Submission to Productivity Commission Inquiry into Australia's Urban Water Sector

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Summary

Water, and its collection and use, has become a highly politicized issue. Its economics in terms of scarcity value for urban use is however straightforward. And the techniques for its collection and delivery are well established.

Australian demand for water for urban uses amounts to only about one percent of the continent's total run-off into rivers or three per cent if the Gulf of Carpentaria rivers are excluded. Ample supplies are readily available to serve major cities at least in Queensland, NSW and Victoria.

Costs of augmenting supplies through new dams with systems that are largely gravity fed are less than a fifth the costs of water from desalination plants. The latter and measures like requiring water savings and installation of household water tanks have been solutions favoured by governments because they are judged to bring less political resistance. The upshot of rejecting the cheapest solution is dearer water. But, because the price effects are delayed and hidden, in the case of regulatory measure, politicians can escape voter reprimand.

In addition to prices being inflated by political decisions that deny the cheapest supply sources, the provision of water also suffers from its natural monopoly features. These tend to entail gold plating and over staffing. The effects of this are exacerbated by political appointments and an absence of profit disciplines on the water supply businesses.

Several solutions to this have been advanced. Corporatisation was once considered promising and remains superior to direct political control. However corporatization suffers from an absence of rewards for profit orientation. The residual claims from savings and innovatory successes that private shareholders have cannot be easily replicated in government owned concerns. And it is these residual claims that drive the pursuit of efficiency.

One way forward is to outsource to private industry as much as possible to avoid some of the inefficiencies of public ownership.

Pricing of water is also contentious. Cost reflectivity is the ideal for a natural monopoly and this would entail a connection charge approaching 85 per cent of the total charge with the water metered charge averaging only about 10-15 per cent. Though many would see pricing in a cost-reflective manner to be inimical to social and economic goals, business entities are not the appropriate vehicles to pursue these.

1 Introduction

Over recent years many Australians have come to accept a myth that water is scarce, especially in Australia, misleadingly labeled by some as 'the driest continent'. Although Australia has less precipitation than other continents, in relation to its size, as a country its rainfall per head is the third highest in the world (after Russia and Iceland).

Sixty per cent of Australia's rainfall feeds the rivers draining into the Gulf of Carpentaria, but even excluding the sub-tropical north, Australia enjoys a relatively high level of rainfall per head of population, far higher than the Mediterranean countries, whose climate type describes much of the southern part of the continent.

Water from rainfall is however highly variable in Australia and high dams have been built in order to provide insurance against this. Brisbane, Darwin, Canberra, Melbourne and Sydney have all got dams with over 5 years water storage capacity. Adelaide and Perth have fewer natural options and have less storage, while Hobart does not need major dams for urban water supply.

2 Recent developments

2.1 Political avoidance of dams as new supply sources

There is a history of pressure groups seeking to prevent new dams being built. Traditionally opposition was from farmer organizations, and was confined to dams for urban usage. These, it was feared, would drive up the costs of rural irrigation water and reduce the availability of water that might be occasionally required for farming. In more recent years green groups have joined this opposition, as part of their general dissent to new productive activities, and have become the most strident voice resisting new dams.

Abandoning their responsibilities to lay out and assess the facts, governments have bowed to pressures, especially those of the greens, and willingly conjured up spurious reasons why water must be used less and why there must be no new dams. Unfortunately they have recruited to this cause many scientists, consultants and opinion leaders. Some of these, whether honestly or meretriciously, have argued that there has been a stepped change down in Australian rainfall and therefore future water availability.

For example, on October 3 2007, Melbourne's *The Age* had a piece by Professor John Langford, who argued that climate change is almost certain to mean less rainfall and, 'we cannot sit around waiting for rain'. He said that 2006 was the worst for 116 years for Murray irrigators. He also pointed to melting Arctic ice, hypothesising that the Arctic might be ice free in 2030. Professor Langford argued that we cannot rely on dams for Melbourne's water in an era of declining rainfall. He favoured the building of a desalination plant, then with a $3.1 billion price tag, plus mandatory measures to reduce water usage in the home. In his view, water prices would double as a result of increased demand and climate induced supply reductions.

Such notions of permanent water scarcity gained credibility from recent drought conditions. But, whether or not major systemic climate change is taking place and if so whether lower rainfall is a corollary, such concerns have now become less fashionable, if not less credible, especially since the apparent falsification of some rather extreme predictions by the Commonwealth's Climate Commissioner, Tim Flannery, and by former Minister Penny Wong[1].

Even so, a residue of factoids about water have been created and become part of the culture driving many people's views on its use.

Accepting and promoting such judgments, many politicians have adopted measures that regulate lower water usage. And, although if they believed imminent shortages, they might have opted for earlier movement to build dams, instead they announced costly new projects that avoid using traditional sources of rainfall. Assembling the finance for such projects and fending off objections to higher costs imposed on the citizenry in general was considered far preferable to confronting vociferous green groups, many of which had sympathy from the media.

Policy responses are illustrated by the performance and statements of the previous Victorian Government. In the 2004 *Our Water Our Future* paper, a former Minister, Mr Thwaites, emphasized

- improved water efficiency, conservation or recycling;
- improved river health; and
- leveraging other sources of funds for infrastructure, recycling and other water projects.

Introducing the White Paper *Securing Our Water Future Together* in October 2005, Mr Thwaites continued this same theme when he said,

> We will support smarter urban water use across Victoria with a range of initiatives including education and incentive programs, regulations and legislation, and smarter water pricing to reduce demand and increase recycling.

The focus was on conservation and 'smarter urban use'—a euphemism for supply controls. Inactivity in commissioning or even searching for new supply, founded upon an optimistic predisposition in favour of demand restraint regulations, resulted in Victoria's urban water shortages.

In January 2007, Minister Thwaites recognised that curtailing demand could not be relied on to ensure adequate availability. He announced that a desalination plant was 'inevitable'. This was further described in the statement of the then Premier in June 2007 which announced a desalination plant at Wonthaggi estimated to cost $3.1 billion and to produce 150 GL per annum.

Simultaneous to this was the announcement of a 70 kilometre pipeline from the Goulburn to the Sugarloaf Reservoir at a cost of $750 million to allow the annual transfer of 75 billion litres of water to Melbourne by 2010. The water was to be saved by reducing losses from the

[1] Over the past seven years Mr Flannery has predicted imminent water availability disaster for Perth, Adelaide, Brisbane and Sydney. For Ms Wong's views, apparently based on CSIRO briefings, see http://www.abc.net.au/lateline/content/2008/s2353504.htm. The BoM states that there has actually been a slight increase in Australia's rainfall over the course of the past century, http://www.bom.gov.au/climate/change/rain.shtml

Victorian irrigation areas, with the savings to be shared between irrigators, the environment and Melbourne.

The outcome of seeking regulatory solutions and alternatives to augmenting urban water supplies through dam construction has been the imposition of considerable costs on the public, in terms both of expensive new sources of water and of regulatory measures requiring expenditures that provide little value. The latter range from low water usage shower attachments to requiring backyard tanks and enforced non-watering/water saving expenditures of parks and gardens.

2.2 The PC's approach

The PC marshals considerable evidence to illuminate the adverse effects of political decisions on water supply augmentation.

Even so, for a report comprising over 500 pages, the information in the PC study is not set out in a way that allows an easy understanding of the costs of water and of its different components. It places the costs of water for NSW at $524 per household in 2007/8 (Table 9.2). From the evidence cited from the Sydney Water submission (Table 2.1) the share of costs is

Bulk water supply	Dams	10
Bulk water supply	Desalination	10
Water transport and distribution		23
Water and wastewater retailing		3
Wastewater transport and disposal		47

The dams/desalination share is allocated 50/50 by the PC based on material from Sydney Water (sub 21). Sydney Water put the maximum amount of water supplied by the desalination plant at 15 per cent. This suggests that costs of bulk water from dams would account for around 12 per cent of the consumer's bill if the desalination option had been avoided and a new dam built instead.

This 12 per cent share of the total bill infers that if urban water increments were to become more scarce so that a doubling of the cost of the water itself were required, the bill seen by the consumer would increase by only 12 per cent. Material addressed in section 3.1 indicates that dam fed water cost increases should actually be quite modest and certainly not entail a doubling of costs incurred in providing existing supplies.

The prime matters for consideration Productivity Commission's report are to test the costs of augmentations in water supply and offer guidance on how best to harness water for public use. From this two other issues need to be teased out:

- how to ensure the delivery of water and disposal of waste is efficient since competitive reticulation systems are impracticable; and,
- because of the natural supply monopoly, how to price water efficiently to ensure its costs reflect people's valuation of it.

3 Water capture and storage

3.1 Natural water resources

Each year around 3 million gigalitres of rain falls on Australia. About 250,000 gigalitres becomes run-off through rivers with 150,000 of these gigalitres flowing into the Gulf of Carpentaria. Of the remaining 100,000 gigalitres river run-off, around 18,000 is consumed, mainly through irrigation, with about 3,000 gigalitres used in households and urban industries.

Urban usage is therefore only one per cent of the water flowing through all rivers or three per cent if rivers flowing into the Gulf of Carpentaria are excluded.

Recent investigations have demonstrated that there is ample potential to augment supplies of water through new dams, at least in Queensland, NSW and Victoria. All these states have sites which are well situated for new dams, even without having to buy water that is already in productive use in agriculture.

In those states the four classes of objection to new dams that the PC puts in its draft (p.26) have little merit. This certainly applies to the contention that, "there are fewer options available with the best sites already used". Nor is there much credibility in other reasons offered for avoiding new dam building, viz. "the opportunity costs of the land has increased", while the laconic "dams are dependent on rainfall" is meaningless unless it is presumed that the rainfall will cease – and, if reducing rainfall is evident, this provides a case for supply augmentation action commencing earlier than had been the case in the past.

Of the objections to new dams the PC cites only one, "the community has changed its view on environmental impacts….", has formed the rationale behind recent policy actions. The PC should be able to demonstrate the unreasonableness of such views. To do so would require:

- some estimate of the extent of the flooding a new dam entails (compared to adverse outcomes of alternative supplies); and
- likely loss of fauna and flora and of "significant environmental ecosystems and processes" that follows from this.

Among recent sites considered for new dams have been Traviston (Queensland), Tillgera (NSW), and several options in Victoria's eastern catchment area. It is unlikely that these sites would have any environmentally significant impacts that would rule out their use. The PC should be able to identify whether this is in fact the case. If there were no grounds for genuine concerns about any externality costs of such new dams the PC should make this clear.

3.2 Costs of different resource availabilities compared

High dams, traditionally used to serve major Australian cities, involve extensive catchments and storage areas. The water from these is in the main gravity fed to urban areas. Costs beyond the initial capital expenditure of the dam itself and its piping are therefore relatively low and, unlike other sources, their water does not require pumping costs or purification to allow human consumption.

Capital costs of different options that have been canvassed by the PC are shown below.

Table 1

Capital costs of different augmentations					
Plant Type			**$M cost**	**GL capacity**	**$m per GL**
Desal	Sydney	Kurnell	1890	90	21
	Melbourne	Wonthaggi	3500	150	23
		Wonthaggi (R)	5400	150	36
	Qld	Tugan	1200	49	24
	Perth	Kwinana	387	45	9
		Binningup	955	50	19
	Adelaide	Pt Stanvac	1830	100	18
Dams	Canberra	Cotter	363	78	5
	Qld	Hinze	395	310	1
		Wyaralong	348	37.5	9
	Vic Eastern		1350	210	6
Lg. Recycle	Sydney	St Mary's	250	18	14
		Rousehill	60	4.7	13
	Wollongong		25	7.3	3
	SE Qld	W. Corridor	2600	36	72
		Murrambana	197	11	18
	Perth	Kwinana	28	6	5
	Adelaide	Glenelg	76	5.5	14
Stormwater	Salisbury		43.5	8	5
	Onkaparinga		30	2.2	14
	Charles Sturt		58.6	2.4	24
	Playford		9.6	1.3	7
	Orange		5	2.1	2

Source: Data derived from PC draft but with modifications (i) for the Victorian Desalination plant to also reflect the costs in NPV terms estimated by the Auditor-General; (ii) to include the costs estimated from public data for a major new dam in the Victorian eastern catchment.

There are some “exotic” water supply measures that have apparent economic merit, depending on the local situations in which they operate. Desalination plants are among these, at least in the Middle East. In Australia a number of stormwater usage and large scale purification projects have been examined and some, as Table 1 illustrates, may have economic merit, although even if they proved to be economically viable they cannot be expected to deliver much additional supply.

Table 2 provides estimates of both capital and operating costs were compiled by the IPA based on data available in 2008 of the costs of alternative augmentations for Melbourne[2].

Table 2

	Size GL/ annum	Capital cost cents per kL	Operating cost cents per kL	Total cost cents per kL
Macalister Mount Useful (a)	150	42	20	62
Macalister Mount Useful (b)	85	52	20	72
Mitchell	150	81	37	118
Latrobe	150	60	24	84
ETP Released Water	90	80	29	109
Sugarloaf	75	146	20	166
Paterson River Stormwater (best case)	26	102	100	202
ETP Recycling	115	179	63	242
Wonthaggi Desal	150	213	88	301

Note: Capital cost is annualized over the expected life and with a 6 per cent return on capital.

Dam costs were based on a study by SKM undertaken in 2005 and released by the previous state government in 2008. On a comparable basis total costs using household rainwater tanks are 200 to 670 cents per litre[3].

The above material shows that new dams that have been under consideration have or would have provided water at a capital cost of one quarter or less the price of water from desalination plants. The disparity is similar or even greater with respect to the backyard water collection tanks.

The disparity of costs between dams and other sources of water is greater still if the operational costs are included – these are considerable for desalination plants which must be coastally located and, unlike dams located high in the catchment areas, are unable to rely on gravity to supply consumers.

Operating costs can be estimated from published accounts. In the case of Melbourne, based on Melbourne Water's 2006/7 operating costs of $65.6 million, the costs of supplying gravity fed water to Melbourne is about 16 cents per kl. Transmission costs from the coastal Wonthaggi plant were estimated at 88 cents per kl, though revised data suggest that these and other costs associated with the facility are now higher.

Electing to build these extremely high cost sources of supply reflects unfavourably upon the political decision takers in NSW, Queensland and Victoria in the exercise of their judgments or the conduct of their civic responsibilities. Even in the case of South Australia, while alternatives were less inexpensive than in the other states, as the PC notes, the desalination plant was certainly larger and more costly than was necessary.

[2] Water Supply Options for Melbourne, IPA 2008. http://www.ipa.org.au/sectors/water/publication/1377/water-supply-options-for-melbourne

[3] The cost-effectiveness of rainwater tanks in urban Australia, Marsden Jacobs, National Water Commission, 2007.

Even more reprehensible have been the decisions governments have taken to force backyard tank installations, now present in 26 per cent of households. While it is clearly good policy to have withdrawn laws that previously made it difficult for households to install such domestic water collection receptacles, the increase in their installation rates in recent years is based on regulation.

The regulatory pressures come in various forms including actual requirements, regulatory measures that impose a financial penalty forcing such action, and regulations that encourage expenditures to supplement water supplies. Among the formal regulatory actions are those like the Queensland Development Code, which requires new homes to meet mandatory water saving targets and must contain water efficient showerheads and toilets and water pressure limiting devices. Victorian provisions have penalties on the non-installation of backyard tanks in new homes. Other regulatory measures tending to force such action are restraints on water usage which encourage consumers to search for high cost options like backyard tanks and bore water.

This suite of regulatory provisions is particularly iniquitous since its application largely falls on new housing hence its costs fall disproportionately on renters and those who are intending to become home owners. The higher cost of the imposts has the effect of raising prices of existing houses thereby insulating those home owners not needing to install tanks (or bores) from the regulatory provisions.

All such regulatory requirements are less visible to budgets and therefore have a merit to politicians of being ostensibly costless. But their lack of budget accountability and transparency makes them even more harmful than on-budget measures.

The Commission has quoted costs of these restrictions at $275 million for Sydney. The Commission's estimate of costs in Perth and Melbourne are of the order of $3.1 to $.2 billion over the next 20 years. In view of some of the costs estimated in Table 2, these are likely to be underestimates.

The evidence on rainfall and river inflows in Australian demonstrates no justification for singling out water for particular attention on grounds of its supposed scarcity. Requiring economies on water use almost certainly is more than offset by increased expenditures on other goods and services.

4 Efficient Delivery of Water

Government owned services are likely to be less profit-oriented than those that are privately owned. The reasons for this are well known and canvassed by the PC. They revolve around the inability of the government owned firm to create residual claimants to cost savings in the form of genuine shareholders.

On top of this, government owned firms are more easily saddled with socially-oriented cost pressures in the form of high cost water and high cost water-saving programs.

It is sometimes claimed that "corporatization" involving boards that are independent of the government can mimic the advantages of genuine private ownership. Indeed, formerly government owned firms like BP and Renault achieved considerable measures of success using this model and to some degree this has been the case with government owned generators operating within Australia's National Electricity Market.

That most such firms have been privatized in part reflects the difficulties inherent even in this form of government ownership. But a significant difference between these firms and those in the water industry is the latter's absence of competitive environments. Competition introduces a discipline on all firms that forces them to meet the industry's best practice or suffer severe financial distress.

However, where, as in the water industry, the supplier has a monopoly, those pressures are absent. One upshot is observable in the electricity transmission and distribution businesses where Littlechild and Mountain[4] have assembled persuasive information that points to lower costs in the (private sector owned) Victorian and South Australian systems compared with the government owned counterparts in NSW and Queensland.

The practical effects of these factors are observable with water supply.

As the PC shows, (Figure 2.6) full time employees in the industry have risen strongly – indeed doubled – over the past decade.

Operating expenditure has increased markedly for the larger utilities – 20 per cent for the larger authorities. This comes on top of a massive 200 per cent increase in capital expenditure, largely caused by the irresponsible investment in "exotic" sources of water supply.

How to motivate public sector enterprises to operate with the efficiency of their private sector counterparts is a probably irresolvable issue. Not only do governments often appoint into positions of authority those to whom they owe favours but in many cases political considerations will also rule out many of the better candidates.

These issues aside, the lack of profit oriented disciplines that the PC draft addresses makes inevitable a considerable shortfall in achieving optimal productivity. Outsourcing of the activity, perhaps by splitting it into different components, can facilitate savings, including by avoiding onerous public service employment conditions. If competitive provision of the separate components is possible, this might avoid some cost-padding. Sandy Springs, Georgia is a recent well publicized success story for outsourcing. In the specific case of water, the operations of French businesses in France and other countries have been favourably compared with government businesses.

The use of comparisons between similar providers can also provide some disciplines but such comparisons are rarely sufficiently similar to present iron-clad results that allow unambiguous judgments. Unfortunately, excessive risk aversion remains inevitable where government owners and their public servants face asymmetric risk/reward incentives.

[4] Comparing electricity distribution network costs and revenues in New South Wales and Great Britain
EPRG Working Paper 0930, Bruce Mountain and Stephen Littlechild, 2010

5 Pricing of Water

The evolution of specific prices is not easy for economics to describe. For goods and services in competitive environments it is a matter of the many different constellations of demand and supply, costs and scarcities.

For goods and services provided by natural monopolies – and this describes all but the basic water provision (perhaps 12 per cent of costs) in water supply – the normal approach has been to divide costs into fixed and variable. This would place a fixed charge, perhaps equal for all uses varying only with the different supply costs for each user, and a variable charge based on the actual usage.

Such constructs may not be quite so straightforward when it is accepted that most costs actually have just different degrees of variability. Even so, water bill costs should have two components, first the water itself and secondly its delivery and the transport of waste water. The water component itself should be expected to comprise only some 12 per cent of the average bill.