Quality of service regulation – Experience from the water and energy sector

A PAPER PREPARED FOR VODAFONE

Background and objective

Economic regulation provides strong incentives for the regulated company to improve efficiency. As increases in efficiency are generally associated with reductions in costs, there is a risk that companies will also reduce quality of service to save further costs. As a result, it is common to combine economic regulation with regulation of service quality.

Vodafone has asked Frontier Economics to describe how quality of service regulation is applied in the water and energy sectors, with a particular focus on recent experience in water. This paper summarises the process for developing quality standards, performance targets and incentives in the water sector in England and Wales based on the most recent price control (PR14), which took effect from April 2015.

We cover the following topics:

- How measures of success in service quality are defined in the water sector;
- How targets are set in the water sector;
- How incentives are designed in the water sector; and
- How performance is monitored in the water and energy sectors.

How measures of success are defined in the water sector

The first step for quality of service regulation is to define what dimensions of service quality should be measured. As part of PR14, Ofwat asked water companies to engage with customers on the aspects of their water service that they most value. Ofwat’s guidance required companies to focus on “outcomes” rather than “outputs” or “inputs”. **Figure 1** shows that outcomes refer to aspects of service quality that customers need or want whereas outputs refer to the results of the actions the company has to take to deliver outcomes. Inputs are the resources used to provide outputs. For example, an outcome may be good drinking water quality. The output may be the upgrading of facilities that treat water to achieve drinking water quality whereas the inputs are the chemicals used in treatment processes.
Companies asked their customers in focus groups, via surveys and other methods what they really cared about. Customers include both households and non-household users. For each of the high level outcomes, companies then identified measures of success. These are measurable performance indicators that provide sufficient information on whether an outcome has been achieved.

**Figure 1. Outcomes, outputs, inputs and measures of success**

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Measures of success</th>
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<tbody>
<tr>
<td>Long-term customer needs or wants</td>
<td>Indicators that capture performance against the outcome</td>
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<tr>
<td>The results of company actions to deliver outcomes</td>
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<tr>
<td>What firms do to deliver outcomes (means to an end)</td>
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In cases where more than one measure of success could be used per outcome, companies used the following criteria to select the most appropriate outcomes. The measure should be:

- as closely related to the outcome as possible and covering a large proportion of the outcome;
- informed by stakeholder engagement;
- measurable, verifiable and comparable;
- easy to understand by stakeholders;
- at least in part controllable (this means that the company can influence performance); and
- future-proof.

Most companies selected between 5 and 10 outcomes and between 20 and 40 measures of success, depending on the company size and nature of the customer engagement. Examples of outcomes include high quality drinking water, resilient services or improved bathing waters. Measures of success include compliance with drinking water quality (measured in percentage of samples), number of supply interruptions greater than 3 hours or number of beaches passing EU standards.

There are six measures of success that Ofwat standardised across companies but the majority of measures are not standardised. While there is a lot of overlap...
between non-standardised measures, the final determinations by Ofwat have still left substantial variations between the measures of success of different companies to reflect local preferences.

**How targets are set in the water sector**

Once the measures of success have been established, companies have to establish performance targets. This involves a number of steps:

- **Establish current performance and level of variation** – companies used current performance as the starting point but also considered historic variations (over the past 5-10 years) to ensure that current performance is not an outlier (e.g. based on an extremely wet/dry year).

- **Estimate costs of improving performance** (and cost savings of worsening performance) – companies developed a detailed understanding of the level of costs associated with different performance levels and also considered the costs that could be saved by reducing performance), given the number of measures of success this raised some issues around common costs. For example, replacing mains has a positive impact on leakage, interruptions and other measures. In these cases, companies had to make a decision on how to allocate costs.

- **Estimate the willingness-to-pay for different levels of improved performance** (and level of compensation for worsening performance) – companies used willingness-to-pay (WTP) studies to estimate how much customers value improvements in performance levels.

- **Estimate cost-beneficial level of improvement** – combining information on costs and WTP, companies could establish the level of performance where marginal costs equal marginal benefit so any further improvements would not be justified as incremental costs would exceed incremental benefits.

The simplest form of a target is the level of performance that is cost-beneficial as shown as the “optimal point” in Figure 2. However, in some cases companies had to choose different targets. This could be for a number of reasons:

- compliance with regulation or statutory requirements such as environmental law; and

- ensuring that overall bill increases are within customer acceptability so some targets were lowered.

Based on trading-off these considerations, companies chose a target level of performance for the last year of the price control and then determined the path...
from the current to the future level. This was often based on a linear path but in some cases reflected specific timing of investment.

**Figure 2. Illustration of cost-beneficial performance level**

![Illustration of cost-beneficial performance level](image)

MWTP – marginal willingness to pay, MC – marginal cost

**How incentives are designed in the water sector**

This section considers how the elements of the incentives are designed and the interaction between the incentives and other mechanisms to ensure minimum standards are achieved.

**Steps in the design of outcome incentives**

Once measures and targets have been established, water companies were asked to develop incentives for delivery of the targets. This involved a number of steps:

- **Determine the incentive type** – in principle companies could choose to select reputational incentives or financial incentives. Reputational incentives are measures that are reported on an annual basis but do not have any financial consequences. The idea is that companies will still try to achieve targets to avoid reporting failure to miss targets. Ofwat’s guidance (shown in Figure 3) asked companies to only choose reputational incentives if there was clearly not sufficient evidence that a financial incentive is appropriate.

- **Choose between penalty-only and two-sided incentives** – for those measures of success that have a financial incentive, companies had to decide whether a two-sided penalty was justified. If customers clearly did not value improvements in performance or if the valuation is associated with a significant level of uncertainty, a penalty-only incentive was considered most
Quality of service regulation – Experience from the water and energy sector

appropriate. This is to ensure that outperformance is only incentivised if customers value it.

- **Determine the extent of trade-offs** – in practice companies will be able to trade-off financial incentives as, at an aggregate level, penalties incurred on one measure of success can be set off against rewards earned on other measures. Ofwat asked companies to consider whether any measure should be grouped in a basket of measures to make these trade-offs more explicit. This was only used on a very small number of measures such as compliance with various environmental obligations.

- **Determine incentive structure** – companies were also asked to consider deadbands and caps and collars for each measure with a financial incentive. Deadbands are levels of performance around the target that do not lead to any penalties or rewards. The purpose of deadbands is to account for general fluctuation in performance but does not remove all uncontrollable factors. Caps and collars are used to limit maximum exposure by companies with respect to performance on one particular measure.

**Figure 3. Ofwat’s guidance on incentive choice**

Source: Ofwat, 2013, Setting price controls for 2015-20 – final methodology and expectations for companies’ business plans, page 68

The final determinations show that most measures of success have a financial incentive and there is a mix of penalty-only and penalty-and-reward incentives.
Most incentives have a deadband and a cap and collar. During the price control Ofwat encouraged companies to propose more financial incentives than they initially proposed in their business plan submissions and also asked companies to include a greater number of incentives with a reward despite customers preferring penalty-only incentives.

Interaction with minimum standards and enforcement penalties

The system of outcome incentives introduced by Ofwat at PR14 built upon an existing structure of minimum standards for service performance. These include the following:

- **Drinking Water Quality.** The Drinking Water Inspectorate (DWI) monitors compliance of drinking water against standards. Compliance failures can result in enforcement action and possible financial penalties.

- **Pollution incidents.** The Environment Agency (EA) monitors the quality of water in rivers and other water courses. It takes enforcement action and imposes fines on water companies that are in breach of discharge consents.

- **Customer service.** The Guaranteed Standards Scheme (GSS) sets out minimum payments to customers in relation to service failures. These include extended supply interruptions or periods of low water pressure.

The outcome incentives are considered to be additional to these processes for enforcing minimum standards. The aim is to incentivise the company to deliver performance that is above the minimum level, where this is consistent with customer preferences. Therefore, the existence of penalties by other regulators such as the DWI was not considered by Ofwat to be a reason to avoid an additional financial incentive.

How to determine the incentive rate

Ofwat provided specific guidance on how to develop penalty and reward rates. The key input is customers’ WTP for an improvement or reduction in performance of one unit. In addition, water regulation is set up in a way that any over- or underspend against the cost allowance in price limits is shared with customers (with customers and the company both retaining c. 50%). So the incentive rates had to be adapted to reflect this. This resulted in the following guidance:

- Penalties: Incremental WTP - (incremental costs x customer share of underspend)
- Rewards: Incremental WTP x (1 - customer share of overspend)
WTP results for improvements and reductions of performance were often not symmetric so different rates apply for rewards and penalties. In addition, companies did not have WTP information on each measure of success so penalties were often based on potential cost savings. This ensures that the incentive is sufficient to deter the company from deliberate underspend.

Ofwat did not standardise the incentive rates for companies so companies can have the same measure of success with a different incentive rate as their evidence base (WTP, costs) differs.

**How to check the balance of incentives**

Once the overall incentive package for each company was developed, Ofwat assessed the incentive structure by considering the variation in the return on regulated equity (RoRE). The process for calculating the variation in RoRE is set out in **Figure 4** below and involves the following steps:

- start with the regulatory profit allowance (RAB multiplied by WACC) and adjust for tax and debt interest to give the allowed profit for equity investors;
- estimate the upside and downside risk associated with incentives and calculate the upside and downside profit for equity investors; and
- divide by the amount of regulatory equity (RAB minus debt) to give a range for the return on regulatory equity.

**Figure 4. Calculation of RoRE range**

To assess the impact on profit, companies had to assume a specific performance level. Ofwat stated that the 10th and 90th percentile performance level are appropriate for estimating the variation in RoRE for the purposes of assessing the incentive strength.
Figure 5 provides an example of a RoRE range. The red and light blue areas show the variation in RoRE as a result of the outcome delivery incentives (split into two outcomes). The other areas demonstrate the variation in RoRE as a result of other performance incentives (totex out- and underperformance and a specific incentive related to customer satisfaction).

Figure 5. Example of a RoRE range

The RoRE range is a useful tool to compare the magnitude of different incentives. Companies generally considered the following:

- Does the RoRE range look reasonable? Is the maximum too high or the minimum too low?
- Is the balance between the upside and downside reasonable?
- Is the balance between the different incentive rates reasonable?
- Is the balance between different outcome incentives reasonable?

In the final determinations, Ofwat specified that the RoRE range for outcome delivery incentives would be capped at +/-2% to limit the upside and downside risk. Converting this to an impact on the cost of capital this implies that:

- the upside scenario, where the company achieves the maximum rewards for performance, it would achieve an overall return 0.75% above the WACC; and
- the downside scenario, where the company faces the maximum penalty for poor performance, it would earn a return 0.75% below the WACC.
Ofwat considered that this calibration of the incentives to the return on capital was an important part of the incentive design. It considered that the owners of the companies should face sufficient financial incentives to focus the efforts of the company on achieving performance rewards and avoiding the penalties. The scale of the upside and downside risk was similar in magnitude to that arising from cost performance, meaning that Ofwat believed that companies should face broadly similar exposure to the quality of performance as to the level of cost efficiency.

**How performance is monitored in the water and energy sectors**

Water companies are expected to publish their performance on outcome delivery incentives and costs on an annual basis. At this stage, it is not clear whether Ofwat will publish a summary of companies’ comparative performance to strengthen the reputational incentive of highlighting comparative performance.

In its RIIO\(^1\) price controls, Ofgem publishes information on companies’ performance on an annual basis both in a summary report and on a dedicated website\(^2\). The summary reports cover all aspects of the price control such as cost performance, outputs, etc and Ofgem uses league tables as a tool for comparison as shown in **Figure 6**. While the annual report covers both financial and reputational incentives, the direct comparison between companies strengthens both types of incentives as stakeholders, investors, customers, etc can easily see which company is performing well.

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\(^1\) Revenue=Incentives+Innovation+Outputs

Figure 6. Summary of performance assessments

Source: Ofgem, RIIO-GD1, Annual Report 2013-14