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Economic Regulation of Network Industries

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ABSTRACT

This report was commissioned by Treasury in February 1999 as an input into its ongoing work programme on the regulation of network industries.

Network industries are characterised by long-lived investments and increasing returns to scale. This raises two related concerns – protection of consumers from monopoly abuse and protection of investors from opportunistic behaviour by governments. This report reviews the underlying problems of economic regulation of network industries. In particular, it discusses the problems of monopoly and regulation, the objectives and principles of good regulation, the trade-offs that regulation must deal with, and international experience with network regulation in the UK, the US and Australia.

Conclusions of the paper include that regulation should provide incentives for short and long-term efficiency, and that regulation should be based on the principles of openness, transparency, consistency and accountability.

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**ECONOMIC REGULATION OF
NETWORK INDUSTRIES**

**A Report for the
New Zealand Treasury**

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EXECUTIVE SUMMARY

Network industries are characterised by long-lived investments and increasing returns to scale. This raises two related concerns – protection of consumers from monopoly abuse and protection of investors from opportunistic behaviour by governments. Since the transaction costs of managing such problems via customers directly contracting for services may be prohibitively high, it may be more efficient for governments to regulate on consumers' behalf. However, regulation introduces costs of its own in terms of incentives for short and long-term efficiency.

In assessing alternatives, it is important to consider their costs, benefits, and stability. Unregulated monopoly, for example, may prove unsustainable and the threat of regulation may involve many of the costs of actual regulation (if it is effective in constraining prices). If prices are held down by the threat of regulation the utility will tend to under-invest in service quality. In assessing New Zealand's "light handed" regulatory regime, a critical question is the extent to which it addresses the problems of monopoly on the one-hand, and involves (or addresses) the problems of regulation on the other.

It is also important to be clear regarding the policy objectives of regulation. Maximising overall gains to society may be desirable, but experience around the world points to consumers' interests as the principal goal of regulatory regimes.

Good regulation must provide incentives for short and long-term efficiency. Allowing companies to retain a share of the gains from cost reduction encourages short-term efficiency, while stability and commitment are essential for efficient investment. Commitment and stability in turn derive from clear objectives and processes that are open, transparent, consistent and accountable.

In the UK, over a decade of regulatory experience has seen little if any convergence on a sound regulatory "contract". UK regulation is characterised by regulatory discretion and opportunism, and a higher cost of capital than in the US. However, recent proposals by the DTI for reform suggest growing recognition of such problems.

In the US, the 5th and 14th Amendments to Constitution have led to commitment and "due process", the *Hope (1944)* decision provided investors with a reasonable assurance of cost recovery, and the Administrative Procedures Act established rules which must be followed in making determinations. Whilst the US system has achieved a high degree of regulatory commitment, it has been characterised by cost plus regulation, reducing incentives for short-term efficiency. More recently, "incentive based" mechanisms have been introduced.

In Australia, lessons were learned from the UK experience. Legislation and industry codes are highly prescriptive, narrowing the scope for regulatory discretion and opportunism. Australia's approach may have "short-circuited" the evolution of institutional arrangements seen in the US, although time and further privatisation will provide a clearer test.

1. INTRODUCTION

The New Zealand Treasury asked NERA to review the underlying problems of economic regulation of network industries. The Treasury asked us to consider the following:

- the objectives of regulation;
- the inherent problems that regulation must address and their implications for ‘good’ regulation in practice;
- international experience; and
- the questions that need to be addressed in assessing alternative regulatory regimes.

We first discuss, in Section 2, the problems of monopoly and regulation.

In Section 3, we discuss the objectives and principles of good regulation. We then identify key issues regulation must address, including fundamental trade-offs, committing to the preferred approach, and providing appropriate incentives for efficiency.

In Section 4, we discuss international experience in the UK, US and Australia.

Section 5 sets out possible questions and criteria for appraising alternative regulatory arrangements.

2. PROBLEMS OF MONOPOLY & REGULATION

In this section we discuss characteristics of network industries and problems of network monopoly, and then identify the trade-offs inherent to regulation. We note that the trade-offs identified in relation to regulation may also be relevant to network industries that are not directly regulated to the extent that a regulatory threat is anticipated (this point is developed in Section 2.3).

2.1. Characteristics of Network Industries

Network industries are characterised by increasing returns to scale and long-lived assets. Increasing returns to scale make monopoly provision efficient, while long-lived assets make repeated competition for the market (as a substitute for competition within the market) difficult to implement efficiently.

In some circumstances where monopoly provision would be efficient, consumers might voluntarily form and run a co-operative monopoly enterprise (for example, a group of residents might contract collectively for common provision of certain services). Transaction costs make such voluntary arrangements more difficult to implement as the scale of long lived assets involved grows, and the numbers who must agree and monitor the necessary contractual arrangements increases. Regulation by governments on behalf of citizens may provide a lower transaction cost arrangement in such circumstances.

The problems of monopoly and regulation can be thought of alternatively as the protection of customers from monopoly abuse, or the protection of investors making irreversible investments in long-lived assets.

2.2. Concerns in Relation to Network Industries

Where transaction costs prevent efficient contracting, the following concerns arise in relation to network industries:

1. *High costs due to inefficiency* (productive inefficiency);
2. *Reduced supply and excessive prices* (allocative inefficiency);
3. *Impacts on other producers* (allocative & dynamic efficiency);
4. *Inappropriate service quality* (though this concern primarily relates to a price constrained monopolist who may provide service quality below customers' willingness to pay, and not to monopoly *per se*); and
5. *Distributional concerns* (concern over the distribution of rents between customers and owners, and/or between prices charged to different groups of customers).

We discuss these concerns in turn, before considering the trade-offs involved in any regulatory response to such concerns.

2.2.1. High costs due to inefficiency

Monopolies may tend to be inefficient relative to competitive firms since it is more difficult for the owners of monopolies to identify and reward good performance versus good luck. The absence of a competitive benchmark (the market price) makes it more difficult to motivate efficiency via performance incentives for monopolies.¹

The fact that monopolies may be inefficient does not, however, imply that there is anything governments and regulators can do about the problem. Provided the business is subject to normal capital market disciplines, the underlying problem (ie the lack of a market performance benchmark) applies to both owners and regulators.

2.2.2. Reduced supply and excessive prices

By pricing above the level required for cost recovery a network industry reduces demand, and leaves customers who would be willing to purchase their output *at cost reflective prices* with unmet demand. Overall economic welfare is therefore reduced. In addition, the mark-up of prices above costs under monopoly transfers income from customers to owners. Both possible “abuses” of monopoly power motivate regulation. Regulators may be able to reach a “bargain” on behalf of customers which involves prices more in line with costs, but which is consistent with investment incentives to encourage increased and ongoing supply.

2.2.3. Impact on other firms

Monopolies reduce supply and raise prices not just to final consumers, but also to other firms. The costs of raising prices to other firms may be higher than standard analysis using the concept of dead-weight loss suggests.² Excessive prices may prevent the provision of goods and services, or the introduction of new technologies, where there are fixed costs for their introduction. By restricting attention to existing goods and services, the costs of monopoly may be significantly underestimated.³

¹ Joseph Farrell. 1983. “Monopoly slack and competitive rigor: a simple model” MIT mimeo; cited in Eric Rasmusen. 1994. “Games and Information”. Blackwell.

² Where dead-weight losses refer to welfare losses due to foregone consumption of *existing* goods and services.

³ Paul Romer. 1994. “New goods, old theory, and the welfare costs of trade restrictions”. *Journal of Development Economics*: 43.

2.2.4. Service quality

Whether an *unconstrained* monopolist will under or over provide service quality is ambiguous.⁴ Incentives to skimp on quality arise when prices are held below monopoly levels since a reduction in quality of service is tantamount to an increase in price.⁵

The problem of under-provision of service quality is therefore something that must be addressed under regulation, *but arises principally because regulation seeks to constrain prices, rather than as a consequence of monopoly per se*. Such problems may be addressed through regulation of quality and service standards (a difficult task given the many dimensions of service quality and, in general, poor information about customers' willingness to pay). We do not address these issues further.

2.2.5. Distributional concerns

The objectives and practice of regulation around the world suggest that distributional concerns may dominate in terms of the underlying motivation for, and conduct of, economic regulation. Pressure for regulation may therefore prove irresistible, whether or not net economic gains are anticipated. In addition, regulation is often used to support particular groups or activities even where the objective might be more efficiently delivered using fiscal transfers or other interventions. For example, targeted income assistance to low income groups could reduce pressure for discretionary tariffs.

2.3. Alternative Forms of Regulation

Alternative forms of regulation, e.g. price caps versus rate of return regulation, are not as distinct as they appear in theory when applied in practice.⁶ Price caps do not remain in place indefinitely – and incentives for cost reduction are blunted to the extent that price caps are reset in line with costs. In addition, neither form of price control in and of itself provides investors with an assurance that they will recover their costs over the life of an asset.

The threat of regulation, which forms an integral part of New Zealand's system of "light handed" regulation, may be less distinct from actual regulation than it first appears (provided, of course, that it is effective in constraining monopoly behaviour). For example, if prices are held down by the threat of regulation the utility will tend to under-invest in provision of service quality. In addition, to the extent that the threat of regulation forces a utility to maintain prices in line with costs, incentives for cost reduction may be diminished. Finally, the extent to which the problem of commitment can be addressed under "light handed" regulation is unclear.

⁴ Hal Varian. 1992. "Microeconomic Analysis". Norton & Company Inc.

⁵ Vickers and Yarrow. 1988. "Privatisation – An Economic Perspective. The MIT Press.

⁶ Weisman, D.L. 1993. "Superior regulatory regimes in theory and practice". *Journal of Regulatory Economics*: 5.

In assessing New Zealand's "light handed" regulatory regime, a critical question is the extent to which it addresses the problems of monopoly on the one-hand, and involves (or addresses) the problems of regulation on the other.

2.4. Pros and Cons of Regulation

Regulatory powers can be used to reduce or constrain prices in the short run. In the longer term the task of regulation is more difficult due to the need to ensure continued incentives for efficient provision of the service. Regulation can in principle improve on problems of excessive pricing and under supply (allocative efficiency) at the expense of some regulatory costs. In addition, in doing so regulation will redistribute income between owners of a network monopoly and consumers, and potentially among consumers. Regulation may also be used to reduce the scope for network utilities to engage in exclusionary behaviour aimed at deterring competition from new entrants (for example, by granting network access on unfavourable terms).

Regulation involves administrative costs: for example, the UK water regulator Ofwat has an annual budget of approximately £10 million.⁷ In addition, regulated companies will incur compliance costs, and costs associated with analysis and advocacy in relation to regulatory arrangements. We note, however, that costs associated with "influence" activities focussed on the government and officials may occur in the absence of regulation, in an effort to maintain the status quo.

Regulation involves the following potential economic effects:

1. *Difficulty preserving incentives for efficient investment.* Regulation, or the threat of regulation, involves the risk of opportunistic behaviour, thereby discouraging efficient investment and long term efficiency. In addition, it is difficult to preserve appropriate incentives for investment under regulation even if problems of opportunism could be overcome.
2. *Reduced incentives for short term operating efficiency.* Cost plus regulation, or price caps that are periodically reset by reference to actual costs, blunt incentives for efficiency.

While the problem of monopoly is essentially static (prices above costs), the problems of regulation are dynamic, relating to long-term investment (and short term price caps). Recognising and minimising inefficiencies in long-term investment associated with regulation is a key element of the design of sound regulatory institutions.

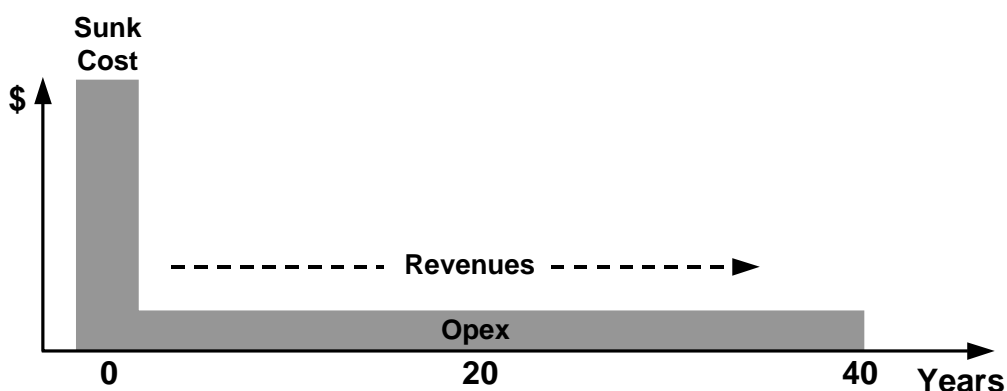
⁷ Ofwat. 1997. Director General's Annual Report 1997.

2.4.1. Incentives for efficient investment

In the long run the costs of network utilities are determined to a large extent by the efficiency of investment, and its cumulative effect on the capital stock of the industry. In commercial relationships long-term contracts are typically utilised to reduce the scope for opportunism when long lived sunk assets are involved.⁸ However, regulation itself introduces the risk of opportunism whereby regulators are tempted to ignore sunk costs in setting prices.⁹

Figure 2.1 illustrates the underlying problem – the revenues required for the business to remain viable need not provide a return on sunk investments.

Figure 2.1
Regulators may Prevent Recovery of Sunk Costs



Suppose that, first, the regulator announces the price that may be charged in the first regulatory period. The firm then chooses whether or not to make a sunk investment. After this, at the end of the initial regulatory period, the regulator has the opportunity to change the price cap.

Following investment, the regulator, wishing to maximise the benefit to consumers after investments have been made, would set a price that covers operating costs but does not give the firm a return on sunk investment costs. However, anticipating this, the firm foresees that it will not gain an adequate return on the investment project and declines to invest.

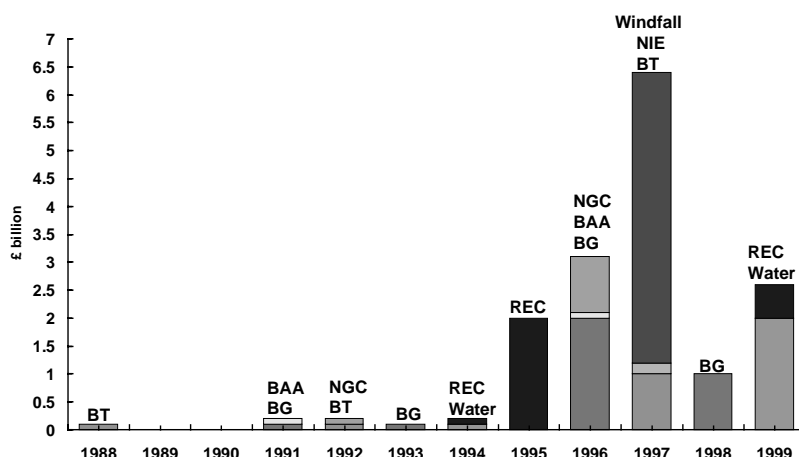
⁸ See, for example, "The Performance of Long Term Contracts: Further Evidence from Coal Markets," Working Paper of the Department of Economics, Massachusetts Institute of Technology, February 1989.

⁹ Bruce Greenwald. 1994. "Rate base selection and the structure of regulation". *The Rand Journal of Economics*: v15(1).

Resolving regulatory opportunism is a key problem for regulation (as it is in a number of other areas of government policy).¹⁰ The solution cannot rely on giving discretion to well intentioned individuals, since their optimal behaviour may be opportunistic (see Box 2.1 for examples of opportunism in the UK). An approach must be found that ties the hands of regulators (or allows them to tie their hands).

**Box 2.1
Regulatory opportunism in the UK¹¹**

The following figure shows the impact on the present value of UK utilities from a series of “rule” changes. Initial reviews, up to the 1995 Regional Electricity Company (REC) price review, more or less validated the NPV of the price controls set at privatisation. The first significant rule change was in 1995 when the proposed price caps for regional electricity companies were revised following a take-over offer. A series of “rule” changes followed, including the windfall tax in 1997, which extracted £5.2 billion from the privatised utilities. The impact on the water industry shown for 1999 depends on the outcome of the current price review. (Note that the values given are calculated changes in the NPV of the business, not observed changes in market value which reflect many factors including anticipated changes.)



¹⁰ Persson and Tabellini. 1990. “Commitment versus discretion in wealth taxation” in *Macroeconomic Policy, Credibility and Politics*. Harwood academic publishers; and Kydland, F and Prescott, E. 1977. “Rules rather than discretion: the time inconsistency of optimal policy plans”. *Journal of Political Economy*, Vol 85, No 3, P619-637.

¹¹ Based on forthcoming address by Graham Houston (NERA) “Regulatory Risk and the Cost of Capital” to Utility Regulation Summit ‘99. May 26 1999, London.

Even if the problems of regulatory opportunism can be overcome, ensuring efficient investment is likely to remain difficult under regulation. Optimal investment involves dynamic choices by firms taking into account a project's payoffs under alternative outcomes. The regulator typically faces a trade-off between detailed oversight of investment decisions (blunting managerial incentives for efficiency), or a more hands-off approach which, while flexible, cannot provide appropriate incentives for efficient investment since regulators cannot replicate the incentives that would operate if project returns were uncapped.¹² Aside from overcoming opportunism, this is one of the most difficult areas to "get right" in regulatory systems.

2.4.2. Incentives for short term efficiency

In order to provide incentives for short-term efficiency, prices must be fixed so that the regulated firm profits from cost reduction. However, in the absence of perfect foresight, prices and costs will inevitably diverge, leading to pressure to reset prices in line with costs, thereby undermining incentive to reduce costs.¹³ While price caps with no provision for revision have been put in place in some instances (for example, the New Zealand Telecom "Kiwi" share which caps line charges) a growing gap between costs and prices may still ultimately trigger recontracting. To the extent that utilities anticipate and manage the risk of recontracting by passing a greater share of cost reduction to customers, the incentive to make such savings is diminished.

To illustrate the incentive effects of periodically resetting price caps, under a five year duration "RPI - X" price cap, regulated companies would retain only 7-29 per cent of efficiency gains in net present value terms (depending on the timing of savings).¹⁴

In principle, the trade-off between resetting prices in line with costs and incentives for cost reduction might be overcome if an external or exogenous benchmark could be used. This has been attempted in the UK, for example, by comparing the performance of the independent water companies through an informal variant of "yardstick competition".

In practice it has proved difficult to isolate genuine efficiency differences from cost differences due to different circumstances. In addition, a seminal article on yardstick competition noted "*It is essential that the regulator commit himself not to pay attention to the*

¹² Since a single fixed allowed rate of return will not be appropriate for projects with different risk characteristics, or involving real options (where the option of deferral exists under conditions of uncertainty and irreversibility).

¹³ In a competitive market firms are price takers and an individual producer is better off to the full extent of any cost savings, compared with a situation where that producer makes no savings, thereby ensuring strong incentives for cost reduction while maintaining prices in line with costs.

¹⁴ Brian Williamson. 1998. NERA Topic 20 "*Incentives and Commitment in RPI - X Regulation*". October. www.nera.com.

*firms' complaints and to be prepared to let the firms go bankrupt if they choose inefficient cost levels."*¹⁵

Faced with a choice between undermining the financial viability of a possibly efficient company, and rebasing allowed revenues in line with costs, regulator may be reluctant to chose the former. Complete reliance on yardstick competition does not, therefore, appear credible, and the trade-off identified above remains.

We conclude that regulation involves a trade-off in the short term between maintaining prices in line with costs, and preserving incentives for cost reduction in the long term.

¹⁵ Shleifer. 1985. "A theory of yardstick competition". *Rand Journal of Economics* Vol 16(3).

3. WHAT CONSTITUTES “GOOD” REGULATION?

3.1. Objectives of Regulation

At a general level, the objective of economic regulation might be overall welfare (profits for the regulated company and gains to customers through lower prices), or consumer benefits alone (through lower prices). Profits enter overall welfare via income to owners of the company.

A regulator acting as consumers’ champion would be concerned with short and long term prices alone, and would only leave profits with the regulated company to the extent that they motivated cost reduction in customers’ interests. A regulator acting as “social planner” concerned about overall welfare would take account of profits in their own right, in addition to the role of profits in motivating cost reduction.¹⁶

In the case of customers’ interests alone, society (and consumers) focus on long-term gains. Individual regulators, however, may focus on short-term gains to the detriment of long term incentives for cost and price reduction.

Regulation may also be concerned with the distribution of consumer surplus between different groups, and with promoting competition, internalising environmental externality, or promoting research and development, for example. We ignore these other objectives here, but note that their pursuit may be consistent with efficiency whether or not they are appropriate goals for an economic regulator.

3.1.1. Overall or consumer surplus?

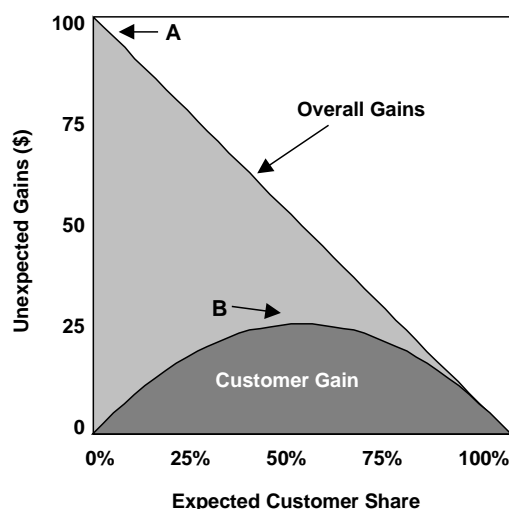
In a competitive market the maximisation of overall surplus (profits and consumer gains) is aligned with the maximisation of consumer gains. This is not the case under regulation, where regulated firms must be paid “information rents” (profits) in order to motivate cost reduction.¹⁷

Regulation designed to maximise overall surplus is different from regulation aimed at maximising consumer surplus alone. Figure 3.1 illustrates the point.

¹⁶ While it may be argued that this is no longer the case if the utility is foreign owned, and the “social planner” is only concerned with domestic welfare, there are reputational reasons for taking account of impacts on the value of the business.

¹⁷ Jean-Jacques Laffont and Jean Tirole. 1993. “A theory of incentives in procurement and regulation”. The MIT Press, page 76.

Figure 3.1
Trade-off between Customers’ Share of Efficiency Gains
& Incentives to Reduce Costs



If the regulatory objective were total surplus then point A, where the company keeps all of the gains from cost reduction, would be optimal (customers do not share unanticipated gains i.e. with a permanent price cap).¹⁸ If the regulatory objective were customer benefits alone, then the customer gain is maximised at point B where the product of outperformance and the customer share is maximised. Overall gains, and hence total welfare or “overall surplus” are lower than at point A, but consumers are better off. The cost in terms of lost efficiency is the cost of getting good information about minimum cost levels.

Practical experience around the world suggests that the “choice” of objective is likely to be limited. Customers’ interests are normally given prominence, and profits which are judged “excessive” may lead to “recontracting” by regulators and governments (for example, price caps in the UK have been re-opened between reviews, and the windfall tax was imposed on regulated utilities). It is therefore important to consider the likely stability of regulation in formulating the objectives of regulation.

Total surplus may be a “feasible” objective in some jurisdictions and not others, for example, depending on historical experience, attitudes, and whether other safeguards for vulnerable groups exist. However, a number of the features of good regulation set out in this section will be relevant regardless of whether the objective is overall surplus or customers’ interests alone.

¹⁸ Note that no allowance is made in the figure for allocative efficiency losses due to a divergence of prices and costs. Allowance for allocative efficiency losses would shift the optimum a little to the right.

3.1.2. Long or short-term customer interests?

Regulators may be tempted to offer short-term price reduction at the expense of lower costs (and prices) over time. This should be recognised in setting the objectives of regulation. For example, a recent review of regulation in the UK concluded:

"...regulators should consider consumers' long- as well as short-term interests, and the continuity, availability and quality of supply, as well as prices."
DTI. 1998¹⁹

3.1.3. Other objectives?

Regulatory regimes frequently specify a range of objectives (see Appendix for UK examples). It is not clear that this is efficient, since multiple objectives may reduce the accountability of regulators, increase regulatory uncertainty, and prove costly for regulators to achieve given the instruments available to them. However, it is an almost inevitable feature of legal drafting. Only practice and precedent can establish a guiding principle for making trade-off between objectives.

Pressure for objectives other than price control should be anticipated. For example, pressure may arise from a desire to achieve specific outcomes without the need to raise public expenditure, particularly if expenditure constraints are in effect. This was recently demonstrated in the UK's debate on the use of coal in power generation and support for the coal industry. Ensuring that clear and appropriate mechanisms are in place to protect public health and safety, address legitimate environmental concerns, and protect vulnerable individuals may reduce the need to address such concerns via the economic regulation of network industries.

3.2. Principles of "Good" Regulation

Actual objectives of regulation in different parts of the world may diverge from what we for the purposes of this paper consider "good objectives". However, in most cases, we think that governments and their regulatory regimes do attempt to meet the "long-term" and "efficiency" criteria, although some are more successful at doing so than others.

When we discuss "**long-term**" objectives, this implies that regulators should not be able to forfeit consumers' long-term interests (e.g. investment to secure a reliable supply in the future) in favour of short-term interests (e.g. price reductions during the regulator's term of office). When we discuss "**efficiency**", this implies the achievement of efficiency in operations and investment is a key objective which overlaps with other objectives (e.g.

¹⁹ Paragraph 16 of DTI review paper. 27 July 1998. "A Fair Deal for Consumers - Modernising the Framework for Utility Regulation - The Response to Consultation".

competition, where introduced, should be efficient; minimisation of regulatory risk encourages efficiency; the minimisation of transaction costs is a component of efficiency.)

Regulation needs to provide monopolies with proper **incentives** in order for them to aspire to the objectives of meeting long-term customer needs through efficient investment and operations. Companies will only have proper incentives if regulators can demonstrate some degree of **commitment** and **stability**. Commitment and stability in turn come from processes that require openness, transparency, consistency and accountability.

Thus, regulation should be:

- **open**: a process which allows interested parties to put forward their views and be challenged by others, providing maximum access to relevant information;
- **transparent**: the demonstrable use of available information where a regulator reaches decisions on the basis of observable data sources and a replicable (mechanistic) formula, in order to minimise the scope for discretion (otherwise the system might be prone to opportunistic decisions and regulatory risk);
- **consistent**: whereby the regulator uses a stable set of decision criteria to ensure that when change in regulatory methodology/practice is required, this can be done in a manner that is as acceptable and predictable as possible; and
- **accountable**: decisions should be reasoned and justified by reference to defined criteria (such as a list of regulatory objectives), so that they can be effectively challenged. This provides an incentive to reach good decisions.

The **independence** of a regulatory body is often cited as one of the most important characteristics of a regulator for ensuring long-term consumer interests and efficient business decisions. Where there is a perceived risk that there will be political pressure to tighten the deal for private investors (which would increase the cost of capital), good regulatory governance is critical; a regulatory agency must not be able to be dismissed or deprived of funds simply for making politically unpopular decisions.

However, independence is difficult to achieve. Regulators must be appointed, and therefore regulation is inherently tied to the political process (see Section 4 for examples of independence in the UK, the US and Australia).

It is also questionable whether absolute independence is desirable. Ultimately the regulatory agency's decisions must be **legitimate** in a democratic society. The requirement to balance the need for regulatory independence with the need to demonstrate legitimacy is critical. What gives legitimacy to regulatory decisions is process, not personnel:

- guiding principles for decisions (**consistency & accountability**);
- broadening the degree of participation in agency decisions (**openness**);

- transparent analytical procedures for decision-making (**transparency**); and
- appeal mechanisms (**accountability**).

By specifying the regulator’s duties and powers in law, the regulator can more easily be held accountable for its actions. This will also help ensure some degree of independence from political pressure.

3.3. Addressing Key Issues in Regulation

In essence the problems of regulation relate to recognising the trade-offs involved, providing appropriate incentives for cost reduction (and service quality), and committing to the preferred approach. The principles of good regulation set out in Section 3.2 embody broad approaches to addressing the problems of regulation. In reality the devil is in the detail – here we offer guidance on the areas that should be addressed. We do not, however, set out to describe an “ideal” regulatory arrangement in detail.

3.3.1. Fundamental trade-offs

The trade-offs involved under regulation should be recognised and addressed. In particular, regulation involves trade-offs between:

1. maintaining incentives for cost reduction while ensuring that prices are not too far out of line with costs (recognising that firms will earn “information rents”);
2. ensuring that firms have a reasonable assurance of cost recovery while limiting the scope for “gold plating” (due to guaranteed returns on investment); and
3. responding flexibly to new information while limiting the scope for regulatory opportunism.

These trade-offs are addressed in the discussion below.

3.3.2. Committing to the preferred approach

To deliver incentives for cost reduction any approach must offer both sufficient incentives and a reasonable assurance that the approach will remain in place.

Governments and regulators find it difficult to commit since they are in a position to change the rules and/or act retrospectively. We therefore believe it is unrealistic to envisage a long-term contract without making provision for adjustments and renegotiations at infrequent intervals. Box 3.1 illustrates approaches to regulatory commitment in the US, UK and Australia.

It is also important to consider the possible trade-off between approaches which appear technically “ideal”, assuming the regulator is an impartial judge of what is best, and

approaches which may be more transparent and replicable and therefore ensure greater accountability. A simple methodology may reduce the scope for opportunism and disagreement.

Box 3.1

Commitment in the US, UK, and Australia

In the US the *Hope Natural Gas* case of 1944 established that utilities should earn the opportunity cost of capital applied in other comparable uses – in order to attract investment. In addition, the Administrative Procedures Act (1946) and other legislation establish administrative rules and procedures which must be followed in making regulatory determinations.

In contrast, in the UK commitment mechanisms are relatively underdeveloped, and there are those who argue against transparency and *ex ante* commitment:

*“there are dangers in too much transparency”; and
“the best performance measure is often the new one, which is applied to ex post data, and which therefore cannot be manipulated”²⁰*

While Professor Whittington’s view is an extreme one that is insupportable in theory and in practice, regulators in the UK may have taken comfort from his views since a lack of clearly defined targets and rewards makes it more difficult for the public to appraise their performance.

However, even in the UK legal precedent may result in the narrowing of regulatory discretion. A decision by the Northern Ireland electricity regulator to disregard part of the decision by the MMC recently went to judicial review. The Appeal Court upheld the MMC decision in full. The recent DTI review of regulation also recognised the importance of creating long-term stability.²¹

Australian privatisation learned from the UK experience. Legislation and industry codes are highly prescriptive, narrowing the scope for regulatory discretion considerably compared with the UK. The approach in Australia has effectively “short-circuited” the evolution of institutional arrangements seen in the US.

Commitment may be built up from a number of elements including:

- clear objectives to which regulators can be held accountable;
- approaches which reduce dependence on the views and attitudes of individual regulators, for example, regulatory boards;

²⁰ Professor Geoffrey Whittington, 1998. *Water: maintaining RPI - X incentives*. Lectures on Regulation Series VIII. 3 November. The Institute of Economic Affairs and London Business School.

²¹ DTI. July 1998 *"A Fair Deal for Consumers - Modernising the Framework for Utility Regulation - The Response to Consultation"*.

- objective methods for setting the components of allowed revenues such as efficiency targets, the cost of capital, and tariffs etc;
- transparency in terms of mechanistic formulae and objective (ie observable and independent) data sources;
- a long-run agreement or contract including review procedures, performance monitoring, and provisions relating to renewal/termination of the contract;
- reducing pressure for re-contracting by eliminating the scope for unnecessary forecasting errors in setting future price caps, and linking costs to known price indices;
- an automatic rule for sharing profits rather than ad hoc revisions, if it is thought that regulators are likely to be concerned about profit levels between reviews;
- specified “low level” dispute resolution procedures to minimise the risk of fully reopening the regulatory contract; and
- legal dispute resolution and appeals procedures.

3.3.3. Providing appropriate incentives

Incentives for operating cost reductions and for efficient investment are key components of good regulation. Clear rules are required so that companies know what incentives are on offer, and can respond to them with a degree of confidence that they will receive the rewards on offer. In terms of incentives for operating cost reduction, key elements include:

- a systematic approach to the definition and classification of costs (both as a starting point for price or revenue formulae, and as an agreed basis for monitoring performance);
- an agreed basis for estimating anticipated efficiency gains (so that price or revenue formulae can be updated over time); and
- procedures for adjusting price caps in response to past out or under-performance based on actual costs, and/or exogenous and mandated cost changes (both within one formula and at subsequent reviews).

Firms will only invest if they have a reasonable assurance of cost recovery ie the cost of committing funds to irreversible investments will be recouped via retained cost savings and/or additional revenue allowances. In turn this requires the following building blocks:

- a record of the opening regulatory asset base (at privatisation, or at the last review);

- an agreed approach to depreciation and capital additions since the last review;
- the allowed rate of return; and
- forecast costs for the next period.

Box 3.2

Experience with Alternative Regulatory Plans in the US

In the US regulators have introduced Alternative Regulatory Plans (ARPs) under authority of state legislature. ARPs bypass traditional regulatory methods, but are designed to provide the same constraints on opportunistic behaviour by both the regulator and the company. The plans are voluntary and must be “in the public interest”. The ARP between the state of Maine's regulatory commission and Central Maine Power stressed the importance of a stable contractual relationship to create appropriate incentives:

*"[The ARP] represents a very positive step for regulation in Maine. [It] provides, under a very broad set of assumptions, a high degree of stability and predictability in electric rates for CMP customers. In light of the substantial and often unpredictable rate increases of recent years, these benefits are worth achieving. As a Commission, we have an obligation to mirror the effects of genuine competition to the extent consistent with our broader commitment to serve the public interest... [The] price cap provisions... together with the virtual elimination of the fuel clause, give incentives and create risks for CMP's management much closer to those found in less regulated companies."*²²

The plans include price caps and exogenous cost pass through provisions. The plans may also include profit sharing arrangements, designed to keep profits within acceptable bounds. For example:

The price Cap has a profit-sharing component that adjusts the subsequent year's earnings if the earnings are outside a +/- 350-basis-point bandwidth around the authorised cost of equity (currently 7.05% to 14.05%). CMP's current authorised cost of equity is 10.55%. The profit-sharing component will be in effect for each price change taking place on or after July 1, 1996. (CMP, p. 8)

Finally, the plans include “off-ramp” or “soft-landing” provisions which provide procedures for dealing with foreseeable risks and limits for determining when an ARP will be abandoned. For example, the CMP plan allows termination of the plan under two conditions:

First, if the Company's actual return on equity falls outside of the sharing mechanism deadband for two consecutive years, then CMP may petition the Commission for review of rates, revenue requirements and the overall ARP. Second, if the Company fails to achieve 90% of the Demand-Side Management targets adopted in the Energy Resource plan for two consecutive years, then any party may petition for a Commission revision or termination of the ARP. (CMP, p. 41)

²² State of Maine Public Utilities Commission, Docket No. 92-345 (II), 10 January, 1995.

In each case objective data and replicable formulae should be used where possible, even if the formulae is not “ideal”. Deviations and adjustments from the approach should still be possible, but only if they are negotiated and justified.

All of the separate elements of regulation must be specified carefully to ensure that regulators cannot subsequently undo sound incentive arrangements offered in advance of key decisions (see Box 3.2 on previous page which illustrates an approach to specifying a regulatory contract in the US). For example, a regulator may impose tougher *future* efficiency targets to remove *past* outperformance relative to previous targets. To reassure companies that unanticipated efficiency gains will be rewarded, an objective and transparent approach to setting future efficiency targets is required in addition to an agreed basis for sharing past outperformance.

In essence, the aim of regulation of network industries should be to specify a “contract” offering appropriate incentives, and including procedures for dealing with unanticipated events and disputes. The best regulatory policy does not shy away from the problems of regulation, but anticipates them and embraces them when setting revenues. When new problems arise – as they are bound to do – the best regulatory institutions investigate and identify the amendments least likely to undo their earlier good work. Regulation of long-term investment only works properly if every short-term decision reflects long-term objectives.

4. INTERNATIONAL EXPERIENCE

In this Section, we describe international experience of the economic regulation of network industries, focusing on the utilities sectors in the UK, US and Australia.

4.1. UK

In the UK, network industries underwent wide-scale privatisation in the 1980s and 1990s. In conjunction with the privatisations, a regulatory regime was established. This regulatory regime is therefore relatively young (e.g. compared to that of the US).

For the majority of the network industries in England and Wales, the regulatory regimes are characterised by:

- single-sector, national regulatory agencies (although a multi-sector regulator has in 1999 been appointed for the gas and electricity sectors);
- regulatory bodies headed by a single director;
- price cap regulation for networks (known as "RPI-X"); and
- periodic (three to five -year) price reviews.

Sector-specific Acts of Parliament (e.g. Electricity Act 1989) are the formal contract between the privatised companies, their regulators, and consumers. In addition to the sector-specific Acts and the individual company licences, there are other acts that legislate the behaviour of the privatised companies. These include the Competition Act 1998 and various EU Directives (e.g. Bathing Waters Directive).

4.1.1. Evolution to current regulatory regime

The first decade of regulation did not see the emergence of clear principles or precedents of regulation. The present Government is looking into regulatory reform, and thus the frameworks may evolve to include new objectives for the regulators because of the previous lack of attention to institutions and rules.

The main objectives of *privatisation* were to raise finance (to raise revenue from flotation and to bring in private capital to fund much needed investment), to improve the efficiency of the enterprises (through competition where possible and through incentive-driven regulation where not - at least immediately), to shift control to the private sector (which had a stronger bargaining position with the unions and could impose more credible budgetary limits), and to widen share ownership. The most powerful economic justification for *regulation* was to limit prices for "natural" monopoly industries characterised by large sunk costs and economies of scale.

In 1983, the "Littlechild Report" on price regulation for British Telecommunications recommended the RPI-X form of price control for the industry. This form of regulation has been used throughout most regulated industries in the UK ever since.

Privatisation and regulation have met many of the original high-level objectives of industry reform. Loss-making and/or debt-incurring network industries have been removed from the government's purse, and privatised industries making profits, paying taxes, and running more efficiently have emerged.

However, over the past few years, the failures of the current regulatory regime have come to light. In part, the failure to achieve a popular consensus for privatisation may have contributed to the failures of the current regulatory regime, which are mainly:

- inadequate industry restructuring prior to privatisation, leaving segments of the network industries as large vertically integrated monopolies (e.g. gas) and/or inadequate divestments (nuclear energy and electricity generation in the hands of a duopoly) which made regulation more problematic and which led to a wider scope for regulation than what might have been necessary;
- lack of specification of regulatory rules and procedures, leaving the regulators with wide discretion on how they adjust the basis on which companies are rewarded, leading to regulatory opportunism and on-going uncertainty;
- a lack of clear precedent from the appeals process via the Monopolies and Mergers Commission (now known as the Competition Commission); and,
- lack of forethought of the complexities of price-cap adjustment at periodic reviews, especially in relation to incentives and requirement to consider cost-levels. This has been exacerbated by the previous two issues.

The first issue has been attempted to be resolved by, for example, the break up of British Gas and the requirement for National Power and PowerGen to divest of some of their generating capacity. Competition has also been introduced in telecommunications, electricity and gas supply, and is being contemplated in water.

The latter related issues have roots in institutional problems. The UK regulatory framework has left many of the rules and procedures of regulation loosely defined. Although the obligations of the regulator are stated (although vague), the regulators are not required to set out the basis upon which they arrive at a decision. As a consequence, regulation in the UK is less subject to judicial review, and decisions are left unexplained.

Discretionary behaviour is manifested by the lack of clear precedents provided by past MMC decisions. Because there is no legal requirement to consider precedent on the part of the MMC; because each Commission panel is separately constituted so the decision is the decision of the members of that panel and not the MMC as an institution (hence the existence of dissenting opinions in some cases); and, due to the deliberate hedging and

placing of caveats on most statements so as not to fetter the discretion of future panels, it is difficult for companies to challenge MMC decisions under judicial review.

However, UK legal precedent may be narrowing in terms of regulatory discretion. A decision by the Northern Ireland electricity regulator to disregard part of the decision by the MMC recently went to judicial review. The Appeal Court upheld the MMC decision in full. Also, the DTI has released in July 1998 *Modernising the Framework for Regulating Utilities* to institute regulatory reform which, among other things, proposes a more transparent framework with greater emphasis on ensuring predictability and consistency of regulatory decisions.²³ Along-side the DTI review, other changes may widen the scope for judicial review, while competition and new rules regarding competition (and monopoly abuse) have been implemented (e.g. Competition Act 1998). We discuss the existing regime as well as recently proposed reform in more detail below.

4.1.2. Objectives of regulation

4.1.2.1. What are they?

The duties and functions of each of the utility regulators in England and Wales are set out in the primary legislation relating to that sector. In all cases, the duties of the regulator are shared with the Secretary of State. The following regulatory duties - or, objectives - apply to most of the network industries in England and Wales:

- protect consumer interests;
- meet reasonable demands;
- ensure adequate financing;
- promote ("secure" or facilitate") competition;
- promote efficiency;
- promote R&D/innovation;
- safety; and
- protect the environment.

These objectives and the statutes that support them are described in detail in the Appendix.

²³ DTI. July 1998 "A Fair Deal for Consumers - Modernising the Framework for Utility Regulation - The Response to Consultation".

Furthermore, in the Department of Trade and Industry's recent initiative to ensure a "Fair Deal for Consumers" in the creation of a new regulatory regime for the combined gas and electricity sectors, the following regulatory objectives have been listed:

- transparency;
- stability;
- predictability.

However, it is questionable whether the DTI's proposals for a new energy regulatory regime actually meet these criteria, especially as a desire for flexibility has also been expressed.

The duties of each sector regulator in England and Wales are outlined in their respective Acts of Parliament. The main Acts are the:

- Electricity Act 1989;
- Water Industry Act 1991;
- Railways Act 1993;
- Airports Act 1996;
- Telecommunications Act 1984; and
- Gas Act 1986.

The DTI has recently outlined what it believes should be the future duties and objectives of utility regulation. The Government has stated in its response to the consultation on utility regulation that it intends to introduce legislation placing a new single primary duty on the regulators requiring them to:

"protect the interests of consumers, wherever possible and appropriate through promoting effective competition. The interests of consumers should be interpreted to include prices and conditions of supply, continuity and availability of supply, quality of supply, and where relevant, the range of services offered. In defining the interests of consumers, due weight should be given to their longer- and medium-term interests as well as to their immediate or short-term interests. The duty should also make explicit the need to ensure that regulated companies are able to finance the carrying out of their functions". (Proposal 3.1)²⁴

In addition, the Government proposed a new secondary duty on regulators to have regard to Ministerial guidance on social and environmental objectives. The guidance would be

²⁴ DTI (July 1998), *A Fair Deal for Consumers: Modernising the Framework for Utility Regulation. Response to Consultation*.

subject to full consultation, including with Parliament.²⁵ Existing duties in respect of the elderly, disabled, energy efficiency, etc, will be retained, although legislation will be introduced to extend regulators' duties to cover low-income consumers and the chronically sick (Proposal 2.2). Where the Government wishes to implement social or environmental measures which would have significant financial impacts on consumers or companies, it would be required to implement these through new, specific legal provisions rather than through guidance to regulators (Proposal 2.3).

In March, 1999, the UK Treasury in its Comprehensive Spending Review reiterated these objectives. The Treasury also placed emphasis on the role of competition: "the regulatory system is designed to protect the interest of the consumers by promoting competition, and policing the market place during the transition to fully competitive markets".²⁶

4.1.2.2. *How are objectives achieved?*

Regulators in the UK have attempted to provide incentives for efficiency by:

- setting objectives for efficiency (e.g. through efficiency comparisons, productivity comparisons, and price caps);
- systematic regulatory treatment of costs (e.g. through systematic classification of costs, Regulatory Accounting Guidelines in the water sector, investment approval procedures);
- some retention of savings (e.g. capex and opex savings); and,
- relating expenditure to defined outputs and service standards.

However, many of these issues are still being debated (e.g. treatment of costs), and a clear and consistent methodology by which regulators provide incentives for efficiency has not been established across the sectors.

4.1.3. Institutional design/characteristics

4.1.3.1. *Process: rate-making, appeals, arbitration*

Under the system of price-cap regulation in the UK, the control of tariffs usually operates by limiting the weighted average annual increase in charges for a basket of principal outputs to the annual change in the Retail Price Index (RPI) plus an adjustment factor, often known as "X" (or, "K" for the water and sewerage sector). Each company's X factor is set for three to five years.

²⁵ DTI (July 1998), *op.cit.*, Proposal and Conclusion 2.1.

²⁶ Department of Treasury, *Public Services for the Future: Modernisation, Reform, Accountability, Comprehensive Spending Review: Public Service Agreements 1999-2000*, March 1999.

Additionally, there are in some cases cost pass through provisions which allow X to be altered each year in certain circumstances. The cost pass through arrangements were designed to cater for the significant uncertainties which prevailed at the time of the UK privatisation and, in the case of certain industries, relate to the large capital expenditure programmes being implemented to meet higher quality (and environmental) standards being introduced over the next decade.

The sector regulators each follow their own process and timetable for their respective price reviews. The water sector regulator, Director General Ian Byatt of Ofwat, has been the most forth-coming in disclosing and meeting price review timetables as well as issuing consultation papers outlining the framework and principles for reviews. However, even Ian Byatt has behaved in a non-transparent and arguably opportunistic manner. For example, the "glide path" intended to pass on past efficiency gains to consumers instituted in the 1994 price review is to be removed. In addition, Ian Byatt's approach to final determinations at the last review was far from transparent. Finally, the approach to the current review may also prove non-transparent as the following quote from the Director General illustrates:

*"Ofwat will not be releasing the software to companies. It is for the companies to decide whether to accept our price limits, not to replicate our work."*²⁷

There is no formal requirement on the sector regulators to consider or to seek representations from third parties when resetting the price control formula, although some customer groups must be consulted regularly on all relevant issues. There is a limited degree of bilateral negotiation between individual companies and the regulator but there is no requirement on the regulator to justify its decisions. A company has the right to appeal the regulator determinations to the former Monopolies and Mergers Commission (MMC) - now known as the Competition Commission.

4.1.3.2. *Regulatory characteristics*

Independence

The sector-specific regulators of network industries in the UK are set up as independent regulatory bodies, and are in fact often referred to as "independent regulators" in the popular press. To ensure a degree of independence from politics, regulators are not part of a Government Ministry, and are not elected but appointed for fixed terms. They can only be removed from office in the case of incapacity or misbehaviour.

Invariably, the network industry regulators are not wholly independent. They are appointed (and in some cases re-appointed) by their respective sector Ministers. They must operate under relevant laws, which are established by Parliament. They are also subject to political pressure, and due to such pressure may consider issues that they may not otherwise

²⁷ "Byatt rejects access to pricing model," *Water Magazine*, 4 December 1998.

have considered (e.g. increased emphasis on leakage issues after the Labour Government's Water Summit declared it an important topic). However, the fact that regulators place some emphasis on issues consumers consider important is more a reflection of demonstrating legitimacy in a democracy rather than a reflection of poor regulatory corporate governance.

"Transparency, Consistency, and Predictability"

In announcing the Government's review of utility regulation on 30 June 1997, Margaret Beckett, then President of the Board of Trade, set out objectives for the review which included that the: "guiding principles must be transparency, consistency and predictability of regulation."

The Government's proposals state that:²⁸

- individual regulators should be replaced by small executive boards (Proposal 7.1);
- regulators be placed under a statutory duty to consult on and publish their forward programmes and a code of practice on their consultation and decision-making processes (Proposals 7.3-7.5);
- regulators be placed under a statutory duty to publish reasons for key decisions (Proposals 7.3-7.5);
- there be additional rights and requirements for regulators to publish company information (Proposals 7.6 and 7.7);
- there be a duty on regulators to debate matters of common interest, with a view to developing a consistent approach to regulatory methodology (Proposal 7.8);
- regulators should align the bases of regulatory reporting with formal accounting standards where possible (Proposal 7.10).

The DTI framework for modernising utility regulation is in many ways a step in the right direction to increasing transparency and reducing regulatory uncertainty which has pervaded the system since privatisation.

Commitment

Since the establishment of the regulatory regime for network industries in the late 1980s, commitment has not been demonstrated and regulatory rule changes have been prevalent (see Box 2.1 for more examples of regulatory opportunism in the UK). The first instance which marked a regulatory rule change was in 1995 when the regional electricity companies' 1994 price adjustments were revisited by the regulator immediately after they had been

²⁸ DTI (July 1998), *op.cit.*, Section 7 ("Better Regulation").

announced, though not yet implemented, because ensuing mergers suggested further scope for savings. Rule changes also took place in the UK gas industry. NERA estimates that the impact on the NPV of regulated business from regulatory rule changes in the UK since privatisation amounts to over £12 billion.²⁹ Note that the concern is not that regulation has necessarily become tougher, but that there have been instances where regulators have reneged on prior commitments and/or have made retrospective rule changes, demonstrating opportunistic behaviour which damages company incentives to invest (and thus damages long-term consumer interests).

Accountability

In future, regulation in the UK may provide greater scope for judicial review. For example, the European Convention on Human Rights (which will be incorporated into UK law at the end of 1999/early 2000) includes the right to a fair hearing under Article 6, and the right not to be arbitrarily deprived of one's possessions under Article 1. This may open up new avenues to challenge regulators. In addition, recent developments in European telecommunications law may allow a person wishing to challenge a decision of the DTI or Oftel in respect of telecommunications to argue that conditions included in licences do not meet the tests of being "least onerous", proportionate, non-discriminatory and transparent. These changes may pervade into other sectors as well.

The UK Competition Act may also force a more accountable, consistent regulatory regime through the requirement that regulators have to provide reasons for their determinations under the Act. This would create pressure on regulators to behave consistently (in terms of the substance of decisions) and possibly rely on precedents more so than in the past.

4.2. US

In the US, network industries are for the most part investor-owned, except for the water sector where municipal ownership is more common.³⁰ Regulation of the network industries is divided between the federal government and the individual states. The federal regulators, following Article I, Section 8 of the US Constitution, deal with those network operations that can be called "interstate commerce" (e.g. interstate gas transportation and high-voltage electricity transmission). The states regulate the local distribution of network services.

The US Constitution, in the form of the Interstate Commerce Clause, enumerates specifically the economic powers delegated to the federal government. All other government powers related to regulation are reserved for the fifty individual states under the police powers delegated to them. These include the power to regulate business to safeguard the health,

²⁹ Based on forthcoming address by Graham Houston (NERA) "Regulatory Risk and the Cost of Capital" to Utility Regulation Summit '99. May 26 1999, London.

³⁰ Investor ownership of utilities is most prevalent for gas and electricity companies - but there are still large numbers (i.e., hundreds) of small, municipal utilities in the gas and electricity distribution businesses.

safety, morals and general welfare of its citizens.³¹ Most state commissions also have the authority to issue licences, franchises or permits for the initiation of services, and to prescribe or change rates, and prescribe uniform systems of accounting and publication of annual reports.

4.2.1. Evolution to current regulatory regime

Regulation of the network industries has a long history in the US. There was little regulation after Revolutionary War and War of 1812 - competition through franchises granted locally was relied on to protect consumer interests. However, it was quickly apparent that some form of regulation was needed, especially for certain industries/monopolies. Therefore, common law was adapted from England. Monopolies were seen to be against the public interest, and certain occupations were labelled "common callings". Court decisions declared how the firms should be regulated.

Problems with common law and franchise control arose when some businesses extended beyond local areas. Common law was expensive, while franchises were contracts (according to the Supreme Court at that time), and therefore could not be impaired by the state, and thus "regulation" was inflexible and slow. In reaction, federal and state regulatory commissions started to develop in the period right before the Civil War of the 1860s. The first US federal regulatory commission, the Interstate Commerce Commission, was established in 1887 and the first two state commissions, New York and Wisconsin, were started in 1907. However, the regulatory commissions basically followed the rate-making "formula" suggested by court rulings.

The early history of regulation in the U.S. was characterized by notorious accounting abuses, including overstated expenses, unverifiable investments in plant and equipment, a lack of separation between utility and non-utility businesses and overcapitalization.³² Such abuses were effectively ended with the adoption by the federal government in 1938 of the Uniform System of Accounts for the regulation of the natural gas industry. Since that time, various forms and amendments of the Uniform System of Accounts have been the basis for all federal and state utility regulation in the US.

The early history of public utility rate regulation in the US also revolved around the task of determining the "fair value" of the capital stock to be used to set prospective utility prices. The US Supreme Court, in an 1898 decision, directed that the standard of "fair value" was to form the basis of the valuation of utility property used in rate-making. This decision, which held for almost 50 years, created a difficult time for utility price regulation in the US and left regulation

³¹ Phillips, Charles F. *The Regulation of Public Utilities: Theory and Practice*, Public Utilities Reports Inc, 1993.

³² Phillips, Charles F. Jr., *The Regulation of Public Utilities*, Public Utilities Reports, 1993, pages 216-217.

in the hands of court dictate. The problems were that "value" had a particularly vague definition: on the one hand it could mean the cost of reproducing the assets; on the other it could mean the market value of the assets.

The *Hope Natural Gas* case in 1944 marked a clear shift away from court-dictated regulation and complicated questions of asset valuation toward a clearer set of standards for the state regulatory commissions - and hence less reliance on the courts. The role of the courts, it declared, was to interpret whether federal and state statutes were unconstitutional - not to determine how regulators should regulate. This became known as the "end result" criteria. In addition, in 1946 the Administrative Procedures Act (APA) was passed. The APA set out the administrative rules and procedures (not pricing methodology) which would need to be followed in making regulatory determinations.

Together, *Hope*, the Uniform System of Accounts and the APA provided regulators with a large amount of discretion in choosing the methodology through which a "fair" return would be calculated, but at the same time provided a strict set of rules whereby regulators came to and explained their decisions. *Hope* also states that a "fair return" should provide companies with the opportunity cost of capital as applied in other comparable uses so as to attract investment, by giving the company a revenue which covers both a return on capital (profits) and return of capital (depreciation).³³ Once the methodology for calculating a "fair return" was determined, a regulator should be prepared to explain *why any departures in methodology or process were implemented*, potentially subjecting the decision to judicial review. The *Hope Natural Gas* case and the APA are discussed in more detail below.

Today, all 50 states and the District of Columbia have regulatory commissions. In addition to the state commissions, the Federal Energy Regulatory Commission (FERC) regulates interstate commerce by gas and electricity utilities, and the Federal Communications Commission (FCC) regulates interstate telecommunications.

The main body of law in the US which all federal and state institutions must abide by is the US Constitution. Integral to the Constitution are the safeguards for private property. The limitations on control of business by the federal government are found in the Fifth Amendment: "*No person shall...be deprived of life, liberty or property without due process of law, nor shall private property be taken for public use, without just compensation.*" The Fourteenth Amendment states: "*No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any state deprive any person of life, liberty, or property, without due process of law...*" Note that neither of these amendments rules out the taking of private property. However, due process plays a vital role in regulation and judicial review.

³³ If the return on capital is set equal to the cost of capital (which is normal practice), the return of capital must cover full depreciation (i.e. investors must be able to recover the full cost of any investment over its life - including any decline in asset values, whether due to 'wear and tear' or revaluations).

The present regulatory structure in the United States, both on a federal and on a state level, is the end product of a myriad of statutes and court decisions such as the *Hope* decision and the APA. We think these statutes and decisions may briefly be summarised in terms of three rights and four obligations accorded to regulated utilities.

Rights

- (i) Utilities have the right to charge just and reasonable rates which provide the opportunity to cover all costs, including a reasonable rate of return on the capital invested in the enterprise. A reasonable rate is interpreted as a rate sufficient to attract new capital in the capital market.
- (ii) Utilities have the right to special powers to take private property if it is in the public interest to do so. Such "takings" of property must be justly compensated.
- (iii) The utility has the right to operate under reasonable rules and regulations, such as normal office hours, prompt payment and service deposit requirements.

Obligations

- (i) The utility is obliged to serve all customers who are willing to pay the prescribed rates.
- (ii) The utility is obliged to provide safe and adequate service.
- (iii) The utility is obliged to charge rates that are just, reasonable, and not unduly discriminatory.
- (iv) The utility is obliged to have the approval of the regulating authority before extending, altering, or abandoning any service.

These rights and obligations provide focal points for the regulatory commissions and their staff. Regulatory commissions and their staff provide continuous oversight to ensure that utilities are carrying out their obligations.

4.2.2. Objectives of regulation

4.2.2.1. What are they?

The basic regulatory objectives that have been employed by the state and federal regulatory commissions in the US (and observable through various precedents) include: ³⁴

- preventing excessive (monopoly) profits and unreasonable (inequitable) price discrimination

³⁴ Phillips, Charles F. *The Regulation of Public Utilities: Theory and Practice*, Public Utilities Reports Inc, 1993.

- assuring adequate earnings to the utility to enable it to maintain credit quality and hence expand as demand requires (including allowing cost recovery unless unreasonably excessive)
- ensuring service provision to the maximum number of customers
- promoting development and industry in certain regions
- ensuring maximum safety
- ensuring management efficiency.

Setting tariffs, or, "rate-making" has dominated regulation in the US. The precedents set by the Supreme Court and lower courts on the appropriate rate of return is essential to understanding the regulatory objectives in the US. The Supreme Court has indicated several economic criteria for regulation, including: maintaining the financial integrity of the utility; enabling the utility to attract necessary capital to meet the needs of customers; and, providing a return on equity that is commensurate with returns on other investments with similar levels of risk.³⁵ Therefore, by combining the commercial and social objectives of economic regulation, a "virtual range" for rates of return has been created:

*"There is a range of reasonableness within which earnings may properly fluctuate and still be deemed just and reasonable and not excessive or extortionate. It is bounded at one level by investor interest against confiscation and the need for averting any threat to the security of capital...At the other level it is bounded by consumer interest against excessive and unreasonable charges for services."*³⁶

The need to balance consumer welfare with being "fair" to businesses is also reflected in New York State's Public Service Commission's mission statement:

*"Our purpose is to ensure that New Yorkers have access to competitively priced, high quality utility services provided safely, cleanly, and with maximum customer choice. We will be innovative, fair, and responsive in balancing the needs of customers, service providers, and all others."*³⁷

4.2.2.2. How are objectives achieved?

Regulators in the US have attempted to provide incentives for investment and operational efficiency by:

³⁵ US Supreme Court *Permian Basin* decision, 1968.

³⁶ *Pennsylvania Public Utilities Commission v. Bell Telephone Co.*, 1962.

³⁷ www.dps.state.ny.us/mission.html, 8 April, 1999

- setting objectives for total efficiency (e.g. through total factor productivity trends and increasingly through price cap regulation);
- systematic regulatory treatment of costs (e.g. NARUC standardised accounting);
- relating expenditure to defined outputs and service standards (e.g. investment targets in telecommunications); and,
- a reasonable assurance of cost recovery.

In addition, each state generally has a Public Service Law, and possibly energy and other sector laws. However, the Public Service Laws are often much broader than the respective sector Acts of Parliament in the UK (e.g. Water Industry Act 1991), and therefore leave more room for interpretation. For example, under "Powers and Duties of Public Service Commission" for the state regulatory agency in New York State, it simply states:

*"The commission shall encourage all persons and corporations subject to its jurisdiction to formulate and carry out long-range programs, individually or co-operatively, for the performance of their public service responsibilities with economy, efficiency, and care for the public safety, the preservation of environmental values and the conservation of natural resources."*³⁸

It is accepted and expected that court precedents provide the guidance for regulators in interpreting the vague federal and state laws, which often date back several decades. The *Hope* has set a precedent on the determination of the appropriate rate of return network industries should earn. *Hope* implies only in exceptional cases will costs not be allowed to be recovered. One such example is the nation-wide ruling on recovery of nuclear generating costs, where companies are able to recover their principal (depreciation) but not the interest (rate of return).

Although *Hope* says that regulators must allow investors a chance to earn the opportunity cost of capital by giving them a revenue which covers both the return *on* capital and the return *of* capital, *Hope* does not say how regulators should set revenues in order to meet the opportunity cost criterion. (As mentioned above, this was a major step away from the courts deciding how regulation should be conducted, but instead only concentrating on the "end result".) This in turn has left much room for discretion on the part of state regulators in determining pricing methodology.

To remedy the uncertainty that can ensue from year-to-year rate changes (characteristic of "rate of return" regulation) and the lack of a more detailed regulatory regime (in terms of regulatory discretion in determining what pricing methodology to use in determining "fair returns"), several states have begun to implement Alternative Rate Plans (ARPs). ARPs:

³⁸ New York State Public Service Law, Article 1, Department of Public Service.

- are voluntary agreements between regulated utilities and the state regulatory commissions which set out in contract the obligations of the utility over several years, and the allowed returns, often in the form of a price cap;
- set down procedures with dealing with foreseeable changes;
- must operate under the legal framework (US and state constitutions and related precedents as well as federal and state sector-specific laws), and all obligations required therein from both the regulators and the regulated utilities; and,
- give regulators the ability to revert to "normal" regulatory procedures.

The ARP between the state of Maine's regulatory commission and Central Maine Power stressed the importance of a stable contractual relationship to create appropriate incentives:

*"[The ARP] represents a very positive step for regulation in Maine. [It] provides, under a very broad set of assumptions, a high degree of stability and predictability in electric rates for CMP customers. In light of the substantial and often unpredictable rate increases of recent years, these benefits are worth achieving. As a Commission, we have an obligation to mirror the effects of genuine competition to the extent consistent with our broader commitment to serve the public interest... [The] price cap provisions...together with the virtual elimination of the fuel clause, give incentives and create risks for CMP's management much closer to those found in less regulated companies."*³⁹

It is important to note the arbitrariness of labelling regulation in the UK as "price cap" and in the US as "rate of return". Both regimes use various forms of price adjustment mechanisms: some parts of the UK electricity sector are regulated on the basis of rate of return, while price cap regulation has been used in the telecom industry in the US since the late 1980s. Increasingly network industries in the US are turning to some form of price cap regulation and away from "rate of return" or profit sharing. The use of "future test years" in rate of return regulation in the US, discussed below, also provides companies with incentives to reduce costs.⁴⁰

4.2.3. Institutional design/characteristics

4.2.3.1. Process: rate-making

There are two principal aspects of rate setting in a regulatory proceeding in the US. First, based on the regulated company's costs, the commission determines the total revenue to

³⁹ State of Maine Public Utilities Commission, Docket No. 92-345 (II), 10 January, 1995.

⁴⁰ Michael Einhorn in *Price Caps and Incentive Regulation in Telecommunications* (1990) states that rate of return in federal telecom regulation did not begin in order to protect consumer interests but so that AT&T did not predatorily price competitive services.

which the company is entitled for provision of service. Second, this total revenue is translated into a rate pattern yielding individual prices for each segment of service.

The state regulatory commissions fix prices by setting the "fair rate of return" (see the Hope decision) that companies can earn on their assets. The rates set by the commission remain in effect until the commission deems the rates to be too high or too low, which means that the review can take place at any time. The guiding principle for setting rates is cost-recovery. Of course, variations on this exist, as different sectors and states are turning to price-cap oriented regulation.

Using New York State as an example, a typical rate case begins with the selection of a 'future test year'. The future test year is usually the first year that the new rates would be in effect. All costs and revenues are then estimated for this future year, with the goal of determining what future rates will provide the company with a reasonable opportunity to earn a going rate of profit. The future test year calculations include the following:

- forecasts of operating expenses, including taxes and depreciation;
- forecasts of the utility's net investment in utility plant, on which it is allowed to earn a return;
- determination of the allowed rate of return which will be permitted on the utility's rate base; and
- adjustment of prices for individual segments of service, such that the total required revenue is generated with the most efficient pricing structure possible.

Not all commissions in the United States use a future test year as New York does. Many states still use an historic test year, in which past costs and revenues are used as the basis for setting rates. In spite of various, frequently ad hoc, adjustments to the historic rates, this latter approach often results in poor regulation because actual future net earnings are typically only weakly correlated with historic net earnings. The end result of historic test year regulation is that regulated companies frequently suffer wide, unpredictable swings in their earnings.

Thus, ARPs (mentioned above) have been developed by state regulatory commissions to provide greater incentives through a stable contractual framework. ARPs provide potentially greater gains for both customers and the regulated utilities by normally stipulating the following:

- the period between rate and/or price reviews (which often last for five or more years)
- what forms of cost will be passed through (normally only exogenous costs)
- penalties for failure to meet quality standards

- reporting requirements
- review procedures
- dispute resolution and arbitration.

Particularly interesting aspects of the ARP are that:

- usually prices, not returns, are capped
- quality standards are more explicitly set, and fines can be levied for poor performance
- "off-ramp" or "soft-landing" provisions provide for (a) procedures for dealing with foreseeable risks during the term of the ARP and (b) limits for determining when an ARP will be abandoned. For example, the Southern California Edison Company, in its ARP, "acknowledges the need for an escape valve, or off-ramp of sorts, in the event of a dramatic change in cost of capital."⁴¹

4.2.3.2. *Process: appeals and arbitration*

When investor-owned utilities wish to increase prices, they have to present a case to the State Regulatory Commissions. On receipt of a request for a rate increase, the regulatory commission typically requires the company to submit proof that such a rise can be justified. The evidence will then be examined in a public, quasi-judicial, arena, often presided by a hearing examiner or administrative law judge. Companies have the right to appeal about regulatory decisions to the State Supreme Court, but these appeals are limited to procedure and it is rare that the Supreme Court does not support the state regulatory commission's decision on matters of substance.

Judicial review plays a larger role in arbitration in US regulation than it does in regulating utilities in most other countries. In the US, all acts of legislatures and decisions of administrators are subject to judicial review. State courts can rule on the unconstitutionality of state statutes, and federal courts federal statutes. The final authority is always the US Supreme Court, which is the final interpreter of the Constitution. In particular, it must ensure that due process has been met, per the Fifth and Fourteenth Amendments of the Constitution.

Through time, judicial review has been seldom used to rule against regulatory commissions. Since a series of Supreme Court decisions in the 1930s (including the *Hope* case), appeals are largely limited to matters of procedure: if a commission makes a decision without following its stipulated procedures for examining evidence, calculating rates of return, measuring

⁴¹ Application of Southern California Edison Company to Adopt a Performance Based Ratemaking Mechanism Effective January 1, 1995. Decision 20 September 1996.

costs, etc, than the aggrieved party may appeal a decision to the courts which may in turn instruct the commission to re-make its decision following the specified procedure. The Court's view is that the commission and the commission's expert staff are presumed to be more qualified in making technical (i.e. substantive) decisions than the court.

4.2.3.3. *Regulatory characteristics*

Independence and accountability

The regulatory commissions in the US are often called "independent" commissions. They are seen as independent because they do not officially fall within any one of the three branches of government (executive, legislative, and judiciary). Both at the federal and state levels, several factors contribute to the characterisation of regulatory "independence":

- appointments are for defined periods
- no more than a majority of the commissioners can be from the same political party
- removal from office is difficult, unless some form of malfeasance can be proven.

However, "pure" independence, if there is such a thing for a regulatory body, does not exist in the US. The executive branch sets appointments. The regulatory commissions are created by legislative authority and depend on legislation for their powers (although regulatory laws are left deliberately vague so that regulatory commissions can apply the statutes how they think best, subject to judicial review). Furthermore, the concept of independence of the regulatory commissions has often been challenged on the grounds of legitimacy - if the regulatory authority is not accountable to the (elected) executive and legislature, this can pose problems of its own. In addition, under the US Constitution, the legislature cannot divest itself of its powers or duties. The regulatory commission can be delegated power from the state and federal legislatures - but the extent of that power will ultimately be determined by the legislatures. In this way, the executive and legislatures hold the commissions accountable. The commissions are in the end accountable to the judiciary, as their determinations are subject to judicial review.

Transparency

Regulatory decision-making in relation to the network industries in the US can be considered transparent. The APA sets out the basic requirements for the decision-making procedures of federal agencies and has served as a model for the states, which have adopted similar statutes. The manifest purpose of the APA was to give regulators - who before 1946 operated under what some legal scholars in the US believed was dubious constitutional legitimacy - a firm legislative, due process underpinning. That underpinning, however, required that regulators followed meticulous steps in terms of notifying parties of impending actions, calling for and examining evidence, and formulating their rulings.

The APA divides decision-making procedures between "administrative procedures", "negotiated rule-making procedures", and "alternative means of dispute resolution". The APA describes how information should be made public. It also discusses rights to representation, subpoena procedures, establishes testimony procedures of all parties, sets out the process by which an agency may reach a decision and what must be included in documentation, and defines the powers to impose sanctions.

The transparency of the process opens up opportunities for appeal when the regulator's decision does not meet the required standards. The desire to avoid appeal means that individual decision-makers take more care to ensure that their decisions are transparent and justified by the most reliable evidence.

Commitment

The US Constitution safe guards private property through the "due process" clauses of the Fifth and Fourteenth Amendments (discussed above). The "due process" clause and the potential for judicial review has ensured "commitment" on the part of regulators. This can be demonstrated by the recent debate on stranded assets, as markets - particularly energy - open up to competition.

For example, New Hampshire was intending to introduce competition into the energy sector without 100 per cent recovery for stranded assets. This has led to a drawn-out legal battle, whereby the liberalisation process has been stalled. In California, the debate on stranded assets lasted for several years after liberalisation was contemplated. It was decided that all customers must pay a stranded cost, or Competition Transition Charge, to their utility distribution company for specified assets.

4.3. Australia

4.3.1. Current regulatory regime

Australia, like the US, is separated into a federal and state governments. There are six states and two territories. A significant proportion of Australian network industries are government owned, generally at the state level. Privatisation is a relatively recent phenomenon, and has developed to the greatest extent in Victoria. Most utility services are also characterised by uniform prices across vast geographic areas.

Regulation of network industries has only been considered a priority over the last decade. The first state-based utility regulator was set up in New South Wales (NSW) in 1992. The IPART Act established the Independent Pricing and Regulatory Tribunal (IPART). IPART functions as a tribunal, holds public hearings and makes final decisions for a range of publicly- and privately-owned utilities. With the development of privatisation, the Office of the Regulator General Act (1994) established the Office of the Regulator-General (ORG) for Victoria. The Act sets out the ORG's objectives and its approach, and established it as a

single-person, multi-sector regulator. More recently, the 1996 National Competition Principles Agreement between all Australian state governments requires independent economic regulation (primarily through the presumption of third party access) of all network businesses, whether state or privately owned.

The Australian Competition and Consumer Commission (ACCC) is the federal competition policy agency and is now also the main federal regulatory authority for network industries. In the past, the ACCC acted primarily as a competition policy enforcement agency. However, the Competition Principles Agreement and the associated legislative amendments implemented at both state and federal level have significantly extended the ACCC's role to include arrangements for third party access to networks, including the pricing of network and other monopoly services.

The introduction of the National Electricity Code and the National Gas Access Code (Appendix to the National Gas Pipelines Agreement) have resulted in an increased role for the ACCC as a national regulator of both gas and electricity transmission, as well as providing a more consistent framework for the regulation of distribution assets by the individual state regulators. However, individual state regulators still retain a significant degree of discretion, and are subject to state-based legislation, in addition to the national codes. There is currently no national regulatory framework applying to the water sector, although the development of state-based arrangements for water sector regulation is a requirement of the Competition Principles Agreement.

The National Electricity Code was adopted at the start of the National Electricity Market (NEM) in December, 1998. The development of the Code was seen as consistent with national competition policy reforms and the objectives of the NEM. The NEM is overseen by the National Electricity Market Management Company (NEMMCO) and the National Electricity Code Administrator (NECA). (State and Territory jurisdictions, for example through the National Electricity, South Australia, Act in June 1996, have enacted legislation enabling NEMMCO and NECA to fulfil their roles within the various jurisdictions.) Western Australia and the Northern Territory are not covered by the National Electricity Code. The code specifies regulatory jurisdiction for transmission (the ACCC), distribution (the state regulators), and market rules (NECA).

The Gas Code was signed by each state in November 1997, and each state has either enacted or is in the process of enacting its own legislation to adopt the agreement, with only minor derogations.⁴² The Code provides a uniform national framework for third party access to gas pipelines, both between and within state jurisdictions. The Gas Code is intended to comply with the requirements of the Competition Principles Agreement. The Code specifies regulatory jurisdiction for transmission (ACCC), distribution (state regulators), and market rules (ACCC).

⁴² The exceptions are (i) Queensland, where substantial derogations are being sought and are currently under review by the National Competition Council and the ACCC, and (ii) Tasmania, which currently has no gas pipelines.

While there has been significant movement towards a consistent national framework, both code's give a degree of discretion to the state regulators so that differences in approach between (for example) IPART and the ORG can still have a material impact.

4.3.2. Objectives of regulation

4.3.2.1. What are they?

State Regulators

For New South Wales, Section 15.1 of the IPART Act sets out the factors that have to be taken into account by the Tribunal in conducting its investigation, and includes things such as "the protection of consumers from the abuse of monopoly power", "the appropriate rate of return on assets" and "the need to promote competition". Under 15.2 IPART is required to indicate which of the issues in section 15.1 it has considered in reaching its decision.

For Victoria, the Office of the Regulator General Act, 1994, which sets out the ORG's objectives, states that the general objectives of the Regulator-General's office are⁴³:

- to promote competitive market conduct;
- to prevent misuse of monopoly or market power;
- to facilitate entry into the relevant market;
- to facilitate efficiency in regulated industries; and
- to ensure that users and consumers benefit from competition and efficiency.

Federal Regulation

The ACCC's objectives are to⁴⁴:

"improve competition and efficiency in markets;

foster adherence to fair trading practices in well-informed markets;

promote competitive pricing wherever possible and to restrain price rises in markets where competition is less than effective;

inform the community at large about the Trade Practices Act and the Prices Surveillance Act and their specific implications for business and consumers; and,

use resources efficiently and effectively. "

⁴³ Access Arrangements for Multinet, Westar, and Stratus, Office of the Regulator-General, Victoria, October, 1998.

⁴⁴ www.accc.gov.au/about/fs-about.htm, 14 April, 1999.

The Gas Code is perhaps the best example of the consistent and well-founded establishment of federal and state regulatory objectives. The overall Gas Code objectives are set out in its Introduction. Section 2.24 provides a further list of factors the regulator should take into account the access arrangements put forward by the pipeline owners (including the Reference Tariff Policy). Section 8.1 sets out the General Principles that a Reference Tariff Policy should be designed to achieve. Taken together these objectives reflect accepted objectives of economic regulation of infrastructure: for example, enabling the service provider to earn revenue which will recover its efficient costs; replicating the outcome of a competitive market; not distorting investment decisions and providing an incentive for the service provider to reduce costs.

There has been much discussion about the relative weight to be attached to particular objectives, where they may not be compatible. In particular, IPART in its Final Decision on Great Southern Networks' access arrangements places considerable weight on 2.24 (e) "the public interest"; and 2.24 (f) "the interests of Users and Prospective Users". These objectives differ from and are more general than those listed in Section 8.1, which are⁴⁵:

- "(a) providing the Service Provider with the opportunity to earn a stream of revenue that recovers the efficient costs of delivering the Reference Service over the expected life of the assets used in delivering that service;*
- (b) replicating the outcome of a competitive market;*
- (c) ensuring the safe and reliable operating of the Pipeline;*
- (d) not distorting investment decisions in Pipeline transportation systems or in upstream and downstream industries;*
- (e) efficiency in the level and structure of the Reference Tariff; and*
- (f) providing an incentive to the Service Provider to reduce costs and to develop the market for Reference and other Services."*

In its submission to IPART on the Access Arrangements, Great Southern Networks highlighted the factors in 8.1 as taking precedent over those in 2.4. This example illustrates that there is still scope for disagreement over the regulatory objectives under the Code.

4.3.2.2. How are objectives achieved?

The National Electricity Code and the National Gas Code specify asset valuation principles and other mechanisms to enable the service provider to earn revenue which will recover its efficient costs, replicate the outcome of a competitive market, not distort investment decisions, and provide an incentive for the service provider to reduce costs.

⁴⁵ National Third Party Access Code for Natural Gas Pipeline Systems, Australia, 1997.

For example, to enable a service provider to earn revenue which will recover its efficient costs, the Gas Code sets out a range of principles that can be adopted in setting the initial asset base, including the optimised depreciated replacement cost (ODRC), or depreciated actual cost (DAC). The Electricity Code is more prescriptive in requiring the use of optimised deprival value (ODV) in valuing assets.⁴⁶ In determining the cost of equity, both codes refer to the Capital Asset Pricing Model (CAPM), although the use of alternative approaches is not prevented.

The Electricity Code has been criticised as being too prescriptive and for placing too great an emphasis on the interests of the utilities themselves, at the expense of customers and related aspects of public policy. This may be largely due to the fact that the Electricity Code was drafted by the representatives of the industry in each state. The Gas Code establishes a much more detailed set of economic and regulatory principles than exist for any equivalent utility in the UK or Europe, but is much less prescriptive than the Electricity Code. It also strikes a better balance between the interests of consumers and service providers probably because representatives of the federal government, as opposed to industry representatives (of the state run enterprises), were responsible for drafting the Gas Code.

Regulation of network industries in Australia is relatively new, although thinking and experience is developing quickly, with fairly rapid transfer of experience and knowledge from both the UK and the US. While it is too early to conclude that all the purported objectives have actually been met, the requirement for all significant network businesses to offer third party access on economic terms has transformed the environment under which state-owned water, gas and electricity companies operate. Emerging contentious issues have included: the price distortions brought about through a history of uniform tariffs, and the associated incentives for network by-pass; the relationship between asset values, depreciation, and the cost of capital; and, the appropriate degree of benefit sharing across review periods.

4.3.3. Institutional design/characteristics

In general, Australian regulation of network industries is more legalistic compared to the UK system, and therefore more closely resembles the US regulatory model. We look in more detail at some of the institutional design and characteristics of Australian regulation below.

⁴⁶ The ODRC is the cost of replacing the asset with the cheapest asset that does the same job whereas ODV attempts to take into account the economic value of assets as well as their replacement costs.

4.3.3.1. *Process: rate-making, appeals, arbitration*

State Regulators

For declared government monopoly services, IPART is empowered to determine maximum prices (Sections 11(1a) and 12(1a)), and/or carry out a periodic review of pricing policies (Sections 11(1b) and 12(1b)). IPART may fix maximum prices in either of two ways: (a) maximum prices may be determined in any way the Tribunal considers appropriate (Section 14), including: setting specific prices for individual services, increasing or decreasing prices for individual services or groups of services, setting a rate of return on assets, referring to the CPI; and (b) establishing a methodology for determining maximum prices.

If the Tribunal considers that it is impracticable to make a determination of maximum prices as in (a), it may determine under Section 14A a methodology to be used by the agency for fixing the maximum price.

The IPART Act contains a number of provisions to ensure that the Tribunal's activities are carried out through a public process. The main requirement is that the Tribunal must hold at least one public hearing for each investigation. The Tribunal may seek public participation by: advertising public hearings (Section 21(3)); seeking public comments on terms of reference (Section 13(2)); providing public access to submissions (Section 22A(1)); inviting public comment on issues and submissions; holding public seminars and workshops (Section 21(2)); releasing reports and determinations to the public (Section 19(1)); and, public reporting of compliance by agencies (Section 18(4)).

The general assumption of the legislation (Section 22A) is that the public will have access to information provided to IPART for its investigations. That Section also extends the possibility of public access by allowing the Tribunal to approve the release of information that would not otherwise be available under the Freedom of Information Act, following consultation with the supplier of the information. Whilst most Tribunal activities are public, the Tribunal may direct that evidence be considered in private and may restrict access to confidential documents.

The Tribunal is required to consider a range of issues when making determinations and recommendations. The factors can be grouped as follows:

- Consumer protection: prices, pricing policies and standards of service, general price inflation, social impact of decisions;
- Economic efficiency: greater efficiency in the supply of services, impact of exercise of functions by some other body, the need to promote competition;
- Financial stability: rate of return on assets, impact of borrowing, capital and dividend requirements; and,

- Environmental and other standards: protection of environment by appropriate pricing policies, considerations of demand management, standards of quality, reliability and safety.

For each investigation the Tribunal is required to report on its assessment of each of these factors.

There is no mechanism for businesses to appeal IPART's decisions under the IPART Act. However, IPART's decisions under the national gas and electricity codes are appealable. Decisions in other sectors in NSW, e.g. water, are not able to be appealed at present.

The Office of the Regulator General Act (1994) sets out the ORGs objectives and its approach, and specifies that a three-person appeal body appointed by the Minister, with 14 days to decide appeals. The basis for appeal is limited to bias or misinterpretation of facts. However, the ORG does not set prices in the electricity, gas or water industries. Prices remain controlled by the Victorian Government, in the form of Tariff Orders in the case of the electricity and gas sectors.

Federal Legislation

The Electricity Code specifies detailed principles to be applied when turning revenue into prices. It sets minimal prescriptions for the regulatory processes (although it is criticised for being too prescriptive on the mechanics of regulation - see discussion above), and sets appeal arrangements as for jurisdictional regulators.

The Gas Code specifies transparent, consultative process for regulatory decision-making, eg, a presumption that all submissions and correspondence are public, and the requirement for regulator to provide reasons. The Code allows appeal by any party on matters of law.

The Gas Code specifies broad principles for pricing. However, it is fairly prescriptive in setting out what factors should be taken account in setting the initial asset base (Section 8.10 - see discussion above), and the rate of return (8.30, 8.31):

The Rate of Return used in determining a Reference Tariff should provide a return which is commensurate with prevailing conditions in the market for funds and the risk involved in delivering the Reference Service....By way of example, the Rate of Return may be set on the basis of a weighted average of the return applicable to each source of funds...Such returns may be determined on the basis of a well accepted financial model, such as the Capital Asset Pricing Model...However, other approaches may be adopted where the Relevant

Regulator [the ACCC] is satisfied that to do so would be consistent with the objectives contained in Section 8.1 [discussed above].⁴⁷

It also sets out the procedures that must be followed by the regulator before reaching a decision, including the allowed timeframes.

4.3.3.2. *Process: regulatory characteristics*

Independence

The issue of independence is more complicated in Australia than in the US and UK. Regulatory independence is difficult to achieve when government-owned entities are being reviewed. Nevertheless, an explicit objective of the Competition Principles Agreement was to ensure a competitively neutral environment for state-owned enterprises. Relative to the situation five years ago, significant progress has been made in this regard.

Transparency and Accountability

As described above, in several cases regulator's are required to give reasons for their determinations. Rule-making procedures are also relatively explicit (as compared to the UK). Thus, the Australian system exhibits a greater degree of transparency and accountability than presently exists in the UK.

Some aspects of regulatory design owe much to perceived problems in the UK, eg, fixed review periods, prescribed approaches to asset valuation, and requirements to give reasons. It has been questioned whether public consultative processes have been compromised or their effectiveness reduced due to the lack of cross-examination. There are also inconsistencies in the appeal arrangements and in the ability to challenge decisions. There are also questions as to the sustainability of the informal consultative processes currently in place, particularly in the face of a growing inclination for litigation (including by third parties). Nevertheless, appeals and judicial review are realities in Australia, and are generally believed to be an important element of framework as well as a significant influence on the decision-making of regulators.

Commitment

Because of the legalistic nature of the Australian system, and the focus on rules and procedures as in the US, commitment has so far been less problematic in Australia as compared to the UK. Laws and regulations, more detailed in content and assuring cost recovery in detail, prevent regulators from more opportunistic behaviour. The Gas Code, for example, states that once an asset is included in the asset base, it cannot be taken out without just cause. Decisions, which are believed to extend beyond the principles set out in

⁴⁷ *National Third Party Access Code for Natural Gas Pipeline Systems, Australia, 1997*

the Code, are sure to face either a merits or a judicial review. Indeed, the recent decision of Great Southern Networks to appeal IPART's recent Final Decision on its gas access arrangements confirms this trend.

4.4. Conclusion

In this section, we briefly compare and contrast economic regulation of network industries in the UK, US and Australia.

- In the UK, over a decade of regulatory experience has seen little if any convergence on a sound regulatory “contract”. UK regulation is characterised by regulatory discretion and opportunism. However, recent proposals by the DTI for reform suggest growing recognition of such problems.
- In the US, the 5th and 14th Amendments to US Constitution have led to commitment and “due process”, the *Hope (1944)* decision provided investors with a reasonable assurance of cost recovery, and the Administrative Procedures Act has established rules which must be followed in making determinations. Whilst the US system has achieved a high degree of regulatory commitment, it has been characterised by cost plus regulation, reducing incentives for short-term efficiency. More recently, however, “incentive based” mechanisms have been introduced.
- Economic regulation of network industries is even newer in Australia than in the UK. Furthermore, competition has generally been promulgated along-side privatisation, and therefore the emphasis has been on promoting competition from the outset. Nevertheless, for those elements of the network industries where strong natural monopoly conditions remain, regulated terms and conditions for network access have become a very important feature of the utility sector.
- One complicating issue in Australia (which arises to a lesser extent in the US - for example with electricity wholesale wheeling) is the relative roles of federal and state regulation. While a uniform framework has been developed at the federal level in Australia, the legal and practical application of these principles at state level is still not uniform. Although this remains an important objective of the Competition Principles Agreement, the development of greater uniformity across jurisdictions and across similar network industries is an ongoing issue.
- In Australia, lessons were learned from the mistakes in the UK. Legislation and industry codes have been deliberately made prescriptive, narrowing the scope for regulatory discretion and opportunism. Australia's approach may have “short-circuited” the evolution of institutional arrangements seen in the US, although time and further privatisation will provide a clearer test.

5. ASSESSING ALTERNATIVE REGULATORY REGIMES

In this section, we set out questions that should be addressed in appraising alternative institutional arrangements for network industries. We draw upon our analysis and international experience in identifying key issues, recognising that no form of regulation is able to eliminate all monopoly distortions in the economy, and regulation itself involves costs and distortions of its own.

5.1. Appraise Feasible Alternatives

Any appraisal of alternatives should be between realistic alternatives: “*The costs and benefits of New Zealand’s light-handed approach therefore have to be compared with those likely with other imperfect, regulatory options, rather than with ‘first best’ outcomes in an ideal (but unreal) world.*”⁴⁸ We consider that the appraisal of realistic alternatives involves the following questions:

- *What are the costs and benefits of unregulated monopoly versus alternative forms of regulation (recognising that the threat of regulation may involve some of the same costs and benefits as actual regulation)?*
- *Has the likelihood that each alternative will prove stable been taken into account in assessing alternatives?*

5.2. Clarify the Objectives

Clear objectives will assist in ensuring that regulators are held accountable. We consider that the following questions should be asked when setting regulatory objectives:

- *Are the policy objectives in relation to network industries and/or regulation clear?*
- *To what extent are the objectives consistent, and if not what institutional processes are in place to achieve an appropriate balance between objectives?*
- *Are there other more efficient ways of addressing multiple objectives, which may allow a clearer focus for economic regulation?*

5.3. Align Regulatory Conduct with Long Term Objectives

Institutions, including appeal mechanisms, should be designed to ensure that regulatory conduct is aligned with the desired objectives. The following questions should be addressed:

⁴⁸ Alan Bollard. 1996. “The New Zealand Solution: An Appraisal”. Lectures on Regulation, London Business School and IEA. 26 November 1996.

- *Does the regulatory process work to align every short-term decision with long-term objectives?*
- *Does the regulatory process support commitment and stability through transparency, openness, consistency and accountability?*
- *Do clear procedures exist for dealing with unanticipated events and disputes?*

5.4. Recognise and Address Underlying Trade-offs

The trade-offs involved under regulation should be recognised and addressed. In particular, regulation involves trade-offs between:

1. maintaining incentives for cost reduction while ensuring that prices are not too far out of line with costs (recognising that firms will earn “information rents”);
2. ensuring that firms have a reasonable assurance of cost recovery while limiting the scope for “gold plating” (due to guaranteed returns on investment); and
3. responding flexibly to new information while limiting the scope for regulatory opportunism.

We consider that the following questions should be asked in addressing these underlying trade-offs:

- *Does the regulatory regime provide incentives (profit opportunities) for the network industries to have efficient operations?*
- *Do companies have a reasonable assurance of cost recovery for sunk investments?*
- *Is the regulatory “contract” well specified (whether or not it involves regulation or the threat of regulation)?*

APPENDIX A. DUTIES/OBJECTIVES OF UK REGULATION

The duties and functions of each of the utility regulators are set out in the primary legislation relating to that sector. In all cases, the duties of the regulator are shared with the Secretary of State.

A.1. Meet Reasonable Demands

The Director General of Electricity Supply (DGES) has a primary duty to carry out his functions in a manner which he considers is best calculated “...to secure that all reasonable demands for electricity are satisfied” (Electricity Act 1989, Section 3(1)(a)).

Similarly, the Directors General of Gas Supply, Water Supply, and Telecommunications (DGGS, DGWS and DGT) all have a primary duty under the relevant legislation to secure that all reasonable demands for the utility services are met.⁴⁹ In the case of water, this is expressed in terms of the obligation on the regulator to ensure that the licensees’ functions are properly carried out.

A.2. Ensure Adequate Financing

The DGES has a duty to carry out his functions in a manner which he considers is best calculated “...to secure that licence holders are able to finance the carrying on of the activities which they are authorised by their licences to carry on” (Electricity Act 1989, Section 3(1)(b)). This covers the activities of generation, transmission, distribution and supply.

Other regulators (DGGS, DGWS and DGT) have similar obligations.⁵⁰

The need to ensure that licence holders authorised to provide utility services are able to finance them has been used by regulators to justify financial “ring-fencing” conditions for the regulated business, in situations where the licensee has been taken over by a wider group.

⁴⁹ Section 4(1)(a) of the Gas Act 1995
Section 2(2)(a) of the Water Industry Act 1991
Section 3(1)(a) of the Telecommunications Act 1984

⁵⁰ Section 4(1)(b) of the Gas Act 1995
Section 2(2)(b) of the Water Industry Act 1991
Section 3(1)(b) of the Telecommunications Act 1984

A.3. Promote Competition

In telecommunications, the DGT has a duty to “maintain and promote effective competition.” (Telecommunications Act 1984, Section 3(2)(b)). In gas, the DGGS’s duties under the 1986 Gas Act were augmented by the 1995 Gas Act to include the obligation to “secure effective competition” (Gas Act 1995, Section 4(1)(c))

The DGES has a duty to carry out his functions in a manner which he considers is best calculated “...to promote competition in the generation and supply of electricity” (Electricity Act 1989, Section 3(1)(c)).

The more limited potential for competition in the supply of water services is reflected in the wording of the obligation on the DGWS with respect to competition. Instead of being required to “promote” or “secure” competition, the DGWS is obliged to “facilitate effective competition, with respect to such matters as he considers appropriate” (Water Industry Act 1991, Section 2 (3)(e)).

A.4. Protect Consumer Interests

The DGWS has a duty to ensure that the interests of “every person who is a customer or potential customer... are protected as respects the fixing and recovery ... of water and drainage charges”. (Water Industry Act, Section 2(3)(a)). In particular the Act makes reference to the interests of consumers and potential consumers in rural areas, and requires that no undue preference is shown, and that there is no undue discrimination.

The DGWS has further obligations to ensure the protection of consumers’ interests with respect to (i) the terms on which any services are provided and the quality of those services; and (ii) the benefits that could be secured by the application of the proceeds of any disposal in relation to an Appointee’s protected land. In performing his duties, the DGWS is to take particular account the interests of those who are disabled or of pensionable age (Section 2(4)).

The DGT has a duty to “promote the interests of consumers, purchasers and other users in the United Kingdom, (including, in particular, those who are disabled or of pensionable age) in respect of the prices charged for, and the quality and variety of, telecommunications services provided and telecommunications apparatus supplied” (Telecommunications Act, 1984 Section (2)(a)).

The Gas Act refers to the obligation to protect consumers’ interests “in respect of the prices charged and the other terms of supply, the continuity of supply and the quality of the gas supply services provided” (Gas Act 1986 Section (4)(a)). The 1995 Amendments to the Act added to this list the obligation to protect consumers’ interests in the “exercise of rights ... to enter their premises.” (Section (4)(a)). In performing his duty, the DGGS is to take particular account the interests of those who are chronically sick, disabled or of pensionable age.

The DGES has a duty to carry out his primary duties in a manner which he considers is best calculated to protect the interests of consumers of electricity in respect of:

- “(i) *the prices charged and other terms of supply*”;
- (ii) *the continuity of supply; and*
- (iii) *the quality of the electricity supply services provided.*”⁵¹

The Act does not specify by what means the regulator is to achieve these objectives. In relation to the quality of supply, the Act contains provisions for establishing standards of performance (Section 39). In particular, the DGES is empowered to make regulations “*prescribing such standards of performance as, in his opinion, ought to be achieved in individual cases.*” Such standards may be published, and may differ between PESs (Section 40). The provisions of the 1989 Act have been further supported by the 1992 Competition and Service (Utilities) Act, which requires the PESs and other utility services providers (i) to inform their customers about the standards of performance (Section 21); and (ii) to conduct their business in such a way as can reasonably be expected to lead to the PES achieving the standards of performance (Section 22).

As well as requiring the DGES to take into account the protection of consumers’ interests in general, the Electricity Act also contains provisions relating to particular consumer groups. Under Section 3(4) of the Act, in the performance of his functions in relation to prices charged and other terms of supply, the DGES must “*..take into account in particular the protection of the interests of consumers of electricity in rural areas*”. The Act also states that the DGES, in relation to the quality of electricity supply services, must “*..take into account in particular the protection of the interests of the disabled and pensioners*” (Section 3(5)).

A.5. Promote Efficiency

Section 41 of the Electricity Act empowers the DGES to determine standards of performance in connection with the promotion of the efficient use of electricity by consumers.

Similar obligations exist in the other utility industries to promote the efficiency and economy in the carrying out of the licensed functions.⁵² However, only the Gas Act makes explicit reference to promoting efficiency in the use of gas.

⁵¹ Electricity Act 1989, Section 3(3)(a).

⁵² Section 4(2)(b) of the Gas Act 1995

Section 2(3)(d) of the Water Industry Act 1991

Section 2(2)(c) of the Telecommunications Act 1984

A.6. Promote R&D

The electricity regulator has a duty to promote research into, and the development and use of, new techniques by licence holders in generation, transmission or supply (Electricity Act 1989, Section 3(3)(c)).

The DGT has a similarly worded obligation (Telecommunications Act 1984, Section 2(2)(d)). There is nothing comparable in the Acts for water and gas.

A.7. Safety

In gas, the DGGS is required to protect the public from dangers arising from the transmission and distribution of gas (Gas Act 1995, Section 4A(1)). In water, as a result of the public health implications, the Water Act contains a specific section regarding water quality, and makes it an offence to supply water unfit for human consumption (Sections 67-70). The Telecommunications Act does not place any duties on the DGT with respect to health and safety.

The DGES has a duty to under Sections 3(3)(d) and 3(3)(e) of the Electricity Act to:

- protect the public from dangers arising from the generation, transmission and supply of electricity; and
- to secure the establishment and maintenance of machinery for promoting the health and safety of workers.

A.8. Protect the Environment

The duties of the DGWS relating to the environment are highly specified. These duties form a separate section of the Water Industry Act (Section 3). The obligations apply equally to the Secretary of State, the Minister of Agriculture, Fisheries and Food and every water company holding an appointment as a “relevant undertaker.”

The DGES has a duty to take into account, in exercising his functions under the Act, the effect on the physical environment of activities connected with the generation, transmission or supply of electricity (Electricity Act 1989, Section 3(3)). There are no duties on the DGT relating to the environment in the original 1984 Act.

A.9. Consumer Councils

The DGES is obligated under Section 2 of the Electricity Act to establish consumers’ committees for each PES area. The duties of these committees, as set out under Section 51 of the Act, are to:

- consult with each PES regarding matters appearing to affect the customers or potential customers of that supplier;
- keep under review matters affecting the interests of consumers in that area; and
- advise the DGES on any matter relating to the supply of electricity in that area.

The Water Act requires the DGWS to establish customer service committees as does the Electricity Act (Water Industry Act 1991, Section 28(1), Section 29). They also have the power to investigate complaints. There are currently 10 such committees. In addition, in March 1993 the DGWS established the Ofwat National Customer Council (ONCC). The ONCC is a non-statutory body intended to strengthen the representation of water customers' interests and to assist the DGWS in complying with his statutory duty to protect the interests of customers. Its members are the chairmen of the ten customer service committees.

The Gas Act 1986 established the Gas Consumers' Council (Section 2(1)). As in the case of the other utilities, the role of the Council is to advise the DGGS on matters relating to consumers' interests and to investigate certain complaints.