

**ESTABLISHING A SOUND
CONCEPTUAL BASIS FOR PRICING
BURDEKIN IRRIGATION SCHEME
WATER**

PRELIMINARY REPORT

for

THE BURDEKIN RIVER IRRIGATION COMMITTEE

by

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FOREWORD

The pricing of economic infrastructure services, such as water, electricity and railways, is crucial to the international competitiveness of rural-based industries and to the profitability of rural businesses. In this regard, the Burdekin River Irrigation Area (BRIA) irrigators' concerns with SunWater's pricing proposals have significant implications for investments, development and employment opportunities in Northern Queensland.

Sound economic principles should under-pin the BRIA scheme and the BRIA irrigators are clearly not opposed to the need for economically efficient pricing of water. What they are opposed to are the application and implementation of wrong economic principles, doubtful assumptions and the lack of transparency in applying irrigation water charges, all of which amount to disguised and unfair taxes on Queensland water users and related rural and regional industries.

This preliminary report discusses the key policy, economic and financial issues at stake in the dispute between BRIA and SunWater and provides our advice on the analytical and policy areas for resolution of the dispute.

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August 2001

EXECUTIVE SUMMARY

This Report sets out the issues that need to be addressed in order to establish a logical and economically justified basis for irrigation water pricing from the Burdekin irrigation scheme.

It is established that the Burdekin scheme was financed by a Commonwealth grant under section 96 for the construction of the dam and headworks, while the State Government undertook the cost of downstream irrigation channels. The State Government subsequently resumed land in the irrigation area and proceeded to sell it at an enhanced price, reflecting the availability of irrigation. Payments were later collected for water allocation licences from the scheme.

There appears to be nothing in the history of the BRIA scheme to establish the proposition that irrigators contracted to provide a return on gross capital invested in the project through annual water charges.

Orthodox economic cost benefit analysis, which was the approach taken to assess the economic viability of the Burdekin scheme in 1980, does not presume that all costs of a project should be borne by its immediate users. Cost benefit analysis looks at the overall benefits to society, the economy, etc from a project and does not presume that user charges alone should be levied to provide a return on capital or to recover expended capital.

User charges may, in some circumstances, be economically justified to cover some project costs, but the key question is how costs are measured and allocated, especially in a non-competitive market or in the case of a natural monopoly?

This Report argues that the following are not acceptable costs and should not be incorporated in SunWater's price proposals:-

- section 96 grants from the Commonwealth;
- costs already recouped from users' charges or contributions; and
- capital contributions by way of land sales and water allocation charges and licences.

The Report also:-

- rejects SunWater's claim that "Burdekin irrigators pay the basic cost of water delivery plus a 0.7% return on assets" – on the contrary, we estimate the rate of return to be considerably higher;
- rejects the use of deprival value or replacement cost for valuing capital on the grounds that they lead to inflated and unjustified charges;

- submits that it is real or actual costs determined freely at arm's length not notional or opportunity costs, which are relevant in determining the replication of a competitive market outcome, in accordance with National Competition Policy objectives;
- rejects the proposition that because prices have remained the same as in 1996 that they are necessarily fair and reasonable, as a large amount of inefficiency or monopoly rents may, almost certainly, have been embedded in the first place; and
- submits that the government "subsidy" figure of \$33 million appears to rest on (inflated) replacement cost accounting, which is therefore meaningless and has no relevance to actual costs incurred.

The Report points to the fact that the government policy basis on which Australian water projects like the Burdekin, were originally undertaken and priced, was fundamentally changed in 1994/95 by the National Competition Policy and COAG agreements between Commonwealth and State Governments.

On the face of it much of the application and implementation of National Competition Policy and COAG philosophies rest on wrong economic principles, doubtful assumptions, and inadequate transparency and accountability - and in terms of pricing outcomes result in disguised taxation and deadweight losses to the economy.

Empirical work on the Burdekin pricing regime will be necessary to compare the current approach to water pricing with that in place prior to 1994/95 and for conclusions to be drawn on how, and in what way, BRIA irrigators should take forward their pricing dispute with SunWater, so as to ensure lasting international competitiveness of the industries and regions served by the Burdekin scheme.

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1. What are the Issues?

The purpose of this Report is to set out the issues which need to be addressed in order to establish a logical and economically justified basis for pricing water supply from the Burdekin irrigation scheme. We have been provided with many documents relevant to the scheme but are not in a position at this stage to provide an opinion on all of the issues which appear relevant.

Indeed, we gather that no comprehensive cost benefit accounting audit of the scheme has ever been undertaken. In itself, that is perhaps not surprising as one would understand that a prudent and economically-minded government would not wish to waste money establishing that an obviously worthwhile development scheme was worthwhile. However, if user charges are to be imposed or justified on the assertion that a scheme has not paid its way or not been worthwhile, then one would have thought it elementary that SunWater or other Government departments would have made the effort to establish the relevant facts.

1.1 Why was the scheme established?

Be that as it may, the first issue to address is why the Burdekin scheme was established in the first place. It is clear that at the time the Federal Labor Government considered the scheme to be a great national development scheme worthy of national support. It is clear that before funds were advanced for the project, there was a considerable degree of examination of its prospective costs and benefits. As is normal with public investment projects, economic analysis of costs and benefits of such a scheme looked beyond immediate costs and benefits and sought to take into account spillover benefits for the region and the nation as a whole. Thus the 1980 Report to Parliament sensibly recognised that irrigators were not the sole beneficiaries of the scheme and included the increased gross annual value of production and secondary benefits as well as direct revenue from irrigation charges when assessing the economic benefit to the State (pp 142-179).

It is our understanding that the Burdekin scheme was financed by a Federal Government grant under section 96 of the Constitution for the dam and headworks while the State Government undertook the costs of downstream irrigation channels. The State Government resumed land in the irrigation area and proceeded to sell it at an enhanced price reflecting the availability of irrigation. In addition, payments were later collected for water allocation licences from the scheme.

We gather it has been said, on the advice of public service advisers, that “The Burdekin Scheme was established in the late 1980s on the basis that irrigators would be required to pay a small capital contribution.” This statement is hard to understand in the absence of a clear nexus to the history of the project. An economist might well assume that irrigators made their capital contribution to the project when they purchased their land and water licences. Nothing in such a statement justifies a conclusion that irrigators were made aware that they would be required to pay a small capital contribution *as a component of their annual water charges*.

We are unaware of any such implication in the 1980 Report to Parliament. We are advised that no such advice was provided to irrigators as to this requirement and that there was no undertaking provided by irrigators to this effect. The 1980 Report to Parliament states on page 3 that, based on water charges from the channel system of \$13/ML, a river charge of \$4/ML and a drainage charge of \$5/Hectare there would be \$3.8 million in excess of estimated annual operation maintenance costs and this would provide a 2.05 per cent return on the capital cost of the project. (It may be noted that in 1980 when the Report to Parliament was estimating annual revenue on a channel charge of \$13/ML, irrigators received \$372 per tonne of sugar. For the 1999 & 2000 seasons, irrigators paid \$36/ML and received \$250 per tonne of sugar). The Report also states that in the event Townsville obtains part of its supply from the Burdekin River a charge for water allocated to the city would be made which would further increase the net revenue and level of capital cost serviced. We understand that this additional revenue is now being achieved.

Because there appears to be nothing in the history to establish the proposition that irrigators contracted to provide a rate of return on gross capital invested in the project through annual water charges, any statement of expectations about the financial returns from the project is merely that. It is instructive that the Department of Natural Resources in summarising its policy on water pricing for State-owned scheme stated:-

“ (b) Existing schemes

- ◆ Water prices for all schemes will continue to be adjusted annually in line with any cost changes for providing the services
- ◆ The medium-term objective is to ensure water revenue for each sector (i.e. urban agricultural and industrial) covers the operating and refurbishment costs of proving supply by 2001. The aim is to achieve this outcome by:
 - reducing costs;
 - increasing revenue (where practical); and
 - increasing water prices over and above general cost changes as a last resort.”

There was no mention of any requirements to recover a rate of return on capital.

The real question of interest is whether the Burdekin scheme has performed in accordance with the cost-benefit analysis used to justify the public investment. If it has generated receipts and benefits sufficient to have already recovered the capital outlays expended by the State Government, the idea that users should be charged to provide a financial return becomes questionable, even on the narrow basis of financial accounting, let alone broader economic cost benefit analysis.

It would be a great pity if a major national development scheme created for the benefit of Northern Australia and Australia generally were to be priced, on the basis of a mistakenly narrow or incomplete accounting, so as to negate the benefits for the region intended to be developed. One would hope that the application of National Competition Policy in the area of water has neither such a purpose nor effect and that, if it has, it will be rapidly reviewed to bring it into conformity with both ordinary and economic logic.

2. Should all costs be met by irrigators?

2.1 Economic cost-benefit accounting

Two important questions which are raised by cost benefit analysis are whether there is or should be an additional return on capital over and above that which has already been paid and whether annual water charges on irrigators should be seen as a major or primary source of funding for the project.

From an agnostic, non-economic, point of view there is no reason why governments should seek a return on any funds expended anywhere. For example, governments do not seek to recoup money spent on age pensions or subsidies to aged persons out of the estates of such persons. A government could equally choose to subsidise producers without seeking a return, just as the European Community chooses to subsidise its sugar beet farmers (with whom Australia's are in competition). Indeed a cynic might argue that if governments are going to throw away taxpayers' money they might as well subsidise people who are doing something productive rather than unproductive.

More importantly, orthodox economic cost benefit analysis has no presumption that all costs of a project should be borne by its immediate users. Especially where a project is undertaken by a body such as Government which is in a position to recoup external benefits in the form of revenue from appreciated land sales, land taxes, stamp duties, payroll taxes etc there is no presumption that user charges alone should be expected to provide a return on capital or to recover expended capital.

That the Burdekin scheme was intended to benefit persons other than irrigators is emphasised in the March 1980 Report to the Parliament which identified as part (b) of its objectives "to provide water supply for further agricultural development and for likely increases in urban and industrial development in major centres of the region to well beyond the year 2000". That it is intended to benefit the nation as a whole is abundantly clear from the Commonwealth's decision to provide very substantial Commonwealth non interest bearing, non repayable grants to the Burdekin scheme and the Statements of the then Prime Minister of Australia at the time, for example, are relevant:

Extract from Hansard, House of Representatives, 25 May 1988

MR HAWKE: "...I preface my answer to this question by noting the well known fact – the absolutely tireless efforts of the honourable member for Herbert in bringing the Burdekin Dam to reality. Although the reality was a long time in the making, the Burdekin Dam will stand as a monument to the commitment of successive Labor Government to national development in general and, in particular, to our concern for the needs of north Queensland. I remind those honourable members with a shorter sense of history that it was the Chifley Labor Government that took the first step towards the dam's construction, with the setting up of a joint Commonwealth-State ministerial committee to investigate

northern development. That was the genesis of the emergence of this great edifice. Then it was the Whitlam Labor Government that in 1974 made available the first Commonwealth funds for water resources development in the Burdekin region. Of course, then it was this Labor Government which in 1983 initiated construction of the Burdekin Dam and which has seen the project through to completion.

I know it will be a matter of undiluted joy to every honourable member that I am now able to inform the House that the dam is not only completed but, following the recent cyclone, also full. I can say that the construction of this great Burdekin Dam has been fully funded by the Commonwealth to the tune of \$129m. In the spirit of conservative cooperation which is now emerging between me, and the current Premier of Queensland, Mr Ahern, I am pleased to say that I recently received an invitation from him to participate in a joint ceremony to officially dedicate the dam.

The Burdekin Dam – and this is a matter of fundamental importance – will benefit the north by stabilising agricultural development in the fertile Burdekin delta, and it will contribute to the security of water supply for Townsville, Thuringowa and the surrounding areas. In all, I am pleased to say that perhaps 250,000 people will directly benefit from the dam’s construction, and many hundreds of thousands more people will indirectly benefit from it. Finally, I take very great pride in the fact that it was this Government that committed the Burdekin Dam to construction, fully funded it and has seen it through to completion.”

Cost benefit analysis looks at the overall benefits to society from a project and does not insist that “each tub stand on its own bottom” in the sense that it must pay its own way from user charges alone. If that were the case, then there would be no purpose for governments undertaking any public works at all, since they would all be commercially viable projects. Though some persons might wish for no role at all for governments, economists since Adam Smith have long recognised that it is part of the business of governments to undertake projects which though of the greatest benefit to society are unlikely to yield a private profit to their projectors.

2.2 External benefits and their importance for public works

Infrastructure such as water conservation systems confers external benefits on others, notably landholders and treasuries (which is why historically they have often been involved - witness the Duke of Bridgewater’s canals in the 18th century). A narrow focus on financing infrastructure solely through user charges in 2-party bargaining models obscures these vital externalities. The logic is simple. Infrastructure renders some locations more profitable places to conduct business from or more amenable places to live (eg wheat lands opened up by railways, town water put on). Since Labor and capital are locationally mobile, these newly-created differential productivity advantages are capitalized in enhanced land values, providing a fund out of which to finance the infrastructure (the Union Pacific was financed by a Congressional land grant running beside the track).

Conversely, the extraction of monopoly rents through excessive charges by an infrastructure owner such as SunWater would operate to reduce locational profitability, drive industry and jobs away, and diminish land values and tax revenues - it amounts, as Hotelling (1938, p307)

recognized, to *de facto* withdrawal of infrastructure from serving the country it was built to serve.

Non-exploitative water pricing regimes are in this way fundamental to Australia's economic development, productivity, living standards and international competitiveness.

2.3 Externalities and Community Service Obligations

Because the provision of infrastructure benefits persons other than the immediate users, the question arises whether every public or quasi-public utility should be forced to "pay its own way." For example, railways may have been built to open up and develop territory and even though they may have never made a profit, they may have nonetheless been overall a worthwhile social investment in terms of their contribution to the activities of producers.¹

As the Economic Planning Advisory Council acknowledged some years ago, where there are external benefits there is a rationale for intervention: "there may be benefits elsewhere in the economy (for example to suppliers, customers or alternative employers or in relieving a chronic balance of payments problem) which render a project which is not sufficiently attractive to an individual company beneficial to the country as a whole."

Considerations such as this have tended to be at the heart of what are today commonly described as community service obligations. "Public enterprises have traditionally been required to provide a range of services on other than a commercial basis, particularly below cost to particular users, either on the basis of location, user category or income level, or in some cases (public transport) to all users. In the past, many of these concessional services have been provided by cross-subsidisation, or by the GBE earning a poor rate of return or even making major losses.² As EPAC noted "water authorities often supply irrigation areas with water at or below cost."³

Infrastructure provision and pricing is often presented as an alleged subsidy to rural and regional Australia. Typically the provision of roads, telephones, rail transport to rural areas involves relatively greater costs, yet rural users have not been charged on the basis of full cost recovery for all this public infrastructure. However, it would be naive to suggest that they should be so charged. There are external benefits generated by the provision of infrastructure on a community service basis to rural Australia. If all "uneconomic" services were withdrawn from rural and regional Australia, among the costs would be fewer producers willing to locate outside the cities and produce the bulk of our export income, which is still based on primary industries.⁴

Any form of economic cost-benefit accounting for a project needs to take into account the benefits of spillovers to Treasury. These benefits are *in addition to* direct financial accounting benefits such as sales of Crown land at an appreciated price due to the project or allocation of water licences attributable to the project. These spillover benefits may take the form of increased employment, leading to increased payroll taxes, increased land values and stamp duties on conveyances and increased rates and land taxes in the region benefited by a project. In addition, there may be savings of expenditure to be accounted for e.g. reduced community services spending in areas where local unemployment is reduced.

To the extent that external beneficiaries, including treasuries, contribute to the capital costs of infrastructure the cost base for setting access charges can be reduced. If access charges are reduced closer to marginal cost, there are efficiency gains as more use is made of the facility.

3. Accounting for external benefits - financial accounting

3.1 Accounting for relevant direct costs

As part of a broader cost benefit analysis, user charges may be imposed for a project to cover some of its costs. But it is important to ask what is the purpose of measuring costs.

The basic reason for measuring costs in a private sector commercial enterprise is to decide whether to stay in that line of business (assuming one cannot increase prices in a competitive market). Where a private sector producer has market power over price, there are basic reality checks for testing whether it is exploiting that market power to seize a monopoly rent. The acid test of a competitive market is that no player is able to earn supranormal profits or monopoly rents, so one examines measures such as accounting profitability and discounted cash flows.

For governments engaging in public works it is not quite so simple. Unlike private sector investors, as we have noted above, governments benefit from spillovers such as increased tax revenues and productivity elsewhere. For the moment we assume the basic reason for measuring costs is to establish a basis for recovering capital invested in public works, to ensure its operation is economically efficient and to have a basis for balancing costs against public interest considerations such as external benefits. We also assume governments are well-advised and wish to avoid extraction of monopoly rents from infrastructure users which would damage downstream investment and are interested in avoiding “gold plating” or feather bedding and only wish to recover efficient costs from the project. For that reason governments may wisely wish to ensure that on a financial accounting basis excessive charges are not levied.

In looking at whether a government is extracting monopoly rents from its user charges for a project (or on the other hand, subsidizing the scheme) one would examine (on a full project basis, including external benefits):

- What is the rate of return on net invested funds (net of any capital contributions by users or grants from the Commonwealth)?
- What is the internal rate of return on cash flows in and out over, say, the last 15 years (including land sales and sales of water licence allocations)?

We do not know whether SunWater has undertaken such calculations to test its assertions that it is under-recovering on the Burdekin scheme. But they are material to such an assertion.

We would argue that in measuring the capital base what is required is a determination of *the actual costs* incurred by the infrastructure owner (in this case SunWater) in creating the physical capital assets which make up the infrastructure facility.

In economics, as in ordinary English, “value” is not synonymous with “cost”. To take a simple example, if I inherit unexpectedly a block of land, it may be very valuable but I can hardly claim to have incurred a “cost” in acquiring it. However, a “value” may be used as a proxy to determine “cost” *where other evidence is not available*. Thus, given a competitive market, if I do not know what you paid for a widget and the cost you have incurred, I may make a good estimate by seeing what widgets are selling for.

But note that the use of a “value” to measure a “cost” is fraught with danger in the case of a non-competitive market. Cost is cost but value may differ widely from cost where free entry into the market by other suppliers is not possible. There are many cases, eg urban land, where the current market value is well in excess of its original or actual cost. This is because value depends on market demand and not merely the cost of supplying the service. In the case of natural monopolies, there is invariably a sharp difference between the original cost of supply for the incumbent and the cost which would be faced by a new entrant now.

3.2 What are the costs of service?

In looking at an ordinary financial accounting for a project (as opposed to a complete economic cost-benefit accounting) , the costs of providing service from an infrastructure project such as an irrigation scheme will be allocated into -

- (a) a rate of return on the capital invested (net of costs recouped from users or sources such as land sales or amounts given as Commonwealth grants);
- (b) depreciation of the net capital base (if the asset is depreciating); and
- (c) the operating, maintenance and other non-capital costs incurred in running the system.

3.3 Recouped costs

An important and relevant issue in the case of the Burdekin scheme is the computation of capital costs where capital has been previously recouped from user charges or contributions, depreciation on actual historic cost or from section 96 grants from the Commonwealth. It is inadmissible, even in ordinary financial accounting, to count as a cost that which has been refunded.

3.4 Commonwealth grants

We understand that the Commonwealth gave a non-repayable section 96 grant to the government of Queensland for the construction of the Burdekin dam and headworks. From an ordinary accounting point of view, it would be quite inappropriate to include the cost of the dam and headworks in such a case as part of the capital base upon which SunWater might notionally be entitled to a rate of return. By way of analogy, if one person gives a gift to a parent to provide an education for a child, it would be strange if the parent sought to sue the child for the educational debt. If the Commonwealth gave a grant out of general tax revenue to the benefit of North Queensland, it would be equally strange were the intended beneficiaries to be charged for the intended gift.

We are unaware that any section 96 or other grants from the Commonwealth carried an obligation for recoupment through user charges on irrigators. Indeed, it appears that the previous Queensland Government accepted the Burdekin Dam had been fully paid for by the Federal Government, and may have taken this into account when considering what might otherwise have been seen as the city of Townsville's obligation to contribute to the capital cost of the Burdekin Dam.

3.5 Land sales

We understand that irrigators have made substantial capital contributions by way of land and water allocation purchases at the Government Land Auctions. This does not appear to be acknowledged by SunWater when calculating an appropriate rate of return. Page 154 of the Economic Assessment in the 1980 Report recognises that land purchases payments are a transfer between the users and the State. Even in ordinary financial accounting, where a land developer is able to internalise externalities through acquisition and resale of adjacent land, that is brought to account in measuring the financial viability of the project. For example, when Bond University was developed, we gather sales of adjacent land (the value of which would be enhanced) were taken into account in looking at the financial viability of establishing the private sector university.

3.6 Water rights sales

Similarly, where capital amounts were paid for water licences these should be brought to account as financial contributions to capital costs. While a capital contribution by way of purchased water allocations was not envisaged in the 1980 report we are advised that such an arrangement was nevertheless implemented in March 1993 at Auction 10 and has resulted in irrigators providing significant additional contributions to the capital cost of the channel works undertaken by the State Government.

3.7 Double recoupment?

If SunWater were to produce a full financial accounting for the project (let alone a full economic cost benefit analysis) it may well show that many irrigators have paid well in excess of their proportionate share of capital and are now being asked to contribute again via *annual* water charges.

3.8 Rate of return - SunWater has not made a case even on financial accounting principles

We understand that SunWater has claimed that "Burdekin irrigators pay the basic cost of water delivery plus a 0.7% return on assets."

We also understand that that figure is based upon replacement cost of the whole scheme's assets.

Given the apparent failure by SunWater to provide complete project financial accounting on historic costs of all capital expenditure and receipts it is simply impossible to accept such an assertion. Until a complete financial accounting based on historic cost is produced by SunWater, no one can state with confidence what the rate of return is even on ordinary financial accounting principles, let alone on full economic cost-benefit accounting.

However, the significance of the apparent omissions can be roughly estimated through a “back of the envelope” re-calculation. If the figure of 0.7% is based on a replacement cost of \$363 million for the whole Burdekin scheme assets and if the whole scheme actually cost, say, \$120 million of which \$80 million was paid by the Commonwealth for the dam and headworks, then the maximum historic cost incurred by the State for the channels was \$50 million. Even on an undepreciated basis, this would imply a conventional rate of return of 363 divided by 50 times 0.7%, that is the rate of return could be in excess of 5.08%.

If the net capital receipts from land sales and water licence allocations plus depreciation amount to, say, \$30 million then the rate of return would be 5.08 times 50/20 that is, 12.7%.

It should be stressed that such a rate of return figure for the project would still only be an ordinary financial accounting from the State’s point of view, not a full economic cost-benefit accounting, but the dependence of the claimed low rate of return to apparent accounting omissions is obvious and SunWater might reasonably be asked to do a full financial accounting.

3.9 Anticipated cost recovery

It has been suggested that the Burdekin scheme was intended to recover from irrigators a return on capital cost of 2.05%. We note that this figure is mentioned in page 3 of the 1980 Report to Parliament but we also note that that was in the context of a scheme actual cost of \$155 million (before the Commonwealth section 96 grant towards the dam cost of \$75 million). We also note that this figure rested on assumptions as to sugar prices and assumed charges of \$13 per megalitre for channel water and \$4 per megalitre for river pumping. We further note that this figure included expected land rentals: to the extent that land sales replaced land rentals these should of course be set as offsets to capital costs.

We also note that the 2.05% figure was represented as equivalent to providing full debt servicing at 9.5% on \$33.5 million of the actual total project cost, a far cry from the economically unjustifiable suggestion that irrigators should be servicing a full capital return on the current replacement capital costs of \$363 million.

We reiterate however that such debates over commercial accounting cost recovery or “subsidies” are quite irrelevant from the point of view of economic cost benefit accounting. What is far more important is to examine the returns to government from the totality of activity generated by the scheme. Governments are *not* commercial bodies and undertake public works precisely because they can expect collateral benefits which private entrepreneurs cannot expect to reap, the most obvious being that private infrastructure developers cannot levy taxes on the profits of the industries they make possible. For governments to argue that they should make a commercial return on investment *plus* collect taxes from the economic activity generated by the investment is to suggest that they should reap a form of “double dip” returns from investment (while, it may be remarked, never seeking *any* cost recovery in the area of transfer payments). No doubt such arguments can always be made but it is hard to respect them as being based on economic logic as opposed to political expediency.

4. Deprival values are not relevant to cost recovery

Sometimes it is argued that the value of capital invested in an infrastructure industry should be computed on a deprival basis, often interpreted as the greater of the net present value of the cashflows attributable to it or its replacement cost.

4.1 Deprival value

Deprival value is the value *to an owner* of an asset, as opposed to market value - that is, the net present value of all future income he might be expected to receive if left with free unregulated use of the asset. In the case of a natural monopoly such as a water scheme, that value would be the increment in land values resulting from the possibility of irrigation, since, if the monopoly water supplier charged so much that capital and labour could not get competitive returns, the fields would be abandoned. But such a valuation on water assets would mean zero net benefits to the rest of the community - all external benefits would in effect be seized by the water asset owner to secure a super-normal return on his investment. It would also mean that if purchasers of irrigated farms had paid for farms on the basis of “actual cost only” pricing of water, they would have paid for the deprival value already in their bid prices and would face expropriation of their investment (through “double sale”) were water charges to be recomputed on the basis of deprival value of water assets instead of anticipated “actual cost only”.

We understand the Queensland Government has (wisely) not adopted a deprival valuation of water assets, but this theoretical point illustrates the intimate connexion between water asset valuation (with its implications for charging policies) and land values. It is simply impossible to account rationally for water assets without taking into account the returns derived by a water project from rates and taxes on, or sales, of land.

4.2 Circular valuations are inadmissible

The net present value of an asset to its owner depends on what he can charge for its use and may be well in excess of its original cost. But it is logically inadmissible to value an asset on the basis of its earnings and use that valuation as a proxy for the cost of the asset or as a measure of the owner’s investment in the asset. This error was recognised by the United States Courts in the 1940s. Its genesis was stigmatised much earlier by Eugen von Bohm-Bawerk in his treatise *Capital and Interest*. Bohm-Bawerk noted that to identify capital (the factor of production) as a fund of value (as proposed by John Bates Clark) was to confuse the measure of the value of a thing with the thing itself. Because capitalised values depend on assumed rates of interest or return, it is circular reasoning to employ such values as a basis for computing required rates of return, and then to use such computed revenues as measures of capital costs. To take an extreme example of confusion between real capital invested and capitalised values, some historians have stated that at the end of the Civil War, the Southern States experienced a massive loss of capital when the slaves were freed. But what was lost was no real physical capital or Labor power, rather what was lost was the capitalised value to the slave owners of the ability to levy a 100 percent tax on the earnings of the slaves.

Hence, it is entirely inadmissible to measure the capital invested in an infrastructure business by using a net present value analysis to capitalise an expected stream of earnings. Net present value (NPV), market value or optimised deprival value (ODV) valuation methods generally employ this approach and hence should be rejected. We note that this kind of problem has been recognized in regulatory reviews for other industries (e.g. gas pipelines) and it may be dismissed at the outset.

5. Is there an opportunity cost where capital has been sunk?

We have argued that in computing a rate of return on capital investment it is appropriate to use depreciated actual or historic cost.

It is sometimes argued that this normal commercial method of computing *return on investment* is inaccurate and that the rate of *return on assets* should be computed on the basis of their value as determined by their opportunity cost, that is to say, the market value they would have if turned to another use. To take a simple example, if I pay \$20 million for a building and it is now worth \$50 million and my rentals are \$5 million per year I am earning 25% per annum on my historic cost of investment but only 10% on the current market value of my assets.

First it should be noted however that in commercial accounting if a higher value is to be used for assets, that revaluation has to be brought to account as part of the overall profit of the enterprise first. So if SunWater wishes to use an asset base of, say, \$363 million instead of, say, \$20 million it should bring into its accounts \$343 million as extraordinary profits (which doubtless irrigators would wish to see credited towards of their charges for the next hundred years). The point is that a rate of return on the current valuation of assets is no measure of the rate of return on actual cash flow investment.

Second, and more importantly, we also note that any attempt by an infrastructure owner to appeal to notions of opportunity cost as a basis for awarding regulated returns carries some dangers for him. Replacement cost is a *notional* concept of cost: what it would cost a new entrant or the incumbent owner to replace the existing dam and channels. The inference is that the existing asset owner should be able to secure a return on what the system would cost to replace, *not what it actually has cost*.

But that is not the real choice facing the owner of infrastructure assets such as a dam and channels. Once his capital has been spent and invested in concrete and channels, his opportunity cost is its scrap value. His fund of liquid capital has gone and he has physical capital assets. You cannot just pick up a dam and put it on another river. If those physical assets were to be valued on the basis of opportunity cost, that is, their value in another use, then *the value would be minimal or zero*.

An interpretation of cost recovery which rejects replacement cost and gives primacy to depreciated actual cost (DAC) protects an infrastructure owner such as SunWater from this kind of ruthless application of the concept of opportunity cost. Once it is realized that replacement cost is only a particular application of the concept of opportunity cost, owners of sunk assets cannot appeal to replacement cost without extreme danger to themselves.

There is a danger (unfortunately becoming more common) that in talking of more efficient use of capital, public sector economists fall into serious theoretical error in relation to sunk capital. Sometimes there is an overtone that “capital” is a fluid pool of value which can be effortlessly shifted from one use to another and that, wherever invested, capital should be returning a current market rate of return on its replacement cost. Thus water and other public authorities should revalue their assets and seek to adjust prices upwards to get a current inflation-adjusted rate of return.

This is a conceptual fallacy. In the real world capital can only be allocated prior to taking form as fixed physical assets - history cannot be rewritten by mere mortals. Sunk capital cannot be redeployed and the idea of gaining a current rate of return on replacement cost of sunk capital is nonsense. Sunk capital can only earn quasi-rents, by which is meant that it is like land and must take what rent the market will pay for its services. Only a monopolist can force sunk capital to pay whatever he decides is a “fair” price.

The idea that efficient use of the capital stock should relate to pricing on the basis of some notional or hypothetical past cost rather than making the most use of what exists is as silly as suggesting that, if the Romans had built aqueducts in Australia, economic efficiency requires that they be revalued and charged out on that basis. This misguided (and theoretically unsupportable) notion of capital efficiency is now moving to become a critical area of contention in microeconomic reform, where the revenue demands of governments (through devices such as mandated dividend requirements for Crown corporations) may conflict with the central objective of competition policy which is to cut production costs, thereby raising living standards and export competitiveness.

It is a fallacy to assert that sunk costs “owe” a rate of return to their government or other owners or even that sunk assets should be valued at replacement cost! This is precisely the fallacy Hotelling (1938, p 307) warned about in his example of the Union Pacific railroad. In the real world, economic efficiency does *not* require that the owners of Roman aqueducts still in use should be charging for the replacement costs of what have long since become indistinguishable from a natural river.

The reality is that it would be misguided for SunWater to appeal to economic concepts of opportunity cost to justify a replacement cost valuation of \$363 million for Burdekin scheme assets on which SunWater is “owed” a commercial return. Opportunity cost would dictate a *zero value* be put on sunk scheme assets.

6. Is replacement cost relevant at all?

Another argument commonly used to justify charges based on replacement cost accounting is that unless users are charged for their use of capital on what it would cost to replace, the capital is being used uneconomically and indeed used up in the sense that it will not be able to be replaced financially when consumed.

This argument for replacement cost rests on the idea that it signals to users the marginal cost of their current use of resources and is therefore economically efficient. As Vickrey puts it

“Since changes in present usage cannot affect costs incurred or irrevocably committed to in the past, it is only present and future costs that are of concern in the determination of marginal cost. Past recorded costs are relevant only as predictors of what current and future costs will turn out to be. The marginal cost of ten gallons of gasoline pumped into a car is not determined by what the service station paid for the gasoline, but by the cost expected to be incurred to replace the gasoline at the next delivery.” (William Vickrey *Marginal- and Average Cost Pricing* in Eatwell et al editors, *The New Palgrave* Vol 3, Macmillan, 1987 p 314).

6.1 Replacement cost depends on assuming an alternative use

But to use this kind of argument to support pricing for the services of sunk assets at replacement cost is not correct, as Vickrey, a lucid advocate of short run marginal cost pricing, recognized. You either sell gasoline now or later (one use precludes the other) but a dam or channel is available for use both now and later and a failure to use it now does not prolong its life later. There is no economic reason to stint usage of a dam or channel now through higher charges simply because in 50 years time it will cost more to replace it. If there is no capacity constraint, there is no economic efficiency reason for not pricing at (minimal) marginal cost. (There may be an argument in commercial accounting for average cost pricing to recover financing costs but this is an argument more in favour of depreciated actual cost as a pricing principle than replacement cost.)

This argument seems to assume however that one can costlessly transfer the use of fixed or sunk assets from today’s time period to tomorrow. But you cannot mothball dams and channels and say you will preserve them intact for the use of irrigators in 50 years’ time and that way avoid “undercharging” today’s irrigators. The fact is the assets exist and their replacement in 50, 100 or 200 years time has nothing to do with pricing their use now.

6.2 Replacement funds are never earmarked

There is a factual error with the argument that replacement cost depreciation or renewal charges ensures that funds are provided for system replacement. In reality, there is no legal obligation for any infrastructure owner charging for depreciation or renewals to set aside those depreciation or renewal charges in an escrow or trust fund earmarked for system replacement. There is nothing to stop depreciation allowance cash flow or accumulated renewal reserves being paid out to shareholders as dividends or invested elsewhere (as happened in New South Wales some 20 years ago when Electricity Commission “hollow logs” were raided to rescue the State budget - with disastrous results on electricity and later pricing).

6.3 Water assets may never need replacing - renewals annuity accounting

Second, water assets such as dams and channels may have an indefinite life and ordinary depreciation concepts may be irrelevant - what matters is their ongoing maintenance and repair. For this reason, some form of renewals accounting is used rather than conventional depreciation.

However water assets may need lumpy capital expenditures from time to time to restore them to serviceable condition or prevent catastrophic failure.

From a conventional financial accounting point of view, it is appropriate to charge users for such expenses *as and when incurred* by amortizing the expense over its expected period of service. To the extent that renewals annuity accounting merely achieves such a result it is unexceptionable. But if renewals annuity accounting is used to accumulate a fund for replacement of assets, rather than merely smoothing the swings and roundabouts of periodic capital expenditures, it becomes a form of replacement cost accounting in disguise and should be rejected as such.

6.4 Replacement cost charging is not a competitive industry outcome

Third, the argument that today's users should be charged by the basis of tomorrow's anticipated costs is an outcome not achievable in competitive markets and involves inter-generational inequity. Producers in ordinary competitive markets can only charge users on what capital has cost them not on what it will or may cost them in the future. If or when a capital asset has to be replaced, a firm will raise equity or a loan at that time and charged its users from then on. But if it tried to charge today's users on the basis of tomorrow's higher costs, it would be driven out of business by other firms able to obtain the same assets at today's lower cost. In the case of public works, the traditional and sensible funding mechanism for a self-sufficient project has been to raise a loan for the cost of the public work and charge on the basis that such a loan will be amortized through a sinking fund over the life of the capital asset. Each generation bears the costs incurred in providing the assets it uses and is not charged for providing assets to be used by the next generation.

It may be noted that replacement cost accounting is not generally used by the private sector in competitive industries. The private sector prefers to work with actual cash outlays and establish whether cash profits plus revaluation gains meets a hurdle rate of return. Any adjustment for inflation can then be made. If a business invests \$10 million and 5 years later is turning over \$500,000 a year but the assets are now worth \$20 million, it does not tell its shareholders it is only making a profit of 5% or complain because the replacement cost of its assets has risen. When it becomes necessary to look at replacing its assets that will be a decision to be taken then in the light of price and market expectations as they stand then and to be financed by debt or equity or both to maximizes risk-adjusted shareholder returns. There is no reason why the next generation of infrastructure users cannot be expected to pay for their own costs through a future infrastructure bond issue. To look at it another way, why should the windfall gains from inflation be appropriated by asset owners through rates of return on indexed asset values rather than flow through to users?

6.5 Debt finance and gearing

Indeed, the ability to borrow to finance asset acquisition can be a useful source of profit. Interesting questions are raised if 100 percent of assets are indexed for inflation but 60 percent of those assets have been financed from bondholders who are not inflation proofed. Gearing exploits not only the differential between the allowed return on capital and bond interest but also exploits the indexation of 100 percent of the capital base for depreciation purposes. It is interesting to note that current cost accounting, after a surge of interest in the 1970s, was not adopted partly because it was felt that monetary gains and losses had to be adjusted for inflation, not just physical assets. That is not a debate which need be gone into here but it does highlight the point that inflation or replacement cost adjustments for assets

may deliver windfall gains to asset owners where those assets are largely or even totally debt financed.

6.6 Replacement cost charging ignores asset holding gains

Fourth, where the replacement cost of assets is rising, firms will show revaluation gains from their asset holding activities. From a financial accounting point of view, these holding gains must be set against higher forward-looking depreciation charges (if they are to be used) in working at the profitability of investment. A firm can simultaneously show a rising cost of capital replacement and still be producing handsome profits on actual cash investment.

It may also be noted that depreciation or renewal charges based on replacement cost in a period of inflation is likely to lead to a situation where the original cost of an asset is depreciated not once but many times over.

Depreciation or renewal charges based on replacement costs are obviously intended to ensure that current users are charged their current cost of capital usage. But unless the physical infrastructure is actually being worn out by the usage, as opposed to the mere effluxion of time, there is no reason to levy depreciation or renewal charges on such a basis. From this point of view, depreciation or renewal charges not based on actual capital exhaustion or renewal costs are arbitrary.

There are three concepts of depreciation: depreciation as the current cost of physical capital usage (the national accounting concept of depreciation); depreciation as a recovery of costs (the financial accounting concept of depreciation) and depreciation as the change in the market value of an asset (the economic concept of depreciation).

While from a national accounts perspective depreciation is the current cost of capital usage, from the investor's point of view depreciation means the net change in the value of an asset, taking into account realised and unrealised holding gains.

Thus,

$$\text{economic depreciation} = \text{national accounting depreciation} + \text{revaluation gains or losses.}$$

In examining investor returns, if users are to be charged on a national accounting concept of depreciation which ignores revaluation gains and losses, then it would be equally appropriate to ignore capital gains or losses in establishing the cost of capital.

To look at it another way, if the infrastructure owner is to charge users for the decline in the value of his infrastructure asset, he should equally credit them with increases in the value of the asset accruing over the same time. Just as for taxation purposes, depreciation which has been written off is recouped when an asset is sold for more than its written down value, so any infrastructure owner which seeks to say its charges should be based on replacement cost should equally be required to include as revenue in measuring returns to investment any amount which represents a revaluation of its assets.

6.7 Nor is depreciated optimized replacement cost relevant to cost recovery

Often replacement cost is further refined as a concept to depreciated optimized replacement costs (DORC), the idea being that it is illogical to charge users for replacement of an asset which would not be replaced “as is” but with newer and better technological redesign. For example, one might replace above-ground channels liable to break with in-ground water channels with concrete sides which would have lower maintenance costs.

But the DORC concept suffers from a lack of conceptual clarity. Apart from guessing how an asset might be replaced, one can distinguish between the concepts of incumbent DORC and new entrant DORC. The concept of replacement cost depends on who is doing the replacing. For example, an incumbent does not have to pay for land resumption and may use existing assets to lower the cost of replacement. In the water industry, DORC seems unused precisely because an incumbent tends never to replace but to renew assets as required: with proper renewal asset lives can be infinite (as Roman aqueducts still in use demonstrate).

There is a further conceptual problem with replacement cost concepts. If one is trying to replicate the outcome of a competitive market, there is always free entry. A new entrant can acquire the resources necessary to enter the industry on the same terms and conditions as incumbents. If by replacement costs is meant the replacement costs a new entrant would face *now* then we are not in the situation of replicating a competitive market outcome (which is supposed to be one of the objectives of competition policy reform). To replicate a competitive market outcome, it is necessary to assume that the hypothetical new entrant can acquire resources *on the same terms and conditions as the incumbent*. In other words, the incumbent should not be allowed a competitive advantage through the mere facts of time and history. One should assume that the hypothetical new entrant had the same market opportunities as the incumbent.

One should assume the new entrant entered the market at the same time and has had the same opportunities. Only by abstracting from time and assuming simultaneous entry on the same terms and conditions, can one replicate competition. Under this entry hypothesis, it is reasonable to assume that a new competitor would have behaved much as the incumbent has behaved: that is to say written down replacement cost concepts reduces towards depreciated actual cost, once one removes the anti-competitive bias of time and history. In other words in the timeless economic world of perfect competition, depreciated actual cost is the measure of competitive cost. Such a concept may seem somewhat metaphysical but it highlights the strong assumptions which need to be made if one is to replicate the outcome of a competitive market. To overlook those assumptions is to use a concept of replacement cost which gives a windfall to an incumbent monopolist.

By way of further comment, if one asserts that asset owners are entitled to a risk weighted rate of return then those risks, if based on competitive market returns, would include the risk of obsolescence of capital equipment. In such a situation, our conclusion is that the correct basis of computing capital costs to measure a return *on* capital and a reasonable return *of* capital should be *the lesser of* DAC (depreciated actual cost) or incumbent DORC (depreciated optimized replacement cost). In the case of the Burdekin scheme it is likely that this means one would use depreciated actual costs given replacement costs seem much larger at some \$363 million. (Whether a re-optimization of the channels with modern technology could result in a lower DORC figure is an engineering question on which we have no

figures.) In computing capital costs recoupment of costs by grants, land sales and water licence allocations would be brought into the account and if they exceed the cost, there is no basis for seeking a return on capital or a return of capital on cost recovery grounds (though, doubtless, a monopolist will always seek to charge whatever he can wherever he can - which is what competition policies are meant to stop).

6.8 Replacement cost accounting as creative accounting

It is worth noting that accounting writers are not deceived by the use of replacement cost accounting and class it in the creative accounting category, along with the sort of accountancy tricks used by corporate crooks to fiddle profits the other way.

Thus Griffiths (1986, p 12) remarks “Clearly the chosen method of accounting will influence the budgets and forecasts which are critical in determining the level of price increases to be introduced. While the electricity industry insists on using current [replacement] cost accounting which produce lower reported profits it will be able to justify more easily its price rises. Whether it is right to rely on the expediency provided by a particular accounting concept, which, ironically, has now been totally discredited by the private sector and the accountancy profession is another matter altogether, but one which is very rarely discussed in the tap room or snug bar.

The use of creative accounting in determining pricing policies cannot, therefore, be underestimated. The Thames Water Authority showed this quite lucidly when it was attempting to resist government pressure for it to increase water rates. The government assumptions were based on current cost principles and show that a price increase was needed in order for Thames to meet its required return on capital. The Thames assumptions, using historical [conventional financial accounting] principles, demonstrated quite the opposite and showed that more than adequate returns could be achieved without a price rise. Somebody had to be wrong.”

There needs to be critical examination of the arguments for replacement cost valuations and whether any value should be attributed to sunk capital (cf Wells and King on scrap value). Arguments used by Professors King, Johnstone, Wells, Bonbright, Whittington and others demonstrate that using replacement cost concepts provides a “free lunch” in economic terms and demolish the argument that replacement cost charging is “economically efficient” (based on Tobin’s q ratio).

6.9 DORC not adopted by accounting profession

In traditional historic cost accounting, only actual incurred costs are brought into account as ordinary profit or loss. Losses from revaluation of assets are not treated as actual, incurred, costs: instead depreciation is based on spreading the actual historic cost of an asset over time.

Since the 1970s and, especially during periods of higher inflation, there has been greater interest in alternative accounting treatments based on current replacement cost accounting. Under current cost accounting, assets are revalued in accordance with their replacement cost and depreciation is charged as a cost on the revalued asset amount. The merit of current cost accounting is that it ensures management charges itself of the true cost of using up capital assets. But it should also be noted that current cost accounting also brings into account as

income or gain any revaluation gains on assets. While these are not treated as part of operating profit, as Edwards and Bell (1961) recognise, they should be treated as part of the overall profits of the firm.

In *Utility Asset Valuation and the Problems with DORC* (July 1998) Professors D J Johnstone and M C Wells argue that replacement cost valuations mean that consumers “have paid once already through past prices and will now pay again for the same assets, even though there is no immediate replacement, through the effect of the depreciation and opportunity cost components of the pricing equation. It can even be argued that consumers will pay three times, in that some of the operating and maintenance costs reimbursed to the utility investor (through the pricing equation) will likely go towards capital improvements rather than expenses.”

“...what does seem to be unjustifiable is the apparent lack of a coherent approach to the issue of ‘current value’ accounting in the non-business (government) sector. There seems to have been no concerted effort to draw lessons from the ultimately unfavourable attitude of business. The various regulations give the impression of as many ad hoc choices, sometimes leading to possibilities of opportunistic accounting policies, sometimes resulting in figures which even the entities involved have difficulty interpreting. (Camfferman, K. “Deprival Value in the Netherlands: History and Status” *Abacus* 34 (1998), pp 18-27

Clearly those who have promoted the drift of both DV and ODV into the public sector have either not heeded that experience with CCA, DV and related concepts in the private sector, or did not know of it. If it is the former, then the public sector reformers must be considered to suffer a certain lack of candour (Clarke, F L “DV and ODV in Australia” *Abacus* 34 (1998) pp 8-17) (Source: Johnstone, D.J. and Wells, M.C. 1998).

“RC based accounting has been promulgated at all levels within the Australian public sector. In 1994 the Steering Committee on National Performance Monitoring attempted to institutionalise this framework through its publication and wide dissemination of a set of asset valuation guidelines closely resembling those of the various CCA (current cost accounting) proposals put forward by the accounting profession in the 1970s. This publication (the ‘red book’) is seen within the bureaucracy as an ‘accounting standard’ for the public sector, but does not have this credibility within the accounting profession as a whole nor within the much more extensive accounting literature. To the contrary, the “red book” seems to be the product of a bureaucratic process wherein the end was more important than the means. In coming down in favour of RC accounting, without the least qualification nor any vague reference to the academic and professional history of this valuation framework, the ‘red book’ is lacking in intellectual foundation and integrity. It is remarkable that rather than building on existing knowledge, the ‘red book’ in effect suppresses that knowledge. To some extent, it is likely that this is a consequence of those involved in formulation of the red book’s guidelines simply not being aware of all that had gone on one or more decades beforehand. Accounting reforms in the public sector are a much more recent and almost unprecedented phenomenon, and it is understandable if the public sector as a whole has little ‘corporate memory’ of the earlier debate. It is essential, however, that the ‘red book’ be seen in the light of this apparent collective ignorance, and that its deficiencies be at least known if not corrected. (For detailed critical review of the ‘red book’ see Johnstone, D J and Gaffikin, M J R, “Review of the Asset Valuation Guidelines of the Steering Committee on National

Performance Monitoring of GTEs”, Australian Accounting Review 6 (1996) pp 50-56.”
(Source: Johnstone D.J. and Murray M.C. 1998.)

6.10 Replacement cost is irrelevant to incentives to invest

One objective of the COAG water reforms was to ensure that private investment could occur in water assets by providing an incentive to invest through investors receiving a return on capital. Leaving to one side the point that incentives to invest in new projects are largely irrelevant to an established scheme such as the Burdekin, it needs to be stated clearly that SunWater cannot justify replacement cost as a basis for establishing “ideal” or “target” returns on capital on the grounds that returns so established are necessary as incentives to invest.

The incentive to invest depends on *ex ante* rates of return. Strictly speaking there is no need to pay a return to, or index the capital returns to, sunk capital as though it were free to get out of the ground and go elsewhere. That is not to say that a regulator should opportunistically strip private investors of any returns on sunk capital, since future investment would be prejudiced if the expected *ex ante* returns were seen to be retrospectively expropriated *ex post*.

But incentives to invest are not affected if there is no return on capital where that capital has been recouped by grants, collateral receipts such as land sales or water licences. Further any return on investment should take into account investment returns by way of realised or unrealised asset appreciation as well as depreciation or renewal charges.

Both of these considerations are relevant to the use of replacement cost accounting. Writing up the capital asset base to replacement cost allows an infrastructure owner to claim a return on capital expenditure which has either already been recouped or was never incurred. To claim a return based on the use of replacement cost-based valuations takes into account a notional and non-incurred capital cost to investors, without equally bringing to account, as a cost offset or gain, the corresponding holding gains on existing assets. As Edwards and Bell recognised in their *Theory and Measurement of Business Income*, the total returns to investors include realised and unrealised holding gains as well as operating profit computed on a current cost basis. In examining incentives to invest, you cannot rationally count an appreciated replacement cost as a capital asset base for computing returns to owners without counting realised and unrealised asset appreciation as a *gain*.

Lest it be argued that no account should be taken of unrealized gains because they cannot be distributed to shareholders, it is pertinent to note that company law does allow dividends to shareholders to be paid out of realised and unrealised capital gains (see Ford’s *Corporations Law*). For example, in the case of insurance companies, distributable profits are *required* by the relevant accounting standard to take into account both realised and unrealised gains.

6.11 Consistency in measuring income

It is also pertinent to note that the Ralph Review of Business Taxation proposed a model of income which takes into account all forms of realised gains and leaves open the possibility of bringing unrealised gains to account as income.

6.12 What is involved in establishing a rate of return?

It also should be noted that if a return is computed on the basis of a weighted average cost of capital which includes a return on equity, such a computed return to equity securities usually includes capital gains - that is to say, a return which includes the stock market's capitalization of realized *and unrealized* undistributed capital gains liable to be earned by the companies. If one is claiming a rate of return which is supposed to take these gains into account then their existence should be recognized also in the infrastructure owner's computation of the revenue stream being earned.

Otherwise, if the asset holding gains are not to be recognized as revenue, it is invalid to allow return on, or return of, capital based on an inflated capital base.

6.13 Value and cost in a competitive market

Given the emphasis of National Competition Policy on replicating the outcome of a competitive market and the emphasis on the capital and non-capital costs of an infrastructure provider, the natural economic sense is to recall that in competitive equilibrium "cost" equals "value". *The purpose of infrastructure valuation is to ascertain the cost that would have been incurred in a competitive market by another provider.* Actual costs incurred by the incumbent are the only real factual evidence of "costs" whereas "values" are only matters of opinion, not fact. It is, however, understandable that a new regulatory regime might wish to use valuations to check costs eg because records of actual costs might not be available past the limitation period or because non-arm's length or inflated transfers of assets might prejudice users. Suppose SunWater were to incorporate a subsidiary, transfer the Burdekin scheme assets to that subsidiary at \$2 billion and lease the assets back for \$250 million per year and then say that was the "cost" of the scheme which should be met by irrigators. One can imagine that there would be no more credence given to such a "cost" figure than the Australian Tax Office gave to depreciation tax claims manufactured through tax avoidance schemes to write up depreciation allowances through non arm's length trading in depreciable assets in the early 1980s.

The essential point is that it is *real or actual cost* determined freely at arm's length, not *notional or opportunity cost*, which is relevant in determining the replication of a competitive market outcome. In ordinary English, "cost" refers to an actual not a notional cost. While accountancy uses the concepts of historic cost versus replacement costs and economics employs the parallel concepts of real cost versus opportunity cost, it must be recalled that the origins of the economic concepts of real and opportunity cost can be traced back to the Ricardian theory of rent. In that theory, value is determined by the real cost of production on marginal, zero-rent, land. Because of the law of one price, grain produced on more productive land yields a surplus over its real cost. That surplus is appropriated by the landlord as rent. In a similar way, monopoly rent is the surplus over the real or actual cost of supply which may be appropriated by the monopolist.

In this regard, we are of the view that the natural English language interpretation of the word "cost" when we speak of "cost recovery" is in accordance with sound economic principle: the whole idea of National Competition Policy is - or ought to be - to avoid abuse of monopoly power by ensuring that natural monopolies do not charge users more than would

be charged in a hypothetical competitive market where “values” were constrained by the *actual* costs incurred by competitors.

Hence, we would argue that depreciated actual cost (DAC) is the *prima facie* real cost on which any returns on capital or return of capital should be erected. Depreciated actual cost is a factual measure of cost - it is fact for which there is objective evidence: all other measures of “costs” or “value” are matters of opinions only.

6.14 Depreciated Actual Cost (DAC)

There are strong arguments in favour of using historic or actual costs (DAC) and ruling out notional costs, as noted by Stephen King (1996, pp 94-95) except so far as necessary to prevent transfer pricing between affiliates. “Evaluating allowed returns on capital involves three broad steps. First the regulator must determine the rate base; the value of the infrastructure facility which will form the basis for the calculation of allowed return. The regulator must then determine the allowed rate-of-return to be applied to the rate base. Finally the regulator may place constraints on the prices that the facility owner can charge for various access services in to generate his or her allowed revenue. ... Other countries, particularly the U.S., have a long and chequered history of rate base determination. The experience of these countries provides many lessons for Australia, particularly for the application of access under Part IIIA. Our conclusion, based on this experience, is that, unless there are significant reasons why an alternative rate base method would yield better incentives in a particular situation, *historic or original cost valuation should be used to calculate the rate base.*” [emphasis added]

We note that the question of determining allowable costs is also dealt with under the income tax law. It is instructive to note that where a taxpayer is allowed a deduction for a cost or a repair, the Courts have insisted that the cost be actually incurred and that the cost must not be notional only. For example, in *FCT v Western Suburbs Cinemas Ltd* (1952) 86 CLR 102, the High Court declined to allow a deduction for notional repairs. This is in accordance with the economic concept of a real or actual cost as opposed to opportunity cost. In this regard any claim by SunWater that cost reflective prices to irrigators should yield a return on a replacement cost of \$363 million of assets and that charges should thus be \$100 per ML not \$36 per ML must be rejected as unfounded.

6.15 Irrelevance of price paths to justifiable costs

It may be argued by SunWater that irrigation charges have not risen and that prices now are the same as in 1996 at \$36 a megalitre. It is obvious that such a statement is entirely irrelevant to the question of what may be justified in the name of cost recovery. As a matter of logic, the fact that prices may not have risen may only indicate there was a large amount of inefficiency or monopoly rent embedded in the prices in the first place. One does not excuse extraction of an inflated or monopolistic price by suggesting to the customer that one might have tried to extract more. Vanderbilt, the American railway magnate, might have tried that approach in the 19th century with his remark “the public be damned” but it is not an economic justification for rational pricing.

6.16 What are the logical implications of replacement cost charging?

The logical implication of replacement cost charging is that all public assets should constantly be revalued and the public charged so as to provide a rate of return on those assets on the basis of what it would cost to build those assets today.

For example, the Storey Bridge would be revalued to replacement cost and then have a toll imposed to provide a return to that notional capital value plus provide a fund for its replacement. All of the land works, highways, drains etc constructed in Brisbane since 1857 would be revalued and the public charged accordingly.

Obviously, no government would be silly enough to attempt to implement such a proposition and one would expect more than incredulity from a public expected to pay again for the public works bequeathed by their forebears. One might add that it would be difficult to invent a public sector charging scheme more calculated to drive business out of Brisbane and Queensland in general.

Yet this is essentially what a replacement cost charging methodology involves.

6.17 Conclusion on replacement cost

One thus sees that replacement cost is not relevant at all to an inquiry as to the commercial rate of return earned on the State's actual unrecovered investment in the Burdekin water scheme. The validity of such an asset base for computing return on investment cannot be accepted as a matter of history, logic, accounting or economics. To the extent that statements such as "Full cost recovery in the Burdekin would be well over \$100/ML" rest on such valuations they are simply unsupportable.

Given that the SunWater government "subsidy" figure of \$33 million appears to rest on replacement cost accounting for water assets it must be rejected as meaningless. It is not a cash outlay figure but a notional or manufactured figure only and has no relevance to cost recovery in any meaningful sense.

7. Meeting operational costs (OPEX)

From the point of view of economic theory, water users should only be charged the marginal cost of water supply. The application of this principle in practice can be complicated. For example, when a river is in flood the community would pay anyone to take water from the river rather than charge them for its use -- the marginal cost of supply is negative.

In the normal situation, the marginal cost of supply is limited to the cost of pumping. If this cost is privately borne then the only cost of supply to the irrigating authority is the cost of opening up the dam gates to let the water flow downstream.

In practice, however, in addition to short run marginal costs of this nature, a water authority must recover other operational and maintenance expenditure in order to remain solvent.

Where such expenditure cannot be precisely allocated to marginal use, it is most efficient for it to be recovered in a lump sum access charge or a rate on land benefited.

Unfortunately, where there is a monopoly supplier such as Sunwater, a further complication arises. A monopoly supplier has no competitive market incentives to minimise costs. He may incur costs but those costs may not represent the costs of efficient supply – there may be managerial cost padding.

In a way this may be seen as a variant of the well-known principal-agent problem whereby those entrusted with carrying out a collective endeavour on the part of others to be benefited may have no incentive to act in the interests of the ultimate beneficiaries. The law of trusts and fiduciaries resolves this problem in favour of beneficiaries by requiring fiduciaries to disgorge any profits gained for themselves in acting in a fiduciary capacity. However, the law does not, and cannot, create incentives to efficient cost containment.

The economic merit of local area management is that by subjecting operational and maintenance expenditure to the control of those who have to pay the bills, the principal-agent problem is resolved by removing the possibility of management incentives opposed to those of the ultimate intended beneficiaries of the scheme.

We are therefore not surprised that the Queensland Water Reform Unit suggested efficient costs might be 15% less than actual costs for 1999-2000. Nor are we surprised that Marsden Jacob in their study of the scheme have suggested that significant savings can be made in favour of irrigators through more efficient management. We note that combining access and volumetric charges Marsden Jacob estimated a total cost of water supply of \$24.10 per megalitre compared to current prices at the time of \$39.10 per megalitre.

We understand the Marsden Jacob figures were subject to slight variation upwards. This was partly due to inclusion of land taxes and rates for land under channels and dam. This in itself raises another issue, namely, whether a public authority supplying water should be subject to a taxation regime of any kind. We are aware of the general requirement for tax equivalent regimes upon enterprises competing with the private sector but we do not see such a regime as necessarily appropriate for a statutory monopoly. Certainly if taxes are imposed upon a statutory water authority those tax collections should be seen as part of the return to Federal and State governments from the project as a whole.

Incidentally we note that it is logically absurd to charge the scheme with taxes as costs which have to be met while failing to take into account, as benefits of the scheme, tax revenues generated by the existence of the scheme. In particular we note that the 1980 Report to Parliament anticipated at page 4 an internal rate of return on the scheme of some 10%. Taking a simple “back of the envelope” calculation, one might guess that if such a return generated taxable incomes, then the scheme would be generating tax revenues of some 5% on a gross cost of \$155 million, that is, it would be generating some \$7.5 million dollars per annum for Federal and State governments. This reinforces the point that alleged figures of “subsidies” to or from government make very little sense in the absence of a full economic cost benefit accounting ex post (which we have not seen).

We also note that both the Queensland Water Reform Unit and Marsden Jacob included an allowance for a renewals annuity as part of operational costs. We assume that the renewals

annuity only represents anticipated actual cash outlays on irregular maintenance requirements and does not represent any form of provision for a replacement fund for the scheme (which would be a form of replacement cost charging).

8. What does the COAG agreement really require?

The COAG Agreement of 1994/95 – an integral element of National Competition Policy – was designed to change fundamentally the approach to, and administration of, water provision and pricing in Australia (RIRDC 1999, 2001, ARMCANZ 2001). The aim of COAG, which was not made clear at the time, is to *increase* the price of water (with the intention of reducing its usage and accommodating environmental concerns).

The Productivity Commission has made this abundantly clear as follows:

“...NCP water reforms have resulted in significant increases in charges for many users, particularly irrigators. Notwithstanding improvements in the efficiency of service delivery, these increases are likely to continue. At the same time, the reforms are providing benefits to the environment through, for instance, greater incentives to reduce wastage, thereby leading to more efficient investment in water infrastructure.” (PC 1999a, p158)

The basis on which the Burdekin Scheme was conceived in the early 1980's, and on which it had proceeded in terms of water pricing and financial management was, accordingly, fundamentally changed in 1994/95 by National Competition Policy and COAG agreements of Commonwealth and State governments. The fact that major institutional change in water is being meted out to rural and regional Australia as a consequence of the NCP/COAG policy was confirmed again recently by ARMCANZ as follows:

“...Australia is now in its sixth year of water reforms. Progress in implementing the reforms has varied amongst jurisdictions and jurisdictions still face challenges and issues in this regard. Nevertheless, implementation of the COAG Framework has had a positive impact in urban and rural water pricing and management:

- ♦ *the urban water industry has seen the most significant benefits generated by the reforms so far. On the east coast overall water consumption in urban areas has dropped by 19 per cent over the past five years. However, the trend of reduced costs to consumers will diminish as the capacity for realising efficiencies and generating savings is reduced over time; and*

- ◆ *in the rural water sector the jurisdictions have been implementing the reforms leading to major institutional change for management of water resources and water allocation, reforms to water pricing, cost recovery and support for water trading.”* (Source: ARMCANZ Resolution: 1A, 18 August 2000, Brisbane)

9. Reconciling National Competition Policy and the Burdekin

Sound economic principles should underpin the Burdekin Scheme, particularly if the industries it supports are to be internationally competitive. Having been conceived as a project to increase the economic development of North Queensland in the early 1980s, and being well under-way in that context when the National Competition Policy was embraced by governments in Australia in 1994/95, the question must now be asked are correct economic principles being abandoned in the Burdekin as a direct result of National Competition Policy? If so the economic costs of the new pricing regime now governing the Burdekin need to be quantified and brought to account.

The discussion in the foregoing sections illustrates how efficient pricing of water can be compromised, and the Burdekin region's competitiveness reduced. At the least it appears that fundamental changes in approach to water pricing were put in place in 1994/95 and are now being imposed on the Burdekin. These changes need to be analysed and compared with the situation prior to 1994/95. Conclusions can be drawn on how, and in what way, Burdekin Irrigators should take forward their concerns over the new direction the Burdekin Scheme is taking as a consequence of National Competition Policy and COAG philosophies.

On the face of it much of the application of National Competition Policy and COAG philosophies rests on wrong economic principles and doubtful assumptions, and in terms of pricing outcomes, results in disguised taxation. However, further empirical research and data analysis of the Burdekin pricing regime will be necessary before we can reach final conclusion on the present pricing dispute between BRIA and Sunwater.

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ENDNOTES

1. For example, a large infrastructure projects such as the Very Fast Train would inevitably generate large positive external benefits. Increased productivity of Labor and capital would tend to result in increased land values along the route. It may well therefore be first best practice to finance such infrastructure through a land rating system.
2. Economic Planning Advisory Council (1990) *The Size and Efficiency of the Public Sector* EPAC Council Paper No 44, October 1990 page 60. As noted by Ross Clare and Kaye Johnston (1992) *Profitability and Productivity of Government Business Enterprises* EPAC Research Paper No. 2, August 1992 page 6 “Community service obligations . . . usually involve the provision of services that would not be undertaken by a purely commercial provider, or the provision of services at a price lower than commercial considerations would dictate. Cross-subsidisation between categories of customers is the normal method used for funding such obligations.”
3. Economic Planning Advisory Council (1990) *The Size and Efficiency of the Public Sector* EPAC Council Paper No 44, October 1990 page 51
4. It is relevant that “International comparisons show that Australian industries generally operate at levels of productivity below the OECD average; the exceptions are agriculture and mining which compete on world markets and operate on a world scale (EPAC Council Papers Nos 32, 39 and 42).” Economic Planning Advisory Council (1991) *Improving Australia's International Competitiveness* EPAC Council Paper No 45 January 1991 page 4