THE DESALINATION PLANT, THE NORTH-SOUTH PIPELINE AND THE WELFARE OF MELBURNIANS

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In the bad drought of the noughties, the availability of water for Australia's cities and towns was a matter of much concern, and a major political issue. There were severe restrictions on outside use of water in all mainland capitals other than Darwin, and in many regional centres. Desalination plants were built to add to water security in the capital cities of all mainland states. In Victoria, where Melbourne's water storages fell below 30 per cent, with concerns the capital would run out of water, the Bracks Labor government in June 2007 announced a plan to spend heavily on two new water projects: the largest desalination plant in the southern hemisphere; and a pipeline to bring water to Melbourne from across the Great Dividing Range, with the water being sourced from a share of 'water saving' from a one billion dollar modernisation of the 'old and inefficient' Goulburn-Murray 'foodbowl' irrigation system.

Part of the institutional context within which Melbourne's water investments were made was stated recently by Chloe Munro, chair of the National Water Commission (NWC), which drives water reform under the National Water Initiative (NWI): "The urban water sector in Australia is currently dominated by large government monopoly service providers, and central planning and regulation" (NWC 2011c, p.iv). The Productivity Commission (PC) in its recent major inquiry into urban water found: "Conflicting objectives and unclear roles and responsibilities of governments, water utilities and regulators have led to inefficient allocation of water resources, misdirected investment, undue reliance on water restrictions and costly water conservation programs" (PC 2011, v.1, p.xvi).

In this paper an outline is provided of Melbourne's desalination and pipeline projects. The outline serves to highlight the absence of transparency in the analysis and decision processes for the large investments in Melbourne's water security, and the politicisation of decision making in urban water.

Were the investments a good deal? That question is addressed, with important considerations being: the insurance provided by desalination and pipeline water against low run-off into Melbourne's dams; the willingness of Melburnians to pay for more water and water security; and the cost-effectiveness of the new water sources.

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Regardless of whether the investments were a good deal, they are now part of Melbourne's water system. They represent 'sunk' costs, and the key question is how the new water sources can best be integrated into Melbourne's traditional dams- (and largely gravity-) water system. Two issues that are fundamental in answering this question are when to draw on desalination and pipeline water and how to price them and charge for them.

Outline of the Pipeline and Desalination Projects

The North-South pipeline

Victoria has a history of strong opposition to inter-basin transfers of water from agricultural uses to urban use — though not to the very large inter-basin transfers to Murray-Darling Basin (MDB) irrigators through diversion of 99 per cent of Snowy River waters in the mid-20th century. Responding to a proposal to bring water from the Big River in the Goulburn Basin, Liberal premier Henry Bolte said before the 1964 election he "would not allow one drop of water to be taken from north of the Divide to augment Melbourne supplies" (Powell 1989, p.243). The Bracks Labor government's white paper, *Securing Our Water Future Together* (2004), did not acknowledge trade with irrigators in the Goulburn or Thomson River Valleys as a way to obtain extra water for Melbourne. In discussion at that time, the government sometimes referred pejoratively to the transfer of water from the Goulburn River to Melbourne as 'taking water' from farmers. The opposition to rural-urban water transfers may partly reflect concerns associated with the 'externality qualification' near the end of this section.

Against this background, it was not to be expected that the Victorian Labor government would decide early in the 21st century to source water from the Goulburn River for Melbourne. That is so notwithstanding that opposing rural-urban water transfers is inconsistent with the desired National Water Initiative outcome, accepted by all jurisdictions, of "facilitate[ing] water trading between and within the urban and rural sectors". This NWI principle is in keeping with mainstream economists' thinking, as expressed, for example, in the PC's view (2005, p.204) that "…if water is to be allocated to its highest value use in the future, the urban and rural water markets will need to become increasingly integrated." A significant practical point is that a small percentage transfer of water from the Goulburn system could make a substantial percentage increase in Melbourne's water supplies.

The pipeline announced by the Bracks government linked the Goulburn River near Yea with Sugarloaf reservoir, 70 kilometres south, to the north-east of Melbourne. The pipeline has a diameter of 1.75 metres, and was to deliver an average 75 GL of water a year, though it has the capacity to deliver 100 GL a year (Productivity Commission 2011). The pipeline cost $692 million (Victorian Auditor General 2010a). Despite opposition to the pipeline from some property owners who thought they were

inadequately compensated for having the (underground) pipeline pass through their properties, and from some community members opposed to any removal of water from the Goulburn Valley, the pipeline was completed in February 2010. Allocation of $5 million to 31 community groups along the pipeline bought support for the project (Melbourne Water n.d.)

Consistent with their (questionable!) opposition to sourcing water for the pipeline by the direct method of buying from willing-seller irrigators, or environmental water holders, the government announced an imaginative, albeit costly, approach to sourcing water for the pipeline. It would bring about a one billion dollar stage-1 upgrading of the Goulburn-Murray irrigation system, achieving 'water savings' of 225 GL a year on average, to be shared equally between irrigators, environmental flows and Melbourne. The costs were to be paid (initially) by Melbourne's three government-owned water retailers ($100 million each), the Victorian government ($600 million) and the water authority Goulburn Murray Water ($100 million).

With an average of 75 GL of water a year available through the pipeline, and adding one-third of the one billion dollar stage-1 foodbowl capital costs to the pipeline cost of $692 million, the capital cost per kL of pipeline water is $13.7. (With the direct trade approach to sourcing 75 GL of water, obviating the need for funding investment in irrigation infrastructure, the $692 million capital cost of the pipeline would fall to $9.2/ kL, and to $6.9/kL if the full 100 GL capacity of the pipeline were used.)

Regardless of whether water for the pipeline is sourced directly by purchases from willing sellers, or indirectly by water-saving investments, its opportunity cost is given by the market price for water in the Goulburn system. In its assessment of rural-urban water trade through the North-South pipeline, the PC (2011, v.2, p.166) assumed operating costs of:

- $0.70/kL in dry years
- $0.48/kL in medium years
- $0.25/kL in wet years

Operating costs include the market price of water plus pumping and treatment costs.

The existence of 'water savings' taking a system-wide approach has been disputed by some (e.g. Gyles 2011). Others have accepted that savings exist, but have found the public investment undertaken to achieve them economically inefficient, cost-ineffective, and often inequitable (e.g. PC 2010). The Victorian Ombudsman found the progressive targeted water savings in the foodbowl project to 2009-10 were achieved, but that the definition of 'water savings' used was 'problematic' (Victorian Ombudsman (2011, p.7). The Ombudsman also criticised the announcing of the complex foodbowl project "without sufficient planning and in the absence of established evaluation and approval processes being undertaken", along with inadequacies in processes, governance and transparency (Victorian Ombudsman 2011, pp. 7-8). The Victorian Auditor- General found the government's decision to undertake the Foodbowl modernisation project was 'poorly informed': "the decision to commit $1 billion was based on advice of water

savings and cost assumptions that had not been verified, technology that had not yet proven itself and the feasibility of the project, which was unknown" (Victorian Auditor-General 2010b, p.vii).

The Baillieu LNP government which won the election in November 2010 banned the delivery of water through the pipeline in normal circumstances. LNP policy is to bring water to Melbourne through the pipeline only in times of 'critical human need', interpreted to mean Melbourne's dams are less than 30 per cent full on 30 November (Water Minister Peter Walsh, 2011b). This condition has never been met since the Thomson dam, Melbourne's largest water storage, was completed in 1984. The LNP policy of 'plugging the pipeline' brings a new meaning to the term 'dry water policy'! The LNP policy is likely prominent in the thinking of the NWC when it refers to 'artificial policy barriers' (NWC 2011a, p.11).

The Water Minister says Melbourne's three water retailers have been assigned entitlements to the city's part of saved water. Allocations are held in Lake Eildon "as Melbourne's insurance policy against Stage 4 water restrictions in the future" (Walsh,15 November, 2011). The Water Minister says these allocations can be traded in the MDB in years the water is 'not needed' by Melbourne, but the bulk entitlement arrangements are not in place for this to occur most efficiently.

The LNP's reneging on a deal done by the Labor government raises a question about fairness. Through their substantial contributions to the cost of the pipeline and through the payments of the water retailers and the government for the infrastructure upgrade, Melbourne people have largely paid for pipeline water, but the LNP government's decision to plug the pipeline means that, except in extreme circumstances, Melbournians are currently not allowed to receive the water they have largely paid for. If the water retailers were private companies, they would have expressed outrage at the actions of the LNP government, but because they are government-owned, they must acquiesce. Almost certainly, the great majority of Melbourne water users do not understand that they are being denied the extra water and water security that they have paid for through the pipeline and foodbowl investments.

A qualification needs to be made about trading water out of the Goulburn River Valley. Shifting water out of the Goulburn Valley and the MDB has system-wide effects (externalities) that for efficiency should be internalised. The externalities arise because the export of water from the MDB reduces 'return flows', and hence the water available downstream. In economic terms, MDB water is not a pure 'private good'.

In seeking to address the 'return flows' externality that occurs when water is traded out of the MDB, it may be reasonable to suggest as a first approximation that it would be appropriate to impose a tax on water intended for Melbourne via the pipeline, where the size of the tax would depend on the estimated reduction in return flows. In determining the size of this tax, the input of hydrologists would be crucial. Effectively, a tax on water exports increases the SRMC of rural water to Melbourne

Is the tax on water trade for Melbourne appropriate for indirect trade in 'saved water' under the foodbowl project as well as for direct trade through water purchases in the rural water market? For efficiency, the answer is 'yes'; there are the same system-wide effects of exporting water. On equity grounds, however, it might be argued that the foodbowl project adds to water in the MDB system after Melbourne receives its one-third share, and Melburnians paid most of the one billion dollar infrasructure bill.

Even with an externality-correcting 'tax', it is likely the pipeline could still in most circumstances bring cost-effective (cheaper than desalination) water to Melbourne if this were permitted. Regardless of whether this were done via the 'water saving' model or the direct trade approach, efficiency requires that its pricing into the Melbourne bulk system reflect the current supply/demand situation (market price in the Goulburn Valley) for water.

The effective ban on using the pipeline to deliver water to Melbourne does not mean it will lie empty. It will be kept full of water for fire-fighting.

The desalination plant

The reverse osmosis desalination plant is under construction near Wonthaggi, in south Gippsland. It will source sea water from and discharge saline concentrate into Bass Strait. The plant has a planned capacity of 150 GL a year, with potential to increase to 200 GL. It is being delivered under a public-private partnership (PPP) between AquaSure consortium and the Victorian government. AquaSure was chosen after a competitive tender. The consortium:

- builds the plant (and an 85 km pipeline to Cardinia reservoir);
- operates the plant until 2039;
- then transfers it to the Victorian government at no cost.

The capital cost of the desalination plant is $3.5 billion. Dividing by the annual capacity of 150 GL gives a capital cost of $23.3 per kL.

The Labor government refused to disclose important financial information about payments for desalination services, citing commercial confidentiality. When it won office, the LNP government asked PricewaterhouseCoopers to advise on costs for desalinated water under the contract with AquaSure. PWC advised that payments to AquaSure would be $654m p.a. (increasing slowly) from 2012-13, even if no water was taken (PWC, 28/2/2011). To put this annual payment in perspective, the revenue of Melbourne's bulk supplier, Melbourne Water, in 2010-11 was less than $1 billion. The $654 million is a big deal!

The contract allows Melbourne to take no water in a year, or a positive amount starting at 50 GL and increasing in 25 GL increments to the capacity of 150 GL. PWC reported that if the maximum 150 GL is taken, the cost will be $763million. PWC said this gave a 'true

cost' of $5.09 per kL for desalinated water. With a lower take, the 'true cost' of desalination water was higher (e.g. $13.58/kL with 50 GL).

A more useful interpretation of the costs reported by PWC is:

- $654m annual water security payment (or 'insurance premium'), intended to commence in 2012-13. This represents approximately $250 each for Melbourne's 1.7million households, if they pay two-thirds of the premium. (Households use about two-thirds of Melbourne's water.)
- A rising SRMC of *exercising* the desalination 'insurance policy':
  $0.50/kL (first 50 GL)
  $0.60/kL (>50 to 75 GL)
  $0.80/kL (>75 to 100 GL)
  $0.92/kL (>100 to 125 GL)
  $1.04/kL (>125 to 150 GL)

A strongly rising SRMC for desalination water seems surprising. Wouldn't it be expected that actual operating costs would stay approximately constant as the volume of water taken from the desalination plant increased? The reason for the rising SRMC of desalination water, says Victoria's Department of Sustainability and Environment (DSE), lies in higher prices for electricity as the desalination plant runs longer and must increasingly pay peak-load electricity prices (personal communication, DSE, 5 March, 2012). (Reflecting the contractual arrangements, DSE does not use the term 'short-run marginal cost', but 'water usage payments', which represent average payments per kL attributable to taking desalinated water. Thus, 'water usage payments' rise from $0.50/kL when 50 GL are taken to $0.73/kL when the maximum 150 GL are taken. For the purpose of undertaking benefit-cost analysis of different levels of desalination water take by Melbourne, and for comparing the cost-effectiveness of taking water from the desalination plant with water from other sources, it is short-run marginal cost that is relevant).

The public-private partnership has not been a happy one. The consortium missed the scheduled initial production of desalinated water at end-2011, and will not be able to commence regular deliveries on 1 July 2012 as per its contract with the government. Ironically, the consortium places the blame for the delay on rain, as well as industrial relations problems. Leighton Holdings, owner of consortium member Thiess, expects losses of $496 million due to problems with the desalination project (Millar and Schneiders, 2012). Consortium members are seeking more than $1 billion from Victoria because of delays due to 'cyclonic' weather and industrial troubles, as well as a government loan of more than a billion dollars for the consortium to bolster its financial position and pushing back the date for full production 12 months to mid-2013. Millar and Schneiders (2012) write: "The claims raise questions about the viability of AquaSure if the government does not come to its aid, and about the integrity of the project as a public-private partnership, under which the private sector is supposed to shoulder the financial risk of delivering the project." Aquasure and the Victorian government both have strong incentives to think about renegotiating the desalination contract.

Were the Investments in the Pipeline and Desalination a Good Deal?

The reality that after two wet years (lifting Melbourne's dams to 65% — three years' supplies at recent consumption levels — in mid-February 2012) water will not be needed from the two new water sources for some time is irrelevant in assessing them. Key questions are:

- was the government's decision to invest heavily in augmenting Melbourne's water sound, based on the information then available?
- were the decisions made the best ones?

In mid-2007, Melbourne and its catchments were many years into a severe drought. The city's dams had fallen below 30 per cent. Restrictions on water use had applied since November 2002. Although scarcity pricing, supported by many economists as an efficient way to ration limited water supplies, was not adopted, use was made of an inclining block tariff (IBT), under which a low volumetric charge applied for a household's initial 'essential' water use, with two subsequent steps in the volume-based charge as household use increased. Water demand was expected to increase with rising population (the effect of rising incomes received little attention), while forecasts by CSIRO and others were for lower mean and more variable rainfall and run-off.

Willingness to pay and benefit-cost analysis

It is clear that *some* investment in extra water and water security for Melbourne was warranted. However, the one-size-fits-all basis of water provision that has characterised what the government and the government-owned water businesses offer Melbourne households makes it hard to assess willingness to pay (WTP) for extra water and for more secure water (water less dependent on runoff into Melbourne's dams). It is not just the *absence of choice* in the water services available to Melburnians that works against reliable estimation of WTP for water augmentation, but *particular features* of the identical water service provided to most customers —volumetric charges that do not reflect changes in the scarcity of water, inclining block tariffs, restrictions on outside water use — have the unintended effect of making the estimation even more difficult.

Water restrictions in Melbourne, as in most other state capitals, apply only to outside use of water. Some households, including many apartment-dwellers, use little or no water outside, and experience little or no inconvenience from water restrictions. Others have self-insured by investing in tanks and recycling systems. Given the choice, many of these households would prefer Melbourne's restrictions (or even tougher ones!) to paying extra for a more secure water supply. They would choose restrictions over more secure water with higher charges. Others, especially those to whom gardens are important, would choose to pay more to reduce the frequency, severity and cost of restrictions.

It is natural to query the case for *two* large additions to Melbourne's water system simultaneously. Together, the pipeline and the desalination plant would initially add capacity equal to about 64 per cent of Melbourne's water consumption in 2009-10. The PC said making two large investments in water supplies at the same time was "the antithesis of a real options approach" (PC 2011, p.108). The real options approach embodies 'adaptive management' and 'just-in-time' ideas in:

- not committing far ahead to costly actions to avoid 'worst case' scenarios;
- utilising new information (e.g. on dam levels, opportunity cost of water) as it becomes available; and
- considering all options for balancing supply and demand, with the aim of achieving balance at least cost.

The PC undertook ex-ante modelling to assess the economics of several policy options. The Commission did not examine the exact water augmentation projects chosen by the Victorian government, but its modelling is calibrated to Melbourne's situation, and its analysis is very relevant in assessing policy options for investing in new water supplies and in considering how to integrate new water sources into Melbourne's water system. Using multi-stage stochastic mathematical programming in a real options setting, the Commission found net social welfare gains over 20 years were:

- +ve for a 75 GL pipeline;
- -ve for a 150 GL desalination plant;
- -$2.7b to -$3.7b from building *both* (PC 2011, p.198).

The PC's analysis naturally assumed that the pipeline would be used! Building a pipeline and not using it generates costs without the benefits of relatively low-cost water for Melbourne in most years. Plugging the pipeline is the domestic equivalent of banning international trade: in both cases there are losers at both ends; in the case of the pipeline, both ends are in Victoria. However, there is the potential to overturn the ban, and obtain the benefits of the pipeline project.

As with all modelling, there are limitations to the PC's modelling of policy options. These limitations are recognised in the Commission's report, including in the referees' (John Freebairn and Alan Woodland) comments in the technical supplement. In the modelling, water users are treated as homogeneous. In fact, as noted previously, there are big differences in the willingness of water users to pay for extra water and for more reliable water supplies. Likely of more significance is the assumption of risk neutrality on the part of households and other water users, water businesses and government. Risk aversion means the WTP is higher for water whose availability is not perfectly correlated with run-off into Melbourne's dams; this applies to pipeline and desalination water. Because desalination water is more secure than pipeline water, WTP for a mean expected delivery of X GL from a desalination plant would be higher in the presence of risk aversion than WTP for X GL from the pipeline (e.g. Freebairn 2008, 2012; PC 2008, 2011). However, the result of the PC's benefit-cost analysis for a 150 GL desalination plant is so unpromising (B:C ratio closer to 0.1 than to 1 (PC 2011, p.201)) that alternative assumptions would need to give *very* large increases in benefits for the plant to pass muster.

Cost-effectiveness

To facilitate consideration of cost-effectiveness, the information presented separately previously for unit costs of pipeline and desalination water is brought together below.

	Rural-urban trade	Desalination
Capital cost ($/kL)	13.7	23.3
Operating costs ($/kL)	0.25 (wet years) 0.48 (medium years) 0.70 (dry years)	0.50 (1st 50 GL) 0.60 (>50 to 75 GL) 0.80 (>75 to 100 GL) 0.92 (>100 to 125 GL) 1.04 (>125 to 150 GL)

Capital costs per kL of water supply capacity are 70 per cent higher for desalination water than for pipeline water, even with the more costly water-saving approach to sourcing water for the pipeline, and using only three-quarters of the pipeline's 100 GL a year capacity.

Operating costs, also, are lower in almost all circumstances for pipeline water than for desalination water. Usually they are substantially lower. The operating costs shown assume that water for the pipeline is bought directly in the rural water market. Under the 'water-saving' approach to sourcing, Melbourne's water retailers would pay a charge less than the market price of water for delivery of their annual water allocations. However, because the opportunity cost of sending the water down the pipeline is given by its value in the rural water market, efficiency requires that this value be treated as a cost of making the water available to Melbourne. Addressing the system-externality effect of exporting water from the Goulburn Valley would reduce — hydrological input would be needed to determine the size of the reduction — the operating cost advantage of pipeline water over desalination water.

Integration

With the large water augmentations now sunk costs, their efficient integration into Melbourne's water system is important. Key questions are:

- sourcing: when to use desalination and pipeline water; and
- pricing and charging: how to price water and how to recover costs for new water.

Sourcing

With water investments sunk, efficiency requires *drawing* on lower-cost (SRMC) water sources before higher-cost ones. In nearly all circumstances, SRMC of desalination water higher is higher than for pipeline water. On economic grounds, desalination water is best seen as high-cost (capital and operating) insurance for the rare circumstances when lower-cost (SRMC) water is not available from dams, rural-urban trade or elsewhere.

With the present contract between AquaSure and the Victorian government, Melburnians cannot avoid paying a high desalination insurance premium ($654million per year initially). But they will face lower water bills if the desalination insurance does not need to be, *and is not*, exercised. This will require that government and water businesses establish and follow sound approaches for sourcing water as cheaply as possible measured by SRMC.

The LNP government has not revealed its rules for drawing on desalination water. It will want to keep dams *well* above the 30% (end November) at which it will turn on the pipeline. It is likely to be taking desalination water at high short-run marginal cost when it could have pipeline water much cheaper. The cost of 'not using the pipeline' was estimated by the PC at $229m to $736m over 20 years (PC 2011, v.2 p.199).

As noted previously, the *fairness* of plugging the pipe is especially dubious given Melburnians' large payments for the pipeline and the foodbowl irrigation investments.

Pricing and Charging

It is reasonable to suggest that "the water regimes of Australia's largest cities target cost recovery and government revenue objectives more effectively than the objectives of efficient water allocation and water system development" (Edwards 2008, p.149). Accordingly, efficiency in water pricing (at bulk and retail levels) and charging are not the top priorities of Victorian governments and their Melbourne water businesses.

In Melbourne, as in other capital cities, emphasis has been placed on long-run marginal cost (LRMC), which puts the full costs of new water, including capital costs, in the volumetric charge, in setting volumetric charges for water. This is in keeping with the pricing principles agreed by all jurisdictions under the NWI. For economic efficiency, however, what is required is short-run marginal cost (SRMC) pricing (e.g. Ng 1987, Freebairn 2008, PC 2011). With SRMC pricing, volumetric charges at all times reflect the supply-demand balance (i.e. relative scarcity or opportunity cost) of water. Volumetric charges would be lower under SRMC pricing than under LRMC pricing when water is plentiful, and higher when water is scarce. Hence, urban water use would differ more between years with SRMC pricing than with LRMC pricing, other things (including the water restrictions regime) equal.

The PC in its modelling found that retail prices would be lower on average with SRMC pricing than with LRMC pricing, and that "investment is more risky under the smoothed pricing scenario [LRMC] because while consumers face a relatively predictable pricing environment with prices being set in advance, water suppliers need to deal with variable inflows without any assistance from consumers" (PC 2011, v.1, p.167).

A consequence of accepting the principle of SRMC pricing would be to call into question the logic of the Victorian LNP government's target of at least 60 per cent for the volumetric component of average household water bills (Walsh 2011a). (Melbourne, with the highest volumetric component of water bills of any capital city, has effectively achieved the target for at least a decade (PC 2011, v.1, pp. 30-31)). Given relatively price-inelastic demand for water, with the unit volumetric charge (price) varying more between periods with SRMC pricing than with LRMC pricing, it would be expected that the volumetric share of water bills would vary in the same direction as the price of water. Although they do not at present exist in Victoria, the NWC has called on governments and water businesses to remove "artificial regulatory requirements to recover a certain percentage of revenue from volumetric charges which expose water businesses to excessive risk" (NWC 2011b, p.xvi).

Aside from pointing to their efficiency-reducing support for LRMC pricing, the PC identified several other problems in the NWI pricing principles, including: the absence of provision for consumer choice in tariff offerings; the failure to limit the pursuit of equity issues through the use of pricing structures (e.g. distorting inclining block tariffs); support for 'permanent water saving rules' that may not enhance community wellbeing; and unsatisfactory principles on cost recovery (PC 2011, v.1, pp.177-8).

The NWC, also, has recognised the need for further reform in urban water management, including pricing. It has noted that the urban water sector is less customer-oriented than other utilities: "…. the Commission is concerned that the urban water sector is currently not providing customers with choice about their levels of service" (NWC 2011d, p. 30). The NWC also supports moves towards SRMC pricing, at least in times of water shortage, when scarcity pricing could ration water supplies efficiently, without putting financial pressures on water businesses and governments as water restrictions do. While accepting that *administrative* approaches to scarcity pricing would generally be easier to implement within the regulated urban water systems, the Commission sees much potential in enhanced competition in urban water to achieve advances in the efficiency of water pricing and use (NWC 2011a,b,c,d).

Greater choice for water customers and a review of approaches to valuing and pricing water are among items on the agenda as Victoria's LNP government considers a plan prepared by a ministerial advisory council to enhance the contribution of water management to sustainability and liveability in Melbourne (Department of Premier and Cabinet 2011). Melburnians stand to benefit if the re-thinking of water management extends to use of the North-South pipeline. The ban imposed by Victoria's LNP government on rural-urban water trade in all but extreme circumstances not only deprives

Melburnians of relatively low-cost water, but also prevents the integration of Melbourne's water system with the competitive MDB rural water market. That integration would connect Melbourne's water system to a competitive spot water market, and it would facilitate efficient decisions on pricing, storage and sourcing of water and on augmentation of water supplies. Removal of the policy blockage to trade through the pipeline would also provide Goulburn Valley owners of water rights with the benefit of a larger water market.

Regardless of the approach to pricing and charging, the investment of more than $5 billion in water projects necessarily means large increases in water bills. Real increases in water bills are estimated to average between 10.9 % and 13.2 % p.a. over the period 2009-10 to 2012-13 for Melbourne's three water retailers (PC 2011, v.1, p.32). Further very large increases in water *prices* and bills are in store. If households pay two-thirds of the $654 million annual desalination 'insurance premium', that amounts to an average of about $250 per household. With current LRMC pricing, the premium could logically be included in the volumetric charge, but with the more efficient SRMC (opportunity cost) pricing, its inclusion in the volumetric charge would cause a price distortion.

Conclusion

Decisions on augmenting Melbourne's water supplies in the depth of the drought, amid fears the city would run out of water, were bound to be difficult. Ex-ante economic assessments have found the North-South pipeline passes the benefit-cost test, while the foodbowl water-saving investment in the Goulburn-Murray irrigation system does not. Melbourne's investment in a large desalination plant also fails muster in a benefit-cost analysis.

With capital sunk in the desalination plant and the pipeline, it is efficient to draw on water sources in order of short-run marginal cost. It will likely nearly always be cheaper to use pipeline water (whether bought from willing-sellers in the MDB or 'saved' through infrastructure investments) than desalination water — though addressing the system-wide externality that is present when water is exported from the Goulburn Valley would reduce the cost advantage of pipeline water. If retained, the ban on bringing water down the pipeline will be costly to Melburnians, not only because the city's water users will be denied regular access to relatively low-cost water, but also because the best opportunity to link Melbourne's water system to a competitive water market is passed over. Water trade would facilitate implementation of any decision to move towards efficiency-enhancing short-run marginal cost pricing of water at bulk and retail levels.

Many will say they are better-off with Melbourne's $5 billion water augmentations. Many others will pay more for extra water security worth little or nothing to them. If water customers had choice between water products offering different mixes of water security, price level and price stability, there would be more winners and fewer losers from costly augmentations. Retail water prices that do not respond promptly to changes

in relative water scarcity, together with inclining block tariffs and water restrictions, add to the difficulties in accurately assessing the benefits of augmenting water supplies.

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