Designing incentive packages

Balancing incentives to drive the right behaviour

Severn Trent
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Severn Trent Water Limited
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Executive Summary

In its statement of principles for setting prices[1] Ofwat said that it was seeking to "develop clearer, simpler and more effective incentives that drive allocative, dynamic and productive efficiency". Ofwat asked us to examine some of the issues on incentive design, and we welcome this opportunity to contribute to the debate.

We support improvement in incentives. In our publication "Changing Course"[2] we argued for changes in the regulatory framework, with an increased emphasis on incentives. Such an approach will help to ensure that companies deliver the outcomes which customers and other stakeholders want, encourage innovation, and reduce the need for regulatory information collection.

Ofwat asked Severn Trent Water to examine two key questions from its consultation on the wholesale price control:

- **How could packages of incentives be assembled that are consistent with outcomes?**
- **What factors in packages are likely to influence company behaviour?**

Our approach to assessment

We have developed a set of criteria for assessing incentive frameworks:

- Delivery of the right outcomes for customers and the environment
- Delivery at least whole-life cost
- Appropriate returns for investors
- Practicality

We have modelled a number of different scenarios to assess how companies will behave under different incentive packages, e.g.:

- Where a company has a choice between a solution with certain costs, and an innovative solution which is likely to be lower cost, which will it choose?
- Will a company deliver more than the agreed target, where the additional costs to customers are less than the benefits?
- Will a company choose the least whole-life cost solution?
- Where a solution is likely to deliver better outcomes, but is risky, will a company choose this or a more certain solution?

We have looked at issues such as:

- What's the best package of incentives?
- What's the right balance between rewards and penalties?
- How should the strength of incentives be determined (individually and as a package)?

Alternative frameworks

In reviewing incentives, we have concentrated on outcomes and cost performance incentives, and the interaction between them. These are likely to be the most significant components of the incentives package, both in terms of the size of incentives and their significance for consumers.

The options we have modelled are based on those set out in Ofwat's consultation on wholesale incentives, as shown below:

[1] Ofwat, *Future price limits – statement of principles (* May 2012)

[2] Severn Trent Water, *Changing Course – delivering a sustainable future for the water industry in England & Wales* (April 2010)

Incentive	Options
Cost performance	Total expenditure options ("totex" options, which involve assessing performance in terms of expenditure as a whole, rather than opex and capex separately.
	Opex / capex considered separately (similar to the current approach)
Outcomes	Reward and penalty
	Penalty only

We have also looked at how Ofwat's intention to make its own assessment of companies' expenditure (the "baseline") fits with the incentive framework.

Conclusions on incentives

Our overall conclusions on the incentive framework are:

- The current incentive framework encourages capex solutions.
- A simple "totex" approach, looking only at total expenditure in a five-year period, would create a bias towards opex. It would, therefore, discourage capital investment in areas such as renewable energy, which may have a longer payback period.
- A "weighted totex" approach, applying a greater weight to opex, can create the right balance of incentives.
- There is a need for both penalties and rewards, in relation to at least some aspects of service performance. A penalties-only approach makes companies avoid solutions such as leakage, water efficiency measures, or catchment management, where the impact of actions is uncertain.
- Rewards and penalties should be based on willingness to pay. An incentive approach encourages the right level of service delivery, if the incentives are calibrated correctly.
- When Ofwat sets the baseline expenditure, it needs to reflect the outcomes companies are delivering - companies will not implement opex solutions for delivering beyond initial targets if they believe that baseline expenditure will be cut back at the next review.

In addition to getting the right incentive framework, to be effective the rest of the regulatory framework needs to be aligned. This should include:

- Appropriate measures of success – at a higher level than previous outputs, to encourage innovation.
- Appropriate cost assessment.
- Incentives to encourage accurate business planning.

If any one of these is not set correctly, it could cause the whole package of incentives to be ineffective.

The two examples below illustrate our approach and how the best approach to incentives can be determined.

Example 1: 5 year menu

A company has a choice where it could avoid a £50m capex scheme by spending opex of £5m per year. If we consider the impact of the opex over a medium length period - 15 years – the present value of the opex option is 20% more expensive. But in a 5-year totex menu this choice would improve the company's performance against Ofwat's baseline. It would encourage the company to look for short-term savings.

If the menu is weighted to take account of the continuing effect of opex (the Net Present Value over 15 years), then the company would be encouraged to adopt the solution with lowest whole-life cost, whether it is capex or opex.

Example 2: penalties and incentives

A company has a £50m capex scheme which is certain to deliver an outcome. Customer Willingness To Pay also values the outcome at £50m.

An alternative scheme will probably deliver the scheme 15% cheaper, but the outcome is not certain. There is a 30% chance that it will not meet the target and a 30% chance that it will over-achieve.

If the company might suffer a penalty (shortfalled £50m) for missing the target, it must factor this into its evaluation. If there is no reward for over-delivery then the result is skewed. A rational company will choose the certain option. Indeed, if costs increased it would be prepared to invest more than £50m to avoid the penalty (making the scheme non-beneficial).

With a symmetrical approach, the company could also earn a reward, reflecting customer WTP for the additional output delivered. If it has an equal chance of earning rewards or penalties, it will pick the most efficient option.

We believe that the overall package we have set out can deliver an appropriate balance between risk and reward, and the incentives within it are capable of providing clear messages as to what company behaviour will achieve the best outcomes.

Implementing the approach

We consider that the Ofwat methodology consultation in December should set out these broad principles. Companies can then develop incentive proposals and review them with their Customer Challenge Groups. They can then be discussed with Ofwat before companies submit their business plans.

The way in which baselines are set by Ofwat has a significant effect on incentives. We have set out alternative timelines for this so that the "menu" approach can have the intended effect of encouraging robust business plans.

No incentive framework will provide the right incentives for all situations. However, providing the package is broadly right, we believe it will be effective because:

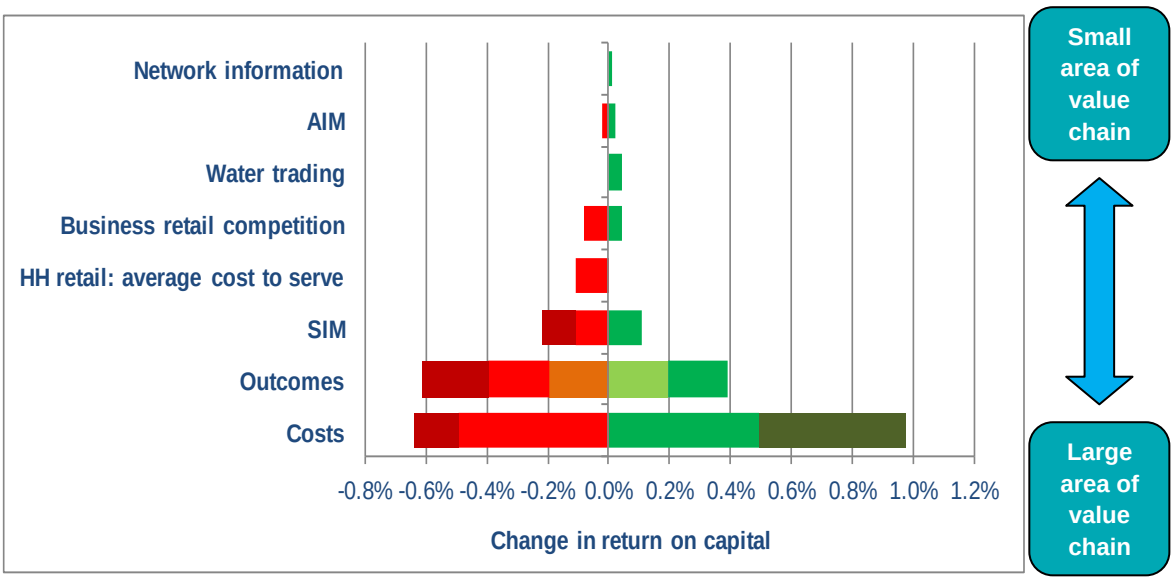
- There are reputational and procedural incentives associated with being seen to act in customers' best interests. Companies recognise that they will reduce trust and be subject to greater scrutiny if they appear to manipulate the framework.
- Companies do not make calculations of the precise impact of the framework on every decision. If the framework generally provides the right incentives, it will encourage the right behaviour.

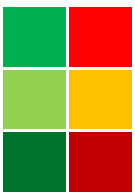
The package of incentives

The overall incentive package needs to be reviewed to ensure that:

- It will lead to a combination of bills and service which is acceptable for consumers.
- The overall balance between risk and return for companies is appropriate.

The diagram below sets out an illustrative view of how the incentives could affect returns.





Upside / downside - new incentive

Upside / downside – lower choice

Upside / downside - old incentive

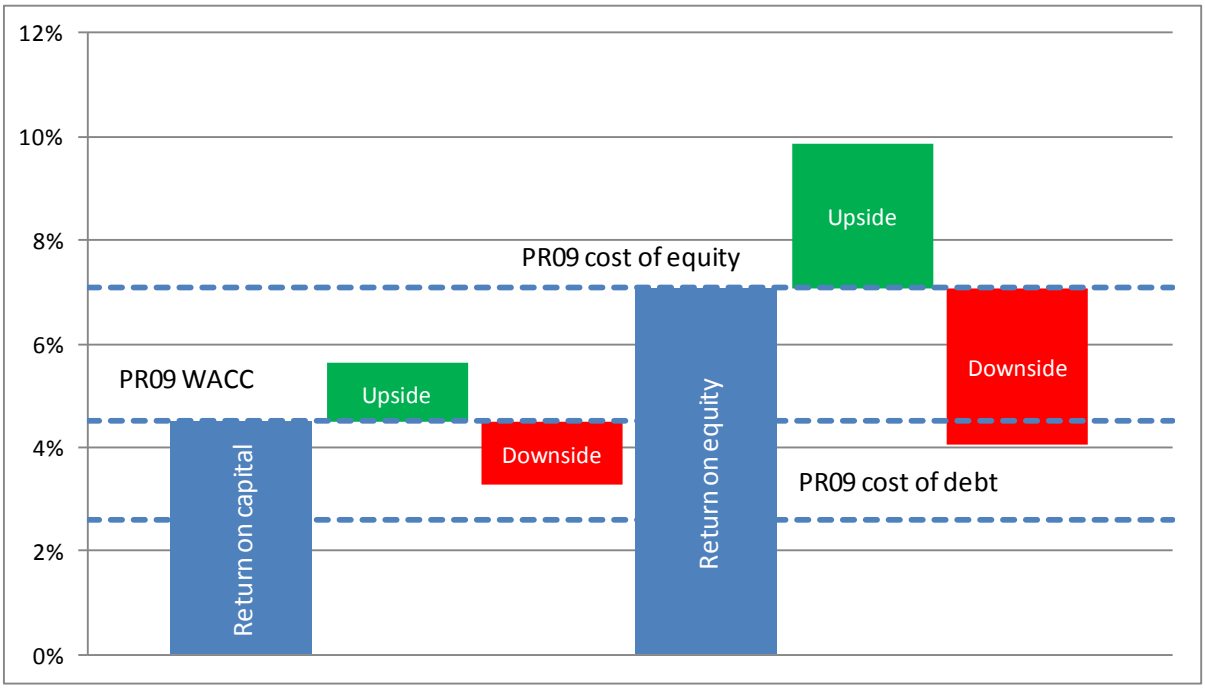
The chart above shows our estimate of the impact of each incentive on a company's return on capital. The lighter coloured segments represent the choice that might be made by a company that does not seek a high level of risk under the new incentives. The darker coloured bars represent the incentives available under the old system.

As can be seen, the majority of the incentives are new, but are not particularly strong. The strongest incentives are for the Service Incentive Mechanism, outcomes and costs, These all existed under the previous approach, but (with the exception of costs) were weighted to the downside; for outcomes the incentive was wholly penalty-based and at the extreme (measured as a 50% shortfall on a single sub-service), a greater penalty than the package we would propose.

In our view, the strength of individual incentives in the package should reflect what customers value, and the extent to which performance in each area affects the overall cost and service that customers receive.

The overall package should offer reasonable scope for reward, without creating unreasonable financial risk. We think the package we propose is reasonable, and would achieve this objective.

Illustrative effects on returns



1. Introduction

This report is Severn Trent Water's contribution to the debate about the future incentive framework for the water industry, and sets out our assessment of how to build an effective incentive package.

We believe that effective incentives will drive better outcomes for consumers and increase innovation.

Purpose of this report

In its statement of principles for setting prices[3] Ofwat said that it was seeking to "develop clearer, simpler and more effective incentives that drive allocative, dynamic and productive efficiency". We were invited by Ofwat to contribute to development of thinking on incentives.

We support improvement in the incentive framework. In our publication "Changing Course"[4] we argued that the current regulatory framework:

- Does not incentivise sustainable solutions, leading to a lack of innovation.
- Does not provide incentives for accurate business planning, leading to mistrust and accusations of companies "gaming". This has led to increasingly detailed regulation in attempt to "get the answer right".

We put forward proposals in the report for change, with an increased emphasis on incentives. Such an approach will help to ensure that companies deliver the outcomes which customers and other stakeholders want, and will reduce the need for regulatory information collection. We welcome, therefore, the opportunity to contribute to the debate about the future incentive framework.

Ofwat has set out some alternatives for incentive packages in its consultation. We have focused in this report on the options which Ofwat has presented, with modifications where we consider these to be necessary for the incentive package to have the optimum impact[5].

Ofwat asked Severn Trent Water to examine two key questions from its consultation on the wholesale price control:

- How could packages of incentives be assembled that are consistent with outcomes?
- What factors in packages are likely to influence company behaviour?

We presented our initial findings at a workshop on wholesale incentives, held

[3] Ofwat, *Future price limits – statement of principles (* May 2012)

[4] Severn Trent Water, *Changing Course – delivering a sustainable future for the water industry in England & Wales* (April 2010)

[5] Ofwat, *Consultation on wholesale incentives for the 2014 price review* (August 2012)

by Ofwat on 19 September 2012. The slides are available on the Ofwat website[6].

This report focuses on cost performance and outcomes incentives. However, for these incentives to be effective, a successful framework also needs:

- Incentives to encourage accurate business planning.
- An effective approach to cost assessment.
- Appropriate measures of success.

Structure of the report

The report is structured as follows:

- Chapter 2 sets out our approach to assessing alternative incentive packages.
- Chapter 3 shows the results of our analysis (with full details of the modelling given in Appendix 1).
- Chapter 4 discusses some of the practical implications of setting incentives.
- Chapter 5 considers how the overall package of incentives can be assessed, in terms of the balance between potential upsides and downsides.
- Chapter 6 sets out our conclusions.

[6] Severn Trent water presentation, http://www.ofwat.gov.uk/pricereview/pr14/prs_pre1209wholesalesvt.pdf

2. Our approach to assessing incentive packages

In this chapter we set out:

- Criteria for assessing incentive packages.
- How we have approached the evaluation.
- The options we have assessed.

2.1 Criteria for assessing incentive packages

We have developed a set of criteria for assessing incentive packages. We consider these to be consistent with the overall criteria which Ofwat has set out in its Future Price Limits principles:

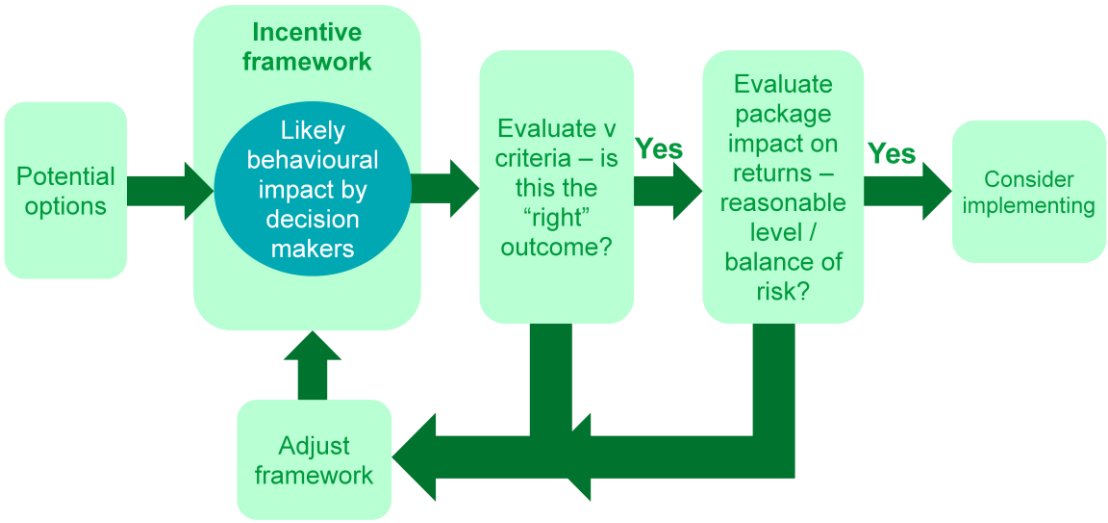
Criterion	What the incentive package should encourage
Delivery of outcomes	**Increased delivery** where the benefits to consumers outweigh the costs they would face.
Delivery at least whole-life cost	**Choice of least whole-life cost solutions**. Where there is uncertainty, the option with lowest expected cost should be chosen.
Increased innovation / the right approach to risk	**Adoption of riskier solutions**, where this is justified by the potential benefit to customers in terms of lower costs or improved outcomes.
Appropriate returns for investors	**Returns reflecting performance** – improved returns for companies that deliver low costs or improved outcomes, and lower returns for companies with higher costs or worse outcomes. Limited windfall gains or losses for factors outside a company's control.
Practicality	**Companies taking account of incentives when they make decisions**. This means the impact should be clear (mechanisms can be complex but their effect should not be). **Limited information requirements –** incentives should be based on information which is already available or can be relatively easily obtained.

2.2 Types of incentive

This report focuses primarily on financial incentives. However, reputational and procedural incentives may also be significant, either as an alternative or as complementary to financial incentives. Where appropriate we have referred to these alternative forms of incentive in this report.

2.3 Our approach to assessing incentive frameworks

The diagram below sets out our approach to evaluating incentives. We have applied potential incentive frameworks in a number of different scenarios for costs and outcomes delivery, and evaluated the predicted results against our criteria. The package then needs to be reviewed as to whether it produces a reasonable level and balance of risk. Packages which meet the criteria and have an appropriate balance of risk can then be considered for implementation.



We have looked at issues such as:

- What's the best package of incentives?
- What's the right balance between rewards and penalties?
- How should the strength of incentives be determined (individually and as a package)?

2.4 Building an incentive package

In reviewing the incentives as a package, we have concentrated on the interaction between outcomes and cost performance incentives. These are likely to be the most significant components of the incentives package, both in terms of the size of incentives and their significance for consumers. In addition, as Ofwat noted in its consultation on wholesale incentives, these two incentives need to be carefully calibrated against each other.

There are links between other incentives. For example, a weak abstraction incentive mechanism, combined with a strong water trading incentive, could encourage trading using environmentally damaging sources. But in practice, the potential for such cases is limited, and uncertainty about the long-term continuation of the current level of licensed volume would limit the scope for trading.

The potential links between the other incentives need to be considered when the final details of the incentive are being set, but not when the basic framework is being designed.

2.5 The practicalities of company decision making

Incentive mechanisms are not necessarily simple, but the impact of the package of incentives in totality need to be clear. The

mechanism should be capable of being expressed as a relatively simple statement of what will benefit the company, and be consistent with achieving the right outcomes.

For example, we want to avoid decision-makers having views such as:

- "Don't spend on opex because we'll look worse on comparative efficiency"
- "Investments to save money have to pay back within five years". (This is an example of how misunderstanding of regulatory mechanisms can arise; it is not actually true but it is widely believed and does drive behaviour).

Our objective is to create views among decision-makers such as:

- "We should choose the lowest whole-life cost option, irrespective of the split between capex and opex".
- "We should deliver more if we can do it for less than £x per problem solved".

2.6 The options modelled

We have modelled the incentive frameworks shown in the table below, which are based on the options set out in Ofwat's wholesale incentives consultation.

Each of the frameworks has been assessed on the basis of the results from the modelling in a number of different scenarios.

We have also modelled alternative approaches to menus.

Incentive		Options
Cost performance	M1	Total expenditure options ("totex" options, which involve assessing performance in terms of expenditure as a whole, rather than opex and capex separately.
	M2	Opex / capex considered separately (similar to the current approach)
Outcomes	M3	Reward and penalty
	M4	Penalty only

These have been modelled using the following scenarios, with varying levels of reward and penalty:

S1-3 Uncertain costs

These include choices between opex and capex solutions – for example, how much it will cost to reduce leakage is less clear than the cost of increasing water resources.

S4-5 Single or multiple menus

We looked at the way that a company might behave if it had more than one menu – particularly whether it would seek to reallocate costs to gain an advantage.

S6 Uncertain outcomes

For example, catchment management, where it is uncertain whether outcomes in terms of water quality will be delivered.

S7 Delivery of higher service

This scenario looked at two aspects of service:

- **Customers value extra service** – for example, in areas such as sewer flooding, where customers would place

a high value on reducing sewer flooding, to the point where it was eliminated.

- **Customers place diminished value on higher service** - **f**or example, drinking water quality, where customers place a very high value on maintaining drinking water quality but may put a lower value on further improvement.

S8 Changes to costs or benefits estimates mid-period

In some cases, it may become apparent mid-period that a project is more costly than first expected. With a given incentive package, how would the company respond?

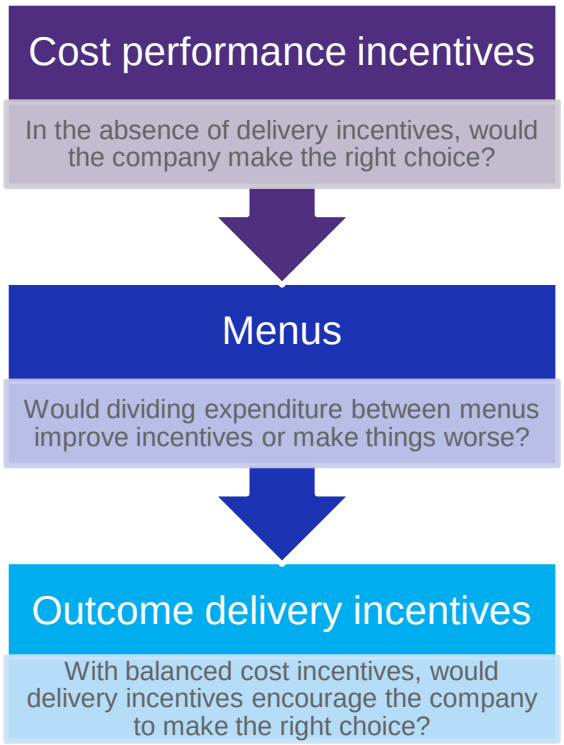
3. Assessment of options

In this chapter we set out:

- The way we have applied our framework for assessment
- The assumptions we have made
- Our evaluation of incentives for cost performance and outcomes
- The interaction between incentives

3.1 Assessment of options

In evaluating options we have followed the following sequence:



We interpret the "right choice", for cost performance, as the solution with the lowest whole life cost. For delivery incentives, we have assessed which option delivers the greatest cost benefit. In both cases we have made this assessment over a period of 15 years.

The modelling approach and results are set out in greater detail in Appendix 1.

3.2 Rational company decisions and behavioural economics

The model is measuring the effect of financial incentives and we assume that the "rational" company decision is based on profit maximisation. We recognise that companies do not always select the approach that will yield the greatest profit. Reputational effects can be powerful, but we think they usually carry more weight if they are accompanied by some financial incentive.

3.3 Modelling cost performance incentives

We have modelled three approaches to cost performance incentives:

CP1 Current approach

Opex and capex are considered separately for cost performance incentives. This could be combined with considering total expenditure in assessing efficiency, which would at least in part address issues of capex bias.

CP2 Five-year totex approach

This considers only total expenditure and does not distinguish between opex and capex.

CP3 Weighted totex approach,

This adapts CP2, giving a higher weight to opex when reviewing total expenditures.

The weighted totex approach reflects the fact that operating costs tend to be continuous, whereas capital expenditure is generally a one-off. Treating them as if they were the same can create a bias, as noted in the First Economics report for UKWIR on efficiency and incentives[7].

We recognise that some operating costs are for one-off expenditure, and that some capital maintenance expenditure is recurring. In addition, there are cases where expenditure is not clearly either capex or opex and maintaining a regulatory distinction may lead to some distortion of company allocation of spend.

However, in our view the balance is such that treating opex and capex differently will give a clear improvement in the incentive framework over treating them as if they were the same. The distinction is not just a regulatory distinction; it is one made in accounting and economics to reflect that one type of expenditure gives benefits over time whereas the other has a short-term impact.

Applying a weighting to reflect the continuing impact of opex could be done by looking at the present value of the opex over 15 years and the capex over 5 years. With a discount rate of 4.5% real this gives a weighting of around 2.4 for opex relative to capex.

Applying additional weight to the most recent year of opex, rather than reweighting all years' opex, would probably have the best incentive properties. We think that Ofwat will (or should) continue to use company opex in the run up to a price review to inform future allowances for "Pay As You Go" expenditure. This means that company customers benefit from company outperformance (if any) in the last year of a price control because this will be the basis on which future allowances will be set. When assessing performance for the purpose of the menu, the "base year" value should therefore be given additional weight on the assumption that this is the value of continuing opex for future periods (the following 10 years in a 15 year assessment).

Companies will continue to collect information on opex and capex for preparation of accounts so there is no additional information requirement. We anticipate that Ofwat will still wish to collect information on operating costs and capital expenditure, even if they are aggregated for the purpose of price-setting, so we do not think that there is any additional regulatory burden, compared with an unweighted approach to totex.

3.4 Cost scenarios

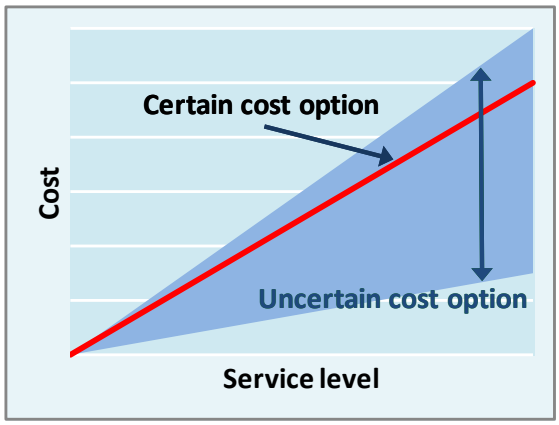
We tested these approaches against a number of potential cost scenarios before looking at the impact of outcome incentives.

Scenario 1: certain versus uncertain costs

In this case the company has included a scheme with known costs within its original business plan. The certain approach is assumed to be a capital scheme such as a treatment works – greater certainty over cost and outcome is one of the reasons why companies might favour capital solutions.

The company has another option which could be cheaper. Its cost is uncertain, but the expected cost is lower. This might be an opex solution such as catchment management. This is illustrated in the graph below.

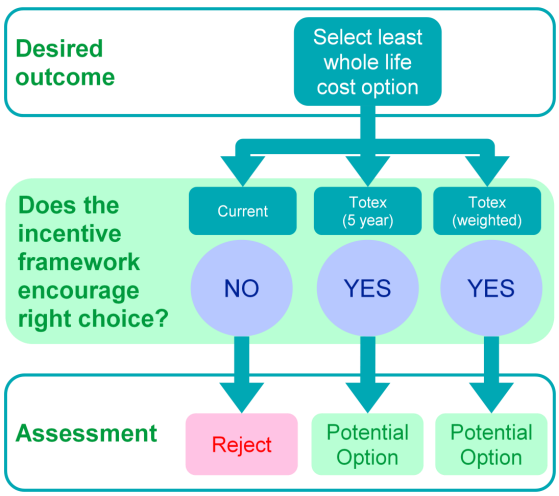
[7] UKWIR, *Alternative approaches to efficiency and economic incentives* (2011)



For this case we have assumed that the alternatives both deliver the same benefit (the effectiveness of catchment management might also be variable, but we look at this in other scenarios).

The "right" outcome here should be that the uncertain solution is encouraged. On average, the opex solution is 15% less expensive, and a rational company should adopt it – unless it is very risk averse.

The conclusion from the modelling is that the current approach would not encourage the right choice, because of the impact of the opex solution on efficiency assessment.



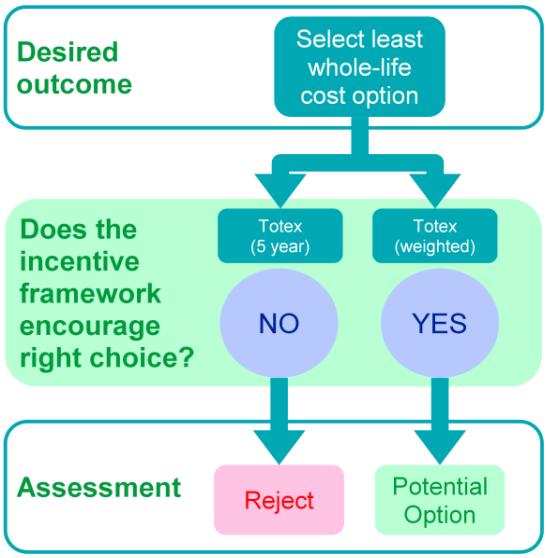
Scenario 2: capex versus opex

In the first scenario, both the 5-year menu and the weighted menu would encourage a beneficial option. What if the company knew that the opex solution would be more expensive?

Using the same assumptions, we tested the two menus against an opex alternative towards the upper end of our range.

The "right" outcome here should be that the menu *discourages* the alternative solution because, on average, the opex solution is 15% more expensive, and a rational company would not adopt it – unless the regulatory framework distorts decision-making.

As the diagram below shows, a 5-year totex approach encourages the wrong choice.



This shows the limitation of a single period totex approach. Because it focuses on total expenditure in a 5-year period, the company is encouraged to concentrate on short-term cost saving – even if this has negative consequences.

There are many instances in which this would encourage the company to do the "wrong thing". For example, any "spend to save" scheme – where capex could be used to reduce future operating costs – would need to have a payback of less than 5 years to be considered (particularly

given the construction time before opex benefits could be realised).

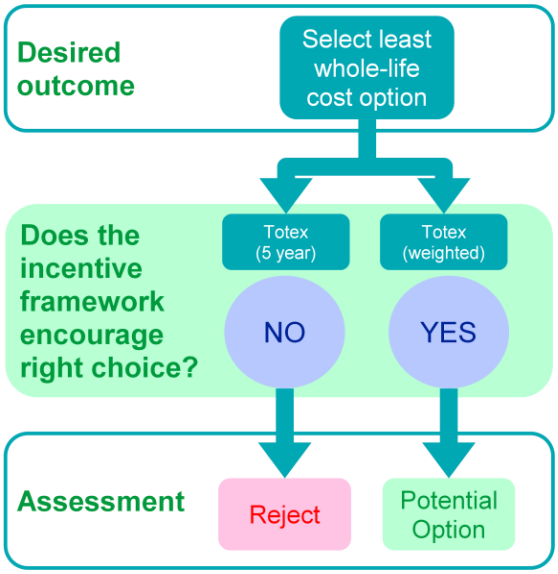
This effect of the totex approach could affect both decisions after a price review has been completed, and the choices made from a "menu", as illustrated in the following scenario.

Scenario 3: spend to save scheme

With our notional company, we assume that the original capex scheme is a "spend to save" scheme – for example, a renewable energy scheme. In present value terms this is very positive, but it will not pay off within the next regulatory period. The company could choose to cut this scheme in order to reduce total expenditure over the next 5 years, in response to an Ofwat challenge on total costs.

With a 5-year menu, the company can benefit significantly from making a "saving" up front – even if there is a significant whole-life cost increase of 30%.

By contrast, the weighted totex menu strongly discourages short-term cost cutting of this nature.



3.5 Applying a menu approach

Ofwat wants to improve the incentives for companies to prepare high-quality business plans, which include companies' best forecast of costs. It proposes to use "menus" for total expenditure at the next price review.

In order to operate a menu and give a choice, Ofwat needs to set a baseline assumed level of expenditure. A number of reports have considered ways in which cost allowances might be set without reference to company costs.[8] However, we think that:

- Modelling the costs bottom-up would be extremely complicated and probably inaccurate.
- The potential benefits do not warrant such a complicated approach.

The objective would be to ensure that company behaviour does not influence future cost allowances – i.e. to prevent gaming. In our view, it is easy to exaggerate the scope for companies to control or manipulate their costs in order to achieve a regulatory outcome. As we discuss in section 2, this seems to lose sight of the way that companies actually make decisions.

We think Ofwat will need to have some regard to company costs for the purpose of setting a baseline. There are two sources that it might use:

- Historic costs (which might inform future expenditure for existing service levels)
- Future costs for new obligations and outcomes – from business plans

Without the latter, Ofwat will not have enough information on which to understand future obligations, or to take customer expectations - as expressed

[8] For example, the First Economics report for UKWIR, *Alternative approaches to efficiency and economic incentives,* 2011

through the Customer Challenge Group (CCG) - into account. Historic information could be used to set a baseline for existing services, but this method might not take account of all cost pressures, for example:

- Costs arising from new laws or regulations affecting employment costs or carbon commitments; Ofwat might be aware of such changes but find it difficult to gauge the impact for a particular company given the nature of its operations.
- Changes in energy prices – again, while it would be possible to research these changes, but getting the right impact for individual company operations would place a burden on Ofwat.
- Risks to capital maintenance (the extent to which the future is different under the Common Framework)

This means that company final business plans could not be used to represent the company choice. Ofwat would be producing a baseline for existing services alone, and it would not be one that took account of all variables for base service.

We think it would be better if the baseline is set after the company's business plan is submitted. This is because:

- The baseline needs to take into account companies' obligations and proposals for service improvements, developed through stakeholder engagement, and the estimated costs of these. These will be set out in companies' business plans.
- We think that the baseline should take into account CCG views on the balance of a company's plan and whether it reflects customer priorities, and whether the plan is robust and contains realistic assumptions about future efficiency. This cannot be assessed until companies have completed their business plans.

For companies with robust business plans and positive stakeholder engagement through their CCGs, the baseline should be set at the company's business plan. As in Ofgem's approach to menus, a menu score of 100 should carry an incentive allowance so that there is a benefit to having an agreed business plan.

We do not think that fast-tracking business plans would work so well if Ofwat had already made a decision on what constituted the right forecast for costs. Ofwat's baseline would not have taken account of customer engagement, or other qualitative elements of the plan, but it is difficult to see how Ofwat could fast track a plan that was not reasonably close to its assessment on base costs. In effect, the baseline – set on limited information – would outweigh the business planning and engagement process.

We think it is important to remember that the menu is only a means to an end – if accurate business plans can be encouraged through other means then Ofwat should allow for this possibility.

If the baseline were to be set after companies have submitted their business plans, two potential approaches are set out below, which would enable the incentive mechanism to encourage robust business plans to be effective and give companies the opportunity to make a choice.

The advantage of setting a baseline before the Draft Determination (option 2) is that this would mean that the Draft Determination is likely to be closer to the Final Determination, making responses

more meaningful. However, it does create a tighter timetable. In either case, the process will work more effectively if companies have already discussed with Ofwat the major issues in their business plans, in order to speed Ofwat's consideration of the plan.

1. Baseline first set in the Draft Determination

- Companies submit business plans in January 2014.
- The first view of the baseline is set in the Draft Determination in May 2014. Companies can then make representations on the baseline, by July 2014, and argue for items to be included, as at present.
- Ofwat needs to notify companies of its baseline decision in late September / October 2014, ahead of the Final Determination, so that they may communicate a choice.
- Each company will need to prepare for the possibility that it might need to reduce its programme and the choices it needs to make in order to do so, and communicate its choice in October 2014.
- Price limits in the Final Determination should reflect the choice that the company has made, and any incentives or penalties that go with it.

2. Baseline set before the Draft Determination

- Companies submit business plans in January 2014.
- The first view of the baseline is set in March 2014, based on Ofwat's initial view of the Business Plan. Companies can then make representations on the baseline, by May 2014, and argue for items to be included.
- Ofwat publishes a draft determination in July 2014.
- Each company will need to prepare for the possibility that it might need to reduce its programme and the choices it needs to make in order to do so, and communicate its choice in October 2014.
- Price limits in the Final Determination should reflect the choice that the company has made, and any incentives or penalties that go with it.

3. Setting the Baseline before business plans are submitted

In order for there to be some value in Ofwat setting the baseline before companies submit their business plans, it must be set in time for companies to change their plans and go back to Customer Challenge Groups. To set baselines, the timescale could be:

- Companies submit initial estimates of outcomes and costs in May 2013.
- Ofwat sets initial estimates for the baseline in August 2013.
- Companies review their plans.
- Companies submit plans in January / February 2014.
- Draft Determination in June 2014.
- Companies make final choices in October 2014.

A significant disadvantage with this approach is that - since there is no requirement to submit a draft plan - companies may not be in a position to submit initial estimates on this timescale. In our case, we are intending to produce a draft plan for consultation in April 2013, so we could meet this timescale. Cost estimates and aspects of service improvement could, however, still be subject to significant change.

3.6 The number of menus

The wholesale consultation looked at a number of options for dividing costs between different menus. In principle, the number of different menus within each service should not matter if incentives are balanced. In practice, no incentive system will be perfectly balanced in all circumstances. In our assessment, the weighted totex menu is better than the others.

In general, where there are fewer cost classifications, there is less potential for incentives to be distorted through cost allocations. With more menus – for example, base and enhancement menus – there are a number of boundaries which could be exploited. Allocation problems become more acute if incentives are asymmetric. We have carried out some modelling with menus for base and enhancement. This can have the effect that a company gets an incentive bonus, even though, at the overall level, its performance is neutral and should earn no reward.

Extra menus also appear to be at odds with:

- The aim of totex – being blind to the nature of expenditure in order to equalise incentives; and
- The objective of simplicity.

There would need to be a great deal of scrutiny over the way that costs were allocated, or excluded from the menu.

We recognise that Ofwat has to make a distinction between base and enhancement to *assess* efficiency on a totex basis. The segregation of cost also enables a different (higher) efficiency challenge to be applied on enhancement expenditure. There are many arguments for doing this – new technologies being employed on enhancement schemes, greater scope for innovation and so on. However, creating such boundaries operates against the objective of equalising incentives.

If a company can attract a lower efficiency rate for one class of expenditure, then it will benefit by moving expenditure from one treatment to another. This is the exact type of behaviour that the totex approach is trying to prevent.

Scenario 4: allocation between menus

Using the notional company, we imagine that it has two menus for each service – one for base and one for enhancement as in Ofwat's wholesale consultation option B3.

Assuming that the company is able to exercise a choice in the way that we describe above, the company can benefit if it reallocates spend from one menu to another, even if its total costs do not change.

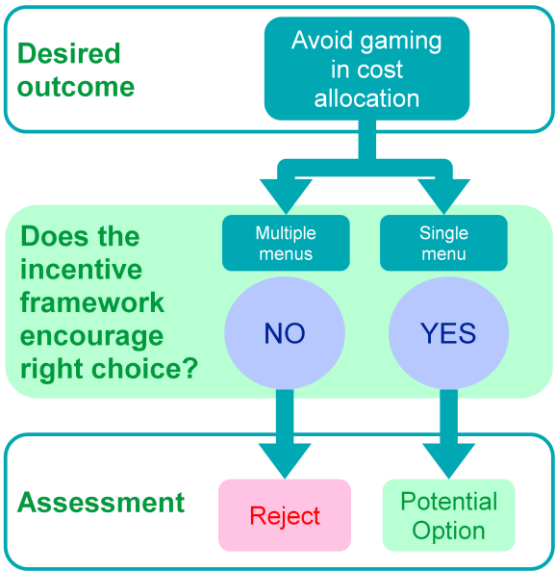
This is partly down to the asymmetric design of the current menu – rewards for outperformance are greater than the penalties for underperformance. However, the effect is also a product of the interaction between the "honesty" (ex-ante) incentive and the cost performance (ex-post) effects. Reallocating expenditure from one menu to another can boost a company's "honesty" score in one menu and thereby allow it to earn higher rewards.

Scenario 5: choice in allocation of efficiency savings

To illustrate this, we changed to a symmetrical menu. We imagined that the company faced a menu score greater than 100, and was therefore under pressure to reduce its costs. This time, we assumed

that real savings were available to the company, but it had a choice about where these should be made.

Even though the overall cost after these savings did not change, the company was better off concentrating them in one menu rather than spreading them evenly. Once again, this provided an incentive to game the system, which we do not consider to be desirable.



We recommend that all menus should be symmetrical, and that the number of menus should be limited to one per service.

3.7 Separate menus for opex and capex

Although the illustrations above used a transfer of capex for simplicity, there are similar problems with capex and opex menus. Companies have scope to target savings in the areas where they are performing well in order to benefit from better incentive rates. Doing so might distort decision-making, so that they do not choose least whole-life cost. This would not be in the best long-term interest of customers.

From the work we have done, our preferred option is a totex menu for each service. But this approach does have drawbacks compared to the current system of separate assessment. The existing rolling incentive encourages companies to continue driving costs down, because they can retain the benefit for the same period (regardless of when the savings are made). Separate opex and capex menus might fit more easily with such an approach.

Although this is a good feature of the current system, we do not think its retention is compatible with the aims of totex.

- The roller would need to be applied to one portion of expenditure and not another. This would make it more difficult to equalise incentives.
- We are uncertain of the way in which this could interact with a system where a portion of opex is capitalised.

The First Economics study for UKWIR proposed a way of resolving this by setting the baseline opex on a rolling 10-year basis and setting efficiency targets for each year. This could be workable, although we understand that it might conflict with the objective of regulatory simplification.

Our preferred totex variant above is a weighted menu. In all of the analysis above, we have used the present value of opex over 15 years, rather than 5 to apply this weighting. However, with this method, there could be an additional timing effect. The menu score would be improved more by saving money early or simply deferring expenditure until later in the period.

In some earlier work we thought that a further mechanism might need to be introduced in order to address this issue. However, if (and only if) the true-up at the

end of the period is NPV-neutral, then we do not think it is a problem.

The true-up claws back the intrinsic benefit that a company would usually get from saving money, and the time value of that saving. The menu then distributes a share of all benefits (including the time value benefit) to the company. Thus it is *right* that there should be rewards from early saving.

The issues with regard to continuing opex savings are more important because actual opex in the base year has, until now, been used as the starting point for setting allowed base opex going forwards.

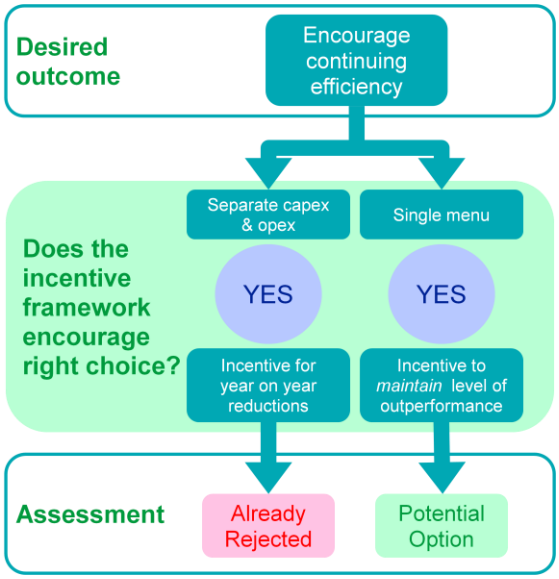
We note that the UKWIR study project on totex cost assessment considered a number of alternative approaches, where base year expenditure would not be rolled forward in this way. If one of these was adopted, then the issue would not arise. However, we think that the arguments for setting future opex / "Pay as you go" values without reference to companies' actual expenditure are weak, for the reasons we set out in section 3.5.

For opex, the approach in Ofwat's existing incentive allowance does offer a partial solution. This caps the allowed opex outperformance at the value achieved in the base year (since customers only benefit from the reduction in opex going forward).

This could be adapted to the weighted menu. The value of opex performance projected forwards beyond AMP6 (for the purpose of calculating the outturn ratio) would be set at the value achieved in the base year, as set out in the example below. For simplicity, capex within the menu has been ignored.

Year	1	2	3	4	5-15	Simple Sum	NPV Score
Baseline opex	100	100	100	100	100	500	1074
Outturn opex	90	92	94	96	?		
Assessed as:	90	92	94	**96**	**96**	468	1004
Outturn ratio:							95.0

The use of the base year value does, at the least, provide companies with a reason to *maintain* the level of performance that has been achieved. And it is important not to overestimate the degree to which companies are able to plan the phasing of the performance that they actually achieve against regulatory targets. The flat-price model above is a theoretical construct. The reality is that all costs are rising in nominal terms. If the rate of inflation falls, the adjusted regulatory target may to start to rise less quickly than the company's cost base. In real terms it may appear that the company is not putting in as much effort later in the period, but the reality is that inflation simply makes that target more difficult to achieve.



3.8 Strength of incentives

Without amendment, the weighted menu does, however, reduce the incentives for cost saving below the notional share (30% in the current menu). The current menu is designed to measure performance on a 5-year basis. If the menu score takes into account opex from future periods, then each pound of saving will have less impact on the ratio.

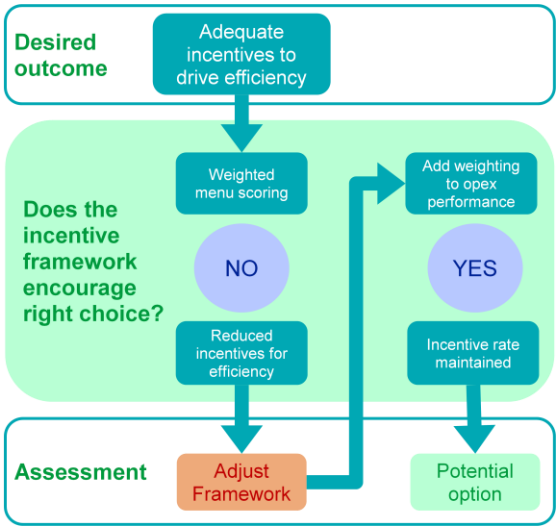
For example, if a company spent capex in line with the profile above, a company would score 93.6 using a simple sum of the expenditure over 5 years. Within the current CIS this score would be sufficient to deliver an incentive rate of 30%; a score of 95.0 would not.

The solution is to apply a weighting to opex (or PAYG) within the baseline for the purpose of the reward as well as the menu score.

With a discount rate of 4.5%, the effect of using a 15-year NPV is to give opex a weighting of around 2.4 relative to capex. This is shown in the table below:

	Value £m	NPV(for menu)
Opex (15 years)	100 (per annum)	1074
Capex (5 years)	100 (per annum)	439
Ratio		2.45x (to 2dp)

If we apply a multiplier of 2.4 to the opex element of the baseline, the reward for performance can be maintained at 30%. We set out some illustrations on this point in the appendix.



This mechanism still presents weaker incentives for saving opex than the current approach. However, the reduction could be offset by increasing the incentive rate available through the menu, in line with the recommendations in the CEPA report[9] for Ofwat – raising the 30% incentive available at a ratio of 100 to between 45% and 50%.

We acknowledge that there were differences in the construction of Ofwat's CIS baseline, which affected the strength of the incentive available at 100; Ofwat adopted an average efficiency approach whereas Ofgem set its baseline at the assessed efficiency frontier. Thus there are reasons why the incentive rate for matching the baseline *should* have been different. However, because Ofwat's baseline also included one-sided changes in scope it did not represent an industry average position.

3.9 The split between capex and opex or "pay as you go"

Setting the split between capex and opex is not an incentive as such. Like the notional gearing that Ofwat has historically used in financeability tests, there is no obvious transmission mechanism linking Ofwat's assumption to the desired company behaviour.

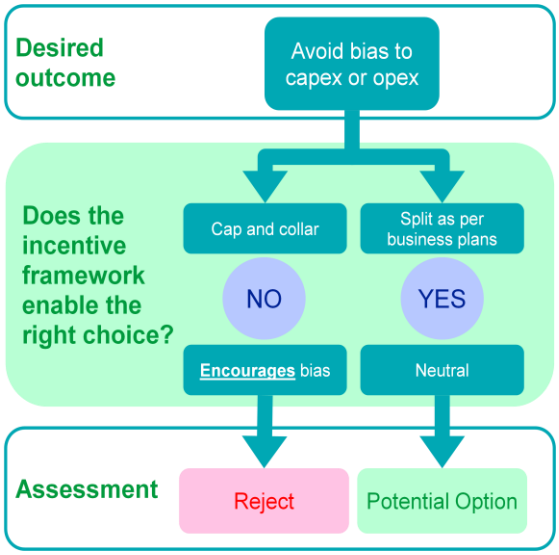
The actual effect of defining an up-front split of capex and opex would be to vary the amount of revenue that a company receives in period. This would have an incentive effect – but if the objective is to discourage capex bias, this would actually be the opposite of the one intended.

Since Ofwat's regulatory treatment would have no influence on a company's actual accounts:

- A high capex company would receive extra revenue, although it would not have expensed any more opex through its Income Statement during the period.
- To an investor, looking at statutory accounts, it would appear that the company is earning a higher return.
- To ratings agencies looking at cashflow, it would appear that its ratios are more robust.
- In effect, the high capex company would be rewarded for any bias and encouraged in this behaviour.
- If capped, a high opex company would suffer the opposite effect – it would be punished for *not* being biased.

The "cap and collar" analysis could be used only to challenge companies that put forward a capex – opex split that is outside a pre-defined range. We recognise that the extent to which the above impacts apply depends on the size of the range and the extent to which Ofwat is prepared to accept company proposals after review. But we are concerned by the perverse consequences that would arise if a company's split was amended without some means of transmitting this into company action.

[9] Cambridge Economic Policy Associates Ltd, *Incentives and Menus* (July 2012)

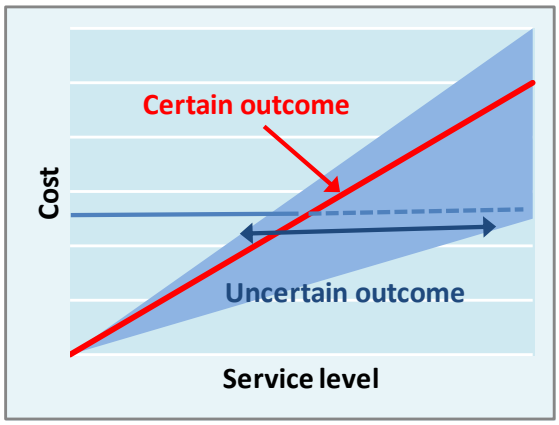


3.10 Outcome and benefit models

As we noted in the discussion of uncertain costs, another reason why companies might favour capital schemes is that they have greater control over the outcome. An opex solution such as catchment management might have uncertain costs and uncertain outcomes. It might take time for the alternative scheme to "bear fruit". If a company has a specific target which must be met within a defined time, it might choose the option that will guarantee that result. It is even more likely to do so if there is a penalty for failure, even if an alternative could be cheaper and / or deliver better outcomes for consumers.

Scenario 6: uncertain outcome

In this case, we have modelled a company facing a choice between a capital scheme which will definitely deliver the outcome, and an alternative (opex) solution which will probably be cheaper. However, there is a 30% chance that the alternative will not deliver the target level within the assessment period. This is illustrated in the diagram below.



We have carried out the modelling using a symmetrical weighted menu, identified above as the best approach to cost performance incentives. This is a cost beneficial choice. In the absence of outcome incentives, a rational company that is not risk averse would choose the alternative scheme.

We modelled this scenario against two possible penalty approaches and a symmetrical approach.

I1. Shortfalling

This is the current Ofwat approach to outcome incentives.

I2. Income clawback

An approach where income equal to consumers' valuation of the benefits lost is clawed back if the outcome is not delivered, calibrated using Willingness to Pay (WTP).

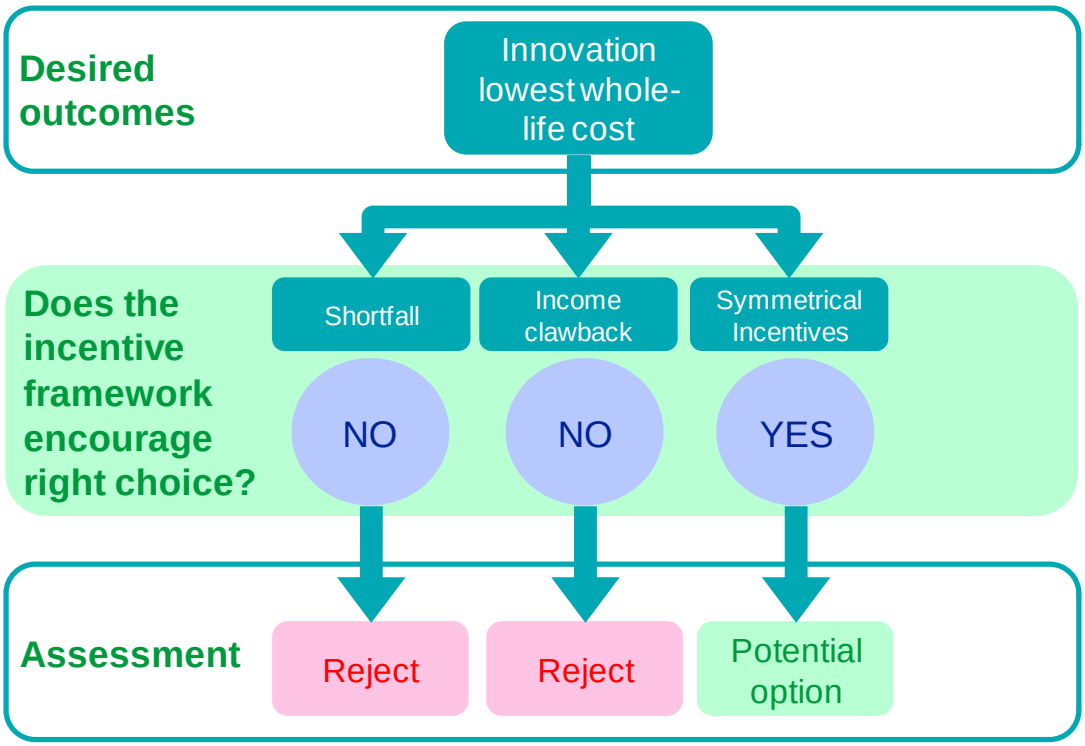
I3. Symmetrical approach

This uses WTP values as in I2 above, but with rewards for exceeding targets.

As shown below, symmetrical incentives encourage companies to make the right choice.

With either of the first two approaches, the company would have to factor in the 30% chance of a penalty. This skews its choice. It would prefer a more costly, but safer option. Indeed, it would be prepared

to invest *more* than the original value of its solution (making it non-cost beneficial) to reduce the chance of a penalty.



Scenario 7: delivery of higher service

A problem with a penalty-based approach is that it encourages companies to do no more than meet the target that has been set. As noted above, it might be willing to go a little beyond the target to build in a safety margin and thereby reduce the chance of a penalty being incurred. However, if it over-delivers by too much, it must put itself at risk:

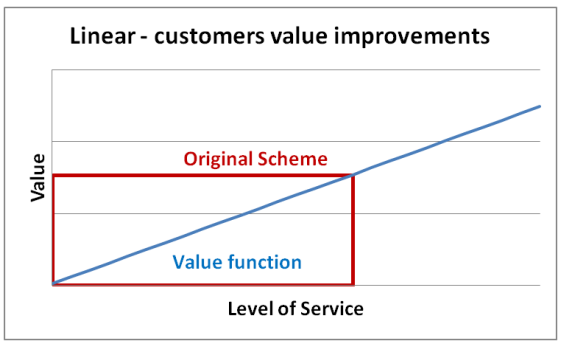
- Ofwat may assume that it should be able to maintain the same level of performance going forward – making the company's challenge more difficult going forward.
- This risk is compounded if Ofwat considers additional expenditure required to over-achieve as inefficient (which it may well be – if customers do not value the additional output).
- In the current framework, this is a particular problem with opex solutions such as leakage. A company that voluntarily lowers its leakage target will never be able to raise it again – it will have a permanent increase in opex (with associated effects on its efficiency assessment).

Under a penalty-based approach it is always in the company's interest to argue for an easier target, rather than demonstrating what might be achieved. In the above example, a penalty-based approach to leakage means that companies will wish to build in additional cost provision, in case targets are more difficult to achieve than expected. This may lead to leakage control appearing to be uneconomic, so reductions will not be proposed in business plans.

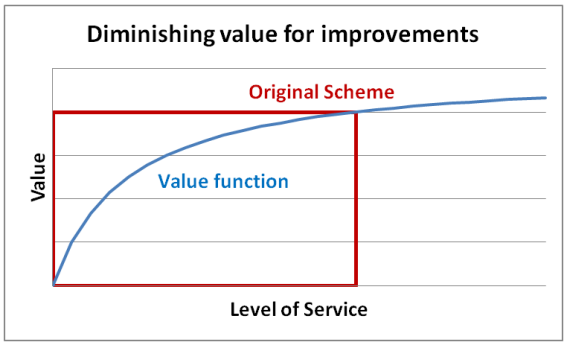
A symmetrical approach, where a company could earn a reward for improved outcomes, could encourage companies to set themselves more challenging targets. The concept is similar to the basic principle of RPI-X for costs – companies have an incentive to outperform, and in the long run this is to the benefit of customers who benefit from lower costs going forwards.

The concern would be that the rewards on offer would encourage a company to deliver outcomes that are not required - and customers will end up paying for things they do not want. We therefore looked at two scenarios:

- Firstly, where customers desire more improvement – there is a **linear value** function where they have the same willingness to pay for each extra unit of service. A possible example here might be sewer flooding.



- Secondly, where consumers value their existing service, but do not need or want higher levels of service – there is a **diminishing value** function. An example might be drinking water quality.

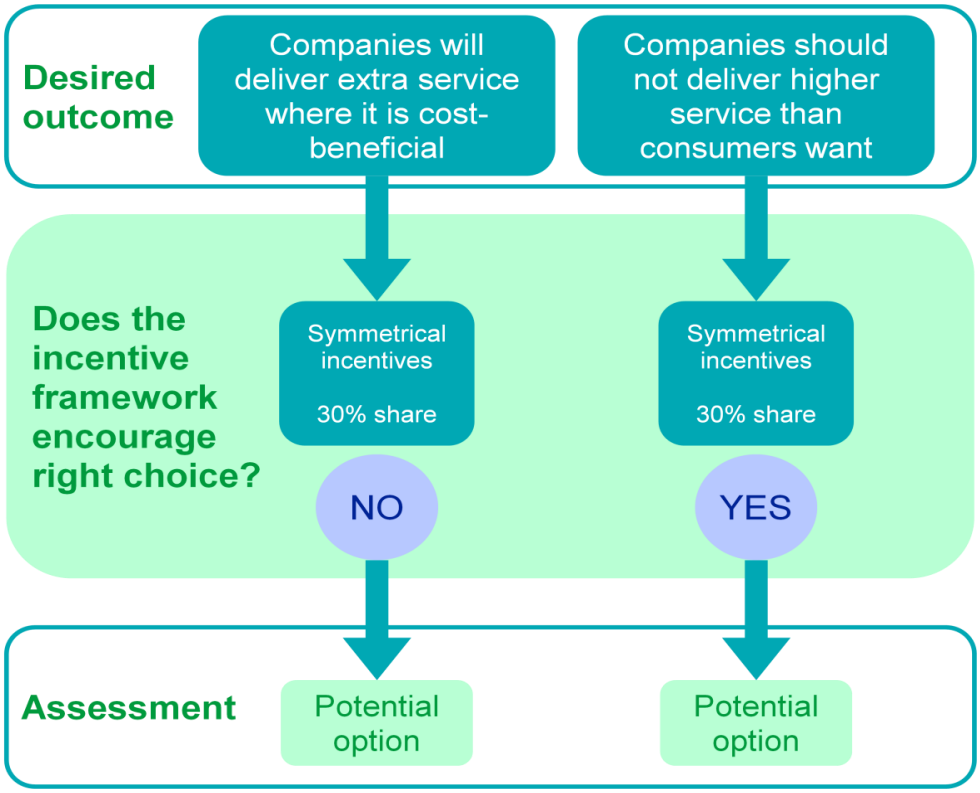


Two points emerge from the modelling:

- The company share of benefits from additional improvements needs to be related to the share of cost outperformance, to get the right balance between cost saving and additional service delivery. So the share of benefits from over-delivery would need to be increased if the cost incentives were strengthened (as we and CEPA have suggested).
- Secondly, that the additional costs associated with over-delivery would need to be reflected in future periods. If a company expected that continuing costs would be subject to a steep efficiency challenge, it would factor this into its analysis and avoid further improvement.

  This approach might seem to be a high price for additional improvements – particularly if increased cost incentives drive the company share higher. However, it is important to remember that this is only the benefit arising from a single period. The normal regulatory expectation would be that the new (higher) level of service should be continued and therefore there should be additional benefits to customers that stretch beyond the next review. In addition, it might be hoped that it could spur innovation by encouraging companies to demonstrate that higher standards are achievable at more reasonable

cost than they would argue in for in a penalty-based approach.



3.11 Trade offs and cost control with balanced incentives

A problem with Ofwat's previous framework, where outputs were set at a detailed level in the Final Determination, was that companies had an incentive to continue with the delivery of specified capital schemes - even if the costs had increased to the point where they were no longer cost-beneficial.

We can see this from scenario 6 where, in order to avoid a shortfall or income clawback, a company would be prepared to invest more than the original value proposed in its business plan.

The extreme example of this would be where a company delivers the outcome through other means, but is still logged down or shortfalled because it has failed to deliver a named scheme. This has happened in Severn Trent's case, where delivery of the required improvement to a river, but changing location of where the improvement was delivered, has led to logging down. The move to an outcomes-based regime should help to avoid this situation.

The wholesale consultation suggests a couple of mechanisms which might further help to redress this balance:

- Allowing **trade-offs** so that a company can offset under-delivery on one measure by over-delivering on another.
- Trade-offs could be permitted either within an outcome or between outcomes.
- The wholesale consultation includes options where trade-offs can be combined with a penalty-based approach or with rewards and penalties.

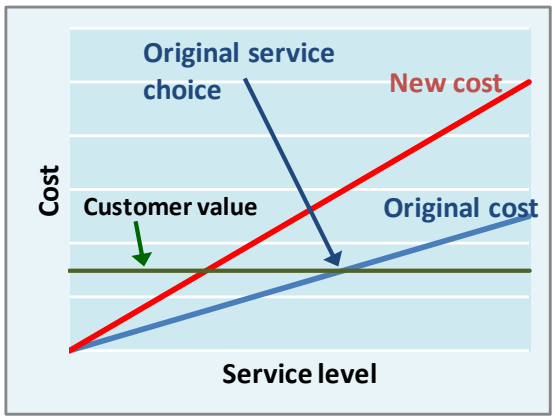
We think that trade-offs are only relevant to a penalty-based approach, where over-delivery in one area could be used to avoid the consequences of under-delivery in another. In our view, trade-offs do not need to be specifically allowed with a symmetrical approach - provided the incentives are set at the right level, companies will make trade-offs anyway.

In a system with symmetrical incentives, there might be a concern that companies will continue to deliver schemes that have become non-beneficial because of the rewards on offer.

The following scenario illustrates why this should not be the case if incentives are balanced.

Scenario 8: Response to cost increases during the period

In this example, the notional company discovers that its original forecast of the cost required in order to deliver an outcome was too low, as illustrated below.



With symmetrical incentives, the company would be strongly discouraged from delivering the scheme, because it would gain no rewards from spending more money where there was no additional benefit to consumers. It would have an incentive to seek better alternatives – or, if none are available, avoid delivering the service improvement entirely and reconsidering at the following review.

We had originally thought that the outcome incentive would need to be independent of the menu, because we did not think that the effect of costs in period and the true-up would be NPV-neutral. However, we understand that Ofwat intend to change the true-up to achieve this objective, although the exact mechanics of the new approach had not been made public at the time of writing.

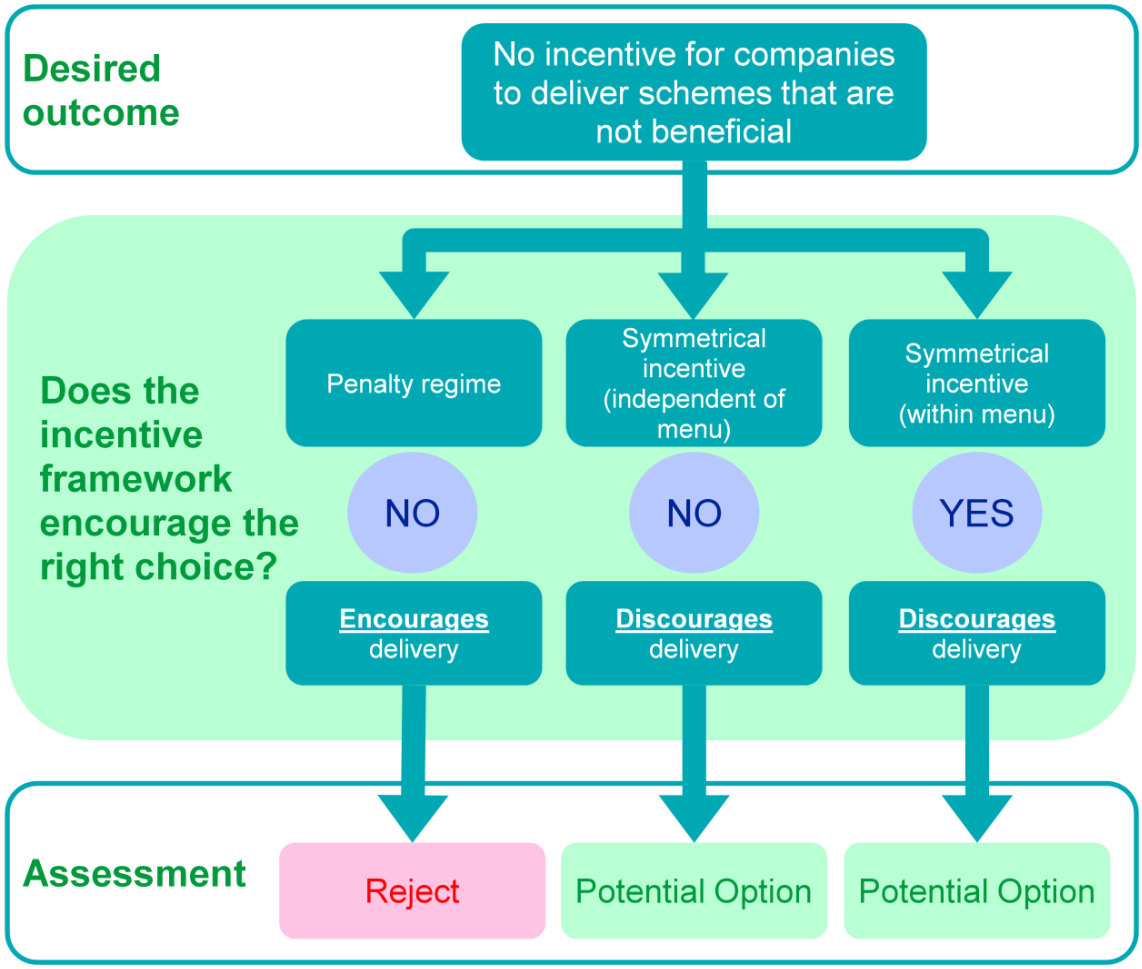
If we assume that:

- the true-up for costs is neutral; and
- opex in the baseline is weighted so as to deliver the right share of savings on a present value basis, as discussed in section 3.8;

then an outcome incentive independent of the menu could be calibrated correctly. However, there are still attractions to dealing with outcome incentives through the menu..

The alternative we adopted was to adjust the company's outturn costs (for the purpose of the menu score alone, not the RCV) to reflect the variation in benefits delivered. This would be similar to logging, but rather than adjusting the ex-ante menu score the company's outturn expenditure would (by agreement) be adjusted upwards or downwards to reflect the value of the variation in service delivered.

This analysis would apply equally to the circumstance where customer willingness to pay for improvements diminished during the period.


Desired outcome
No incentive for companies to deliver schemes that are not beneficial
Does the incentive framework encourage the right choice?
Penalty regime
Symmetrical incentive (independent of menu)
Symmetrical incentive (within menu)
NO
NO
YES
Encourages delivery
Discourages delivery
Discourages delivery
Assessment
Reject
Potential Option
Potential Option

Evaluating incentive packages against scenarios – some conclusions

The table below summarises our conclusions on how alternative incentive frameworks perform, in terms of achieving regulatory objectives.

Objective	Current	Alternatives
Least whole-life cost option chosen	Opex comparative efficiency discourages opex solutions	Totex emphasis on 5-year cost minimisation could push incentives too far the other way and discourage investment – but this can be addressed (by assessing the value of opex over a longer period).
Costs increase – does a company proceed with delivery?	Yes if it affects serviceability – otherwise a company may decide not to proceed.	Calibrated rewards and penalties can ensure company proceeds where justified by level of customer benefit.
Best outcomes for customers	Current approach discourages risky solutions	Calibrated rewards and penalties can ensure company chooses the best option – but may be affected by company risk aversion.

4. How the incentives might work in practice

An effective incentive framework requires that appropriate measures of success be set, and that the initial targets set are reasonable.

4.1 Setting outcomes incentives

If an outcomes incentive is to be effective then it is necessary that, in addition to the incentive being set at the right level:

- The right measure of success is set.
- The targets are set at the right level, so that subsequently it is not too easy to outperform, and companies are not at undue risk of underperformance.

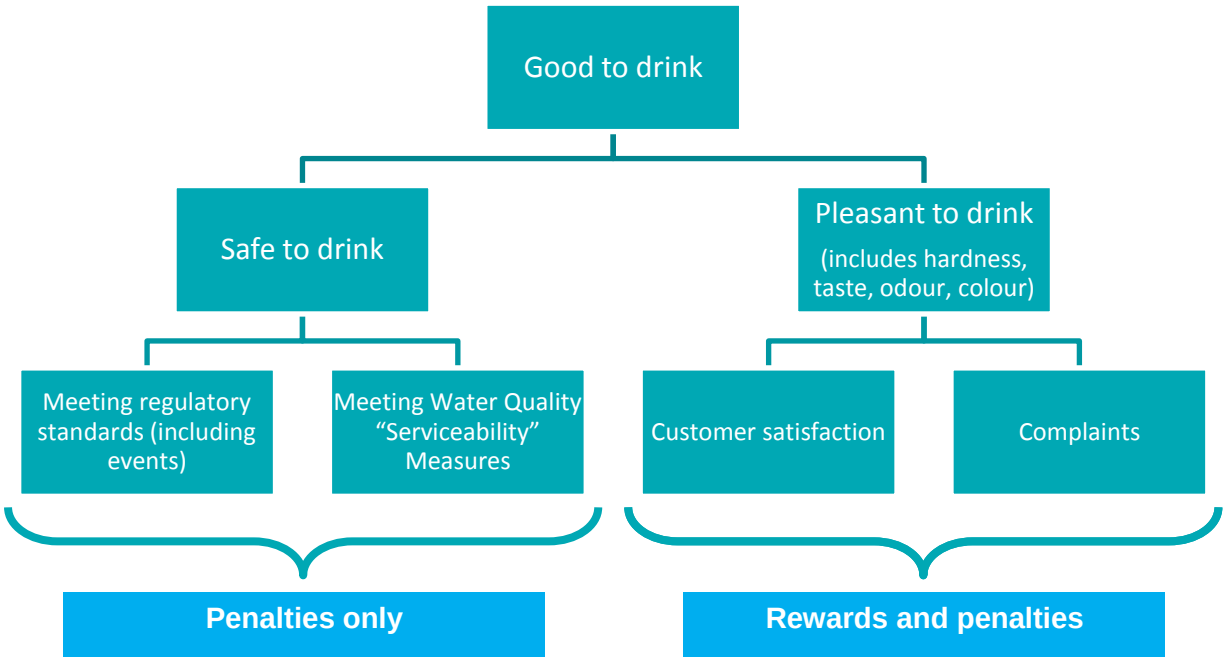
Setting the right measures of success for the outcome is key. These should be capable of being measured, and with an reasonable level of water company control. Where possible, they should be set at a higher level than previous outputs.

The company can then review whether it is appropriate for there to be financial incentives, and the balance and level of any incentives, taking into account customer research.

An example is shown below, for drinking water quality. Companies will have an outcome relating to water quality, which includes the two aspects of safety and being pleasant to drink.

Safety can be measured in terms of meeting DWI standards. This area is a high priority for customers but [performance is already generally high, and it would not be appropriate to have rewards for performance in meeting statutory standards.

In the area of "pleasant to drink", outputs would previously have been measured in terms of delivery of specific schemes to improve drinking water. This can be moved to a higher level, in terms of measuring customer perception, through complaints or surveys of satisfaction. In this area, a balance between rewards and penalties, based on customer willingness to pay, could be appropriate.

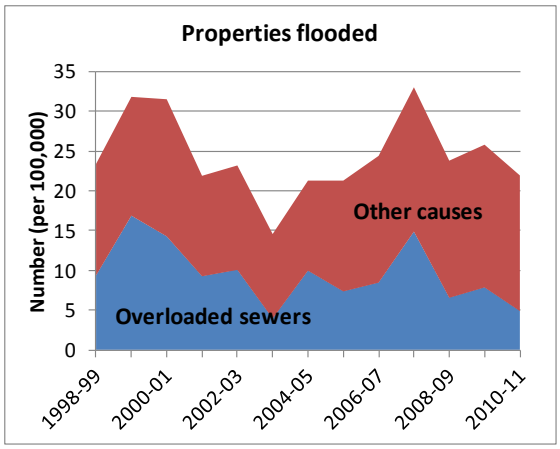


4.2 Where outcomes incentives could be effective - sewer flooding example

The current approach to sewer flooding has had drawbacks in three areas – output setting, cost performance incentives, and a focus on penalties:

- The regulatory outputs approach has concentrated on the flooding register. This has encouraged focus on capital schemes to reduce the register.
- The cost performance incentives have discouraged opex solutions such as sewer cleansing, and mitigation solutions.
- Focus on penalties for failure to deliver the output has not encouraged companies to go beyond original commitments.

Little progress has been made in reducing flooding. There has been some reduction in flooding from overloaded sewers, but not in total flooding incidents. This is shown in the graph below.



Sewer flooding in England and Wales

4.3 Changing the approach to sewer flooding

The new approach could include:

- Higher-level outcomes defined by company and agreed with CCG, which could measure success in terms of what matters to customers – flooding incidents, and their severity / frequency.
- Incentives based on number of flooding incidents, with rewards and penalties calibrated to WTP, and agreed in overall package of incentives with CCG.
- Rebalanced cost incentives to remove capex bias, through an NPV-neutral menu approach.

We consider that this will improve the prospects of reducing flooding.

This higher-level measure would mean that companies would bear some increased risk from variations in weather – but over a 5-year period this usually averages out. The risk could be in the range +/- 10% in terms of number of incidents. A “cap and collar” approach could be used to reduce upside and downside exposure.

4.4 Issues in setting rewards and penalties

We consider that the Ofwat methodology consultation in December should set out the broad principles for incentives. Companies can then develop incentive proposals and review them with their Customer Challenge Groups. They can then be discussed with Ofwat before companies submit their business plans.

For most significant areas where there is a choice over what is to be achieved values are available for willingness to pay. We believe that incentives should be set with reference to willingness to pay but constrained because of:

- The need to ensure some net benefits received by customers.
- Some uncertainty about benefit valuations.

- The potential overlap with other incentives, especially the Service Incentive Mechanism e.g. reducing interruptions to supply could reduce complaints and therefore change the reward or penalty arising from SIM, as well as affecting any specific reward or penalty.

Where companies are meeting statutory obligations, it is likely to be inappropriate to use willingness to pay values and some other basis, which could be cost, should be used to set penalties.

In some aspects of service it may be desirable to adopt a "cap and collar" approach, to limit windfall gains or losses from factors outside a company's control.

There is also a need to constrain the overall rewards, so that bills do not rise above what research has shown would be an acceptable level for customers.

4.5 Making the package of incentives work with Boards

Regulatory mechanisms don't need to be simple – but they need to be clear whether a company's action will deliver a reward or penalty – **and be straightforward for boards to use in decision making**

This means mechanisms should avoid:

- Adjustments after the event.
- The need for a significant amount of judgment on whether a measure has been achieved.
- If either of these is necessary to avoid excessive windfall gains or losses, then consider a cap and collar to limit gains and losses.

Simple rules of thumb need to emerge, for example:

- "We should choose the lowest whole-life cost option irrespective of the capex : opex mix".
- We should deliver more sewer flooding outcomes if we can do it for less than £x.

No incentive framework will provide the right incentives for all situations. However, providing we believe the package is broadly right, we believe it will be effective because:

- There are reputational and procedural incentives associated with being seen to act in customers' best interests. Companies recognise that they will reduce trust and be subject to greater scrutiny if they appear to manipulate the framework.
- Companies do not make calculations of the precise impact of the framework on every decision. If the framework generally provides the right incentives, it will encourage the right behaviour.

5. The overall package

This chapter sets out our views on the appropriate scale of rewards and penalties that should be available, and how this might be scaled to reflect the differences between companies.

The overall incentive package needs to be reviewed, in the context of the rest of the framework for price-setting, to ensure that:

- The overall incentive package will lead to a combination of bills and service which is acceptable for consumers.
- The overall balance between risk and return for companies is appropriate,

As noted in Chapter 4, ensuring that the level of bills remains acceptable may require some limits on the scale of incentives through a "cap and collar" approach. Customer research by companies will have established the range of bill changes which would be regarded as acceptable.

Ensuring that there is an appropriate balance between risk and return requires taking into account the incentives packages and other business risks, so that:

- Companies performing well can earn returns above the cost of capital
- Poorly performing companies earn lower returns.

A company should not be unduly exposed to risks of getting into financial difficulties, particularly for factors outside its control, as this could undermine investor confidence in the sector.

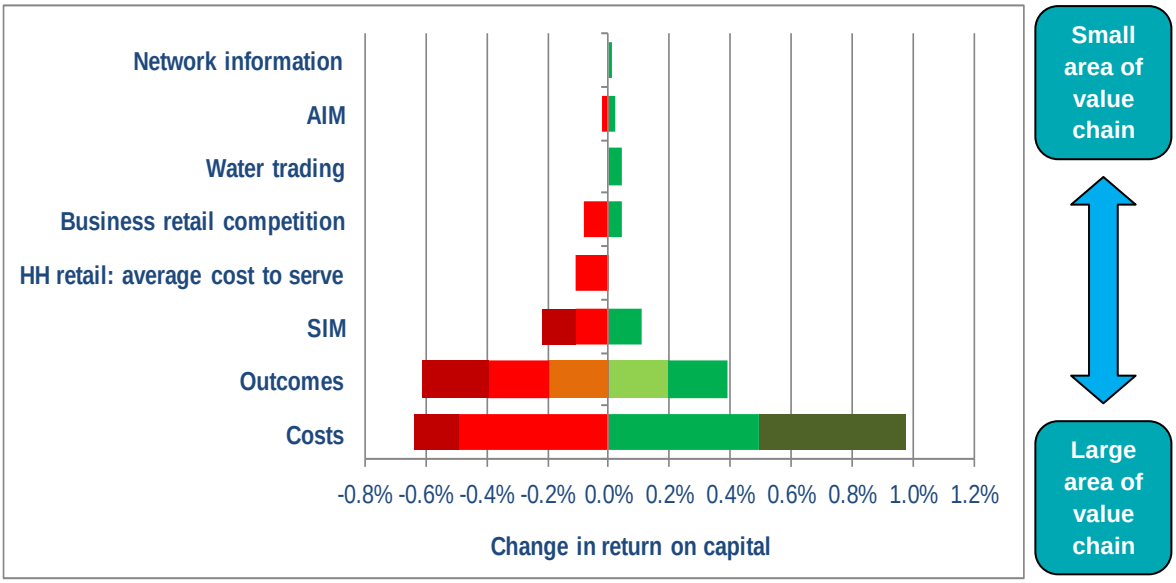
Assessing risks involves:

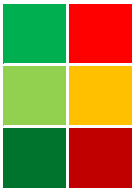
- Identifying and quantifying the factors which drive underperformance or outperformance on costs and measures of success, including factors both within and outside a company's control.
- Assessing the scope for companies to mitigate these risks.
- Incorporating the impact of the financial incentives in the regulatory framework.

Whether, overall, the risks are symmetric or asymmetric, and whether the level of risk is consistent with the average return available to investors, then needs to be considered.

This analysis should be carried out when details off the incentive mechanisms are finalised, but we have made a preliminary assessment, based on past performance and our analysis of the potential incentive package. The diagram below gives an indication of relative scale of incentives.

5.1 Overall impact on company returns in next 5 years





Upside / downside - new incentive

Upside / downside – lower choice

Upside / downside - old incentive

As can be seen, the majority of the incentives are new, but are not particularly strong. The strongest incentives are for the Service Incentive Mechanism, outcomes and costs. These all existed under the previous approach, but (with the exception of costs) were weighted to the downside; for outcomes the incentive was wholly penalty-based and - at the extreme - a greater penalty than the package we would propose.

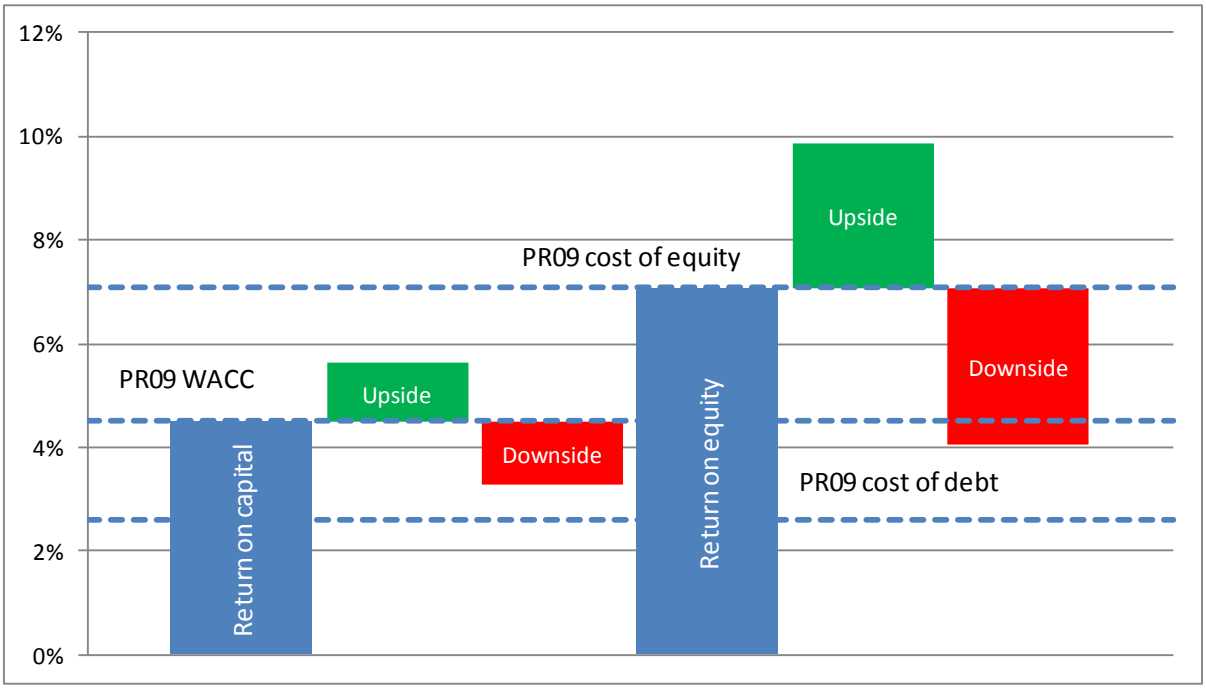
The estimated impact of the incentive package is based on the same notional company that we used in the scenario modelling, with the addition of the following assumptions.

	Assumptions
Gearing	60% (so an incentive worth 0.5% return on the RCV will change the return on equity by around 1.2%)
Scale of capital programme	The £500m programme is 46% of the opening RCV, in line with the PR09 average. Opex spend over the AMP is equal to capex.
Pre-tax return	For simplicity, we have used a basic pre-tax return of 6.3%, which is equivalent to the 4.5% set at PR09
Cost incentives	The incentive rate is 50%, in line with CEPA's recommendations. We have assumed that at the upper end a company is capable of scoring a menu score of 95 for both honesty and performance. The strength of the old system is based on the same rate of outperformance. The incentive rate for capex is 30%. For opex, the downside is 100% (a company loses all excess spend in period), but the upside varies between 117% and 300%.[10]

[10] UKWIR, *Alternative approaches to efficiency and economic incentives* (2011)

	Assumptions (continued)
Outcomes	Since these affect large areas of service, we have assumed that they could be worth up to 80% of the value of the cost incentives. However, depending on company and Customer Challenge Group preferences, they might be more limited. At the lower end we have assumed half this value. For the old system, we have set the bar at the value of a 50% shortfall for one sub-service. We have not split out a quality programme so this is ¼ of all capex for our notional company. This is somewhat high for a water and sewerage company, but also probably low for a water only company. In practice, Ofwat has never set a shortfall close to this value, but it is feasible that a company could suffer a penalty on more than one sub-service.
SIM	This is +/-0.5% of the notional company's revenue over 5 years. We built a rudimentary revenue requirement for the company using the spending assumptions already described.
Household retail: Average cost to serve	We assumed that Ofwat's preferred option is to allow companies the lower of their actual cost to serve or the average. After adjustments for the level of metering and other factors, we assumed half of the loss to companies with above average costs, then divided this across the whole industry.
Business retail competition	The upside is based on a margin of 1.5% on non-household revenue, which is 25% of the notional company's total. We skewed this to the downside because, if there are new entrants, incumbent companies must lose customers and come under pressure to reduce margins. On average, they must lose.
Water trading	Although there will be limited opportunity for trading in the next AMP, we assumed some gains based on our earlier work. There are gains for both exporters and importers, but we have assumed a downside a quarter of the benefits as importers lose the opportunity to build their own resources.
AIM	As this deals with local issues for a single aspect of the value chain, we assumed this to be small in value
Network Information	If this is implemented, we believe that the incentive to provide information should be a positive one, scaled according to the costs and benefits of gathering it. We assume these to be very small in comparison with service delivery costs.

Illustration of the impact on company returns



The largest impact on returns in the next five years is likely to derive from cost incentives, as in the past. We have estimated the potential impact of outcome incentives from willingness to pay values derived for the last price review and past experience on variability of performance.

- We consider that the Abstraction Incentive Mechanism is likely to have a relatively small impact, because it will only apply to a limited number of abstractions, and companies' ability to change abstractions is limited in the short term.
- Water trading incentives may have a larger impact in the longer term but it is likely that only a small number of trades could be completed and operational by 2020.
- The future structure of the Service Incentive Mechanism is not certain, but the range above is based on previous OPA rewards and penalties.
- We have assumed that the incentive for network information is relatively small, because it would not be appropriate for there to be large incentives for information provision.

On the basis of our proposals for an incentive package, there appears to be a reasonable overall balance between rewards and penalties. A bias towards penalties in outcomes incentives would significantly tilt the balance towards penalties.

At this stage, the potential rewards and penalties would seem to offer reasonable scope for outperformance, while not creating an undue risk of financial difficulties –within the illustrated range, equity returns would not be eliminated. This will, however, need to be reviewed when the incentive rewards and penalties have been developed in greater detail.

6. Conclusions

This chapter sets out our conclusions on the appropriate package of incentives.

- The best package needs to include:
  - Appropriate measures of success – at a higher level than previous outputs.
  - The right balance of incentives.
  - Appropriate cost assessment.
- Any one of these not being set correctly could cause the whole package to be ineffective.
- A totex menu based on five-year spend is not effective – a weighted totex menu, with greater weight given to opex, is needed to avoid excessive focus on the short term.
- Setting baseline expenditure needs to reflect the outcomes companies are delivering - companies will not deliver opex solutions for delivering beyond initial targets if they believe that baseline expenditure will be cut back at next review
- A penalties-only approach makes companies avoid uncertain solutions – there is a need both penalties and rewards, in relation to at least some outcomes.
- Rewards and penalties should be calibrated against willingness to pay to avoid the complexity of trade-offs.
- An incentive approach does not encourage companies to over-deliver outcomes that customers do not value if calibrated correctly.

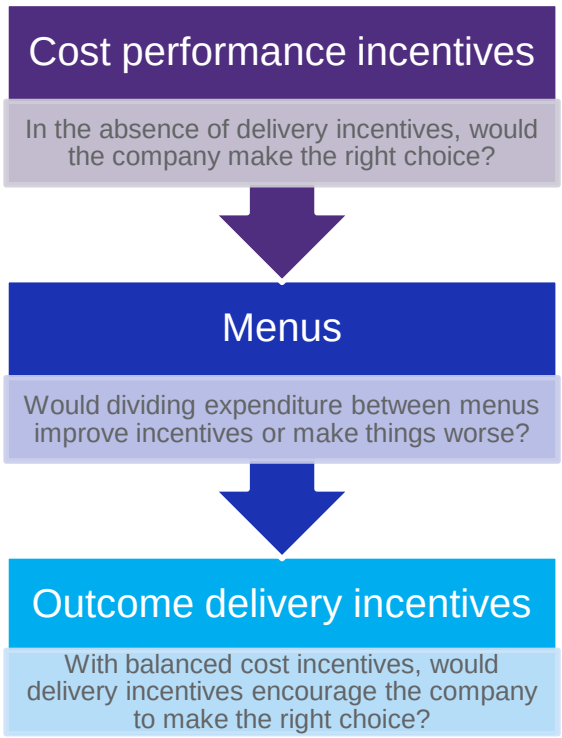
We believe that the overall package we have set out can deliver an appropriate balance between risk and reward, and the incentives within it are capable of providing clear messages as to what company behaviour will achieve the best outcomes.

Appendix – modelling details

A1 Assessment of options

A1.1 Sequence

Ofwat's wholesale consultation sets out some useful considerations for considering whether the overall package of measures. Intuitively, it would seem right that we should consider the outcomes we want to deliver before we think about the costs required to do so. However, our experience in attempting this evaluation led us to reverse this order:



We interpret the "right choice", for cost performance, as the solution with the lowest whole life cost. For delivery incentives, we have assessed which option delivers the greatest cost benefit. In both cases we have made this assessment over a period of 15 years.

A1.2 Assessment period – why 15 years?

Fifteen years is a shorter life many assets in the industry – indeed, it is less than the industry average, which is around 25-30 years for above ground assets and new infrastructure has lives of 80-200 years. This period under-reflects the value of capital investments that might save opex. In more limited cases it might over-represent the benefit – and there are many shorter life assets now being used in the industry. The First Economics study on this topic for UKWIR assessed the relative value of capex and continuing opex savings over a period of 30 years.

We have chosen 15 years for three main reasons:

- Firstly, on the basis of regulatory precedent – a 15 year period is used in Interim Determinations (IDoKs) to assess the materiality of opex changes, while capex is assessed over 5 years. This is done primarily to give proper weight to opex changes which, though lower in cash terms over a 5 year period, have a more significant impact on company profit and cashflow ratios in the short-term, and longer-term implications. In similar fashion our third cost recovery option (below), applies a weighting to opex
- Secondly, the mechanism needs to strike a balance between the value of one-off opex savings and continuing savings.
- Finally, we recognise that there is a perception of capex bias within the industry. Although 15 years is lower than the average life of even of the above ground assets, assigning a higher weight to opex might not encourage cultural change.

For these reasons, we believe that a weighting of 15 years for opex is balanced, and by no means excessive.

Of these issues, the second is the most significant and warrants further examination. It is true that a five-year approach (as per Ofgem) should be able to equalise the impact of one-off opex savings against capex if neither had any continuing impact. This would be best if the choices between capex and opex were only questions of allocation – that is, the expenditure is the same and the only issue is how it is classified. We think the value that can be shifted through accounting policy is small. This is a marginal issue, and should not drive the construction of the regulatory regime. Our work is attempting to look at real choices that companies might make, and therefore for modelling purposes we assume that all opex choices have a continuing impact.

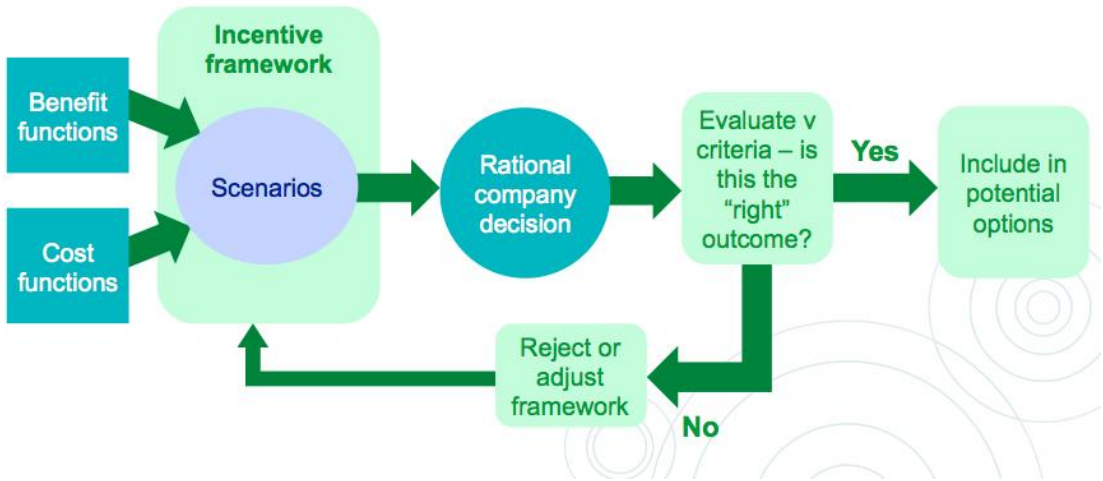
For simplicity, when looking at the trade-offs between capex and opex we have assumed that all options have the same duration – that is, all capital schemes have a life of 15 years, opex alternatives are recurring costs over 15 years and the options deliver benefits over the same period.

A1.3 The notional company

As we have used a stylised model to test the options, we have not included legacy effects such as the existing Regulatory Capital Value, base Current Cost Depreciation and so on. The notional company has a business plan which includes £500m of opex and £500m capex spread evenly over the period.

In any given scenario, this base programme includes a scheme which delivers an outcome, but there are alternative schemes which could be used. Some of these deliver better outcomes, some improved efficiency, some are worse. For an incentive to work, it must encourage a rational company to make the “right” decision.

A2 Our approach to assessing incentives



A2.1 What is the "right" outcome?

We have used the following criteria for assessing the results:

- The right outcomes for customers (in terms of both bills and services) and the environment.
- Delivery at least whole-life cost , without bias towards capex or opex
- Encouraging innovation.
- Achieving the right approach to risk.
- Appropriate returns for investors.
- Practicality.

A2.2 Rational company decisions

The model is measuring the effect of financial incentives and therefore we need to assume that the "rational" company decision is based on profit-maximisation.

Of course, there are many circumstances in which companies do not select the approach that will yield the greatest profit. There are other, reputational effects which could come into play, but these are difficult to quantify in a model.

Reputational effects are powerful, but we think they will usually carry more weight if they are accompanied by some financial incentive. Where the two go together, reputational incentives will tend to amplify the impact of relatively small financial rewards or penalties.

A3 Cost performance models

The design of the menu in all cases is based upon Ofwat's Capital Incentive Scheme for PR09. This means that it includes the same variables to drive the outcome, unless stated otherwise – for example, in most results we retain the same rewards and penalties for a given level of performance, although we think that the share allowed to the company should be increased to 45 or 50%, as recommended in the CEPA report. Later in the report we look at the impact of changing some of these parameters – for example, the skew towards outperformance in the ex-post incentives.

We have tested four possible models for cost performance:

CP1 Current approach

For the purpose of modelling, we summarise the current system as follows:

- Opex allowances are allowed pound for pound in revenue
- For capex a company is allowed depreciation over 15 years and earns a return on the balance in the Regulatory Capital Value.
- A 5 year menu for capex (separate menus for water and sewerage)
- Opex allowances for the following period are based on a roll-forward of current costs.
- There is a rolling incentive allowance, whereby companies can keep the benefits of incremental opex savings for 5 years.
- Opex is subject to a top-down efficiency assessment based on the costs of the frontier company. For modelling purposes, we assume that the frontier company's costs do not move over the period, so any change a company makes will increase or decrease its distance from that benchmark.
- For opex increases, the company would be expected to "catch up" 60% of the difference over the following regulatory period. Conversely, a company which saved opex could expect its efficiency challenge to be reduced by a similar amount (unless the company was already at or below the frontier).
- Capex is subject to a unit cost challenge. If a company spends more capex in one period, there is not a mechanistic impact on the efficiency challenge it can expect in the next review.
- Actual capex over 5 years is compared to Ofwat's baseline, and this ratio generates rewards and penalties.
- In the end of period true-up, additional capex is included in the RCV, whereas additional opex in period is not.
- Inflationary effects – including differences between COPI and RPI - are ignored.

CP2 Five year totex menu

This is close to the approach adopted by Ofgem. In our modelling, we have assumed the following:

- Ofwat sets a baseline with a split between "Pay As You Go" (PAYG) expenditure, which is allowed pound for pound like opex, and capex.
- Deemed capex earns a return and companies are allowed depreciation in revenue, as above.

- Total expenditure over the 5 years is compared to Ofwat's baseline and this ratio generates rewards and penalties through the menu
- In the end of period "true-up", the difference between the total expenditure of the company and Ofwat's allowance is adjusted through the RCV.
- For this purpose, the split between totex deemed capital and PAYG is set in proportion to the baseline. So, in our notional company, 50% of actual expenditure is compared against 50% of Ofwat's allowance and adjusted through the RCV, regardless of the actual split. We set out some examples of this mechanism in section A10.1.
- We assume that there is a revised approach to the assessment of efficiency which means that additional opex is not subject to a mechanical catch-up challenge. This report does not examine how this might be done – it is the subject of studies being undertaken for UKWIR and others. We just assume that the new approach is effective in countering the incentive effects on opex efficiency.
- Inflationary effects are ignored. We assume that the recommendations of the UKWIR report on alternative measures are implemented – i.e. COPI inflation is dropped and all expenditure is indexed with RPI. We think it would be difficult to implement a totex approach without doing so.

CP3 Weighted totex menu

This adapts the totex model as described above to reflect the continuing impact of opex increases beyond a single review period:

- Ofwat's allowed expenditure takes account of the actual mix of expenditure in the company's business plan. It is still challenged on the basis of totex efficiency, but the baseline includes PAYG which is in proportion to the company's assumptions, after challenge.
- When assessing the ratio between the company's business plan and Ofwat's assumptions, opex (PAYG) is assigned a weighting to reflect its continuing impact. This could be done either by looking at the present value of the opex over 15 years and the capex over 5, or by assigning a multiple of 2.4 to opex, which has broadly the same effect. We discuss the merits of the latter approach later in the report.
- At then end of the period, actual expenditure is compared to Ofwat's totex assumptions. The same weighting is applied to actual opex / PAYG to determine the outturn ratio, for the purpose of rewards and penalties in the menu.
- The true up operates in exactly the same way as in the second menu.

CP4 Separate capex and opex menus

Another possibility is the creation of separate menus for opex and capex that had the same incentive properties. The advantages of this option would be to address some shortcomings of the totex approach, for example:

- It could avoid the difficulties associated with a totex efficiency assessment
- It could provide better incentives for opex efficiency, which is encouraged by the rolling opex incentive Ofwat operates at present, but are removed in a straightforward menu.

Although it is more difficult, our work suggests that a change to the efficiency assessment is necessary for any of the alternatives, to address the imbalance between capex and opex incentives.

A4 Summary of regulatory and financial effects considered

The modelling includes the following effects arising from choices that a company might make:

A4.1 Menu and cost performance incentives

Menu "honesty" incentive (ex-ante income) - in most scenarios we have modelled a company position where the business plan is in line with Ofwat's baseline, so that the ex-ante position is neutral. In Ofwat's current menu design, this is a ratio score of 100. However, we have looked at the interaction between the "honesty" incentive and company behaviour where there are multiple menus for each service.

Menu cost performance incentive (ex-ante income) - this is the menu incentive arising from the ratio between outturn expenditure and the (adjusted) baseline.

Impact of required efficiency – this is the impact of the catch-up efficiency for opex. As discussed above, it is only factored into our assessment of the current approach because we assume that any new totex approach to efficiency is less mechanistic.

Gain / (loss) in period – this is the difference between the revenue allowance for the original scheme included in the Final Determination (for example, allowed depreciation and returns for capex), less the company's actual expenditure (which might be opex in some scenarios).

RCV true-up – this is the impact of the true-up on future returns. Since the assessment period is 15 years, this is the present value of 10 years' returns on the adjustment to the RCV at the end of the period.

In a fully NPV-neutral menu, these last two effects could be eliminated. The gain or loss in period could be removed because all incentives and penalties would be captured through the reward or penalty score. The difference between the allowance and actual performance, multiplied by the incentive strength, would determine all effects and the true-up would offset all differences between the allowance and outturn.

We have included this effect because not all menu designs capture such effects perfectly. When some expenditure is within the menu and some is not (as with the current system), the menu cannot capture all incentive effects.

Where all expenditure is included within the menu, the effect of the RCV true-up could also be excluded.

In theory, the returns available through the RCV could also be excluded because returns invested at the cost of capital only represent normal profit, which the investor could have made if their money had been invested elsewhere. But we do not think normal profit can be ignored in all cases.

In the current regulatory regime one type of expenditure earns a return and another does not. The economic logic above applies in a conventional business, where a standard net present value analysis would be used to assess an investment.

All cashflows, including the continuing opex, would be taken into account when assessing whether it was profitable. But the level of revenue or profit earned would not be linked to the amount that was capitalised – it would be based on the price that customers would pay for the goods or services in a market. For future opex or "pay as you go" companies can only deliver profit by reducing costs – otherwise they only achieve cost recovery.

Differences between allowed depreciation and the corrected values allowed through the RCV true-up could also mean that the adjustment is not neutral. The process described in IN12/10 was to adjust gross of depreciation. Taken at face value, this would create a permanent difference in the RCV.

We understand that Ofwat will be putting forward an alternative approach, which is intended to make the true-up NPV-neutral. While we do not know how this will work (because it was not available at the time of writing), for the purpose of this report we have assumed that it achieves its objective for expenditure that is included within the menu.

A4.2 Outcome or output incentives

Shortfall – this is the impact of Ofwat's existing (penalty-based) approach to outputs or outcomes. When a company is shortfalled, the ex-ante ratio is recalculated. There is a one-sided adjustment, reducing the baseline. Ofwat has stated that shortfalls will be implemented through the menu; we have assumed that this is calculated as if the company's ex-ante income had used the new ratio.

Example 1: The notional company does not deliver a scheme that was included in the baseline. Its ex-ante menu score is revised, and it earns the same revenue penalty that it would have received if Ofwat had not included the scheme in the original baseline.

	Original	Penalty	Revised
Baseline	£1,000m	(£50m)	£ 950m
Plan	£1,000m		£1,000m
Score	100.0		105.3
Penalty	(PV)		£ 3.6m

Outcome incentive (independent of menu) – this mechanism does not exist at present. In the scenarios including outcome incentives, we assume this they are delivered through an income adjustment in the next regulatory period. The company is allowed a share (30%) of the difference in benefits delivered. Benefits are based on Willingness To Pay values; in different scenarios customers' appetite for further improvement varies. Penalties are calculated through the same mechanism – that is, the company receives an income penalty based on WTP for the outcome that a company has not delivered.

Example 2: The company delivers more service than assumed in the baseline. Customers value the extra service and Willingness To Pay values for the additional output give a NPV of £9.6m. The company is allowed a 30% share of the additional benefits (£2.9m), which is converted to an annuity over the following 5 years (£0.8m per year in revenue).

Outcome incentive (through menu) - in early modelling, we made the outcome incentive entirely separate from the menu. We thought that it would be too difficult to calibrate rewards and penalties properly, because we did not think that the true-up was NPV-neutral.

As discussed above, we are now assuming that Ofwat's (as yet undisclosed) process will achieve this objective. A neutral adjustment for costs means that the menu could also be used for outcome incentives.

The shortfall approach, where an adjustment is made to the ex-ante menu, is not suitable for this purpose. This is because of the interaction between outcomes and the two elements that the menu is seeking to address: cost performance, and the original level of "honesty" in the company's business plan. However, it would be possible to achieve a balanced approach by adjusting the outturn menu to take account of the additional benefits delivered (or the under delivery, as the case may be).

In this approach, the WTP value of the variation in outcomes would be reflected through the menu score – but only for the purpose of calculating penalties and rewards (the RCV would not be affected).

Example 3: As in example 2, the company delivers higher service than assumed in the baseline. The present value of the additional benefit (£9.6m) is equivalent to that of an additional £10m capital in the first year of the AMP. The company's outturn position is adjusted *downwards.* It is as if it had not spent £10m – an efficiency that is delivering more output for the same cost (rather than the same output for less cost). Assuming a symmetrical menu, it would earn the same reward as in the previous example.

	St\art	Reward	Rev.
Baseline	£1bn		£1bn
Outturn	£1bn	-£10m	£990m
Score	100.0		99.4
Reward	(PV)		£2.9m

A5 Cost scenarios

We tested these menus against a number of potential cost scenarios before looking at the impact of outcome incentives

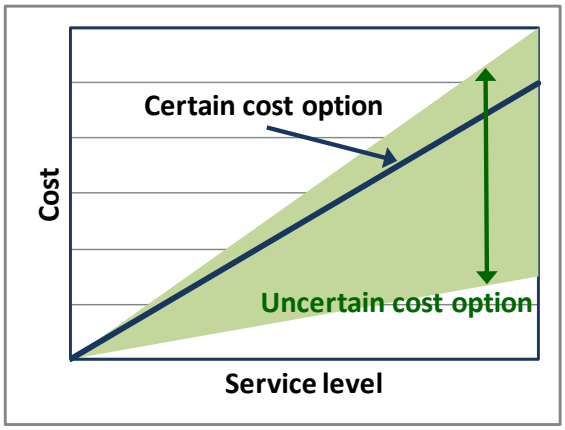
Scenario 1: certain versus uncertain costs

In this case the company has included a scheme with known costs within its original business plan, which has been accepted by Ofwat to be included in its price determination. The certain approach is assumed to be a capital scheme such as a treatment works – greater certainty over cost and outcome is one of the reasons why companies might favour capital solutions.

The company has another option which could be cheaper, but its cost is uncertain. This might be an opex solution such as catchment management.

For the original scheme, we assume a capital scheme costing £50m with a cost / benefit ratio of 1:1 – the Net Present Value of benefits over 15 years is equal to the cost. The capital scheme would be built in year 1 of the period.

- At best, the opex scheme could cost 50% less (in NPV terms).
- At worst, the opex scheme could cost 20% more.
- The average position is a saving.



For this case the alternative delivers the same benefit (the effectiveness of catchment management might also be variable, but we look at this in other scenarios)

S1 - NPV with average costs

Original (capex) solution	Alternative (opex solution)	Benefit / (Disbenefit)
£47.8m	£40.7m	£7.2m

The "right" outcome here should be that the menu *encourages* the alternative solution. On average, the opex solution is 15% less expensive, and a rational company should adopt it – unless it is very risk averse.

S1 - results with alternative menus

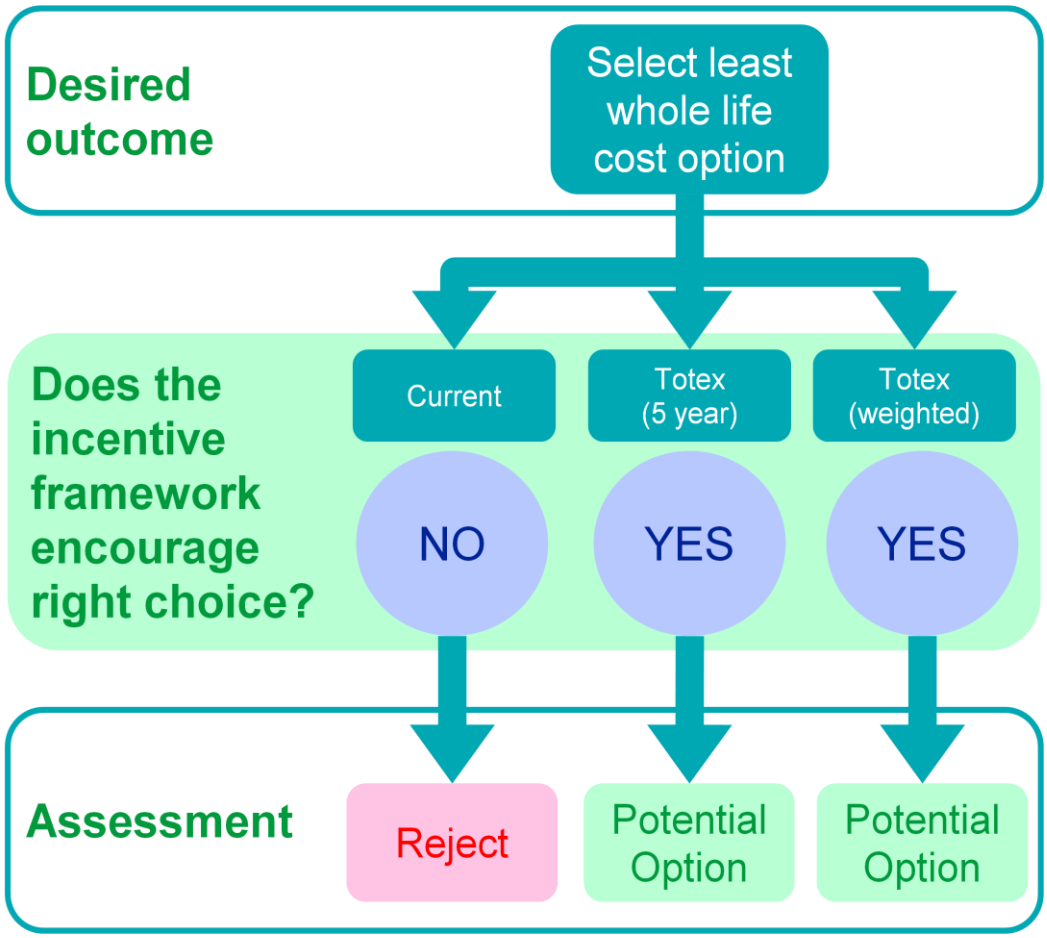
	NPV over 15 years, £m		
	Current	**5-year totex**	**Weighted totex**
Menu: cost performance	10.6	6.6	1.1
Income less cost in period	4.7	4.7	4.7
Impact of true up	(21.3)	(4.7)	(4.7)
Required efficiency	(9.5)	-	-
	(15.5)	**6.6**	**1.1**

Two of these approaches provide incentives for the company to carry out the alternative scheme, which should be the "right" outcome. With the 5 year menu, there is very strong encouragement; with a weighted menu the effect is much weaker – lower than the present value of the benefits on a basic NPV assessment. This perhaps illustrates a point which CEPA made about the need to strengthen the incentives available through the menu (to around 45-50%). However, for the purpose of this exercise, we have not varied the parameters of the menu Ofwat used at PR09.

Our assessment framework leads us to reject the current approach, which strongly discourages the uncertain opex solution.

On the assumption that the Ofwat's true-is effective in neutralising revenue effects within the menu, in the two totex menus the net reward is determined by the incentive framework. But under the current framework, opex is not captured. The financing costs of saving capex are neutralised, but there is no compensation for the additional opex incurred.

This is a powerful disincentive to opex solutions and, although significant, a change to efficiency assessment alone would not be sufficient



Scenario 2: capex versus opex

In the first scenario, we noted that both the 5 year menu and the weighted menu would encourage a beneficial option, but the former gave much stronger encouragement. What if the company knew that the opex solution would be more expensive? Using the same assumptions, we tested the two menus against an opex alternative towards the upper end of our range.

The "right" outcome here should be that the menu *discourages* the alternative solution. On average, the opex solution is 15% more expensive, and a rational company would not adopt it – unless the regulatory framework distorts decision-making

S2 – Inefficient opex solution

Original (capex) solution	Alternative (opex solution)	Benefit / (Disbenefit)
£47.8m	£55.0m	(£7.2m)

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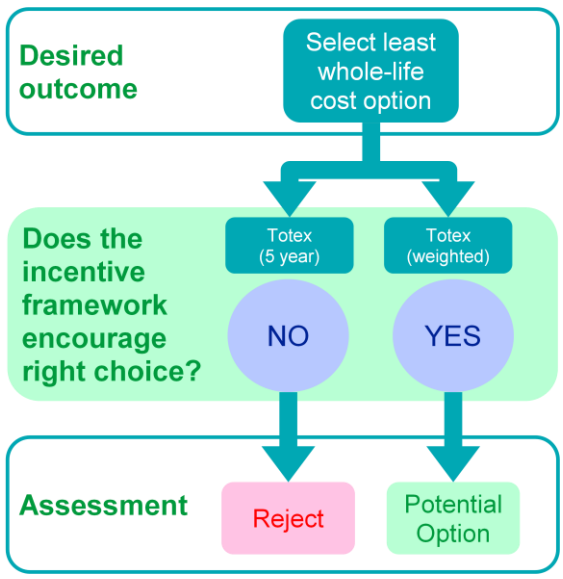
S2 - results with alternative menus

	NPV over 15 years, £m	
	5-year totex	**Weighted totex**
Menu: cost performance	5.2	(1.1)
Income less cost in period	(1.2)	(1.2)
Impact of RCV true up	1.2	1.2
Required efficiency	-	-
	5.2	**(1.1)**

This shows the clear limitation of a single period totex approach. Because it focuses on total expenditure in a 5 year period, the company is encouraged to concentrate on short-term cost saving – even if this has negative consequences.

There are many instances in which this would encourage the company to do the "wrong thing". For example, any "spend to save" scheme – where capex could be used to reduce future operating costs – would need to have a payback of less than 5 years to be considered (particularly given the construction time before opex benefits could be realised).



A6 Menu incentives for the accuracy of business plans

A6.1 Honesty incentives

Most of scenarios we have considered deal with company choices *after* a periodic review has been finalised. However, one of the reasons for using menus is supposed to be to encourage honesty in business planning.

For the "truth-telling" properties of the menu to work, the company has to be able to exercise a choice, once it has seen Ofwat's baseline assumption. It can then decide how much of its proposals it wants to have included in the determination, and how far it is willing to take a risk in order to (potentially) earn a greater reward.

If our notional company is allowed a choice, the "honesty" (ex-ante) incentive of a 5-year menu encourages short-term decision making in much the same way as the "cost performance" (ex-post) effects illustrated above.

Scenario 3: spend to save scheme

With our notional company, we assume that the original capex scheme (costing £50m) is a "spend to save" scheme will save the company just under £5.8m per annum – for example, a renewable energy scheme. In present value terms this is very positive, but it will not pay off within the next regulatory period. The company could choose to cut this scheme in order to reduce total expenditure over the next 5 years.

In this scenario, we assume that the company starts with a ratio of 100, for simplicity. However, it is much more likely that a company would try to cut schemes in response to a cost challenge from Ofwat (that is, if it had a ratio of greater than 100). The company also follows through with its choice – if it cuts the scheme its outturn opex is in line with its forecast.

S3 - NPV of cut in renewable energy

Original (capex) solution	Alternative (opex solution)	Benefit / (Disbenefit)
£47.8m	£62.2m	(£14.4m)

This shift between capex and opex is more extreme than the outturn case illustrated above – if the scheme is cut from the programme, the present value of the opex incurred will be 30% higher than the renewable energy plant. A rational company would not choose this unless the framework encouraged it to do so. On the assumption that the "true-up" is effective, we ignore this and the gain in period from this point onwards.

S3 - results with alternative menus

		NPV over 15 years	
		5-year totex	Weighted totex
Menu score: "honesty"	Ratio	97.9	100.9
Menu score: performance	Ratio	97.9	100.9
Menu: "honesty"	£m	1.5	(0.6)
Menu: cost performance	£m	4.7	(2.2)
	£m	**6.3**	**(2.8)**

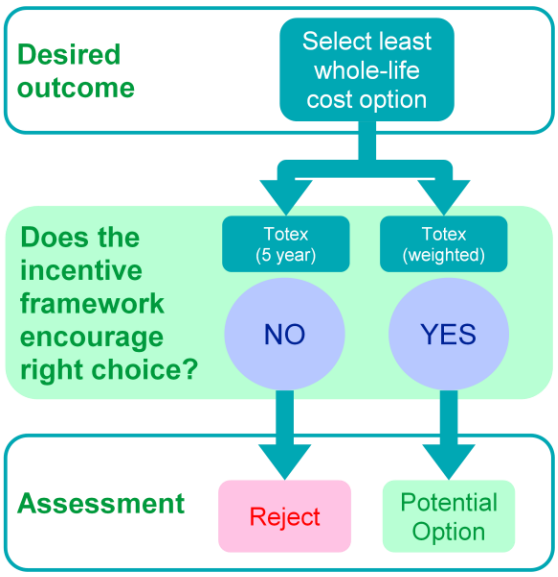
Numbers may not add due to rounding

The result here shows that, with a 5-year menu, there are even more benefits for the company if it can identify this "saving" up front – so much so that it could benefit with a whole life cost increase of more than 100%.

In addition to the up-front reward for an "accurate" business plan, the company would receive an enhanced incentive rate if its actual performance was equal to, or better than, its "bid".

By contrast, the weighted totex menu strongly discourages short-term cost cutting of this nature. Both the honesty (ex-ante) and performance (ex-post) scores are reduced if the scheme is cut.

Applying our framework:



A6.2 Application of menus at PR09

At PR09 the menu did not actually allow the "honesty" properties of the menu to operate. Because the baseline was settled after the company's final submission, Ofwat in effect chose where each company would sit on the menu.

Ofwat also set its own view of costs at the centre of the menu, meaning that a company had to match this ratio in order to break even. As it is natural for a regulator to challenge a company's view of costs, it was almost inevitable that Ofwat's view of costs would, by and large, be lower than the company business plans.

As a result of these two measures, most companies therefore had ratios of more than 100 and suffered a penalty.

The sequence of decision-making is important in ensuring that the "honesty" properties of the menu approach function properly. We have set out our views on some alternatives, and our preferred option, in section 3.5. The process used at PR09 could not be repeated in any event, because there will be no Draft Business Plans for PR14.

A7 Number of menus

The wholesale consultation looked at a number of options for dividing costs between different menus. In the modelling for this report so far, we have not examined the incentive properties of all these alternatives. In all of the illustrations we have looked at a single service, but we assume that for WaSCs there would be menus for each service.

In principle, the number of different menus within each service should not matter if incentives are balanced. In practice, no incentive system will be perfectly balanced in all circumstances. In our assessment, the weighted menu is better than the others. But we recognise that it has drawbacks. It is better for dealing with continuing opex and capex effects, but less well-suited to dealing with one-off savings.

In general, where there are fewer cost classifications, there is less potential for incentives to be distorted through cost allocations. There is limited potential for costs to be reallocated between the water and sewerage in order to exploit a regulatory benefit. Where shared services are allocated, this is quite obvious and easy to challenge if it appears inappropriate.

With more menus – for example, base and enhancement menus – there are a number of boundaries which could be exploited. A company might experience one incentive rate on enhancement and one on base service. This might make it advantageous to outperform in one area at the expense of under-performance in another.

Allocation problems become more acute if incentives are asymmetric. At PR09 this was the case for both capex and opex.

The opex incentives are asymmetric since there is no regulatory penalty for under-performance on a service, but there are incentives for outperformance through the opex "roller". The CIS menu was also deliberately skewed to reward outperformance more strongly than it penalised under-performance. It is therefore possible for a company to receive positive incentive allowances if it under-performs on one service but out-performs to by an equal amount on the other.

We think a company has limited scope to choose this outcome when incentives are for whole services (though it may happen). There are also intrinsic, non-regulatory reasons why a company would not necessarily want to under-perform on either service. However, with in-service allocations, the scope for gaming increases.

We can illustrate this by looking at the effect that multiple menus could have on company decision making.

Scenario 4: allocation between menus

Using the notional company, we imagine that it has two menus for each service – one for base and one for enhancement as in Ofwat's wholesale consultation option B3.

- The company has included £500m opex and £500m capex for each menu. Therefore the company has double the programme used in the previous examples.
- Ofwat agrees with the company's programme and therefore sets a totex programme of £1bn for each menu.
- The company starts with an "honesty" (ex-ante) score of 100. The base

position is that the company receives no rewards or penalties.

- The menu has the same design as the PR09 Capital Incentive Scheme. Therefore it is asymmetric, giving stronger rewards for out-performance than for under-performance.
- The process works in the way that we describe above. The company is able to choose its final position on the menu by bidding against the baseline.
- The company chooses to move £50m capex between the two menus. This is pure allocation, with no real efficiency saving. It then spends in line with this assumption.
- Since we are only looking at the reallocation of capex, we have used a 5 year menu. Other effects (such as RCV true-up) will be neutral and can be ignored.

S4 - results from allocation between menus

		Menu 1	Menu 2	Overall
Menu score: "honesty"	Ratio	105	95	100
Menu score: performance	Ratio	105	95	100
Menu: "honesty"	£m	(3.6)	3.4	(0.1)
Menu: cost performance	£m	(10.1)	11.7	1.5
	£m	**(13.7)**	**15.1**	**1.8**

Numbers may not add due to rounding.

The company gets an incentive bonus, even though, at the overall level, its performance is neutral and should earn no reward.

It is clear from this analysis that separate menus could enable gaming, and that most of the benefit would arise from the cost performance incentive.

This will be partly due to the impact of the asymmetry of the menu. However, amending this aspect of the menu design would not be sufficient to address the problem, as we illustrate in the following scenario.

Scenario 5: choice in allocation of efficiency savings

In this example, our notional company has been assessed at 105 on each of the menus. In this instance, it has a *real* choice as to where it makes savings.

- For this example, we assume that the menu operates in the way that we have suggested – that is, the company is able to exercise a choice *after* Ofwat has set the baseline.
- We have also amended the menus to make them symmetrical.

In its choice against the baseline, the company could save £50m capex. This could be:

- Allocated evenly between the two menus; or
- Allocated to a single menu.

Following the review, it identifies further savings of £50m. It has the same choices as before.

S5 – results if savings are spread evenly

		Menu 1	Menu 2	Overall
Menu score: "honesty"	Ratio	102.5	102.5	**102.5**
Menu score: performance	Ratio	100.0	100.0	**100.0**
Menu: "honesty"	£m	(1.7)	(1.7)	(3.4)
Menu: cost performance	£m	(0.1)	(0.1)	(0.2)
	£m	**(1.8)**	**(1.8)**	**(3.6)**

S5 - results if saving are concentrated in 1st menu

		Menu 1	Menu 2	Overall
Menu score: "honesty"	Ratio	100.0	105.0	**102.5**
Menu score: performance	Ratio	95.0	105.0	**100.0**
Menu: "honesty"	£m	-	(3.6)	(3.6)
Menu: cost performance	£m	10.6	(10.1)	0.4
	£m	**10.6**	**(13.7)**	**(3.1)**

Numbers may not add due to rounding

Expenditure at the "bid" stage (ex-ante) and the outturn (ex-post) is identical – as shown by the overall ratios highlighted in red. However, even with symmetrical menus it is more advantageous for the company to concentrate its cost savings in one area if it can.

The reason is the interaction between the "truth-telling" incentive and performance. In the second instance, the company is assessed as "honest" because it matches the baseline. This allows it an increased incentive rate on its actual expenditure.

As noted, we do not think this is a huge problem with a menu for each service because there is limited scope for reallocation between services. But if a company could earn rewards by manipulating allocation within service, the problem would be more acute.

Extra menus also appear to be at odds with:

- The aim of totex – being blind to the nature of expenditure in order to equalise incentives; and
- The objective of simplicity.

There would need to be a great deal of scrutiny over the way that costs were allocated, or excluded from the menu.

The benefits also seem to be limited:

- We recognise that Ofwat will need to take account of the impact of enhancement to *assess* efficiency on a totex basis. But we do not think that separate menus are required in order to do so.
- Applying different efficiencies to enhancement operates against the objective of equalising incentives.

We recommend that all menus should be symmetrical, and that the number of menus should be limited to one per service.

A9 Strength of incentives

Without amendment, a weighted menu reduces the incentives for cost saving below the notional share (30% in the current menu). This is because the current menu is designed to measure performance on a 5-year basis. If the menu score takes into account opex from future periods, then each pound of saving will have less impact on the ratio.

For example, if a company spent £468m capex against a baseline of £500m, it would score 93.6 using a simple sum of the expenditure over 5 years. Within the current CIS where the present value of opex is not considered, this score would be sufficient to deliver an incentive rate of 30%. In the example below, opex savings of the same magnitude deliver a score of 96.4. If we apply the reward formula to the baseline over only 5 years, this would not give a 30% reward because the method does not take account of effects beyond the current period.

Example: continuous opex saving without weighted baseline

17% reward	**1**	**2**	**3**	**4**	**5**	**6-15**	**5 year sum**	**NPV Score**
Baseline opex	**200**	**200**	**200**	**200**	**200**	**-**	**1000**	**1513**
Baseline capex	**190**	**190**	**190**	**200**	**200**	**-**	**468**	**1004**
Baseline	**200**	**200**	**200**	**200**	**200**	**100**	**1000**	**1513**
Outturn opex	90	92	94	**96**	**96**	**96**	468	1020
Outturn capex	100	100	100	100	100	-	500	439
Outturn	**190**	**192**	**194**	**196**	**196**	**196**	**968**	**1459**
Saving	8	8	6	4	4	4	32	54.1
Reward @96.4	2.1	2.1	2.1	2.1	2.1		10.7	9.4

Numbers may not add due to rounding

Assuming an honesty score of 100 for the business plan, if we apply the reward formula to the 5-year baseline, we get the following incentive each year:

(100 - 96.4) x 30% x £200m baseline = £2.1m annual reward.

Over 5 years, this reward has a present value of £9.4m. The savings, as seen above, have a present value of £54m. The reward represents only 17% of the savings rather than the 30% intended.

The solution is to apply a weighting to opex (or PAYG) within the baseline for the purpose of the reward as well as the menu score.

With a discount rate of 4.5%, the effect of using a 15-year NPV is to give opex a weighting of around 2.4 relative to capex. This is shown in the table below:

	Value £m	**NPV(for menu)**
Opex (15 years)	100 (per annum)	1074
Capex (5 years)	100 (per annum)	439
Ratio		2.45x (to 2dp)

If we apply a multiplier of 2.4 to the opex element of the baseline, the reward for performance can be maintained at 30% (or whatever level is desired).

For the purpose of setting rewards, the baseline value becomes:

£100m + £100m x 2.45 = £344.6m

If the same reward formula is then applied, the reward becomes 30% of the saving.

This change would not over-reward one-off savings or capex savings. For example, if the company saved only £10m opex in the first two years, the value carried forward from year 4 onwards would not be changed. In this event, the ratio score would be 98.8, and the reward would remain 30% of the savings. The rewards for 1-off opex savings and capex savings would be the same.

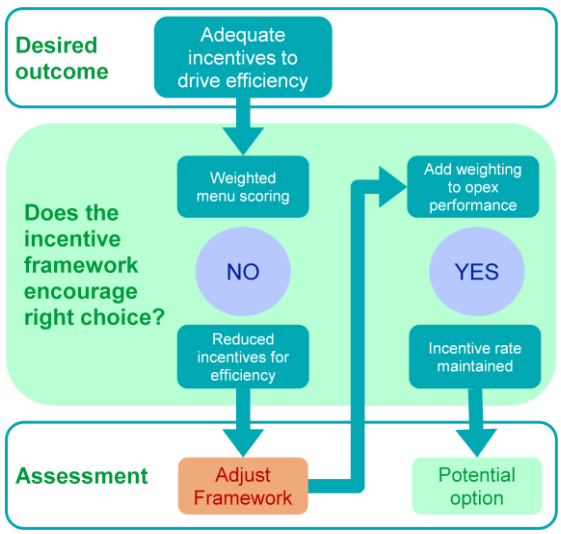
Example: one-off opex saving with weighted baseline

30% reward	1	2	3	4	5	6-15	5 year sum	NPV Score
Baseline opex	**200**	**200**	**200**	**200**	**200**	**-**	**1000**	**1513**
Baseline capex	**190**	**190**	**190**	**200**	**200**	**-**	**468**	**1004**
Baseline	**200**	**200**	**200**	**200**	**200**	**100**	**1000**	**1513**
(for rewards)	345	345	345	345	345			
Outturn opex	90	90	100	**100**	**100**	**100**	468	1055
Outturn capex	100	100	100	100	100	-	500	439
Outturn	**190**	**190**	**200**	**200**	**200**	**100**	**968**	**1494**
Saving	10	10	-	-	-	-	20	18.7
Reward @98.8	1.3	1.3	1.3	1.3	1.3		6.4	5.6

Numbers may not add due to rounding

This mechanism still presents weaker incentives for saving opex than the current approach. However, the reduction could be offset by increasing the incentive rate available through the menu, in line with the recommendations in the CEPA report[11] for Ofwat – raising the 30% incentive available at a ratio of 100 to between 45% and 50%.

We acknowledge that there were differences in the construction of Ofwat's CIS baseline, which affected the strength of the incentive available at 100; Ofwat adopted an average efficiency approach whereas Ofgem set its baseline at the assessed efficiency frontier. Thus there are reasons why the incentive rate for matching the baseline *should* have been different. However, because Ofwat's baseline also included one-sided changes in scope it did not represent an industry average position.



[11] Cambridge Economic Policy Associates Ltd, *Incentives and Menus* (July 2012)

A10 The split between capex and opex or "pay as you go"

Setting the split between capex and opex is not an incentive as such. Like the notional gearing that Ofwat has historically used in financeability tests, there is no obvious transmission mechanism linking Ofwat's assumption to the desired company behaviour.

The actual effect of defining an up-front split of capex and opex – as in the "cap and collar" proposals - will be to vary the amount of revenue that a company receives in period. This will have an incentive effect – but if the objective is to discourage capex bias, this would actually be the opposite of the one intended.

Since Ofwat's regulatory treatment will have no influence on a company's actual accounts:

- A high capex company will receive extra revenue, although it will not have expensed any more opex through its Income Statement during the period.
- To an investor, looking at statutory accounts, it will appear that the company is earning a higher return.
- To ratings agencies looking at cashflow, it will appear that its ratios are more robust.
- In effect, the high capex company will be rewarded for any bias and encouraged in this behaviour.
- If capped, a high opex company will suffer the opposite effect – it will be punished for *not* being biased.

In the example illustrated in the table below, the industry average opex for the segment is 60%, which would mean a cap at 70% and a collar of 50% under Ofwat's indicative proposals.

Plan	Company A (capex heavy)	Company B (average)	Company C (opex heavy)
Opex £m	100	300	400
Capex £m	400	200	100
Total £m	500	500	500
Opex %	20%	60%	80%
Assessment	Below average	Average	Above average
Result	Collar Applies 50% treated as "fast"	No change	Capped 70% treated as "fast"

As a result of the changes, the following "fast money" is allowed. The balance is capitalised. A simple one-year depreciation allowance of 20 years has been included on all capex and a pre-tax return for illustrative purposes.

Allowed revenue	Company A (capex heavy)	Company B (average)	Company C (opex heavy)
Fast money allowed	250	300	350
Depreciation @20 years	13	10	8
Return (6.3% pre-tax)	10	8	6
Revenue	**272**	**318**	**363**

In this example, we assume that company spending patterns arise for historic reasons – they are, broadly speaking, a legacy of the nature of the networks inherited at privatisation.

For example, companies with high capex have been required to implement large quality programmes. For example:

- The capital programme at Severn Trent has, since privatisation, been relatively small because it has no coastline.
- Conversely, capex in the South West has been extremely high for the same reason.
- Water only companies may have may have smaller capital programmes and higher opex because smaller networks may be less "average" – the more different types of area a company serves, the less likely it is that a particular extreme will have a massive influence on overall costs.

If we think that the spending patterns of our example companies cannot be amended radically in the short-term, then an external observer looking at each company's accounts sees the following:

Actual IFRS Income Statement	Company A (capex heavy)	Company B (average)	Company C (opex heavy)
Income	272	318	363
Opex (actual)	(100)	(300)	(400)
Depreciation of actual capex	(20)	-10	(5)
Profit	**152**	**8**	**(42)**
Average capital value	158	127	95
Return on capital	96.3%	6.3%	-43.7%

Far from encouraging innovation, this seems to strongly reward companies which spend more capex than others – probably for reasons that are unrelated to their preference for capex.

Companies which spend more capex at present would receive cash from customers more quickly than it would be expensed through their statutory accounts. To external observers, it would appear that they were being rewarded. This seems the opposite of the intended reason for introducing totex.

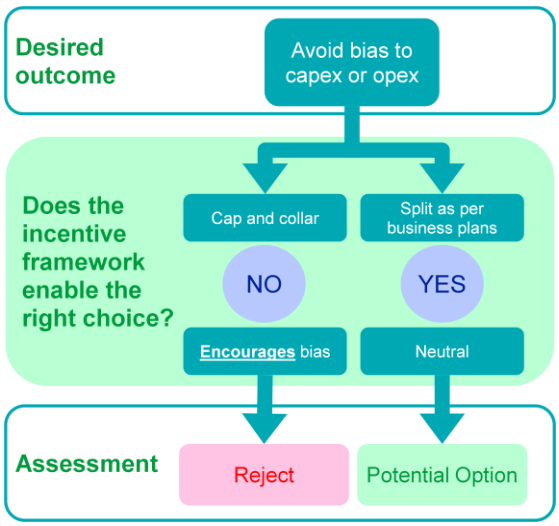
A company should not be rewarded or penalised because its base costs have a different mix from the norm – it should be encouraged to exhibit the right behaviour **in future** (i.e. adopting least whole life cost solutions).

The split of opex or "pay as you go" expenditure and capex should be based on the company's business plan, after Ofwat challenge (i.e. the baseline), or on an agreed basis if the plan is suitable for "fast tracking".

If a totex approach is adopted, the capitalisation rate should be based on the same (assumed) split – so that the value included in the RCV does not vary based on a company's actual spending patterns, only on the total expenditure in period.

The "cap and collar" analysis could be used only to challenge companies that put forward a capex – opex split that is outside a pre-defined range. We recognise that the extent to which the above impacts apply depends on the size of the range and the extent to which Ofwat

is prepared to accept company proposals after review. But we are concerned by the perverse consequences that would arise if a company's split was amended without some means of transmitting this into company action.



A10.1 Our proposed approach

In our view, the starting point for the split between Pay As You Go and capex should be company business plans. Unless the company was "fast tracked" – and we think that Ofwat should include this possibility in its approach – then the expenditure proposals would be subject to Ofwat review.

The "cap and collar" approach might be used as one method for challenging company plans – though we think it would be more fruitful to concentrate on the mix of incremental expenditure (where the company has more choice) rather than historic patterns.

If Ofwat set a baseline that differed from the company plan, the PAYG percentage in the baseline would be used as the basis for determining the future capitalisation in the RCV, regardless of company expenditure patterns.

For the purpose of assessing the menu score, the company's actual outturn expenditure would be used, in the actual proportions.

Example

The notional company has a 50% split in its baseline, as in the 8 scenarios that we have modelled. Its honesty score is 100, so this same proportion is used in the baseline. But if Ofwat had challenged, the company could be set a different mix to the one it had assumed in its plan.

In outturn, the company it implements a renewable energy scheme costing £50m, which saves £5m per year. In period, it spends £550m capex and £475m opex. Its PAYG split changes to 46%.

For the RCV, 50% of total expenditure is capitalised, in line with the baseline mix.

	£m		£m
Actual Totex	1,025	x50%	512.5
Base capex			500.0
True-up			12.5

For the purpose of menu rewards and penalties, the scheme is NPV-positive, so the future opex savings are taken into account

	£m	NPV £m
Baseline	1,000	1,513
Outturn	1,025	1,507
Menu Score		99.6

In most of this report, we have talked about opex as if it is synonymous with "Pay As You Go". Actual opex can be identified based on the split that is already required for accounting purposes, which is also the basis for Ofwat's reporting requirements.

Ofwat's PAYG split, however, might also include an element of Infrastructure Renewals Expenditure. Under UK GAAP a portion of this is charged to Profit and

Loss during the period; under IFRS it is treated as opex. At some point, companies will stop reporting under UK GAAP for statutory purposes.

Ofwat has not decided its future position on alignment with IFRS. If Ofwat maintains a distinction between IRE and operating expenditure in the regulatory accounts, then it would apply the NPV weighting to the UK GAAP definition of opex alone. The implications are:

- The PAYG split would not be the same as the split between capex and opex.
- The 15-year NPV weighting would not apply to all PAYG
- The value capitalised would not be the same as in the scenarios presented.

While this is not as “neat” as the simplified opex = PAYG models, we do not think it undermines the weighted model or makes the mechanism substantially more complicated.

A11 Outcome and benefit models

As we noted in the discussion of uncertain costs, another reason why companies might favour capital schemes is that they have greater control over the outcome. An opex solution such as catchment management might have uncertain costs and uncertain outcomes. It might take time for the alternative scheme to "bear fruit". If a company has a specific target which must be met within a defined time, it might choose the option that will guarantee that result. It is even more likely to do so if there is a penalty for failure, even if an alternative could be cheaper and / or deliver better outcomes for consumers.

Scenario 6: uncertain outcome

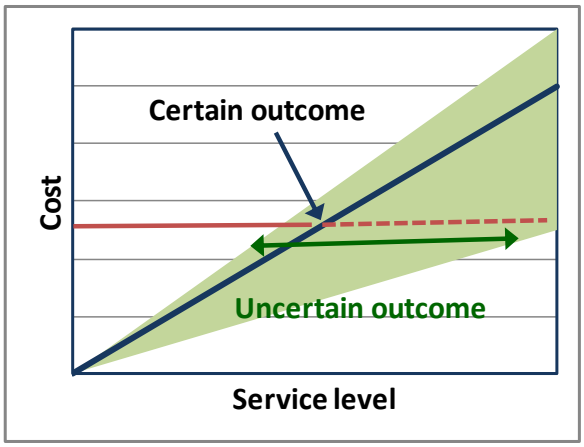
In this case, the notional company faces a similar choice as modelled before.

- The original solution is a capital scheme costing £50m. It has a cost / benefit ratio of 1:1 and will definitely deliver the outcome.
- The alternative (opex) solution will probably be cheaper. The range of cost variation is the same as in the first case (+20% to -50%).
- On average, the uncertain scheme will deliver the same benefit as the original choice that was included in the company's business plan.
- However, there is a 30% chance that the alternative will not deliver the target level within the assessment period.

S6 - NPV with average costs

Original (capex) solution	Alternative (opex solution)	Benefit / (Disbenefit)
£47.8m	£40.7m	£7.2m

Following the assessment process, we are now modelling using the weighted menu, which has now been made symmetrical. This is a cost beneficial choice. In the absence of outcome incentives, a rational company that is not risk averse would choose the alternative scheme.



We modelled this scenario against two possible penalty approaches and a symmetrical approach.

- Shortfalling (the current Ofwat approach to outcome incentives. We have made assumptions about the way this would be delivered through the menu.
- An income clawback approach, based on consumers' valuation of the benefits lost if the outcome is not delivered (Willingness to Pay).
- A symmetrical approach, also based on WTP. In this case, we have assumed that the company gets 30% of the WTP value as a reward or penalty.

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S6 – results with alternative outcome incentives

	NPV over 15 years, £m		
	Shortfall	**Clawback**	**Symmetrical**
Menu: cost performance	(3.2)	2.2	2.2
Outcome incentive	(0.6)	(6.4)	-
	(3.8)	**(4.2)**	**2.2**

If there is a 30% chance that it will suffer a penalty, then the company will have to factor this into its assessment of the best option. If we are averaging out the cost (which is probably lower) we must also take the average value of the penalty – or 30%.

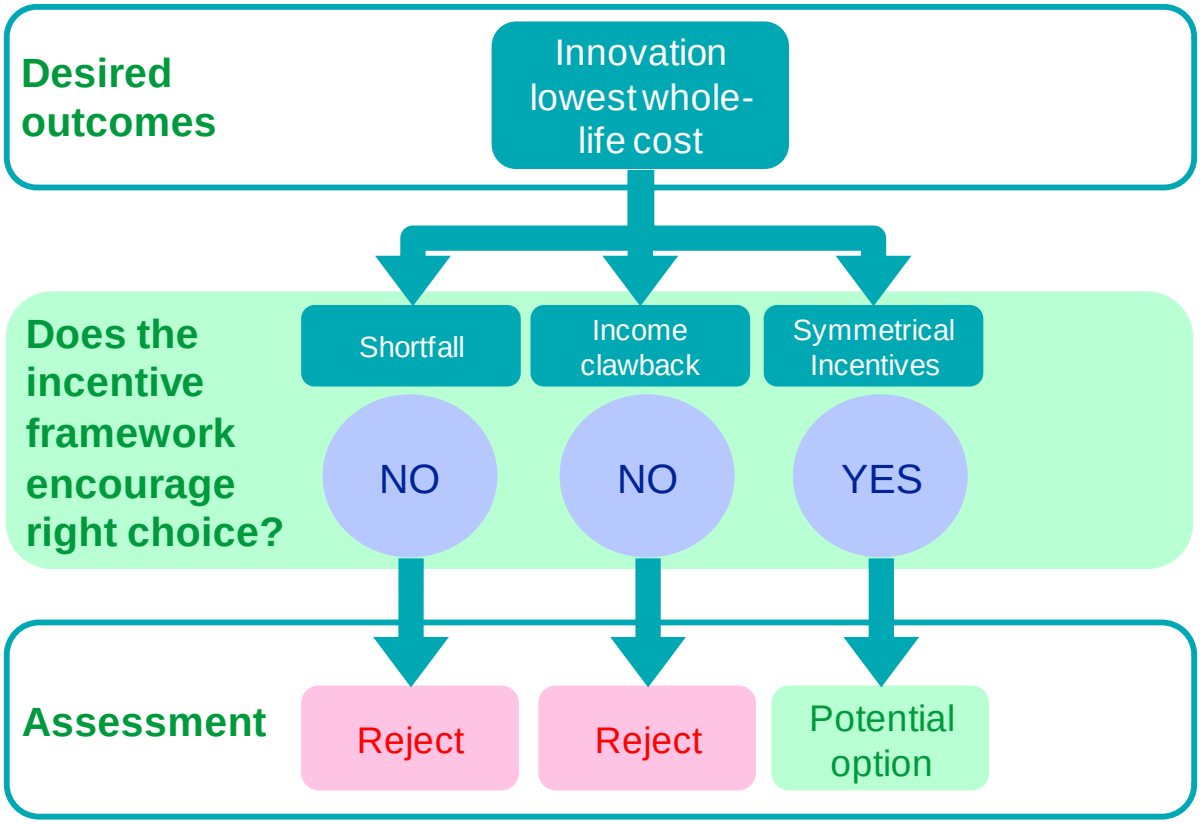
In the **shortfall** case, this translates to 30% of the value of the original scheme being removed from the baseline assessment as a one-sided adjustment. This has an impact on the assessment of the company's performance against the baseline – we have also assumed that there is a revenue effect calculated through the menu mechanism. This penalty is sufficient to deter the company from picking the beneficial option.

In the **clawback** case, the company must assume that, on average, it will lose 30% of the benefit value. This is actually a stronger disincentive than the shortfall. However, as noted earlier, we think that separate incentives based on benefit values are a are a better way to manage rewards or penalties. From our analysis of multiple menus, we have observed that there are interactions between the honesty and cost performance incentives.

If outcome incentives are added as well, it becomes increasingly difficult to calibrate the effect of the different incentives to deliver the right signals.

In the **symmetrical case**, no value for the incentive has been included. This is because, on average, the alternative scheme will deliver exactly the same benefit as the original – thus there should be no settlement. If the company under-delivers by 30% it will be penalised in proportion – but there is an equal chance that it will over-deliver by the same amount and earn a reward. Therefore its average case is based on the NPV of the costs.

An argument against symmetrical incentives would be that they could encourage inefficient over-delivery. But *penalties* could encourage inefficiency, as can be seen from the example above. Under a shortfall approach, the company is better off spending over 20% more if it can be certain of averting the penalty, and under the second approach this would be even higher. In both instances it would then end up with a non-beneficial outcome (since the original scheme had a cost-benefit ratio of 1:1).



Scenario 7: delivery of higher service

A problem with a penalty-based approach is that it encourages companies to do no more than meet the target that has been set. As noted above, it might be willing to go a little beyond the target to build in a safety margin and thereby reduce the chance of a penalty being incurred. However, if it over-delivers by too much, it must put itself at risk:

- The regulator may assume that it should be able to maintain the same level of performance going forward – making the company's challenge more difficult going forward.
- This risk is compounded if the regulator considers additional expenditure required to over-achieve as inefficient (which it may well be – as in the example above).
- In the current framework, this is a particular problem with opex solutions such as leakage. A company that voluntarily lowers its leakage target will never be able to raise it again – it will have a permanent increase in opex (with associated effects on its efficiency assessment).

It is always in the company's interest to argue for an easier target, rather than demonstrating what might be achieved.

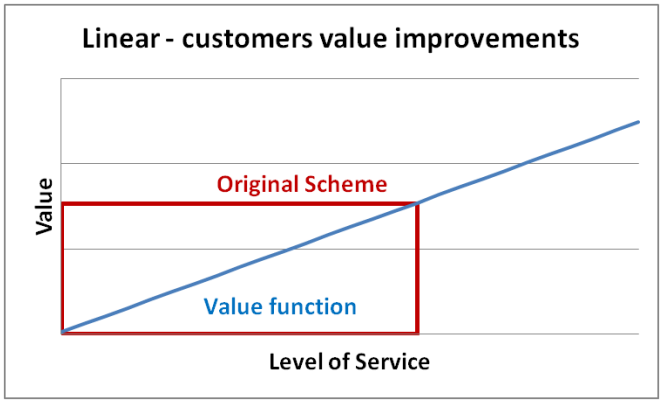
A symmetrical approach, where a company could earn a reward for improved outcomes, could encourage companies to set themselves more challenging targets. The concept is similar to the basic principle of RPI-X for costs – companies have an incentive to outperform, and in the long run this is to the benefit of customers who benefit from lower costs going forwards.

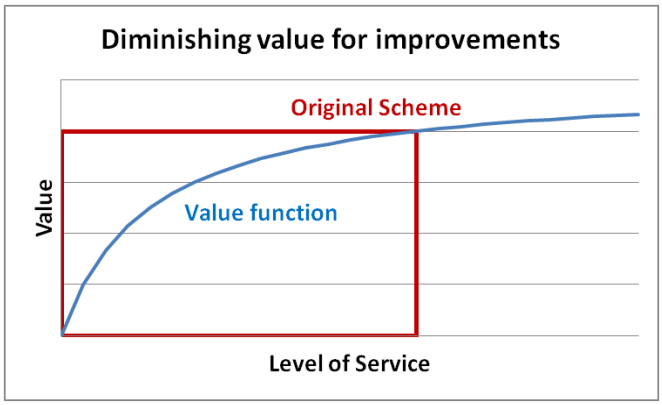
The concern would be that the rewards on offer would encourage a company to deliver outcomes that are not required -

and customers will end up paying for things they do not want. We therefore looked at two scenarios:

- Firstly, where customers desire more improvement – there is a **linear value** function where they have the same willingness to pay for each extra unit of service. A possible example here might be sewer flooding.
- Secondly, where consumers value their existing service, but do not need or want higher levels of service – there is a **diminishing value** function. An example might be drinking water quality.

To eliminate the "noise" associated with shifting from a capex scheme to opex in these cases, we modelled a 20% (£10m) increase in capital expenditure compared to the scheme in the base programme. This is a straightforward scenario where service rises in proportion to the additional investment.





S7 - NPV of benefits

	Original Solution	Alternative (high capex)	Additional Benefit	New cost benefit ratio
Linear function	£47.8m	£57.4m	£9.6m	1:1
Diminishing function	£47.8m	£48.7m	£0.8m	0.8:1

Numbers may not add due to rounding

S7 - results with symmetrical incentives and different consumer valuations

	NPV over 15 years, £m	
	Linear WTP	**Diminishing WTP**
Company share of benefit	30%	30%
Menu: cost performance	(2.9)	(2.9)
Outcome incentive (independent of menu)	2.9	0.3
	-	**(2.6)**

Numbers may not add due to rounding

The objective in this case was to develop a framework that would not discourage companies from delivering additional outputs, provided customers are willing to pay for them.

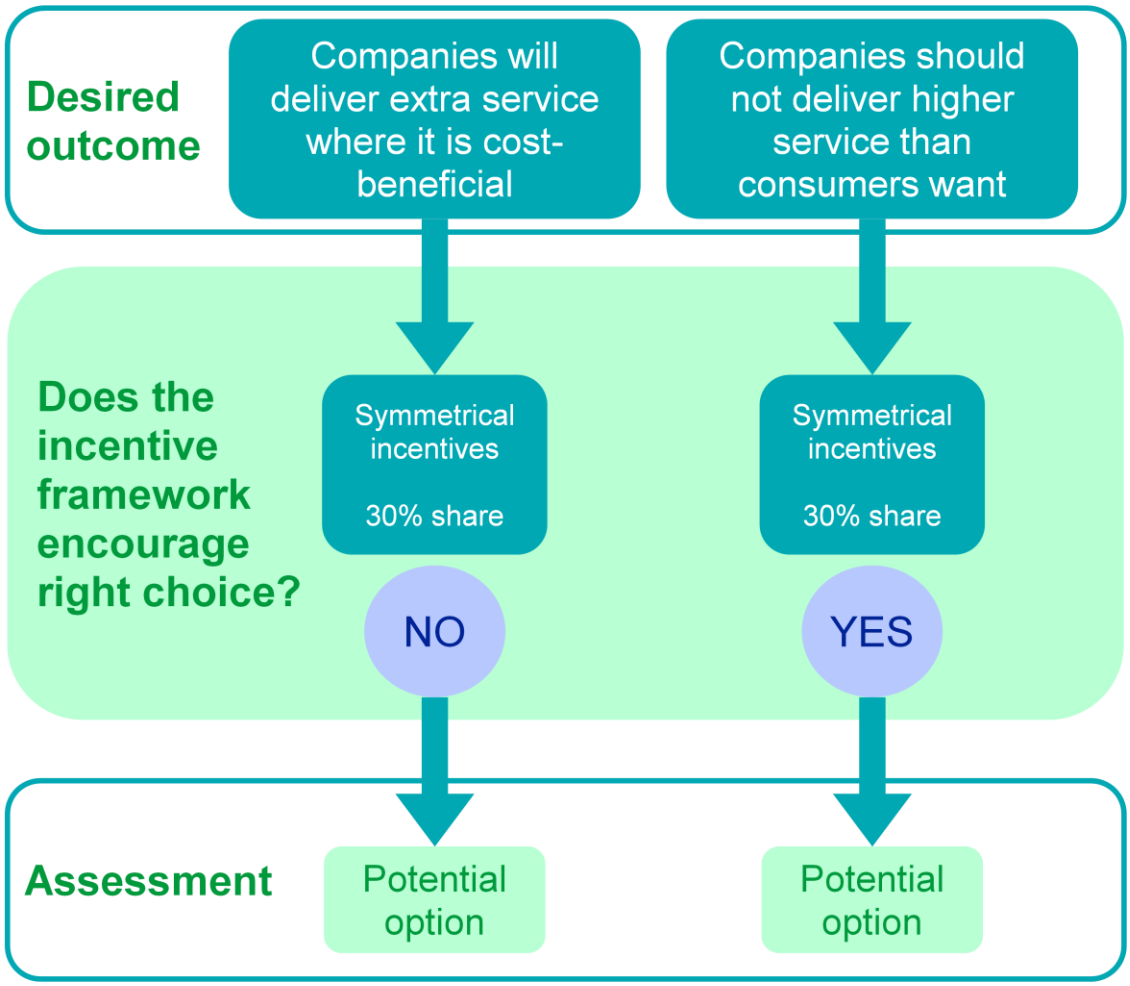
In the first case, customers value the additional output. A 30% share of the additional service benefits is sufficient to offset the negative impact of the cost performance incentives. The company receives mild encouragement – but this is still not enough that it would start to

deliver outputs that customers did *not* want (as in the second case).

We would make two points with regard to these findings:

- Firstly, the share of benefits allocated to companies in the following period might need to be increased if the cost incentives were strengthened (as we and CEPA have suggested).
- Secondly, that the additional costs associated with over-delivery would need to be reflected in future periods. If a company expected that continuing costs would be subject to a steep efficiency challenge, it would factor this into its analysis and avoid further improvement.

This approach might seem to be a high price for additional improvements – particularly if increased cost incentives drive the company share higher. However, it is important to remember that this is only the benefit arising from a single period. The normal regulatory expectation would be that the new (higher) level of service should be continued and therefore there should be additional benefits to customers that stretch beyond the next review. In addition, it might be hoped that it could spur innovation by encouraging companies to demonstrate that higher standards are achievable at more reasonable cost than they would argue in for in a penalty-based approach.



A11 Trade offs and cost control with balanced incentives

A problem with Ofwat's previous framework, where outputs were set at a detailed level in the Final Determination, was that companies had an incentive to continue with the delivery of specified capital schemes - even if the costs had increased to the point where they were no longer cost-beneficial.

We can see this from scenario 6 where, in order to avoid a shortfall, a company would be prepared to invest more than the £50m proposed in its original business plan.

The extreme example of this would be where a company delivers the outcome through other means, but is still logged down or shortfalled because it has failed to deliver a named scheme. The move to an outcomes-based regime should help to avoid this situation.

The wholesale consultation suggests a couple of mechanisms which might further help to redress this balance:

- Allowing **trade-offs** so that a company can offset under-delivery on one measure by over-delivering on another.
- Trade-offs could be permitted either within an outcome or between outcomes.
- The wholesale consultation includes options where trade-offs can be combined with a penalty-based approach or with rewards and penalties.

We think that trade-offs are only relevant to a penalty-based approach, where over-delivery in one area could be used to avoid the consequences of under-delivery in another. In our view, trade-offs do not need to be specifically allowed with a symmetrical approach - provided the incentives are set at the right level, companies will make trade-offs anyway.

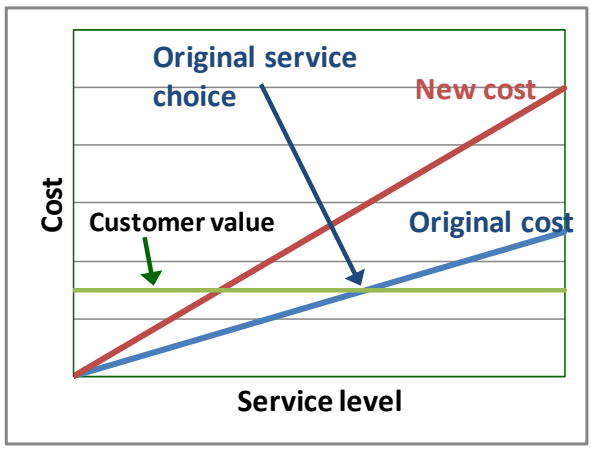
In a system with symmetrical incentives, there might be a concern that companies will continue to deliver schemes that have become non-beneficial because of the rewards on offer.

The following scenario illustrates why this should not be the case if incentives are balanced.

Scenario 8: Response to cost increases during the period

In this example, the notional company discovers that its original forecast of the cost required in order to deliver an outcome was too low. Its best current estimate is that the scheme will cost 20% (£10m) more, but will deliver no additional benefit.

This is, of course, a stylised scenario where consumers will accept less improvement than was planned. If non-delivery risked deterioration in service, we might expect customers to react differently.



S8 - NPV analysis

	Benefit: Original Solution	Original cost benefit ratio	New cost	Additional Benefit	New cost benefit ratio
Linear function	£47.8m	1:1	£57.4m	-	0.8:1

In this instance, the desired outcome should be that the company will not proceed with the original scheme, since it is no longer cost-beneficial.

We found that, if:

- the true-up for costs within the menu is made NPV-neutral (as we are now assuming); and
- the cost incentive is amended by weighting the baseline so that it delivers 30% on a present value basis

then an outcome incentive that is independent of the menu would work.

However, there are still attractions to dealing with all outcome incentives through the menu.

The menu-based approach adopted here is to adjust the company's outturn costs (for the purpose of the menu score alone, not the RCV) to reflect the variation in benefits delivered (£60m). This would be similar to logging, but rather than adjusting the ex-ante menu score the company's **outturn** expenditure would (by agreement) be adjusted upwards to reflect the value of the non-beneficial scheme.

S8 - results of symmetrical incentives with higher costs

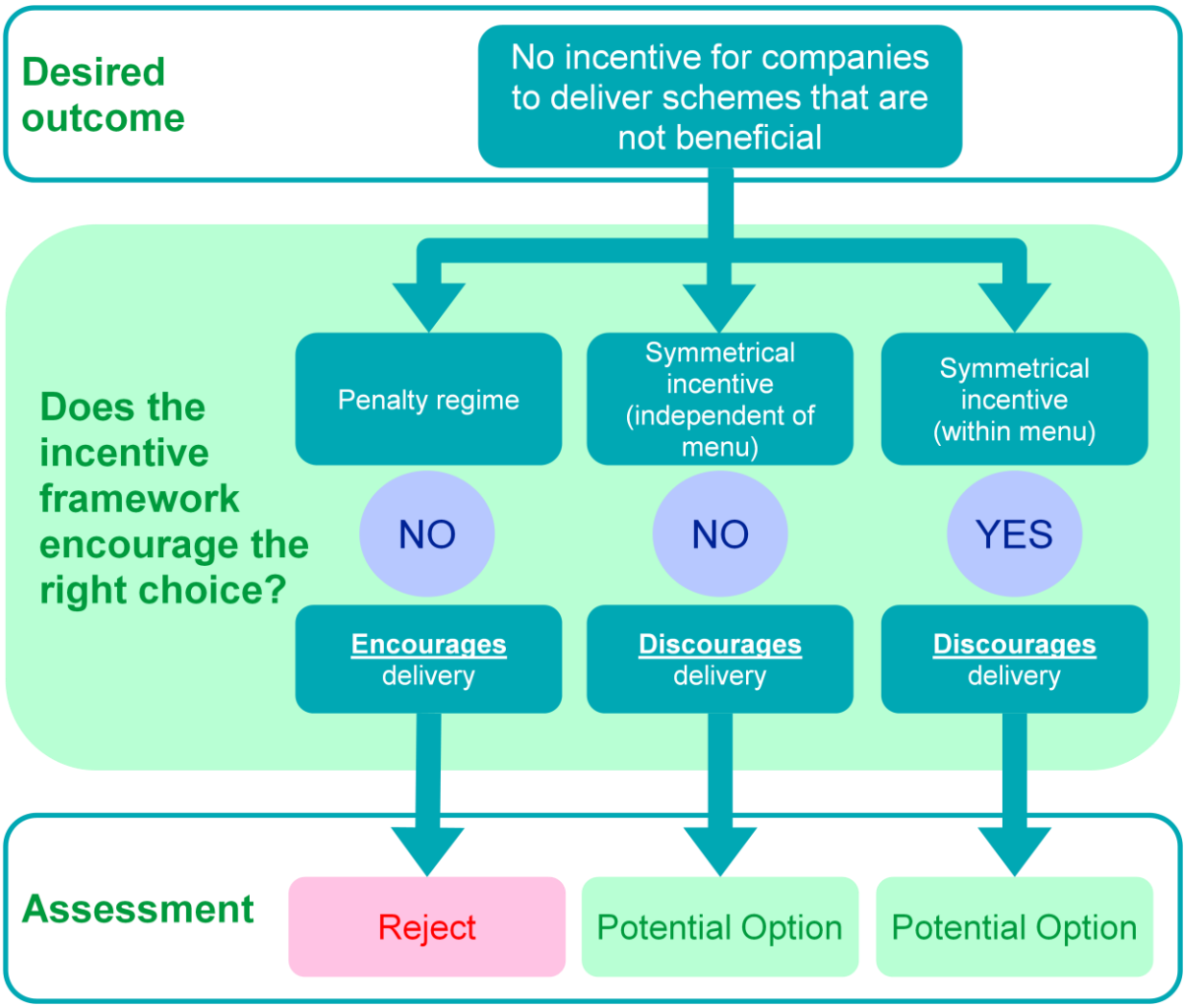
	NPV over 15 years, £m		
	Company still delivers (Either incentive)	**Company does not deliver** (Independent Incentive)	**Company does not deliver** (Menu-based incentive)
Company share of benefit	30%	30%	-
Menu: cost performance	(2.9)	14.4	14.4
Outcome incentive	-	(14.4)	(14.4)
	(2.9)	**-**	**-**

Numbers may not add due to rounding

With the right incentives, the company would be strongly discouraged from delivering the scheme. It would have a cost performance penalty and would gain no incentive reward because there is no additional benefit to consumers. It would have an incentive to seek better alternatives – or, if none are available, avoid delivering the service improvement entirely and to reconsider at the following review.

This analysis would apply equally to the circumstance where customer willingness to pay for improvements diminished during the period.

For illustrative purposes, the values with scenario 7 (over-delivery) would also produce the right outcome with this change in approach. However, in the case of over-delivery, for the purpose of scoring the menu, the company's actual expenditure would be adjusted downwards by the value of the additional benefits obtained.



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