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Institutional Constraints and Inter-Jurisdictional Water Trade: The Case of the Australian Capital Territory and New South Wales

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Abstract:

Water trade remains a contentious political issue in Australia, regardless of the acknowledged benefits to which economists continually refer. At least two sources of concern arise in discussions about water trade. First, concerns are often expressed about inter-sectoral ramifications. These usually take the form of prophecies about the profligate growth of urban centres being achieved at the expense of regional and rural communities. Second, mention of unfettered trade between jurisdictions is usually sufficient to provoke rhetoric that draws upon long-standing rivalries between states. This paper considers the benefits of water trade between agricultural interests in the Murrumbidgee Valley in New South Wales and the predominantly urban users in the Australian Capital Territory. The paper goes beyond the standard economic analysis by also pointing to the range of institutionally-based constraints that circumscribe the operation of water markets. In this regard, the arguments in the paper offer a salient caveat to the bold predictions of the National Water Plan and related statements on the operational dimensions of water policy.

1.0 Introduction

Randall (1981) made an early case that as the Australian water economy entered a maturing phase, it was appropriate for a system of transferable water access entitlements to be implemented as an alternative to the administrative allocation and reallocation that characterised Australian water management at that time. Water trading commenced in Australia in the

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1980's, initially as a mechanism to facilitate the movement of water between water users during periods of drought. However, Pigram (1993) identified a continuing hesitancy in Australia to endorse a totally market driven water industry, and called for the “unfettered and uninhibited trading” of water in order to maximise economic benefits from the resource. These sentiments were subsequently echoed in various policy circles, including in the outcomes from the Council of Australian Government's (CoAG) 2004 National Water Initiative and, to a lesser extent, via the 2007 National Plan for Water Security.

However, after more than two decades of insistence by economists and others about the potential value of transferable water entitlements in the management of water resources, the implementation of genuine water markets remains contentious within the broader community. This can partially be traced to the difficulty of designing trading rules that adequately account for the nuances that characterise water resources. These include economies of scale in storage, conveyance and distribution; the fact that water resources can be both simultaneously replenished and depleted; mobility of the resource; uncertainty in supply; the ability to instantaneously provide multiple benefits through water; and the public and private good characteristics of these benefits. These characteristics cause unique but unpredictable interrelationships among water users and are made even more challenging when dealing with inter-sectoral and inter-jurisdictional issues. The outcome can often be that *prima facie* sensible and rational policy is resisted and delayed as a result of institutional inertia¹.

The Australian Capital Territory [ACT] provides an interesting study area for investigating issues of this type and holds appeal on several grounds. First, there has generally been a lack of pre-existing water trade, either within the ACT or interstate. Second, ACT's geographic location, which is entirely within the Murrumbidgee River catchment, means that the physical and economic

¹ 'Institutions' has been assigned various definitions throughout the Institutional Economics literature. Here we take institutions to mean the set of both formal and informal rules. Thus, our focus is primarily upon those organisations and agencies that play a part in shaping the rules by which water trade can occur between jurisdictions. 'Institutional actors' are thus individuals who carry some influence within those organisations and agencies. For a useful review of the role of institutions in the Australian water milieu see Challen (2000).

potential for water trading is confined to a limited number of entities – namely, downstream residents in other states who currently hold access rights to water (see Figure 1). Third, the existence of agricultural/urban water rivalries attend most trading issues – about 87% of the water consumed in the ACT is done so by urban users in Canberra and Queanbeyan (ABS 2004-05) whereas 89% of the diversions from the Murrumbidgee in New South Wales [NSW] are accounted for by irrigation interests (Australian National Resource Atlas [ANRA] 2000). Poignantly, the former presently pay a marginal price of \$1250-\$3000 per ML whilst the latter pay a bulk price of about \$2-\$3 per ML, even after steep price rises in recent years². Fourthly, the magnitude of the extractions in the differing jurisdictions and the relatively modest call made by ACT residents on local water resources adds another salient dimension. More specifically, the ACT is estimated to consume about 63GL per year of the 494GL per year that emanates from within that state. In addition, the ACT presently makes no claim on the average 386GL that annually passes through its jurisdiction via the Murrumbidgee River to downstream users in NSW (ACT Electricity and Water (ACTEW) 2005).

Research into these issues in the ACT is also of interest because of the long-standing commitment by the ACT government to the principles embodied in the Murray-Darling Basin 'Cap'. In simple terms, the ACT cannot participate in water trade with NSW (or other jurisdictions) until a Cap for ACT water extraction is agreed. Thus, on the one hand the ACT stands to benefit from water trade in meeting expanded demand from urban users, and yet on the other hand ratifying a Cap on ACT extractions is itself attended by difficult institutional and political considerations. Nevertheless, these nuances and complexities did not dissuade the ACT Chief Minister joining other states (namely, NSW, SA and Qld) in offering in-principle support for the Howard

² It needs to be conceded that these prices are illustrative only and are not strictly comparable. For instance, irrigators who form part of communal irrigation schemes would also pay a water delivery charge (circa \$10 per ML) and the urban price relates to potable reticulated water. Potable water costs vary considerably by location, but as a general guide amount to around \$550 per ML, includes the cost of bulk water (Victorian Water Industry Association 2003 p. 79). Thus, even after accounting for these nuances there are substantial differences in the prices paid by urban water users in the ACT and irrigators in NSW.

Government's National Plan for Water Security, which was itself partially premised upon water trade³.

Notwithstanding the apparent consensus of policy thinking between the ACT government and most other Murray-Darling Basin jurisdictions, there remain significant differences between water use in the ACT and that which occurs in other states. There are also non-trivial historical and institutional differences in the ACT which bear heavily on policy decisions and their implementation. In this context the Murray-Darling Basin's Independent Audit Group [IAG] (2007, p. 47) noted that "as the nation's capital, adoption of a Cap for the ACT has important symbolic ramifications, not only to other parts of the Basin, but to the nation as a whole". Arguably, these institutional issues have the effect of raising the stakes on water policy decisions in the ACT and may well account for the slow progress to facilitate trade.

Most rudimentary neo-classical analysis of water trade would support inter-jurisdictional trade between NSW and the ACT as the least-cost alternative for shoring up water supplies. However, this approach substantially glosses over the role of institutional actors who hold responsibility for building the frameworks to enable trade. Regrettably, failure to account for the perceptions and motivations of this group has resulted in overly simplistic predictions that focus primarily on the benefits of trade whilst downplaying the costs and complications associated with the establishment of trading regimes. In this paper we do not argue that trade is itself a flawed policy response – rather, the aim is to highlight the range of institutional constraints which require urgent attention if the most is to be made from a policy that promotes water trade.

The paper itself comprises four additional parts. In Section 2 we review the important characteristics of water resource management in the ACT and the

³ The National Plan for Water Security provides support for water markets inasmuch as it foreshadowed spending \$3.1 Billion over ten years to purchase water entitlements in over-allocated systems. Regrettably, the 'Plan' was also premised upon large public investments in irrigation infrastructure, which arguably is the antithesis of the rationale that is used to support water markets. In essence, the current policy stance puts only limited faith in the market and in so doing partially undermines its potential success. For an excellent review of the 'Plan', see Watson 2007.

legislative obligations that circumscribe these issues. Section 3 is used to focus on the options for developing reliable water supplies to meet growing urban demands in the ACT. Special attention is given to the gains and limitations of the 'least cost' options presently on offer to the Territory's water supply authority (ACTEW). This section also addresses the mechanisms for instigating inter-state trade between NSW and the ACT. Section 4 is then used to present the results of an earlier empirical analysis of institutional stakeholders. Importantly, this analysis covers the range of policy makers and bureaucrats whose support is required to allow for the timely deployment of a policy that supports water trade. This gives some indication of the costs and difficulty of transforming institutions in this context and partially explains the extant delays on this front. The final section is used to draw policy lessons, before offering some brief concluding remarks.

2.0 ACT Water Resources, the Cap and Trade

The ACT became a participant in the Murray-Darling Basin Initiative in 1998, when it signed a Memorandum of Understanding with the other initiative partners (Commonwealth, NSW, Victoria, South Australia, and Queensland) (MDBC 1998). Joining the Murray-Darling Basin Initiative obliged the ACT to negotiate a Cap on water extractions. In May 2006 the ACT became a full member of the Initiative, at which time it reaffirmed its original support for the Cap. The Cap had been formally implemented in NSW, Victoria and SA by July 1997, whilst Queensland imposed a moratorium on all new development in 2000. In essence, the Cap attempts to limit water extractions from the Murray-Darling Basin by constraining consumptive use to some pre-agreed level within each jurisdiction. In the case of NSW and Victoria, the Cap limits diversions to those that would have occurred under 1993-94 levels of development, with the exception of two small allowances made for Pindari Dam and Lake Mokoan. Diversions in South Australia were set equivalent to the full development of existing high security entitlements, which is similar to about 90% of the very high security entitlements in effect in 1993-94 (MDBC 2004).

Notably, the IAG (2007) whilst reviewing the implementation of the Cap over 2005-06, concluded that “the ACT should complete its consideration of the form and size of the cap to apply to the ACT by early 2007 and finalise agreement on the actual Cap by October 2007”. At the time of writing (January 2008) these matters have yet to be settled, although the Chief Minister of the ACT introduced the Murray-Darling Basin Agreement Bill to the ACT parliament in August 2007. In introducing the Bill the Chief Minister revealed the intention for the ACT Cap to “reflect current levels of use as well as a requirement for the capacity for the future growth of the ACT” (ACT Parliament 2007, p. 2384). Other parties to the Murray-Darling Basin Initiative are yet to ratify this stance.

Once agreed, the Cap will form a key constraint on the extent to which the ACT can access its water resources. Water trading is important in this context because if growth in ACT water use moves beyond the limits of the Cap, entitlements to use this water will need to be purchased from outside the ACT. Establishing the Cap will also enable water entitlement holders in the ACT to sell those access rights to users in other States that are partners to the agreement.

It is important to recognise that trade in access rights (or even annual entitlements) is not simply constrained by the necessity to first establish a Cap on ACT extractions. There are three additional parameters that limit the development of water trade between the ACT and NSW: water pricing principles; water allocation principles⁴; and, water storage capacity. First, bulk water pricing⁵ is heavily influenced by the principles enshrined in the CoAG water reforms. In addition to being committed to the Murray-Darling Basin Initiative, the ACT also has obligations under the 1994 CoAG framework and, more recently, the National Water Initiative (NWI). Notwithstanding that both

⁴ Notwithstanding legislative changes to define water allocations with more precision, the term ‘water allocation’ has retained differing meanings within the Australian vernacular. On the one hand the term is taken to mean the maximum annual volume of water available for extraction by a given user. In other contexts it is considered as the maximum volumetric access rights which can be drawn in perpetuity, subject to seasonal availability.

⁵ In this instance we refer to the regulated costs imposed on water right holders as distinct from the market price for water access rights.

NSW and the ACT have made similar commitments to 'full cost recovery' as part of the NWI, the resulting pricing principles embody significant differences. More specifically, the ACT currently applies a Water Abstraction Charge (presently set at \$550 per ML) that effectively captures resource rents that would otherwise accrue to the holders of water access rights. No equivalent charge is imposed in NSW. Clearly, these differences will severely impact on the extent and direction of any trade in water access rights between jurisdictions – in essence, there is a strong incentive to discount the value of any ACT water access rights in an open market and a disincentive to trade water into the ACT if the abstraction charge is then imposed on those imported water rights.

Second, there are key differences in the water allocation principles that apply in NSW and the ACT. In NSW, holders of water access rights receive a number of unit shares in a specified pool of water. The responsible NSW department then publishes data indicating the long-term average volume of water that is likely to be available for extraction in each water source. But the amount of water (allocation) that the water access entitlement holder can use within a particular period is determined according to seasonal conditions (and according to the security of the entitlement they hold), with the only guarantee to access entitlement holders being that they will receive a constant share of the changing water resource pool⁶ (NSW Government 2004). By way of contrast, in the ACT water access entitlements are granted as a right to a volume of water within a particular period. Water allocations are based on average flows and do not expressly specify reliability, but the conservative management of ACT water resources means that water access entitlement

⁶ NSW has taken a more aggressive approach to water allocations than other states which results in generally lower reliability. Within a given season, however, allocations are conservatively structured, being progressively announced as inflows are received. Estimates of final allocations at any given point in time are based on the level of water held in storage and an allowance for the lowest 1 percentile of inflows. Arguably, this is a different form of conservatism but, as has recently been discovered, can be found wanting when new records are established for low inflows.

The annual reliability of access entitlements in NSW also varies considerably between water sources (regulated, unregulated and groundwater). Access entitlements from unregulated water sources are even less reliable than from regulated sources because of the absence of water storage infrastructure with which to smooth availability between years.

holders are guaranteed to receive the full volumetric face value of their entitlement in all but extreme situations (National Competition Council 2001). In extreme situations a hierarchy of uses (with some urban domestic uses being most highly protected) guides the reduction of water availability to individual access entitlement holders. In addition, informal voluntary agreements to restrict water use are also negotiated with water access entitlement holders in times of resource scarcity. In essence the 'water products' of the two jurisdictions differ in non-trivial ways. Moreover, recent evidence on the impact of 'tagging' as the preferred mechanism for facilitating trade between jurisdictions with different allocation principles points to the significance of this constraint⁷. For instance, Rooney (2007) claimed to have been unable to facilitate a single interstate trade since the introduction of 'tagging'. This is largely attributed to the administrative complexities that now attend the process.

Third, interstate trade between NSW and the ACT is inhibited by the limited water storage capacity in the ACT. This is perhaps the most formidable challenge to water trade between the two jurisdictions. While the ACT has significant excess consumptive rights to water resources above current consumptive needs, natural climatic variability (both within and between years) means that it is necessary to store this water to meet the time dependent needs of urban and rural water users. The continual need for water restrictions since 2002 because of drought, illustrates that ACT water storage capacity (rather than the ACT's average catchment resources) is the binding constraint on the ability to supply consumptive needs. Whilst water trade could be used to gain additional water access rights, this counts for little without facilities to store and deliver the water when it is in greatest demand. This issue is discussed in greater detail in the context of the water supply

⁷ Tagging amounts to ensuring that a water access right retains much the same supply reliability regardless of a change in ownership. For instance, a water access right that currently enjoys a reliability of 7 years full allocation in 10 could be sold into a valley that is capable of delivering a higher reliability (say, 9 years in 10) by virtue of additional upstream regulation. However, if the new owner was to invoke the access 9 years in 10 they would simultaneously undermine the reliability of existing users in that valley. In this context tagging is an attempt to prevent one of the potential externalities to trade. The involvement of a large number of agencies required to make judgements about reliability partly explains the high transaction costs associated with this approach and, thus, the paucity of trade since its introduction.

options under consideration by the ACT government and its water utility (ACTEW).

3.0 Water Supply Options for the ACT

Constraints on the ACT's water storage capacity have been central to water planning in this jurisdiction for some time. In 2004-05 the ACT Government considered four options to expand water storage capacity. The options included: constructing a new dam at Mt Tennent; enlarging the existing Cotter Dam; buying water from the Snowy Mountains scheme in NSW for storage in Tantangara Dam, and then either letting it flow down the Murrumbidgee or piping it through a tunnel to Corin Dam (see Figures 2 and 3); or undertaking a range of small-scale works and management changes to existing ACT water supply infrastructure. Ultimately, the Government opted for the fourth option, including greater use of Cotter Dam, developing the capacity to transfer water from the Cotter system to Googong Dam, as well as other minor measures. Combined, these were to effectively increase ACT water supply capacity by around 12GL/yr (ACTEW 2005). By choosing this option the need for the ACT Government to make decisions about water storage to meet longer term ACT urban water supply needs was also avoided. Figures 1, 2 and 3 have been included to help readers gain an appreciation of the geographical context.

Figure 1: The Murrumbidgee River Catchment

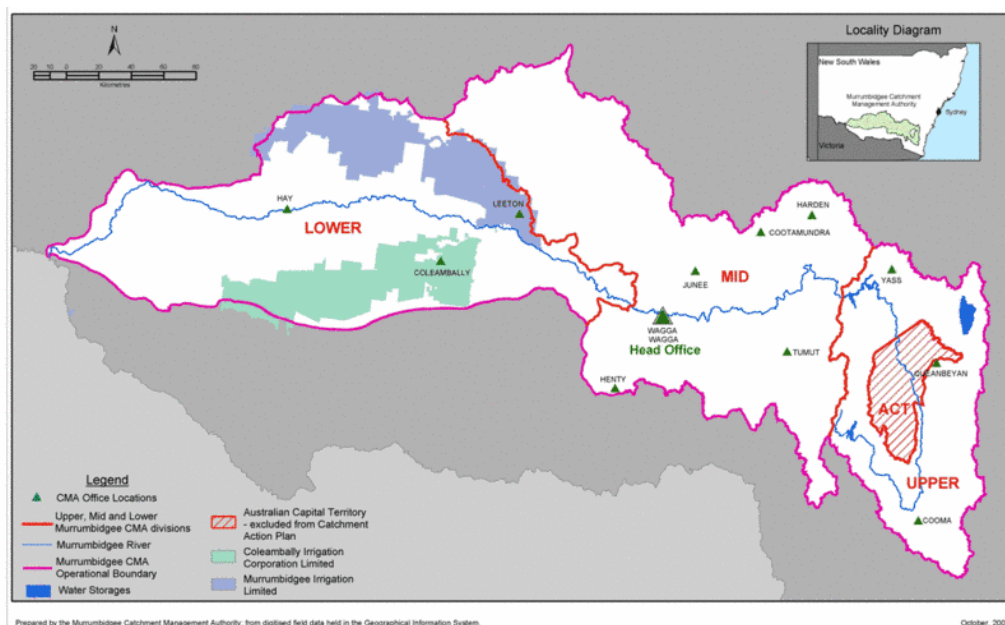


Figure 2: ACT Water Catchment Areas

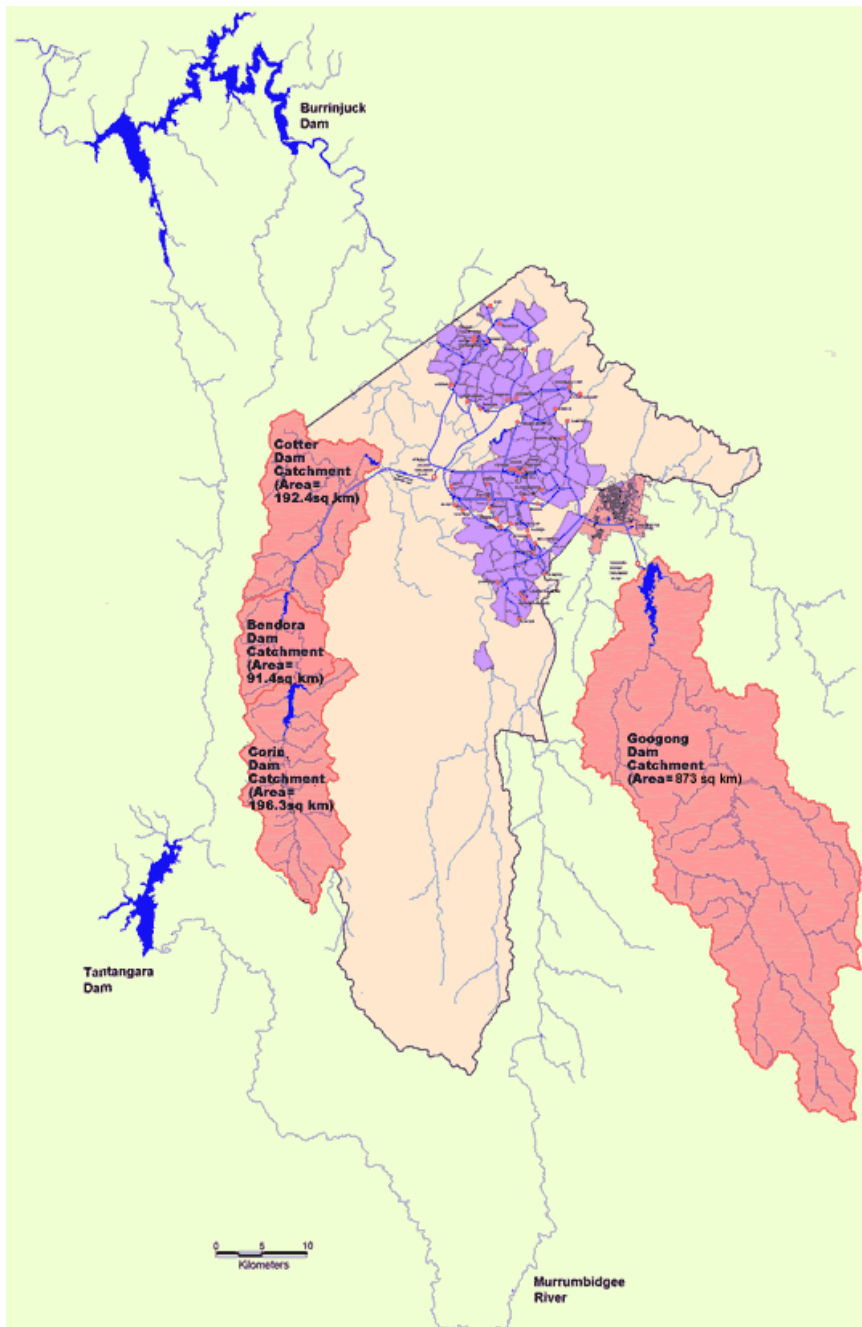
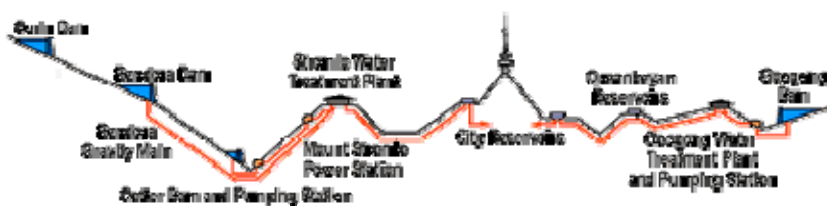


Figure 3: Canberra's Water Supply Profile



By July 2007 the prolonged drought accompanied by gloomy predictions of much lower runoff as a result of climate change had prompted the release of another suite of water security recommendations by ACTEW. Reminiscent of the earlier investigations, four key proposals were presented to the ACT government. The first overarching recommendation pertained to sourcing carbon offsets to account for the additional energy usage associated with each of the water supply options. Second, ACTEW advocated the immediate commencement of the planning required to enlarge Cotter Dam from 4 GL to 78 GL. The capital cost of these works is expected to be about \$145 million. Third, additional pumping capacity to increase extractions from the Murrumbidgee River and to subsequently store water in Googong Reservoir was recommended at a cost of about \$70 million. Fourth, ACTEW recommended that water supplies which were independent of rainfall within the ACT catchments should also be developed. Two main alternatives were presented in this context. The first was euphemistically termed the Water Purification Scheme and amounts to blending reclaimed and treated sewage water with natural runoff into the Cotter Dam. This was expected to cost between \$181 million and \$274 million. The second alternative which is particularly relevant in the context of water trade is referred to as the Tantangara transfer (ACTEW 2007; ACT Government 2007).

In order to further scrutinise the options developed by ACTEW, the Chief Minister appointed a Water Security Taskforce to report back to the ACT government. As a result of the taskforce's deliberations, the government released five decisions pertaining to water supply and another three relating to demand management. On the demand front, the government has given approval to the extension of permanent water 'conservation' measures, primarily in the form of ongoing household water restrictions that limit outside water use. In addition, improved metering technology is to be trialled and ambitious targets for reduced per capita water consumption have been set. More specifically, there is now an expectation that per capita water consumption will fall by 12% by 2013 and 25% by 2023 (ACT Government 2007).

The ACT government has also now approved the Cotter Dam enlargement (by 2011) and ratified progress on the Murrumbidgee-Googong transfer infrastructure. The proposal to develop a Water Purification Scheme, as an additional potable supply source, has been downgraded insomuch as this is to be developed as a demonstration scheme focussing on non-potable water uses. Investigation of greenhouse gas offsets was also given less emphasis, with the government relying on ACTEW and ActewAGL to further investigate these issues on a voluntary basis. Importantly, the ACT government reached agreement that the Tantangara transfer option should be progressed (ACT Government 2007).

As noted earlier, the Tantangara transfer provides access to water sources outside the ACT. The basic idea behind this option is that water would be transferred from the Snowy Mountains Scheme via Tantangara Reservoir to an ACT-controlled storage (either Googong or Corin Reservoirs). The merits of the Tantangara transfer had gained attention in earlier investigations by ACTEW and include the existing storage capacity of Tantangara, which stands at 239 GL, well in excess of any existing or proposed storage in the ACT. This water supply option also offers increased flexibility in the management of existing ACT reservoirs and, with sufficient zeal on the part of the water bureaucracy, could realise enhanced supply within one year. The option is also very cost effective with estimated capital costs of \$38 million and annual operating costs of \$3.4 million per year required to secure 20-25 GL per year for urban use (ACTEW 2007; ACT Government 2007).

Three fundamental steps are required to operationalise the Tantangara transfer. First, water access rights need to be purchased from the owners of Snowy Mountain water, who typically are water users far downstream on either the Murray or Murrumbidgee Rivers. Most obvious in this context are irrigators in NSW such as those in the Murrumbidgee Irrigation Area or Coleambally Irrigation Area (see Figure 1), although rights could also be purchased from Victoria or South Australia. Clearly, in the context of the discussion in Section 2 of this paper, a precursor to these events is the likely necessity to reach agreement on the ACT Cap. Second, the purchased water

rights must result in water being physically stored in Tantangara Dam. Since this storage facility is effectively owned and managed by NSW there is an attendant requirement for the ACT to reach agreement with Snowy Hydro on operational issues. Put simply, these relate to compensating for the impacts of storing and releasing water for the benefit of ACT residents versus the current advantages that accrue to Snowy Hydro through generation of hydro electricity. Thirdly, the water from Tantangara (elevation 1230 metres) must be transferred to a point where it can be used to augment the ACT water supply. This third phase presently comprises two alternatives; one involving a 20 Km tunnel directly to the Corin Reservoir (elevation 1000 metres) and another allowing water to flow the long way down the Murrumbidgee River before pumping via pipeline to the Googong Reservoir. The first of these alternatives offers medium to long term benefits, including the potential to generate hydro power en route, whilst the latter is the most attractive short term approach. Regardless of the mechanism for augmentation, the Tantangara transfer has much in its favour when considered on the basis of capital and operating costs.

4.0 Empirical Insights into the Perceptions, Motivations and Interests of Institutional Stakeholders

Notwithstanding the apparent merits of arrangements such as the Tantangara transfer, there is clearly some reservation on the part of ACTEW about the feasibility of this approach. Poignantly, perceived constraints appear to be 'institutional' in nature, rather than technical or economic. For example, ACTEW observed recently that "[t]his proposal has always been very attractive in theory, but as ACTEW advised in the 2004/05 reports, *it involves a high level of legal and political assurance to provide the confidence to rely on such an option*" (ACTEW 2007, p. ix [emphasis added]). The government-sponsored fact sheets on this project also caution that this option requires "a complex series of approvals and consent processes that include NSW, ACT, Victoria and Commonwealth jurisdictions" (ACT Government 2007, p. 1). At issue here is the concern that "Tantangara water is currently controlled by NSW [and] this could mean ACT is denied water at a critical time when

supplies are most limited” (ACTEW 2005, p. xiii). Of particular interest in the context of the arguments in this paper is the impact of institutional actors on the capacity to progress what *prima facie* appears to be a low-cost water supply option for the ACT (at least when viewed through the neo-classical lens), albeit accompanied by some obvious institutional challenges.

In order to shed some light on this issue we draw upon earlier survey work undertaken in 2005. The survey sought to uncover the objectives of regulators and agencies that might potentially participate in a market, or at least play some part in shaping the rules by which a market could operate. A total of thirty (30) organisations were approached and twenty-two (22) respondents agreed to be interviewed. The data presented here emanate from in-depth, structured interviews of high-ranking officials from those organisations. Interviews were conducted in the first half of 2005 and the organisations that participated are listed in Table 1.

Table 1: Organisations from which respondents to the institutional analysis were drawn

NSW Department of Infrastructure Planning and Natural Resources
Murrumbidgee Catchment Management Authority
Environment ACT
Murray Darling Basin Commission
Australian Government Department of the Environment and Heritage
ACT Department of Treasury
The Cabinet Office (NSW)
NSW Fisheries
State Water (NSW)
Murray Lower Darling Rivers Indigenous Nations
ACTEW Corporation
Murrumbidgee Irrigation Ltd
Coleambally Irrigation Cooperative Ltd
NSW Irrigators' Council
Nature Conservation Council of NSW
Conservation Council of the South East Region and Canberra
Australian Government Department of Transport and Regional Services
National Capital Authority
Department of Prime Minister and Cabinet
Murrumbidgee (Regulated) Water Management Committee
NSW Department of Environment and Conservation
Australian Government Department of Agriculture, Fisheries and Forestry

Clearly, interview participants were chosen for their institutional roles and in no way form a random sample of the population, the views elicited are not representative of the population of the Murrumbidgee Valley, and the analysis of the data cannot be used to indicate causality between different variables. The analysis of the data collected is essentially univariate, with the objective of identifying likely institutional constraints to progressing interstate water trade for the ACT.

The interview included a survey covering five main areas: (i) information about the participants; (ii) the perceived view of the organisation towards water allocations; (iii) the role of the organisation in developing, managing or participating in water markets; (iv) perceptions of the attitudes to water markets held by other stakeholders; and (v) perceptions of the likely views of irrigators about water trade. The discussion here focuses primarily on data drawn from the second, third and fifth sections of the survey.

Although there was a high prevalence of policy makers in the sample in Table 1, a range of other organisational goals and objectives other than policy making were represented. However, a notable exception was the very low representation of organisations with a role as a water market intermediary (one respondent with a current role and two with a future role).

Of particular interest was the series of questions within the survey which sought information about the relative importance of different organisational goals with respect to water allocation policy. Participants were asked to rank various policy goals that covered nine main topics⁸. The goals offered to respondents and identifiers for each are detailed in Table 2.

Table 2: Alternative Goals for Water Policy

Goal Identifier	Policy Goal
1	Predictability in how water resources are used
2	Water use (technical) efficiency
3	Sustainable water resource use
4	Fairness in the sharing of water resources
5	Simple and transparent administration of water resources
6	That society's wellbeing from the use of water resources is maximised
7	To limit the pace of change from current water management policy positions, until knowledge of consequences improves
8	To have water used in ways that are financially most valuable
9	To preserve policy adaptability

⁸ These options were developed from an earlier interview process. In addition to the nine choices available, respondents were given the opportunity to specify their own organisational policy goal. Few respondents exercised this choice and when doing so rated such goals as relatively minor considerations.

The cumulative ranking of the alternative goals by those surveyed is summarised in Table 3.

Table 3: Frequency of Ranking of Goals by Institutional Actors

Goal Identifier	Frequency Ranked Most Important	Frequency Ranked Second	Frequency Ranked Third	Frequency Ranked < Third	Total Frequency
1	1	2		6	9
2	2			2	4
3	12	6			18
4	2	1	5	2	10
5		2	3	8	13
6	8		1	1	10
7		1	1	3	5
8	1	1		2	4
9	1	1		3	5

Of the goals on offer, *sustainable water resource use* was ranked most highly, having been rated the most important policy goal by 12 respondents and the second most important for 6 others. However, when participants were questioned about their interpretations of ‘sustainability’, there was a range of responses. Interpretations included: “maximising long-term social welfare”; “guaranteeing long term ecological health”; “ensuring sustainability of the capital investment in water delivery and production infrastructure”; “maintaining access to water resources that preserves investment integrity”; and “sustaining regional communities that rely on water resources”.

Responses to the policy goal of *simple and transparent rules* are of particular relevance to this research, because of its direct link to transaction costs and the potential for bringing to fruition projects such as the Tantangara transfer. This policy goal was the second most commonly selected objective (13 times in total), but was rarely ranked as an objective of overall importance. No respondent ranked this item as their primary policy objective and only five organisations ranked it as the second or third most pressing objective.

Two of the policy goals specifically relate to long-term resource management outcomes (namely, *limit change while knowledge of consequences improves* and *to preserve policy adaptability*). Both of these options received low rankings by interview participants (5 times for each), and the latter was the only objective regularly identified as being less relevant.

A key finding of the stakeholder analysis was that, without exception, interviewees claimed that there would be no material changes to their organisation's policy objectives in the foreseeable future. More detailed questioning revealed that most respondents acknowledged the necessity for changes at the margin, but expressed the view that the overarching objectives would not require adjustment over time.

Interviewees were also asked to judge the relative capacity of *market-based* and *planning-based* water allocation mechanisms to achieve the policy goals that had been ranked earlier. This was completed through the use of agreement scales. Low values (minimum of 1) indicate that respondents considered *market-based* allocation mechanisms to have relative advantages over the alternative, *planning-based* approaches for achieving a given policy objective. By way of contrast, high values (maximum of 5) indicate that respondents considered *planning-based* approaches to be superior in achieving that particular objective.

The ranking of objectives ranging from those with the strongest potential for *market-based* allocation through to *planning-based* systems are summarised in Table 4.

Table 4: Ranked Mean Usefulness of Market-Based Approach for Achieving Policy Goal

Rank from Market-based to Planning-based approach	Policy Objective
1	To have water used in ways that are financially most valuable
2	Water use (technical) efficiency
3	That society's wellbeing from the use of water resources is maximised
4	Sustainable water resource use
5	Simple and transparent administration of water resources
6	Predictability in how water resources are used
7	Fairness in the sharing of water resources
8	To preserve policy adaptability
9	To limit the pace of change from current water management policy positions, until knowledge of consequences improves

Analysis of variance indicates that the differences between the mean responses to pairs of objectives are significant ($p < 0.05$) for 26 of the possible 36 combinations of objectives. That is, for each of these pairs there is a significant difference between the expected ability to achieve a given objectives with either *market based* or *planning based* allocation mechanisms. Table 5 provides a summary of significant differences in mean responses.

Table 5: Significant difference* in mean response to the expected effectiveness of market-based approaches to achieving different water policy goals (lower score implies a higher rating of the market-based approach)

Goal Identifier	1	2	3	4	5	6	7	8	9
1		0.55				0.24	1.68	0.80	
2	0.55		1.85	1.69	1.05		2.73		1.77
3		1.85			0.30	0.54	1.38	1.10	
4		1.69			0.14	0.38	1.54	0.94	
5		1.05	0.30	0.14			2.18	0.30	1.22
6	0.24		0.54	0.38			2.42	0.06	1.46
7	1.68	2.73	1.38	1.54	2.18	2.42		1.98	0.46
8	0.80		1.10	0.94	0.30	0.06	1.98		2.02
9		1.77			1.22	1.46	0.46	2.02	

* $p < 0.05$

The policy goal described as *limiting the pace of change from current water management policy positions, until knowledge of consequences improves* was the only option to show a significantly different ($p < 0.05$) mean response to all other policy ambitions. More specifically, this indicates that respondents considered markets to have a poor ability to contribute to this objective, relative to the contribution markets could make in accomplishing other water policy goals. Two other policy goals (*Water use (technical) efficiency*, and *To have water used in ways that are financially most valuable*) were perceived by respondents as being well supported by market-based approaches. Importantly, neither of these objectives for which there was a clear perception about the usefulness of markets were ranked as being particularly important in the eyes of the respondents.

One final dimension of these data warrants closer scrutiny in the current context. This relates to the perceived motivation of irrigators to participate in water trade. The relevance of this aspect of the analysis hinges on the necessity for irrigators to sell water access rights, or at least water allocations, to make approaches like the Tantangara transfer feasible. Moreover, the policy makers' perceptions of the difficulty of inducing this behaviour amongst irrigators might arguably impact on their own enthusiasm for market-based reform.

In this part of the survey participants were asked to use a Likert scale⁹ to indicate the proportion of irrigators who were expected to respond to a range of motivations to sell either annual allocation to irrigation water (referred to as a temporary sale) or water access rights (referred to as permanent sales). The eight statements derived from earlier interviews with irrigation interests and others with knowledge of water trade. The motivational statements appear in Table 6 along with identifiers for later reference.

⁹ This comprised 6 points set at 20 per cent intervals and ranging from 0 per cent to 100 per cent.

Table 6: Potential Motivations for Irrigators to Sell Water

Identifier	Irrigators' motivations
1	Irrigators consider selling water temporarily that is surplus to cropping requirements.
2	Irrigators consider selling water temporarily to generate a higher net income than that from using the water on the irrigator's land.
3	Irrigators consider selling water permanently that is surplus to cropping requirements.
4	Irrigators consider selling water permanently to generate a higher net income than that from using the water on the irrigator's land.
5	Irrigators consider selling water permanently if making an adjustment to dryland farming.
6	Irrigators consider selling water permanently as a means of enabling on-farm retirement.
7	Irrigators consider selling water permanently and buying it back temporarily on an as-needs basis.
8	Irrigators would consider selling water (permanently or temporarily) even if this would significantly affect other water users (third parties).

The mean proportion of irrigators expected to comply with each of these motivational statements is summarised in Table 7.

Table 7: Perceived strength of Motivation for Potential Water Sellers

Selling Motivation	Mean Response (% agreement)
1	63.9
2	58.6
3	28.6
4	29.7
5	42.4
6	47.5
7	20.1
8	37.3
Grand mean	41.0
Standard errors of differences of means (s.e.d.)	6.38
Least significant differences of means (l.s.d.) [5 % level]	12.59

To further scrutinise these data, analysis of variance was used to test whether perceived motivations differed significantly. The results indicate that there is

no significant difference ($p < 0.05$) between the perception that irrigators are driven to sell on the basis of 'generating higher net income' and the view that irrigators will sell water which is 'excess to requirements'. This is true for the sale of both temporary and permanent water entitlements. There is, however, a significant difference ($p < 0.05$) in expectations about how irrigators view the selling of water temporarily in comparison to the permanent sale of water entitlements. Respondents consistently predicted a higher level of participation in temporary trade compared to permanent trade, regardless of the motivation for that trade (excess water or higher net income).

In summary, survey respondents appeared to be driven by a perception that irrigators think that it is moderately acceptable to sell water temporarily (especially if it was surplus to requirements for that year), moderately unacceptable to sell permanently even if making a permanent exit from the irrigation industry (but without leaving the farm), but that it was totally unacceptable or unwise to sell water permanently if there was any chance that the irrigator may need it again in the future. For a policy maker looking for a market-based solution with low transition costs, these perceptions would not auger particularly well.

Importantly, respondents were also asked if they expected irrigators' attitudes to water sales would change over time. The majority of respondents expected that more favourable attitudes to water trading would emerge in response to a range of factors including: cultural change; generational change; peer group influence; experience; settling of market values and the slowing of capital growth in water entitlement values over time. Notwithstanding these predicted changes in water markets, respondents saw little need to adjust the organisational goals of agencies operating in this environment.

5.0 Policy Implications and Concluding Remarks

So far we have considered the available options for increasing the reliability of urban water supply in the ACT. We have argued that market-based approaches, such as the Tantangara transfer, have offered much promise for

some time but have failed to gain genuine policy traction. Ironically, this has occurred against a backdrop of policy rhetoric that supports interstate and inter-sectoral water trade. In an effort to shed light on the slow progress on this front we have considered original survey data that gives insights into the perceptions of organisational actors who have an influential role in developing the frameworks to support trade of this kind. Our analysis of these data reveals several useful findings.

First, some of the expectations held amongst organisational actors are inconsistent with common economic assumptions about resource reallocation once a water market is established. More specifically, the neo-classical approach to markets presumes that irrigators will dispassionately choose to sell on the basis of whether the water market price exceeds the marginal value product of water in irrigated agriculture; but this is resoundingly *not* the view of those surveyed. The failure of common economic assumptions to encompass the more complex decision-making processes have been noted in a range of water-related studies (see, for instance, Tisdell, Ward and Grudzinski (2001)). In a similar vein Young (1986) acknowledged over a decade ago that “society may value water resources for non-commodity purposes”. Moreover, Young (1986) concluded that “economists have some obligation to respect those values”, and argued that there was a need to assess the impact of non-economic goals and devise exchange institutions with properties that permit the full range of social concerns to be reflected in transactions. All of this is a formidable task, particularly in the eyes of policy makers who themselves may carry some doubt about the usefulness of the market.

Whilst those interviewed on behalf of water-related agencies openly acknowledge the existence of a wide range of motivations underpinning water trading decisions, these same policy makers were not especially interested in focusing on these constraints in the development of water trading rules. In short, this would appear to lie squarely in the ‘too hard basket’ for most agencies. There is also support for the view that those charged with framing the rules for trade appear to be focused on developing conventions that tacitly

meet criteria set by superordinate bodies, such as the National Water Commission or CoAG. The extent to which these efforts translate into efficacious policy outcomes that support water trade might be questionable.

Second, the results from the stakeholder analysis confirm the presence of a spectrum of values and objectives within the Murrumbidgee catchment's institutional environment. Notably, there is a strong organisational preference as expressed by the stakeholders interviewed to pursue an objective of sustainability in the management of water allocation. Despite variations within the definition of this goal, when coupled with two supporting observations this may at least partially explain the apparent policy inertia on ACT-interstate water trade.

The first of these observations is the extremely low level of expectations amongst key stakeholders of the necessity for any change in their own or each others objectives in the future. This has important implications for potential intertemporal transaction costs, if policy arrangements do in fact require adjustment. Put simply, there is strong support for the view that it is likely to be difficult (and costly) to induce change if the institutional actors do not perceive it as being necessary or indeed a responsibility. In addition, there is a stark contrast between the perceptions that market participation will evolve over time and simultaneous perceptions that the goals and objectives of organizations that circumscribe these markets will remain static.

The second supporting remark pertains to the perceived role of market-based approaches to water allocation. In this regard, stakeholders do not have strong expectations that water markets can help in meeting the sustainability goal to which their organization aspires.

In concert these constraints result in significant policy inertia which makes it difficult to achieve trading solutions – not because they are unworthy, but because it is difficult to overcome the institutional constraints to achieve them, at least in the eyes of those who must undertake the policy work.

The conclusions and lessons drawn from this analysis are consistent with other studies highlighting the impact of institutional barriers to policy change in the context of water (see, for example, Saleth and Dinar 2004). However, what is often missing from the debate, are realistic estimates of the costs visited upon urban residents as a result of on-going policy inertia. Arguably, this can be traced to the propensity for politicians (and their purportedly subservient bureaucracies) to be less responsive to those imposts spread over a large population, compared to large costs borne by many fewer people with intense preferences for maintaining the *status quo* (Olsen 1965). As noted earlier, urban residents in the ACT continue to endure some of the most stringent water restrictions in Australia and yet publicly available estimates of the costs of this policy are usually lacking. Only recently, a trend has emerged to enumerate the costs of urban water restrictions with useful and differing methodologies being proffered by Brennan, Tapsuwan and Gordon (2007), Grafton (2007) and others (see, Hatton Macdonald 2007). Ironically, most of the published studies¹⁰ have occurred in urban centres with relatively modest restriction regimes compared to the ACT, so applying these approaches here would provide a useful contrast on several fronts. In particular, such studies would provide additional incentives for overcoming the intransience on inter-sectoral, interstate water trade which continues to plague water policy formulation.

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¹⁰ Pearce (2005) offers unpublished estimates of the annual costs of water restrictions in Canberra. These range from a low of \$18 per household for Stage 1 to a high of \$769 per household for Stage 5 restrictions (see, Edwards 2007, p. 154).

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