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FINAL PAPER

***Long-term* affordability: who should pay for
our infrastructure resilience, renewal & the
move to low-carbon?**

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Executive summary

This paper is focused on *long-term* affordability in the energy and water sectors. It aims to look beyond price control periods and explore who should pay for future costs and how these should be best managed. It examines some of the similarities and differences between the two sectors in this area and proposes some possible principles by which some of these judgements could start to be made for the future.

The energy and water sectors provide essential services that are key to both public and environmental health. Affordability is therefore always likely to be an area of public interest. Given the fact that energy and water services are also essential to the functioning of the economy, their affordability is also a sub-set of wider public concerns around whether these costs are generally ‘reasonable’, fair and acceptable. It is therefore of interest to GB as a whole that these services are well managed and deliver value for money.

Affordability of energy and water is currently an issue for a significant minority of people and, for energy, there is a national dimension to this. 10% of households in England, 30% in Wales and 39% in Scotland are estimated to currently be in fuel poverty and 11% of households in England and Wales are at risk of affordability problems in water. Affordability is clearly currently more of a pressing issue in the energy sector. Average water bills are currently a third the size of average energy bills, with energy prices having increased sharply in recent years and not been stable.

Since privatisation, consumers have paid for the vast majority of the costs of energy and water services through their bills (except in Scotland where householders pay for their water through their council tax bills). Costs are currently kept affordable primarily through a combination of regulation driving out increased efficiency and, in energy, competition.

Looking to the long-term, affordability is likely to be more of an issue in energy than in water in terms of the scale of the problem, the pace of change needed and the degree of uncertainty. In energy, there is likely to be a step change in costs as the sector has to mitigate, and adapt to, the impacts of climate change. There is significant uncertainty around future wholesale energy costs, and the associated price of carbon, along with question marks around the effectiveness of EU and UK energy efficiency measures which are designed to offset these. The next 15 years will be important in the move to low-carbon if the impacts of climate change are to be managed. Delaying investments in the energy sector may increase risks and costs that could have a significant impact on the affordability of these sectors to future generations.

In water, costs are likely to change incrementally as organisations adapt to climate change. Key uncertainties are around the scale of future sewerage costs and the quantity and quality of water resources (although company based Water Resource Management Plans that look 25 years ahead provide a good indication of where the pressures are likely to be). As energy costs account for around 15% of operating costs in water companies, the water sector may also be indirectly influenced by changes in energy costs. Both sectors also face uncertainties around finance costs – particularly if interest rates rise.

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In the coming decade, it is estimated that two thirds of the costs of the projected investments in the energy sector and nearly all of the projected investments in the water sector will continue to be met through consumer bills. At the same time, some are predicting that households in low-income groups may see their incomes decline – although this is clearly a political and hotly contested subject.

To fully understand future long-term affordability pressures, it is important to have a holistic view of costs. Each sector has a different way of analysing costs.

Sustainability First has used the following framework to think about them:



- **Maintenance costs** – operational costs and the investments needed to renew and repair existing infrastructure to meet current demand. These costs will remain the most significant element of total costs into the future;
- **Capital enhancement costs** – to extend existing networks to meet known new service demands and the costs of incremental change. These may well include some environmental costs;
- **Natural capital ‘repair’ and maintenance costs** – many of the costs associated with the underlying natural resources on which both sectors rely, and are influenced by, are not always clear. If natural capital levels are to be maintained and repaired, in line with the 2012 White Paper ‘The Natural Choice’, there is likely to be an increasing interest in how these natural capital costs are valued and recovered; and
- **Strategic investment costs** – investments ahead of need before there is a full and immediate demand, thus representing a step change in service delivery.

In the energy sector, there is potentially a case to be made for a further category of costs to be recognised and funded if long-term affordability is to be maximised – **‘institutional and organisational transition costs.’** Such costs could help ensure that evolution in the sector towards low-carbon, particularly in terms of institutional arrangements, happens at the ‘right’ pace. This may require moving beyond a project by project to a wider, less atomised and more strategic approach to managing the challenges of affordability. Existing institutional structures (both in terms of market structures and regulatory arrangements) should not ‘lock in’ existing solutions, technologies and actors. It seems important to recognise explicitly that there are institutional costs of a major transition: costs which are at present not in the ‘vires’ of any current actors to recover; and the costs of re-shaping and / or integrating new markets (eg local approaches and the demand side) which at present cannot readily be recovered from customers or from tax-payers on a simple ad-hoc basis.

When thinking about who should pay for what costs in the future, it would seem a fair and acceptable proposition that at a high ‘macro’ level costs should be met by those that benefit from the services delivered and / or cause any associated pollution *and* those best able to control them and their associated risks. The following ‘straw man’ suggests a way of thinking about how costs could be paid for and recovered in the future. It is worth noting that the majority of the costs in both sectors will continue to be in the on-going maintenance of existing systems and that the costs towards the bottom of the table may not, at least in the short to medium term, be relevant to the water sector. The straw-man raises several questions.

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Sustainability First ‘straw man’ for thinking about how costs could be paid for and recovered in the future

Type of costs	Degree of uncertainty	Who pays?		Recovery mechanism	
Maintenance costs	 Low	Current consumers. Risk and reward sharing mechanisms can help balance who pays between companies / investors and consumers	Current consumers	Current consumer bills (and future consumer bills through depreciation)	 Bill payers
Capital enhancement costs		Generality & specific groups of current consumers & developers		Current consumer bills & specific bill payer / developer charges – eg connection charges (and future consumer bills through depreciation)	
Natural capital repair costs		Specific current consumers, citizens, asset owners or developers- if known. If not, possibly taxpayers	Polluter based fines, levies and compensation arrangements (polluter pays principle)		
Natural capital maintenance costs		Mix of current asset owners, consumers, developers & citizens	Mix of current consumer bills (through internalised environmental costs), innovative funding (eg Payments for Ecosystem Services) & tax - in exceptional circumstances & if basis of cost allocation is unclear		
Strategic investment costs		If required by legislation, either current generations as consumers or citizens &/or future generations	Either through levies on bills or, for projects of national importance, tax or through government underwriting key risks		
In energy - institutional / organisation transition costs		If to support legislative change, current generations as consumers or citizens &/or future generations	Current and future citizens?	Either through levies on bills, tax or government borrowing	
	High				

Source: Sustainability First

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Firstly, who should pay for long-term investments that primarily benefit future generations? There could be a logical argument that these should be met through taxation, to ensure ‘progressive’ cost recovery and to pool risks & costs. However, in the current fiscal and political environment this may not be credible, except in the case of strategic investments of national importance or if projects are paid for by Mayoral Authorities investing business rates in local infrastructure funds. If this position is accepted, and the vast majority of long-term investment costs continue to be paid for by consumers, it is important to recognise this has distributional impacts.

The existing problems faced by energy and water consumers in vulnerable circumstances are unlikely to diminish in the future, and may actually increase. Energy and water companies will therefore continue to have a key role to play in addressing this issue, including through: proactively developing strategies and intelligently using data to identify groups that are likely to struggle to pay before they get into difficulty; working in partnership with NGOs, community groups and trusted intermediaries to better understand problems and develop and deliver targeted information, advice and support; and ensuring well trained staff treat customers fairly, ensuring such services are visible and easily accessible.

Secondly, if consumers continue to pay for most long-term investments, the extent to which they as individuals are able to manage future costs and risks needs to be assessed. Consumers through their every day actions can help to reduce costs by using resources more efficiently. However, the wider ranging and systemic risks and challenges that the energy and water sectors face may require a more coherent and joined-up approach to policy, regulation and service delivery in the future if long-term efficiency and affordability are to be maximised. The newly created National Infrastructure Commission could potentially provide a useful contribution here. Clear, predictable policy frameworks, both on the supply and demand sides, will be needed if future costs are to be kept as low as possible. These will need to: clearly set out in advance trigger points for policy reviews; take into account the future role that will need to be played by building and appliance standards and in-home communications infrastructures; and consider how key actors such as developers can be incentivised to help facilitate efficiency. Although there is clearly an important role for competition in and for the market (eg auctions) to reduce long-term costs, to release the potential of the demand side & facilitate technological & commercial innovation, it may also be helpful to take a fresh look at the respective contributions of competitive compared to co-operative approaches to managing long-term costs.

Finally, if future costs are going to be primarily met by bill payers, it will be important to ensure that: future costs and profits are transparent; consumers are engaged in decisions about prices and investments in a timely fashion so that change takes place in an acceptable, stable and predictable way; and it is clear who is making and accountable for decisions as to what should be paid for - along with who is bearing the long-term risks and accruing the long-term benefits. To maintain confidence that the combined future bill impacts on consumers are understood and that long-term affordability is being maximised in the round, it may be sensible to review the current fragmented nature of consumer and public engagement in this area to ensure that a co-ordinated public voice is heard in these debates. Without this, discussions around inter-generational equity are likely to remain opaque.

1. Introduction.

1.1 Overview of the paper

The paper begins with a suggested definition of affordability and, with reference to existing customer research in energy and water, a discussion of why affordability is important. The fundamental principles that underpin public views in this area are then explored. A review of the current affordability picture in the sectors and an assessment of how costs are recovered and managed today to keep bills affordable follows, to provide context to the subsequent discussion.

The paper moves on to explore future affordability. It examines future cost pressures and the arguments for dealing with these in a timely way. It then assesses different types of costs (maintenance / business as usual costs; capital enhancement costs; natural capital ‘repair’ and maintenance costs; strategic investment costs; and institutional and organisational transition costs). It asks what risks these costs pose and who is best placed to manage and pay for them. The question of who should pay for what costs in the future and how these should be paid for is then explored.

A brief assessment of how future costs may be best managed to ensure that they are affordable follows. The paper ends with a section on practical next steps that might help mitigate cost recovery for new long-term capital expenditure and for institutional reform and transition.

1.2 Similarities and differences between the sectors

This paper provides a learning opportunity for the energy and water sectors to compare and contrast their experiences in the area of long-term affordability. The similarities and differences between the two sectors that are explored in the paper are briefly summarised below:

- **Similarities** - Affordability is an issue in both energy and water as the sectors provide essential services that are key to public and environmental health and economic growth. Consumers currently pay for nearly all of the costs in both sectors and affordability is an issue for a significant minority. Both sectors are part of natural systems so there are issues around who should pay for what in each. Regulated energy and water companies are capital intensive monopoly networks that have long asset lives so what is / isn't paid for by today's consumers will have an impact on the services received and prices paid by future generations.
- **Differences** - The main differences between the sectors in this area is that the quantum of future challenges in energy is much greater than in water. Energy prices are already much higher than water prices and are predicted to face a step change increase in future years. The energy sector faces much greater uncertainty in terms of how it needs to both adapt to and mitigate the effects of climate change. This has led a plethora of environmental and social taxpayer and consumer funded levies and subsidies. In water, change is likely to be

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more incremental, with the challenge mainly being around adaptation to climate change. Nearly all of future water costs are likely to be funded through consumer bills.

1.3 Assumptions

- In this paper we take as given that the projected investment outlined in section 5 will need to take place.
- We do not analyse who bears the costs and risks of development and construction or different sources of finance for major projects (such as PFI or foreign borrowing). Ultimately it is the consumer / taxpayer who will pay for long-run costs, even if this is via shareholders / investors.
- New-Pin will explore these issues and many of the others touched on in this paper, such as the role of the demand side and the impact of standards on costs, in more detail in subsequent papers and workshops. In that sense, this paper represents a ‘first-step’.
- Debates around long-term affordability clearly raise important questions about vulnerability. These are only briefly touched on in the paper as at the New-Pin kick-off meeting in July it was suggested that we should *not* consider vulnerability at this time. Network members may want to explore different approaches to tackling the very real affordability challenges faced by a significant minority of consumers in a separate paper.

2. What is affordability?

Affordability is concerned with the relationship between costs and income, relative to other demands on that income. In the energy and water sectors, at the individual household level, it can be defined as the share of income that is spent on these services or, alternatively, as the share of these bill payments in household expenditure. This latter definition helps to address the fact that other sources of income (such as savings or credit) may be used to finance consumption. These definitions are what is sometimes called ‘the affordability ratio.’¹ Table 1 on page 11 has further details of current sector specific definitions of fuel and water affordability measures.

Affordability of water and energy is not an issue for everybody. Nor is it an issue at all points in time. Affordability matters to:

- Citizens - to enable health and well-being. Those experiencing affordability problems with energy and water may suffer not only from a direct impact on their health but also the effects of increased anxiety, anger or a sense of isolation. This can have knock-on impacts on health care costs.
- Citizens and the environment– to ensure long-term investment in a timely way to secure the future (low-carbon, resilience, supply security).
- Customers and regulators – especially in a prolonged period (as now) of low and real-terms decreases in wages.

¹ *Understanding affordability pressures in essential services*, UKRN, January 2015

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- Government / politicians – e.g. concern re ‘needless’ price pressure on CPI / RPI, inflation and economic growth and / or as an issue of equality and social justice.
- Companies and investors – for reasons of customer retention, good customer relations and reputation.

The following **principles** may underpin the concept of affordability in the energy and water sectors. Some of these are clearly overlapping and most have a relevance that extends far beyond discussions of affordability. Principles such as fairness may partly be value driven. Others, such as acceptability, may be shaped by public perceptions of the sectors. Surveys of public opinion can help reveal such perceptions but it is worth noting that they also frequently indicate the limited knowledge that many have of what energy and water bills actually cover and pay for.

Efficiency

This is clearly a vital concept in discussions of long-term affordability. It is important that prices reflect costs to encourage investment and so that consumers can react to price signals and take up demand side efficiency measures.

Public acceptability, reasonableness and value for money

Even if affordability is not an issue for everyone and all of the time, the ‘reasonableness,’ ‘public acceptability’ and even ‘legitimacy’ of energy and water costs and prices is likely to be an on-going subject of wider public interest. For some, bills may be affordable but seem unreasonable. Affordability can therefore be seen as a ‘sub-set’ of concerns around acceptability. There would seem to be a public interest in costs and prices being ‘reasonable’ and ensuring services are value for money (VFM), irrespective of an individual’s ability to pay. Whether costs are seen as ‘right’ may be influenced by movements in the price other essential services – particularly key costs such as housing & food. The current context in terms of other demands on household budgets would therefore seem important in terms of understanding acceptability. Static real incomes and / or increasing bills for certain essential services have challenged public expectations about the costs of different items in the household budget (most notably for energy - following the increasing costs of wholesale gas from 2011, but also, more recently, for housing & rental costs).

In the water sector, for example, a Consumer Council for Water (CCW) survey found the propensity to be ‘struggling’ or ‘in arrears’ is not directly correlated with total income but seems to have much to do with outgoings and particularly the spend on larger bills such as housing.² Other CCW research found that ‘*Customers are feeling financially squeezed; most feel that their incomes are not keeping up with the cost of living (68%) and changes in the cost of living are a concern (66%)*’.³ Positive changes in perceptions of water bills in the last year for all domestic consumers (68% of customers thought charges were fair and 77% thought they were affordable in 2014 compared to 54% and 67% respectively in 2013) could be due to a combination of reduced unemployment, low price-inflation and some recent modest wage increases. The study noted ‘*the downward trend in perceptions of VFM since 2010 also*

² *Living with Water Poverty*, CCW, August 2014

³ *Customers’ views on Ofwat’s draft determination 2015-2020*, CCW, October 2014

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*appeared to have reversed with 75% saying water services and 77% saying sewerage services were VFM. This appeared to be part of a wider trend for household services with the same survey finding 79 (57% in 2013) of gas and 80% (60% in 2013) of electricity customers considering that these services represented VFM’.*⁴

Fairness

The public may consider that due to the essential nature of the services, it is important that bills are as ‘fair’ as possible. However, fairness is often in the eye of the beholder. There would appear to be some support for an element of cross-subsidy and socialisation of costs rather than taking a wholly individualistic approach to financial cost allocation. For example, a survey of Ofgem’s Consumer Panel’s views on social and environmental schemes found that those schemes that aim to help people in vulnerable circumstances received the most positive response, with panellists keenest to help elderly people on low incomes and people with disabilities. There may also be a public desire to ensure that the interests of future generations, as well as those currently struggling to pay, are protected. The same report found that panellists thought that government policies that aim to reduce Britain’s carbon emissions were generally ‘a good thing’ and they were ‘*largely happy, though in a lukewarm way, that the costs for these types of schemes are socialised.*’⁵ Other research in the energy sector may reinforce the view that the social aspects of affordability are top of most people’s minds, with Policy Exchange noting that ‘*Consumers are generally reluctant to pay for security of supply and decarbonisation either through bills or taxation*’ and concluding that ‘*Insufficient attention has been paid to consumer affordability*’ leading to a ‘*circle of distrust.*’⁶

In the water sector, the issue of fairness also has another dimension. As companies cannot disconnect consumers, it has led to a significant rise in outstanding revenue (‘bad debts’) that now add around a hypothetical £21 to average annual bills.⁷ This has raised questions for some of whether ‘can pay but won’t pay’ consumers are abusing the system, an issue that has some resonance in wider political debates around ‘scroungers and strivers.’ There is clearly some desire in the water sector to ensure fairness longer-term. Research for Severn Trent has found, ‘*For the vast majority of customers, value is more than just what they are being charged: it is affordable bills plus future-proof improvements.*’ The company has also stated ‘*Even when circumstances allow a clearer understanding of the costs to serve (for example of serving urban areas versus rural areas) consideration of the social good embodied in water services should preclude any narrow cost-based interpretation of fairness. As in other network industries, recognising entitlements such as universal access to these services helps make sense of a starting position for the water industry of the many cross-subsidies that are justified in terms of their wider social benefit.*’⁸

⁴ *Water Matters*, CCW, August 2015

⁵ Consumer First Panel, Wave 6, Year 1, Ofgem, July 2014

⁶ *The customer is always right*, Policy Exchange, July 2015

⁷ *Water affordability*, Ofwat, December 2015

⁸ *Charting a Sustainable Course*, Severn Trent, September 2015

Choice and transparency

Consumer and public choice can influence perceptions of value in the sectors. For example, research from CCW has found that some respondents still considered that their energy bill represented better VFM than their water and sewerage bill, despite higher costs, as they had no choice over their water and sewerage supplier and their charges and so lacked any point of comparison making it difficult to know if their water bill represented VFM. Along similar lines, respondents also thought that telecom companies offered better value than both sectors due to the extent of the choice available and the fact that services could be tailored to suit the requirements of empowered customers.⁹

When there is no or limited choice, or indeed a weak market, transparency is vital if people are to be convinced that their water and energy bills are reasonable. The CMA, for example, has flagged the lack of trusted and transparent information on costs and profits as an issue in its Energy Market Investigation.¹⁰ Being clear and open about who is the decision maker for key investments and significant decisions that will have an impact on bills is also important.

Stability and predictability

Even if bills are affordable, sudden changes can make financial planning and budgeting difficult and can erode perceptions or value. Severn Trent have found that ‘*Gradual change in bills, rather than sudden or large changes, is important to customers.*’¹¹ CCW research has shown that abrupt changes can challenge the acceptability of bill increases, with respondents noting, ‘*... water bills were felt to increase less steeply and less frequently*’ than energy bills.¹²

3. Current affordability picture

Table 1 summarises a current picture for affordability in GB, along with the definitions now in use by Ofgem and Ofwat to measure affordability in the energy and water sectors.

Table 1: Current affordability in energy and water – definitions, levels and recent trends

	Energy	Water
Definitions of affordability used by respective regulators	England – Low Income High Cost (LIHC) fuel poverty measure examines number of households in fuel poverty (above average required energy costs which to meet would push household below the poverty line) and the fuel poverty gap (difference between fuel costs paid by the fuel poor with average	England and Wales – Ofwat uses an ‘Affordability Risk Indicator’ to define those that spend more than 5% of their disposable income after housing costs on water and sewerage services. (CCW also uses self-reported affordability to provide a qualitative assessment of this)

⁹ *Living with water poverty*, CCW, August 2014

¹⁰ *Energy Market Investigation, Provisional Findings*, CMA, July 2015

¹¹ *Severn Trent*, op cit

¹² CCW, August 2014, op cit

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	required fuel costs) Wales and Scotland – Bills as a proportion of income (10%) measure	Scotland – charges related to ability to pay through direct link to the Council Tax system
Current bills	GB - £614 average electricity, £773 average gas in 2014/15 (Ofgem Supply Market Indicator)	England and Wales – average combined water and sewerage bills is £396 in 2014/15 Scotland - £334 in 2013/14 (Scottish Water)
	Consumers in Wales and the South West and South of England currently pay more for water and energy than consumers in other regions	
Current affordability challenges	England – 2012 - 2.3 million households (10%) in fuel poverty with an average fuel poverty gap of £480 using the LIHC measure Wales and Scotland – 2012 - 0.4 million (30%) and 0.9 million (39%) in fuel poverty respectively, using the 10% measure GB – in 2013 1.5 million electricity and 1.4 million gas households were in debt, with debt levels of £306 and £323 respectively	England and Wales – 2015 - 2.6 million households (11%) spending more than 5% of their income after housing costs on water and sewerage services (i). Scotland – due to charging arrangements, there is no official water poverty data for Scotland. However, in 2013 20% of the domestic customer base was in water debt ¹³
Main drivers of affordability challenges	Low income Housing characteristics – thermal ratings (particular problem for older properties in the private rented sector) etc Heating type – a higher proportion of households off the gas grid and in all electric households (without storage) are in fuel poverty (ii) Payment method - households paying by pre-payment meters are more likely to be in fuel poverty than those paying by other methods. Although they may not necessarily be in debt, they may be self disconnecting to save money.	Low income Metering can also have an impact on affordability – many small households with affordability problems could save money by switching to a meter – and conversely some large households may be worse off
Groups impacted	Couples with dependent children, single people under 60, lone parents with dependent children	Single people living alone without water meters (i)
Recent trends	UK – energy bills represented 5% of total household spending in 1994, falling to 3% between the late 1990s and 2006 and rising to 5% again from 2009 – 2012. Average electricity and gas bills increased by 63% and 120% respectively in real terms between 2003/13. Average fuel poverty gap per fuel poor household increased by 74%	England and Wales - average combined water and sewerage bills have stayed broadly flat since 2000 increasing by 4% in real terms over that 15 year period. Scotland – average combined water and sewerage bills have declined by 10% in real terms between 2004/05 and 2013/14

¹³ *Keeping your head above water*, Consumer Futures Scotland, February 2014

	in real terms during this period	
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Source: Adapted from *Understanding affordability pressures in essential services, UK Regulators Network (UKRN), January 2015*

Key: (i) Water affordability, Ofwat, December 2015. (ii) Many of the factors that have an impact on whether people struggle to pay their energy bills are outside the direct control of energy companies. The type of heating system used, thermal ratings in the home etc all have an impact on affordability. The pattern of household demand can also influence costs and this impact is likely to increase in the future.

Although this paper is focused on future affordability, the current context is important as it gives an indication of the challenges to come and the perceptions that the public may have on this issue. From the Table it can be seen that the two sectors currently face similar, but also slightly different, affordability pressures. The current level of consumer bills is very different between the two sectors: today average household water bills are around one-third of the size of average household energy bills. In real terms, energy bills have risen and fluctuated in recent years whereas water bills have been stable and flat or declining.

There are existing problems with intra-generational equity in the sectors. A significant minority of consumers currently struggle to pay both their energy and water bills. This is fairly consistent across sectors in England with 10% of households in fuel poverty and 11% at affordability risk in water. However, there is a national sector dimension to this as in Wales and Scotland fuel poverty rates (30% and 39% respectively) are far higher than water affordability risk (11% in Wales – unknown in Scotland due to charging arrangements). This significant discrepancy in fuel compared to water affordability issues in Wales (and potentially also in Scotland) could be influenced by a number of factors including climate, housing stock and different ways of measurement in the devolved nations.

4. How costs are currently paid for via end-bills and kept ‘affordable’

Today, the ‘business as usual’ costs of the services provided by the energy and water companies are recovered through consumer bills on a broadly ‘socialised’ basis, whereby all customers contribute on a ‘common’ basis to these underlying costs, in ways which do not reflect in their end-bills when, where or how they use their energy or water. These are spread over time through depreciation (pipes and wires typically being written off over between 40 and 60 years). Some rough justice in cost-recovery is achieved via volume (except for non-metered water households in England and Wales where rateable value based charges do not always equate to the level of usage and in Scotland where water charges are based on council tax bands). In energy there is some differentiation in practice as to how costs are recovered from different customer groups due to retail competition, but this is largely ‘not visible.’ Recovery of network costs in customer bills in both sectors varies by region. Other than this, there is very little cost-reflectivity in approaches to cost-recovery from end-customers, except for I&C customers (mainly energy, but in future also water).

In **energy**, costs of new network build are met via the revenues allowed under regulated price controls, and subsequently recovered from end-customers via suppliers’ network charges. The costs of certain ‘strategic wider works’ in

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transmission - i.e. investment made ahead of actual need – are approved by the regulator and recovered from customers. Costs of conventional power generation – the costs of building, owning and operating conventional generating plant over its lifetime has until now been met, in full, via the revenues which generators can obtain from selling their power into the wholesale power markets. Generator wholesale costs form roughly one-half of the end-bill, passed-on by suppliers to their customers.

Costs of low-carbon power generation – historically, the *additional* costs of high capital-cost low-carbon generation technologies needed to meet policy objectives, and which cannot look to the conventional wholesale markets for adequate remuneration - have been met through subsidy: paid for either by the electricity customer (the volume related Renewables Obligation, or lump sum levies such as small-scale feed-in tariffs [FIT]) and / or by the tax-payer (Carbon Capture and Storage and the Renewable Heat Incentive). In 2013, concern about the escalating impact of the levies on energy bills led the government to shift some cost-recovery of the levies to the taxpayer with the Government Electricity Rebate (suppliers were required to give their customers a £12 rebate for two years to cover some of the costs of the Warm Homes Discount and some environmental programmes).¹⁴

In the **water sector**, long-run capital costs are recovered from water bills.

Current bills are kept ‘affordable’ through price controls for energy monopoly networks and for water and through producer and retail competition for other energy costs and, in the future, for none-households in the water sector. Through driving out efficiency savings, regulation and competition reduce costs.

The regulatory frameworks that have been used in both sectors for the most recent price controls (Transmission [T1], Gas Distribution [GD1] and Electricity Distribution [ED1 in 2014] in energy), the 2014 Periodic review (PR14) for England and Wales in water, and the Scottish Review of Water Charges in 2015 have sought to exert a downward pressure on capital costs in both sectors. These have evolved in recent years with the aim of focusing more on outputs / outcomes and less on process. A brief overview of *some* of these changes follows:

- Ofgem uses an approach called ‘RIIO’ (Revenues, Incentives, Innovation and Outputs). This involves some sharing of efficiency gains. The inclusion of innovation as one of the key parts in the price control formula, and associated regulatory innovation funding streams, was designed to help manage long-term uncertainty and make future costs more affordable.
- In its 2014 price control Ofwat used ‘Outcome Delivery Incentives’ (ODIs) to help ensure companies were delivering what customers wanted. ‘Willingness to pay’ research was used as one of the indicators to help establish this. A menu mechanism in the price control should mean that a proportion of any underspend in costs is passed on to customers in the next price control as a reduction in bills, and vice versa for overspends. Ofwat provided companies and Customer Challenge Groups with tools (including Pay-As-You-Go ratios) to balance the proportion of costs recovered within the price control period and the amount recovered over a longer time. The regulator also assessed

¹⁴ Press release, DECC, 2nd December 2013

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current and future affordability as part of its risk based review and in its draft and final determinations. Some companies have proposed additional ‘gain-pain sharing’ mechanisms to share excess profits with customers.

- Ofwat and Ofgem have both now moved to a Totex¹⁵ way of measuring costs in price controls that should in theory give companies more flexibility to pursue least costs options, whether these are on the supply or demand side. It is still relatively early to assess whether the move to Totex has actually led to any significant changes in how companies evaluate and manage costs.
- Both Ofgem and Ofwat have tried to introduce an element of reputational incentive into their recent price controls with the former ‘fast tracking’ well justified business plans and the latter giving ‘enhanced status’ to high quality business plans. These approaches also give successful companies greater control of their forward investment costs.
- Ofgem has also made some changes to its approach to cost of capital, introducing a cost of debt indexation.
- Ofgem has used a ‘Consumer Challenge Group’ for its RIIO price controls to act as a critical friend to the regulator on regulatory methodology and to critique business plans. For ED1, companies also started to set up their own consumer engagement mechanisms. Due to the regional nature of the water sector, Ofwat sought to bring outside challenge into the PR14 process through encouraging the creation of company specific Customer Challenge Groups to review business plans. This was complemented with a national Customer Advisory Panel that looked at cross-cutting issues such as pension costs and business carbon footprints.
- The use of a ‘negotiated settlement’ approach in the recent Scottish Review of Water Charges has given customer representatives in Scotland significant influence (within defined ‘tram-lines’) with the aim of securing better outcomes and reducing regulatory complexity.

Mechanisms such as auctions (eg Electricity Market Reform and capacity auctions in energy) and going out to competition for construction and financing costs (Thames Tideway) have been used to manage costs of large scale projects.

Table 2 summarises the current subsidy arrangements that exist in the two sectors and points to some possible current ‘gaps’. The current complex patchwork of arrangements may well be due to historical ad-hoc developments and affordability pressures in specific locations and at specific points in time. However, it may also be driven by the differences between the two sectors, including the in the level of current and projected bills.

Unnecessary and out-dated long-term subsidies are not in the public interest. However, given the value that both customers (and investors) place on stability and predictability, the short-term horizons of many of the subsidies in the table are worthy of note.¹⁶ Recent debates around the Levy Control Framework (LCF), which introduced a cap of £7.6 billion p.a. to 2021 to cover overall expenditure on most but not every energy support scheme paid for by both customers and taxpayers, illustrate

¹⁵ Where price controls set limits for ‘total expenditure’ rather than having separate operational (opex) and capital expenditure (capex) in a bid to equalize demand and supply side solutions.

¹⁶ See Sustainability First discussion paper on Low-carbon Interventions, June 2015

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this point. Questions have been raised about the extent to which it has been able to link expenditure with outcomes, the choice of technologies it has encouraged, and whether it is sustainable given predicted breaches in expenditure before 2021, along with the fact that there is no budget agreed for the 2020s to indicate the future scope of the framework.¹⁷

Table 2 - Who pays for current subsidies in the energy and water sectors and are there any possible current gaps?

	Energy	Water
Consumers- implicit cross-subsidies	Average regional network charges	Average regional pricing
	Advice and support for those facing affordability problems (i). Measures to prevent the disconnection of customers in vulnerable circumstances (the winter moratorium set out in licenses and other Energy UK initiatives) act as another form of cross subsidy	Advice and support for those facing affordability problems including WaterSure tariffs and company specific social tariffs (ii). Given the ban on disconnections in the sector, the cost of ‘bad debts’ is significant and acts as another form of cross subsidy
	Energy Intensive Users exemption from Contracts for Differences (iii)	Between non-metered payers (from small households living in high rateable value properties to large households living in properties with low rateable values)
	Network innovation costs (to be reviewed in 2016)	Water charges used as a basis for recovering costs of highway drainage – irrespective of highway usage
Consumers – security of supply subsidies	Capacity payments	
Consumers- environmental subsidies	Contracts for Differences – eg off-shore wind (until 3/21)	
	Renewables Obligation (until 3/17)	
	Feed-in-tariffs (until 3/21)	
Consumers – social subsidies	Warm Homes Discount	Rain-water run-off subsidy for community organisations
	Energy Company Obligations (until 3/17)	
Tax payer - environmental subsidies	Government Electricity Rebate (until 12/15)	
	Renewable Heat Incentive	
	Carbon Capture and Storage – (tax payer match funding)	
	Energy Intensive Users compensation schemes for EU Emissions Trading Scheme, Renewables Obligation and exemptions from the Climate Change Levy (iii)	
	Taxpayer guarantees if developers go bust could become subsidies (eg nuclear guarantee) or if certain low probability high impact events occur in specific contracts (eg certain construction risks with the Thames Tideway – [iv]).	
Tax payer -social	Government Electricity Rebate	South West Water customer rebate (until

¹⁷ For example, see *The Levy Control Framework*, NAO, November 2013

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subsidies	(until 12/15)	2020) (v)
		Winter fuel payments for over 62s
	Cold weather payments for those in receipt of certain benefits	
Possible current gaps in subsidies	Renewables (eg onshore wind from 4/16 and small scale solar)	Limited subsidy of social, enviro. and security of supply costs
	Institutional / Transition costs	Innovation funding
	Natural capital repair and maintenance costs?	

Source: *Sustainability First*

Key

- (i) Social tariffs are being phased out in energy by the end of 2015 following the introduction of the Warm Homes Discount
- (ii) It is estimated that by 2020, 15 out of 18 water companies will have social tariffs in place (UKRN, January 2014, op cit)
- (iii) Total Energy Intensive User compensation and exemption payments are forecast to rise from a current level of £360m to £880m by 2019/20 (Policy Exchange op cit), potentially eroding the Polluter Pays Principle and leading to cross-subsidisation between different groups of consumers.
- (iv) The Government Support Package (GSP) for the Thames Tideway mitigates against some low probability but high impact events, including: insurance cover of last resort; short-term liquidity in the event of financial market disruption; additional equity contribution in the event of significant construction cost overruns (after other sources have been exhausted); and compensation to debt and equity investors if the project is discontinued. The Infrastructure Provider benefits from the GSP, for which it pays a fee.
- (v) Significant concerns about the historical unfairness of the privatisation settlement to South West Water consumers were picked up in the 2009 Walker Review of Affordability in the water industry. This identified that historically high levels of charges in South West Water were unfair as 3% of the population in England and Wales were effectively paying the clear up costs for one-third of the country's bathing waters to meet the standards of the European Bathing Waters Directive. As a result of these different factors, from March 2013 to 2020, the Government agreed to make a contribution of £50 towards household water bills in the region each year. Customers in the South-West are still much less satisfied (56%) than customers in all other regions (average – 75%) and the gap is widening. (*South West Water press release, 27th November 2012 and Water Matters, CCW, August 2015*)

5. Affordability of future bills – projections

5.1 External challenges impacting on future affordability – the big picture

The previous sections have highlighted the known and relatively well-documented current affordability challenges in the energy and water sectors and what this can mean for *intra*-generational equity. The energy and water sectors face several common underlying external challenges that could accentuate future affordability pressures and raise questions about longer-term *inter*-generational equity. However, people clearly need access to energy and water services continually, and hence there is a need for 'continuous' affordability. As we are current and future consumers at the same time, it is important therefore that affordability is seen through a 'rolling window.'

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As well as the challenges described below, other exogenous factors (‘unknown unknowns’) could also impact on the sectors. There are clearly also interdependencies between the various challenges outlined here. To build up a picture of future affordability pressures, it would seem important to understand what these are and what their combined impact could be on future bills.

Climate change and sustainability

In energy, the tougher carbon pricing that may be introduced to help mitigate climate change and secure sustainable low-carbon supplies could push up costs. The water sector will need to absorb these potentially higher energy costs. Energy use in the water sector is going up and has increased substantially over the last 20 years with energy costs now accounting for approximately 15% of operational costs in the sector.¹⁸ New sources of water and treatment processes (most notably desalination plants but also resources such as deeper aquifers) are also increasingly ‘energy hungry.’

Resilience and security of supply

The need to replace aging assets and ensure all assets can adapt to climate change will also drive future costs in both energy and water. Given the length of asset lives in the sectors, the decisions made today can have significant long-term consequences. Information on company asset bases, and associated asset health, is not always complete – especially in areas such as sewerage pipes or in other networks ‘closest to the home.’ This can make it difficult to accurately assess what the scale of long-term resilience costs may be in the sectors. The positive impact that innovation and developments in technology may have on driving down future adaptation costs is another unknown.

Ensuring water and sewerage services are resilient to both increased flood and drought risk will be important in the future. The task of securing adequate water resource levels in the face of more extreme and variable weather may in some areas pose a challenge to long-term water affordability. Although the costs of flood management are now met by a wide variety of actors and water companies currently only play a part in this, looking to the future, if flooding does become more severe, there may be a need to re-evaluate how this risk is best managed and controlled which could possibly change existing responsibilities and cost allocation practices. This could lead to flood management costs being paid through consumer bills.

In energy, geo-political risks (such as the ability to import ‘cheap’ gas from Russia) could accentuate commodity price fluctuations, leading to security of supply challenges in the sector, pushing up costs and exacerbating bill instability.

Increasing and changing patterns of consumption

¹⁸ *Bridging the gap between the energy and water sectors*, Cornwall Energy, May 2015

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Climate change could also impact on demand, particularly in the water sector. The World Economic Forum currently rates water crises as *the* top global risk in terms of impact for the next 10 years.¹⁹ If this leads to changes in patterns of food production for example, the ability of GB to continue to rely on the same level of food imports as currently may be called into question and may lead to knock-on changes in demand levels and patterns of water use in GB itself. Such crises could also clearly impact on migration flows into the UK.

Population growth overall, and particularly when it is concentrated in particular areas such as the South East, can lead to more immediate affordability pressures. Increasing urbanisation and the growth in the number of smaller households (that may have higher costs to serve) can add to this. The increase in private rented sector housing, where it can be more difficult to install energy and water savings measures or for consumers to save money by switching tariffs if they are in a short-term let, could potentially make it more difficult to control costs.

Economic growth, and its knock-on impact particularly on energy demand and costs, is another major area of uncertainty. It's also difficult to predict what impact the exponential growth in digital activity may have on longer-term energy demand forecasts and whether smart technologies and ways of doing business are able to balance out increases in electricity consumption.

Finance

If interest rates were to increase from their current historical low levels, it could have a significant impact on the costs of finance. Different companies will have different exposures to this risk, depending on their debt / equity profiles.

5.2 Future costs

Looking to the future, in 2015 the National Infrastructure Plan (NIP) estimated the infrastructure pipeline for energy at £244bn and for water at £25bn.²⁰ DECC estimated that progress on building renewable and low-carbon energy requires investment in both generation and transmission to replace ageing assets of around £100 billion by 2020. In water, Ofwat expects £44bn to be invested in the sector between 2015 and 2020 to improve services and resilience and to protect the environment.²¹ A 2013 National Audit Office (NAO) report had predicted that two thirds of the total future infrastructure investment needed in these sectors would be met through consumer bills²² and the 2015 NIP that all of future water investment to 2020 would be through bills. When the NAO report was discussed in the Public Accounts Committee in 2014, the Committee Chair noted '*Regulators must play their part by having a coordinated approach to assessing the impact on bills and affordability of infrastructure investment, in collaboration with Government*'.²³ Others have also questioned whether broader policy coherence, and a wider view of

¹⁹ *Global risks report*, World Economic Forum, 2015

²⁰ *National Infrastructure Plan*, 2015, HMT

²¹ *The economic regulation of the water sector*, The NAO, October 2015

²² *Infrastructure investment – the impact on consumer bills*, The NAO, 2013

²³ *Infrastructure investment – the impact on consumer bills*, Public Accounts Committee, July 2014

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what cost effective delivery might look like, would be beneficial.²⁴

Recent research from the UKRN has sought to better understand the pacing and phasing of utility investments within and across sectors to help regulators and others manage overall affordability and acceptability to consumers. Table 3 summarises future bill projections and the key uncertainties in energy and water. This illustrates that over the next decade, cost in-puts along with policy costs in the energy and water sectors are likely to help raise prices. The initiatives that may help drive prices down - regulatory interventions, technological change, competition and demand developments – are touched on in section 7.

Table 3 - Future bill projections and key uncertainties

	Energy	Water
Projected bills	<p>Bills are expected to decrease by around 4% (in real terms) between 2014 and 2020, based on DECC’s central assumption about fossil fuel prices and the original budget for the Levy Control Framework. However, the Department’s central scenario estimates an 11% average increase in bills in real terms between 2014-2030, which in part reflects that its analysis does not include any new energy efficiency policies or extensions to current ones beyond 2022 that may be required to meet the fourth Carbon Budget & beyond</p> <p>Looking to the longer term, there may be year round pressures on energy bills due to the growing demand for cooling in summer</p>	<p>England and Wales – between 2015/16 and 2019/20, average combined water and sewerage bills are projected to fall in real terms by 5%. Longer term, uncertainty over enhancement expenditure and the cost of capital may put upwards pressure on bills. Defra have therefore identified three scenarios for average household bills to 2050 that range from a decrease of 27% to an increase of 28%. In the baseline scenario, average bills are projected to increase by 2% by 2030 and then gradually fall giving a slight decline of 4% over the modeling horizon.²⁵</p> <p>Scotland - affordability is addressed through Principles of Charging set by Scottish Ministers - bills are expected to continue to decline in real terms in both the short and longer term.</p>
Regional differences	No relevant information found – but there are likely to be regional differences	By 2030 Defra estimates that Welsh Water (£520), South West Water (£507), Wessex Water (£462) and Thames Water (£412) could have the highest average bills ²⁶
Impact of environmental levies	<p>DECC estimates that for the average combined gas and electricity bill, energy and climate change policies make up 7% in 2014, rising to 14% in 2020, then declining slightly to 13% in 2030.²⁷</p> <p>The combined impact of expected fuel price rises and measures needed to 2030 to meet the fourth carbon budget need not adversely impact on fuel</p>	The Water Framework Directive is the key external policy that impacts water and sewerage company costs. In England and Wales, the costs of compliance are expected to fall from a peak of 2.6% of water and sewerage bills in 2017 to 1.3% in 2025. Other significant policies are the urban wastewater treatment directive and water resource management.

²⁴ *Getting Delivery Right: The EU 2030 Climate and Energy Targets and the Challenge of Governance*, Institute for European Environmental Policy (IEEP), December 2014

²⁵ *The Cumulative impact of regulation and policy on future water bills*, Defra, July 2015

²⁶ Defra, op cit

²⁷ *Estimating the impact of energy and climate change policies on energy prices and bills*, DECC, November 2014

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	poverty. Targeting measures specifically at fuel poor households could offset the impact of expected fuel price rises on fuel poverty levels to 2030. ²⁸	
Key uncertainties	<p>Wholesale costs - Cost in-puts in energy are generally assumed as likely to rise over the long-run due to higher producer costs, although the global nature of these markets make them hard to predict (wholesale costs currently make up 50% of domestic energy bills). Factors such as the EU Emission Trading System and the Carbon Floor Price can push up costs whilst the Capacity Market and interconnectors may reduce them</p> <p>Energy efficiency savings - DECC assumes that initiatives such as increased efficiency from EU product policy and tougher building regulations will be able to offset other policy costs. Unless future energy efficiency measures help reduce consumption as expected, energy bills could increase more than DECC presently predicts over the longer term (to 2030).</p> <p>Cost of capital – particularly if interest rates rise and / or policy risk remains high.</p> <p>Smart technologies – metering, data and grids along with Electric Vehicles and low-carbon heat systems are all expected to have a positive impact but there is some doubt about whether targets, particularly for the latter, will be met.²⁹</p>	<p>Sewerage costs – there is a lack of data on the condition of sewerage assets, and hence the need for investment in this area</p> <p>Resource levels - the need for greater expenditure on water resources to ensure resilience against different population / GDP and climate scenarios is another source of uncertainty</p> <p>Investments for quality – could push up costs eg removing chemicals from waste water</p> <p>Cost of capital – particularly if interest rates rise or policy risk increases. Given the monopoly nature of much of the sector, changes in this area could have a significant impact</p> <p>Smart technologies – although likely to have a more limited potential than in energy in the short term, developments in metering, data and treatment systems could have a longer term impact</p> <p>Market reform –for none household retail and for upstream services - is expected to reduce household bills by about 1% by 2025.</p> <p>Abstraction reform - as no firm proposals have yet been made in this area, it is a potential source of uncertainty</p> <p>Operational costs – energy costs are one of the most significant items here.</p>

Source: Adapted from *Understanding future affordability pressures in essential services*, UKRN September 2015

5.3 Future incomes

In terms of the **average** consumer and based on central scenarios for bill outcomes, it is projected that energy and water bills should account for a slightly lower proportion of real household incomes in 2020 compared to 2014.³⁰ However, such projections are based on average bills for ‘average’ consumers and do not take account of

²⁸ *Research on fuel poverty - The implications of meeting the fourth carbon budget*, Centre for Sustainable Energy November 2014

²⁹ *Meeting Carbon Budgets – Progress in reducing the UK’s emissions 2015 Report to Parliament*, Climate Change committee, June 2015

³⁰ *UKRN, September 2015*

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potential distributional impacts on certain groups, particularly those on low incomes or with high consumption needs.

The issue of future incomes of customers in vulnerable circumstances is clearly influenced by numerous factors including employment rates, wage growth and welfare and benefit changes. It is highly political and there are clearly differing views. For example, a study carried out for the Resolution Foundation by the Institute for Fiscal Studies and Institute for Employment Research found that the household income of low- and middle-income groups would decline by 2020 with associated distributional impacts. In the case of a baseline scenario of steady economic growth, households in low-income groups may see their incomes declining by 15% in real terms between 2008/09 and 2020/21, falling from £10,590 per annum to £9,000 per annum (in 2008/09 prices). Household income of middle-income groups was projected to decline by about 3% in real terms, from £22,960 per annum to £22,200 per annum in 2020/21 (in 2008/09 prices). Families on benefits may see their income decline by 1.7% a year.³¹ A 2013 Which? report predicted that there could be growing income inequality to 2030. They forecast that the gap between the percentage of household spending on essentials in the 20% of households with the lowest incomes and the 20% of households with the highest incomes would increase from 6.4% in 2010 to 7.4% in 2030.³² It is worth noting that current government assumptions are that low-income households will enjoy lower taxation and higher real earnings by 2020.

Future changes in other essential costs, particularly housing, should be taken into account when looking at long-term affordability projections. The increase in the proportion of people renting, particularly in the private rental sector where rents are higher, could place a future squeeze on the income available for energy and water costs. Similarly, if interest rates go up from their historically low levels, this could also have a significant impact mortgage repayments and hence on the available incomes of homeowners to meet energy and water costs.

Although this paper isn't focused on vulnerability, it is important to note that many of the subsidies, support mechanisms and sources of advice in the sectors are channelled to those in receipt of certain 'passport' benefits. Some energy and water consumers in vulnerable circumstances may not be eligible for these and the welfare landscape is clearly in flux. Debates about the impact of welfare reform and the national living wage are keeping this a live issue. It has been predicted that universal credit is likely to interrupt benefit incomes, lead to more irregular payments and reduce monetary values to an extent that debt rates could increase to pre-credit crunch levels.³³ To ensure long-term affordability, it is clearly important that support is targeted at those energy and water consumers most in need and is able to flex to respond to changes in the benefit system.

³¹ *Who gains from growth? Living standards in 2020*, Resolution Foundation, 2012

³² *Consumers in 2030*, Which? January 2013

³³ *The impact of welfare reform on water debt*, Research for UKWIR by Citizens Advice, March 2015

5.4 The pace of change needed

Balancing short and long-term affordability pressures requires a judgement to be made on the appropriate pace of change that is needed to address the above challenges. This adds an element of uncertainty to policy and consequent activity in the sectors.

This is clearly most acute in the energy sector. Although climate change impacts are becoming clearer and many of the costs of achieving a sustainable and secure energy supply are now analysable and shadow pricing possible, uncertainties do remain. The difficulties of securing global agreements and approaches, and the risks of unilaterally reducing emissions and introducing changes in respect of low-carbon in advance of other countries (leading to ‘unfair’ impacts on our global competitiveness - witness recent discussions around the impact of energy prices on steel works closures), should not be underestimated. There are also strong arguments that technological progress results in cheaper ways of reducing emissions over time.

Waiting to decarbonise until costs are lower or there is more evidence clearly also has risks. Lord Stern points out that this could lead to the *‘technological ‘lock-in’ of high carbon infrastructure that could last for decades.’* He warns *‘delay [in policies to tackle climate change and associated investments] will increase risks and costs and would lead to the need to undertake radical, rapid and expensive decarbonisation in two or three decades time resulting in the scrapping of vast amounts of locked in capital.’* He says the issue is pressing: *‘climate performance is off track. The next 15 years will be critical’* if reduced emissions are to hold warming below the crucial level of two degrees. In his discussion on the ethics of climate change and the associated inter-generational issues, Lord Stern raises the question of whether we should *‘discount the value of future goods because “people in the future will be richer”?’* He goes on to point out that it depends on *which* goods are being considered. Due to the essential nature of the energy and water sectors, this could in effect be *‘discounting future welfare... it is discrimination by date of birth.’*³⁴

Lord Stern’s early views on discount rates have been challenged by some academic reviewers. However, his point about costs increasing if decisions are delayed would now appear to have a wider resonance. Indeed, the Governor of the Bank of England has recently echoed this theme. In a speech in September 2015 he described climate change as *‘...the tragedy of the horizon. It goes beyond the business cycle, the political cycle and the horizon of technocratic authorities, like central banks, who are bound by their mandates.’* He has counselled that *‘Earlier action will mean less costly adjustment’* but that *‘the window of opportunity is finite and shrinking.’*³⁵

Given the potential scale of long-term climate impacts, and the fact that costs and hence prices could increase if action is delayed, following the precautionary principle in energy and investing in these external challenges in a planned and stable way would seem a sensible way forward. Morally it would also seem to be the ‘right’ thing to do for future generations, who will not after all be able to receive any

³⁴ *Why are we waiting? The logic, urgency and promise of tackling climate change*, Nicholas Stern, LSE, June 2015

³⁵ *Breaking the tragedy of the horizon – climate change and financial stability*, Mark Carney, 29 September 2015

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recompense or redress if the decisions taken are ‘wrong’ and future options are foreclosed.

It could well be argued that decisions in this area are essentially political. However, once politicians have set the framework for action and the pace of change needed is clearer, companies should and can engage with their customers on the proportion of costs that should be recovered in current versus future price control periods.

6. Who should pay for future costs and how should these be recovered?

6.1 Different types of costs

Although consumers care about prices, these are driven by costs. To fully understand future long-term affordability pressures, it is important to have a holistic view of costs. Each sector has a different way of analysing these. Whilst not wanting to be mechanistic about different categories of costs, Sustainability First has used the following framework to think about them:

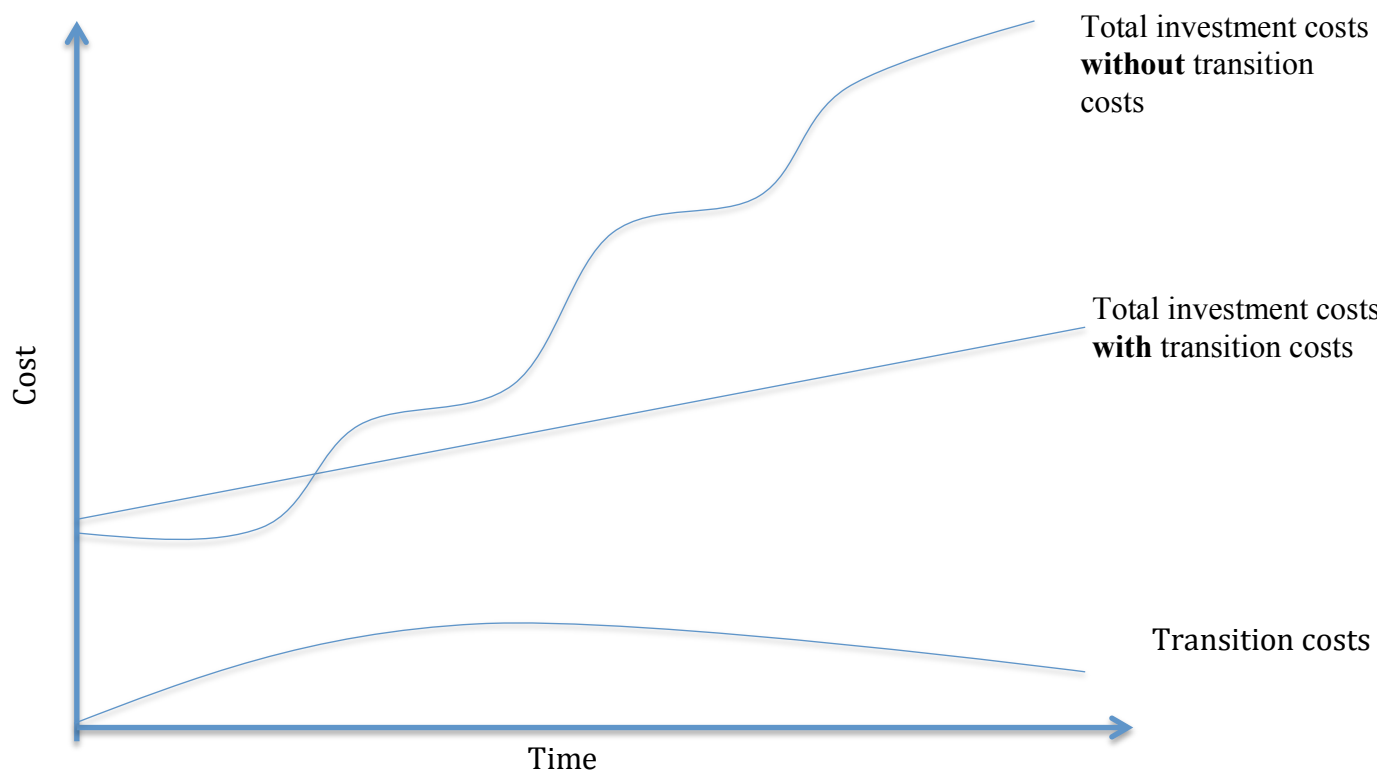
- **Maintenance costs** – operational costs and the investments needed to renew and repair existing infrastructure to meet current demand. These costs will remain the most significant element of total costs into the future. They will largely be ‘business as usual’ costs. However, in order to make prices more affordable in the long-run, existing practices may gradually be questioned. For example, it may become increasingly unacceptable to use clean drinking water, rather than grey water, to flush toilets.
- **Capital enhancement costs** – to extend existing networks to meet known new service demands and the costs of incremental change. In water, these are likely to contain large elements of environmental and resilience costs for adapting to climate change. In energy, they may be focused on the costs of increasing electrification of heat and transport, increasing the differences between consumers with and without low carbon technologies;
- **Natural capital ‘repair’ and maintenance costs** – many of the costs associated with the underlying natural resources on which both sectors rely, and are influenced by, are not always clear. If natural capital levels are to be maintained and repaired, in line with the 2012 White Paper ‘The Natural Choice’, there is likely to be an increasing interest in how these natural capital costs are recovered. In water, it may be the case that many natural capital costs are already integrated into maintenance and capital enhancement costs; and
- **Strategic investment costs** – investments ahead of need before there is a full and immediate demand, thus representing a step change in service delivery. This is a contentious area of costs and raises the question of what level of strategic investment is the most appropriate. There are clearly risks attached to both investing too early (such as wasted expenditure / stranded assets) or delaying investments (reducing optionality). These risks may be explored further in future New-Pin papers.

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In assessing the above types of costs, it became apparent that in order to facilitate the step change in investment and innovation that will be needed to reduce long-run costs in the energy sector, one potential group of costs may be missing from the above analysis: **institutional & organisational transition costs**. These costs are particular to the energy sector at the moment as here low-carbon challenges are most acute, the value chain has been disaggregated and opportunities for smart approaches are clearer. In the water sector, the main area of transition is currently predicted to be around climate change adaptation. As this is likely to be an incremental change, it may not require such a specific type of cost recognition. In the longer-term, this could potentially change.

Transition costs could be defined as the explicit but relatively small costs associated with ensuring that energy sector evolution towards a low-carbon world can happen at the ‘right’ pace to maximise long-run affordability. Figure 1 provides an *illustration* of how transition costs may potentially help reduce total investment costs, and hence provide a pathway to long-term affordability, over time.

Figure 1 - Indicative illustration of the potential impact of institutional and organisational transition costs on total investment costs



Source: Sustainability First

It could be argued that it should be left to the market itself to drive such change and the costs of transition should be part of part of business as usual costs. For example, companies such as Apple have been able to bring about transformative change in the communications space primarily through on-going innovation and competition. Indeed, there are already instances in energy where companies have worked with government and regulators to help secure change (eg NETA, BETTA and EMR).

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The argument could be made that such funding models should continue into the future, and that the recognition of more explicit transition costs could potentially lead to a waste of customers money and / or interfere with market solutions. To avoid this, it will be important to: assess the steps in institutional reform which are ‘transition-critical’ / ‘mission critical;’ understand whether those steps are in practice already funded; and identify any ‘gaps’ in institutional reform and their funding. In writing this paper, it became clear that there are several reasons why it could be in the public interest to specifically recognise institutional and organisational transition costs in energy in this way:

- 1. To work around existing legal and regulatory vices** – existing frameworks and rules can restrict the scope for co-operation, collaboration and new ways of working in the sectors. It can be difficult for departments, regulators and market actors to go beyond their existing ‘vices’ and license conditions and move beyond the current ‘project-by-project’ approaches to cost-recovery and transition. The newly created ‘National Infrastructure Commission’ may help in this regard but very early indications are that the Commission’s work is also likely to be project focused (see page 38). Through pooling risks and resources to test new approaches, transition costs should help overcome the institutional and political inertia in the system and enable greater flexibility and a smoother, more co-ordinated approach to managing change and systemic risks (see page 28).
- 2. To open the way for new actors, particularly ‘local’ & demand side approaches** – new actors can find it difficult to enter into the energy market. Entry costs are high, and the ability and capacity of often small new market actors, whose interests may be diverse and fragmented, to navigate the existing market rules etc can act as a barrier to entry. Transition costs could help support such new entrants, enabling them to articulate the barriers that need to be overcome. Ofgem’s work on ‘Non-traditional business models’ should undoubtedly be helpful here. It’s also worth noting for comparative purposes that the Financial Conduct Authority has an ‘Innovation Hub’ that supports new and established businesses to be able to introduce new innovative products.³⁶
- 3. To enable technological and commercial innovation amongst incumbents** - regulation has pushed down costs but sometimes at the expense of stripping out R&D capacity. This can make it difficult for existing market actors to lead on technological innovation (Ofgem’s innovation funding competitions have in part been designed to help address this point – see page 41). The focus of regulation on efficiency has in the past perhaps also made it more difficult for companies to develop wider, and particularly commercial, skills bases that may be needed to evolve in an uncertain environment. Channelling transition costs through incumbent actors could potentially entrench and ‘lock-in’ existing solutions and approaches. However, in networks incumbents will always have a key role to play and recognising transition costs in part to help existing actors to work together to achieve change could be important. This process could also help achieve a cultural change amongst often understandably risk averse licensees, helping them to become more outward looking and willing to forge new partnerships and ways of working. Transition costs could thus help enable the necessary experimentation to occur to ensure that least regret

³⁶ For example, see *Regulatory Sandbox*, FCA, November 2015

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approaches are taken, new solutions are piloted, optionality is maintained and whole system long-term costs minimised and introduced in as stable a way as possible.

Government clearly has a role in co-ordinating the management of transition costs to ensure that the solutions reached are as strategic and holistic as possible and affordability is maximised. The risks of picking ‘winners’ – whether in technologies, institutional designs or approaches - are well rehearsed. As Professor Michael Grubb has pointed out ‘...*the problems of purely publicly-directed investment are of course well known.*’³⁷ However, there is a clear need to help ensure that new technologies and institutional approaches are able to move from low to higher levels of technological and user readiness and public acceptance. Getting the right balance between the state providing a sense of strategic direction or ‘guiding mind’ and working with regulators and market actors to support and facilitate transformative change will be important.

6.2 Risks, rewards and cost recovery mechanisms

The question of who should pay for which groups of costs is likely to be influenced by who has incurred the costs (eg of any pollution) and who will bear the risks and reap the rewards of the investment. In addressing this issue, it may be helpful to explore the different types of risk that may be faced in the energy and water sectors in the future:

Organisation level risks (‘enterprise’ risk)

Risks related to a given company or regulator including: operational (eg plant / treatment centre failures); financial; technological; compliance and regulation; reputational; and strategic risks. For energy retailers, for example, this could include wholesale price risk and possible imbalance risk if they get their procurement contracts wrong. Procurement risk could be exacerbated by loss of predicted market share through more active switching. Energy suppliers are also very concerned about potential cash flow risk relating to supplier levy obligation arrangements. For investors in new projects, this risk will include development and construction risk. Enterprise risks impact the investors and consumers of a particular company. Current license arrangements and regulatory frameworks have unsurprisingly to-date placed most emphasis on this type of risk.

Risks that go beyond one organisation (‘extended enterprise’ risk)

Risks that arise through the relationships and dependencies that the organisation has with other organisations. These could include: supply chain risk; political risk (eg wrong technology choices by government); and public acceptance risk. The impact of this type of risk spreads to the consumers and investors of more than one company. Political risk in particular can have a ‘ripple’ effect if policy or technology choices fail to deliver the projected benefits, leading to a reduction in investor (and consumer) confidence.

³⁷ *Submission to the CMA*, Professor Michael Grubb, April 2015

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Risks that impact on a natural system (‘systemic’ risk)

Risks that relate to the fact that the energy and water sectors sit at the heart of environmental systems and are key to atmospheric and water ‘health.’ The inter-dependencies between the energy and water sectors may potentially accentuate systemic risk. This type of risk impacts on citizens, the environment and wider society.

Risks that relate to the transition to low-carbon (‘transition’ risks)

Primarily financial risks that could result from the process of adjustment towards a lower-carbon economy. As the Governor of the Bank of England has noted of such risks *‘changes in policy, technology and physical risks could prompt a reassessment of the value of a large range of assets as costs and opportunities become apparent. The speed at which such re-pricing occurs is uncertain and could be decisive for financial stability.’*³⁸

A more joined-up approach to policy, regulation and service delivery may be needed if systemic and transition risks are to be managed – particularly in energy.

Table 4 summarises the possible risks for different types of costs. On the basis of the risks and rewards outlined in Table 4, Table 5 moves on to propose a framework for thinking about who should pay for each type of investment costs and suggests how these could possibly be recovered. It is important to note that the majority of the costs in both sectors will continue to be in the on-going maintenance of existing systems and that the costs towards the bottom of the table may not be relevant to the water sector. In the water sector, therefore, the question of who funds future investments may be less salient than it is for energy. However, this could start to change in the longer term.

When thinking about who should pay for what costs in the future, it would seem a fair and acceptable proposition that at a high ‘macro’ level costs should be met by those that benefit from the services delivered and / or cause any associated pollution *and* those best able to control them and their associated risks.




³⁸ *Breaking the tragedy of the horizon*, op cit

Table 4 –Possible risks and rewards of different types of costs

	Different types of investment cost				
	Maintenance	Capital enhancement	Natural capital	Strategic investment	Transition
Scale of investment	Medium	Low – medium	Varies	Significant	Likely to vary
Type of risk	Enterprise risk	Enterprise risk (particularly development and construction risk)	Extended enterprise risk Systemic risk	Enterprise risk (particularly development and construction risk) Systemic risk Transition risk	Systemic risk Transition risk
Degree of uncertainty	Low	Medium	Medium / High	Medium / High	High
Who receives the reward / benefit of the investment?	Existing investors and current consumers of a given company	Current and future investors and consumers	Current and future investors and consumers Environment and future citizens	Less certain – less likely to be ‘individual’ Environment and future citizens Future investors and consumers Benefits can be of national strategic importance	Environment and future citizens Future investors and consumers Benefits can be of national strategic importance
Who may be best able to manage the risk?	Individual companies and their consumers However, it is difficult for suppliers and investors to control network and policy costs and in monopolies for essential services, difficult for consumers to avoid or even reduce this risk – hence regulation has a role	Existing companies and their consumers New market actors / developers Investors Regulators Policy makers	Specific consumers, polluters and developers Policy makers Regulators New market actors Investors	Regulators may be best able to manage these risks if they derive from policy / legislative requirements. Investors and new market actors will have to respond to these signals. Individual companies and their consumers will also need to play a role.	Policy makers and regulators may be best able to manage these risks but will need to do so through working with other market actors

Source: *Sustainability First*

Table 5 – ‘straw-man’ framework for thinking about who should pay for different types of investments and possible cost recovery mechanisms

Type of costs	Degree of uncertainty	Who pays?		Recovery mechanism	
Maintenance costs	 <p>Low</p>	Current consumers. Risk and reward sharing mechanisms can help balance who pays between companies / investors and consumers	 <p>Current consumers</p>	Current consumer bills (and future consumer bills through depreciation)	 <p>Bill payers</p>
Capital enhancement costs		Generality & specific groups of current consumers & developers		Current consumer bills & specific bill payer / developer charges – eg connection charges (and future consumer bills through depreciation)	
Natural capital repair costs		Specific current consumers, citizens, asset owners or developers- if known. If not, possibly taxpayers		Polluter based fines, levies and compensation arrangements (polluter pays principle)	
Natural capital maintenance costs		Mix of current asset owners, consumers, developers & citizens		Mix of current consumer bills (through internalised environmental costs), innovative funding (eg Payments for Ecosystem Services) & tax - in exceptional circumstances & if basis of cost allocation is unclear	
Strategic investment costs		If required by legislation, either current generations as consumers or citizens &/or future generations		Either through levies on bills or, for projects of national importance, tax or through government underwriting key risks	
In energy - institutional / organisation transition costs		If to support legislative change, current generations as consumers or citizens &/or future generations		Current and future citizens?	
	High				

Source: Sustainability *First*

6.3 Maintenance & capital enhancement – future cost socialisation

The approach outlined in Table 5 to dealing with maintenance costs, and possibly also capital enhancement costs, may well be widely accepted. Few are likely to argue against current consumers paying for these costs through bills providing monopoly elements are robustly regulated and consumers in vulnerable circumstances have adequate protection. Risk / reward sharing mechanisms to balance who pays between consumers and investors may make bills more acceptable – providing such mechanisms are ‘fairly’ calibrated. The main area for debate with these types of costs in the future may be whether they should continue to be ‘averaged’ across current consumers or whether the benefits of greater cost reflectivity outweigh the benefits of cost socialisation leading to different groups of current customers bearing different costs.

The drive towards a more active demand side in energy and the development of new uses (such as electric vehicles) and sources of energy (such as distributed generation), are raising questions of whether greater cost-reflectivity would be advantageous and help increase system efficiency. For example, how much cost should early adopters of new technologies or local connectors to the network pay compared to those with low usage levels and flatter consumption profiles (who may be unable to respond to demand side signals) or consumers who will benefit from it once it is more heavily / efficiently utilised?

Technological advances that enable the increasing disaggregation and targeting of costs may necessitate a more sophisticated approach to cost socialisation in the future. However, it is important to remember that cost-reflectivity is not a neutral concept. We can choose which costs are reflected in prices and who should pay for them. As greater cost-reflection could lead to increasing differences between customer groups and could have further distributional costs, along with data collection and friction costs, there are concerns that the overall impact of any such changes needs to be better understood before further moves in this direction. To help assess whether it may be sensible in the long-term to further de-average maintenance and capital enhancements costs it would therefore seem prudent to model the impacts to more clearly identify who the winners and losers may be of both further action in this area *as well as* the impacts of keeping the status quo. The results that are starting to emerge from the work by the Centre for Sustainable Energy (CSE) on customer archetypes for Ofgem together with Ofgem’s Low-carbon Network Fund and Network Innovation Competition projects could provide valuable data to incorporate into such models (the early demand side response trials in the latter pointing to the emergence of very real down as well as upsides for consumers).

There are some similarities here with the situation in the water sector with moves towards greater water metering. The steady rise in water metering amongst those who will save with volumetric tariffs is leading to ‘incidence effects’ in the remaining non-metered customer base. Here, the costs of high-users in some companies are spread amongst a dwindling number of households. In some cases, this can mean small households living in high rateable value properties are subsidising large households living in properties with lower rateable values – unless they of course opt for a water meter and to pay volumetric charges. Ofwat estimates that the rateable value system currently means a cross-subsidy of about £560 million per year. This does not target

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low-income households efficiently, and many household customers on high incomes benefit.³⁹ As water companies are encouraged by the regulator to ‘own’ their structure of charges, there would appear to be further scope for them to work with their customer challenge groups to address these issues.

The development of new tariffs, such as seasonal or other peak charges, would clearly raise further questions around cost-reflectivity in water. In its July 2015 consultation on charging guidance to Ofwat, Defra acknowledged the substantial cross-subsidies inherent in the water sector, noting that in many cases unwinding existing cross-subsidies ‘*would be of little practical benefit and may lead to bill instability; creating winners and losers without delivering any measurable policy benefit. However, in some cases it may be beneficial to use targeted price signals to improve recognition of environmental costs. The Government recognises that innovative tariff structures can send positive price signals and improve economic and environmental efficiency..... However, the introduction of such tools needs to be properly evaluated... Well- designed small-scale tariff trials can provide important evidence to guide decisions on tariff design.*’⁴⁰

Although energy and water companies undoubtedly face some different challenges in the area of cost socialisation (eg in regions that currently have significant water resources, the argument for cost-reflective price signals may not currently be compelling), there is much that the two sectors could learn from each other in this area. The issue of future costs socialisation and cross subsidisation is the subject of a forthcoming Sustainability First discussion paper.

6.4 Natural capital – who pays for mistakes and maintains the future?

Natural capital costs, and their associated maintenance and repair, can be difficult to quantify. The Natural Capital Committee (NCC) have noted that ‘*Most accounting frameworks, in practice, focus on recording changes in flows, often neglecting changes in the underpinning assets (or stocks) from which they are derived.*’⁴¹ In the water sector, this is reflected in the fact that water companies do not currently include levels of relevant water resource on their balance sheets. For this reason, the NCC has advocated a move to Corporate Natural Capital Accounting (CNCA).

Given this is a relatively recent and emerging area of policy and CNCA frameworks are still evolving, it could be argued that natural capital costs should be excluded from discussions on affordability; that it could make an already complex debate about who bears which costs more difficult. However, if a long-term view of affordability is taken, unless a holistic approach is followed on costs, any resulting proposals could be sub-optimal. The NCC have said, ‘*Taking account of the distributional impacts of environmental change is an issue of growing importance. Consideration should be given to distinguishing such impacts from the wider (non-natural capital) distributional incidence of the costs and benefits of an investment.*’⁴² It is worth

³⁹ UKRN January 2015 op cit

⁴⁰ *Consultation on charging guidance to Ofwat*, Defra, July 2015

⁴¹ *The State of Natural Capital*, Natural Capital Committee Third Report, 2015

⁴² *Op cit*

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noting that the NCC recommended in its Third Report that the National Infrastructure Plan should incorporate natural capital into the energy and water sectors. This would clearly help secure the issue in the decision making process.

A move to CNCA leads to questions about who should pay for mistakes (repair costs) and who should foot the bill for ensuring the integrity of natural capital is maintained for the future. If the polluter pays principle is accepted, there is a strong case for natural capital repair costs to be met by those that have caused the pollution, be these specific companies, consumers, citizens, asset owners or developers. These costs can be recovered through polluter-based fines, levies and compensation payments. This task is clearly more difficult if the natural assets in question have fallen into a state of disrepair over a long period and there are no obvious ‘polluters’ to apportion any making-good costs to. In such circumstances, and if the value of the natural capital is significant, there could potentially be a case for the wider public to pay for the repair costs, possibly through taxation.

It terms of natural capital maintenance payments, the NCC has recommended that where responsibilities are clear, cost recovery should be an *‘extension of the polluter pays principle to a concept of owner-responsibility obligations for natural capital. For example, developers could be required either to restore or protect existing natural capital or alternatively to make compensating investments in natural capital where its protection on site is simply not possible’*.

Innovative funding solutions such as Payments for Eco-system Services can be one way of managing and recovering natural capital costs. The ‘Upstream Thinking’ project undertaken by South West Water in Exmoor and other water-catchment sites in the region which addresses the impacts on water quality of dispersed pollution from agriculture is a good example. Joint investments between farmers and the water company ensure that land is managed in such a way that potential water pollutants including peat, soils and natural fertilisers are kept on their land and do not run off into surrounding water courses. This brings benefits to the farmer (in terms of lowering the costs of operations), to the water company (which does not have to invest as much to treat the water downstream) and wider society (which benefits from having healthier rivers for recreation, angling and enjoying wildlife). Government are now funding a series of innovative pilots along these lines to help identify and unlock new ways of reducing costs and paying for services.⁴³

Where responsibilities are less clear, particularly if the natural capital is jointly owned or as is often the case subject to impacts from multiple parties, deciding who should pay is potentially more complex. Integrating the natural capital costs into all the relevant charges, whether these are bills or taxes, of those using the natural asset so that they fully reflect environmental costs and benefits, may be the most effective way of doing this. Carbon pricing could be a case in point. The extent to which this could damage short-term competitiveness, particularly in regard to indirect impacts on input prices for globally traded goods, may however need to be acknowledged.

⁴³ *The State of Natural Capital*, NCC Third Report, 2015

6.5 Strategic investment – consumer, taxpayer or local funding?

Given existing patterns of cost recovery and future cost projections, debates about consumer versus taxpayer funding are mainly of concern to the energy sector. In both sectors, however, the current fiscal and low tax environment makes the possibility of taxpayer funding remote – at the national level.

The devolution agenda could bring a new dimension to this issue. For example, Bristol and Nottingham Councils have been experimenting with becoming energy suppliers, selling the energy that they generate. In Gateshead, the local authority has been involved in developing CHP. Local authorities grouping together will have more clout. The ability of Mayoral Authorities to keep their business rates and channel them into local infrastructure funds, which can be used to underwrite higher cost local projects, could be a significant impetus for change.

If projects are ‘required’ by legislation / regulation / targets, there can be a strong case for the entity making the investment to expect to be able to recover some of the additional expenditure which that investment entails from the current generation of consumers via some kind of special mechanism. There are broadly two possible options for doing this:

- **Consumer based levies** – the precise design of a levy may vary but it is one way of covering strategic investment costs. In general, a levy will serve to increase consumer bills more than otherwise. A levy, or a series of levies, may result in distributional or other unforeseen impacts. A levy world is arguably relatively accountable and transparent – and provided there are no post-hoc interventions, a levy world is largely bankable / predictable. The new Electricity Market Reform arrangements are a good example of customer-based levies.
- **Citizen / taxpayer funding** – broadly progressive, but arguably contentious in a low-tax environment, and potentially breaks the link between direct customer understanding of the investment. Taxpayer / Government ‘commitment’ may be shaped by short-termism and electoral cycles. There could be a case for tax-payer funded projects to be always an ‘exceptional’ means of funding strategic investment, either for reasons of cost (e.g. CCS, Severn Barrage?), national strategic interests (eg Third Runway?) or because the benefits accrue to wider society (eg taxpayer supported extension of broadband into all communities enables growth to flourish and public services to move to digital). Taxpayer funding may also be more appropriate when there is significant uncertainty about the possible impacts of the investment (or lack of it) on future generations. As future generations clearly often bear the costs of today’s erroneous decisions and investment – without scope for redress from their forebears – ensuring there is a potential ‘democratic accountability’ link in such decisions would seem important.

Analysis from Policy Exchange indicates that people prefer targeted subsidies:
‘People generally have inherent preferences for funding policies through taxation rather than levies but after deliberative questioning some people end up shifting back

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*towards bill levies rather than taxation due to their dislike of VAT and income tax.*⁴⁴
The advantages and disadvantages of the two methods of recovering strategic investment costs are summarised in Table 6.

In deciding which cost recovery mechanisms are the most appropriate for a particular project, it may be worth considering the following possible questions:

- What’s the scale of the investment?
- What’s the degree of risk?
- Is the investment of national strategic interest?
- To what extent will it have an impact on wider society?
- How far are different approaches progressive or regressive and how can any regressive impacts be best managed by other means?

Table 6 – Possible advantages and disadvantages of different methods of paying for investment costs

Method of paying for costs	Advantages	Disadvantages
Levies on bills – funded by consumers	<ul style="list-style-type: none"> - Relatively clear and accountable - Can be part of a predictable framework - By directly impacting on consumers, can encourage more efficient use of services 	<ul style="list-style-type: none"> - Distributional impacts - Consumers may be reluctant to pay for certain activities, potentially leading to under-investment in the future - If changes are made to levies in an ad-hoc way, can undermine consumer and investor confidence
Taxation – funded by citizens	<ul style="list-style-type: none"> - Can be progressive and minimise distributional impacts - Enables the pooling of risks within and between generations - Could foster sense of public ownership and desire for greater public control 	<ul style="list-style-type: none"> - Could be subject to change as a result of political pressure and electoral cycles - Not necessarily transparent and accountability can be diffuse - Doesn’t lead to direct financial incentive to encourage more efficient use of resources

Source: Sustainability First

For nationally significant strategic investments, citizen / taxpayer funding may be used as a back-stop to cover certain high impact low probability risks. It is important in such cases to understand who makes this decision, what the range of future liabilities may be and what the total short and long-term impacts (positive and negative) could be on different groups.

⁴⁴ Policy Exchange op cit

7. How should future costs be best managed and kept ‘affordable’?

Government, regulators, market participants and consumers all have a role to play in ensuring that long-term costs are well managed and kept as affordable as possible. All actors clearly need to work together if a downward pressure is going to be kept on costs and new and cheaper ways of providing services are to be developed. Increased efficiency is crucial to lower expenditure so that it can offset future investment costs. Whilst this may be possible for the incremental investments faced by the water sector, it may be more challenging if a step change in investment is needed as may be the case in energy. It can also be difficult for companies already operating at the efficiency frontier to find significant savings – unless they are able to enter into new joint ventures or undertake mergers and acquisitions activity (which may be limited by existing license conditions or regulations).

This section *briefly* touches on what can be done by different actors to manage costs. However, issues such as the scope for demand side efficiencies, resilience and standards and how best to stimulate innovation will be explored in more detail in further New-Pin papers.

7.1 Policy frameworks

To ensure that social policy isn’t ‘outsourced’ to the private sector, it is vital that policy frameworks explicitly take account of affordability issues and in particular, the needs of people in vulnerable circumstances. Policy guidance needs to recognise that unlike progressive taxation, bill based cost recovery mechanisms can have distributional impacts that need to be understood (on a sector by sector and holistic basis) and managed. Ensuring that energy and water policies dovetail into welfare and benefits policies would seem important. As the benefit landscape changes, it is important that policy frameworks allow a flexible response from companies.

Government clearly also has a wider role to play in providing the clear, predictable policy frameworks that are necessary to attract investment into the energy and water sectors. Without such stability, investor confidence will suffer and the cost of capital may go up, making affordability issues more acute. Clear long-standing objectives, and consistent departmental strategic guidance and co-ordination between Departments, would therefore seem vital for all types of long-term investment costs. This is particularly important given the systemic risks in the sectors and the corresponding need for an holistic approach to some of the policy challenges in the sectors. Once again, there are potential differences here between the two sectors. Given the scale of uncertainty in terms of carbon, having a clear sense of policy direction in the energy sector is likely to be more contentious than in the water sector.

Given the significant potential that efficiency / demand reduction and response schemes can have for reducing long-term costs, policy frameworks in these areas need to play catch up with those for the supply side. Of particular note is that the design of domestic energy efficiency initiatives appears to be in a state of some uncertainty since the closure of the Green Deal to new consumers in July 2015. The energy policy ‘reset’ will need to tackle these issues in a holistic way.

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A coherent and strategic policy approach across government to issues such as building and appliance standards and in-home communication infrastructures for smart technologies is needed to enable demand side potential to be realised. Thought needs to be given as to how actors outside the sectors, such as developers, can be incentivised through timely signals to deliver products and services that can enable demand reduction. Policy guidance may also be of help in challenging some standards that may not be fully justifiable if affordability is under pressure. For example, the use of drinking water to flush toilets or water gardens.

There is a case for policy frameworks to also have a role in encouraging the greater recognition of natural capital costs, until these are more established as legitimate costs in regulatory terms. In the water sector, policy frameworks and the Water Resource Management Planning process already recognise many environmental costs. The challenge here is to ensure that environmental protection is appropriately valued so that initiatives are justified and represent value for money. Given that some natural capital costs may straddle regulatory and statutory remits (for example the costs of managing flooding), developing a joined up view of how to best value and manage these, and account for fines, levies etc, would seem important to help ensure regulatory consistency in the future. This could chime with the views of the NCC that *‘Energy, water and food are all vital goods and services that are derived from natural capital and are dependent to a significant extent on its condition. The solutions in this case will be highly interconnected too, so much so that to make progress in tackling one area requires careful integration with solutions in another.’*⁴⁵

7.2 The National Infrastructure Commission

The recently announced National Infrastructure Commission could play a role in identifying institutional and organisational transition costs but early indications are that this will focus on future infrastructure of ‘national significance’ and hence be more focused on project specific **strategic investment costs** – identifying both what projects may be needed and how these should be funded. Although the Commission’s scope will be across infrastructure sectors, transport and energy have been flagged up as early priority areas for review, in the latter leading to an assessment of supply / demand solutions such as the role of storage, demand management and interconnectors, that will help feed into National Policy Statements. The extent to which the Commission will be able to look at long-term efficiency is uncertain.

Commenting on the establishment of the Commission, Lord Adonis its new Chair has said *‘I hope that it will be possible to forge a wide measure of agreement across society and politics on key areas of infrastructure requirements for the next 20 – 30 years.’*⁴⁶ To help achieve this aim and to build public confidence in the process, the new Commission may want to explore previous recommendations made by Green Alliance that such an independent commission should receive formal public in-put through a ‘civil society advisory council’ and that this council in turn should work with a newly created independent body with the working title of ‘Citizen Voice’

⁴⁵ NCC op cit

⁴⁶ *The National Infrastructure Commission*, Press notice, Rt Hon George Osborne, 5th October 2015

which should act as an impartial facilitator of public engagement at the local level.⁴⁷ Others have pointed to the need to similarly involve citizens, ensuring that the evidence base for decision making is transparent and shared at an early stage, enabling disagreements to be met head on. This should help the Commission move beyond high level analysis to the costs and benefits of different policy options.⁴⁸

7.3 Strategic investment and competition for the market

This is a key way in which Government can help make strategic investment costs manageable. In the energy sector, auctions for contracts for difference, plus the annual auctions in the new Capacity Market, are a good example of how the market should hopefully lead to lower wholesale prices, and hence lower end consumer bills, than otherwise. To build public confidence in the decision making process, it is important to ensure such competitions are open to all suppliers, and are not bilateral negotiations as would appear to be the case with recent nuclear decisions and possibly may also potentially be the case for Carbon Capture and Storage (where there are similarly few players). There are also concerns amongst some that such competitions need to either be technologically neutral or to focus on more mature technologies if long-term affordability is to be maximised.⁴⁹ However, the complexity of embedded cross subsidies and different charging arrangements may make full technology neutrality impossible. If the costs of newer technologies continue to be managed through competition in this way, it would seem important that there is also a longer-term view from Government to help market actors have greater clarity about future opportunities. Such a view will also need to take into account the choices that need to be made in terms of how major projects are financed (such as through foreign borrowing or PFI).

Regulators also have a role to play in using competition for the market to manage strategic investment costs. Ofwat's approach to the Thames Tideway is a good example of where the auction for project providers has been claimed to be bringing down costs from an expected £80 per customer p.a. to £25 per customer p.a. from mid-2020's (and of which £7 is already in the bill).⁵⁰ In energy, Ofgem runs a competitive tender process to select and license Offshore Transmission Owners (OFTOs). Since June 2009, Ofgem has licensed thirteen OFTOs for assets worth over £2.5 billion in total. An evaluation of tender round 1 of the offshore transmission regime found that competitive tendering of offshore transmission assets saved consumers between £200m and £400m and it is expected the savings in tender round 2 will also be considerable. The energy regulator has also recently announced their intention to work with Government to introduce new competition arrangements for some of GB's electricity transmission network. Competitive tendering for new, separable, high value onshore transmission assets could benefit consumers through cost savings and innovation.⁵¹

⁴⁷ *Opening up infrastructure planning*, Green Alliance, February 2015

⁴⁸ *Making the National Infrastructure Commission work*, The Institute for Government, October 2015

⁴⁹ Policy Exchange op cit

⁵⁰ The Guardian, 25 August 2015

⁵¹ UKRN, September 2015, op cit

7.4 Regulation and maintenance costs

Given the essential nature of the energy and water sectors and the fact that many of their activities are still monopolistic (22% of an average dual fuel bill is made up of regulated monopoly network costs),⁵² regulation has a key role to play in managing long-term maintenance and capital enhancement costs to ensure that these are as efficient and affordable as possible. Although this is clearly important in both sectors, it is particularly so in water due to its predominantly monopolistic nature and the fact that costs have historically been recovered from consumer bills and this practice is likely to continue into the future.

As the dust settles on the recent price reviews and control related Competition and Markets Authority (CMA) activity, it will be important to assess how successful the relatively ‘new’ regulatory approaches on page 14 have been in practice in ensuring services meet the long-term needs of consumers in vulnerable circumstances and are provided at the lowest cost possible. For example: to what extent will companies have developed proactive strategies and made intelligent use of data for identifying groups that are likely to struggle to pay before they get into difficulty; how far have they developed long-term partnerships with NGOs, community groups and trusted intermediaries to develop and deliver targeted information, advice and support services to them; and to what extent do they understand their customers and treat them fairly, providing payment options that are able to flex and evolve in response to changes in circumstances and the benefits system?

Going forward, the role of comparative information for the network parts of the businesses in facilitating comparative competition and ratcheting up performance is likely to be subject to much scrutiny. For this to be effective, however, it will be important that the public are able to understand the information presented and know who to hold accountable for what.

Following the completion of the recent price reviews, numerous studies initiated by various regulator and numerous market actors of the effectiveness of different customer engagement mechanisms have been initiated. The extent to which these have been able to address long-term affordability issues will be of interest. Early observations include that customers value resilience highly and can take a long-term view, accepting the need to do some things now to avoid future costs. However, unless customer engagement is coherent – and that company based initiatives are joined up with national and regulatory initiatives – it can be difficult to ensure that judgements about the pace of change necessary are fully informed. How regulators – and subsequently companies – communicate with the public on how the results of customer engagement are reflected in price limits is another important area for reflection if companies and public interest groups are going to have the confidence to develop long-term relationships.⁵³

Citizens Advice have already commented in a recent study that actual returns in the sectors exceed regulatory baseline returns (although they could also have gone the other way and been negative), key elements of the Weighted Average Cost of Capital

⁵² UKRN September 2015 op cit

⁵³ *The economic regulation of the water sector*, op cit

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(the cost of debt and the risk free rate) post financial crisis are not always in line with current ‘real world’ market conditions and market valuations have indicated that companies have been over-rewarded. Although these medium-term variations may have a limited impact on long-term affordability, the changes Citizens Advice proposes could help drive long-run costs down. These include changes to regulatory incentive arrangements and suggestions that regulators investigate the role that dynamic benchmarking could play, whilst recognising the need to balance this with the increased complexity that it could bring. They have also recommended that Ofwat should follow Ofgem’s lead, and adopt indexed cost of debt in future settlements, and consider that now that firms have had the opportunity to get used to indexation, both regulators should aim to shorten the time encompassed by the index in future settlements.⁵⁴ Some of these points would appear to be backed up by recent NAO research in the area that estimated that customers could have experienced savings of £840m between 2010 and 2015 if Ofwat had used an indexation approach.⁵⁵ The UKRN’s current examination of cost of capital across regulated sectors may throw some light on these issues, improve understanding and where helpful, increase consistency between sectors.

There are different approaches in the two sectors as to whether regulators should facilitate innovation. In energy, Ofgem’s Low Carbon Network Fund and Network Innovation Competitions, where money from consumer bills can be used by network companies to run innovative projects, has sought to stimulate new commercial and technological approaches. To maximise their impact, funded projects are required to share their findings with the rest of the sector. There is no equivalent for innovation in the energy retail space although suppliers can discuss these issues in Ofgem’s Smart Grid Forum. In water, companies are seen as having a privileged incumbent position and as such are required to meet R&D costs themselves, with shareholders absorbing the cost.

7.5 Competition in the market

This is one of the key ways that can be used to try and ensure **maintenance and capital enhancement expenditure** is as efficient and affordable as possible. It can also help drive innovation and hence make environmental standards affordable. Competition in the water sector is clearly currently limited and it remains to be seen how significant an impact the opening of the non-residential market will have in 2017 – both for costs for that customer segment and more widely in the industry – given the relatively small percentage of total costs that will be directly effected by the change. Whether the upstream reform that is planned for the sector beyond 2019 – at the same time as abstraction reform – will have a more significant impact is subject to even more uncertainty. There are some concerns that the latter will lead to de-averaging of prices that could cause distributional impacts. The water sector may well be able to learn some valuable lessons from the energy sector here.

In energy, provisional findings from the recent CMA energy market inquiry have highlighted significant problems with customer engagement. These indicate that there

⁵⁴ *Many Happy Returns*, Citizens Advice, May 2015

⁵⁵ *The economic regulation of the water sector*, op cit

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would appear to currently be limited as to how far particular groups of consumers can exert market pressure on energy costs. In its provisional findings, the Authority calculated that disengagement led to suppliers overcharging consumers around £1.2 billion p.a.⁵⁶ The extent to which competition in energy is able to drive innovations that may help deliver long-term cost savings, such as the development of flexibility services, is to some extent still uncertain. However, if unbridled, it could well have significant, and potentially new, distributional impacts that would need to be managed. Energy companies will continue to have a key role to play in addressing this issue and will need to ensure that their strategies for dealing with consumers in vulnerable circumstances are sufficiently future proofed for the new smart world.

In general terms it is worth highlighting that although competition in the right places can help reduce short-term costs and drive innovation, it is not an end in itself and can actually act as a barrier to sharing information and the co-operation that may be needed to manage some systemic risks and their associated long-term costs.

7.6 Corporate structures

The corporate structures of incumbents and new market actors may well have some influence on long-term affordability through their impact on financing costs. For example, Dŵr Cymru as a not-for-profit organisation and Scottish Water as a publicly owned body can choose whether any profits are reinvested in the business or passed on to consumers through reduced bills rather than being paid out as dividends to shareholders/ investors (although it should be recognised that Dŵr Cymru is subject to the same monopoly price control as the English water companies so the impact of its corporate structure on affordability may be more limited). Scottish Water can only borrow from the Scottish Government and as a result, financing costs are generally lower and relatively more stable when compared to the water industry in England and Wales or the energy sector.

8. Practical steps which might help mitigate long-run cost-recovery

The following steps to help manage long-term costs are grouped into five over-riding **themes**: transparency; stability; co-ordination; efficiency; and public accountability, oversight and engagement. The last theme is particularly important, as the public will, at the end of the day, be paying for future investments and need to have confidence that the decisions that are made in this area take their interests into account. How the public perceive change is important if companies and regulators are to gain legitimacy and the ‘social license to operate.’ Engagement will also be vital if the demand side is to fulfil its potential and consumers are to become part of the solution – not just ‘the problem’.

⁵⁶ *Energy Market Investigation – Provisional Findings*, CMA, 2015

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1. Transparency

Government and regulators

- i. Providing high quality information to politicians and the public on the costs of different policy options and the impact that different cost recovery mechanisms may have on current and future users, in particular customers in vulnerable circumstances. Information should include the risks that the government is taking for the taxpayer and who the long-term benefits are going to accrue to.
- ii. Clear articulation of strategic objectives and the pace of change necessary to achieve long-term targets. This could include scope for more clarity (i.e. on volume, targets, quantity vs. price) on the required / desired investment trajectory *across* sectors.
- iii. Early clarification on whether a project / new investment is to be largely taxpayer or customer funded and the reasons why.
- iv. Clear objectives and success criteria for any proposals that further disaggregate / unbundle costs.

All actors

- v. Providing greater transparency for consumers on current and future prices, the costs that make these up and how these will be managed and recovered.
- vi. Being explicit about the trade-offs and valuations inherent in decision making rather than keeping them implicit and invisible, communicating clearly on this and being open about who is the decision maker.
- vii. Being clear about the consequences of inaction and of delayed strategic investment.
- viii. Providing comparative information to enable engaged consumers to compare the sectors to the ‘best in class.’

2. Stability

Government and regulators

- i. Supporting a stable long-term framework for cost recovery and refraining from ad hoc or inconsistent interventions.
- ii. Government to have clear and transparent trigger points for review of existing support mechanisms that are built into policy frameworks in advance. Political and regulatory interventions to be largely predictable (i.e. ‘no surprises’ or post-hoc interventions) to keep down cost-of-capital, and so to support affordability. Any ‘sunset’ provisions in subsidies to be clearly set out up front and where possible phased.

All actors

- iii. Use scenarios to identify commonalities so that whatever happens, there is a degree of certainty and stability.

3. Co-ordination

Government and regulators

- i. Analyse the long-term and cross sector impacts of different investment requirements on those that will have to pay enabling a joined up approach to

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- long-term affordability issues and the timely assessment of potential responses from government and regulators.
- ii. Facilitating the inclusion of new market actors and the supply chain in key policy making arrangements, such as those assessing the need for transition costs, to encourage new collaborations and partnerships that may help deliver future value. It may be particularly important that local actors and the demand side are proactively involved in this way.

All market actors

- iii. Good practice principles – about speed / pace at which long-term future investment costs are to be passed to bill-payers – to be consistently applied.⁵⁷
- iv. Ensuring that any distributional impacts of changes in cost recovery methodologies are understood, minimised or compensated for.
- v. Develop ‘communities’ of those with an interest in the area, including policy makers, regulators, companies and NGOs, to help get traction for timely and appropriate change.

4. Efficiency

All market actors

- i. Involve consumers in decisions about what future long-term efficiency should look like.
- ii. Examine the balance between short and long-term efficiency savings to ensure that short-term cost reduction doesn't erode the scope for longer-term efficiency.
- iii. Aggregate information on efficiency and share this with all actors in an anonymised way.

5. Public accountability, oversight and engagement

All market actors

- i. Introduce clear accountability mechanisms for delivery and expenditure over the long-term so it is clear who is accountable for what and how these decisions have been made. The bigger the scale of the investment (eg Thames Tideway), the more important this will be if public and investor confidence is to be maintained.
- ii. Ensuring that mechanisms are in place to enable those paying for the investments can have oversight of this – if as consumers through company and regulatory consumer panels etc if as taxpayers, through clear, specific and regular Government reporting (eg NAO VFM studies of strategic investments and transition costs).
- iii. Work is needed to ensure that different public engagement mechanisms are sufficiently co-ordinated to enable timely interactions, and a holistic view of long-term affordability.
- iv. Use long-term affordability as a lens in stakeholder engagement through which to examine other issues such as standards.
- v. Working with customers in vulnerable circumstances to develop forward looking vulnerability strategies – more extensive work with providers in other

⁵⁷ SF low-carbon interventions paper on ‘Principles’

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sectors to develop joint approaches for targeting households in vulnerable circumstances that may need assistance.

Companies

- vi. Developing and embedding long-term relationships with customers – work with consumer groups and panels to enable on-going monitoring of expenditure by those that will be paying thus helping to foster confidence that long-term costs are responsive to user needs and are being managed as effectively as possible.
- vii. Clarity about what and what not asking consumers for their views on. Explaining final decisions and why may not have taken consumer views on board.