



## **SERVICE QUALITY IN REGULATED MONOPOLIES**

by

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### **Abstract**

Economic regulators provide incentives for good quality of service as well as constraints on the prices or revenue which can be charged by firms with monopoly power. Economic theory suggests that regulators should choose standards according to consumers' valuation and the marginal cost of quality improvements, and that firms respond by equalising the marginal costs from not making improvements (i.e. the regulatory penalty plus any loss in revenue) with the marginal costs of improvement. This paper explores the evidence for such economically rational behaviour by both regulators and regulatees. We use a specially constructed data set on service quality targets and achievements across the main UK utility sectors; documentary evidence from regulators; and interviews with managers in companies subject to those regulators. There are inconsistencies both within and between regulators. We conclude that regulators are motivated by political as well as economic factors. And that companies may not respond primarily to the regulator's financial rewards or penalties for their quality targets, with a consequent danger that regulated consumers pay for marketing in unregulated markets; and the resulting level of service quality may be 'too high' in the economic sense.

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## **1. Introduction**

The balance between quality of service and cost is a major public concern, both in the public and in the private sectors. Higher quality is generally more expensive to provide, and results in higher prices for consumers (or taxes for taxpayers). The form of regulation of UK monopolies has exacerbated these concerns, and regulators have raised targets and penalties over time. Does the combination of profit maximisation and price cap give companies incentives to save ‘too much’ on safety, environmental and service quality?

We abstract from inter-agency and political dimensions to examine the trade off between price and quality where both are determined by a single (economic) regulator, namely for the quality of consumer service which companies should deliver. All the economic regulators have some such service measures, such as reliability of supply, speed of communication and response to customers. We collect information on the targets and penalties which regulators have set, and on the achievement of companies to these incentives, and assess these in the light of the economic criteria. Moreover both the gas and energy regulator are introducing and strengthening the explicit rewards and penalties for service quality within the price cap.

We use three sets of sources. The first is a data base, especially constructed for this study, of the standards, targets and fines set and achieved in the four utility industries (gas, water, electricity and telecoms) since privatisation. The second is documentation from water and energy regulators about setting quality targets; and the third, interviews with a number of senior managers in two regulatory offices and three companies.

In section 2 we discuss the economic arguments for determining quality criteria. Section 3 presents evidence on the regulators’ choice of standards, targets and fines, and section 4 traces how service standards have developed across the four sectors. Section 5 reports the company responses, both in terms of achievement and comment. Section 6 identifies some important practical implications for choosing quality targets and penalties in the light of company responses.

## **2. Quality of Service and regulated industries**

### ***2.1 Measuring performance***

Measuring performance has become increasingly important in management of organisations, both public and private, over the last two decades. Performance measurement has been used as an instrument to measure the success of an organisation in meeting its own objectives, and as a management tool for improvement (Merchant, 1985, Fitzgerald et al 1991, Euske et al 1993). As performance measures are increasingly ‘politicised’, particularly in the public sector, there is also growing concern that performance measures can have unintended dysfunctional consequences, as managers respond to the incentives which they provide (Burchell et al, 1980). In the economics literature, the issue has been presented as an agency problem, applied to both private and public sectors. Holmstrom and Milgrom (1991) address problems of multi-tasking in a private company; Rees (1984) discusses the objectives and incentives of managers in nationalised industries. Several multi-dimensional frameworks have been proposed which stress the interdependence of financial and non-financial performance measures (Johnson and Kaplan, 1987, Fitzgerald et al, 1991, Nanni et al, 1992, Eccles and Pyburn, 1992, Kaplan and Norton, 1993). However as Jensen, 2002, has shown, if robust scorecards cannot be found to balance the interests of different stakeholders, this may have the perverse effect of making managers accountable to no-one.

When industries are privatised, performance measurement takes on an additional dimension. The original economic model of price cap regulation was developed as a temporary measure in telecoms, an industry expected to become competitive very rapidly (Littlechild, 1983). While it tried to surmount many of the recognised problems of traditional US style rate of return regulation, the need to reset price caps introduced a strong rate of return element to their implementation and practice. Littlechild acknowledged that “it would seem sensible to ensure that quality of service did not deteriorate as a result of the tariff reduction scheme” (p. 35).

Literature on quality of service in regulated industries is relatively sparse. Spence (1975) showed that an unregulated monopolist might either under or over provide quality, according to the preferences of the marginal consumer relative to the average. Rate of return regulation is likely to increase incentives for over provision of quality if its provision is capital intensive and

would boost the rate base (Sherman, 1989). The rate of return element inherent in price cap regulation suggests that it, too, might stimulate over provision of quality. However price cap could also lead to degradation of quality, as indicated in the Littlechild quotation above, if higher quality incurs higher costs. Conversely, profitability may be positively related to quality of service in some respects. Ogden (1997) identifies prompt bill payment, reduced costs of handling complaints and reputation in other competitive markets as three incentives to improve service cited by managers in water companies.

## ***2.2 Determining optimal quality***

There are a number of ways in which regulators can address quality issues. Baldwin and Cave (1999) discuss the difficulties of determining both the optimal level of quality and whether it is being delivered, and recognise the usual “tendency for the measurable to drive out the unmeasurable” (p.254). Ideally, consumers can be given a choice of quality, and charged according to the costs of providing it. But the possibility of choosing different service qualities has been highly politicised, with public outcry at the possibility that those with more money should be allowed to ensure a more reliable electricity or water supply, for example.

One characteristic of network industries is the common level of quality provision across at least some groups of consumers (those supplied from the same water source or section of a distribution system), so that one consumer’s quality of supply must be shared with that of his neighbour. In such cases regulators have to determine which services they should set standards for, and identify, appropriate target levels and penalties. In economic terms, the appropriate incentives to the firm would involve a penalty for breaching the standards which is equal to the total monetary valuation of the consumer losses incurred for each quality standard (e.g. the reliability of a particular distribution wire). In each case the optimal quality is that at which the willingness to pay for additional quality by all the consumers affected is exactly equal to the cost of providing that extra quality. But this would clearly be very difficult operationally, both in establishing what consumers wanted and in fine tuning the system (the costs of such fine tuning would itself not be worth the benefits). Ascertaining consumers’ willingness to pay is itself problematic. Consumers often give inconsistent responses to surveys about willingness to pay, because of both conceptual difficulties and well known free rider problems; moreover there is usually an asymmetry between willingness to pay and compensation demanded if standards fall (willingness to accept), which is typically about twice as high. There are obvious

explanations of this (for example consumer expectations) but it does not ease the task of the regulator in determining what targets should be set.

One crucial factor determining consumer valuation of quality is their previous experience. Whether standards were above or below the optimum level in the regulated industries' nationalised predecessors is a moot point. Standards were generally driven by the engineers who operated and in most cases managed the industries, and were likely to be determined by technical capacity rather than consumer choice, an argument that they may have been 'gold plated'. On the other hand the control regime included incentives to increase labour intensity (Rees, 1984) and in the years just before privatisation investment by many of the industries was severely restricted under public expenditure limits. Moreover consumer expectations have increased across the economy, but particularly for these industries since they became private (Ogden 1997). This phenomenon was illustrated by the greater demands made of water companies in the drought of 1995, compared with that in 1976 when the industry was still public. Furthermore, public consciousness and valuation is affected by media coverage and is unlikely to be stable, making optimum quality very difficult to identify.

### ***2.3 Rewards and penalties for quality***

The economic regulator could incorporate quality concerns directly in the price cap, making the price or revenue allowed directly dependent on quality delivered. If quality increased a company would be allowed to raise its price, recouping some of the costs directly from the consumers who had benefited, and a degradation of quality would similarly be reflected in lower allowed prices. Alternatively, the regulator could impose a particular level of quality, and make breach a matter for legal action. In this case the penalties are likely to depend on legal arguments, but should conform to the same principles as if penalties are applied by the regulator. Ideally any degradation away from the optimum level should confront the company with costs which are equal to the value of the total consumer losses. In some cases high levels of compliance may be achieved with lower penalties, but this generally requires some other mechanism to be in force (see for example Harrington, 1988, Livernois and McKenna, 1999, Rodrigues-Ibeas, 2002). There may also be direct or indirect loss of revenue from degraded quality. For example a breakdown in the distribution system means less product is delivered and paid for; where reliability is very poor, and/or very valuable, alternative supplies may be ensured, as through private generators with subsequent loss in distribution revenue. But most

consumers do not have an alternative if a network fails, so revenue losses are small and costs need to be reflected in a financial penalty for the firm. In terms of incentives it makes no difference whether this is in the form of lower allowed revenue, fines or compensation, i.e. whether the money is paid to a central regulator or government fund or to consumers through lower prices or compensation. But there is clearly an attractive political and distributive argument that consumers who have suffered poor service should receive some compensation.

Compensation may be discretionary, in the sense that it depends on consumers claiming payment. To give appropriate incentives to companies against breaching the standards, compensation rates need to be adjusted according to the proportion of consumers likely to claim (so that if only one tenth claim, the payment should be ten times the actual damage incurred). This of course raises issues of equity, particularly if it is high income consumers who are most likely to complain and claim compensation. A counterargument is that those most likely to complain are those who have suffered the greatest damage – but in monetary terms the valuation of such damage itself is likely to depend on income and so be distributionally determined. An alternative which is increasingly applied is to make compensation mandatory and require that the company pays it to all consumers affected.

Quality may be determined, rewarded or penalised, either in absolute terms, or relative to other providers, where there are several companies that can be compared (e.g. regional monopolies as in water or electricity). Where such comparison is possible it is likely to be used across a range of variables, including costs as well as quality.

### **3. Regulators' approaches to targets, penalties and rewards**

Economic regulators set both price caps and some quality standards in the industries which they regulate. Since privatisation, price levels which industries were allowed to charge under their price cap generally decreased while the quality standards were being raised<sup>1</sup>. (Markou and Waddams Price (1999) provide summaries of both price cap and service quality targets, and Chau, 2002, gives details of the targets themselves). We focus on the two regulators which

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<sup>1</sup> The only exception is the water industry, where average prices rose in the first ten years after privatisation, reflecting both investment requirements and higher environmental standards, mostly imposed by the EC (such environmental quality is excluded from this analysis).

have the longest and most consistent history in this respect: the Office of Water Services, Ofwat, economic regulator of the water industry; and the Office of Gas and Electricity Markets, Ofgem, which regulates the gas and electricity industries<sup>2</sup>. We use documentation to identify arguments for selection of quality standards, target levels and fines. These refer both to the individual measures of quality, and to more recent composite measures (Overall Performance Assessments, OPA in water and the Information and Incentives Project (IIP) in electricity).

The water regulator started with clear ideas of the role of consumers in determining standards and targets. In preparing for the first review of the price cap Ofwat stated that

“... [C]ustomers should be sovereign and given the material on which they can make informed judgements about the quality of the service they want and the price they are prepared to pay.”  
[Ofwat 1992, p.6]

The electricity regulator has similarly recognised the importance of consumers’ views in developing the IIP project

“...it is important to consider customer’s willingness to pay for improvements to quality service.” [Ofgem, 2000a, p.16]

and in relation to regulation of Transco

“Consumers are interested in quality as well as prices. Therefore the price control review has involved consideration of the appropriate guaranteed and overall standards of performance and other quality indicators.” [Ofgem, 2001a, p.3]

“... [O]ver time, it may be necessary to incentivise additional services which are identified as being of value to customers or where the incentives on Transco to deliver the appropriate quality of service need to be improved.” [Ofgem, 2000b, p.27]

In the course of the second price review, the water regulator had a clearer idea of what consumers wanted

“Experience to date suggests that there is limited willingness among customers to pay extra for improvements in service.” [Ofwat, 1997a, p.13]

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<sup>2</sup> In telecoms, where consumers have some degree of choice, companies set and report on their own performance targets; the rail and postal systems’ quality standards have been established too recently for us to be able to trace their evolution.

The water regulator also recognised the difficulties of a common distribution system

“... [A] number of other features which characterise the water business ... the difficulty of differentiating quality for different customers. All customers must pay for improvements in quality and service levels.” [Ofwat, 1993, p. 16]

And the trade-off between quality and price was clearly recognised at an early stage by Ofwat

“The strategic assessment shows how much higher bills could rise if all the quality improvements currently being considered were implemented as new obligations ... All the figures in this assessment are subject to a wide degree of uncertainty.” [Ofwat, 1992, p.5]

“Some of the benefits could go to customers in the form of higher standards of service or lower prices;” [Ofwat, 1993, p.7]

At about the same time the electricity regulator pointed out that the trade-off was not automatic

“High standards of customer service do not necessarily involve higher costs, though they may do where investment is required.” [Offer, 1994, p.xiii]

The energy regulator recognised these tensions later in developing the IIP

“There may be a concern that in the future companies will attempt to outperform the cost assumptions underlying price controls by reducing the quality of supply of the service provided.” [Ofgem, 1999a]

And the relation to the price cap was clear in the 1999 price review of electricity distribution

“... while recognising that sufficient revenue must be raised to maintain an appropriate quality of service, to finance required new investment and to allow an appropriate return to shareholders.” [Ofgem, 1999b, p.5]

“The trade-off between higher (lower) prices and higher (lower) quality involves two decisions that are taken at the time of the price control review. In effect a judgement is made on the new value for money line and where on the line each company is positioned.” [Ofgem, 2000a, p.16]

Similar views were expressed by the water regulator

“...companies which are more efficient and which have higher standards of performance should benefit at the price review compared with those that are less efficient or have lower standards.” [Ofwat, 1998, p.9]

The first electricity regulator had been much more cautious

“... I do not believe it would be appropriate to make direct connections between performance under the Standards of Service and the supply price control. I will, however, review the potential for linking performance and price when I review the price controls on the RECs’ distribution businesses.” [Offer, 1993, p.20]

The energy regulator’s view of the role of standards was clarified

“Ofgem believes that is important to introduce guaranteed and overall standards of performance in respect of certain non-contestable activities carried out by Transco. They will provide the primary protection to Transco’s final consumers in relation to quality of performance, at least until they are supplemented by financial incentives on interruptions under Transco’s price controls ...” [Ofgem, 2001c p.75]

Ofwat raised a particular issue about the timing of quality improvements and related price increases

“Currently customers are paying for quality improvements through bills while the work is being carried out before the improvements have been completed. This is contrary to normal commercial practice where suppliers of new services only charge once the service is provided ... a new approach to the funding of quality obligations ... Companies would only be able to raise revenue from customers for quality obligations after they had delivered the planned outputs. This would provide companies with stronger incentives to deliver schemes on time. [Ofwat, 1997b, p.27]

In terms of how to ascertain consumer needs, Ofwat has most recently relied on consumer surveys carried out by the companies, and the views of the Consumer Councils (CSCs).

Reporting these it notes

“There was less consistency in the precise balance between bill reductions and service improvements. The companies have concluded that customers would prefer a balance in favour of service improvements, whereas others, including the CSCs, take a different view.” [Ofwat, 1999, p.6]

This quotation also highlights the strategic role that consumers’ views can take in the debate between the regulator and the companies. Here the regulator seems to suspect that companies

are interpreting consumer preferences to argue for more investment and higher prices, while the consumer representative body disagrees.

#### **4. Evolution of Service quality measures, target levels and penalties**

Measures of service in UK regulation evolved in several directions. In some cases (e.g. telecoms) comparative performance indicators are published at quarterly intervals, but the regulator imposes no direct financial implications. This typically occurs where there is some degree of competition, and the information can be used by consumers in choosing suppliers (e.g. telecoms and energy supply). For monopoly sectors, regulators have typically developed two sets of standards. One relates to performance for individual consumers and attracts compensation (fixed by the regulator) for the consumer if it is not met (in gas and electricity known as guaranteed standards). Such compensation may be automatic or in response to consumer requests. The number of requests in the latter case depends on the company's diligence in informing customers of their entitlements. One of the electricity industry's guaranteed standards (GS10) is to notify consumers of their rights to compensation within a specific time.

The second set of standards, overall standards, relates to areas where it is inappropriate to provide individual guarantees, but where customers have a right to "expect" a minimum level of service. These may cover similar areas, and are often focused on the system as a whole and achievement of a particular percentage of a target standard. A third measure, combining overall performance across several measures, has recently been introduced for water and sewerage and electricity distribution, a form of yardstick competition as suggested by Shleifer (1985) in which quality can be incorporated as a dimension of output. We compare these in section 4.5 below. The penalty here is a lower position in a league table, with direct financial reward or punishment through the allowed price cap. Legal instruments are generally used to enforce standards set by non-economic (e.g. environmental or health and safety) rather than by the economic regulators, and are not the direct subject of this paper (though see Baron, 1985 for the implications of separating quality and economic regulation).

We focus on the monopoly parts of the privatised industries where regulation and quality of service measures are likely to persist. The current regulated monopoly networks are Transco

(gas transmission and distribution), the National Grid Company (high voltage national electricity transmission), the Regional Distribution Companies (low voltage regional electricity distribution), and the water companies (vertically integrated water only or water and sewerage companies). We omit systematic analysis of performance measures in railways because of their relatively short and troubled history in the private sector.

#### **4.1 Water**

In water the Director General of Water Services specifies a set of standards known as ‘DGs’. These refer to a variety of service dimensions ranging from operational aspects such as pressure of mains water and risk of sewer flooding, to consumer interface issues such as response to billing enquiries and written complaints. Since the original eight standards were established when the industry was privatised in 1989/90, some have been made more specific, some have been abolished, and two new categories, referring to bills of metered consumers and speed of telephone response, have been added.

Almost all target levels have been raised since they were introduced (Chau, 2002). When the scheme was first introduced, compensation payments for residential consumers depended on consumers making a claim. In 1993 penalties were doubled and extended to business as well as residential consumers. Take-up was low (few consumers knew of their rights to compensation, or could not be bothered to claim) and from April 1993 automatic compensation was introduced for some standards. This would increase the costs for the company quite considerably, both in terms of compensation paid and because of the process costs of identifying and reimbursing the consumers and demonstrating to the regulator that this had been done. In 2001 penalties were again raised, and in most cases doubled to £20 per incident.

The regulator’s valuation of consumer loss has clearly increased considerably, both in terms of individual consumer compensation and, even more, in terms of the costs of breach for the companies (since both the amount and the extent of compensation has been increased). However the standard penalties across the measures suggest that there was little fine tuning of estimates of consumer valuation, despite recent increases in two of the penalties.

## 4.2 *Electricity*

The electricity regulator applied guaranteed standards for individual consumers, which should be met in every case, or a penalty, whose minimum level was set by the regulator, was payable. Overall standards for the system were also set, either as supplementary to guaranteed standards or in different areas. No predetermined penalty attached to failing to meet these overall standards. These standards were originally applied to the public electricity suppliers who provided both distribution and supply services under a joint license; recent legislative changes to accommodate the introduction of competition have involved the separation both of businesses and licensing for these two functions.

The Director General originally set 10 guaranteed standards, and a further one was added in 1998. Required levels (i.e. those triggering compensation payments) have tightened considerably across the board, particularly recently. Required response to consumer queries was reduced from 10 to 5 working days in 1993-94; the same reduction was made in the time to provide an estimate of charges in 1998-99, and more rapid responses to meter problems and time to provide a meter were imposed. In 2000-01 the target for restoration of interrupted supply was reduced from 24 to 18 hours.

The minimum compensation payable for most guaranteed standards has increased over time, typically from an initial £10 per incident for each, to £20 to £50 by 1997/98. An exception is the change in the penalty for failing to supply a meter. This rose from £20 to £40 for residential consumers in 1993-94, and fell again to £20 in 1994-95 where it has stayed since (though this partly reflects a tightening of the time allowed, noted above).

The overall standards were initially set individually for each company “after review of recent performance, consultation with the companies, the Electricity Consumers Committees and other customer representatives” (Chau, 2002). Such a procedure is consistent with balancing consumer valuation against costs of increased quality, but there is no direct evidence of such an approach, despite the quotations of the previous section. All the overall standards were raised to 100% in 1998/99, and remained there, except for one. The changes in the standards are summarised in table 1.

**Table 1: Changes in electricity guaranteed standards (source Chau, 2002)**

Year	GS-1	GS-2	GS-3	GS-4	GS-5	GS-6	GS-7	GS-8	GS-9	GS-10	GS-11
1991/92	Within 4 hours of any notification during working hours	24 hours	Within 3 working days for domestic, 5 working days for non-domestic	Within 10 working days (simple jobs), 20 working days (others)	At least 2 days' notice	Visit or reply within 10 working days	Visit or reply within 10 working days	A substantive reply within 10 working days	All appointments to visit on a day must be kept	Write to customer within 10 working days of failure	N/A
1991/92	£10	£20 domestic, £50 non-domestic, plus £10 per further 12 hrs	£20 domestic, £50 non-domestic	£20	£10 domestic, £20 non-domestic	£10	£10	£10	£10	£10	N/A
1993/94	.	.	.	.	.	.	.	A substantive reply within 5 working days	.	.	N/A
1993/94	£20	£40 domestic, £100 non-domestic within 24 hrs, plus £20 per further 12 hours	£40-£100	£40	£20 domestic, £40 non-domestic	£20	£20	£20	£20	£20	N/A
1994/95	.	.	.	.	.	.	.	.	Offer and keep a morning or afternoon appointment, or a more precise time if requested	.	N/A
1994/95	.	.	£20 or £40 domestic, £100 non-domestic	.	.	.	.	.	.	.	N/A
1995/96	.	.	.	.	.	.	Visit within 10 working days or substantive reply within 5 working days	.	.	.	N/A
1995/96	.	.	£20 - £100	.	.	.	.	.	.	.	N/A
1996/97	.	.	.	.	.	.	.	.	.	.	N/A
1996/97	.	£40 (domestic) £100 (non-domestic) + £25 per 24hrs	.	.	.	.	.	.	.	.	N/A
1997/98	Respond within 3hrs weekdays 7am-7pm, and within 4 hrs at weekends 9am-5pm	.	.	.	.	Visit within 10 working days or substantive reply within five	.	.	.	.	N/A
1997/98	.	£50 (domestic customers) for restoring supplies within 24 hours, plus £25 per further 12 hours	.	.	.	.	.	.	.	.	N/A
1998/99	.	.	Arrange an appointment within 2 working days (domestic), 4 working days (non-domestic)	Within 5 days for simple jobs, and 15 days for others	Customers must be given 5 days' notice	Visit within 7 working days or substantive reply within 5 days	Visit within 7 working days or substantive reply within 5 working days	A substantive reply and agreed refunds paid within 5 working days	A morning or afternoon appointment, or a timed appointment if requested by the customer	Write to the customer and make payment within 10 working days	Within 3 hours on weekdays and 4 hours at weekends
1998/99	.	£50 (domestic), £100 (non-domestic), £25 for each 12 hour period	.	.	.	.	.	.	.	.	£20
2000/01	.	Must be restored within 18 hours	.	.	.	.	.	.	.	.	.
2000/01	.	.	.	.	.	.	.	.	.	.	.

Both the National Grid Company and Transco transmission have complex systems of incentives for transmission services; in NGC's case this is based on sliding scale regulation and in Transco's on auctions for entry and exit capacity, which will be extended to long term capacity in the autumn of 2002. There is a simple supplementary set of performance targets for NGC, agreed with Ofgem, for infrastructure to ensure there is sufficient capacity at peak. No penalty or reward attaches to performance in this dimension, though the regulator does publish comparative figures on the four Great Britain network systems (national grid, the two Scottish networks and the interconnector to France).

### **4.3 Gas**

Like the electricity distribution companies, Transco was privatised as part of a combined distribution-supply business, and did not become a separate business entity until the mid 1990s (ownership was separated in 1997). Transco has obligations as a system operator, and incentives to provide adequate quality in this capacity have been sharpened from 2002 (Ofgem 2001b). In addition Transco's quality of service to final consumers was converted from a voluntary to a required basis as part of the recent price review (Ofgem 2001 c). Five guaranteed standards, attracting different levels of payment, were introduced. These related to supply interruptions exceeding 24 hours, reinstatement of premises after re-laying service pipes, making and keeping appointments, providing adequate alternative heating and cooking facilities for potentially vulnerable customers who were disconnected, and notification of consumers or shippers of their rights to payments. Seven overall standards were imposed (but at rather lower levels than the 100% provided for most of the electricity industry). Ofgem also plans an incentive scheme for Local Distribution Zones (LDZs) similar to that introduced for distribution companies in the IIP, although comparison within a company raises rather different issues from those between companies.

### **4.4 Comparison within Ofgem**

For energy, a single regulator determines quality standards and penalties in the gas and electricity networks; any differences between the two should reflect either customer preferences or differential costs of providing elements of quality or both. Although the regulator is the result of merging two separate bodies, the gas and electricity regulators, who

may have had different priorities, these have been a single body since 1999, and so it is reasonable to expect some consistency or at least convergence of approach. The following table compares the most recently published guaranteed and overall standards in electricity and gas (concentrating on those standards in electricity which are most relevant to the distribution element).

**Table 2: Gas and Electricity Guaranteed Standards 2001-2 (source Chau, 2002)**

SERVICE		Performance Level		Penalty Payment (£)		Difference
Electricity	Gas	Electricity	Gas	Electricity	Gas	
GS1: Failure of Supply fuse	~	3 hrs weekday, 4hrs weekend	~	20	~	~
GS2: Restore supply after faults	GS1: Restoring supply after unplanned interruption	restored in 18 hrs	compensation made for each 24 interruption beyond 24 hrs	50 domestic, 100 nondom, + 25 each 12 hrs	30	6 hrs & £20-70 difference
GS5: Notice of Supply Interruption	~	5 days notice	~	20 domestic, 40 nondomest	~	~
GS7: Responding to meter problems		7 days or 5 for substantive reply		20		
GS6: Investigation of Voltage Complaints	~	7 days or 5 for substantive reply	~	20	~	~
GS9: Making & Keeping Appointments	GS3: Making & Keeping Appointments	Must offer and keep appointment	Must offer and keep appointment	20	20	SAME
GS10: Notifying Customers re Standards	GS5: Notifying Customers re Standards	10 working days	Where not informed in 20 working days, payment is due	20	20	SAME Payment, but 10 days payment difference
GS11: Responding to Pre-payment Faults	~	respond in 3hrs weekdays, 4 hrs weekend	~	20	~	~
~	GS2: Reinstatement of Consumer's Premises	~	Premises to be reinstated within 10 working days; payment for each 5 working days thereafter	~	50 domestic, 100 nondomestic	~
~	GS4: Adequate Heating and Cooking Facilities	~	Payment if supply disconnected without alternatives for disadvantaged	~	24	~

**Table 3: Gas and Electricity Overall Standards 2001-2 (source Chau, 2002)**

SERVICE		Performance Level		Achievement Level (%)		Difference
Electricity	Gas	Electricity	Gas	Electricity	Gas	
OS1a: Faults reconnected in 3 hrs	~	3 hrs	~	Various	~	~
OS1b: Faults reconnected in 18 hrs	~	18 hrs	~	Various	~	~
OS2: Voltage faults corrected	~	6 months	~	100	~	~
OS8: Respond to LETTERS	OS4: Acknowledge correspondence	10 working days	5 working days	100	90	5 days, 10% difference
~	OS1: Respond to telephone calls	~	30 seconds	~	90	~
~	OS2: Notify planned supply interruptions	~	A letter to be provided 5 working days in advance	~	95	~
~	OS3: Informing customers when due to be reconnected	~	12 hours of knowledge	~	97	~
~	OS5: Visits after receipt of complaint	~	2 working days after receipt of correspondence, visit 5 working days after contact	~	93	~
~	OS6: Response to COMPLAINTS	~	Substantive response within 10 working days	~	90	~
~	OS7: Respond to EMERGENCY calls	~	1 hr uncontrolled escapes, 2 hrs controlled escapes	~	97	~

We would expect differences both in consumer preferences and costs between the industries. Consumers generally find supply interruption more inconvenient in electricity than in gas (which has more substitutes); the costs of maintaining supplies are likely to be different, and restoring interrupted gas supplies is much more complex and expensive than for electricity. However it is unlikely that consumer preferences or costs vary much for service aspects such as response to telephones, letters or complaints.

We observe three types of differences between the standards. The first is in the standards themselves; the second is in the level of service expected (e.g. time expected for response); and the third is in the penalties imposed. Electricity has guaranteed standards for notice of supply interruption, and responding to meter problems and prepayment faults; and overall standards for reconnection. All of these could be applied to gas but are not; gas does however have two overall standards with respect to notifying consumers of disconnection and reconnection. Conversely, gas has guaranteed standards to provide adequate heating and cooking facilities for disadvantaged persons and overall standards for responding to telephone calls, visiting after complaints are received, and response to complaints. Telephone response is now one of the dimensions of the electricity distribution Information and Incentives Project<sup>3</sup> (section 4.5). Nevertheless substantial differences between the measures of service quality remain between the industries which are difficult to attribute to differences in technology or consumer preferences.

Four aspects of quality are subject to standards across both industries. Both have guaranteed standards for restoring supply after unplanned interruption, making and keeping appointments and notifying customers about the standards; and both have an overall standard for acknowledging correspondence. Both must offer and keep a morning or afternoon appointment and pay the same £20 compensation if they fail to do so. The target for restoring supply is shorter in electricity (18 hours rather than 24), which may well reflect consumers' greater reliance on electricity. However the penalty for exceeding the target is greater in electricity (minimum £50 as compared with £30 for gas), which is less easily explained. More surprising is the difference in expected time for notifying consumers about the targets (10 working days for electricity and 20 for gas), while failure to comply attracts the same compensation of £20. The situation is reversed for the overall standard on acknowledging correspondence, where a

consumer can expect a reply within five working days for gas, but has to wait for ten for responses to electricity letters. However the higher standard is balanced by a lower target level (90% for gas compared with 100% for electricity) so they are not necessarily incompatible. These differences emphasise the role of history and evolution in determining the levels rather than of systematically balancing consumer benefit and cost.

#### ***4.5 Use of comparative performance by Ofgem and Ofwat***

Comparative regulation measures are an important tool where there are several companies, and Ofwat is further down this path than Ofgem. Ofwat has developed an overall performance measure with weights for each of the quality supply performance measures (the DGs) and measures of water quality and environmental performance. The companies' performance on this overall performance measure affects their prices, though so far only for companies with exceptionally good or poor performance. In electricity distribution there was considerable criticism of the way the 1999 review of distribution prices was conducted (e.g. Tilley and Weyman-Jones, 1999), and a new Information and Incentives Project (IIP) was established as part of that review to come into operation in April 2002. The IIP aimed to address criticism that there was insufficient incentive for service improvement, and to introduce direct incentives for such improvement, and is discussed in section 4.5 below.

The comparative assessments of the companies has different impact in the water and energy industries. For water, the overall performance measure has a maximum of half a percent impact on revenue, with an increase likely in the future if the data improve. In electricity, up to two percent of revenue is affected in the first two years with a subsequent increase to four percent.

We see that all regulators have successively tightened standards of service expected and the compensation to be paid to consumers (i.e. the cost of breach). While their motivation is similar to that which economic models predict, it is clear that they do not 'fine tune' their target levels and fines in the way that pure theory might predict, and that they are acutely conscious of the limits of data which they face. Much of their increasing pragmatism is evident from the

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<sup>3</sup> Other discrepancies are more obviously explicable by industry differences, for example voltage excursions in electricity, reinstatement of consumers' premises and emergency calls for gas.

quotations in section 3. In the next section we show company responses to the incentives with which regulators have presented them.

## **5. Response to performance measures by UK companies.**

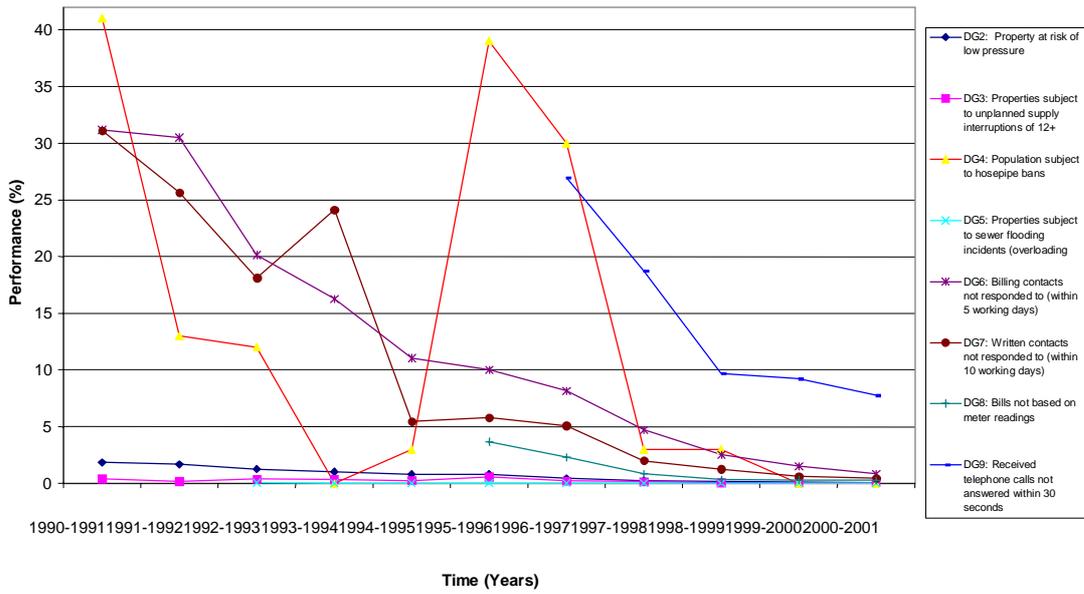
### ***5.1 Company service quality performance***

Most measured standards have shown marked improvement in performance since they were introduced. Of course this begs the question of performance in other areas where performance was not measured, and which (by definition) cannot be answered.

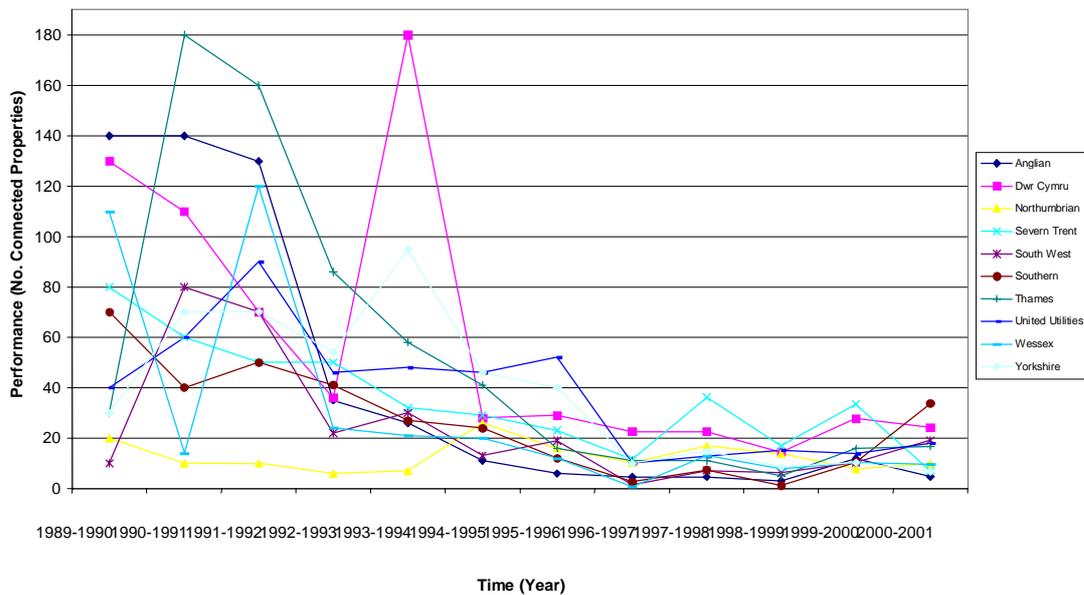
#### ***5.1.1 Water***

The performance of the water and sewerage companies against the various DG measures shows a pattern of consistent improvement across all companies and measures (apart from occasional divergences in particular companies) – see figure 1 for overall performance and figure 2 for an example of a typical measure. The improvement is particularly noticeable and steady in those measures over which the companies have most control, i.e. response to written, billing and telephone contact, and bills for metered consumers. It is a little more erratic for the two measures which are dependent on climate, viz. sewer flooding and water pressure. But even here we see that variability tends to come from two companies rather than be widespread across companies, and that the general level of performance is improving over time. In particular, average performance improves because the worst performing companies improve to levels close to those of the best performing companies at the beginning of the period. Thus the change comes not from moving the frontier of ‘best practice’ but from ‘catching up’ towards the frontier by those who were some distance from it. This no doubt reflects the impact of the comparative system itself as the league tables were developed.

**Figure 1: Water Industry Performance across**



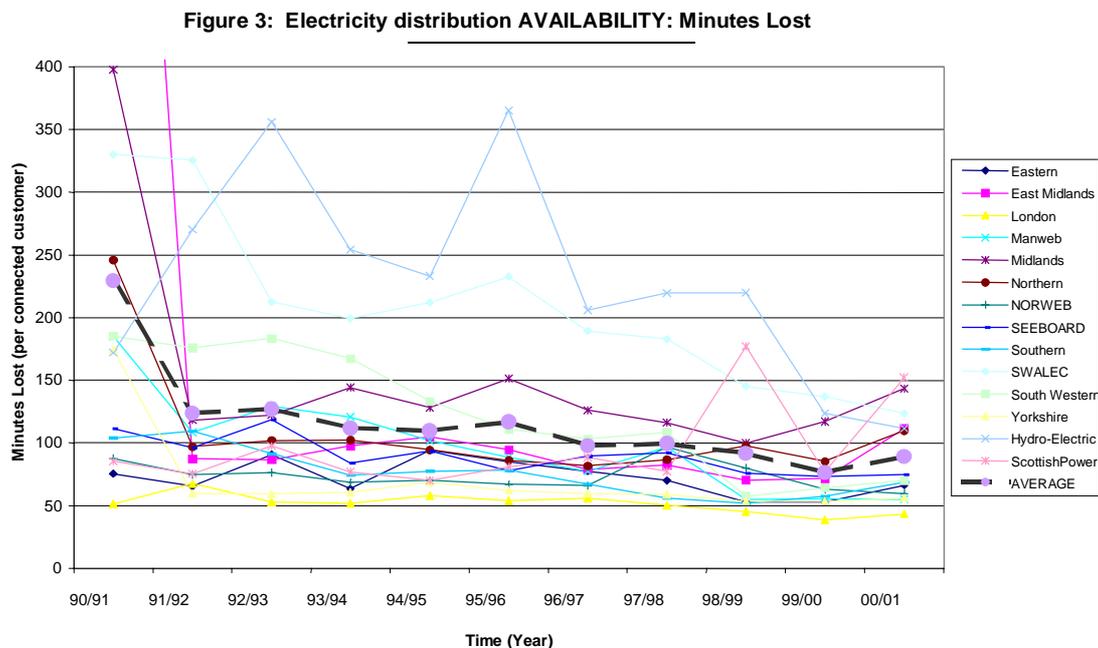
**Figure 2: Flooding**



**5.1.2 Electricity and Gas**

A similar pattern emerges for the electricity distribution companies. There are steady and consistent improvements, and the average performance has improved primarily because the worse performing companies have brought their quality closer to that of the best (see figure 3 for an example). Among those who were performing well at the beginning, there has been

little improvement in many measures. This may represent a technical limit to improvement, or the ‘optimum’ beyond which further quality improvements are not worthwhile, or, again, the lack of pressure which comparative performance places on the best performers, except to retain their position at the head of the table.



NGC’s transmission services are subject to a complex incentive regime, largely based on sliding scale regulation. Quality provision in the infrastructure relates mainly to providing adequate capacity to meet peak demand. Some quality measures are chosen jointly by the company and the regulator, and these indicate a consistently good and improving performance. The National Audit Office notes that “In the past, Ofgem have not provided any detailed incentive schemes for capacity because NGC’s basic quality performance has been very good.” (NAO, 2002, p.33).

### 5.2 *Manager’s attitudes to service quality measures*

We asked three senior managers in different regulated monopoly companies about achieving the regulator’s performance measures, in the light of our results reported earlier in this paper. We focus here on their attitudes to quality measures set by the regulator, rather than the means by which they do it, which are discussed in Brigham and Fitzgerald, 2001.

All three respondents perceived conflicting objectives between government and regulator, and sometimes between different regulators (notably economic and health and safety or environmental regulators).

Concerns were expressed both over the competence of the regulator, and over the tendency for 'inflation' or ratcheting up of standards. All three managers expressed doubt about how the regulator had chosen standards, and the consequent levels which were set. Two companies conducted their own consumer surveys to assess not only what mattered to consumers but also what they would be willing to pay, suggesting in one case that the "*appropriate customer standards were below the current standards*". Concern was expressed by two companies about inconsistency between short term and long term performance, particularly where networks needed to be taken out of use temporarily in order to improve them for long term service.

Two of the managers commented on the form of incentives. One felt it was appropriate that credit for out-performance or pain of under-performance should be shared between company and customers. A second was concerned that over reliance on market mechanisms might distort incentives, particularly if other market participants indulged in 'gaming the system'. Another stated that an optimal system would not necessarily mean 100% performance

All three managers thought that incentives were very powerful, and in one case a lot of work was put into maximising revenue against the performance indicators. However one manager referred to the standards as "*constraints which aren't always binding*", raising the possibility of choosing to breach the standards. Another respondent made it clear that response to quality standards was closely related to the image of the company; they would seek compliance, but not necessarily a good comparative rank, in a measure which they felt did not have high importance to consumers and was not a prime corporate objective. This suggests that companies do not respond 'blindly' to the regulators' incentives. One manager said that the company would sometimes take the reputational risk and pay compensation rather than have sufficient reserves to meet the standards.

All three companies are analysing the effect of not meeting some of the targets and responding to the incentives. Companies are clearly sensitive to the standards set, but the direct financial penalty is often less important than reputational effects. Preserving reputation emerged as an

extremely strong incentive in all the industries, making response to these mixed and inconsistent messages difficult for the companies. Such reputation might have effects in other markets, or more direct financial effects. This was linked directly to privatisation, because private companies were more exposed than those in the public sector. Another respondent felt that the main effect of privatisation had been the freedom from public borrowing constraints and the ability to increase investment, and so quality levels. While the third saw a phased attitude to quality, moving from disinterest, through an initial emphasis on cost cutting to a more accepting and balanced view of quality issues. (This pattern fits well with the stages of privatised companies described by Coen et al, 1998).

Performance on measures of service quality, especially where these are comparative, may have financial consequences either in other markets (particularly overseas) or directly through a deteriorating relationship with the regulator. There is serious doubt amongst managers about whether the current standards reflect a balance between the costs and value of producing higher quality, and that the standards themselves are set higher than customer preferences would suggest.

## **6. Conclusions**

In this paper we have explored service quality standards set by the economic regulators, and the response of the companies, in areas where common distribution systems mean that individual customers cannot choose a service level and price they will pay.

Our research shows that while the economic model is clearly useful in guiding decisions of regulators and responses of companies, the regulatory arena incorporates much broader considerations for both parties. The regulators operate within a much broader political context, while the companies are concerned not only with the politics of regulation, but the spin-off in terms of profitability in other (unregulated) markets. Regulators need to carry both public and political opinion with them in determining service quality levels, even when they suspect that this would not fit the strict economic model of balancing willingness to pay against improvements in service.

Both energy and water regulators are now implementing comparative performance measures which automatically reward or penalise companies according to their performance on a pre-ordained range of measures. Both are still in the 'caution' stage with respect to data, recognising the problems of accurate measurement, and with ambitions to double the financial impact of their schemes if more reliable data can be guaranteed. This suggests an underlying faith in comparative statistics where these can be used.

The standards have proved a powerful incentive for the companies concerned, who have responded by improving their performance in almost every measure, particularly those which are not subject to the vagaries of the physical climate. Improvement has been achieved largely by those who were relatively less good to start with, i.e. by them moving towards the 'best practice' frontier, rather than by movements in the frontier itself. This is despite companies' own views that some target levels (e.g. speed of telephone response) are 'too high' in the economic sense that its cost (ultimately to consumers) exceeds their valuation of the improvement. Such 'over-provision' of quality is the same result as Baron (1985) found with separate regulators, but occurs here in the case of a single regulator. The incentives for the companies are not merely the immediate financial consequences in the regulated context, but their implications in other markets, particularly those in the overseas utility markets, where privatisation is offering substantial opportunities for regulated UK firms. Such spill-over effects are similar to those found in procurement by Collie and Hviid (2001).

This 'multiplier' effect suggests that regulators should be cautious in setting targets, since it is not necessarily their own rewards which will dominate the effect on companies. In particular, the questions about the robustness of data in the overall performance assessment in water and the Information and Incentives Project in electricity distribution are somewhat worrying. The evidence presented in this paper suggests that it is the extraneous rewards, as much as the direct ones, which will motivate companies. The total penalty for poor performance is greater than that imposed by the regulator, so the company will 'over-perform'. If the costs of this 'super quality' are recouped within the price cap, consumers in the regulated market are effectively paying for the companies' marketing activity elsewhere. This suggests the possibility of perverse incentives from such measures, and the need for vigilance by regulators in passing on higher costs from better service in the prices allowed within the regulated market.

Particular instances of such perverse incentives emerged from the research. Both regulators and companies are concerned about incentives which reward current availability, especially where there was a need for renewal of infrastructure which will take it temporarily out of service in the interests of its long-term reliability. Similarly, using indicators of relative performance might discourage co-operation, for example by one company helping to restore power supplies for another in the case of localised adverse weather conditions. The regulators are well aware of these issues, but it does suggest that the scope for ‘unintended consequences’ goes well beyond the direct impact of any scheme which they devise.

More generally this shows the difficulty of pinpointing particular measures which are designed to capture quality of consumer service, even within a single regulator. Reconciling other regulators’ objectives, for example health and safety and environmental, with the economic regulator’s drive for efficiency and low prices, poses different but related issues. These have been particularly sensitive in the light of recent fatal railway and gas accidents in the UK. The research also highlights the power (for good or ill) of political influences on regulated industries, a particular irony since removing business from such influences was one of the justifications for the original privatisation process. Regulation is now entering a new stage in the UK, following an initial phase of privatisation, and a second of establishing the immediate post privatisation regulatory adjustments. Many commentators believe that the early squeeze of profits and downward pressure on costs, which yielded more efficiencies than many had anticipated, is now exhausted, so that increasing attention will be paid to service and other measures of quality and output. While regulation is built on a fairly straightforward economic model, this research shows that the process is more complex on both the regulator and company side because of the broader political and world market context. This complicates the regulator’s task in setting targets and penalties, where they need to identify not only consumer trade-offs but also the full incentives which influence companies.

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