



National Audit Office

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## **Report**

by the Comptroller  
and Auditor General

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## **Cross-government**

# Infrastructure investment: the impact on consumer bills

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Our vision is to help the nation spend wisely.

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National Audit Office

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Cross-government

# Infrastructure investment: the impact on consumer bills

Report by the Comptroller and Auditor General

Ordered by the House of Commons  
to be printed on 12 November 2013

This report has been prepared under Section 6 of the  
National Audit Act 1983 for presentation to the House of  
Commons in accordance with Section 9 of the Act

Amyas Morse  
Comptroller and Auditor General  
National Audit Office

7 November 2013

This volume has been published alongside a second  
volume comprising relevant appendices and our report  
*Modelling the impacts of infrastructure investment on  
consumer energy bills* HC 812-II, Session 2013-14

This report focuses on infrastructure investment that domestic consumers pay for through bills, with a specific focus on the energy, water and, to a lesser extent, telecoms sectors. We examined work by government and regulators to understand the impact of infrastructure on bills and mechanisms they use to help consumers get value for money from new infrastructure investment.

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Printed in the UK for The Stationery Office  
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2602812 11/13 PRCS

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Appendix four: competition, and Appendix five: case studies, have been published in a second volume HC 812-II, Session 2013-14. Appendix six: survey of private sector infrastructure experts has been published on our website.

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This report can be found on the National Audit Office website at [www.nao.org.uk/2013-infrastructure-funding](http://www.nao.org.uk/2013-infrastructure-funding)

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## Key facts

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**£310bn**

the estimated value of planned investment in UK infrastructure identified in the government's 2012 National Infrastructure Plan (includes investment to replace and maintain existing infrastructure)

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**67%**

of the £310 billion is expected to be financed privately, and repaid through consumer bills in the energy, water and telecoms sectors

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**Unknown**

aggregate financial impact of planned infrastructure investment on consumer bills across all sectors

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**8 per cent** of total household spending, spent on energy and water bills in 2011 by the average household

**15 per cent** of total household spending, spent on energy and water bills in 2011 by those on the lowest incomes

**3.7 times** increase needed in the proportion of UK energy from renewable sources by 2020, compared with 2012 level, to meet legally binding renewable energy obligations

**£221** estimated increase in the average household energy bill between 2013 and 2030 in real terms. The average household energy bill in 2011 was £1,157 and is projected to rise to £1,255 in 2013 (2012 prices)

# Summary

**1** Economic infrastructure, including energy, transport, water and telecoms, supports services that are essential to daily life and vital for economic success. HM Treasury has identified £310 billion of planned investment in UK infrastructure that is needed to replace ageing assets, help meet policy commitments (such as climate change targets), and meet our growing population's needs, over the next decade and beyond. £176 billion of this infrastructure is in the energy sector. New infrastructure can be funded through taxes or through consumer bills and charges.

**2** Since the privatisation of the public utilities in the 1980s, new infrastructure has increasingly been privately financed and paid for by consumers through their bills. Since 1997, the level of infrastructure investment paid for by consumers has exceeded the amount paid for by taxpayers. HM Treasury expects at least two-thirds of the £310 billion of expected infrastructure to be wholly financed, owned and operated by private companies, which are accountable to their boards and shareholders.

**3** This report considers the costs of investment in infrastructure which will be financed privately and repaid through consumer bills. We focus on energy and water infrastructure, and to a lesser extent, we have also looked at infrastructure in the telecoms sector, where consumers have more discretion over their level of spending. Together, investment in these sectors accounts for 67 per cent of the expected £310 billion investment in UK infrastructure.

**4** In our 2013 report, *HM Treasury: Planning for economic infrastructure*,<sup>a</sup> we concluded that a failure by government to assess the impact on consumers, could lead to consumers facing financial hardship, and unplanned taxpayer support being required. Furthermore, funding of infrastructure via bills is more regressive than taxation: it requires proportionately greater expenditure from those on low incomes. This makes it particularly important to understand the effect of infrastructure investment on the bills of different groups of consumers.

**5** Although investment choices are influenced by trends in consumption, individual domestic consumers have little direct influence over what and how much infrastructure is built. Instead, government departments and economic regulators act to protect consumer interests. Government departments set the overall objectives and policies for each sector. Independent economic regulators have legal duties to protect consumers. The ways regulators do this include promoting competition, acting to prevent and address market abuses and, in some cases, setting the price consumers can be charged. The relevant bodies are listed below:

- In energy: The Department of Energy & Climate Change and the regulator Ofgem.
- In water: The Department for Environment, Food & Rural Affairs and the economic regulator Ofwat. (There are also two quality regulators, the Drinking Water Inspectorate and the Environment Agency, whose work is not covered by this report).
- In telecoms: The Department for Culture, Media & Sport and the regulator Ofcom.

**6** The Treasury also has an important role in planning and overseeing new infrastructure. It has established a specialist unit, Infrastructure UK, which is responsible for:

- coordinating and simplifying the planning and prioritisation of investment in UK infrastructure; and
- improving UK infrastructure by achieving greater value for money on infrastructure projects. Infrastructure UK considers that this remit extends to considering consumer affordability.

**7** Our report examines:

- the current situation for consumers and how this is likely to change (Part One);
- government and regulators' work to understand the financial impact on consumers and assess whether bills are likely to be affordable (Part Two); and
- the mechanisms regulators and government use to help consumers get value for money from new infrastructure (Part Three).



## Limitations on scope

8 There are areas beyond the scope of this report:

- We have not assessed the potential benefits of the infrastructure projects the Treasury has identified, or the consequences if they are not built. We recognise that government and regulators do have to take account of the potential benefits of infrastructure in their decision-making. However, our focus in this report is on whether government and regulators understand the impact on consumer bills, and how they ensure that the infrastructure that is built provides value for money.
- We have not attempted to calculate the financial impact on consumers of new infrastructure. Government has incomplete data on what new investment is expected and when it will be built, and estimates require detailed modelling and assumptions about future government policies and priorities. This is for government and regulators to do.
- We do not consider the variety of policies that aim to make bills affordable for different groups. We are primarily interested in this report in whether the government has appropriate information on which to base its policy decisions.
- While we examine mechanisms to promote value for money in new infrastructure, we do not conclude on the overall effectiveness of regulation.

9 We may return to these issues in future work. Our audit approach is set out in Appendix One and our evidence base in Appendix Two.

## Key findings

**10 The UK needs significant investment in new infrastructure.** This is driven by the need to: tackle climate change and ensure energy security; comply with environmental and public health standards; maintain and replace existing infrastructure as it ages; and cope with rising demand from a population expected to grow 11 per cent by 2030 (paragraph 1.3).

**11 Energy and water bills have risen faster than incomes.** The latest data shows that between 2002 and 2011, energy and water bills rose 44 per cent and 21 per cent respectively, in real terms. Telecoms bills fell 2 per cent in real terms over the same period. However, median incomes were at the same level in 2011 as they were in 2002, in real terms. In 2011, the average household spent £1,157 on energy and £380 on water, equating to 8 per cent of household spending. The average household spent £652 on telecoms in 2011. Telecoms differs from the energy and water sectors because consumers have greater choice over the type and level of service they buy (paragraphs 1.8 and 1.9).

**12 Rising energy and water bills are a particular concern for those households with incomes in the lowest 10 per cent.** Incomes of low-income households fell 11 per cent in real terms over 2002–2011, and 15 per cent of their spending went on energy and water bills in 2011. The Department of Energy & Climate Change estimates that 11 per cent of households are ‘fuel poor’. Updating Ofwat’s methodology, we estimate that at least 12 per cent of households may now be at risk of not being able to afford their water bills (paragraphs 1.10 and 1.11).

**13 High levels of expected investment in new infrastructure mean that energy and water bills may rise significantly.** Consumers will pay for the infrastructure itself, along with the costs of maintaining and operating the infrastructure. Future bills will also be influenced by other factors, such as changes in world energy prices and initiatives to help consumers use less energy and water. The Department of Energy & Climate Change’s central projection is for an 18 per cent increase in energy bills, in real terms by 2030. There are no official projections of water bills available that take account of current regulatory and policy decisions. The only available projection of water bills, prepared by a water company, suggests up to a 28 per cent increase by 2030. The Department for Environment, Food & Rural Affairs and Ofwat told us they have concerns about this projection because it is out of date, and does not reflect government and regulatory decisions since 2010 or the current lower cost of borrowing. Affordability will depend on changes in incomes and the wider cost of living. Some of the new infrastructure might raise incomes by supporting economic growth. But it does not follow that consumers at all income levels will benefit (paragraphs 1.13 and 1.14).

**14 New infrastructure is ultimately a private sector investment choice, but government and regulators take important decisions that can influence the impact on consumers.** Consumers typically repay private sector investment in new infrastructure over decades. Government and regulators therefore need good information on the long-term impact on bills, and they need to understand the affordability implications for different groups of consumers. Knowing ‘how much is too much’ can also help government and regulators mitigate the risk that rising bills undermine public confidence in regulation (paragraphs 1.7 and 1.15 to 1.18).

**15 The best efforts to assess the financial impact and affordability of bills have been in the energy sector, although we have some concerns about the forecasting models.** There is no consistent approach across sectors to forecasting bills or measuring affordability, and a lack of clarity about who is responsible for assessing affordability in each sector.

For energy:

- The Department of Energy & Climate Change (DECC) has done significant work to assess the impact of its policies on energy prices and bills. This has allowed it to project bills to 2030 and it has also begun to assess future levels of ‘fuel poverty’. Its projections are based on complex models that are broadly appropriate for assessing the impact of energy policies on bills. However, there is an inconsistency between the amount of investment the private sector is currently planning, identified in the National Infrastructure Plan, and the amount of investment DECC’s models predict is needed to meet government objectives. DECC’s models currently predict around three quarters the level of investment that is reflected in the National Infrastructure Plan. We also found weaknesses in the models’ quality assurance, which the Department told us it is working to address (paragraphs 2.8 to 2.18).

For water and telecoms:

- Ofwat and Ofcom have both carried out research on the affordability of current bills, but there is no up to date assessment of the likely impact of infrastructure investment on future bills (paragraphs 2.8, 2.19 to 2.25).

**16 Government has made no assessment of the overall impact of infrastructure on future bills or whether those bills will be affordable. Therefore government and regulators are taking decisions on behalf of consumers in the absence of full information about the situation for consumers.** Affordability can only be assessed taking into account all household bills, household incomes and wider costs of living. Gaps in analysis, and the lack of a common approach to measuring affordability, mean that the government does not have an overall picture of affordability, either for the average household or for those on low incomes. There are schemes to support vulnerable consumers in all three sectors, but we are concerned that government and regulators cannot assess the adequacy of these schemes without a better understanding of affordability (paragraphs 2.26 to 2.30).

**17 Where regulators control prices, the effectiveness of scrutiny can vary. Ofgem and Ofwat are placing the onus on companies to innovate and report on results. This move underscores the importance of regulators checking what companies tell them.** We reviewed Ofgem and Ofwat's scrutiny of three large infrastructure projects. Ofgem scrutinised the two energy projects well. However, we were concerned by aspects of Ofwat's scrutiny of the one water project we examined. Ofgem and Ofwat are changing their approach to price regulation, including giving companies greater freedom to innovate to meet consumers' needs. It is too early to say whether these reforms will be effective. However, regulators will need to ensure there is proportionate, independent verification of costs and of physical assets. For example, regulators currently have limited assurance on whether companies have built infrastructure to the agreed specifications (paragraphs 3.8 to 3.17, and Appendix Five, Volume II).

**18 Consultation with consumers about new infrastructure and the impact on bills is improving, although more could be done, especially by central government.** Regulators recognise the importance of reflecting issues that matter to consumers in decisions made on their behalf. In 2008, Ofgem established ways to enable consumers to scrutinise company business plans and it continues to develop its consumer research. Ofwat has made recent changes to how it regulates, requiring companies to engage with local consumer challenge groups. However, Infrastructure UK has had very limited engagement with consumers in its work to plan and prioritise investment and secure value for money in infrastructure (paragraphs 2.27 and 3.18 to 3.20).

**19 The government and regulators have led several initiatives to improve value for money, but need to better coordinate their work across sectors.** Within sectors, we found some departments and regulators collaborating with private companies to address the high cost of UK infrastructure. However, coordination across sectors is hampered by limited resources and the need for unanimous support of all regulators to take any decisions. There is no clear leadership on activity across sectors (paragraphs 3.21 to 3.28).

## **Conclusion**

**20** The UK needs significant new investment in infrastructure to replace ageing assets, and meet policy commitments and the needs of a growing population. As was the case in the past, the majority of this new infrastructure will continue to be paid for by consumers through their utility bills. Despite some good initiatives, notably in energy, the government and regulators do not know how much in total the new infrastructure might cost consumers. Nor do they know whether consumers, particularly those on low incomes, will be able to afford the additional costs. This is particularly concerning, given that energy and water bills have increased significantly in recent years, while incomes have not.

**21** Government and regulators take decisions that influence the costs of new infrastructure, and government policies can mitigate those costs for different groups. Therefore they must make sure that these decisions are informed by an understanding of the likely impact on consumers, and must continue their efforts to ensure there is downward pressure on costs.

## **Recommendations**

- a** **The Treasury should ensure that there are mechanisms in place to assess the cumulative impact of infrastructure investment on consumer bills and the affordability implications, particularly for low-income households.** The Treasury should take the lead to ensure that:
- there are clear roles and responsibilities across government departments and regulators, to assess and monitor the financial impact on consumers of infrastructure investment, and whether bills are affordable now and in future;
  - data from each sector are prepared consistently, so they are comparable and can be aggregated;
  - the impact on vulnerable groups is assessed explicitly, and the results used to inform government policies, especially those to make bills more affordable for certain groups; and
  - assessments and underlying assumptions are either produced or verified independently.
- b** **The Treasury should publish the expected overall impact on consumer bills, to promote transparency and debate about new infrastructure and bill increases.**
- c** **Departments should consider the full financial impact and affordability implications before making commitments on infrastructure. The energy and water regulators should consider the financial impact and affordability of proposed infrastructure before approving company revenues and charges.** They should rigorously scrutinise all decisions on both value for money and affordability grounds.

**d The Department of Energy & Climate Change should:**

- act to increase the transparency and public profile of its modelling of energy markets;
- ensure its models include the full expected increase in infrastructure investment and show the impact of its policies on the cost of all infrastructure; and
- continue to address weaknesses in its quality assurance before taking further major decisions, including reviewing the detailed formulae that drive its models to confirm they are free of errors.

We give more detailed recommendations on the models in our report, *Modelling the impacts of infrastructure investment on consumer energy bills*, Volume II.<sup>9</sup>

**e As Ofgem and Ofwat adopt their new regulatory approaches, they should assure themselves in a proportionate way that:**

- the data companies report to them are reliable and accurate;
- mechanisms set up to allow consumers to engage with and challenge company proposals are independent and have access to the necessary experience and resources; and
- new infrastructure will be fit for purpose for the whole of its expected life.

In due course, the regulators should formally evaluate whether the changes to their regulatory approaches are ensuring that new infrastructure provides value for money.

**f The Treasury, departments and regulators need to formalise and properly resource the mechanisms needed to ensure effective collaboration across sectors:**

- Without interfering with regulators' independence, Treasury should set out where regulators and departments should prepare data consistently to allow aggregation. The Treasury should also ensure that appropriate information is gathered to identify peaks in demand for construction skills, as these could increase the cost of new infrastructure.
- Regulators should ensure that the Joint Regulators Group<sup>1</sup> has sufficient dedicated resources. The Group should report annually on the work it has done and areas where it would be useful to collaborate further.

<sup>1</sup> The Joint Regulators Group is an association of the UK's economic and competition regulators.

# Part One

## What infrastructure investment means for consumers

**1.1** Given the planned increase in infrastructure investment, and existing concerns about the affordability of household bills, this part sets out:

- the need for new infrastructure;
- the current situation for consumers and how this is likely to change; and
- the need for the government and regulators to understand and manage the impact of infrastructure investment on households, including when the costs are not directly visible because they are not funded through the public finances.

**1.2** It is not possible to calculate the proportion of bills that is due to infrastructure costs, but as Appendix Three shows, infrastructure affects many elements of energy and water bills. Other things that affect the price of bills include volatile oil and gas prices, and measures to help households reduce their consumption, such as installing meters. UK government and regulators have very little influence over some parts of bills, like the price of gas. They have much more influence over the type and quantity of infrastructure built. In the telecoms market, technological innovation and consumer demand are major drivers of the investment decisions made by private companies.

### **Need for new infrastructure**

**1.3** The government has identified that significant new investment in infrastructure is needed. This stems from government objectives to promote economic growth and competitiveness, as well as from:

- **Tackling climate change and energy security:** For example, to meet the EU's renewable energy target, the UK is legally committed to meeting 15 per cent of our energy demand from renewable sources by 2020. The Department of Energy & Climate Change expects this will require the proportion of renewable energy to be 3.7 times higher than 2012 levels.
- **Compliance with policies to protect the environment and public health:** For example, the EU's Water Framework Directive will require investment by water companies to meet environmental quality standards. Nationally, the Health and Safety Executive is requiring some gas iron mains to be replaced with safer plastic pipes by 2031.

- **Maintenance and replacement:** Much of our existing infrastructure requires renewal, so it can continue to provide services at the current level. Around a fifth of the UK's existing electricity generating capacity is scheduled to close over the next decade.
- **Rising demand:** The Office for National Statistics projects the UK population to increase by 11 per cent by 2030, requiring services for more people, and additional connections between new homes and infrastructure networks.

**1.4** The government's National Infrastructure Plan 2012,<sup>2</sup> and the associated 'pipeline' of investment projects, identified more than 550 public and privately-owned planned infrastructure projects with a total estimated value of £310 billion, expected over the next decade and beyond. £123 billion of the investment is in energy generation, £53 billion in energy networks and other energy infrastructure, £16 billion in water and £16 billion in communications.<sup>2</sup> Of the £310 billion investment, £257 billion is expected by 2020, £158 billion of which is in energy.

**1.5** HM Treasury acknowledges that the pipeline is not comprehensive. For example, the pipeline only includes the expected cost of water infrastructure up to 2015 when the current five-year regulatory settlement ends, as well as the proposed Thames Tideway Tunnel. However, between 2015 and 2030, there will be three further water regulatory settlements each of which could require investment of a similar order of magnitude to the £22 billion of investment Ofwat approved for the period 2010–2015.

**1.6** Other commentators have argued that much more than £310 billion of infrastructure is needed. A 2009 report estimated that the UK needed around £500 billion of new infrastructure by 2020.<sup>3</sup> If all the planned infrastructure is built, the estimates of £310 billion to £500 billion suggest that UK annual expenditure on construction will need to be between two and four times higher than it was in the period 1980 to 2010. However, the Treasury told us that it does not expect all of the infrastructure identified to be built.

## **Situation for consumers**

**1.7** The relationship between the amount of investment by private companies in new infrastructure and customer bills is complex. The cost of infrastructure investment to consumers will depend on:

- **What infrastructure is built and at what cost:** The cost of operating and maintaining that infrastructure will also be important factors.

<sup>2</sup> The remainder is not expected to be wholly funded by consumer bills and includes £92 billion in transport, £5 billion for flood defences and £3 billion waste infrastructure.

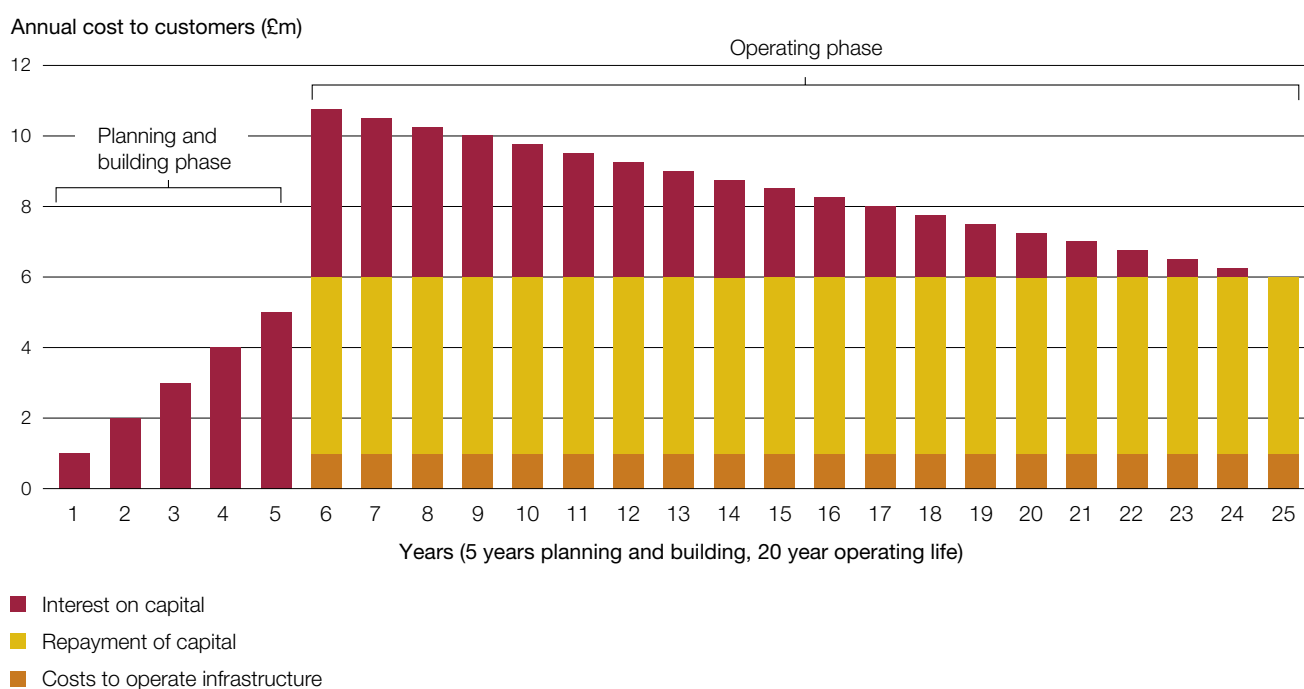
<sup>3</sup> Policy Exchange, *Delivering a 21st Century Infrastructure for Britain*, September 2009.



- How consumers repay investment:** New infrastructure is often paid back through bills over many years. Repayment covers the cost of the infrastructure as well as the interest charged on private finance. Typically, water and energy network infrastructure is repaid by consumers over 15 to 45 years and sometimes much longer.<sup>4</sup> This spreads the costs for consumers, but means that bills remain higher for longer. **Figure 1** illustrates a typical repayment scenario.
- How far consumers are already paying for existing infrastructure:** In the water sector, for example, much of the £85 billion of infrastructure constructed in 1990 to 2010 continues to be repaid via customer water bills. In addition there are costs for maintaining existing infrastructure. Maintenance costs now account for nearly half of all investment in water.

**Figure 1**

How consumers might pay back a £100 million infrastructure investment



**Notes**

- This shows the payback profile for regulated infrastructure where new infrastructure is added to a 'Regulatory Asset Base'. This is the case in the water sector and for energy distribution and transmission networks.
- Assumptions: five-year planning and building phase, 20-year operating phase; original £100 million capital investment is incurred at £20 million a year over years one to five; capital repayments evenly spread over years six to 25; constant 5 per cent interest on capital; operating costs (for example, cost of staff to operate infrastructure) of £1 million per year.

Source: National Audit Office

<sup>4</sup> Some infrastructure, such as reservoirs and sewers, are currently repaid indefinitely.

**1.8** Spending on energy and water bills rose by 44 per cent and 21 per cent respectively, in the period 2002 to 2011 (**Figure 2**), while median incomes were still the same in 2011 as they were in 2002 (**Figure 3**) (all figures calculated in 2012 prices). Changes in water bills vary considerably by water company, but the average increase stems largely from a combination of new investment to enhance networks as well as the need to maintain existing infrastructure. In energy, the picture is more complex, and bills have risen as a result of increases in gas and oil prices, as well as government policies and new infrastructure investment.

**1.9** In contrast, spending on telecoms fell 2 per cent in real terms over 2002 to 2011, although there was significant infrastructure investment during this period resulting in more connections and new services for consumers. The average cost per unit of mobile and fixed line calls fell significantly as did the average monthly cost per mega bit of fixed broadband connection.

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## Figure 2

Changes in average household spending on bills in a decade

Household bill		2002 (£)	2011 <sup>2</sup> (£)	Change over time (%)
Energy	Nominal prices <sup>1</sup>	608	1,128	86
	2012 prices	805	1,157	44
Water	Nominal prices	237	370	57
	2012 prices	313	380	21
Telecoms	Nominal prices	501	636	27
	2012 prices	663	652	-2

### Notes

- 1 Nominal prices show the actual cash value of bills that households pay.
- 2 We used data from 2011 as it is the most recent publicly available data on household spending.
- 3 Water bills fell by 12 per cent between 1999 and 2000, but have risen by more than 40 per cent in real terms since privatisation in 1989.

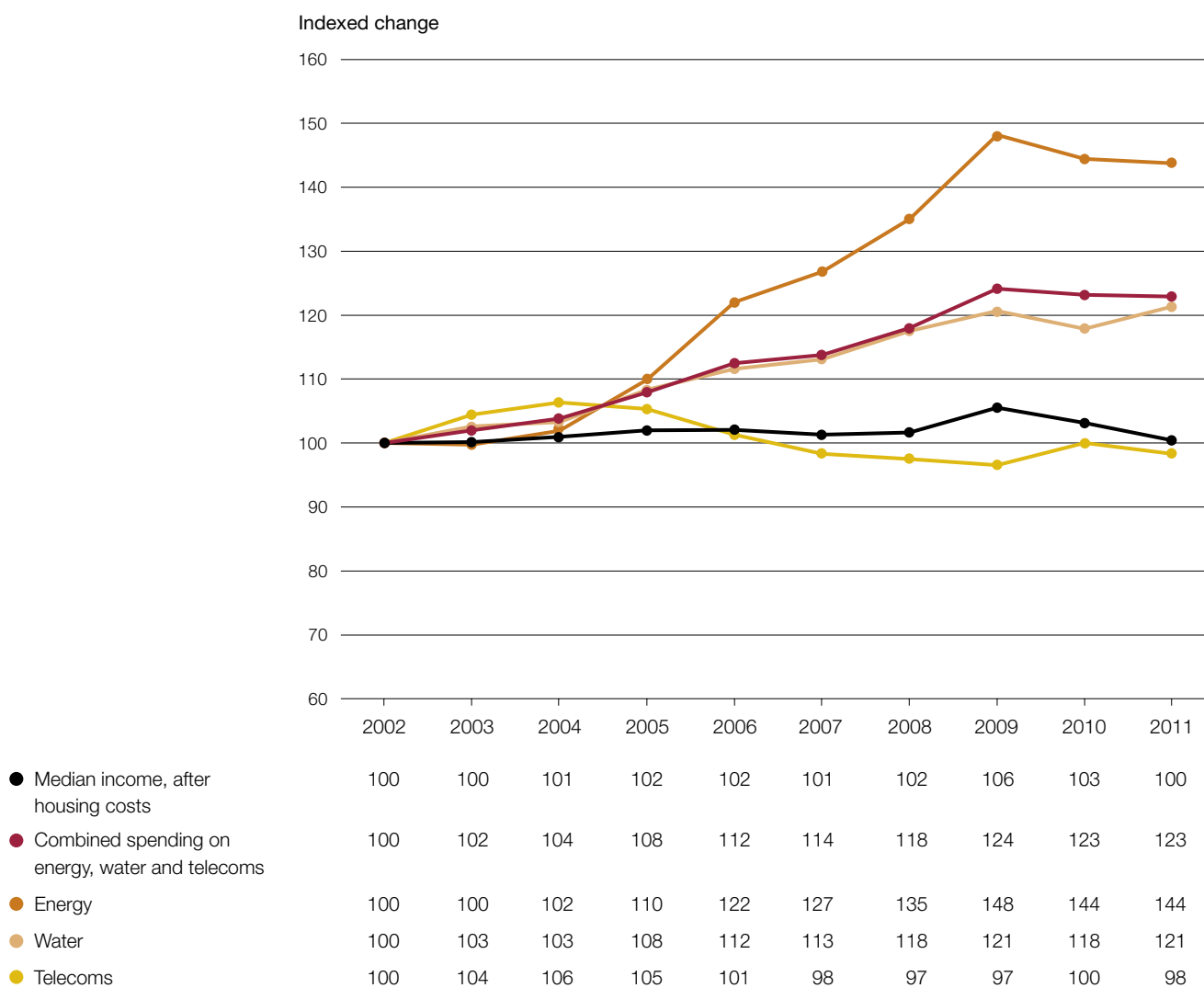
Source: National Audit Office analysis of Office for National Statistics data from the *Living Costs and Food Survey*

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**Figure 3**

Spending on energy and water bills rose more steeply than median incomes, 2002–2011

Index of utility bills and incomes (real terms, 2002 = 100)

**Note**

1 All figures are at 2012 prices.

Source: National Audit Office analysis using Office for National Statistics data from the *Living Costs and Food Survey* April 2002 to December 2011, and Department for Work & Pensions data from the *Family Resources Survey* April 2002 to March 2011

**1.10** In 2011, low-income households<sup>5</sup> spent 15 per cent of their total expenditure on energy and water bills, compared to 8 per cent for all households (**Figure 4**). These households are therefore more likely to be adversely affected by any future rises in bills. The best available data suggests that incomes of low-income households fell by 11 per cent in real terms over 2002–2011.<sup>6</sup> These households have also been harder hit by other rises in the cost of living, such as rising food costs. Pensioner households, which spent 10 per cent and 4 per cent of their total expenditure on energy and water bills respectively in 2011, are also particularly affected when utility costs rise.

**1.11** A significant proportion of households are already at risk of struggling to afford energy and water bills:

- The Department of Energy & Climate Change estimated that 2.4 million households in England (11 per cent of households) were ‘fuel poor’ in 2011.<sup>7</sup> Although the proportion has remained roughly constant since 2003, the severity of fuel poverty for these households has worsened.
- In 2011, Ofwat research assessing the affordability of water bills noted the 40 per cent real terms rise in bills since privatisation in 1989 and concluded that affordability is becoming a real issue for some customers. By updating measures used by Ofwat, we estimate that in 2011-12, 12 per cent of households spent more than 5 per cent of their income on water and sewerage bills. This compares to 8 per cent of households in 2002-03.<sup>8</sup>
- The situation in telecoms is different. Households have more discretion over their level of spending on telecoms services than energy and water. Two per cent of households report that they do not have an internet connection because of high equipment or access costs: many more households, 9 per cent, reported they did not need to be online.<sup>d</sup> BT basic, a social tariff that BT is required to make available to those on certain state benefits, represents just 2 per cent of household income after housing costs, for low-income households.

**1.12** The aggregate pressure on consumer bills has also been suggested as a cause for concern:

- Research by Consumer Futures<sup>9</sup> suggests that it is usually the same consumers who struggle to pay fuel bills who also struggle to pay water bills and telecoms bills.<sup>e</sup>
- According to research by the Money Advice Service, 52 per cent of households now say they are struggling to keep up with their bills and credit commitments, compared with 35 per cent in 2006.<sup>f</sup>

<sup>5</sup> Those households with the lowest 10 per cent of incomes.

<sup>6</sup> The Department for Work & Pensions, which publishes the statistics, considers that results for the bottom 10 per cent of reported incomes are particularly vulnerable to measurement problems.

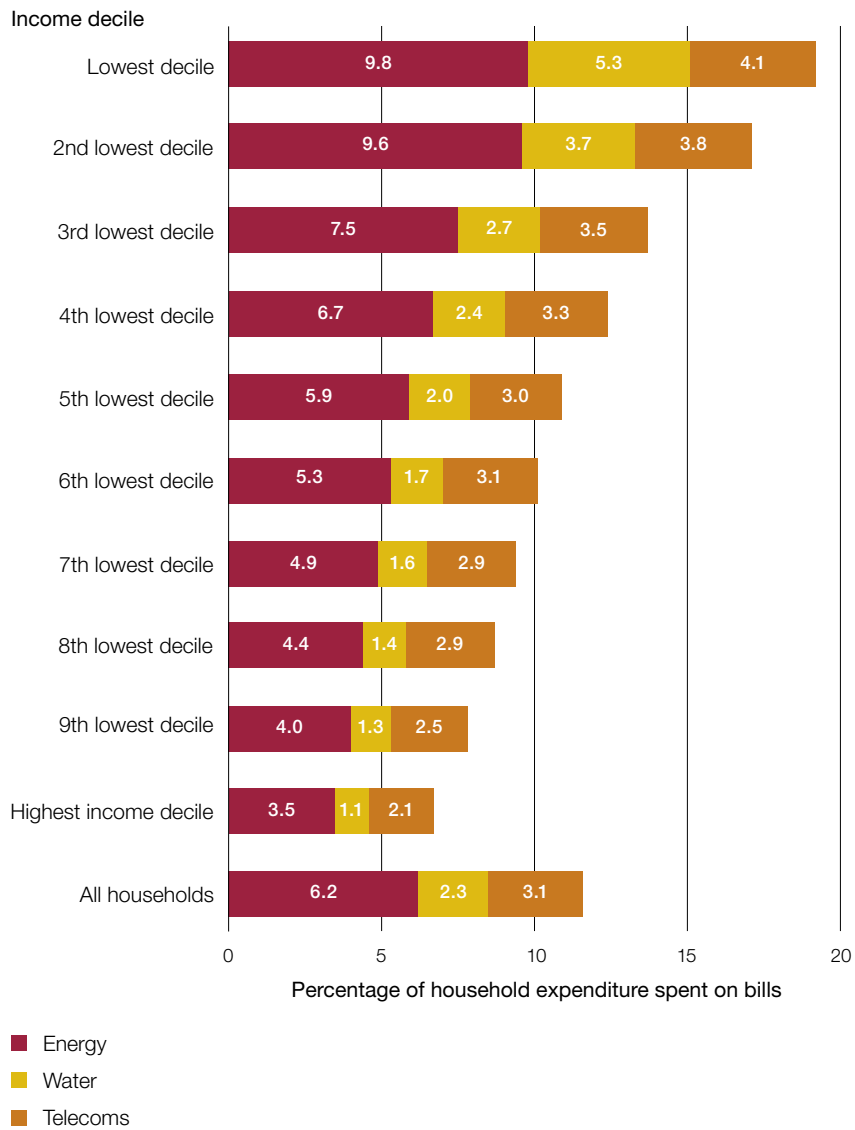
<sup>7</sup> Under the government’s new definition, a household is defined as fuel poor if income is below the poverty line (after energy costs); and energy costs are higher than is typical for household type.

<sup>8</sup> Income after housing costs for households in England and Wales. This measure is not comparable with the number of households that are defined as ‘fuel poor’. See Ofwat, *Affordable for all and Affordability and debt 2009-10* – current evidence, 2011, available at: [www.ofwat.gov.uk/future/customers/metering/affordability/pap\\_tec201105affavid.pdf](http://www.ofwat.gov.uk/future/customers/metering/affordability/pap_tec201105affavid.pdf)

<sup>9</sup> Consumer Futures is currently a non-departmental public body sponsored by the Department for Business, Innovation & Skills and represents consumers across regulated markets.

**Figure 4**

Low-income households spent a greater share of their total expenditure on energy, water and telecoms bills, 2011



**Note**

1 We used household level data to calculate the proportion of household expenditure that is spent on utilities. Then we calculated the average proportion for each decile.

Source: National Audit Office analysis based on Office for National Statistics data from the *Living Costs and Food Survey 2011*

**1.13** The available projections indicate energy and water bills are likely to continue rising (**Figure 5**), despite government policies to help reduce energy bills. The Department of Energy & Climate Change projects that bills will increase by 18 per cent up to 2030 (under central fossil fuel price assumptions), although we have a few concerns about the modelling work this is based on, discussed in Part Two. It also forecasts that while the number of households in fuel poverty will remain roughly constant, the severity of their situation will worsen.<sup>9</sup> There are no official projections of water bills available that take account of current regulatory and policy decisions. The only national projections of future water bills were produced in 2010 by a water company, Severn Trent. The Department for Environment, Food & Rural Affairs and Ofwat told us they have concerns that this projection is out of date, and does not reflect government and regulatory decisions since 2010 or the current lower cost of borrowing. Ofwat believes that water bills have the potential to fall in real terms for the period 2015–2020, reflecting the lower cost of capital, but this does assume the same level of investment as Ofwat approved for the 2010–2015 regulatory period.<sup>10</sup> Ofcom told us it does not project future telecoms bills because it is challenging to anticipate how the market will evolve. We review the extent of work by departments and regulators to forecast bills and assess their affordability in Part Two.

**1.14** The precise impact on consumers will depend on:

- What happens to incomes and other living costs up to 2030. For example, if incomes rise in line with inflation then the average projected increase in energy and water bills in Figure 5 would be 20 per cent relative to incomes. Whereas, if incomes do not grow at all then energy and water bills would rise 69 per cent, compared to household budgets.
- How changes in incomes and utility bills vary by different groups. For example, low-income households, or those whose income grows more slowly than the average, will be more adversely affected by price rises.

## Figure 5

Projections of UK energy and water bills (average household bill)

	2013	2030	Percentage change
Energy (Department of Energy & Climate Change, 2013) <sup>2</sup>	£1,255 (2012 prices)	£1,476 (2012 prices)	18% (2012 prices)
	£1,290 (nominal)	£2,135 (nominal)	66% (nominal)
Water <sup>3</sup> (Severn Trent, 2010)	£377 (2012 prices)	£483 (2012 prices)	28% (2012 prices)
	£388 (nominal)	£698 (nominal)	80% (nominal)
<b>Combined total (energy and water)</b>	<b>£1,632 (2012 prices)</b>	<b>£1,959 (2012 prices)</b>	<b>20% (2012 prices)</b>
	<b>£1,678 (nominal)</b>	<b>£2,833 (nominal)</b>	<b>69% (nominal)</b>

### Notes

- 1 Nominal prices have been inflated from 2012 prices using CPI inflation projections in the Office for Budget Responsibility report *Economic and Fiscal Outlook*, March 2013.
- 2 Estimates include the impact of government policies to reduce energy use, but otherwise assume constant energy demand for the average reference household.
- 3 These are average bills. The actual amounts will vary by water and sewerage company.

Source: National Audit Office analysis by the Department of Energy & Climate Change and Severn Trent Water (*Changing Course*, 2010)

## **Government and regulators: managing consumer-funded infrastructure**

**1.15** There is limited scope for individual consumers to directly influence what infrastructure gets built and when: they rely on government and regulators to protect their interests. Decisions taken now about new infrastructure will have significant long-term cost implications for consumers, so it is important the right decisions are made.

**1.16** Both regulators and government have important choices to make that influence what infrastructure is needed and how the costs affect consumers. In broad terms, government departments set the overall objectives and policies for each sector. Regulators set a framework for the achievement of these policies and objectives by the regulated companies. It is then for regulated companies to plan and deliver the infrastructure within the framework set by the regulator. We set out respective objectives and decisions below:

### Government objectives and decisions:

- Infrastructure UK has an overarching objective to secure value for money in new infrastructure, and recognises this extends to considering affordability.
- Government policy decisions – such as climate change targets and reliability standards – influence how much, and what type of infrastructure is needed. Government policies may also influence consumers to reduce their demand, for example by introducing new Smart Meters for energy use.
- Even where the government has binding commitments, such as the EU's Water Framework Directive, there is a degree of national flexibility over implementation. This includes exemptions or discretion over timescales if measures are poor value for money or unaffordable. The Department for Environment, Food & Rural Affairs told us it has estimated the total cost of implementing the Water Framework Directive at around £30 billion over 43 years.
- Government may offer support to particular groups or regions to mitigate the impact of rising bills. For example, in 2011, the government gave every South West Water customer a £50 annual subsidy to reduce the impact of their high water bills. Likewise, the Warm Home Discount reduces vulnerable customers' electricity bills by £135 annually.<sup>11</sup>
- In energy, the government has introduced the Levy Control Framework, which sets a cap on the total cost to consumers of certain government policies. We will be reporting separately on the Levy Control Framework later this year.
- Government guarantees and decisions on the planning and tax system also have a strong influence on private companies' decisions to invest in infrastructure.

<sup>11</sup> Vulnerable customers include those on low incomes and with high energy needs.

### Regulators' objectives and decisions:

- Ofgem, Ofwat and Ofcom all have objectives to protect consumer interests in their sectors. They are independent of government, to avoid the potential for political intervention in commercial investment decisions.
- Economic regulators set policies to promote competition where possible.
- Where competition is less prevalent, economic regulators can control prices and use incentive-based frameworks to influence the companies building the infrastructure to make trade-offs. This means regulators approve the revenues or charges that companies collect. Trade-offs could be between the price and quality or reliability of services, or between extending the life of assets or investing in new assets. This can change the timing and cost of investments.<sup>12</sup>
- In setting prices, Ofwat and Ofgem also set a notional cost of capital, intended to reflect the financing costs of companies. This can have a big impact on costs to consumers.
- Regulatory bodies such as the Environment Agency and the Health and Safety Executive set regulatory standards that influence the need for new or upgraded infrastructure.

### Private companies' objectives and decisions:

- Companies are accountable to their shareholders and boards, and aim to maximise profits and dividends to shareholders.
- Companies take decisions to invest in constructing and maintaining infrastructure assets, in order to sell services to consumers. Their investment decisions are influenced by government and regulators' decisions.

**1.17** Good information about the cost to consumers of new infrastructure and its likely affordability is needed to help both government and regulators make sound decisions (**Figure 6**). They need to understand the overall long-term costs of planned infrastructure under different scenarios and whether different groups of consumers will be able to afford to pay for that infrastructure.

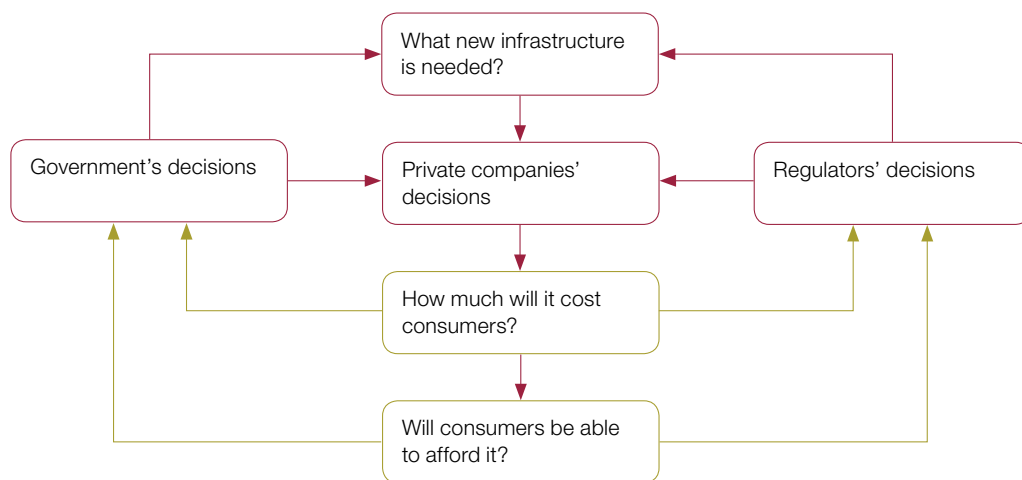
**1.18** Knowing 'how much is too much' in the cost of new infrastructure, would help mitigate the risk that the public perceives the level of future bills to be unaffordable for too many people, which could undermine public confidence in regulation and lead to higher financing costs in the long run. **Figure 7** illustrates this potential feedback cycle. A stable, predictable regulatory regime was the single most important factor in investment decisions in our survey of private sector experts. Of all respondents, 93 per cent identified this as a very important factor in deciding whether or not to invest in UK infrastructure.

<sup>12</sup> For example, Ofgem told us it now explicitly includes consideration of the timing of investments when it appraises companies' investment proposals.



**Figure 6**

The government and regulators need good information on the impact of infrastructure on consumers to inform their decisions

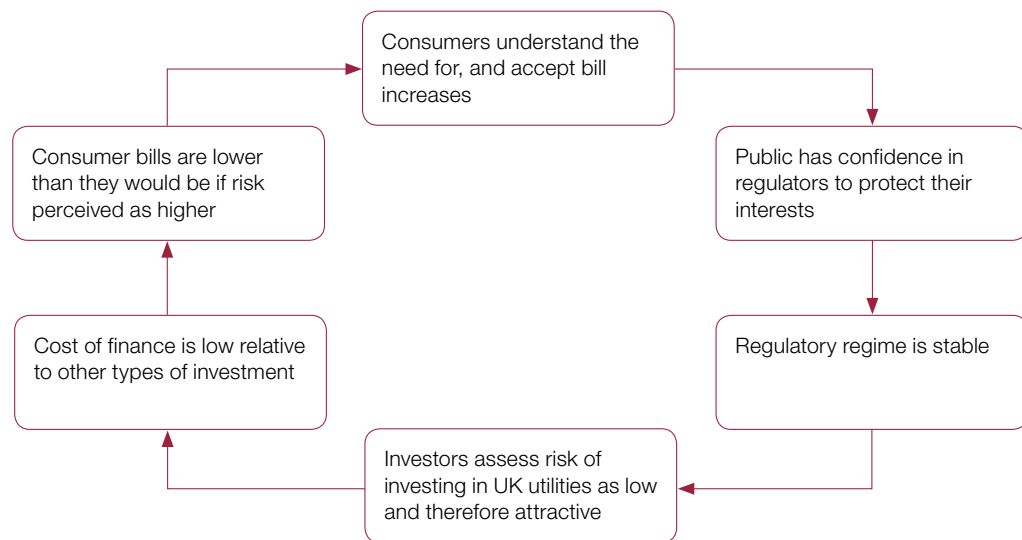


← Decisions about infrastructure  
 → Information informs decisions

Source: National Audit Office

**Figure 7**

Acceptability of bill increases may influence the stability of the regulatory regime, with knock-on effects for consumer costs



Source: National Audit Office, adapted from analysis by the Consumer Council for Water

## Part Two

### Assessing the impact of infrastructure investment on consumers

**2.1** This part examines the work that the government and regulators do to monitor, forecast and assess the affordability of bills in the energy, water and telecoms sectors.

#### **Clarity of roles and responsibilities**

**2.2** Government policymakers need to consider issues of affordability, but regulators have statutory duties to protect consumers. Both government and regulators therefore have an interest in understanding the affordability of bills.

**2.3** There is no clear guidance about who – regulators or government – is responsible for assessing affordability. There is also no common approach to measuring affordability in the three sectors we looked at.

**2.4** Two recent reviews in the energy and water sectors have highlighted a lack of clarity over the respective roles and responsibilities between the relevant department and the regulator on affordability. Ofwat's submission to the Gray review stated: "on the wider social issues around affordability, bad debt and metering ... we would welcome more clarity from the government about these policy issues".<sup>h</sup>

**2.5** Following the Gray review,<sup>h</sup> in May 2013, the Department for Environment, Food & Rural Affairs published a strategic policy requiring Ofwat to "keep under review whether companies are taking sufficient action to have a measurable positive impact on the needs of those customers that may struggle to afford their charges".<sup>i</sup> But it does not specify whether Ofwat is expected to forecast future bills, or report on current or future affordability. Nor is it clear whether it is Ofwat's role to determine what is affordable.

**2.6** The government's review of Ofgem in 2011 identified a blurring of responsibilities between the regulator and government, partly due to the increasing importance of social and environmental policy in the energy sector. In 2014, government plans to publish a statement of strategic priorities for the energy sector which will specify responsibilities and objectives for Ofgem, including on affordability. It will be important that these outcomes reflect Ofgem's ability to influence affordability, since the Department of Energy & Climate Change's policies will continue to have a significant influence over the affordability of bills.

**2.7** In telecoms, the EU's Universal Service Obligation requires that all premises are provided with fixed line telephony at an 'affordable price'. It is for individual member states to decide what is an affordable price. In the UK, Ofcom implements the Obligation through specific conditions it imposes on BT. The BT Basic tariff serves to meet the Obligation. It is currently charged at £14.85 per quarter and is available to those receiving certain state benefits. The price is set by BT, although Ofcom has in the past consulted publicly on BT's proposals. However, it is unclear whether Ofcom has responsibility for determining whether the current price is affordable.

### **Work within each sector**

**2.8** **Figure 8** overleaf summarises the relevant work by departments and regulators in the energy, water and telecoms sectors. We recognise the challenges of making long-term forecasts given uncertainty about how markets might develop.

### **Energy**

**2.9** The best effort to forecast future bills and consider affordability has been in the energy sector by the Department of Energy & Climate Change.

#### Level of bills

**2.10** The Department reports regularly on the level of current and future energy bills.<sup>1</sup> These projections do not separately identify which part of future bills relates to infrastructure, although infrastructure costs are included in the underlying models. The analysis for both current and future bills is disaggregated by different consumer groups. It does not currently include the disabled – a group to which the Department is required by law to have regard, although discussion of the impacts on this group are included in policy Impact Assessments where required.

**2.11** When setting prices for energy transmission and distribution networks, the regulator Ofgem assesses the impact on average bills up to the end of the eight-year regulatory period, but does not analyse the impact for different types of consumer. In October 2013, Ofgem published its impact assessment guidance to provide a stronger emphasis on assessing distributional effects. The revised guidance requires consideration of socio-economic groupings, fuel type usage and regional factors, as well as impacts on fuel poverty.

**Figure 8**

## Government and regulators' work to assess consumer bills and affordability

Sector	Body	Monitoring current bills <sup>1</sup>	Forecasting future bills	
		Different groups covered by analysis	Are future bills forecast?	Different groups covered by analysis
<b>Energy, of which:</b> Overall energy bills	DECC	housing tenure type of heating fuel household expenditure decile household composition <sup>2</sup>	Yes – forecast to 2030	housing tenure type of heating fuel household expenditure decile household composition <sup>2</sup>
Part of bill subject to revenue controls carried out by Ofgem (networks)	Ofgem	analysis of impact of price control for the average bill	Yes – to the end of each eight-year price setting period	None (average only)
<b>Water</b>	Defra	Not monitored	No	n/a
	Ofwat	region metered versus unmetered customers <sup>4</sup>	Yes – to the end of five-year price control period	region metered versus unmetered customers
<b>Telecoms</b>	DCMS	Not monitored	No	n/a
	Ofcom	Ofcom does not report expenditure on telecoms by different groups, but reports the take-up of services by different groups (e.g. socio-economic groups, age, etc.)	No	n/a

**Notes**

- 1 Current expenditure on energy, water and telecoms bills is also recorded by the Office for National Statistics.
- 2 Household composition includes: single non-pensioner, couple no children, couple with children, single parent family, couple pensioners, multiple tax units no children, multiple tax units with children.
- 3 Ofgem's definition of vulnerability is when a consumer's personal circumstances and characteristics combine with aspects of the market to create situations where he or she is: significantly less able than a typical consumer to protect or represent his or her interests in the energy market; and/or, significantly more likely than a typical consumer to suffer detriment, or that detriment is likely to be more substantial.
- 4 Ofwat approves all company charges to consumers.
- 5 From October 2013, Ofgem has updated its assessing of the impact of new infrastructure, to consider the distributional effects on different groups. This is not an assessment of the overall affordability of bills.
- 6 DECC = Department of Energy & Climate Change; Ofgem = The Office of Gas and Electricity Markets; Defra = Department for Environment, Food & Rural Affairs; Ofwat = The Water Services Regulation Authority; DCMS = Department for Culture, Media & Sport; Ofcom = The Office of Gas and Electricity Markets.

Source: National Audit Office analysis

Assessing current affordability of bills		Assessing future affordability of bills	
Is current affordability assessed?	Different groups covered by analysis	Is future affordability assessed?	Different groups covered by analysis
Yes – DECC produces an annual assessment of fuel poverty	<ul style="list-style-type: none"> <li>housing tenure</li> <li>employment status</li> <li>household expenditure decile</li> <li>household composition</li> <li>region</li> </ul>	Yes – for the first time, in 2013 DECC forecast fuel poverty to 2027 under different scenarios for fossil fuel prices and income growth	No (total number of fuel-poor households only)
Partly – Ofgem publishes a range of data provided by energy suppliers and carries out qualitative research to assess which customers are vulnerable <sup>8</sup>	Data shows domestic customers': <ul style="list-style-type: none"> <li>● payment methods</li> <li>● levels of debt</li> <li>● disconnection rates</li> <li>● use of prepayment meters</li> </ul>	No <sup>5</sup>	n/a
No	n/a	No	n/a
Not currently, although Ofwat produced a one-off assessment in 2011	2011 assessment covered: <ul style="list-style-type: none"> <li>● type of tenure</li> <li>● region</li> <li>● metered versus unmetered</li> <li>● household composition</li> <li>● income decile</li> <li>● receipt of benefits</li> </ul>	No	n/a
No	n/a	No	n/a
No overall assessment, but Ofcom publishes data relevant to affordability and carries out bespoke analysis	Bespoke analysis has included: <ul style="list-style-type: none"> <li>● impact of non-geographic call rates on lower income families</li> <li>● consumer debt</li> </ul>	No	n/a

## Affordability

**2.12** Energy is the only sector where there is a statutory definition of, and requirement to report on, poverty. This takes the form of the fuel poverty measure. In addition to reporting on fuel poverty, the Department of Energy & Climate Change also estimates the current and future impact of policies on energy bills for households across the income and expenditure distribution. This analysis is taken into account when considering the affordability of policies. This year, the Department of Energy & Climate Change has also started publishing projections of fuel poverty.<sup>k</sup>

**2.13** In addition to monitoring fuel poverty, the Department monitors consumer debt levels and disconnections. Ofgem has also recently published a strategy which sets out its approach to tackling consumer vulnerability, and its expectations of energy companies in this regard.

## Quality of DECC modelling

**2.14** The Department's estimates of future bills are based on detailed models, which it has devoted significant resources to developing. The models are an important step in understanding and managing the impact on consumers of rising energy bills – rises which are partly driven by infrastructure investment.

**2.15** The Department relies extensively on these models to make its policies on electricity market reform and considers its main electricity market model<sup>13</sup> to be 'business-critical'.

**2.16** In our survey of private sector infrastructure experts, 65 per cent of respondents had at least some confidence in the Department's forecast impact of energy and climate change policies on consumer bills and charges. This compares with 17 per cent of respondents who had very little or no confidence, and 17 per cent who did not know.<sup>14</sup>

**2.17** We reviewed the models and concluded that overall, they perform well in many areas. However, given the weaknesses described below, we would need to see our recommendations addressed before we could have the highest degree of confidence in the model forecasts:<sup>15</sup>

- The overall modelling approach is broadly appropriate. The models incorporate many key determinants of bills, including the costs of different technologies for generating energy, investors' financing costs, and annual and daily fluctuations in electricity demand.

<sup>13</sup> The Dynamic Dispatch Model.

<sup>14</sup> Because of rounding, figures do not add up to 100 per cent.

<sup>15</sup> We audited the Dynamic Dispatch Model, and the Average Prices and Bills Model, using our established framework for auditing models.

- There is an inconsistency between the amount of investment the private sector is currently planning, as identified in the National Infrastructure Plan, and the amount of investment DECC's models predict is needed to meet government objectives. The Department's models currently predict that only around three quarters of the level of energy investment identified in the National Infrastructure Plan will be required to meet government objectives. This is because the Department's models calculate the level of theoretical investment required, based on assumptions about the future (e.g. energy demand, fossil fuel prices). In contrast, the National Infrastructure Plan shows the private sector's intended investment, adjusted down to reflect that not all proposed investment is likely to go ahead.
- The Department's modelling does not allow it to identify how much of the increase in energy prices from investment in energy transmission and distribution networks is due to its policies.
- The models do not currently allow the Department to model strategic behaviour by suppliers, investors or generators, for example if large electricity generators were to limit supply to increase prices.
- There are weaknesses in the Department's quality assurance of its models. For example:
  - The Department has not carried out a detailed assessment of the performance of its business critical model's forecasts against actual outcomes during the period since its development.
  - The underlying formulae behind the main business critical model have not been independently reviewed to check for possible errors, although the Department recently commissioned an independent review of part of the model.
  - Sensitivity testing of how the model reacts to changes in assumptions has been unsystematic. We carried out additional sensitivity tests in situ at the Department, using its models, but the Department declined to provide us with the results of these tests, citing a lack of staff resources to be able to quality assure the findings.

The Department told us it is working to improve and systematise its approach to quality assurance.

**2.18** We have not audited the Department's estimates of the energy efficiency impacts of its policies for this report. In previous work, we have sometimes found that there is uncertainty over how much, and for how long, consumers will change their energy use and therefore whether expected energy efficiency savings will be fully realised.<sup>l</sup> Our full findings on these models are available in our report *Modelling the impacts of infrastructure investment on consumer energy bills*.<sup>m</sup>

## **Water sector**

### Level of bills

**2.19** Neither Ofwat nor the Department for Environment, Food & Rural Affairs publishes an assessment of long-term water bills. Ofwat publishes information on water bills that covers the duration of each five-year price review period. This means that when the end of the price review period approaches (as it is now, with the current one ending in 2015), the available information about future bills covers only a short period.<sup>16</sup>

**2.20** Ofwat carried out a one-off exercise in 2006 to consider scenarios for future average water bills up to 2030, but has not updated this exercise.<sup>n</sup> This analysis concluded that future bills would largely depend on the priority given to environmental and public health objectives.

**2.21** The Department for Environment, Food & Rural Affairs partially updated Ofwat's scenarios in 2011, but did not consider this work sufficiently reliable for publication. Some water companies have published long-term forecasts of future bills in their region, and Severn Trent carried out a national assessment in 2010. This suggests that such analysis is feasible and useful for engaging with customers. However, assessments by water companies depend on assumptions about government policies and regulatory activity, and are not independently validated.

### Affordability

**2.22** There is no official definition of affordability in water. In 2011, Ofwat published a detailed analysis of affordability, using 2009-10 data.<sup>o</sup> This included assessing affordability issues by different consumer groups and demographics. However, this assessment was not forward-looking and Ofwat has no plans to update the analysis.

<sup>16</sup> Ofwat does engage with water companies to identify likely scenarios for future bills.



## Telecoms sector

### Level of bills

**2.23** There are no forecasts of future telecoms bills. Ofcom said it does not attempt to make forecasts because any forecasts would almost certainly be inaccurate, as it is hard to predict trends in technology and how products are used. Ofcom is also concerned that forecasts of bills could give the impression they are setting prices indirectly.

### Affordability

**2.24** There is no defined way of measuring affordability in telecoms, and no estimate of the number of consumers who may be struggling to afford their bills. However, Ofcom regularly collects and publishes a variety of data which helps it identify affordability concerns. It also carries out research on issues such as consumer debt.

**2.25** Ofcom is now undertaking a research project, which it expects to conclude in 2014, to better understand which telecoms services consumers now consider essential, and whether particular groups of consumers find those services unaffordable.

## Look across sectors

**2.26** No one in government is drawing together an overall forecast of consumer utility bills aggregated across the sectors. Consequently, each department could set policies, and regulator set prices, believing them to be affordable, but consumers could still find the combined impact of all their bills rising simultaneously to be unaffordable. There is also no analysis of the overall affordability implications of rising bills for different consumer groups. Taken together with an understanding of other changes in living costs, this would help the government manage the impact for these groups.

**2.27** Infrastructure UK considers that its remit extends to considering affordability. However, it does not currently interpret its remit as requiring it to assess the overall impact of infrastructure investment on consumers or engaging with consumers about what is an acceptable level of overall spending on infrastructure. Infrastructure UK regularly liaises with private sector groups, but not with consumer representatives.

**2.28** In the 2010 National Infrastructure Plan, Infrastructure UK committed to establish a framework for assessing overall affordability but it subsequently said it was not feasible.<sup>p</sup> In 2011, Infrastructure UK did estimate the cost implications of energy and water infrastructure for household bills. But it decided not to publish the analysis believing it would have been rendered out of date by developments in energy policy. We note that the Department of Energy & Climate Change has published forecasts of future energy bills since 2010.

**2.29** If bills were forecast over similar periods in each sector, it would not be technically difficult to combine forecasts across sectors to give a combined level of future bills.

**2.30** To judge whether different households are likely to be able to afford future bill increases, it is necessary to make assumptions about wider macroeconomic factors. These include levels of employment, income, interest rates and the cost of living. Although such variables are inherently uncertain, a common approach across sectors would allow a range of scenarios to be developed.

**2.31** In relation to managing the costs of infrastructure, HM Treasury told Parliament that it has an affordability framework, which tries to capture all the large macroeconomic effects on the costs of living.<sup>q</sup> Although the Treasury examines the impact of current consumer price inflation (including inflation in household bills) on different income groups, this is only a guide to the immediate spending pressures on consumers. It does not indicate the impact of infrastructure investment on household budgets in the medium or long term. This is the period over which the cost of new infrastructure will impact on consumer bills.

# Part Three

## Ensuring value for money

**3.1** In this part we examine how the government and regulators promote value for money in infrastructure paid for by consumers, and how far the government and regulators engage with consumers before approving infrastructure plans.

### **Nature of utilities markets**

**3.2** Many day-to-day consumer purchases take place in competitive markets, which allow consumers to choose what and whether to buy, from who and when. The ability to shop around puts downward pressure on prices. Companies bear the impact if they make the wrong investment decisions or go over budget. These have a powerful impact on value for money for the consumer.

**3.3** Utility markets have notable features, which limit consumer choice and the effectiveness of competition:

- Energy and water are essential services, and consumers have little discretion about using them.<sup>17</sup> If consumers are concerned about their ability to pay they are usually limited to reducing their consumption, not paying their bills<sup>18</sup> or, in some sectors, switching supplier.
- Utilities are provided through large, physical regional and national networks, which limit the ease of entry of new suppliers, and make wholesale utility markets inherently uncompetitive. In energy and fixed-line communications, the national networks are operated by one or two companies. In water, households have no choice over their supplier, which is determined by the location of their home.<sup>19</sup>

**3.4** Consumers therefore rely heavily on the government and regulators to act for them, and protect their interests.

<sup>17</sup> In an increasingly digital world, communications services are arguably rapidly becoming essential too.

<sup>18</sup> Customers cannot be disconnected due to non-payment of water bills.

<sup>19</sup> There is much greater choice in energy and communications at the retail level, with many companies providing services to consumers. The government also plans to introduce elements of retail competition in the water sector.

## Ways to ensure value for money

**3.5** The government believes that competitive markets are the best way in the long-run to provide economic infrastructure services to consumers.<sup>r</sup> It is the regulators' role to promote competition and prevent market abuse. Where competition is non-existent or ineffective, regulators intervene, including by setting prices. We review work by Ofgem and Ofcom to oversee competition in their sectors in Appendix Four, Volume II.<sup>s</sup> The government also carries out other activities aimed at ensuring the value for money of new infrastructure. For example, by improving the efficiency of the planning system, and encouraging joint working between sectors.

## Regulating prices

**3.6** In markets where the regulator judges competition alone to be too weak to protect consumers, or where natural monopoly conditions do not adequately protect consumer interests, it can intervene to set prices. This is the case in the water sector and for energy transmission and distribution networks,<sup>20</sup> where price reviews occur every five and eight years, respectively.

**3.7** **Figure 9** provides a high level summary of how water and energy network infrastructure feeds into bills. At each price review, Ofgem and Ofwat review companies' investment proposals to determine what is an appropriate amount of revenue to permit companies to collect from consumers. Regulators also set performance targets for the companies. Companies then decide how best to deliver the infrastructure, while meeting the performance targets. Reflecting that regulated companies are private companies, accountable to their boards and shareholders, regulators have an important role in setting a framework of incentives for companies. These incentives are designed to encourage companies to provide the services that customers want at a price which is good value for money. For example, both Ofgem and Ofwat have mechanisms for companies to share a proportion of budgetary overspends or unforeseen efficiency gains with consumers.

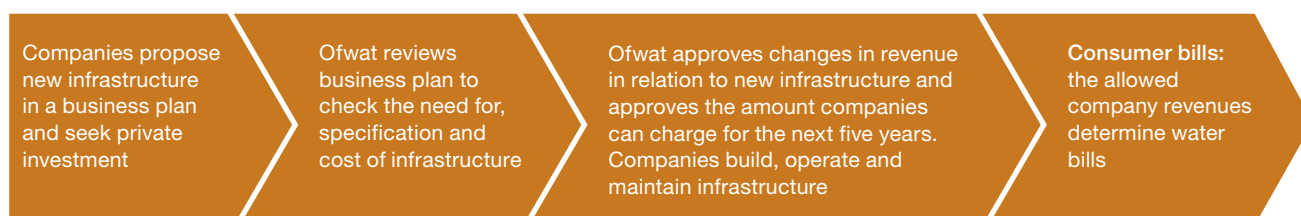
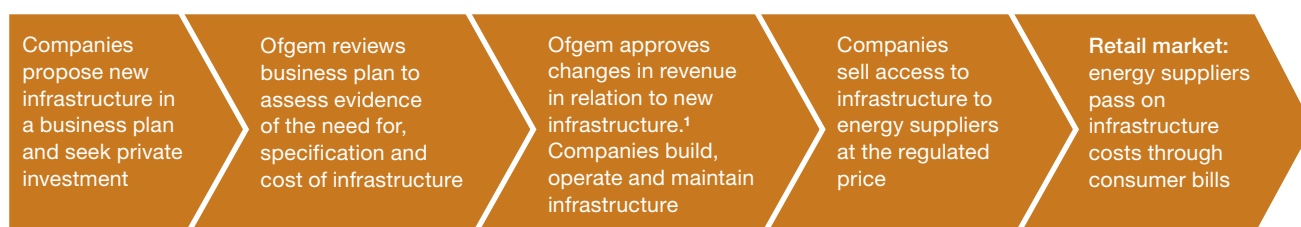
## Scrutiny of infrastructure plans

**3.8** Regulators in the energy and water sectors review the majority of each utility company's infrastructure proposals as part of a portfolio of investment set out in company business plans. Projects reviewed in this way are subject to general scrutiny and influenced by the framework of incentives that regulators set companies, rather than project specific scrutiny. Regulators compare companies' business plans, with the aim of identifying sources of cost reduction and efficiency that can be shared.

<sup>20</sup> Transmission and distribution network costs account for around 20 per cent of the household energy bill.

**Figure 9**

## How water and energy network infrastructure costs feed into bills

**Water infrastructure****Energy transportation infrastructure****Note**

<sup>1</sup> Ofgem generally approves changes in revenue in relation to new infrastructure when it sets revenues for the next eight years.

Source: National Audit Office

**3.9** Regulators' approach to scrutinising infrastructure projects that consumers pay for differs from the government's approach to scrutinising capital projects that taxpayers pay for. Taxpayer-funded capital projects are expected to receive individual detailed scrutiny.

**3.10** When regulators examine business plans they set a notional cost of capital, intended to reflect the financing costs the company will pay to private financiers who provide the capital for the infrastructure projects. In the water sector, Ofwat estimates that a 1 per cent rise in the cost of capital to result in approximately a 6 per cent to 7 per cent increase in household bills, so this is a key element of the price control. We are aware of concerns about how the cost of capital is set for the water sector, and will return to this issue in our future work.

**3.11** Regulators review a small number of the largest proposed projects in detail. This can involve testing and challenging, for example, project costs and timing. However, regulators review the bulk of infrastructure projects as part of a portfolio set out in the company business plan.

**3.12** We reviewed three large infrastructure projects in energy and water that had been scrutinised individually by the regulator.<sup>21</sup> We found evidence of challenge by the regulator in all three cases, leading to reductions in proposed project budgets of between 4 per cent and 9 per cent (see Appendix Five, Volume II). Ofgem scrutinised all the areas we expected. However, in the water sector project, it was not clear that there was a reliable business case showing the need for the infrastructure at the time that Ofwat made its decision to approve the company's business plan.<sup>22</sup> Ofwat believes that if it had subsequently found the infrastructure was not needed, it has mechanisms to recover the cost to consumers. Ofwat also did not investigate how much contingency the company had included in its proposed costs and we are concerned that Ofwat considers that this is a matter for companies.

**3.13** We also found that neither regulator has independent assurance over whether the infrastructure had been provided to the agreed specification. Companies can increase their profits by providing new infrastructure more cheaply than planned, which may undermine incentives to deliver assets which have long-term resilience.

### Changes to regulatory approach

**3.14** Both Ofgem and Ofwat have started to modify their approach to price regulation. In Ofgem's case this is partly to help it cope with new investment in energy networks which is double the level of the last 20 years.<sup>†</sup>

**3.15** The new approaches are designed to give companies greater scope to innovate and freedom to run their networks, so as to better meet consumer needs. Common features include the following:

- **Increased consumer engagement.** Companies are expected to show evidence of engaging with consumers and other stakeholders to validate their business plans (see paragraphs 3.18 to 3.20 below).
- **Focus on results.** Regulators will move away from scrutinising inputs (and outputs, in the case of Ofwat) towards looking at wider measures of value for money, such as reliability and availability of services.
- **Incentives for better-quality business plans.** In energy, companies producing high-quality plans are eligible to have their proposals 'fast-tracked'. In water, higher-quality company plans will also receive a lower level of scrutiny from the regulator.

**3.16** The new approaches put the onus on companies developing their own solutions. Regulators plan to assess companies' business plans in proportion to their quality. However, regulators do not have complete information on what companies plan, and this may offer opportunities for companies to charge consumers more than necessary.

<sup>21</sup> The purpose of our case studies was to understand how regulators scrutinise infrastructure proposals. We have not attempted to draw wider conclusions about the effectiveness of Ofgem and Ofwat's overall regulatory approaches.

<sup>22</sup> The Department for Environment, Food & Rural Affairs had not yet approved the company's water resource management plan.

**3.17** Although exceptional, misreporting by companies is not unknown. In 2005 and 2008, the Serious Fraud Office investigated misreporting by water companies, resulting in fines. Ofwat told us that it is for company boards to ensure that data reported to regulators is reliable, accurate and complete. Our view is that regulators need to ensure there is some independent verification of information that companies provide.

### Consumer engagement

**3.18** Regulators recognise that, in the past, regulatory discussions have taken place between the regulator and the industry, with very little input from consumers.

**3.19** Ofgem enhanced its consumer engagement and insight in 2008 with a range of research projects to gather consumer perspectives, and by establishing a Consumer Challenge Group consisting of around half a dozen experts. The Group advises Ofgem on the price control settlement to ensure it is in the best interests of existing and future consumers. Ofgem also engages with Consumer Futures, the advocacy body that represents consumers across regulated networks. Ofgem has recently introduced financial rewards for companies judged to have engaged effectively with consumers and other stakeholders.

**3.20** Ofwat has also used panels of experts to advise on its methodology for setting price limits and challenge Ofwat's policies from a consumer perspective. In the water sector, there is also the Consumer Council for Water, an independent statutory body which represents consumer interests to water companies and Ofwat. Ofwat has recently required water companies to set up and consult with local customer challenge groups, which include representation from particular customer groups such as the elderly, about their business plans. Water companies appoint the members of customer challenge groups. In practice, companies have often appointed the local Consumer Council for Water representative to the position of Chair. It is too early to know whether customer challenge groups will be given the necessary resources, or be sufficiently independent or expert to challenge companies' proposals.

### **Broader strategies for improving value for money**

**3.21** In 2010, Infrastructure UK reported that UK infrastructure in the energy, water, rail and road sectors is more expensive than European infrastructure.<sup>4</sup> It said that savings of at least 15 per cent were possible by addressing issues with planning and consultation processes, complying with environmental and health and safety regulations, and stop-start investment cycles.

### Sector-specific initiatives

**3.22** A number of sector-specific initiatives have been established to tackle the issues identified. For example, the Department of Energy & Climate Change has created cost reduction 'task forces' to consider how to reduce the costs of renewable energy, and carbon capture and storage technology. In the water sector, HM Treasury, Ofwat and the water industry collaborated to develop recommendations to address the inefficient stop-start approach to water investment.<sup>v</sup> The Treasury estimates these recommendations could reduce the average customer water and sewage bills by up to 2 per cent, a saving of £6.50 on average annual bills.

**3.23** These initiatives are at an early stage, so it is too soon to judge their impact on value for money for consumers.

### Cross-sector initiatives

**3.24** A Joint Regulators Group comprising Ofgem, Ofwat, Ofcom and other economic regulators already exists, which has done useful work on the consistency of the cost of capital and the barriers to infrastructure sharing across sectors.<sup>23</sup> But the group has limited resources and cannot act without the unanimous support of all its members.

**3.25** A 2007 report by the House of Lords Select Committee on Regulators concluded more structured and formal cooperation between regulators is needed. It recommended that the Joint Regulators Group establish a secretariat and suitable arrangements for leadership, to ensure greater consistency of focus and a clearer direction of effort.<sup>w</sup>

**3.26** Economic regulators are statutorily independent of government so Infrastructure UK cannot direct regulators. However, Infrastructure UK is responsible for integrating infrastructure planning across the sectors and is therefore well placed to facilitate greater and more formal coordination between regulators.

**3.27** Since its creation in 2010, Infrastructure UK has developed the National Infrastructure Plan and issued two annual updates, and it works to secure the necessary investment in UK infrastructure projects. Infrastructure UK has also formally requested analysis from the Joint Regulators Group on infrastructure asset sharing.

**3.28** However there is more Infrastructure UK could do to bring the different sectors together to improve value for money for consumers. Improved coordination could, for example, involve regulators agreeing to prepare information on the impact on consumers consistently across sectors, which would enable comparison and the aggregation of data. Comparing data across sectors would also help identify efficiencies. For example it could enable actions to smooth forecast peaks in demand for specialist construction and engineering skills, thereby reducing the cost of securing those skilled workers.

<sup>23</sup> Different types of infrastructure often share the same physical location: electric cables, gas pipes, water and sewerage pipes and internet wires often run alongside each other, and work in one sector may affect other types of infrastructure. This brings opportunities to share costs but also risks around the need for separate regulatory approvals and the possibility that companies may overcharge for access.



# Appendix One

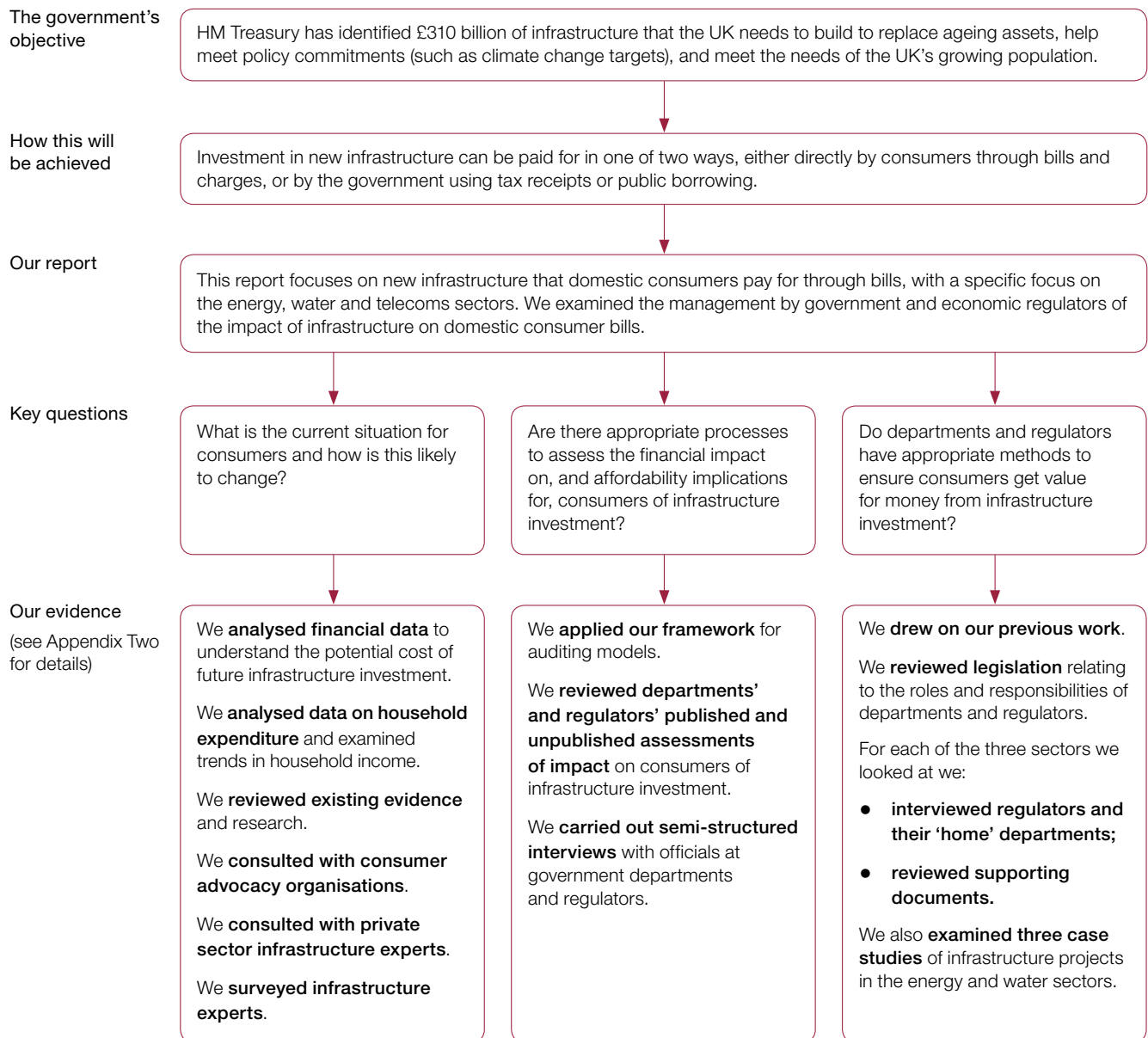
## Our audit approach

**1** This report examined the management of the impact of infrastructure investment on consumer bills by government and economic regulators. We focused on the energy, water and telecoms sectors where infrastructure investment is typically wholly funded by consumers through bills or charges. We limited ourselves to considering the impact for domestic consumers only, excluding commercial consumers. We reviewed:

- the current situation for consumers and how this is likely to change;
- efforts by government and regulators to understand the financial impact on consumers, and assess whether future bills will be affordable; and
- the methods regulators and government use to ensure consumers get value for money from new infrastructure.

**2** Our audit approach is summarised in **Figure 10** overleaf. Our evidence base is described in Appendix Two.

**Figure 10**  
Our audit approach



# Appendix Two

## Our evidence base

- 1 We carried out fieldwork for our independent review of the management of the impact of infrastructure investment on consumer bills by government and economic regulators between March and July 2013.
- 2 We applied an evaluative framework to assess the efforts by government and regulators to manage the impact on consumers of infrastructure investment. We focused on the energy, water and telecoms sectors, where infrastructure investment is typically wholly funded by consumers through bills or charges.
- 3 We focused on domestic consumers only because infrastructure in other sectors, for example rail, is funded through a mixture of fares and taxation and we judged it too complex for considering within our study.
- 4 **We examined the current situation for consumers and how this is likely to change:**
  - We **analysed financial data** to understand the potential cost of infrastructure investment. We reviewed published figures in the National Infrastructure Plans 2010–2012 and analysed data from the government's list of expected investment in infrastructure projects. We compared the government's data with other sources of evidence on potential future investment needs, including research published by Policy Exchange.
  - We **analysed data on household expenditure** collected by the Office for National Statistics in the Living Costs and Food Survey between 2002 and 2011, which we accessed from the UK Data Archive. We examined household expenditure on utilities and communications bills for different types of households, such as low-income households.
  - We used Family Resources Survey data collected by the Department for Work & Pensions to **create measures of water affordability** for 2011, using an approach and methodology originally developed by Ofwat in 2010. We used **descriptive analysis** to examine the proportion of households experiencing water affordability issues, and we looked at the trend of water affordability from 2002 to 2011.

- We used Family Resources Survey data to **examine trends in household income** by decile and we compared this to trends in household expenditure on energy, water and telecoms bills.
- We **reviewed existing evidence** from the Department of Energy & Climate Change on fuel poverty and the Office for National Statistics on access to the internet.
- We **consulted with consumer advocacy organisations**, including the Consumer Council for Water and Consumer Futures.
- We **consulted with private sector infrastructure experts** at The Infrastructure Forum, Energy UK and Water UK.
- We **reviewed published estimates** from the Department of Energy & Climate Change and the Committee on Climate Change of the impact of increased bills and charges on consumers.
- We **surveyed infrastructure experts**<sup>24</sup> to understand the issues around investment in infrastructure from the perspective of the private sector. We sent the survey to 236 individuals working for businesses involved in providing infrastructure in a range of sectors.<sup>25</sup> We achieved a 35 per cent rate of response (82 respondents).<sup>26</sup> Survey topics included the factors important to investors' decision-making; views on the usefulness of forecast financial impact on consumers; confidence in forecast impact of energy and climate change policies on consumer bills and charges by the Department of Energy & Climate Change.
- We **analysed the survey data** in SPSS, exploring the views of investors and finance providers compared with other respondents. We used qualitative analysis to examine responses to open-ended questions.

**5 We reviewed whether there were appropriate processes to assess the financial impact on, and affordability implications, for consumers of infrastructure investment.**

- We applied our framework for auditing models. Our audit questions included:
  - **Model concept and design.** Is there convincing evidence of the rationale and the scoping of the model concept?
  - **Model build and development.** Was the model subject to sufficient review during and after development? Does the model respond logically to basic changes being made to the model inputs?
  - **Model data.** Are the input data of good quality?

<sup>24</sup> Online survey using SNAP software, requiring user logins.

<sup>25</sup> Communications, energy, water and/or sewerage, flood defences, transport, waste.

<sup>26</sup> Five per cent of respondents identified themselves as contractors, 18 per cent as consultants, 9 per cent as banks or other debt finance providers, 40 per cent as equity investors, 4 per cent as membership organisations or trade bodies, 17 per cent as energy or water companies and 7 per cent as another type of organisation.

- **Model assumptions.** Are the model assumptions appropriate? Are the details of these assumptions recorded and rationalised?
  - **Model testing.** Has sensitivity analysis been performed around projections in the model? Do changes to uncertain inputs have a significant impact on outputs?
- We **reviewed departments' and regulators' published and unpublished assessments of impact** on consumers of infrastructure investment.
  - We gathered evidence on how information on financial impact on the consumer is collected through **semi-structured interviews** with officials at government departments and regulators.
- 6 We reviewed whether departments and regulators have appropriate methods to ensure consumers get value for money from infrastructure investment:**
- We **drew on our previous work**, such as *Planning for economic infrastructure*.<sup>x</sup>
  - We **reviewed legislation** about the roles and responsibilities of the Department and regulators to understand where accountability sits for decisions over new infrastructure and considering the financial impact on consumers.
  - We carried out **analysis of the energy, water and telecoms sectors** to understand the regulatory controls aimed at protecting the consumer and ensuring value for money. We **interviewed the departments and regulators and reviewed supporting documents**, to understand what processes and controls they use to assess and regulate the costs of infrastructure to consumers.
  - We **examined three case studies**<sup>27</sup> of infrastructure projects to understand the steps regulators take to protect consumers' interests when scrutinising infrastructure proposals. In our review of case studies, we did not attempt to draw wider conclusions about the effectiveness of current regulatory approaches. The three case studies were selected in consultation with the regulators and met the following criteria:
    - Project was significant in size to merit separate scrutiny. Although regulators look at company business plans as a whole as part of a price review, we expected unusual projects to have been given additional scrutiny.
    - Project was listed in the National Infrastructure Pipeline, costs were agreed and construction was under way or had been completed.

<sup>27</sup> In the energy sector, we reviewed the Western High Voltage Direct Current electricity cable and Northern Gas Networks' iron mains replacement programme. In water, we reviewed Wessex Water's project to improve the security of water supply in south west England.

## Appendix Three

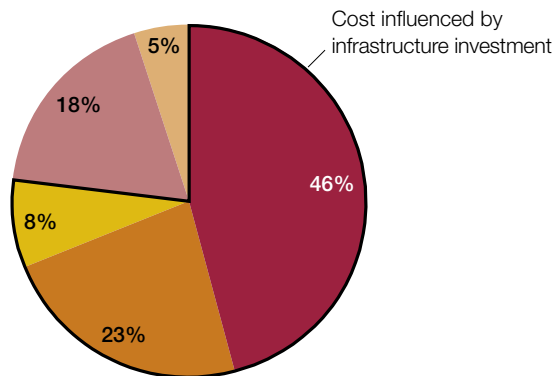
### How infrastructure costs influence consumer bills in energy and water

**1** Infrastructure costs feed into consumer bills in a number of different ways. Although no analysis currently exists estimating the proportion of bills which is due to infrastructure investment, it is clear this investment is a significant driver of bills. Decisions on infrastructure have an impact not only on construction costs, but also the costs of maintaining and operating the infrastructure. **Figure 11** shows the proportion of expenditure influenced by decisions on infrastructure and paid for by consumers.

**Figure 11**

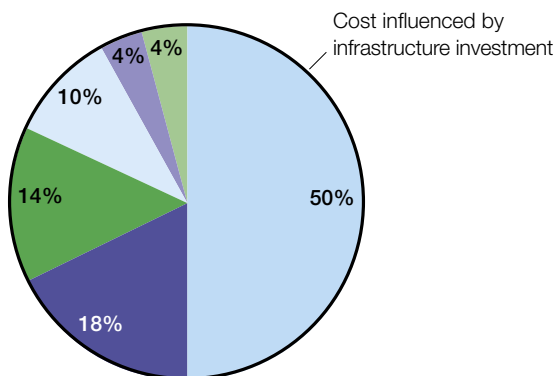
Proportion of expenditure influenced by decisions on infrastructure and paid for by consumers

**Energy**



- Wholesale energy costs. Includes cost of electricity generation infrastructure and gas storage infrastructure. Influenced by international fossil fuel prices. Includes profit and operating costs.
- Network costs. Cost of transporting energy along the network.
- Policy costs. Costs of energy and climate change policies.
- Supplier costs and margins. Billing, customer service and IT systems.
- VAT

**Water**



- Maintenance and renewals. Maintaining and replacing assets from pipes to treatment works.
- Quality enhancements. This relates to costs of improving drinking water and the environment in order to meet standards, typically by treating waste water discharges to a higher standard. These enhancements are required to fulfil legislation.
- Operating expenditure. Day-to-day costs incurred including staff and power costs.
- Supply/demand balance. Making sure there is enough water, and capacity to treat sewerage.
- Enhanced service levels. Improving service levels to customers like reducing pressure problems and sewer flooding.
- Large projects. Delivering big projects, like large sewers.

Source: National Audit Office analysis of Ofwat and Ofgem information: breakdown of water bills based on allowed company revenues taken from Ofwat Price Review 2009, final determinations and breakdown of energy bills taken from Ofgem Energy Prices Factsheet, October 2013.

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ISBN 978-0-10-298704-1

