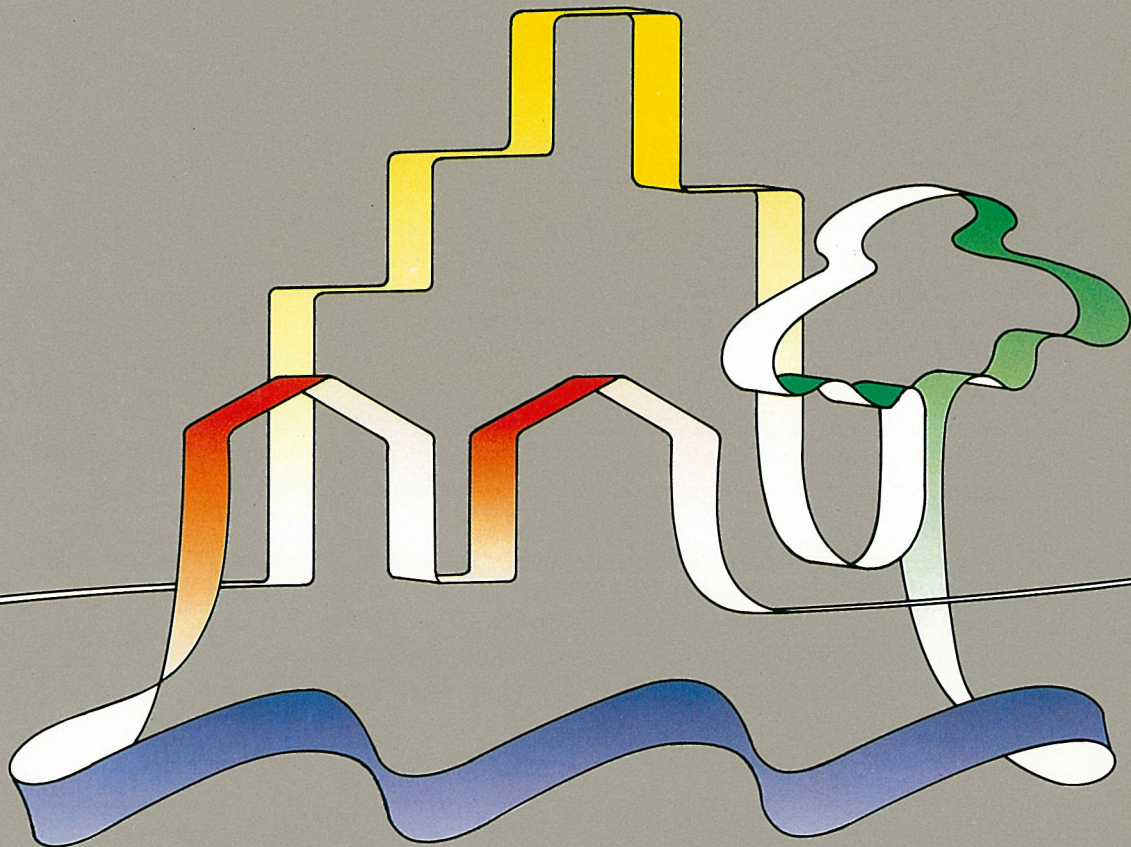




Urban Water Research Association of Australia

Urban Water, Markets and the Hilmer Reform Process



Research Report No. 89

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**Urban Water, Markets and
the Hilmer Reform Process**

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FOREWORD

This report is based on UWRAA Research Project No WR-32: 'Regulation within the water industry' which was undertaken during the period July 1993 and October 1994.

The project was undertaken by the Department of Economics, LaTrobe University with Professor Rodney Maddock as the Principal Researcher. The consultancy was administered by Melbourne Water on behalf of the Urban Water Research Association of Australia, which funded the project.

SYNOPSIS

This Report investigates the scope for reform of the urban water industry in Australia. It does this by having regard to the current situation in Australia, by considering the way in which water is managed in France, the US and the UK, and by analysis of the theoretical and practical arguments for market based reform. The discussion focuses initially on the use of the capital market for control of the firm (privatisation, franchising and corporatisation) and finds that the last is the most preferred. It then looks at the markets for inputs and finds that contracting out should be used as extensively as possible and that the water input should be managed by government in a way consistent with other non-renewable resources. Finally the Report finds little scope for competition in the product market and suggests that tight regulatory control is the most preferred alternative.

The Report then moves on to assess the way in which microeconomic reform along the lines suggested by the Hilmer Report will change the sector. It finds that the major challenges of Hilmer will come from his anti-monopoly position, from the preference to split up organisations, and from the provision of open access to essential facilities such as water networks. The first two of these do not seem appropriate to the industry but will involve the industry in considerable debate if it is to maintain the technically superior integrated monopoly networks which currently exist. The third will require major reforms and rebalancing of prices.

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1. INTRODUCTION

1.1 Overview of Microeconomic Reform

As public budgets have come under pressure over the last decade, Australian governments have realised that their business operations comprised a fundamental financial resource which could be managed to achieve better financial outcomes than had traditionally been the case. The perceived problems were that such enterprises had higher than necessary cost structures and low prices. Since such enterprises provided inputs to a wide range of industries, constituting between 10 and 25 percent of the total costs of most, it was hoped that improving their performance could allow governments to lower the costs of many industries, and lower taxes without lessening the quality of the services on offer. The political advantages of this combination were of considerable appeal and have been incorporated within a broadly shared microeconomic reform agenda.

The devices used to put pressure on public utilities were various. They have been set financial targets, employment ceilings, rate of return targets, etc., and all of these measures involve a change in the degree of monitoring of enterprise performance. Within this broad political agenda in Australia, benchmarking has emerged as a basic device for monitoring the performance of the public utilities. In the words of the Bureau of Industrial Economics (1994) "the development of international performance measures offers a way of indirectly introducing competitive pressures by comparing actual performance to international benchmarks". These and related measures of productive efficiency have been used to pressure particular agencies, and to prod governments to pressure agencies as the demand for microeconomic reform has mounted. The Industry Commission is now undertaking regular reviews of public enterprise performance by reference to a series of benchmarks. (Industry Commission 1994)

These changes are not limited to the public sector in isolation but are part of a significant shift in the way in which the public and private sectors interact within the economy (Maddock 1994). Across the breadth of the nation governments are retreating from the

direct provision of goods and services. The reasons for this shift are not completely clear but economists can probably claim some credit (or blame) as a result of the change in emphasis in research from market failures and towards government failures over the last twenty years. Of course the problems which have been apparent in the command economies, as emphasised by the dramatic collapse of the Soviet Union, have added to the conviction that a move towards greater dependence on markets is appropriate. But there has also been a developing cynicism about government and a reassessment of the role of the public sector in the economy and society. Political entrepreneurs like Margaret Thatcher and Ronald Reagan were able to exploit the anti-government sentiment to capture power.

The philosophy of small government, of reducing the taxation take of government, provided them with the chance to mobilise political support. At the same time the rising burden of interest payments on government debt provided a second reason to reduce public debt and as part of that to seek greater contributions to income (or fewer drains on it) from government business corporations. We can thus probably sheet home responsibility for the changes we have seen to a switch in voter sentiment away from the public provision of services and in favour of less costly government. Politicians responded to the opportunities.

In terms of outcomes the political concern has been with reducing taxation, or with pursuing higher growth rates to lessen the relative cost of a given sized public sector. However the political consensus is more specific than that; it is for change, for a greater use of the market and for less dependence on government. Unfortunately these broad political motives provide little real guidance to concrete texture of change. Different groups of politicians have responded differently to the incentives and we currently see considerable debate about the relative roles of State and the national government in this process. At the national level, the 'microeconomic reform strategy' was the political product marketed by the Hawke/Keating government to the electorate and indeed much of the detail of the strategy owes its intellectual origins to economic theory. However, questions of implementation are still much in dispute (probably reflecting the unsure state of economic theory in the area of transition paths). The public policy debate is broad, change is slow, and institutions are more important than theory tends to allow for.

The process of change could be sudden as proposed by Dhanji (1991) for Hungary and Poland but in economies where piecemeal reform are feasible, as in Australia, we are more likely to see gradual and managed change. The arguments are related to those of Corden's conservative social welfare function. There may be substantial benefits from reform but there will also be substantial losses. The benefits we expect from a corporatisation or privatisation, for example, come from a variety of sources but usually involve redistributions away from some workers and from some consumers of the good concerned. Following standard arguments, since these losses tend to be concentrated while the benefits are usually widespread, we will expect to see a conservative transformation which cushions the losers. To manage the transition we are creating new institutions and new mechanisms by which the state and the (former?) government business enterprises operate. At the same time as the state steps back from direct production, the politicians are setting up mechanisms and procedures to allow the state to influence the new entities to achieve traditional regulatory objectives, to cushion the potential political losses from the transition, but to ensure that the transition actually goes on.

In the case of the water industries these pressures have been particularly severely felt. If we consider the case of Melbourne Water, the enterprise has fallen from employing 7.3 employees per 1000 properties served in 1987 to less than half that now. Changes of this magnitude impose severe stresses on organisations. Part of the explanation for this is historical. Water provision has been changed in political eyes from an essential service to a commercial opportunity as part of this broad restructuring of the public enterprises. The change may well have been more difficult in water because it does seem so essential that cities have good supplies of clean water, because the infrastructure involved is so expensive and lasts for such a long time, and because this has been supported by an essential service mode of management. The challenge for the future is to find a way of organising the industry and delivering the services which adequately reflects the scarcity of water and the intense competition for investment funds.

Markets are good devices for allocating scarce resources. If the water industry is to provide its services efficiently then it must explore the ways in which markets can be used to

conserve scarce resources. This paper considers the way in which this can be done. Markets have their weaknesses as well as their strengths, and distributional matters are amongst the weaknesses. This paper does not address such matters, not because they are not important, but because they are a separate topic for research.

1.2 Overview of the Industry

Water is a resource essential to life. Australia is characterised by large areas where annual rainfalls are low and evaporation rates are high. Because of this, and despite low population density, the capture, conservation and distribution of water resources has had an important role in Australia's development. Most of this has taken place in the public sector. The Industry Commission (1992) reported that capital works with a replacement value of some \$b50 is in place nationally and direct employment in the major enterprises exceeds 35,000. Information about the structure, regulation and management of the industry is given in Part B of this Report. Suffice to say here that the management of these resources for the nation has come into question in recent years. Given the size of the investments involved, the essential nature of water, and the growing awareness of potential environmental questions, the fact that the current resource management strategies have produced low rates of return (1.8% for water and 4.0% for sewerage is the metropolitan average) has been very disappointing. As microeconomic reform proceeds nationwide, the water industries have come in for increasing attention. This work fits within that broad questioning of the management of the public sector in Australia and particularly the way in which markets might be used to improve resource management.

1.3 Overview of this Report

The structure of the paper is straightforward. The framework is set out in Section 2 where it is suggested that the major areas of potential for the use of markets in the urban water industry lie in the markets for control of the enterprise (Section 4), in the use of markets to ensure that the products of the industry are efficiently managed (Section 5), and in the use of markets to purchase inputs (Section 6). Section 3 reviews the foreign experience,

specifically that of the UK, the US and France, with the objective of seeing whether we can benefit from their experiences. Section 7 discusses the way the Australian institutions are evolving, by considering the regulatory structures that are being created. Sections 8 and 9 analyse the implications of the Hilmer Report for the water sector.

2. POINTS OF COMPETITION

The reform of the public sector which is currently underway provides a broad context for understanding the question of restructuring of the water utilities. This Competitive reform has four major manifestations viz deregulation, privatisation, corporatisation and contracting out. The fundamental questions of public policy which has to be addressed is whether the current institutional form, both the structure which surrounds an enterprise, and the broader framework within which that enterprise operates, achieve the best outcome for society.

It is important to realise that this policy debate mixes together two separate economic issues, the structure of the industry and the conduct of firms, and considers ways in which changes to both might improve the performance of the water enterprises. The attempts to change simultaneously the structure of an industry and the conduct of firms within it, is unusual in terms of economic theory and not especially well understood. Traditional models have taken the industry structure for granted, accepting that it will involve monopoly elements, and then tried to devise methods to moderate the conduct of the monopolist. The focus in this view is on the ways in which the principal, the owner of the water corporation, tries to change the incentive system within which its agent (the corporation) behaves. (Laffont and Tirole 1993)

In practice, however, firms operate within a wider environment and one in which they confront a wide variety of market and institutional constraints. Before we go on to consider the objectives of the principal and the ways in which its goals might be met, I would prefer to focus first on the agent and the environment within which it operates. This environment involves

- owners
- regulators
- competitors
- technology
- clients, and
- suppliers.

The firm has to attain some objectives specified loosely (usually) by the owner using the available technologies and subject to the constraints imposed by regulators and competitors. In the process of meeting these, the authority sits between its suppliers, including employees and financiers, and its clients. Managerial discretion is thus hedged in most directions. Market pressures can operate on some of them but not all. One of the objectives of this report is to delineate the areas where market disciplines can be sensibly brought to bear.

Now, when economists come to analyse the issues involved in the web of restrictions on managerial discretion, they use a perfectly competitive model as their benchmark. This model makes use of market forces at a number of different levels. In a competitive market situation, owners pressure firms to earn high profits with the penalty for poor outcomes being a depression of share prices and probable take-over of the firm with the management often being sacked. The **capital market** (the market for corporate control) thus serves as a significant discipline on the performance of managers. In attempting to survive these pressures, the managers come under two other forms of market pressure. The suppliers of inputs be they financiers or workers, which are assumed to operate on a competitive basis, will normally try to raise their prices to the extent they can without foregoing the business. The **factor markets** thus act as a second set of market constraints on the operation. Factor suppliers may try to raise input prices but such rises in costs would inevitably be built into prices for the output. This leads to reductions in market share and hence profits since competitors in the product market will not normally allow a firm to get away with raising its prices. Either new competitors will enter the market or other firms currently operating there will expand their output. Thus a firm can suffer a cost-price squeeze resulting in lower margins and profits. This is the discipline of the **product markets**. This basic economic model thus encompasses three main interlocking markets which provide the market constraints within which a competitive firm operates. Broadly then the firm faces

- profit control by owners and capital market
 - output price control by competitors and product market
- which require it to exert,
- input price control.

This framework, which depends on the yardstick of consumption in these three markets, is patently inappropriate for the water industry as there is no realistic expectation that the water suppliers will ever be other than monopoly service providers. However, some of these same forces can be used in the business of the water authorities to constrain managerial discretion although their nature may be different and changeable in the current situation. We will discuss the way in which the market for control might be used (through privatisation, or proxied through corporatisation or franchising), how the product market might be proxied through yardstick competition or proxied through regulatory controls, and the way in which inputs markets can be used through contracting out and competitive tendering.

The central problem which has arisen in the past is that most authorities have operated as statutory authorities, providing a monopoly service, using internal labour markets. Their public authority status means that they face few pressures from the capital market: management discipline is maintained directly through governmental oversight and often this supervision has been slack. To exacerbate the problems, traditionally many of the inputs to production have also been provided on a monopoly basis through public sector unions, the in-house provision of services etc. Financing has sometimes been the sole factor of production bought on a competitive market although in that case the status of the authorities as semi-government authorities has meant that finance was available on advantageous terms. This combination of input factors has meant that there were significant upward pressures on authorities' prices. In the absence of competition for the output, prices would have risen inexorably had it not been for the political sensitivity of such rises. The political system imposed an effective system of price capping. The public authority thus faced

- profit control through the political system, and
- output price control through the political system
- which required it to exert
- input price control.

The system thus put a lot of emphasis on the command system and made little use of market forces.

Water is a difficult case for economic reform. The existing structure is felt not to have worked very well but at the same time the standard to which public policy usually strives, a competitive market for the good concerned, is extremely difficult to achieve. While it is quite possible that the political system can produce a perfectly desirable outcome, public sentiment in recent years has shifted away from command systems and towards greater use of the market in the provision of goods such as water, or of market forces where they can be harnessed.

The section which follows discusses some of the alternative devices suggested by experience in the US, the UK and France. It is followed, in Section 4, by a discussion of the alternatives which might be used in the market for control. Section 5 then goes on to consider product markets, and Section 6 factor markets.

3. REVIEW OF FOREIGN EXPERIENCE (US, UK, AND FRANCE)

3.1 General

Much of the motivation towards reform in France, Britain and the United States came from the perceived need to inject private capital into an industry facing a backlog of investment requirements. Politicians were unwilling to accept responsibility for rate increases or enlarging the public sector deficit. Additionally, for France and the US, the introduction of private companies was expected to provide the technical skills lacking in most small water and sewerage systems and to overcome the diseconomies of scale they suffered from.

3.2 Water Resources Management Role

(i) Britain

The National Rivers Authority has prime responsibility for managing water resources. It has regional offices covering each of England and Wales' ten main basin catchments. The objectives of the NRA include the formulation of a sustainable policy for developing and augmenting resources to meet demands, the formulation and developing of an aquifer protection policy, the development of a policy to overcome problems of low flows and over-abstraction in some catchments, and the development of licensing, enforcement and charging policies for abstractions, together with charging databases and billing systems. The NRA has recently announced proposals to rationalise its scheme of abstraction charges by introducing regional charges for abstractions, rather than a standard national charge. However, it sees the use of permits rather than charges as its primary instrument of control.

(ii) France

There are several national and regional bodies with responsibility for water resource management. The National Water Committee considers national and regional schemes for

water resources and distribution, and is comprised of representatives of water users, the Departments and the State. Of particular importance are the six Financial Basin Agencies which have a duty to secure balanced water resources and requirements in their regions. The six basin committees comprise municipal, government, users and technical representatives. They set the general policy of the basin agencies, approve budgets and advise on abstracting charging schemes and on opportunities for development. Other players include the Water-basin Delegated Mission which co-ordinates the various authorities and services within the area of a basin, and the Central Hydrological Services who have responsibilities for the control of underground water resources. A new system of abstraction permits is also to be set up to help curb problems of over-abstraction. These are to be administered by new regional authorities, the DIREN. The intention of this reform is to have strong bodies able to set goals at the regional level and co-ordinate activity in the Departments.

(iii) United States

Responsibility for water resource management resides with the individual states. Federal funding for rural areas is mobilised through the Corps of Engineers. The Corps is also in charge of mobilising support for particular projects and for obtaining Environmental Protection Authority approval. The development of new resources maybe undertaken by an individual water supply utility, by the Corps of Engineers or the Bureau of Reclamation in the West. The US has shown some movement towards the use of economic instruments in the form of the auction of permits in some states but does not have an integrated catchment management approach to water resources management.

3.3 Commercial Role (Service Provision)

(i) Britain

Through the 1973 Water Act, 10 regional water authorities, based on river-catchment areas, were created on top of the existing 33 statutory (privately owned) water companies and

several hundred public entities. At that time the water resources of local authorities were transferred to the new water authorities. From 1989 onwards, after a series of changes, the 10 water authorities were transformed to highly regulated private monopolies. The 1989 Water Act requires companies to obtain separate licences to act as water and sewerage operators. To the extent that water authorities have been privatised there are competitive pressures for the ownership of the agencies but they operate without product market competition as legislated monopolies in the main.

(ii) France

There are around 36,000 municipalities in France which either provide services directly or supervise private franchisees. Franchise contracts are awarded separately for water supply and sewerage treatment. The percentages of these services currently franchised are 70 and 40 respectively. There are three main types of contracts. Under affermage contracts (lease holding contract), which usually last 10-15 years, the contractor is responsible for the maintenance of the system and gives advice on the timing and capacity of new capital investments. The municipality, meanwhile, is in charge of financing and commissioning new investment. Under concession contracts, which usually last 25-30 years, the contractor is responsible for the maintenance of the system as well as for new investments over the period of the contract. The municipality regains ownership of the assets at the end of the contract. The third type of contract is the management contract, which is usually of short duration in order to increase the frequency of competition for the market. The contractor is responsible only for the operation of the system and has no role in maintenance, planning or investment. The separation of maintenance and operating roles leads to difficulties as measures can be taken which are not consistent with the long term management of the facilities. Thus in the French case there is competition for control of the operational licence.

The problem with their institutional arrangement is that although there is fierce competition in the bidding for the initial contract, which should ensure the setting of prices at economic levels, once contracts are awarded they rarely change hands. Three main companies

dominate the water industry, Compagnie Generale Des Eaux (CGE) with 40% of the market, Lyonnaise de Eaux-Dumez (LED) with 23% of the market, and SAUR with 5% of the market. These companies have other interests as TV licences, waste disposal, construction, cellular telephones, electricity, etc.

(iii) United States

The water industry in the States is a mixture of private and public companies. Private sewerage companies are very rare, but their number is expected to increase following the lifting of the ban on privatisation of water authorities which had received federal subsidies. Companies are mainly public and monopolies in a situation which is very similar to that which has operated in Australia.

3.4 Surrogates for Competition

(i) Britain -- price caps

In Britain the main form of regulation has been by use of a price cap. In this case a weighted average basket of tariffs must increase by no more than the (RPI+K) limit determined at the time of flotation of the private operating company, where RPI is the retail price index and K is an incremental factor. The K values are set individually in order that companies can finance their functions, and take into account likely efficiency gains and forthcoming additional obligations with regard to water quality and environmental standards. Price control formulas are set for an initial 10 year period with provision for an additional review after five years. At the time of a review, the value of K is reset to a level which would yield a rate of return and financial performance such as would be expected from a company with similar risk characteristics.

The Director General of the industry specific regulator, Office of Water (OFWAT), is responsible for the level and structure of tariffs, reviews the financial performance of the companies, assesses levels of service, monitors investment, and reviews the condition of

assets. In order to protect customers from abuse of monopoly power, both the initial level of prices and the rate at which prices are allowed to increase thereafter are embodied in the K setting process. This process involves a combination of economic and financial approaches. In the former, K is set such that the discounted stream of revenues less expenditures is equal to a target net present value. In the latter approach, K is constrained over the 10 year period by the need to achieve acceptable financial ratios - in particular interest cover, dividend cover and cash flow profiles. The Director General has recognised that the assumptions that went into the financial modelling, such as financial ratios and cost of capital allowed, were unduly generous to the companies so that the question of changes to the caps is no longer strictly limited to the periods of formal review, a development which alters the incentive structure significantly.

The approach used in Britain to promote competition is a combination of comparative competition and regulation. Those companies which are not efficient enough face the threat of takeover, which becomes possible as the initial five year takeover veto expires. Two other sources of competition have been implemented which should have some influence on tariffs and/or provision: inset competition, that is, the right to supply green fields, major industrial customers and even self-supply; and no undue discrimination requirements on companies. Inset competition is likely to be significantly affected by the unevenness in the starting position of the companies in the privatisation process. Such unevenness relates to the arbitrary sets of initial tariffs which were not based on the value of assets, and on the position of the 29 statutory companies which, besides not receiving write-offs and cash injections, were obliged to remunerate existing shareholders at the full value of their investment.

Price cap regulation is seen as a means of maintaining incentives to efficiency of service provision, as water companies receive the benefits of improved performance. However, the incentives can be diluted by cost pass-through provisions designed to protect companies in the event of major new obligations. In order to prevent the dilution of efficiency incentives, the licence provision attempted to constrain both the items which qualify for cost pass-through and the manner in which they were to be taken into account in the adjustment

of Ks. The tariff basket control does not itself impose any constraint on companies to charge prices which reflect the costs of supply, which would be a way of measuring the efficiency of tariff structures, but attempts to maximise profits should tariffs move in the direction of Ramsay prices (see page 39) and hence towards (constrained) efficiency. Nevertheless, the regulations require companies not to discriminate between classes of customers. OFWAT has not reached a decision on the question of the desirability of geographical differentiation of tariffs. The incentives that arise under the tariff basket are such that the company is encouraged to raise the prices most quickly on those items in the charging base which experience the fastest growth, or on those items whose demand is relatively inelastic, ie those items over which the utility can exert market power. These items may or may not correspond to the tariff items with the highest marginal costs. There is consensus that the volumetric component of the tariff structure should reflect the marginal cost of supply. OFWAT is keen to promote the extension of metering to domestic customers not only to improve efficient water usage but also to provide for the signalling function of the usage component.

The price cap approach to regulation, at least in theory, entails a low regulatory burden. Price reviews take place at intervals of five to ten years, and once the price limit has been set, the regulator does not need to vet investment programs or review management's effectiveness. The fact that the regulation in the UK water industry has not exhibited such a hands-off approach stems partly from the difficulty of defining and measuring outputs and inputs and their quality, and partly from the long gap that can arise between the time when expenditures are actually made and the time when improvements in service can be observed.

(ii) France -- Franchise Contracts

The regulation of the water industry in France is very decentralised, operating mainly at the municipal level with Mayors and Prefects having not only prime responsibility for awarding franchise contracts but also for regulation. In this, they receive technical advice from at

least 15 government bodies. The form of price regulation is effectively a price cap with control over prices being exerted through the contract system. For affermage and concession contracts the initial level of prices and their indexation is specified in the contract. Thereafter, and for the term of the contract, the prices charged to customers are indexed according to a weighted average of published price indices for key inputs. For management contracts prices are set by the municipality.

Customers are protected from abuse of monopoly power through the competitive bidding for the initial franchise contract. Also, for political reasons, Mayors, who have the responsibility for awarding the contracts, have incentives to keep low rates. This suggests that there may be failures in the French system as a result of under investment rather than gold-plating.

It is doubtful whether the renewal of contracts are subject to any significant competitive pressure, as franchises rarely change hands. This is the classic problem with franchising: ending a contract means that both parties lose a lot of specific knowledge, so neither prefers to, but unless contracts are really competed for there is little incentive for productive efficiency. There is known to be strong competition for initial franchise contracts, but such competition is difficult to sustain for subsequent terms. The contract length can also provide thorny issues. Too short a contract reduces the incentives of a company to invest in efficiency improvements and to undertake necessary maintenance. Too long a contract reduces the number of opportunities for competition besides giving informational and political advantages to contractors over potential entrants.

The French system has its own form of cost pass-through which serves to dilute the incentives for efficiency of service provision. The profits of the water industry are protected by extensive cost pass-through provisions which are built into the law and apply irrespective of the contract provisions.

Tariff structures are dictated by the municipalities and therefore reflect political and historical considerations. This means that the tariff structure is probably not very efficient

particularly when considering the allocation of resources within the industry. The rates charged by the River Basin Agencies vary according to whether the water use is for public water supply, agriculture or industry. Experience in France suggests that it is difficult to avoid continuous monitoring of water suppliers, and therefore the regulatory burden is significant.

(iii) United States -- Rate of Return

Economic regulation in the US is the responsibility of State Commissions which determine rate increases and tariff structures of private utilities. Some of the most controversial aspects in the rate of return regulation include the valuation of assets (historic versus replacement costs), treatment of past bad investment decisions, and allowable rate of return.

Customers' interests are defended by the State regulatory commissions which exert considerable pressure in keeping low rates. Their pressure is so significant that there have been cases of rates being kept below economic levels. This may be an important counterbalance to the tendency with rate of return regulation to lead to excessive investment. State Commissions apply pressure by forcing companies to defer cost recovery (eg interest payment) or by stopping companies from recovering some investments (eg excessive capacity, poor investment decisions). As discussed above in the case of France, there are dangers in having a price regime which is too politically biased in favour of customers. Rates below economic levels can either adversely affect the willingness of a company to undertake investment, or result in higher costs to customers as companies are discouraged from taking the least cost solution to problems. Market structure, and especially the presence of competition, has a much greater influence on efficiency than public/private ownership and in the absence of product market competition the form of regulation is crucial. Rate of return regulation does not generally create incentives for efficient performance. Nevertheless, incentives can be introduced by allowing some sharing of gains from efficiency improvements but care must be taken as incentives can be distorted when they are focussed on particular parameters. It is known that there is a tendency in rate of return regulation to goldplating and over-capitalisation aimed at inflating the rate base.

Regulators may disallow some costs from being included in the rate base in order to increase efficiency and protect customers. Abuse of regulation may lead companies to avoid large capital investments and/or to increase the cost of capital required by investors.

The regulatory commissions approve rate structures but the principal focus is not on efficiency. Since commissioners are usually actual or aspiring politicians, there is an extensive system of cross subsidisation of domestic and farming customers. Such tariff structures are inefficient with regard to the most appropriate allocation of resources within the industry.

The rate of return regulation involves a significant administrative burden because of annual reviews and the careful scrutiny of costs undertaken.

3.5 Environmental Controls

(i) Britain

The National Rivers Authority is the key regulatory body on the environmental side. It has a duty to monitor the extent of pollution, and can prosecute for a variety of offences. It advises the Department of Environment on water pollution matters, and exchanges information with the water undertakers on pollution. It also has the responsibility to set discharge consents and charges, although charging schemes for consents must be approved by the Secretary of State. Absolute limits are being introduced for discharges from sewage treatment works, and charges are being modified to reflect the volume and content of effluent, and the quality of the receiving water.

The rates currently charged are too low to act as an efficient market mechanism for the control of pollution. OFWAT is attempting to co-ordinate the introduction of major new quality standards with the timing of periodic economic reviews. The lack of coordination between the NRA and OFWAT, however, has meant that the current situation in Britain is widely judged to have been a failure and to have fallen between the two stools of either not

pursuing a sufficiently consistent market approach, which would have required strict charging for effluents etc, or not having maintained normal public sector controls. OFWAT is now urging proper cost benefit studies before future environmental obligations are imposed but it is difficult to see how Britain will extricate itself from the hybrid system it has created.

(ii) France

Recent developments in France include the passing of the 1992 Water Act which introduced compliance with the EC waste water directive, and required basin agencies to double the amount of investment over the next five years (with over half of this amount going into domestic sewerage treatment), increased the power of enforcement of water police and instituted a new polluter pays tax to be levied on the farming community.

3.6 Quality

(i) Britain

The Secretary of State for Environment through the Drinking Water Inspectorate (DWI) is responsible for the setting of drinking water quality standards. In its turn the DWI is responsible for establishing water quality objectives, and ensuring that water supplied in England and Wales complies with the EC water quality regulations.

Standards of service are regulated by the economic regulator OFWAT . The water and sewerage companies are required to report to OFWAT on the quality of the delivery of their services, measured against seven key levels of service indicators (water availability, pressure, interruptions, restrictions of service, flooding from sewers, response to billing queries and written complaints) and to the Customer Service Committees on their service provision. The industry has a Guaranteed Standards Scheme, whereby compensation payments must be made to customers if they receive a service below certain prescribed standards.

(ii) France

Standards for water quality are set through national laws in accordance with EC Directives. Standards of service are specified in the franchise contract. A fairly standard concession contract would include provisions for quantity, quality, pressure, meters, fire fighting and shut-offs.

(iii) United States

Federal regulations governing water quality and the environment are set by the EPA. The US faces major compliance problems. The vast majority of water systems in the US are very small and these have a poor record of compliance with legislated standards and guidelines. In order to counter the problem of non-compliance the EPA is developing risk-based strategies which target enforcement on those areas which reduce the risks the most. It is also keen to allow the States room for discretion as they plan their annual programs.

Standards of service are regulated by State regulatory Commissions. Technical levels of service such as pressure tend to be based on best engineering practice and are fairly uniform across states. However, there are no standard levels of service to be complied with, in either public or private sectors. Commissions can issue written orders for the utilities to undertake actions to improve their levels of service, and these orders carry the weight of law.

3.7 Effluent Standards

(i) Britain

Her Majesty's Inspectorate of Pollution is responsible for industrial discharges and radioactive waste disposals. Much of this responsibility is also carried by the NRA whose scientists oversee quality regulation supposedly on a basis consistent with the natural

characteristics of the catchment. The NRA is also responsible for the conservation and augmentation of water resources, pollution control, the quality of rivers, estuaries and coastal waters; and land drainage and flood defence. This is the same structure which has formal responsibility for water abstractions.

(ii) France

Control over pollution is exercised by legislative and financial means. That is, discharge consents and taxes levied on polluters. The discharge rates currently charged are too low to act as an efficient market mechanism for the control of pollution.

The six Basin agencies grant abstraction licences, levy charges on the abstraction of water from surface and groundwater sources, as well as on effluent discharges, and use the funds raised to finance water resource and pollution activities. Such grants can be made available to any public or private bodies. All abstractors must obtain abstraction licences, regardless of whether they own the land where the source is located. Further, abstraction licences often carry additional requirements, such as ensuring maximum or minimum flows into any river which comes from the abstraction source. Abstraction charges may reflect a number of considerations, including whether it is above or below ground source, the location of the abstraction source in relation to the original source, and the nature of the abstractor (industrial, agricultural or public water supply).

River water quality is a Departmental rather than National responsibility. Although most of the Basin Agencies have river monitoring programs, their main purpose is the tracking down of illegal discharges rather than being part of a river quality project. The six Financial Basin Agencies levy taxes on most industrial and domestic effluent discharges to surface waters, and on the abstraction of water from both surface and groundwater sources. These funds are then used to finance pollution reduction and water resource projects.

The Department of Health and Social Services is responsible for monitoring water treatment and distribution, and for sampling drinking water. The Department's

administrative costs for this are charged, on a cost reflective basis, to the water distributors. In addition, the companies themselves undertake substantial monitoring of water quality. Monitoring of discharges is undertaken by special groups of public employees known as the 'water police' or by contractors from suitable companies.

(iii) United States

The US system is again highly decentralised with water quality and water abstraction legislation notoriously weak. Monitoring is formally either undertaken by regional EPA offices or delegated to States.

3.8 Pricing, Community Service Obligations And Cross Subsidies

(i) Britain

The range of CSOs include drainage services for the highway authorities, maintenance of public access to reservoirs and environs, assistance to elderly and disabled customers and some limited cross subsidy of rural customers. It is the generality of customers who bear the cost of CSOs which are incorporated into the cost projections which form the basis of price negotiation with OFWAT.

(ii) France

The main forms of CSOs imposed on the companies are any implicit requirements to cross-subsidise particular groups of customers, requirements to provide free water for firefighting and more recently to encourage economy of water usage. Such CSOs are funded by customers in general through cross subsidies involving the pricing of water and sewerage services. Companies anticipate CSOs costs and include them in their franchise bids to the municipalities.

(iii) United States

The regulatory commissions dictate the pricing structures of water utilities, and so impose cross-subsidies on some customer types. There is little explicit government subsidy of CSOs.

In both France and the US, there are significant subsidies to agricultural water users, and in parts of the US where water resources are short this is creating a serious misallocation of resources. While there has been some movement towards using economic instruments to re-allocate resources, the existing water rights systems and the political nature of US process creates considerable difficulties. In the UK there are fewer cross subsidies since OFWAT, whilst it cannot dictate companies' tariff policy, does require that tariffs not discriminate between customers; this reduces the scope for cross subsidisation. Only a few specific anomalies exist, such as highway drainage and the regional averaging of tariffs.

3.9 Treatment Of Long Lived Assets

(i) Britain

Price cap regulation encourages firms to skimp on the maintenance of long-term assets, particularly because the effects on service performance can only be observed after significant time lags. To counter this problem, the regulator requires the industry to produce detailed asset management plans for surface and underground assets, and to use a system of infrastructure accounting (renewals approach) to ensure that measures of profit reflect the true cost of maintaining the operating capability of the system. Infrastructure assets are defined as underground systems of mains and sewers, the impounding and pumped raw water storage reservoirs, dams and sea outfalls. Replacement work on such assets is underway all the time, and this is written off as an on-going renewals expense. No depreciation is charged on these assets, unless some allowance for redundancy is felt to be appropriate.

(ii) France

The existence of very long asset lives creates particular problems for a franchising system. First, consider the choice between types of contract. Under a concession contract, for example, prices charged to customers are increased to allow the utility to recover accelerated depreciation of the assets. Second, the difficulty of ensuring an efficient choice of technique and investment. For example, where the municipality is responsible for investment, the franchisee has incentives to lobby for capital intensive techniques, in order to minimise its own operating costs.

(iii) US

Rate of return regulation ensures that companies recover all reasonable maintenance costs expended, therefore, maintenance of long lived assets should not be a problem. The main difficulty arises from the use of historical cost accounting which coupled with persistent inflation makes charges escalate (rate-shock) when substantial assets are replaced or added to the system. A variety of measures to counter this problem include the incorporation of work in progress in the rate base to help spread the effect of project which take several years for completion, deferral of costs and disallowance of costs.

4. THE MARKET FOR CONTROL

As is clear from the survey of Britain, France and the US there are a number of different models for managing the water industry. Each involves its own structure of supporting institutions and each involves a different approach to the use of market surrogates where there are missing markets.

4.1 Privatisation

Privatisation attempts to use the capital market to ensure that the enterprise is managed as efficiently as possible. Here the enterprise is sold off to private owners (partially or completely) in the hope that they will guarantee that the resources of the enterprise are used well.

The empirical evidence on the efficiency of the capital market in achieving these objectives is not convincing but the same is true of direct control by a government department. From the standpoint of the taxpayer the important question is whether the money received from the sale of the asset will produce a greater return in some other use (including debt reduction) than that expected from its current use and whether the new owners will provide the service at an appropriate level. These issues are complicated and doubly so by the fact that the taxpayer is both an owner of the service and a client who pays for its services.

As a general rule if any public enterprise is to be privatised, for example if a water authority is to be privatised, then there should be compelling reasons to do so. The choice is clearly irreversible, and as with any irreversible choice, it should only be undertaken if one is completely convinced that this is the correct choice. The layman's preference to "keep your options open" has strong support in the theoretical literature on options. (Pindyck 1991) This means that water authorities should only be privatised if there is strong proof that society would be better off as a result of the change. The nature of the proof is fairly widely agreed. As the leading British prophets of privatisation Beesley and Littlechild (p.23) put it thus: "It would be helpful to structure the problem as a cost-benefit analysis"

but go on to "...propose to short-circuit this procedure somewhat by specifying a single criterion, namely the present value of present aggregate net benefits to ... consumers". The best measure then is a social cost-benefit study, the second best is an estimate of the aggregate efficiency benefits. Beesley and Littlechild go on to reinforce the point about the need for significant gains from privatisation "(U)nless [net benefits are] considerable, the political costs of change will scarcely be worth incurring" (p.24).

This use of aggregate net efficiency contrasts sharply with the view adopted in the media where privatisation is seen as a means of reducing government debt. The media view is wrong as a moment's reflection will show. If one sells an asset at its true value to write off debt, how does that change one's net worth? Both sides of the balance sheet are subject to the same change. (Forsyth p.9-12)

Returning then to Beesley and Littlechild's efficiency criterion we should try to assess whether a private water corporation would produce significantly more efficient water outcomes than a public water corporation. The hypothesis which underlies privatisation is that private owners, as residual claimants to the profits of the enterprise, will change the incentives for managers in the hope that this will change their behaviour and hence the performance of the company. For there to be benefits the new private owners of the enterprise must have different objectives from the current owner; the new owner must be as effective in enforcing the disciplines on its managers; the incentives to managers would have to change; and managers have to fear losing their jobs through take-over if they mismanage the enterprise. The experience of private corporations in Australia in the 'eighties shows how weak this set of controls on managers really is. On balance the theoretical literature is quite ambiguous on the likely effects of privatisation since it is not clear that the new owners will be able to impose a consistent set of incentives on management and nor is it clear that the market for corporate control will have very much influence on so large an enterprise. (Laffont and Tirole 1991)

The conclusion of Vickers and Yarrow (1988), in their classic text on privatisation, in this regard is salutary: "privatisation is likely to improve social welfare only where it provides

significantly keener managerial incentives than does the control system of public enterprise". (p.39)

When we shift to the empirical evidence the picture is again mixed. Vickers and Yarrow (1988), at the end of their survey of the empirical evidence (p.43), conclude that "where competition is effective, the available evidence suggests that private enterprise is generally to be preferred on both internal efficiency grounds and, subject to the qualifications that other substantive market failures are absent, social welfare grounds. To repeat, this does not mean that, in competitive markets, we believe that public enterprise is always and everywhere the less efficient form of ownership." A more recent study of the British evidence by Hutchinson (1991) presents mixed results for Britain with the notable finding that public enterprises had higher rates of growth of productivity but that privatised enterprises had higher growth of profit. Parker and Hartley (1991) similarly find the evidence to be mixed: "simple propositions about organisational status and performance need to be qualified and treated with some caution" (p.124). After detailed analysis of the British Airways case, Vogelsang (1992) concludes that the productivity gains which can be expected from a reasonably well run firm after privatisation are modest, and when the firm is divested into a non-competitive market, consumers may be worse off as a result of the divestiture.

The literature on privatisation is thus quite mixed. There are cases where efficiency appears to improve and cases where it does not. Given the irreversibility of any decision to privatise a water authority, this ambiguity provides scant support to the privatisers. The fundamental problem is that the market for control provides very weak incentives for managerial efficiency and that this is especially true where the product market is not competitive.

4.2 Corporatisation

Corporatisation is a rather different variant but also represents a particular method to try to exert some influence over the firm at the managerial level as a surrogate for the market for

control. In this case the relevant government sets in place a mechanism to substitute for the capital market discipline by requiring the enterprise to meet rate of return targets. If that goal is met the managers have considerable discretion.

If the capital market is used to force the management of the enterprise to pursue efficiency then there is no need for additional regulatory structures to be imposed and the same occurs with quasi-market structures as in the case of corporatisation.

The essence of corporatisation in Australia however is that it has effectively involved a shift in 'ownership' of public authorities from subject matter ministries to central agencies, such as state owned enterprise groups, which act as far more like a capital market in the objectives they set for the enterprises they 'own'. This shift has tended to be underplayed in the public discussion in Australia but struggles between subject matter and ownership oriented groups within government have been an important component of microeconomic reform within the country. Progressively the ownership groups have been winning and this has involved more attention being paid to the performance of the government business enterprises.

The success of the corporatisation strategy is evidenced from a number of studies, mainly within the Industry Commission, of the improvements in the performance of the corporatised public enterprises. The summary conclusion of the analysis of the twelve water authorities covered in the **Government trading enterprises performance indicators 1987/88 to 1992/93** is extremely informative in this regard. It suggests that after being fairly steady during the eighties, labour productivity has increased by some fifty percent in the last five years, real prices have fallen by more than five percent, and dividends paid to governments have more than doubled.

These figures are even more startling if we ignore the rural water providers and concentrate on the cities, the returns for Sydney and Melbourne suggest that even more dramatic improvements are possible, with prices falling further, productivity rising faster and returns increasing more than for the industry as a whole. The Steering Committee's conclusion is

that "While data limitations make comparisons difficult, considerable variability in results suggest that some GTEs could achieve significant further gains by catching up to the industry best practice leaders". (p.152)

4.3 Franchising

The right to operate a business on behalf of public owners does not differ fundamentally from corporatisation and this is the essential characteristic of franchised systems. In each case a group of managers acts as agents for the public owner on terms set by the owner (corporatisation) or as the result of an auction or tender (franchise).

There is little experience in Australia with the franchising of what have been the traditional functions of public authorities although it appears to work well in some other countries. The French experience however involves a highly decentralised system of control over the franchisee and a price cap style of price control. Viewed from the outside this system seems to pit local politicians who want to keep prices low against companies which undertake a wide range of franchises. The evidence is unclear as to the efficiency and effectiveness of the outcomes. The theoretical literature on franchising suggest that there will be a number of advantages and some disadvantages and the survey above of the French experience in this regard reinforces many of the concerns.

With franchising a firm bids for the right to operate a particular delivery system for a period of time. This bid might include responsibility of maintenance of long lived assets but need not. The key difficulty with franchising is that the firm has to be monitored because it is in a monopoly situation. As well, its impact on the long lived assets which are typical of a water system have to be closely reviewed and assessed. Somebody has to make the investment decisions and, with water assets lasting between twenty and one hundred years, there is little incentive for a firm with a contract of shorter term than that to provide adequately for such assets. This suggests that a franchising contract should be of long duration but the effect of long contracts is that there is very little incentive effect; the franchisee can spend long periods with little fear of loss of contract. Compared to a public

enterprise it is even harder to extract accurate information about operations from a franchisee since the franchisee knows that the likelihood of a contract renewal depends on the ability of the principal to monitor performance.

4.4 Splitting Up Enterprises

To improve the control over the activities of the water provider, most importantly to improve the information flows to the owner, Victoria is moving towards a system of yardstick competition between competing distributors within the Melbourne area. This is expected to generate information about the characteristics of the system. With better information, the government enterprise unit will be able to sharpen the pressures on management to perform and as such it acts as a surrogate for competition (yardstick competition).

The strategy of splitting up large public enterprises has a secondary benefit. It reduces the power such agencies have within the bureaucracy and lessens the political influence they are capable of wielding. Splitting agencies up divides and dilutes the impact of any water authority and hence increases the control which can be exercised by the owner agency. While this is not explicitly a market argument, it does create the situation where the interplay between competing companies produces the sort of information about performance which is available in a market.

The reservations with this system arise because of the different operating characteristics of the distributional companies. In the case of Melbourne, geography and geology advantage certain parts of the city over others. Splitting the system up between different distributors requires either that an artificial system of equalisation be implemented to keep tariffs relatively equal across the city or major differences in pricing will emerge. Sydney sees many of the same geographical diversity. From a market point of view prices would have to be rebalanced substantially between zones to make the best use of the diversity of suppliers but it is unclear whether politicians will allow the necessary changes to occur. This diversity of operating conditions will also make it difficult for a regulator to assess

whether the different operating outcomes arises from differences in managerial performance as OFTEL has found in Britain with its attempts to use yardsticks.

5. PRODUCT MARKET COMPETITION

There are a number of well known cases where markets fail to deliver the benefits economists hope of them. The water industry seems a candidate for such market failure as a result of either or both of scale economies and/or information asymmetries.

Most water is presently provided by a monopoly supplier. This can be because the cost structure of the industry is such that one firm can supply the market more cheaply than could two but it might simply be because of legislative fiat (the prohibition of alternative suppliers entering the market or the awarding of a monopoly franchise). Where the industry concerned is a monopolist, competitors cannot impose the downward pressures on selling prices which are required for allocative efficiency. There is thus failure of the product markets. In the absence of this price discipline, **regulation over prices** is normally considered to be a superior alternative to allowing the firm to operate as a monopoly. Even where this is not necessarily the best solution, it is politically difficult to allow a monopoly to operate a public service without some form of price oversight. This oversight may take the form of price controls, of price capping, or of the use of some surrogate such as rate of return regulation. Since regulation is costly, a simpler approach may be to accept the deviations from market outcomes and allow the monopoly to operate in an unrestricted way but this is not usually tolerated.

With water there is another potential market failure which arises because consumers are not necessarily fully informed about the characteristics of the water provided to them. There are a number of devices available to deal with the potential information asymmetry between supplier and consumer. Voluntary consumer groups might be set up to monitor water quality, or subscription based services such as those proved by **Choice** magazine might provide the necessary information. However because important issues of public health are involved **regulation over product quality** will almost certainly be required. This will particularly apply when the market concerned is not competitive since the monopolist will have little incentive to reveal quality truthfully. The Camelford water poisoning incident in

Britain in 1988 (when the local water supply was massively overdosed with aluminium sulphate) provides a clear example.

The regulation of quality is also an important corollary of regulation over product prices since one response to price regulation available to the firm will be to lower quality. Price regulation is thus usually complemented by quality requirements: in this case the quality requirements may be set as minimum health standards.

When we explore the situation more closely we need to ask which particular aspect of the operations of the water supplying firm lead to its cost advantage over competitors. It may be possible in some cases to isolate that aspect into a separate monopoly and introduce competition into other elements. This is the line of thinking which has led to the interconnection of Optus calls with the Telecom system, and to the possible splitting off of production from distribution in the power industry. With water similar schemes might be considered. Regardless of how far we pursue this, there is fairly general agreement that some element of the water industry has natural monopoly characteristics so that the argument above for price regulation remains important in that domain.

In systems based on an integrated network, as in cases such as water and telecommunications, it is also necessary to ask at the product market level whether the industry concerned can be disaggregated vertically. In telecommunications, Australia chose to develop an industry based on full system competition between two players, Telecom and Optus. The alternative model, used in the US, had local monopolies responsible for the final delivery of the product and allowed competition in the market for interstate carriage of messages. In the electricity sector we are moving towards a system of competition in the generation stage with the grid and final distribution being monopolies. Victoria has decided to move in this direction in Melbourne with a separate entity providing the water to three distributing companies. As discussed above, this strategy is important in terms of the information which flows to the owner, or regulator, but in product market terms this has little direct effect since each of the stages is likely to remain as a monopoly.

There are still major cities such as Brisbane which rely principally on rates to finance water provision. Without a user pays system it is difficult to develop any targeted system of market discipline on pricing. This has pushed authorities towards the introduction of meters for individual households but the pace has been slow. However since metering is a costly step, there is need of clear cost benefit analyses to be undertaken to justify the investment. We know of no such studies having been undertaken.

The nature of the regulator and of the price regulations which act as surrogates for price competition are discussed in detail in a section below.

6. THE FACTOR MARKETS

Water authorities use labour, capital, water and other inputs into the production process.

In relation to its use of labour inputs the main restrictions which authorities face in their purchases involve the potential monopoly power held by various groups of in-house service providers. The obvious mechanism to deal with this is contracting out. The monopoly powers of unions etc are part of the general operating environment of Australian firms and hence not something which requires particular treatment. This has already been used with great success in some companies, notably Melbourne, Sydney and the Hunter, from which it appears as if nearly half of the employment tasks traditionally undertaken within the organisation can be contracted out. If firms are serious, labour market competition can be used as a serious tool to introduce market disciplines within the organisation.

The situation in the capital markets is somewhat different. As public enterprises, water authorities generally enjoy some degree of explicit or implicit government guarantee of their debt. This means that they have access to funds on terms which may be more favourable than those for normal commercial entities. This requires no particular regulatory treatment except in the circumstances that it may lead to a public corporation being able to compete on unfair terms with a private company. Governments have been progressively capturing the rent associated with this for themselves and onloaning funds on more commercial terms. Progressively then, water authorities have had to raise funds on normal commercial conditions.

Access to water inputs to the production process is rather more problematic. Whenever property is held in common and the rights not explicitly parcelled out, we are likely to see the serious misallocation of resources since one agent's use of the resource will lead to external effects on others with resulting inefficiencies. This is a particular concern where water resources are harvested in one area and transported to another, so that the losers and the gainers are not the same people. The principles which are involved in the use of water should be similar to those for any other renewable resource. This suggests that water should

be considered a public resource and water companies given rights to harvest it on various conditions. Where this management is achieved on a sustainable basis, with no degradation in quality, then the charges can be small - probably set at a level necessary to monitor those characteristics. Where quality is lowered, or where streams run dry, price should be established reflecting the loss of amenity implied. (This topic is discussed further in the regulatory section below).

7. REGULATORY DESIGN

While formal market mechanisms might be used to ensure that labour and capital inputs to a water entity are priced at competitive levels and while franchising can provide some scope for competition for the water market, it was clear from our review of the foreign experience that regulation of the product market was considered essential across the institutional spectrum. Where competition is sufficiently powerful to protect the legitimate interests of both consumers and competitors, water authorities should be free from regulation. However, the consensus position is that this is unlikely to apply.

Fortunately, economic theory has laid out a clear structure for the appropriate regulatory environment to operate in situations where competition is weak or ineffective. The key idea is that the regulator should determine the behaviour which the regulated firm would have undertaken in a fully effective competitive situation and to induce the firm to behave in this way.

It is important to realise that this model does ask the regulator to simulate perfect competition. To the extent that the water industry is characterised by economies of scale and of scope, the industry cannot and ideally should not approach the perfectly competitive situation; the relevant criterion is that of effective or workable competition. The standard regulatory rule from perfect competition, of marginal cost pricing, would, for example, send most water providers bankrupt. Regulation thus should set as its objective a different theoretical standard, one closer to perfect contestability than perfect competition.

The approach we adopt here is that the community service obligations of the water provider are negotiated separately and paid for by some means other than cross-subsidy. Hence we will focus on pricing to achieve efficiency.

7.1 Economic Efficiency

Economists use the idea of efficiency to impose a sanity test on public decision making.

Efficiency simply means that there is no opportunity to increase the general welfare which has been ignored. Slightly more formally, an efficient policy is one where nobody could be made better off without harming somebody else. Any policy which improves the position of some without damaging the position of others is called a Pareto improvement. The key role of the regulator is to make sure that there are no Pareto improvements possible. Notice at this stage that there is no presumption of marginal cost pricing or any other specific rule; the efficiency criterion does not suggest that the firm involved is in perfect competition.

It is quite common to pass from the use of this sanity test on policy, to suggest that the regulatory standard should be the competitive market standard of perfect competition. This step is taken on the basis of a set of theorems which demonstrate that an economy in which markets are perfectly competitive is efficient in the sense that there are no Pareto improvements available. This has created the competitive standard as the basis of regulatory price setting.

Despite the wide acceptance of this principle, it is not appropriate. We see the difference expressed in even the Hilmer Report (a pro-competitive document): "In recommending pricing principles ... have regard to ... the efficiency rationale of prices oversight and taking into account the need for a firm to receive a reasonable rate of return on its assets" (p.290). Notice the emphasis on efficiency rather than competition.

The basic failure of the competitive standard in price regulation of the water industry is that the perfectly competitive model, upon which it is based, assumes that firms can enter and exit from an industry costlessly and that the number of firms in the industry is large. When these two assumptions are violated, use of the perfect competition standard is likely to lead firms to operate at too low a scale and to be driven to bankruptcy. In markets which would sustain competition between a significant number of firms, policy decision designed to allow the entry of competition and to shift prices towards marginal costs can be expected to improve welfare. Where monopoly is however the most efficient market form, nothing is to be gained by regulating as if the industry could be competitive and much is to be lost.

In the absence of the perfect competition standard, there are two alternative standards which might be used. The first of these involves allowing firms to price so as to cover costs and achieve a reasonable return on capital, but to minimise the efficiency losses which arise due to prices exceeding marginal cost. This will generally result in different markups on different products sold, with the highest markups being on products for which demand is least price responsive. This is called Ramsay pricing. This is a difficult regulatory standard to set since a regulator would be required to know the cost of providing service to each customer, and the demand elasticity of that consumer (or category of consumers). In Australia price cap regulation works as a short-cut approach to Ramsay pricing. The cap constrains the revenue of the firm as a sum, while the firm will juggle prices to maximise profits within that constraint. This approach has the advantage of allowing the regulator to impose downward pressure on prices, and hence costs, while leaving to the manager the task of deciding margins in different markets. This is a task in which the manager can be expected to have superior information (Tirole 1988).

The alternative regulatory paradigm depends on setting both floors and ceiling to allowable prices (Baumol and Sidak 1994). The primary rationale for setting a price ceiling is to protect consumers from the exploitation of monopoly, but it has the parallel effect in the contestability framework of restraining firms from pricing above the price at which entry would normally occur. The ceiling is thus set on a basis of calculating the price at which others could enter the business and operate on a long term basis in competition with the incumbent. From a consumer point of view price floors have little rationale, but it is clear from the discussion of the French case above, that allowing prices to fall too low can also be damaging. In trade practices terms, prices can be set at too low a level, with predatory intent to restrain competitors from entering the market. From an owner's point of view the concern can be that the enterprise is setting prices low by foregoing necessary maintenance etc. The costing rule in this case would be long run average incremental cost (or marginal cost, whichever is the greater).

Thus, there appears to be two alternative approaches which regulators can sensibly take to water regulation. They can ignore floors, and simply set price ceilings. These could be set

on a case by case basis or by use of a general price cap. When prices are set at a very indirect level, such as by reference to a general rate, we can expect the outcomes to be very inefficient. The alternative approach would be to set price floors and price ceilings and to allow the firm to operate within those ranges.

7.2 Interconnect Pricing

One feature of the new models of water supply arising from the Hilmer Report is the likelihood of increased interconnection of water systems. As these are likely to be treated as essential services, firms will have to allow each other access to one another's service at a variety of different points. This will require an interconnect regime similar to that negotiated by Telecom and Optus and with AUSTEL. Firms will have to establish interconnect points and cost access at different points in the systems.

7.3 Water Quality

One of the major difficulties of water regulation has been that one of the key inputs (water) and one of the key outputs (waste water) are neither purchased from nor sold to a market. Standard economic theory would thus suggest that the quantities used will not be the efficient ones.

The appropriate regulatory responses would be to apply broader market principles. In the case of water harvested by an authority, assuming that the authority rents or builds the facilities it needs, it should be managed in accordance with the principles governing the harvesting of other renewable natural resources. As such, harvesting is probably most appropriately managed by resource oriented ministries. If the resources were priced this would undoubtedly increase the pressure on water supply authorities to improve water management, losses from the system, demand management etc.

Where water is added back to systems in conditions different from those in which it was abstracted, the water use has created an externality. Where the quality has deteriorated, the

consequent externality can be addressed in a number of ways: by anti-pollution laws which specify the conditions on which water can be disposed of, by auctions for pollution rights, by pollution taxes etc.

The difficult question concerns just who will have responsibility for implementing these conditions. The current approach is generally regulatory: the EPA or other appropriate body sets conditions which should be met and monitors outcomes. This approach has two weaknesses. The first is that the pricing of pollution rights allows firms to decide on the most efficient level of pollution relative to the costs of clean-up; that is, that the market can usually make better decisions than regulators imposing blanket controls. The second problem is that water users should have some scope for deciding just what level of pollution they want on their beaches or in their streams. Lower pollution levels means higher costs which means higher water prices. There is no easy method for reconciling these two issues other than through the political process.

8. THE HILMER FRAMEWORK

8.1 Overview

The Hilmer Report into national competition policy started from the premise that it was necessary to facilitate effective competition in order to promote efficiency and economic growth. While trade practices law has some of the same effect, Hilmer argues that there are six essential components of a national competition policy:

- (i) limiting anticompetitive conduct by firms
- (ii) reforming regulation which restricts competition
- (iii) reforming the structure of public monopolies to facilitate competition
- (iv) providing third party access to essential facilities
- (v) restraining monopoly pricing behaviour
- (vi) fostering competitive neutrality between government and private companies.

Since the Australian governments have accepted the basic principles of the Hilmer package of reforms, it now seems clear that the introduction of market oriented changes into the water industry will be carried out in ways consistent with the thrust of a national competition policy.

To the extent that the Trade Practices Act precludes certain kinds of conduct it found support in Hilmer but the main deficiency was that it is mute on most matters of uncompetitive outcomes. This was of particular concern where, for example, governments or their agents decreed that the price of a particular good or service was to be set at a certain level. Where this occurred, the effect could be the same as if the firms had colluded to fix the price, with the same damage to competition but hidden behind regulation. This problem has been especially acute where the Trade Practices Act was thought not to apply to State government authorities. The thrust of much of the reform process in Hilmer is to provide a consistent framework where State government authorities were brought within a consistent pro-competitive structure.

This is however a difficult area of inter-governmental relations since control over public authorities is an important source of power and influence at the State level. It has also been common in recent years, as dividend flows from government businesses have risen for such businesses to make an important financial contribution to state revenues.

The need to address the way in which the different levels of government have tended to devise a variety of different anticompetitive rules and structures for entities within their constitutional authority was a major challenge for the Hilmer Committee. They needed to find a mechanism to deal with legislated monopolies for public utilities, with statutory marketing structures for many agricultural products, and licensing agreements for various occupations, businesses and professions. Since these structures do not contradict the Trade Practices Act there was a need to devise a different structure to address these issues.

The basic approach of that Report has been to look at cooperative inter-governmental approaches based on principles and processes which can be implemented by the individual governments. In relation to the public utilities such as the water industry, these cover five basic areas: regulatory restrictions on neutrality, statutory reform of public monopolies, access to essential facilities, monopoly pricing, and competitive neutrality. The specific policy recommendations within each of these areas lies within the frame of a number of general principles upon which it is hoped all governments can agree:

- (i) that any restriction on competition must be demonstrated to be in the public interest,
- (ii) that any restriction on competition operate for just five years, and only be extended after a subsequent inquiry,
- (iii) that existing regulation be reviewed and lapse after five years,
- (iv) that reviews should take a national perspective where possible.

At this global level then, the Hilmer process will necessitate a series of inquiries into the management of water resources in every State, and possibly a separate inquiry into every separate market, to demonstrate that any restriction on competition implied by legislation is

actually justified. In the process, it will be necessary to demonstrate a clear public benefit from the continuation of such restrictions. This is an important caveat since it turns the onus of proof around. In policy debate to date, the status quo has been accepted generally unless there is a compelling case to overturn it. Here the opposite will occur. Further, the perspective to be taken will be national not local. This means that where water intensive processes have been undertaken within the framework of water being provided under some market restriction, the evaluation of whether the restriction is justified will have to consider the situation of producers in other regions subject to different conditions for the provision of water.

8.2 Regulatory Restrictions on Competition

Regulatory restrictions on competition have emerged over many decades and often have at their roots historical circumstances relating to the economic development of small, isolated colonies. The role of government within the Australian colonies and subsequently the States was different to that currently appropriate. In situations where the infrastructure necessary for the transport of goods and the development of basic services such as post, telegraphy, water and power were often not forthcoming from the private market, or where private actors would impose significant costs through the use of inappropriate and inconsistent standards, the intervention of the government was essential for development. In the case of urban water, public health issues lay at the heart of the provision of water supply and sewerage services by the public sector. There were of course many private initiatives in these areas but the general view was that economies of scale and of standardisation, or other externalities, were present hence public provision was justified.

With the strengthening and deepening of the economy, Hilmer now conjectures that public provision is not necessarily the appropriate delivery mechanism for these goods and services. In some cases technological change has rendered it far easier to provide services than was the case in the past and in some cases there has been an emerging demand for higher level services constructed on traditional facilities; but this has not typically been the case with water. While the effect of changes in the supply conditions and in demand is what

motivates the reconsideration of the terms of public provision, in the case of services such as water this has not been as important. Neither the structure of demand nor of supply has changed dramatically so that we have to look to other factors to explain the perceived need for sectoral and business restructuring.

Whatever the reasons for the demand for reform, the regulated interests have a strong incentive to resist it. Once some restrictions on competition are regulated for, some individuals have their economic situation advantaged. To the extent that these are particular groups of consumers they form a potentially powerful lobby against reform. Similarly the firms which have benefited from the restriction on competition are advantaged and to the extent that these benefits are passed on to their employees, two further groups are privileged by the competitive restrictions.

In order to change the balance of interests, the Hilmer process has aimed to commit the various governments to the principle that "there should be no regulatory restriction on competition unless clearly demonstrated to be in the public interest".

Probably the most important single restriction on competition has taken the form of regulations which preclude entry. Over the last two decades economic theory has focussed increasing attention on the extent to which markets are open to entry, as being an essential factor in understanding the constraints under which incumbent firms operate. The contestability of a market has thus become a central topic of interest (Baumol 1982). Entry to the provision of services of public utilities was often restricted to prevent wasteful duplication of facilities: we probably do not want two competing water delivery systems in a city and we may not want two competing telephone networks although this latter point is in dispute.

The problem which emerged with this argument was that, freed of the potential for competition, firms have had little incentive to control their costs. This has produced inefficiencies which have been estimated by the Industry Commission to be of the order of billions of dollars per year for the major utilities. The question thus becomes whether the

competition which appears wasteful in the duplication of services can be efficient in its better discipline over costs. The thrust of the Hilmer report, as it relates to utilities, is to find mechanisms which allow competition without adding too much in the way of wasteful competition.

This led then to the first policy principle that competition should not be restricted unless the government concerned could demonstrate that such a restriction was in the public interest. The demonstration is expected to follow from a public inquiry and to be derived in a participatory and transparent way. This principle is complemented by the sunset restrictions mentioned above. The Hilmer Report does not make any recommendation for the implementation of such policies at the national level but does suggest that a National Competition Council could help to develop consistency between the various states in this area.

8.3 Structural Reform Of Statutory Monopolies

While many public monopolies operate under the umbrella of regulatory restrictions on entry, the removal of such restrictions is not enough to guarantee effective competition in the area. Most public monopolies have developed a broader framework of activities around their core monopoly business which gives them far greater market power than that which resides within the narrow monopoly.

The introduction of market forces in such circumstances to act as a spur to the efficiency of the enterprise may require structural changes to the operations of the enterprise which exceed the removal of the regulation in support of monopoly. This is a particularly problematic area of public policy since there may well be considerable gains in terms of economies of scope which arise from the integration of the enterprise which may be lost in such a restructuring of the enterprise.

The classic economic analysis of markets runs from structure to conduct and on to performance and much of the regulatory debate has followed the same format. If the

industry concerned has the appropriate structure and conduct is in accordance with the Trade Practices Act, then we can expect improved performance from industry. Hilmer builds upon the same concern that the structure underlies all other matters.

The dimensions that Hilmer sets out for the consideration of structure are the relation of regulatory to commercial functions, the relation of natural monopoly areas to potentially competitive ones, and the separation of competitive activities one from the other.

(a) separation of regulatory from commercial functions

In many cases, Australian public utilities were originally managed as governmental departments. It is hardly surprising then that they traditionally included a variety of governmental functions such as policy making, regulation, inspection etc as well as that of service delivery. As they were cut out of departments and moved off to operate separately, most of the policy making functions were retained within the departments. However, the line concerning technical and regulatory management was not always treated with such clarity and even the policy line was often blurred since the government department concerned had to develop policy for operations by a publicly owned, powerful monopoly often backed by powerful public sector unions.

In a competitive environment such multiple roles may conflict, with the policy and regulatory functions being compromised by the profit focussed activities. It has thus become standard to separate the policy activities from the commercial activities and to locate it in either a subject matter Ministry or a general Ministry, and to separate the regulatory (and standard setting) functions out as well. In some cases it can be appropriate that the firms in the industry undertake self regulation but it is not generally appropriate that these functions be undertaken by a ministry which is also responsible for ownership or control of the public corporation concerned.

(b) separation of natural monopoly elements from potentially competitive areas

A number of public enterprises operate in markets which were thought to be natural monopolies in the sense that one firm could provide the market more efficiently than two or more. In many cases these activities are undertaken in conjunction with other activities - Telecom offers mobile phone services, Post offers courier services etc. Such linkages create various concerns. Such vertical integration creates the opportunity for cross subsidies from the monopoly to the competitive areas which can limit entry (limit pricing). The second concern arises when the monopolist faces competition in the downstream leg: then transfer pricing within the firm can occur at lower prices than an outside firm can acquire the input, thus downstream competition is squeezed.

One remedy for such behaviour is to separate the monopoly activity from the competitive ones, the second is that the conduct of the firm could be regulated to prevent such anticompetitive practices. Both approaches have costs and benefits and these need to be weighed in order to consider the appropriate one in any case. With separation one might insist on no more than accounting separation or full separation: Hilmer opts for the latter. Quite generally, the Report recommends full structural separation.

(c) separation of potentially competitive activities

In some cases it is not clear that the enterprise has a natural monopoly but it may still have grown to such a size that it dominates a market. If a government were to privatise it with the monopoly intact then there would be an immediate problem of potential monopoly abuse. In such cases breaking up the monopoly before privatisation may be the appropriate action. Even where there is no suggestion of privatisation, the introduction of competition may be enhanced if the power of the incumbent is lessened by it being broken down into smaller and potentially competitive components. The benefits will depend on how contestable the market is.

The general approach of Hilmer is thus to recommend that a number of policy principles be agreed by governments. The first is that regulatory functions should be split off from any monopoly and assigned to some other place which avoids conflicts of interest. Where competition is being considered, there should be an inquiry into the benefits and costs of structural separation but with a predisposition in favour of separation.

8.4 Access To Essential Facilities

In some markets the introduction of effective competition requires competitors to have access to facilities which exhibit natural monopoly features and hence cannot be duplicated economically. For example, in electricity a power station needs to have access to the distribution grid in order to transmit its power to its customers. An essential facility is by definition a monopoly, permitting the owner to reduce output and raise prices in a way which is potentially damaging to users and the economy generally. The owner of such bottleneck facilities can also use control of those facilities to exclude competitors. This suggests the need to develop procompetitive regulation in such areas.

Where the owner of such a bottleneck facility does not compete in upstream or downstream markets, it will have little interest in denying access since generally the greater the usage of the facility the greater the profits earned. It can however use its strategic position to extract monopoly profits so that the pricing of 'access' to the essential facility becomes important.

If in addition the facility owner is also vertically integrated, it may have the additional incentive to deny or restrict access. In this case a company which owns, say, a transmission system and has its profits on the use of transmission regulated may seek to use its power over access to the system to allow it to earn monopoly profits in the up or downstream activities. Even the prospect of such action may inhibit entry.

As discussed earlier it may be sensible in such cases to separate such integrated firms structurally. Simple accounting separation will not be sufficient since the refusal to supply access will not enter the accounting relationship. The difficulty for competition policy is to

devise a regime under which competitors will be able to interconnect, and at the same time be protected from the integrated supplier.

In general the law provides no duty on one firm to supply another and much of the fabric of the economic system depends on allowing freedom to contract. In certain cases, most notably telecommunications, the concept of a common carrier has been used, where that concept does imply an obligation to serve. In Australia we can see two distinct approaches to this problem: one, through s.46 of the Trade Practices Act which prohibits taking advantage of market power for the purpose of damaging competition or competitors; the other through specific access rights such as in the interconnect agreement requiring Telstra to provide access to Optus in the public switched trunk network. The section 46 approach is not likely to succeed in Australia since it would require the firm seeking interconnection to prove that access had been denied for the express purpose of "substantially lessening" competition; this is generally not easy.

The creation of special access rights in the case of telecommunications involved specific legislation which required Telstra to provide interconnection facilities with any other carrier; Australia Post now has an access (interconnection) regime as well. The pricing principles which apply to such access in telecommunications are governed by Ministerial decision but must be negotiated between the carriers. Where there is no agreement, AUSTEL becomes involved. The access regime also requires Telstra to provide some access to other facilities considered necessary to use the network. In Post's case the interconnect regime has been sanctioned by the Price Surveillance Authority. The NZ regime left these issues to be resolved through the general trade practices approach and they have been involved in long legal action.

The recommendations of the Hilmer report favour a legislated general right of access. This is done despite the recognition that the decision, to legislate to require access, removes some of the rents which those who constructed the facility expected to enjoy as a result of their investment. This lessens the likelihood of such investment going ahead in future and means that there needs to be a clear and well established public interest underlying the

policy intervention. As access is provided, so there is the necessity to ensure that it is provided on terms and conditions which make it possible for a competitor to use the facilities commercially.

The recommendations are that access should be required where the Minister decides that the facility is essential to permit effective competition in a upstream or downstream activity having due regard to the public interest. At the same time, the interests of the owner need to be protected through the imposition of a fee for access which is fair and reasonable and is recommended by an independent expert body.

Just what the appropriate fee should be is not easy to calculate from economic theory. There are three core issues: the owner has a right to profits, the interconnector has a right to interconnect but is it at marginal costs, and the long term investment needs of the facility must be considered. A high price chokes off competition; a low price reduces the value of the owner which may well be a public company; and a low price means that firms will be disinclined to invest in such facilities in future. In Australia the telecommunications interconnect cost was priced according to the directly attributable incremental costs; in New Zealand, the firm can charge a price to cover the opportunity cost of providing access; the tendency in the US is towards specifying a range between total service long run incremental cost and stand alone costs; the UK tends to use fully distributed costs.

The Hilmer committee recommended an approach whereby a relevant Minister would decide on some pricing principles and then the parties concerned would negotiate commercially, on the grounds that this is less interventionist than the alternative. In cases where the parties could not agree, despite the requirement to provide access and the pricing principles, the government would provide binding arbitration services.

In determining access there would remain the general requirement that the quality of the interconnected product could be monitored, or regulated, to ensure that it did not damage the facility being provided. The interconnecting party also needs protection to ensure that the provider does not price discriminate, favour itself or cross subsidise from this to other

activities.

There are several additional issues of importance. One is that government revenues from ownership of such facilities will fall; the second is that community service obligations may become difficult to finance; and the third is that the Commonwealth may create rights of access to facilities owned by other levels of government.

For the first, Hilmer has little time. If the revenues being generated are monopoly rents, they are not justifiable in the public interest. If they are normal commercial rents then they should not be affected. Many public companies actually earn below commercial rates of return. For the funding of community service obligations, Hilmer recommends that this be done by direct payment rather than by cross subsidy from areas of monopoly rent. Alternatively there might be some requirement that interconnectors make some contribution to the CSO.

8.5 Monopoly Pricing

The monopoly pricing section of the Report, accepts that in markets where competition is likely to be weak or absent, some form of price surveillance will be necessary. Hilmer recognises that in cases where the good is primarily supplied on a local market then the appropriate supervision of prices will occur at the State level. The suggestion is that states adopt an institutional structure such as that followed by the NSW Government Pricing Tribunal and clearly the Victorian Regulator-General fits with this general scheme.

It is proposed that any national approach be at the level of monitoring and oversight rather than control.

8.6 Competitive Neutrality

The competitive neutrality recommendations of the Report have now been fairly broadly accepted in policy discussion over the last decade. The key idea is that government

businesses should not enjoy any net competitive advantages by virtue of their ownership when they compete with other businesses.

The concern here would be that many water authorities are currently providing rates of return on assets which are below those expected by the capital market. A public enterprise which was just returning two percent can hardly be in a neutral position with private companies which may have to return ten percent. While the Report recommends that this be achieved by corporatisation, in cases where the water authority is competing with others for any of its services the recommendation is that any competitive advantages be neutralised within one year. Read literally, the Hilmer recommendation would virtually require that a corporatised public enterprise immediately raise its rate of return on capital to normal commercial levels.

9. RELEVANCE OF THE HILMER RECOMMENDATIONS FOR THE WATER INDUSTRY

From the above summary (Chapter 8) it is clear that once the Hilmer Report recommendations have been accepted - and assuming that they are -- the water industry is going to be subjected to frequent and searching review. These external reviews will be required to take a national viewpoint and to assume that competition should only be restricted when there is a clear public interest case for such a restriction.

The reversal of the usual policy, whereby those proposing change have to demonstrate the benefits of change, will make the task of the water authorities extremely difficult. The problem is that there is no clear single alternative against which they will have to demonstrate their superiority. In water markets, there is no single exemplar against which the status quo could be defended since perfect competition is effectively impossible given the massive barriers to entry to and exit from the industry.

The second major concern for the water industry in regard to the Hilmer Report lies in its presumption that the structural division of a network industry is far preferable to regulating the conduct of the firm. Under this presumption lies the idea that there are no important economies of scope and that there are no efficiencies to be gained from managing the network as an integrated structure rather than separate 'wholesale' and 'retail' components. Since each of these components in the case of water is likely to be a monopoly, there is no theoretical support for the implicit proposition that having two monopolies interacting is in any way superior to having one vertically integrated monopoly. To defend their network structures against the presumption that society would be better off if it were split up, water authorities will have to develop models which demonstrate the efficiencies which arise from integration.

Even the presumption, that it is preferable for firms involved in upstream activities not to be involved downstream, is not necessarily sound. If a firm provides no more than a bottleneck service to downstream distributors it has every incentive to monopoly price. If it

owns one of the downstream firms its incentive is different. If it is unable to discriminate in the price it sells at downstream, then the firm has some incentive to lower its bottleneck price to expand the downstream market. This may be better, in the sense of being socially more desirable, than complete separation. Thus it may be sensible to allow a wholesaler to own one of the downstream distributors rather than enforcing complete separation. Firms facing separation may well wish to investigate this further.

The essential facilities argument in Hilmer produces a number of other concerns for the water industry without clear social advantages emerging. The proposal is to create, for essential facilities, an obligation to supply which does not generally exist in Australian law except under common carrier provisions. The intention is to allow alternative suppliers to bypass inefficient or wrongly priced elements of the network; an effect which may force the network operator to price the components of the network efficiently. Since the network provider will have to allow access, the pricing system for networks will be required to be transparent. Most importantly, large users of water will be able to build their own facilities and to interconnect them. This provision will undercut the ability of water authorities to offer some customers water on different conditions to those available to others. Consider the example of a large business user who gets water under some particular scheme at a per unit price which is below that available to other users. Under the essential facilities regime, that business will be able to interconnect back into the system and provide water to other users at prices which (potentially) undercut existing tariffs. One consequence of such a regime is that the freedom of water authorities to price discriminate will be significantly lessened. Any sort of non-linear pricing scheme will be harder to sustain when customers have the freedom access and bypass rights.

The treatment of community service obligations in Hilmer is also problematic but procompetitive in a desirable way. The direct funding of authorities for the provision of services which are non-commercial will enable authorities to concentrate on commercial activities, with government taking the political responsibility for the size of non-commercial services. The situation where this is likely to provoke public concern is when water is cut off from consumers as a result of a commercial decision not to provide a service and the

government is unwilling to fund the activity. This will clearly cause community concern but will enable firms to operate in a simpler way, meeting the commercial objective they have been set.

10. CONCLUSIONS AND RECOMMENDATIONS

This work finds that there is scope for the introduction of market oriented reforms in the ownership of water authorities, in the sale of water and its associated treatment, and in the market for inputs to the production process. The search for the benefits from such reform is a major component of microeconomic reform.

At the level of ownership, however, the report finds little scope for the use of market forces directly. Thus there is found to be little benefit from privatising water authorities while the product market still retains its monopoly status. For similar reasons, little benefit can be expected from franchising. The preferred model for market control lies in corporatisation, with a central government agency such as a state owned enterprises group providing ownership discipline.

The core difficulty with market reform of the water sector lies with the natural monopoly features of the market for urban water. The only sensible solution here is for tight regulatory supervision.

Such supervision should be provided by a regulator along the lines established by Victoria or New South Wales. The regulator, however, should accept that the regulatory target is not that provided by perfect competition but rather something closer to perfect contestability.

The problem of pollution is an important one in urban water management. It is here that the production and usage of water can create byproducts which can have a significant impact on the environment. Users of water must be made aware of the costs they impose and the greater use of market forces is one device to increase these pressures. The report recommends that pollution and similar water externalities should be priced by a water control agency and that the firm and its price regulator adjust to the resultant costs.

Turning to the markets for inputs the case is simpler. Inputs should be outsourced to the greatest extent possible and this applies to both capital and labour. An important component of this, the water input, should be managed by the state in a way consistent with its strategy for other renewable resources.

This framework of reform has now to take place within the broader structure of microeconomic reform and particularly within the Hilmer reform proposals. Importantly, the Hilmer process will require authorities to justify that the retention of their distribution and production monopolies is in the broad public interest. This will require considerable preparatory effort on the part of the water authorities, most particularly in the preparation of their cases to maintain integrated enterprises.

The report suggests that the Hilmer preference for splitting up agencies into functional groups is probably not appropriate for water and that a tightly regulated set of rules of conduct should be expected. However, since Hilmer makes this the preferred position, water authorities must be prepared to develop strong material if they wish to rebut that position.

On the question of access to facilities the Hilmer position is stronger. The Hilmer recommendation of open access to essential services will require water authorities to price the components of their systems on the basis of efficient component pricing. This will lead to major price rebalancing and require a significant amount of research into the costs of the network at different places and the importance of particular network configurations. Only when this basic work has been done will the authorities be able to establish sensible interconnect prices.

One corollary of this is that the scope for cross subsidies within the water system will be reduced considerably. Much water is currently priced differentially, often by rising block prices, but such pricing configurations will not generally be sustainable once open access to the network is introduced.

Finally the report concludes that the Australian water industry is well on the way to achieving many of the suggested reforms.

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BIBLIOGRAPHY

- Agricultural and Resource Management Council of Australia and New Zealand (ARMCANZ) (1993), Water Industry Performance Review 1987/88 - 1991/92.
- Baumol, W. (1982) "Contestable markets: an uprising in the theory of industrial structure" American Economic review 72, 1-15.
- Bureau of Industry Economics (1992), Environmental Regulation: The Economics of Tradeable Permits - A Survey of Theory and Practice, Research Report No. 42, AGPS, Canberra, 1992.
- Beesley, M. (1992) Privatisation, regulation and competition Routledge.
- Beesley, M. and Littlechild, S. (1992 reprint) "Privatisation: principles, problems and priorities" in M. Beesley Privatisation, regulation and deregulation Routledge, p23-39.
- Brett, D. (1993), Developer Charges and Urban Development Water and Related Services, Research Paper No. 2, Government Pricing Tribunal of New South Wales, Sydney.
- Caves, D. and Christensen, L. (1988) "The importance of economies of scale, capacity utilisation, and density in explaining interindustry difference in productivity growth" Logistics and transportation review, 3-32.
- B. Carsberg (1991) "Office of telecommunications: competition and the duopoly review" in Veljanovski Regulators and the market 98-106.
- Council of Australian Governments (1993), Report of the Overarching Group on Water Resource Policy, Council of Australian Governments, June.
- Council of Australian Governments (1993), Urban Water Resource Policy Working Group (Draft).
- Council of Australian Governments (1993), RWC's Responses to the Rural Water Resource Policy Working Group (Draft).
- Department of Conservation and Environment (1991), Bulk Water Entitlements, Part One, Report No. 42, Water Division, Department of Conservation and Environment.
- Department of Water Resources (1992), Water Victoria: A Scarce Resource, Victorian Government.
- A. Duncan (1989) "The Commerce Act and natural monopolies" Working Paper 89/10 New Zealand Institute for Economic Research, Wellington.

Forsyth, P. (1993) "Privatisation: private finances and public policy" in K. Davis and I. Harper (eds) Privatisation: the financial implications Allen and Unwin.

Government Pricing Tribunal (1993), Water: An Interim Report Volume 1, Government Pricing Tribunal of New South Wales, Sydney, 1993.

Government Pricing Tribunal (1993), Water: An Interim Report - Volume 2. Attachments, Government Pricing Tribunal of New South Wales, Sydney.

Government Pricing Tribunal (1993), Report of the Working Party on Water, Wastewater and Stormwater Demand, Engineering Cost Issues, Discussion Paper No.2, Government Pricing Tribunal of New South Wales, Sydney.

Government Pricing Tribunal (1993), Regulation of the Water Industry in New South Wales: A Discussion Paper, Discussion Paper No.3, Government Pricing Tribunal of New South Wales, Sydney.

Government Pricing Tribunal (1993), Hunter Water Corporation 1993/94 Prices of Water, Sewerage and Drainage Services, Determination No. 2, Government Pricing Tribunal of New South Wales, Sydney.

C. Graham and T. Prosser (1991) Privatising public enterprises Oxford University Press.

Haydon, S. (1993), Major Issues in the Water Industry in Victoria (mimeo), (MWC) Melbourne.

Hutchinson, G. (1991) "Efficiency gains through privatisation of UK industries" in A. Ott and K. Hartley Privatisation and economic efficiency Edward Elgar.

Independent Committee of Inquiry Report (The Hilmer Report)(1993). National Competition Policy

Industry Commission (1992) Mail, courier and parcel services Vol 1 Draft report Industry Commission.

Industry Commission (1992), Water Resources and Wastewater Disposal, Report No. 26, AGPS, Canberra.

James, M. (ed) (1989) Regulating for Competition Centre for Independent Studies, St Leonards, Sydney.

Laffont, J. and Tirole, J. (1993) A theory of incentives and procurement in regulation MIT Press.

London Economics (1992), Report to The Industry Commission - International Experience of Private Provision in Water, Sewerage and Drainage Services.

Parker, D. and Hartley, N. (1991) "Status change and performance: economic policy and evidence" in A. Ott and K. Hartley Privatisation and economic efficiency Edward Elgar.

Paterson, J. (1989), Rationalised Law and Well Defined Water Rights for Improved Water Resource Management, OECD, Renewable Natural Resources, OECD.

Pindyck R. (1991) "Irreversibility and the explanation of investment behaviour" in D. Lund and B. Oksendal (eds) Stochastic models and option values Elsevier

Steering Committee on National Performance Monitoring of Government Trading Enterprises (1992) Measuring the total factor productivity of government trading enterprises AGPS

Steering Committee on National Performance Monitoring of Government Trading Enterprises (1994) Government trading enterprises performance indicators 1987/88 to 1992/93.

Sturgess, G.L. and Wright, M. (1993), Water Rights in Rural New South Wales - The Evolution of a Property Rights System, CIS Policy Monographs 26.

Veljanovski, C. (ed) (1991) Regulators and the Market Institute of Economic Affairs, London.

Vickers, J. and Yarrow, G. (1988) Privatisation: an economic analysis MIT Press.

Vogelsang, I. (1992) Welfare consequences of selling public enterprises. The United Kingdom Volume 2 Report of a World Bank Conference, Country Economics Department, World Bank.

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