

In the parts of the value chain where effective competition is possible, regulators try to ensure that markets are least distorted and as competitive as possible. Where there is a need for regulation, this should aim to be least burdensome to avoid additional costs and distortions. This may mean that, for example, some parts of the value chain are deregulated or that smaller companies are not burdened with the same level of regulation as larger ones.

For regulation of natural monopolies, where effective competition might be limited to the supply chain, the regulator's duty of consumer protection is typically discharged through a number of channels related to different companies' activities, to simulate market pressures and ensure economically efficient outcomes. Examples of these channels and corresponding regulatory tools include:

- Cost efficiency: Regulators challenge companies to reduce their overall costs of service, both operational and capital, often through efficiency targets and incentives, with the overall objective of ensuring that consumers receive value for money for the prices that regulated infrastructure service providers are allowed to charge.
- Quality of outputs: Regulators determine the overall quality and robustness of the infrastructure that companies own and use to deliver services to consumers to ensure that it is fit for purpose and affordable. In some sectors this may also relate to security of supply.
- Conduct regulation: Relevant legislation and regulation set out the standards of conduct that govern how companies should behave and the standards of service consumers should expect.

4.1.2 Key features of UK economic regulation

UK regulatory practice is based on a set of fundamental principles, which underpin regulators' obligations and define regulatory best practice. In particular, five such principles were identified by the Better Regulation Task Force in 1997 as the basis for regulatory conduct that is fit for purpose.[49] These include:

- Proportionality: This means that regulators should only intervene when necessary and that this intervention should be proportional and limited to the problem identified in the market.
- Accountability: Regulators should be able to justify decisions and be subject to scrutiny. In practice, this means that regulators' decisions should be explained and verifiable.
- Consistency: The Government rules and standards must be implemented fairly and consistently. This underpins continuity and sets limits on regulatory discretion.
- Transparency: Regulators should be open and keep regulations simple and transparent. This means that regulations must be well understood and clearly explained.
- Targeting: Regulation should be focused on market failure and minimise side effects. This is particularly important because it aims to limit extending regulation to areas where it is unnecessary or too broad compared with the market failure it is trying to address.

The Legislative and Regulatory Reform Act of 2006 was passed to establish statutory principles of good regulation based on the above principles. This Act obliges regulatory authorities to have regard to the above principles and a regulatory code of practice.[50]

A wider set of behaviours or principles of regulatory practice can be also identified, which has emerged over the long track record of applying economic regulation since privatisation. These more granular principles are effectively implied by the way in which sector regulators have approached the price and output setting process for regulated companies and are consistent with the five principles listed above.

These principles include, inter alia, predictability, transparency, engagement, independence, right to appeal, commerciality, and evidence-based decision-making supported by

[49] More detail on the five principles devised by the Better Regulation Task Force can be found at http://webarchive.nationalarchives.gov.uk/20100407162704/http:/archive.cabinetoffice.gov.uk/brc/upload/assets/www.brc.gov.uk/principlesleaflet.pdf

[50] Details of the Legislative and Regulatory Reform Act 2006 can be found at http://www.legislation.gov.uk/ukpga/2006/51/contents

4. Regulatory practice (continued)

appropriate economic and financial analysis. This, in turn, implies consideration by regulators of the terms on which the private sector would commit capital while ensuring no abnormal returns.

These wider principles that can be observed in regulatory practice are not all hard coded or legally binding, but have been generally followed by UK regulators since privatisation. This consistency in the approach to regulation plays the crucial role in establishing investor confidence and underpin the successes of regulated sectors in attracting private capital and delivering strong outputs for consumers.

Many of these principles have now been adopted in other jurisdictions. However, since the UK has played a central role in the development and first application of these principles as well as of the detailed regulatory methodologies based on them, it is considered one of the most mature markets for regulated infrastructure.

Although there is no binding commitment by regulators for any particular form of regulation or regulatory practice to continue in the future, the generally consistent application of these principles over the past 20 years has distinguished the UK as a leader in terms of visibility, transparency and consistency in applying regulation. Its continuation is likely to be critical to ensure private sector participation and hence give customers the benefits of private ownership and management in the future.

While these high level principles have been generally followed by regulators, it should be also recognised that regulatory practice differs by sector and over time. There is also no uniform view as to how some of these principles, e.g. the required return on capital, should be reflected at any particular point in time. This means that, from the investor perspective, there is always an element of underlying risk.

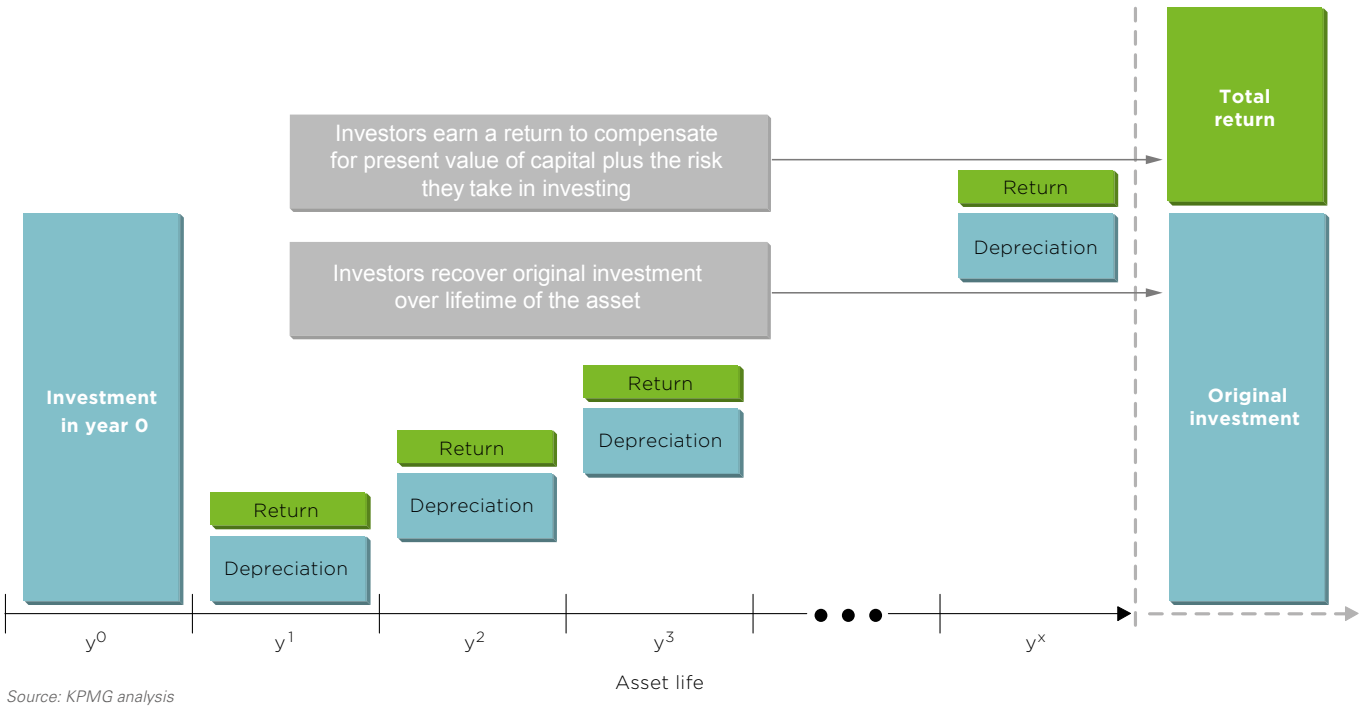
4.1.3 Incentives-based regulation

A key feature of economic regulation of utilities infrastructure in the UK is the presence of financial incentive mechanisms, the aim of which is to encourage companies to adopt behaviours that maximise benefits to consumers.

It is also intended to help promote symmetry of information, i.e. to incentivise companies accurately to communicate costs to regulators.

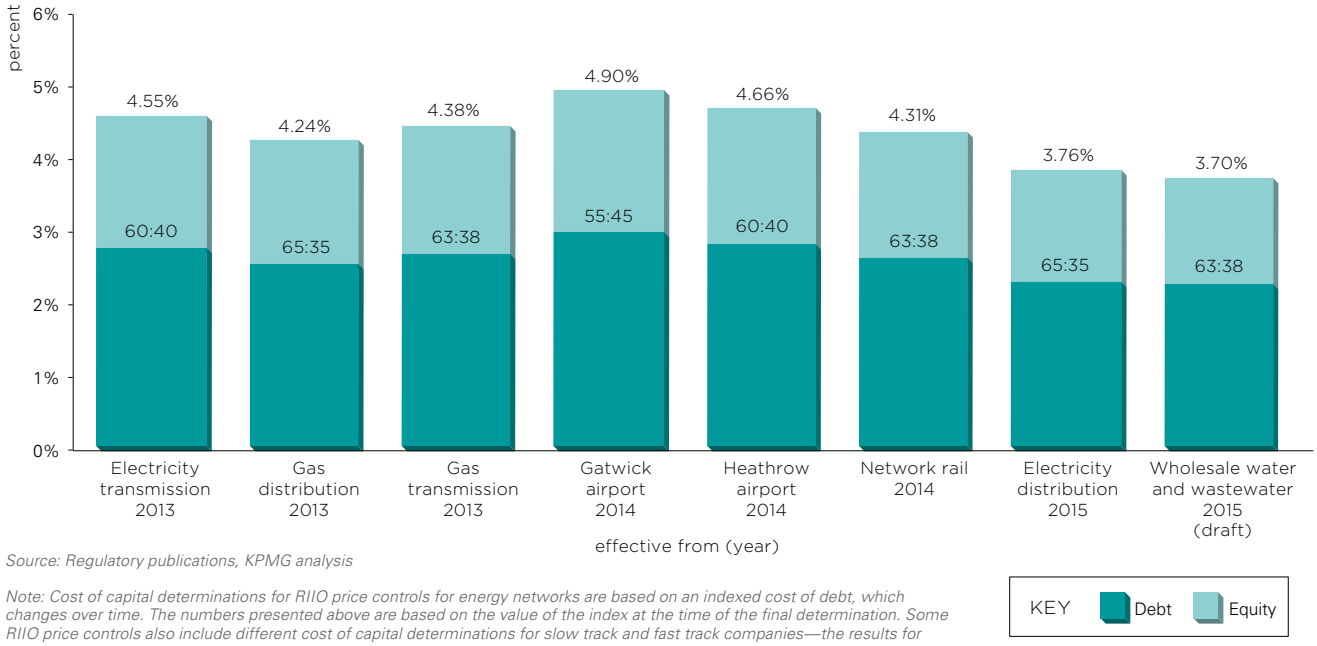
The way this works in practice is that if, for example, companies outperform their underlying cost targets used to set

Figure 9: Recovery of asset costs plus an allowed return under the generic revenue 'building blocks' model



Source: KPMG analysis

Figure 10: Real weighted average costs of capital (excluding tax allowance) and notional gearing levels set at the most recent price determination for the aviation, energy, rail and water sectors



Source: Regulatory publications, KPMG analysis

Note: Cost of capital determinations for RIIO price controls for energy networks are based on an indexed cost of debt, which changes over time. The numbers presented above are based on the value of the index at the time of the final determination. Some RIIO price controls also include different cost of capital determinations for slow track and fast track companies—the results for slow track companies are presented above. For water and wastewater the presented number is based on Wholesale Water and Wastewater only (excluding Retail) at the time of the Draft Determination.

regulated revenues and prices, they can keep at least some of the gains from outperformance. There may be also time limits on this retention and typically there are mechanisms in place to share gains with consumers. This information can also be used to benchmark costs across companies.

Alongside economic regulators, other agencies are responsible for approving companies' specific competencies required to undertake their duties, for example, health and safety and environmental standards. In some cases, the economic regulators are also the safety regulators. The cost of meeting these requirements may be taken into account by the economic regulator in setting price limits.

In general, it should be clear which risks are to be borne by the company and which by consumers, with companies bearing those risks that they are best placed to manage. In practice, not every possibility can be accounted for. For example, in the energy sector, the Health and Safety Executive (HSE) determined that all cast iron gas mains close to domestic properties should be replaced with plastic over a 30 year period, which was allowed for in the costs of the relevant regulated companies.

> Some risks may be shared between companies and consumers, for example via the so-called 'uncertainty mechanisms' where certain outcomes of the regulatory review are subject to future market developments. Companies may also be able to earn additional revenue for improving service standards through incentive mechanisms.

To ensure full transparency, under best regulatory practice, all regulatory mechanisms to be implemented are communicated and consulted with companies in advance. The UK regulators also tend to avoid clawing-back gains retrospectively and changing rules ex post because it may be seen as weakening incentives for enhancing efficiency and performance. This approach has been supported and reflected by the competition authorities' decisions in the course of appeals of regulatory decisions.

Regulators conduct public consultations prior to making their decisions. The

approaches and evidence supporting regulatory determinations are made available for public analysis. Interested parties can assess a regulator's approach and respond to consultations and/or take part in stakeholder workshops to discuss their views with the regulator. The regulatory process and approach, therefore, tends to be open and transparent.

4.1.4 Principles of returns of and on invested capital

Most regulators have a duty to ensure efficient companies can finance their licensed activities. This duty tends to be discharged through the allowance for a return of and a return on efficiently invested capital alongside the recovery of efficiently incurred costs from end users (as opposed to taxpayers).

This approach implies there should be no 'revenue gap' between efficiently incurred costs and the allowed revenue (which is not the case in all other jurisdictions where similar type of regulation is applied).[51] However, timing differences and adjustments through regulatory mechanisms linked to performance as well as discrepancies between projections and outturn inflation, or other economic factors, mean that they would not necessarily equalise at all times.

For the avoidance of doubt, the rest of this section describes a generalised model and not all facets of which apply to all sectors. This is particularly the case for telecoms.

Allowed returns

Typically, the calculation of returns on the capital employed over a given period is based on the returns on net capital at the beginning of the period adjusted periodically downwards for allowed depreciation (which is recovered through prices) and upwards by capital expenditure funded by investors. This is not the only possible approach but is most common.

What this means for regulated infrastructure is that the regime allows for the efficient capital spent during that period to be recovered over time and a return earned on the capital employed during the period. This is illustrated in Figure 9 on page 42.

The amount of capital invested in the business might be set explicitly or as a proportion of the total allowed expenditure (totex, which combines capital and operational expenditure as explained further below) that should be capitalised rather than charged to consumers in a given year.

The capital invested in the business is typically remunerated at the allowed rate of return. This reflects acknowledgment of the fact that capital comes at a price and requires a return, which is recognised by all regulators.

This rate of return is typically set as a constant for a regulatory period, although in some cases recently (e.g. in energy networks) regulators have introduced annual cost of capital indexation, which updates some components of the cost of capital (the allowed cost of debt in this case) annually over the course of the regulatory period. Figure 10 sets out the current allowed real rates of return on capital and notional gearing levels for each of the sector regimes.

The rates of return are calculated in real terms, but investors are allowed a nominal return. The inflation component of the total return is typically estimated and recovered separately by applying inflation adjustment to the asset base. It is usually recovered through the allowed depreciation, i.e. the capital repayment part of the total allowed revenues. In practice, this means that the remuneration of the inflation component of the total return is delayed compared with the real component.

The allowed returns presented in Figure 9 are post-tax, 'vanilla' returns, i.e. they exclude an allowance for tax, which the company is assumed to have to pay on its returns to equity only and which is estimated separately and included into the total allowed revenues. The allowed 'vanilla' WACC means that there is no additional revenue allowance for the hypothetical tax payments on debt that can then be saved using debt tax shields, unless there is a difference between actual gearing and one used for estimating the tax allowance.

While it is most common, the generic approach described above is not universal, with other forms of price regulation such as, for example, allowance for average cost plus a margin, applied in some segments of the value chain in certain sectors. The specific approach to the calculation of allowed revenues varies across regimes and is discussed in more detail in sections 4.3 to 4.7.

Cost recovery

From the regulatory perspective, in order to determine prices, companies must estimate their future costs at the start of each regulatory period and calculate the revenue they will require during that period to recover their costs. In simple terms, using an estimate for demand volumes (e.g. energy consumption, number of passengers, etc.), the company is then able to calculate the required price per unit.

This approach means that at the beginning of each regulatory period the regulated companies submit their business and financial plans to the regulator, which then assesses the proposals provided by the company,

[51] Rail is the exception to this general rule, as the costs are not fully recovered from end users, but are partly subsidised by the State. This is discussed further in section 4.3.3.

in conjunction with its own evidence and analysis, in order to determine the allowed price or revenue levels.

The concept of allowed costs is a key element of regulated revenues and price limits. Regulators pay close attention to the costs projected by each regulated company. The approach to the regulatory cost assessment varies across regimes, but regulators generally use a range of benchmarking and 'yard-stick' assessments, comparing company business plans against one another (with companies both inside and outside of the sector), over time and across sectors to test companies' projections against benchmarks. They also use independent third party estimates and analysis while companies submit their own evidence and justification to support their projections. The analysis and determinations are generally evidence-based.

In determining allowed costs that can be recovered from customers, regulators take into account year-on-year efficiencies that companies are assumed to be able to achieve. In line with the principles of incentive regulation, if companies are able to outperform assumed efficiencies, they keep at least some of the difference.

These are the central features of many regulatory regimes for regulated infrastructure and are particularly important for attracting long-term investors, who are willing to put capital at risk over the lifetime of the assets.

4.2 Regulated cash flows and revenue building blocks

This section provides a simplified, high level illustration of how the allowed revenue for a generic regulated infrastructure company is built up.

- Revenues: Typically, the regulatory approach is based on a revenue cap rather than a price cap. This means that the regulated infrastructure company does not bear volumetric risk. If volumes are lower or higher than forecast and revenues are therefore over or under recovered, these are "trued-up" in subsequent years to recover or repay the difference, though as part of their determinations regulators may consider the extent to which companies should bear the risk associated with inaccurate volume forecasts.

  Revenues are collected from consumers typically through a combination of a fixed and volumetric charge. Consumers can be end users such as residential bill payers or industrial and commercial customers.

  In most sectors, all revenues come from these charges. For example, there is generally very little government subsidisation, and the 'user pays' principle is adopted in most of the sectors in the UK.

  Historically, some regulators have used the 'RPI-X' approach to revenue setting, whereby revenues are linked to RPI inflation, less the expected savings from efficiency gains.

- Building-blocks: To determine the level of allowed revenues that the regulated company can earn, regulators consider projected costs for the regulated company over the coming regulatory period. The costs are known as the 'building-blocks' of the allowed revenue and include:

  – Depreciation: the recovery of capital investment spread over the lifetime of the assets;

  – An operational allowance: to fund the costs of carrying out the regulated activities including asset construction, asset maintenance and operating costs; and

  – A return on asset value: to remunerate investors for providing the capital to construct the assets.

- Costs: It is generally recognised that efficiently incurred costs should be recovered. Allowed costs that can be recovered from consumers are determined by regulators using a combination of benchmarks from other companies in the sector and from other sectors. Operating cost allowances are based on an expectation of efficiency savings each year. The depreciation allowance is normally based on economic asset lives.

  Some regulators are moving away from the distinction between capital expenditure and operational expenditure, focusing instead on total costs (totex) and allocating a fixed percentage of this spend to be capitalised in the asset base, with the remainder being treated as an in year allowance.

  Cost allowances typically include a forward-looking view of the effect of inflation, and some regulators break down costs into separate buckets and provide a different inflation assumption for different cost elements.

  Cost allowances also typically include an efficiency assumption, such that companies are incentivised to reduce costs to at least this level. Companies are generally able to retain at least a proportion of any gains beyond this assumed efficiency level.

- Returns: There is a recognition that companies and investors need to earn a reasonable return on their capital for operating a well-run company, i.e. a return that reflects the risk they

are bearing. There is potential for out- and under-performance through cost savings, normally operational, but sometimes also on efficient capital expenditure. Outturn profits can also be increased or decreased through incentive mechanisms. In most cases, customers also share the benefits and risks of out- and under-performance. There is also recognition that shareholders expect dividends to be paid from the allowed returns.

- Interest: There is a recognition of the importance of ensuring companies can support future investment needs, and therefore that companies should maintain an investment-grade credit-rating and be financeable. The cost of capital allowance is based on an assumption that the company is efficient and maintains an investment grade credit rating on the basis of an assumed notional capital structure, which should be clearly achievable in the current market conditions.
- Tax: It is recognised that companies have to recover from consumers the amounts of tax they have to pay to the state. Tax allowances are generally calculated either to approximate the actual tax costs or on a notional basis through an uplift to the allowed return.
- Reinvestment: There is a general expectation that a combination of retained earnings and new capital will be used by companies to fund new investments. In order to ensure that companies can raise new capital and hence fund new capital expenditure there is a requirement on most companies to maintain a secure investment grade credit rating.

4.3 Sector-specific regulations

The generic cash flow model described above varies in certain respects between different sectors and even sub-sectors. Revenue building-blocks and risk mechanisms will differ on the basis of sector-specific circumstances, for example whether there are separate wholesale and retail markets, or the extent to which the infrastructure is vulnerable to service disruptions. The following sections revisit the generic cash flow model in relation to each regulated infrastructure sector and explain the key differences between each regime in terms of structure, regulatory approach and risk and reward in more detail.

While the fine details of each cash flow model will vary depending on the sector, the objective of this section is to highlight the key considerations and distinctions rather than exhaustively describe all elements of regulation.

4.4 Aviation

4.4.1 Industry structure

Airports and the air traffic control system constitute the infrastructure-heavy parts of the aviation sector, which is, in some parts, subject to economic regulation.

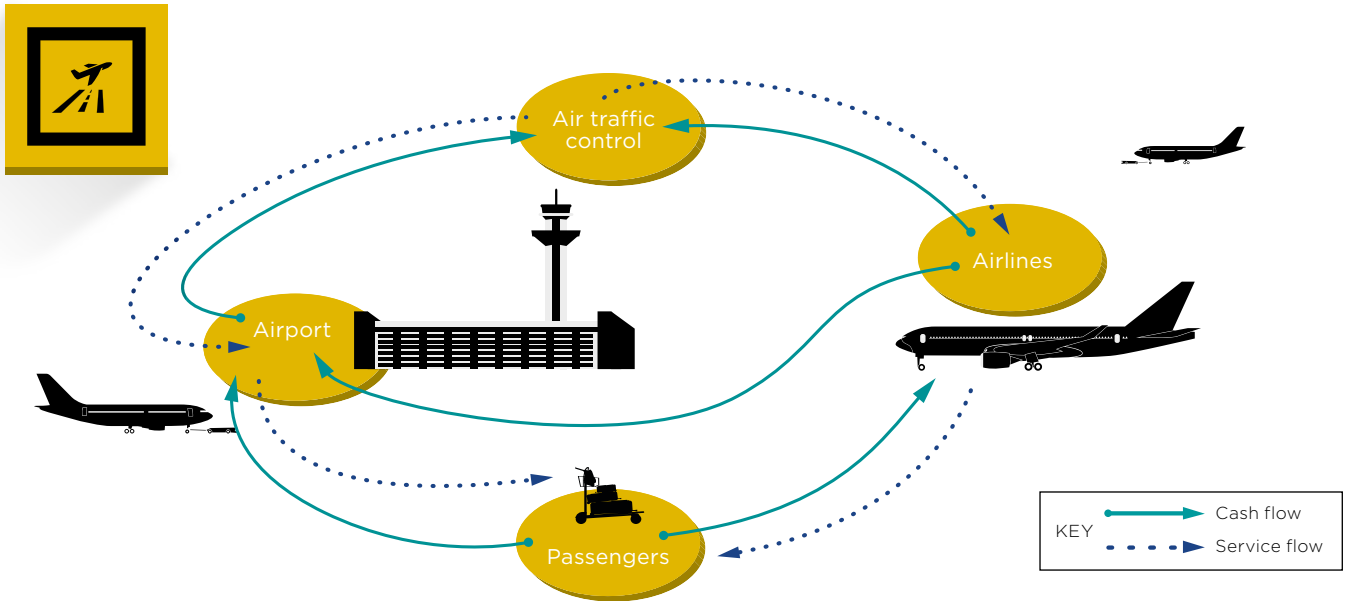
The UK has a large number of airports that are used for operating commercial passenger flights relative to its population.[52] As a result, in certain geographical areas, many airports are in relatively close proximity to each other and a high proportion of the population in that area can reach at least one major airport within a reasonable time.[53] About 70 percent of the UK population are within one hour's reach of at least one airport, while about 75 percent of the UK population can reach three or more airports within two hours' drive time.[54]

This availability and proximity of multiple airports for large parts of the population might be taken to imply a high degree of choice for airport users and hence effective competition without the need for economic regulation. However, in practice, not all airports offer the same services and some services require scale or other business characteristics to be economically viable. These services can include long-haul travel, connectivity (including whether the airport acts as a hub) and a choice of destinations, and tend to be concentrated in a smaller number of relatively large airports. Thus, concentration and specialisation can give rise to market power and consequently the need for regulation.

The location of airports relative to population centres and the quality of the surface access, particularly around London, can also affect airports' market position. However, the aviation sector is dynamic and the use of airport infrastructure can change over time, as evidenced by the rise of the low cost carrier airline model, global airline alliances, or new international routes and hubs. It is this tension between certain monopoly characteristics on the one hand, and the choice available to consumers on the other hand, which is one of the key distinguishing features of airports compared with other infrastructure sectors.

[52] Statistics on UK airports can be found on the CAA's website at http://www.caa.co.uk/default.aspx?catid=80&pagetype=88&pageid=3&sglid=3
[53] A major airport is defined as one with more than one million passengers per year.
[54] CAA estimate, see http://www.caa.co.uk/docs/5/20110905%20Market%20Context-FINAL.pdf for more information.

Figure 11: Airport money/service flow



4.4.2 Legislation, regulation and licences

Regulatory framework for airports

The regulatory framework for UK airports is set out primarily in the Civil Aviation Act 2012.[55] Any airport with over five million passengers per annum is also subject to regulation via the Airport Charges Directive 2009/12/EC, which was transposed into UK law as the Airport Charging Regulation 2011.[56] This sets out rules with regards to the setting of charges for airport infrastructure and is designed to ensure a consistent approach to charging across the single market. The CAA also has regulation powers under the Airports (Ground-handling) Regulations 1997[57], which implemented the Ground-handling Directive 1996/67/EC on access to the ground handling market at EU airports.

The framework for licensing and regulating airport services has recently been reviewed and a number of amendments enacted. In particular, The Civil Aviation Act 2012 set out a new system of airport regulation. This in turn meant that the CAA's economic regulation powers for the non-designated airports in England, Scotland and Wales under the previous 1986 Act ceased from 6 April 2013 and its powers under the 1986 Act for the designated airports of Heathrow, Gatwick and Stansted ceased from 1 April 2014.

Under the Civil Aviation Act 2012, decisions are taken by the CAA against specified criteria to ensure that airports are only subject to economic regulation where certain criteria are met, including criteria around market power and that the benefits of regulation outweigh the costs.

Following the new market structure, the CAA undertook market power tests of Heathrow, Gatwick and Stansted airports and concluded that Heathrow and Gatwick met the market power tests.[58] The CAA found that Stansted should not be subject to economic regulation from 2014 onwards, i.e. charges at Stansted Airport for passenger and cargo traffic are no longer determined by the regulator.

Licences

The introduction of licences for designated (i.e. regulated) airports was a significant feature of the 2012 legislation, giving CAA a powerful regulatory tool that also enabled greater flexibility in the approach to economic regulation. Previously, airports constituted the only regulated infrastructure sector where licences did not apply and the market regime was based on primary legislation. The introduction of licences

[55] Details of the Act can be found at http://www.legislation.gov.uk/ukpga/2012/19/contents/enacted
[56] Information on the Airport Charges Regulations 2011 can be found on the CAA's website at http://www.caa.co.uk/default.aspx?catid=5&pageid=14467
[57] See http://www.caa.co.uk/default.aspx??catid=78&pagetype=90&pageid=69 for more information.
[58] Sections 5 to 8 of the Civil Aviation Act 2012

brought the sector more closely in line with other regulated industries. Under new legislation CAA was able to adopt a more appropriate regulatory regime for Gatwick, where, instead of the CAA imposing a price cap, the airport undertakes certain commitments and prices are monitored against a 'fair price', with the intention that the CAA will intervene if required. The effect is that, in general terms, the regime still protects consumers, but offers some additional flexibility in detail.

Air navigation services

The provision of en route Air Navigation Services (ANS) in UK airspace has been subject to economic regulation, including fixed control period price controls, since the privatisation of National Air Traffic Services in 2001. These services are provided by NATS En Route plc (NERL) under a licence issued by the Government under the Transport Act 2000, which gives effect to economic regulation.[59]

The licence is monitored and enforced by the CAA as the economic regulator. Economic regulation of ANS in UK and Europe has become increasingly governed by EU legislation under the Single European Sky (SES) Performance Scheme[60], which is the EU-led initiative to improve the performance of ANS. Terminal air navigation services are also subject to the SES performance scheme. However, they are currently exempt from domestic licence based regulation under Air Traffic Service (Exemption) Order 2011 (SI 2011/425) until at least 31 December 2019.

4.4.3 Regulation in practice and risk & reward

The key features of the economic regulation of airports that make it distinct from the other UK regulated sectors include:

- Airports undertaking both competitive and commercial non-core activities as well as core aeronautical services;
- Traditionally a price cap regime rather than a revenue cap, i.e. demand risk is borne by the airport; and
- An increased role for airport users.

4.4.3.1 Single till regulation

Under the 'single till' principle, the full range of airport activities (aeronautical and commercial) are taken into consideration to determine the level of airport charges. By contrast, only aeronautical activities are taken into consideration under the dual till principle. This means that the single till deducts non-regulated net revenues from the total regulated revenue requirement whereas the dual till separates the regulated and non-regulated businesses and sets a price cap for the regulated business without consideration for the non-regulated business.

The issue of single till regulation is keenly debated wherever economic regulation of airports is in place and is not universally applied. Single till is the more common regulatory approach globally, however and notable dual till examples include Schipol Airport (Amsterdam) and Sydney Airport, and there are examples of emerging hybrid approaches including Paris-Orly and Brussels Airport. The CAA looked at this issue in detail as part of the Q4 price control review and found in favour of maintaining a single till approach, on the grounds that a single till recognises the demand and revenue complementarities between aeronautical and non-aeronautical services, and is more similar to what emerges from the natural working of competition at non-regulated airports.[61]

4.4.3.2 Price cap versus revenue cap

Most UK regulatory settlements are 'revenue caps' rather than 'price caps'. That is, an overall level of revenue is determined and divided by forecast volume / passenger levels to determine a user charge. Should actual volumes not match forecast levels, there is a provision for adjustments to be made to subsequent revenues. Under a price cap, there is no such provision for a correcting factor and revenues move up or down with volumes , as mentioned in section 4.2. Conceptually, the key difference between the two models is the level of volume or demand risk to which the regulated company is exposed. Under a revenue cap the company faces little demand risk due to the correcting catch up factor, whereas under a price cap the company does face demand risk.

Consistent with the partial competition that exists in the airport sector, the CAA implements a price cap for the designated airports, exposing airports to the demand risk.[62] This additional level of risk is reflected elsewhere in the regularly model, namely in the allowed cost of equity feeding into the allowed WACC.

[59] Information on NERL's licence to provide regulated en route ANS can be found on CAA's website at http://www.caa.co.uk/default.aspx?catid=5&pagetype=90&pageid=585

[60] Further information available at https://www.eurocontrol.int/articles/performance-scheme-single-european-sky

[61] CAA further concluded that the incentives acting upon the airport were generally more focussed on positive consumer aeronautical outcomes in the areas of investment, operating efficiency and service standards and that prices could be expected to be lower under a single till.

[62] While there is no explicit passenger volume correction factor in the airport revenue model there is a passenger mix correction factor to protect airports from airline decisions outside the airport's control.

4.4.3.3 *Single European Sky Performance Plan*

The SES Performance Scheme for Air Navigation Services (ANS) aims to improve the performance of European ANS by establishing targets at the EU-level and committing Member States to adopt consistent targets at the local (national or Functional Airspace Block (FAB) level. The Scheme was introduced through amendment to the SES high-level legislation (SES II), supplemented through the adoption of a Performance Regulation and amendment to the Common Charging Regulation in 2010.[63]

The EC appointed Eurocontrol to act as an independent Performance Review Body (PRB) and to advise it on the development and implementation of the Scheme.[64] There are four Key Performance Areas (KPAs): safety; the environment; capacity (delay); and cost-efficiency. Reference Period 1 (RP1, 2012-2014) of the Performance Scheme focuses on the en route environment only and sets EU-wide targets for the environment, capacity and cost-efficiency KPAs, with national/FAB targets only required for the latter two - the environment target will be addressed at the network level for RP1.

4.4.3.4 *Constructive engagement*

A key feature of the application of the regulatory model in airports is the degree of airport/airline engagement in shaping and informing the outcome of the price control reviews. This is referred to as 'constructive engagement' (CE) in the airports context. CE was first introduced as part of the previous Q5 price control and was extended for the current Q6 control. The output of CE is intended to be a clear statement of agreement and disagreement between the airport and its airlines around key inputs into the CAA determination.

CE is not intended to displace the CAA but does allow the regulator to step back from the process. Where the CAA believes airport / airline agreed outcomes are in the best interest of passengers, it takes more of an oversight role. Notable elements of CE include:

- It is a multilateral approach intended to apply with an independent facilitator;
- It is not a series of bilateral commercial agreements; and
- Discussions should include issues beyond the regulatory building-blocks, including strategic context and affordability.

Aside from constructive engagement, the increased role of users in setting outcomes is also evidenced in bilateral contracts that have played a key role, particularly at Gatwick.

4.5 Energy

4.5.1 Industry structure

The gas and electricity sectors in Great Britain are characterised by a number of private sector companies providing the services of generation, transmission and distribution (i.e. network services) and retailing (i.e. supply and sales of energy to end users. Private sector ownership in the sector is largely the result of a privatisation process that took place more than 20 years ago and had been followed by extensive corporate activity, including multiple changes of ownership and some consolidation.

There is a diverse range of companies involved in upstream activities (i.e. gas wholesale and electricity generation), which are responsible for the wholesale of energy through markets or through bilateral contract arrangements. Many of the companies present are major international corporations with multiple investments in the UK, others are independent power producers. In GB, the tariffs paid by consumers for electricity and gas are not subject to price regulation, but are determined by the market.

The infrastructure-heavy part of the value chain consists of a number of gas and electricity network businesses. The gas transmission network is owned by National Grid, and the gas distribution networks are owned and operated by a number of gas distribution network companies (GDNs), which are licensed to deliver the services over specified geographical areas. Electricity transmission and distribution are also undertaken on a regional basis. Electricity distribution companies are known as distribution network operators (DNOs).

In recent years, there has been a growth in smaller companies with network licences for providing particular small regions (for example industrial developments) with gas and electricity distribution services. The providers of such services are known as independent gas transporters (IGTs) in gas, and independent distribution network operators (IDNOs) in electricity.[65]

4.5.2 Legislation, regulation and licences

The main body with responsibility for regulation of the energy sector in GB is Ofgem. Ofgem is the Office of Gas and Electricity Markets.

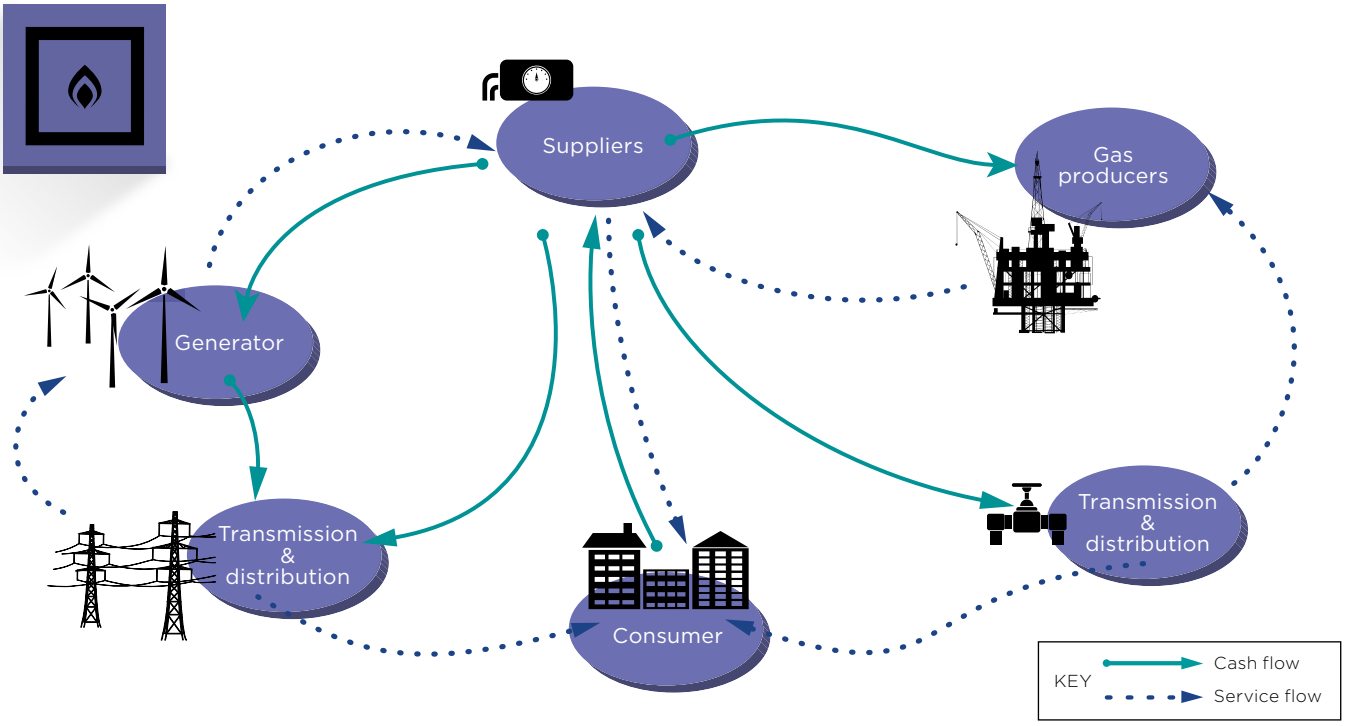
[63] Further information on the CAA's implementation of the SES Performance Scheme for ANS can be found at http://www.caa.co.uk/default.aspx?pageid=11579

[64] Further information regarding Eurocontrol's role in the Single European Sky initiative can be found on the Eurocontrol website at https://www.eurocontrol.int/single-sky

[65] See Ofgem's website for more information on IGTs at https://www.ofgem.gov.uk/gas/distribution-networks/connections-and-competition/independent-gas-transporters, and https://www.ofgem.gov.uk/electricity/distribution-networks/connections-and-competition/independent-distribution-network-operators for more information on IDNOs.

4. Regulatory practice (continued)

Figure 12: Energy money/service flow



Ofgem is governed by the Gas and Electricity Markets Authority (GEMA). The Authority determines strategy, sets policy priorities and makes decisions on a wide range of regulatory matters, including price controls and enforcement. The Authority's powers are mainly provided for in legislation including the Gas Act 1986, the Electricity Act 1989, the Utilities Act 2000, the Competition Act 1998, the Enterprise Act 2002 and the Energy Act 2004, the Energy Act 2008 and the Energy Act 2010. They also arise directly from EC legislation.[66]

Ofgem is responsible for issuing licences to operators in the sector. There is a range of licences Ofgem awards depending upon whether the market participant is involved in gas or electricity, and which part of the value chain they are involved in (for example, there are separate electricity generation, transmission, distribution and retail licences). The ability of a participant to be awarded multiple licences is also subject to EU ownership unbundling requirements, whereby holdings in generation and retail assets must be separated from those in transmission assets.

Outside of the regulated network businesses, Ofgem has market oversight and investigative powers to monitor the competitiveness of the wholesale and retail energy markets. In recent years, the energy regulator has introduced multiple licence modifications to promote the fair treatment of customers by the energy retailers through the promotion of standards of conduct in how the supply companies interact with customers.

In 2014, following a market assessment, a report by Ofgem and OFT deemed that competition was not working as well as it should for consumers. As a result, Ofgem referred the energy market to the CMA for market investigation. The focus of the CMA's market enquiry is on retail and wholesale parts of the value chain rather than networks but the outcome of the investigation is likely to have implications for the entire sector. The CMA is expected to publish its final decisions by the end of 2015.

[66] For more information on the role of GEMA, see https://www.ofgem.gov.uk/about-us/who-we-are/gas-and-electricity-markets-authority. Further detail on the powers and duties of GEMA can be found at https://www.ofgem.gov.uk/publications-and-updates/powers-and-duties-gema

4.5.3 Regulation in practice and risk & reward

The gas and electricity transmission and distribution licensees are regulated under Ofgem's RIIO model (Revenues = Incentives, Innovation and Outputs), which has been introduced recently and is now applied to the regulation of all energy networks.

At the core of the RIIO model are the general principles of efficient cost recovery, incentives and return of and on efficiently invested capital, as described in Section 4.2. However, there are also other features of the RIIO model that provide companies with additional incentives. In particular, key aspects of the RIIO model include:

- Longer regulatory periods than in other price controls in regulated sectors and what was formerly the case in the energy sector – RIIO price settlements are in place for an eight-year period. This offers companies with significant programmes of investment in networks greater visibility and time to plan, procure and deliver major projects.
- Fast tracking through the regulatory process: At the time of the price setting process, companies are required to prepare business plans to justify the prices they would charge customers for the forthcoming regulatory period. As an incentive for companies to produce high quality business plans as inputs into the regulatory process, Ofgem has created the fast tracking regulatory approach: If Ofgem assesses a given business plan to be of high quality based on its initial review, the company is subject to no further regulatory scrutiny and is put in the fast-track to finalise their price controls and receive a number of incentive benefits.
- A greater role for customers in setting targets: Customers have been more involved in the business planning process as regulated companies have been responsible for extensive customer consultation on their business plans and price review submissions. Where the regulator has seen a clear case made for expenditure in a business plan that is both efficient and required by customers, these costs should generally be included in the resulting regulatory allowance.
- Outputs: RIIO price controls also specify a set of outputs the company must deliver over the eight-year period. Outputs tend to take the form of service delivery commitments, for example around the level and duration of customer outages on the networks or secondary outputs around asset condition levels.
- Incentives: Incentives are typically based on delivering outperformance on agreed targets, whether in terms of cost reduction or enhanced quality for customers. Many of the incentives include upsides and downsides. Well-run companies have the potential to enhance returns by delivering on incentives. If companies do not deliver the agreed outputs, outturn returns may be lower than expected.

As part of RIIO, Ofgem has put in place mechanisms to allow transmission network owners to bring forward large investment where the cost of the projects was not included the price control settlement. This is known as the Strategic Wider Works (or SWW) mechanism, with the Caithness Moray transmission project in Scotland being one recent example.[67]

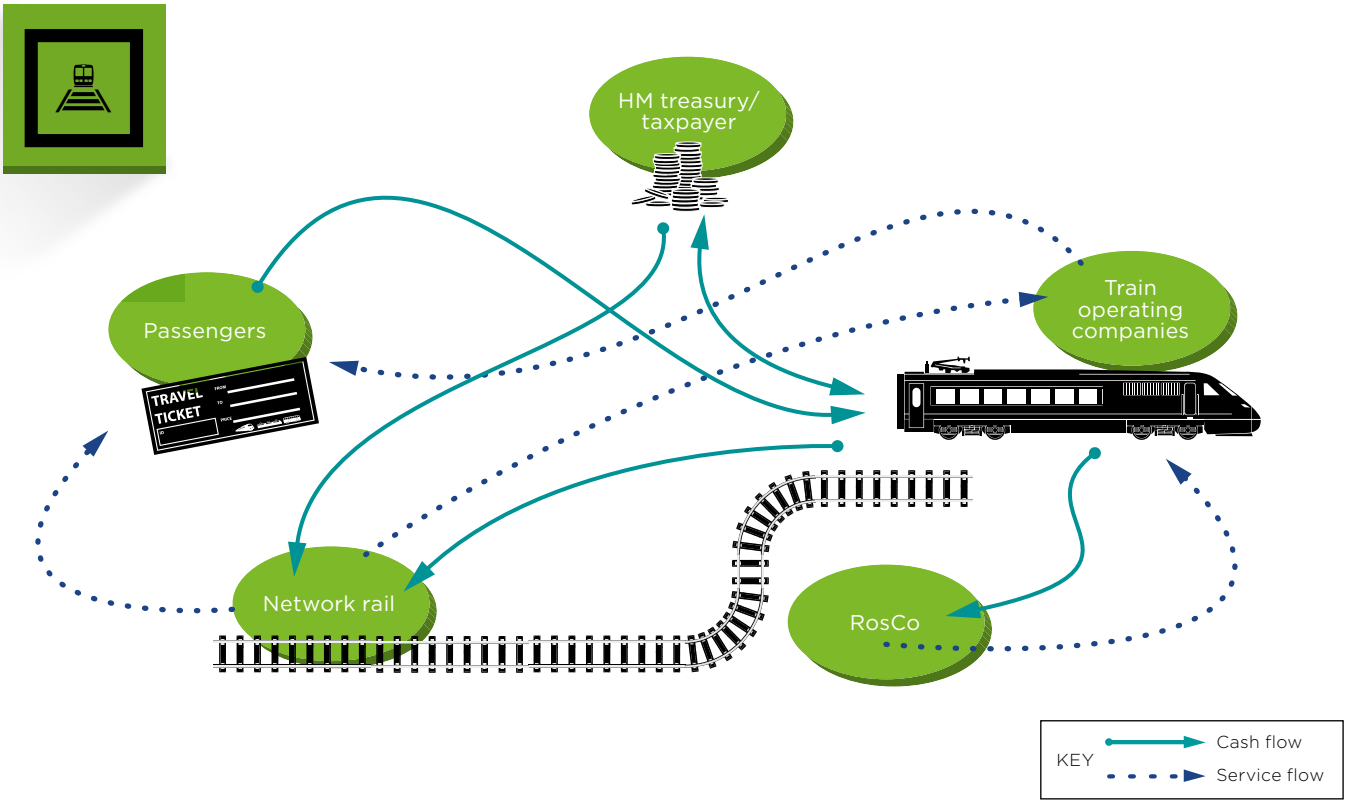
As well as regulating the incumbent network companies via the RIIO framework, Ofgem also oversees regulation of OFTOs and interconnectors. For OFTOs, the competitive tender process sees bidders compete for a regulated availability-based revenue stream over the life of the asset.[68] For interconnectors, Ofgem has introduced a "Cap and Floor" regime for new interconnector projects, whereby developers' revenue is governed by a cap and floor on returns (such that returns below the floor are topped up by consumers, and returns above the cap are clawed back).[69]

There is a number of variations to the application of the core industry regulation model, given the nature of the businesses involved in the supply of energy in GB. The variations in these regulatory models tend to be more in the details of the application of those models rather than in terms of core principles of cost recovery and allowing an efficient operator to make a fair return.

In Northern Ireland, the energy network companies are regulated by the Northern Ireland Authority for Utility Regulation (NIAUR). NIAUR also directly regulates end prices for domestic and small business consumers in both electricity and gas sectors by setting a Maximum Retail Price for the dominant supply companies (former incumbent monopolies), whilst at the same time opening supply markets up to competitive pressures from new entrants. This then allows other retail companies to compete below the regulated maximum.[70]

[67] Further information on Strategic Wider Works can be found at https://www.ofgem.gov.uk/electricity/transmission-networks/critical-investments/strategic-wider-works
[68] For more information on the regulation of investment in OFTOs, see https://www.ofgem.gov.uk/publications-and-updates/offshore-transmission-investor-perspective-update-report.
[69] Further information on electricity interconnectors and Ofgem's cap and floor regime can be found at https://www.ofgem.gov.uk/electricity/transmission-networks/electricity-interconnectors
[70] Further information on NIAUR's electricity price controls for Northern Ireland can be found at http://www.uregni.gov.uk/retail/price_controls/

Figure 13: Rail money/service flow



4.6 Rail

4.6.1 Industry structure

The industry involves a vertically separated structure between infrastructure and train operation. Network Rail (NR) is, with limited exceptions, the owner and operator of GB heavy rail infrastructure, i.e. track and signalling and some large stations.[71]

NR was previously a Private Company Limited by Guarantee (CLG) but, as of 1 September 2014, is a central government body in the public sector, with all of its debt consolidated in the UK's national public sector debt.[72] The Government has expressed interest in developing opportunities for greater private investment in the rail sector. It is currently uncertain whether or when this might result in greater opportunities for other parties to develop/own/operate sections of the heavy rail infrastructure. This objective has been achieved recently for HS1, which is private operated under a 30-year concession agreement let in 2010, and HS2 may make also make use of private funding in the future.

Private train and freight operating companies (TOCs and FOCs respectively) are responsible for operating passenger and freight services. Rolling stock is typically leased by TOCs from privately-owned rolling stock leasing companies (ROSCOs).

4.6.2 Legislation, regulation and licensing

Key legislation governing the GB rail sector includes the Railways Act 1993[73], which provided the powers under which the network was initially privatised and regulated. NR operates under a Network Licence, granted by the Office of Rail Regulation (ORR). This sets out a range of duties, obligations, rights and restrictions to which NR is subject. TOCs are also subject to a licensing regime permitting them to operate services,

[71] HS1 is a notable exception to this.
[72] Further information regarding Network Rail's reclassification is available at http://www.networkrail.co.uk/supplying-us/reclassification-as-a-public-sector-body/
[73] Details of the Railways Act 1993 can be found at http://www.legislation.gov.uk/ukpga/1993/43/contents

but are not subject to full economic regulation like Network Rail.

- Network infrastructure: As the monopoly owner and operator of most of the GB heavy rail infrastructure, NR is subject to regulation by the ORR. NR is regulated under a Regulatory Asset Base (RAB) structure, similar to other regulated infrastructure sectors, on a five-year cycle. Each regulatory cycle involves the ORR determining NR's regulated income for the forthcoming period (referred to as a "Control Period" (CP)), based on a range of factors, including high level outputs and funding specified by the DfT and Transport Scotland as appropriate.
- Train Operating Companies: The GB rail franchising market is competitive and TOCs compete in the open market to win franchises awarded by DfT and Transport Scotland and concessions let by TfL. Each franchise is typically for a duration of between seven and 15 years. Although TOCs are not subject to full economic regulation akin to Network Rail, they are subject to regulation in a number of other ways. They operate under contractual terms specified in their franchise or concession agreement, and they require a licence to operate services which is issued and enforced by the ORR.
- Freight Operating Companies: FOCs are wholly private companies, and are not subject to a government tendering process and also are not held harmless by the Government for the financial consequences of five-yearly track access charge reviews. They require a licence to operate, which is issued and enforced by the ORR. The Government pays a limited subsidy in respect of certain types of freight.

4.6.3 Regulation in practice and risk & reward

Network Rail

NR receives around two-thirds of its annual income from the Government by way of a direct grant, with most of its remaining income made up from regulated Track Access Charges and a variety of commercial sources of income. NR's overall income requirement is determined by the regulator during the 5-yearly Periodic Review, which sets Track Access Charges (and other charges) and determines the outputs and efficiency that NR is expected to deliver.[74]

A further significant source of funding has historically been NR's ability to raise debt capital from private markets under the benefit of a guarantee from the Government. In 2014, the Government decided to provide an equivalent funding facility to NR directly. Around £30 billion of privately held debt was in issuance at that point, but this is unlikely to be rolled over when it reaches term.

The bulk of NR's income is fixed with limited exposure to demand risk. Because this creates only limited commercial incentives for the company, ORR monitors and regulates NR's performance to ensure that it is delivering the services that it has been funded to provide to its customers, including the TOCs and FOCs.

High Speed 1 (HS1) Ltd

HS1 Ltd has a 30 year concession to operate and manage the railway between St Pancras and the Channel Tunnel. As the economic and safety regulator for HS1 Ltd, ORR oversees the company's performance and efficiency. ORR approves all new framework agreements as well as revisions to existing framework agreements (i.e. track access contracts, covering the reservation of capacity for more than one timetable period of six months). ORR also ensures that HS1 Ltd is provided with incentives to reduce the cost of allowing access to the network through periodic charge reviews. The first of such reviews has been completed and covers the period from 1 April 2015 to 31 March 2020 (Control Period 2 or CP2).[75]

The regulatory approach for the anticipated High Speed 2 project is not yet confirmed, but it is possible that the regulatory framework will include aspects of both the regimes applied to Network Rail and to HS1.

Channel Tunnel

The UK-France Channel Tunnel is operated under a 99-year concession agreement, awarded to Eurotunnel (the trading name of two private companies) and expiring in 2086. The infrastructure is regulated for safety and efficiency by a bi-national body, the Channel Tunnel Intergovernmental Commission (IGC), which includes members from both the UK and France. From April 2015, responsibility for regulating efficiency will transfer to the national regulators jointly.[76]

Train Operators

Private companies can provide passenger rail services in the UK either through winning a franchise or concession to run passenger services or by becoming an open access operator that applies to run new services directly. GB TOCs are typically owned either by privately-owned transport groups or by non-UK state-owned transport groups that have

[74] Further information on ORR's regulation of Track Access Charges can be found at http://orr.gov.uk/what-and-how-we-regulate/track-access
[75] Further information on HS1's concession agreement can be found at http://www.highspeed1.com/regulatory/concession-agreement/
[76] Further information on Eurotunnel's concession agreement can be found at http://www.channeltunneligc.co.uk/Essential-texts,24.html?lang=en

entered the GB market. TOCs bid for the right to operate passenger services on certain routes, with the relevant public authority specifying particular requirements for each franchise or concession. This can include minimum service levels on particular routes and franchise tenure. Track, signalling and station infrastructure remains under the ownership, operation and maintenance of Network Rail. TOCs operate all stations except for around 20 key hub stations in major cities. TOCs are granted track access rights by the regulator in return for fixed and variable track access payments to Network Rail.[77]

Generally, DfT is responsible for specifying and letting contracts to TOCs to run franchised passenger services in England and Wales (and long-distance services that also serve Scottish cities). The Scottish government is responsible for franchising services within Scotland (ScotRail) and for the sleeper services between London and Scotland. ORR works with TOCs to ensure that Network Rail operates the infrastructure and plan the future development of the network in a way that meets their reasonable requirements.

TOCs are not capital intensive enterprises, as they do not own infrastructure or rolling stock, with income from passenger fares and related commercial activities. Although certain fares are regulated by the Government, TOCs have freedom to set other fares on a commercial basis. Recent developments in DfT's franchising policy have been designed to limit TOCs' exposure to revenue risk. Operating costs tend to be relatively stable, and TOCs are usually held harmless by DfT for variations in Track Access Charges determined by the regulator. Where franchise services are non-commercial (i.e. revenues do not cover costs), TOCs receive subsidy payments from DfT. Where revenues exceed costs, TOCs pay Franchise Premiums to DfT. Furthermore, the industry performance regime between TOCs and NR includes mechanisms designed to protect TOCs from the revenue and cost impacts of network change and disruption.

Freight operating companies

A small number of privately owned companies operate in the fully competitive rail freight industry. Freight Operating Companies (FOCs) are not subject to economic regulation by the ORR, but do operate under certain licence conditions determined by the regulator, and are subject to regulated Track Access Charges set in the periodic review of Network Rail. FOCs operate outside of a formal franchise regime and are therefore exposed to changes in charging, and risks associated with capital investments.[78]

ROSCOs

ROSCOs were established during the privatisation of the UK rail sector to finance, maintain and renew rolling stock under long-term lease arrangements with TOCs. ROSCOs are not subject to economic regulation, but rolling stock is licenced by the regulator for technical and safety purposes. As leases are not necessarily aligned with TOC franchise terms, the DfT provides certain guarantees to ROSCOs to limit risks from franchise change.[79]

4.7 Telecommunications

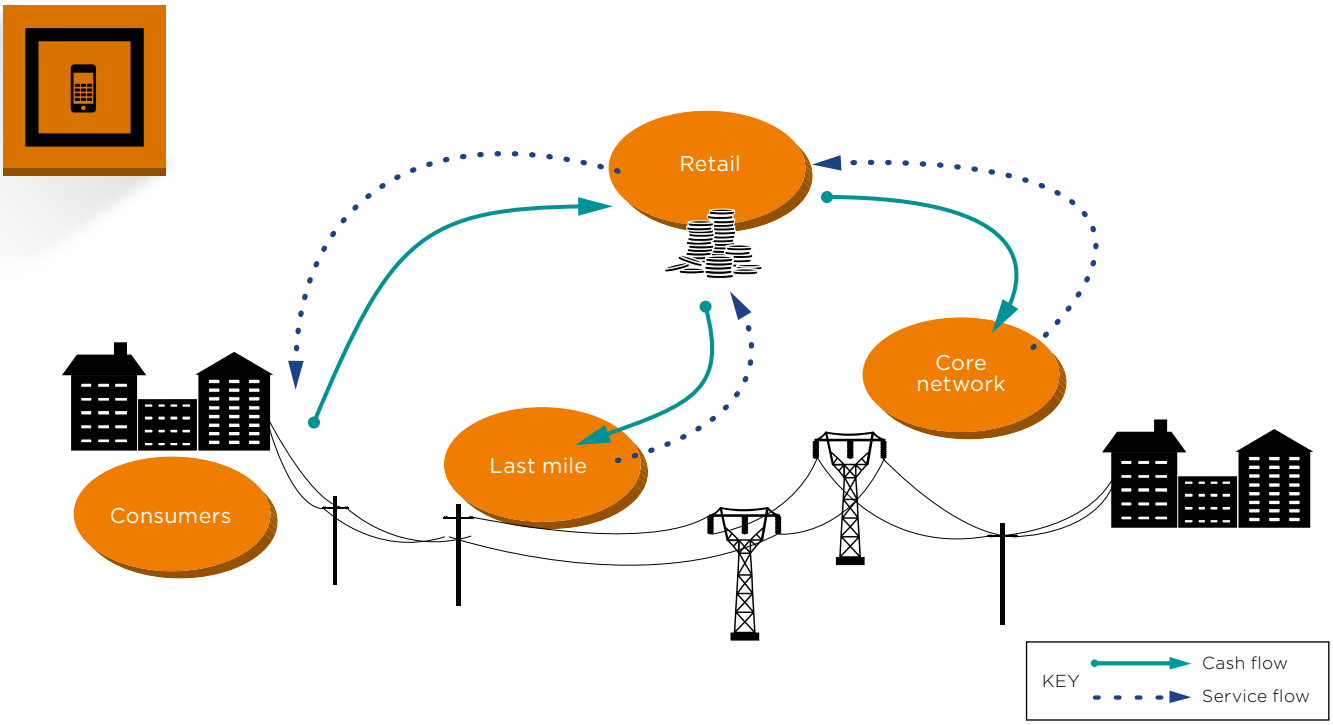
4.7.1 Industry structure

The UK telecoms market is characterised by a number of large, often overlapping, private service providers as well as smaller operators offering niche services.

- BT owns a nationwide fibre core network and last-mile network, allowing it to offer a range of fixed line voice, broadband and TV services to businesses and consumers, as well as a range of wholesale services to other telecoms providers.
- Virgin Media owns a cable network that covers approximately 50 percent of UK households, offering fixed line voice, broadband and TV services. It competes with BT in the areas it covers.
- Sky and TalkTalk offer retail fixed line, broadband and TV services, using a mix of their own network infrastructure and BT's network.
- There are numerous fixed network operators such as colt, at&t, Level (3), verizon, SSE and others that operate fixed network, data and IT platforms. They provide a wide range of services to businesses including, voice and data, connectivity, mobility, data hosting and warehousing, network security, cloud computing and others.
- In mobile telecommunications, there are four large mobile network operators ("MNOs"), which own network infrastructure (and sometime share parts of those networks with other MNOs) and provide retail services to households and businesses. Each of the 4 main

[77] A list of TOCs can be found on ORR's website at http://orr.gov.uk/about-orr/who-we-work-with/industry-organisations/train-operator-companies
[78] A list of FOCs can be found on ORR's website at http://orr.gov.uk/about-orr/who-we-work-with/industry-organisations/freight-operator-companies
[79] A list of ROSCOs can be found on ORR's website at http://orr.gov.uk/about-orr/who-we-work-with/industry-organisations/rolling-stock-companies

Figure 14: Telecoms money/service flow



network operators now offers a 4G mobile service. There is also a range of mobile virtual network operators ("MVNO"s), which purchase network access on a wholesale basis from MNOs.

- At the retail level there is considerable convergence of services being offered, with numerous companies providing a package of fixed and mobile voice, broadband, TV and data services to households and businesses.

4.7.2 Legislation, regulation and licences

The telecoms regulatory model is different from that of other infrastructure regulators, which stems primarily from the different duties that govern Ofcom's approach to regulation of telecoms networks. Ofcom's duties are set out in the Communications Act 2003.[80]

A significant proportion of the Communications Act 2003 consists of the transposition of the EU Regulatory Framework for communications into UK law. The Framework is made up of 5 Directives and 2 Regulations that cover areas such has Access, Universal Service, Electronic Privacy etc. The overall aim of the Framework is for European consumers to be able to benefit from increased choice thanks to low prices, high quality and innovative services.

Ofcom's primary duty is to further the interests of citizens and consumers, where possible by promoting competition. This leads to focus on driving competition rather than on the financial sustainability of the network operators. Ofcom is required to have regard to the desirability of promoting competition in relevant markets; the desirability of encouraging investment and innovation in relevant markets; and the need to encourage the availability of high speed data services throughout the UK.

The telecommunications sector also differs from other sectors in that the requirement to apply for a licence has been replaced by the general authorisations regime, which has general conditions that apply to all operators and specific conditions that apply to only some operators.

[80] Details of the Act can be found at http://www.legislation.gov.uk/ukpga/2003/21/contents

4.7.3 Regulation in practice and risk & reward

Ofcom is required to review certain specified markets in the telecommunication sector on a 3 year cycle, as set out by the European Commission. Where a market has been reviewed by Ofcom and an operator in the relevant market has been deemed to have significant market power (SMP), Ofcom has to consider remedies. These can be far-reaching and include charge controls, non-discrimination obligations, cost-orientation obligations, ex-ante margin squeeze tests, etc.

Many areas that Ofcom reviews are deemed to be competitive and so there are relatively few in which operators are deemed to have SMP. Among the larger ones are the following:

- Fixed access connections, i.e. the last mile infrastructure, which is still predominantly owned by BT with limited competition, and hence BT is deemed to have SMP. This is remedied through local loop unbundling, where equal access charges are levied on all retailers for use of the assets (this is similar to KCOM in Hull). Fixed access connections can be provided over copper or fibre and can deliver voice and broadband services. Unbundled loops (LLU) are becoming the main method of providing competing voice and broad band services, with more than 95% of UK premises connected to a BT exchange where unbundling can take place. Fixed voice and ISDN lines are also provided on regulated terms to any qualifying telecoms operator.
- Leased lines, i.e. private dedicated, often high-speed, lines leased from a network operator. BT is deemed to have SMP in a number of the designated markets, as is KCOM in Hull. Leased lines are categorised into two broad categories – "traditional interface" and "alternative interface". Traditional leased lines are delivered over older technology and deliver data services of up to 155Mbit/s. Alternative interfaces are IP or Ethernet-Based services, and are available on regulated terms at bandwidths of up to 1Gigabit/s.
- Mobile and fixed call termination, i.e. for mobile and fixed calls terminating on someone else's network, the perception is that competitive forces do not bring prices down, hence the regulator has intervened to set price ceilings. MNO terminating rates and, increasingly, certain wholesale and retail charges associated with international "roaming" are set through formal regulatory intervention by Ofcom. Certain fixed voice services, notably call termination and call origination, continue to be price regulated by Ofcom (with rates determined by the European Commission).

Ofcom has a general preference for regulation at the wholesale level, which then often precludes the need for regulation at the retail level. Ofcom's predecessor, Oftel, began removing retail regulation many years ago and Ofcom has continued in a similar vein. The approach to wholesale regulation is set out in Ofcom's market review process. Where a provider is deemed to have SMP, and it is assumed that greater competition could improve the market environment (and provide better outcomes for consumers), wholesale regulation may be viewed as a relatively low-cost, efficient way of introducing greater competition at the retail level.

The most common tool Ofcom uses to manage the balance of risk and reward is the price control. Price controls are developed as remedies for markets where Ofcom has identified one or more companies to possess SMP. The price control can set for a service or group of services with the market definition and will be reviewed and a regular cycle.

Although Ofcom does not have a statutory duty to ensure companies can finance their functions, its long-standing practice when setting price controls has always been to identify a fair level or return on capital, set in advance using market principles, and then not to adjust this allowed return once set. This is illustrated by a number of concepts that it brings to bear when considering market reviews and charge controls:

- 'Fair bet' concept – investors are to be afforded the opportunity (but not a guarantee) to make a reasonable return on any network investments. What this means in practice is that the network operator will bear some of the risks of underperformance if it performs inefficiently or irrationally.
- No retrospection – once a charge control has been set, there is no scenario under which the regulated entity can 'claw back' any costs or revenues, for example if the market volumes are lower than expected. This means that once a charge control has been set, the execution risk lies solely with the SMP operator.

Ofcom generally does not set controls or apply regulation at the retail level, so the balance of risks and potential returns is set by competition in the market.

4.8 Water

4.8.1 Industry structure

In England and Wales, there are 10 large regional water and sewerage companies (sometimes known collectively as WaSCs) that are privately owned. There are also eight regional companies that provide water only (WOCs) though this may change as new appointees are able to enter the market subject to meeting certain criteria. Customers of these WOC companies will have water provided by one company and sewerage provided by another. Each is governed by its own licence, which are broadly similar but not identical.

In addition, there are a number of new appointees and water supply licensees that are much smaller but still regulated. These companies are generally the result of competition for the market in water and take wholesale supplies from the incumbent monopolies.

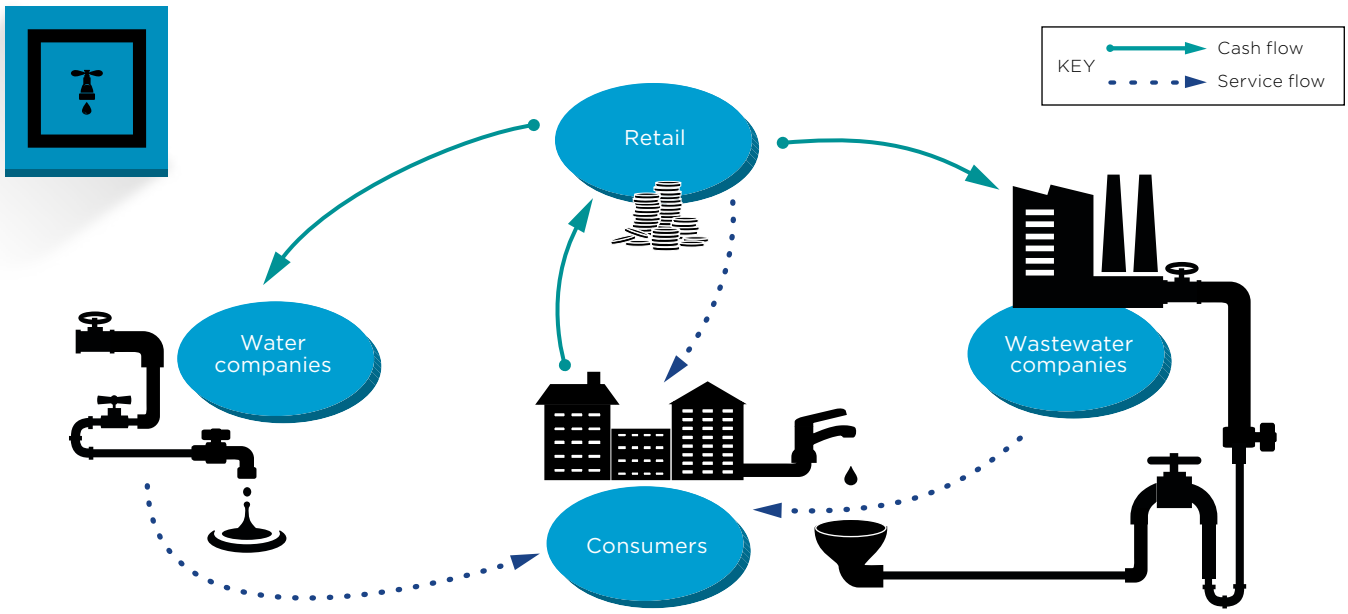
Water companies own the assets outright. In Scotland and Northern Ireland there are state-owned companies that provide water and wastewater services. Water and wastewater services in Scotland are regulated by the Water Industry Commission for Scotland (WICS), and by NIAUR in Northern Ireland.

4.8.2 Legislation, regulation and licensing

Key pieces of legislation impacting the regulation of the sector are the Water Act 1989 which brought about privatisation and the creation of Ofwat, the 1991 Water Industry Act which made some modifications to the 1989 Act, the 2003 Water Act and the 2014 Water Act,[81] which facilitates the introduction of retail competition for non-household customers in the water sector in England.

The 2014 Water Act allows for the introduction of retail competition in the non-household market so that all business, charity and public sector customers will be able to choose their retail supplier. The company providing the network and associated services will in general be subject to the same regulatory principles as applied currently. Implementation work is underway, and the market is due to be fully open for competition in April 2017. The Act also enabled the future introduction of more competition in the network and water resources parts of the value chain.[82]

Figure 15: Water money/service flow



[81] More information on the Water Act 2014 and its role in water market reform can be found at https://www.gov.uk/government/policies/reforming-the-water-industry-to-increase-competition-and-protect-the-environment/supporting-pages/reform-of-the-water-market-the-new-water-bill

[82] Further information on the Water Act 2014 can be found at https://www.gov.uk/government/policies/reforming-the-water-industry-to-increase-competition-and-protect-the-environment

4.8.3 Regulation in practice and risk & reward

Water and wastewater price controls are currently re-set on 5 year cycles. Both revenue and the RCV have historically been indexed by RPI, with price limits being set to provide incentives for efficient operation and for outperformance of the price control.

The PR14 price controls are set largely on the basis of total revenue allowance, so do not only set limits for charges (this is a change from the earlier price controls). A total revenue control reduces the exposure of the company to the risk of unanticipated changes in volume. The price control formula is expressed as RPI ± K with K representing the target for efficiency and any other net cost changes.

There some specific aspects of the water regulatory regime that impact the regulatory risk profile:

- Separation of price controls for wholesale and retail: Ofwat has introduced a number of important changes in the price review beginning in 2015, including the setting of four binding separate price controls: wholesale water, wholesale wastewater, household retail and non-household retail, with an expectation of deregulating non-household retail.
- Outcomes focused approach: Incentives are now much more closely associated with outcomes and companies are encouraged to deliver the outcomes that customers need, want and can afford, including those in relation to the environment. For example, compliance with improvements required as part of the EC Water Framework Directive.[83] Ofwat has created new Outcome Delivery Incentives (ODIs), which can provide rewards or penalties directly through revenue changes, to incentivise high quality delivery of the services that are most highly valued by customers.
- Approaches to ensuring the appropriate maintenance of long lived water assets: The water sector regime includes specific approaches to monitoring asset health and performance and enabling companies to recover through regulated revenue the efficient costs of asset maintenance.
- Total expenditure approaches: Ofwat has also moved from assessing the efficiency of operating and capital expenditure separately to considering overall total expenditure or 'totex'. Each company must now choose an amount of expenditure to be charged as an expense (the 'Pay As You Go' ratio or PAYG), with the remainder being added to the RCV. Companies can also choose a depreciation rate for expenditure previously added to the RCV.

  Since these parameters have consequences for cash flow, companies have been asked to use this flexibility to ensure that they can meet the required credit metrics in the next control period, although ratings agencies' treatment of these mechanisms is not yet confirmed.

  Companies can also use these levers to manage their bill profiles over time, taking account of their customers views on bill profiles.
- Consistent use of the Regulatory Capital Value (RCV) as a basis for setting the returns for the water companies: The RCV is not identified in either the water law or the licences, but the statutory duties on Ofwat refer to a return on capital. Ofwat acknowledges that a return on RCV is a critical part of the regulatory regime for the wholesale network and is central to the companies' ability to attract the additional investment capital they continue to need. Ofwat has maintained a consistent approach to RCV at each successive price review and many investors now use RCV as a proxy for the market value of the regulated businesses and in some cases companies have chosen to incorporate it in debt covenants.

The regulatory mechanism contains provisions for price controls to be re-opened in a few defined circumstances and at these reviews the regulator can reset parts of the regulatory package subject to strong evidence and meeting materiality thresholds (normally 10% of turnover). For less material problems where a reopener is not required, there have been mechanisms to allow for unanticipated changes in cost due to new environmental or legal obligations to be logged and funded at the next price review.

Company business plans, and the regulators' determinations, reflect the outcomes that customer engagement has revealed what the company's customers need, want and can afford. They are reflected in performance commitments that apply across the control period.

During price reviews, Ofwat undertakes a risk-based assessment of company business plans. Companies that perform well against criteria including engagement with customers, delivery of outcomes, efficient costs, the balance of risk and reward and affordability and financeability may qualify for 'enhanced status'. Enhanced companies can gain financial, procedural and reputational

[83] Further information on the Water Framework Directive can be found on the European Commission's website at http://ec.europa.eu/environment/water/water-framework/index_en.html

benefits. Enhanced companies can benefit from an initial financial reward. They also receive procedural benefits from receiving an early draft determination, and reputational benefits from being ranked more highly than their peers.

Ofwat also uses a 'menus' approach to determining the available cost performance incentives. The incentives menu allows companies to choose the sharing factor that applies to their totex costs – the extent of sharing costs' under- and over-performance with customers is set in advance by this choice. The aim of these incentives is to promote accurate forecasts from companies in their plans and to provide greater incentives for companies to out-perform their targets for efficient delivery of outcomes. The combined effect of these two approaches could result in more differentiation between the financial outcomes for higher- and lower performing companies.

IN THIS SECTION

- What happens to regulated company revenues if electricity or gas prices increase dramatically?
- This question answered and more...

5

FREQUENTLY ASKED QUESTIONS

5. Frequently asked questions

What happens to regulated company revenues if wholesale electricity or gas prices increase significantly?

Commodity risk sits with the retail and generation businesses not the networks. To the extent that prices affect demand, the energy network companies in Great Britain are generally regulated on a revenue basis and bear no direct volume risk so any changes in demand should have no direct bearing on the revenues they are able to collect, although there might be differences in timing as to when the revenue is collected.

Are there restrictions on foreign ownership of UK infrastructure?

To own and operate regulated infrastructure, most companies require a licence. There are no restrictions on who can hold a licence other than meeting certain 'fit and proper' requirements principally relating to a company's ability to finance its regulated activities, but also sometimes relating to security of supply.

How are revenues affected by inflation?

For most price-regulated companies, revenues are proportional to the size of the regulatory asset base and typically linked to an index. This means that companies are allowed to recover a real rate of return plus inflation, although there is also an efficiency assumption and other factors that can affect the income. Cost recovery allowances are often tied to inflation assumptions and real price effects, which means that general inflation levels are adjusted for changes in cost-specific prices.

What level of control do companies have over their capital structures?

Most regulators calculate returns based on a notional capital structure, but it is the responsibility of the company management to finance the company as they see fit. Investors bear the risk associated with this decision for the actual cost of capital compared with the allowed return. There are, however, some regulatory requirements in relation to financial structures that companies must adhere to, for example around maintaining an investment grade credit rating and a ring fence around regulated assets.

How does the approach in the UK differ from approaches in other countries?

The UK was a pioneer of independent economic regulation following privatisation of utilities networks in the 1980s and 1990s. While the regulatory regimes in the UK have evolved since they were first developed, many other jurisdictions with privatised infrastructure sectors have looked to the UK as an example of best practice. Therefore, utilities regulation in the UK shares many characteristics with other jurisdictions while at the same time being the leading, mature market in terms of the tenor of the regimes.

Is it possible to build new merchant infrastructure in the UK?

It is generally difficult to build merchant assets for large networks or similar asset-heavy infrastructure. Merchant projects are possible in the telecoms sector, as well as in other sub-sectors of the wider infrastructure market such as energy generation, LNG terminals, interconnectors, metering services etc.

Is it possible to own companies across sectors and/or deliver on a multi-utility basis?

It is possible to own companies across multiple regulated sectors, for example energy networks and water companies. However, following the implementation of the EU Third Energy Package, there are limitations on fully vertically integrated energy companies in terms of ownership of both a transmission company and a generation or retail company. Companies that operate on a cross-sector basis would still require the relevant licences for each sector in which they operate and would be subject to the regulatory regime in each sector, including the relevant ring-fence arrangements.

To what extent can regulation change? Who can change it and how?

UK experience to date has been that the fundamental principles of economic regulation endure and in this way regulators provide stability and predictability for investors. However, within these broad principles, regulatory approaches evolve over time and the method for calculating allowed revenues can, in principle, change subject to the regulatory remit. During the price control period, regulation is set and generally not open to change except in special circumstances. Changes in regulation are generally brought about through new price controls. The process for this is through proposals set out by the regulators followed by a public consultation. Where regulatory changes require licence modifications companies have the option to accept the regulator's proposals or appeal them. Similarly, where regulatory changes are given effect in price controls, companies have the option to accept them as part of the control or refer them to an appeals body.

To what extent can government policy/legislation change and how can this impact companies?

The Government can change policy at various junctures but primary legislation can only be changed following acts of Parliament. Changes in legislation can, but do not automatically affect companies during price control periods, i.e. once the regulation is set for control period (e.g. five years), it is generally not open to change (except in specific pre-agreed circumstances).

How do I know what costs will be deemed "efficient" by the regulator?

Regulators typically publish and consult on their cost assessment processes and provide examples of costs that will be considered efficient. For instances where regulators find proposed costs to be inefficient, companies should be given an opportunity to provide further justification of such costs and many cost assessments are completed ex ante, i.e. the companies are given a view prior to incurring the costs what will be allowed to be recovered.

Could sectors subject to economic regulation become subject to competition?

Regulatory authorities seek to introduce competition in the market (direct competition) and for the market (e.g. for a licence to operate certain services) in particular sub-sectors, where feasible, and where public benefits of its introduction exceed costs. There is a general recognition that competition is beneficial to consumers but it needs to be compatible with sector characteristics to ensure that provision of services is viable in a competitive market. Changes to regulatory regimes, including introducing competition, involve extensive prior public consultation.

Are the regulated infrastructure sectors open to new market entrants outside of the primary market?

Yes. For example, most of the telecoms sector is open to new entrants. New independent gas transporters and distribution network operators are able to enter the energy market. Similarly in water, there are new appointees and new entrants to provide retail services.

Are there any opportunities for concessions?

Assets are generally owned and operated by private companies meaning there are few concessions. There are some exceptions such as HS1 in the rail sector.

FURTHER INFORMATION

FURTHER INFORMATION

Regulator	Link
Civil Aviation Authority	Further information on CAA's regulation of UK airports can be found at: **http://www.caa.co.uk/**
ORR Rail Regulation	Further information on ORR's regulation of Network Rail can be found at: **http://orr.gov.uk/**
Ofcom	Further information on Ofcom's work in the Telecoms sector can be found at: **http://stakeholders.ofcom.org.uk/telecoms/**
ofgem Making a positive difference for energy consumers	Further information on Ofgem's regulation of gas and electricity networks (RIIO) can be found at: **https://www.ofgem.gov.uk/**
Utility Regulator Electricity Gas Water	Further information on the Utility Regulator's regulation of utility companies in Northern Ireland can be found at: **http://www.uregni.gov.uk/**
OFWAT	Further information on Ofwat's regulation of the water and wastewater sector can be found at: **http://www.ofwat.gov.uk/**
water industry commission for Scotland	Further information on WICS' regulation of the water sector in Scotland can be found at: **http://www.watercommission.co.uk**

GLOSSARY

GLOSSARY

Term	Description
CAA	Civil Aviation Authority, regulator for airports and aviation sector. As Heathrow and Gatwick airport are deemed to have significant market power, CAA regulates the prices these airports can charge
Capacity mechanism	A policy mechanism that forms part of the Government's package of Electricity Market Reforms (EMR). The mechanism will allow providers of electricity capacity (mostly gas-fired generation) to receive a long-term fixed price for providing such capacity
CAT	Competition Appeals Tribunal (see section 3.1)
CC	Competition Commission, former appeals authority whose responsibilities now fall within those of the CMA
CfD	Contracts for Difference, a policy mechanism that forms part of the Government's package of Electricity Market Reforms (EMR). The mechanism will allow developers of renewable energy generation
CMA	Competition and Markets Authority (see section 3.1)
Concurrent powers	The sectoral regulators have the power to enforce certain articles of EU and UK competition law 'concurrently' with the CMA. The extent of concurrent powers differs by regulator (see section 3.1.4)
CP1 – CP5	Control periods, ORR's regulatory price control periods (applied to Network Rail)
Demand risk / volume risk	The exposure of a company to the difference between actual demand for products/ services being higher or lower than anticipated
DfT	Department for Transport, the government department for policy development in regards to the transport sector (including rail) in England and Wales
DNO	Distribution network operators, used to refer to owner-operators of electricity distribution networks
EMR	Electricity Market Reforms, the Government's package of policies for reforming the electricity sector
EU	European Union
Ex-ante	Based on forecast rather than actual amounts. In price controls, allowances are set 'ex-ante' if they are determined at the beginning of the control period
Ex-post	Based on actual rather than forecast amounts. In price controls, allowances are set 'ex-post' if they are based on actual outturn results
Fast track	Some regulators have developed a 'fast track' mechanism to incentivise companies to produce higher quality business plans as inputs to the regulatory process. See section 4.3.2.3
Financeability	The ability for efficient companies to secure affordable and competitive financing and service its liabilities. Most regulators have either the objective or duty of ensuring that companies are financeable, often with reference to minimum credit ratings

Term	Description
FOC	Freight-operating company, a company that uses the rail network to transport goods (as opposed to passengers)
GB	Great Britain, includes England, Scotland and Wales
GDN	Gas distribution network, used to refer to owner-operators of gas distribution networks
HS1, HS2	High-speed rail network, HS1 is already in operation and HS2 is in planning
HSE	Health and Safety Executive, the regulator of health and safety standards in Great Britain
IDNO	Independent distribution network owner, smaller companies with network licences for providing small areas with energy distribution services
Incentive mechanism	A regulatory mechanism that allows companies to enhance their allowed returns by achieving certain specified outputs or additional efficiencies
Interconnector	A transmission asset that connects the domestic energy market (either electricity or gas) to a second international energy market, allowing for cross-border energy trading and 'market coupling'
JR	Judicial Review (see section 3.1.3)
K factor	In energy, a correction mechanism in revenue building-block formulas to account for over- or under-recovery of revenues in prior years. In water, an uplift in revenues for quality improvements
Last mile	The local access network or 'local loop', made up of copper and fibre connections between telephone exchanges and homes and businesses. It mainly is owned and operated in the UK by Openreach (part of BT Group)—see also Local Loop Unbundling (LLU)
LLU	Local Loop Unbundling (LLU), the process where the incumbent operator (Openreach) makes its local network or 'last mile' available to other companies. Operators are then able to upgrade individual lines to offer services directly to customers
LNG	Liquefied natural gas
Merchant	A merchant service provider is one that is not economically regulated, and therefore whose prices and revenues are determined by the market, as opposed to an economic regulator
MNO	Mobile network operator, owners of the mobile network infrastructure and providers of retail services
National Infrastructure Plan	The National Infrastructure Plan sets out the challenges facing UK infrastructure and the Government's strategy for meeting the infrastructure needs of the UK economy. The plan contains major commitments for investment in important infrastructure projects and explains how the Government is attracting new private sector investment. Further information on the National Infrastructure Plan can be found at: **https://www.gov.uk/government/collections/national-infrastructure-plan**

GLOSSARY (CONTINUED)

Term	Description
NIAUR	Northern Ireland Authority for Utility Regulation (NIAUR), regulator of energy and water utilities in Northern Ireland most usually referred to as the Utility Regulator
NR	Network Rail, the owner and operator of the national rail network
Ofcom	Office of Communications, regulator for the telecommunications sector
Ofgem	Office of Gas and Electricity Markets, regulator for the electricity and gas sectors
OFT	Office of Fair Trading, former consumer protection body whose responsibilities now fall within those of the CMA
Oftel	Former regulator of the telecommunications sector, predecessor to Ofcom
OFTO	Offshore Transmission Owner, the regime governing the offshore transmission assets connecting offshore generation to the onshore network (run by Ofgem).
Ofwat	Water Services Regulation Authority, regulator for the water sector in England and Wales
ORR	Office of Rail Regulation, regulator for Britain's railways
PR94 – PR14	Price reviews, Ofwat's regulatory price control periods for the water sector
Price cap	A form of regulation that limits the prices that can be charged on a volumetric basis. Companies regulated on a price cap basis might be therefore exposed to demand risk as prices are set based on forecast volumes and shortfalls are not necessarily adjusted or 'trued up' in following periods
Primary legislation	Legislation passed by Parliament; an 'Act of Parliament' or 'Statute'
Q1 – Q6	Quinquennial reviews, CAA's regulatory price control periods for regulated airports
RAB, RAV or RCV	Regulated Asset Base, also referred to as Regulated Asset Value (RAV) or Regulated Capital Value (RCV). Although definitions may vary between users, the terms are often used interchangeably. The RAB is a regulatory concept used to calculate the allowed revenue
Reopener	A mechanism for adjusting or recalculating a regulatory settlement in light of a change in circumstances. For example, some regulatory regimes have reopeners to update the allowance for tax or other uncontrollable costs. In water also known as an IDOK, Interim Determination of K
Revenue cap	A form of regulation that limits the revenues that companies can accrue over a certain period of time. In some sectors, companies regulated on a revenue cap basis are not exposed to demand risk as shortfalls in forecast revenue are adjusted or 'trued up' in subsequent periods
MVNO	Mobile virtual network operator, providers of mobile retail services who do not own/ operate mobile infrastructure but rather purchase wholesale network capacity from MNOs
RIIO	"Revenue = Incentives + Innovation + Outputs", Ofgem's framework for setting price controls for energy network companies

Term	Description
ROSCO	Rolling stock company, a company that owns vehicles that move on railways and leases them to Train-Operating Companies (TOCs) and Freight-Operating Companies (FOCs)
RPI	Retail Price Index, a measure of inflation rates
RPI – X	A regulatory price control approach, whereby revenues are linked to RPI inflation, less the expected savings from efficiency gains. In the UK, 'RPI – X' has broadly been used to refer to the revenue cap approach used in several regulated infrastructure sectors. Although some regulators have moved to more sophisticated approaches to revenue setting, most revenues derived from RAB are still linked to an inflation index
Rural broadband	The connection of homes and businesses in rural or hard-to-reach areas to high-speed internet
Secondary legislation	In the UK, secondary legislation refers to legislation or directives passed by an entity other than the Houses of Parliament. Sometimes referred to as 'enabling' legislation, secondary legislation often provides details of the implementation of primary legislation or clarifies particular aspects that do not require the full Parliamentary process
Single vs. dual till	Refers to the price control approach for regulated airports. The single till approach considers both aeronautical activities and other commercial activities in setting price caps, as opposed to the dual till approach, which only considers aeronautical activities
SMP	Significant Market Power, a set of conditions that may apply to providers of network services where they are deemed to have significant power in a particular market
TfL	Transport for London; the local government organisation responsible for most aspects of London's transport system
Third Energy Package	An EU legislative package aimed at enhancing the markets for electricity and gas in the EU. A key aspect of the third package is the unbundling of ownership of energy generation and retail from energy transmission and distribution
TO / TAO	Transmission owner, the owner of the transmission system assets, also referred to as transmission asset owner (TAO)
TOC	Train-operating companies (TOCs) that run rail passenger services, leasing and managing stations from Network Rail. TOCs directly face consumers and apply for franchises from the Department for Transport to run specific routes. They often lease trains from the rolling stock companies (ROSCOs)
Totex	Total expenditure, including opex and capex
Transport Scotland	The national transport agency for Scotland
True-up	An adjustment to revenues to account for a cost or revenue stream in a previous period being higher or lower than the allowance or forecast
TSO / SO	Transmission system operator, the operator of the transmission system (e.g. system balancing services, ancillary services etc.), also referred to as system operator (SO)

GLOSSARY (CONTINUED)

Term	Description
TTT	Thames Tideway Tunnel, a large infrastructure project by Thames Water. It is intended to improve the capacity of London's sewerage system and reduce the number sewage overflows into the River Thames
UK	United Kingdom of Great Britain and Northern Ireland; includes England, Scotland, Wales and Northern Ireland
Uncertainty mechanisms	A mechanism that accounts for uncertainties in the companies costs/revenues, for example via pain/gain sharing between companies and consumers or re-openers for specific items
User-pays	A principle for recovering the costs of delivering essential services, whereby the end users (i.e. consumers and businesses) pay for services as opposed to tax-payers via government subsidy
WACC	Weighted average cost of capital typically estimated as a sum of company's cost of equity and cost of debt weighted by gearing. Most regulators determine a WACC allowance for regulated companies, which is updated periodically. The WACC is a component of the allowed revenue or price calculation and is not a profit cap, i.e. actual returns on capital may be higher or lower than the allowed WACC, e.g. due to outperformance of regulatory assumptions and incentive mechanisms
WaSC	Water and sewerage company
WBS	Whole business securitisation is a type of a financial structuring often adopted by regulated utilities with extensive covenants and structuring applied to the entire company resulting effectively in a ring fence around the WBS entity
WICS	Water Industry Commission for Scotland, regulator for the water sector in Scotland
WoC	Water only company

UK REGULATED INFRASTRUCTURE INDUSTRIES

UK infrastructure is a very broad and diverse sector. This guide focuses predominantly on economically-regulated infrastructure in the energy, water and wastewater, telecoms, rail and aviation sectors, as well as referencing other types of market participants in those sectors. Companies that operate in the industries referenced in this guide include those outlined below.

Ownership structures are shown as an indication only, as many companies are held in complex structures that do not fit easily into a single category, such as those held by a consortium of companies, the majority of which are ultimately listed.

List of significant regulated infrastructure companies			
Sector	Subsector	Company	Ownership structure
AVIATION	Airports	Heathrow Airport ltd	Private
		Gatwick Airport ltd	Private
	Air navigations service provider	NATS Holdings ltd	Public-private partnership
ENERGY	Electricity distribution	Electricity North West ltd	Private
		Northern Powergrid (Northeast) ltd	Private
		Northern Powergrid (Yorkshire) plc	Private
		Scottish Hydro-Electric Power Distribution ltd	Subsidiary of listed company
		Southern Electric Power Distribution plc	Subsidiary of listed company
		SP Distribution plc	Private with listed parent
		SP Manweb plc	Private with listed parent
		London Power Networks plc	Private
		South Eastern Power Networks plc	Private
		Eastern Power Networks plc	Private
		Western Power Distribution (East Midlands) plc	Private with listed parent
		Western Power Distribution (West Midlands) plc	Private with listed parent
		Western Power Distribution (South West) plc	Private with listed parent
		Western Power Distribution (South Wales) plc	Private with listed parent
		Northern Ireland Electricity ltd	Private
		Independent distribution network owners (IDNOs)	Various
	Electricity transmission	National Grid Electricity Transmission plc	Subsidiary of listed company
		Scottish Hydro Electric Transmission ltd	Subsidiary of listed company
		Scottish Power Transmission ltd	Private with listed parent
		Northern Ireland Electricity ltd	Private
	Gas distribution	National Grid Gas plc	Subsidiary of listed company
		Northern Gas Networks ltd	Private
		Wales & West Utilities ltd	Private
		Scotia Gas Networks ltd	Subsidiary of listed company
		Phoenix Natural Gas ltd	Private
		Firmus Energy (supply) ltd	Private
		Independent gas transporters (IGTs)	Various
	Gas transmission	National Grid Gas plc	Subsidiary of listed company
	Offshore transmission	Various	Various forms of private ownership
	Electricity interconnectors	Various	Various forms of private ownership
	Gas interconnectors	Various	Various forms of private ownership
RAIL	Rail infrastructure	Network Rail ltd	Publically owned
		Crossrail ltd	Publically owned
		HS1 ltd	Private concession
TELECOMS	Fixed-line	Openreach	Subsidiary of listed company
		KCOM Group plc	Listed company
		BT Wholesale ltd	Subsidiary of listed company
	Mobile	Vodafone ltd	Subsidiary of listed company
		Telefónica UK ltd	Subsidiary of listed company
		EE ltd	Private with listed parent
		Hutchison 3G UK ltd	Private
WATER	Water and sewerage	Albion Water ltd	Private
		Anglian Water Services ltd	Private
		Dwr Cymru Cyfyngedig ltd (Welsh Water)	Company limited by guarantee
		Northumbrian Water ltd	Private
		Severn Trent Water ltd	Subsidiary of listed company
		Southern Water Services ltd	Private
		South West Water ltd	Subsidiary of listed company
		Thames Water ltd	Private
		United Utilities Group plc	Listed company
		Wessex Water ltd	Private
		Yorkshire Water Services ltd	Private
		Scottish Water	Publically owned
		Northern Ireland Water ltd	Publically owned
	Water only	Affinity Water ltd	Private
		Bristol Water plc	Private
		Cholderton and District Water Company	Private
		Dee Valley Water plc	Subsidiary of listed company
		Portsmouth Water ltd	Private
		Sembcorp Bournemouth Water ltd	Private with listed parent
		South East Water ltd	Private
		South Staffordshire Water plc	Private with listed parent
		Sutton and East Surrey Water services ltd	Private with listed parent

KPMG NOTICE: ABOUT THIS GUIDE

This Guide has been prepared on behalf of UKRN on the basis set out in our contract with Ofgem ("the Client") dated 21 July 2014. Nothing in this Guide constitutes a valuation or legal advice.

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In preparing the Guide, the primary source has been publically available information. Details of principal sources are set out within the document and we have satisfied ourselves, so far as possible, that the information presented in the Guide is consistent with other information which was made available to us in the course of our work in accordance with the terms of our Services Contract. We have not, however, sought to establish the reliability of those sources by reference to other evidence. In addition, references to draft financial information relate to indicative information that has been prepared solely for illustrative purposes only. Our work was completed on 5 December 2014 and we have not undertaken to update the document for events or circumstances arising after that date.

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