



**A regime for the calculation and implementation of exit,  
access and termination fees charged by irrigation  
water delivery businesses in the southern  
Murray–Darling Basin**

**Advice to the Australian, New South Wales, South Australian and  
Victorian Governments**

**6 November 2006**

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# Glossary

**Access fee:** a fixed fee charged to the holder of a delivery entitlement for the right to on-going access to water delivery services

**Allocative efficiency:** Resources are used to produce goods and services that provide the maximum benefit to society. An important condition for allocative efficiency is that prices for services reflect the value society places on the next best alternative use of the resources used to produce the service.

**Delivery entitlement:** an entitlement to have water delivered at specified times, rates and locations under specified circumstances.

**Exit fee:** a payment made to an infrastructure operator that is levied on the sale of a water entitlement out of the infrastructure operator's network or district.

**Ex ante:** prior to the water delivery network infrastructure (or some major component thereof) being built.

**Ex post:** after the water delivery network infrastructure (or some major component thereof) has been built.

**Infrastructure operator:** an organisation that owns and operates an infrastructure network for the delivery of irrigation water within an irrigation district.

**Interregional trade:** a water trade that results in the water/water entitlement moving to a new location outside the irrigation district (or infrastructure operator's network) of origin.

**Intraregional trade:** a water trade that results in the water/water entitlement moving to a new location within the irrigation district (or infrastructure operator's network) of origin.

**Irrigation district:** an area or district that is supplied water via an infrastructure supply network (channels, pipes and other structures) operated and maintained primarily for properties within that district.

**Retail tagging:** Water entitlements are sold to a buyer located outside the seller's irrigation district (or infrastructure operator's network) but the water entitlement remains on the registry of the seller's region and retains all its original characteristics, including the obligation of the buyer to pay fees and charges levied on the water entitlement by the seller's infrastructure operator.

**Seasonal allocation:** an authorisation to extract or divert a nominated volume of water up to the volume or share of the consumptive pool stipulated in any one season.

**Termination fee:** a payment made to an infrastructure operator upon surrendering a delivery entitlement to the infrastructure operator, with the corresponding removal of the rights and obligations associated with that delivery entitlement.

**Variable (delivery) fee:** a fee charged on the basis of the quantity of water delivered.

**Water entitlement:** an entitlement to receive a periodic, seasonal or annual allocation of a volume of water (which under the NWI should be specified as a share of the consumptive water pool). The actual authorised volume received in a season will depend on the seasonal allocation of water.

## Summary

On 21 June 2006 the Australian Government requested the Australian Competition and Consumer Commission (ACCC) to develop a consistent inter-jurisdictional framework for the use of exit and access fees charged by operators of irrigation water delivery networks (infrastructure operators) so as to assist the New South Wales, Victorian and South Australian Governments meet their obligations under the National Water Initiative.

In particular, the three state governments sought the following advice:

- A theoretical analysis of exit and access fees, including taking into consideration the broader pricing arrangements for and cost of providing water delivery services, as well as concerns about exit fees acting as a barrier to the efficient trade of water (Chapter 3).
- An assessment of current and proposed arrangements for the setting of access and exit fees, focussing on irrigation areas in the connected areas of the southern Murray–Darling Basin that can participate in interstate water trade (Chapter 4).
- A well defined methodology for the calculation and application of exit fees and access fees charged by providers of water delivery services within the context of the broader pricing arrangements for water delivery services (Chapter 6).
- Case studies for specific irrigation areas (one in each jurisdiction) to demonstrate the above methodology (Chapter 7).

The ACCC was asked to report by 6 November 2006. The ACCC understands that this relatively tight timeframe was chosen because the application of ‘exit fees, access fees and other jurisdictional arrangements on a competitively neutral basis’ remains a key outstanding issue for the three state governments to agree on expanding interstate water trade in the southern Murray–Darling Basin.

The establishment of arrangements for interregional and interjurisdictional trading of water will facilitate the efficient use of water, both through making the opportunity cost of using water transparent and providing a mechanism for water to move from lower to higher value uses.

This reallocation of water will change irrigators’ demand for water delivery services. Consistent with the acceptance that expanded water trading will increase allocative efficiency, the associated change in the demand for water delivery services should provide signals to infrastructure operators on how water delivery networks should be efficiently maintained, renewed and ultimately configured in the future.

When there is a permanent decrease in the demand for water delivery services, the assets of infrastructure operators can become under-utilised, and are said to be stranded. This is because irrigation networks are characterised by relatively high fixed common costs that remain largely unchanged, at least in the short to medium term. This can result in an increase in average fixed costs, and may lead to higher prices for remaining irrigators.

The issue of potential stranded assets/costs has arisen as a legacy of the fact that the rights to access and use water and the right to have that water delivered have been bundled together, and these bundled rights were tied to land. As a result:

- Investment in irrigation water delivery networks has, until recently, been undertaken without consideration of the potential for water to be permanently traded out of the region, such that complete ex ante long-term contracts in relation to water delivery services do not exist.
- Infrastructure operators have recovered the fixed costs of operating the delivery network through charges levied on water entitlements, rather than directly for water delivery services.
- The tariff structures of infrastructure operators do not generally reflect the cost structure of their operations—revenue collected through fixed access charges is less than the cost of providing the capacity to deliver water, and revenue collected through variable delivery charges is greater than incremental costs associated with delivering that water.

Some infrastructure operators have responded to this potential for a decrease in demand for delivery services by introducing exit fees on the sale of water entitlements out of their irrigation districts. In general, these exit fees have been calculated to collect the net present value of future revenue that the infrastructure operator would have received to cover fixed costs, had that water continued to be delivered within its network. This arrangement, which fully insulates the infrastructure operator from the financial effects of water trade, will generally be supported by a majority of its customers because it is likely that only a minority of irrigators in each district will substantially reduce their holding of water entitlements and have to pay an exit fee.

However, the imposition of exit fees on an ex post basis reduces economic efficiency:

- Exit fees are a barrier to the trade of water from relatively lower to higher value uses. This results in a loss of economic welfare, since the full potential gains from trade are not realised. The welfare loss increases at an increasing rate as exit fees become larger relative to the traded price of water.
- Exit fees dampen the signal to infrastructure operators that rationalisation of the network may be warranted, since some irrigators will sub-optimally remain in the network. They also dampen the signal to remaining irrigators as to the actual cost of continuing to provide them with delivery services.
- Because exit fees are levied on the sale of water entitlements rather than the termination of delivery capacity, it is not clear to what extent the irrigator values the bundled delivery right when water entitlements are sold. Where irrigators do not have the option of continuing to pay access fees rather than an exit fee upon the sale of water entitlements, the irrigator is not able to keep their delivery rights even though these may be of value. On the other hand, where exit fees are deemed to be a prepayment of future access fees, the infrastructure operator is obligated to continue to maintain the network to be able to provide delivery, even when this may be of little, if any, value.



Ex post exit fees also raise issues about equity between those irrigators that wish to exit the network and those that remain:

- Exit fees that collect the net present value of all future revenue the infrastructure operator would have received to cover fixed costs may not take into consideration:
  - costs that may be avoided due to future rationalisation of the network
  - any specific (rather than common) costs of supplying that irrigator
  - previous contributions to reserves for future asset renewal, and
  - the benefit from any reduction in congestion of the delivery network
- Setting exit fees that fully insulate the infrastructure operator (and thus remaining irrigators) from the financial effects of water trade assumes that all of the third party effects should be borne by irrigators wishing to sell their water entitlements. As these third party effects arise because of legacy arrangements, consideration as to who should bear the cost requires a judgement as to what is fair and reasonable for all parties.

## **The proposed regime**

### **1 Unbundling of water rights and delivery rights**

- 1.1 The right to have water delivered should be unbundled from any water entitlement, and should be recognised through a separate delivery entitlement.
- 1.2 The rights and obligations of this delivery entitlement should be clearly specified including, permissible extraction/supply rates, specified times, locations, circumstances and service levels.
- 1.3 The fixed costs of providing delivery services should be recovered through an access fee levied on delivery entitlements
- 1.4 There should be no fees levied on the sale of water entitlements out of an irrigation district (i.e. exit fees).
- 1.5 Delivery entitlement (and therefore any obligations associated with holding the delivery entitlement) should be tradeable. As delivery entitlements will be heterogeneous due to location specific factors, transfer should be subject to the infrastructure operator's approval to allow it to consider the implications of any proposed transfer on its overall water delivery operations.
- 1.6 Access fees can be charged on implicit delivery entitlements until June 2010, by which time water entitlements and delivery entitlements should be fully unbundled, and the latter tradeable.
- 1.7 The proposed regime should apply to any water entitlements that have previously been purchased under a retail tagging arrangement. Water entitlements should no longer be sold under a retail tagging arrangement.

## **2 Termination of delivery entitlements**

- 2.1 The owner of a delivery entitlement should have the right to be able to surrender (terminate) some part or all of that entitlement, subject to the payment of any termination fee. The process for such should be clearly specified.
- 2.2 Upon the termination of a delivery entitlement:
  - the infrastructure operator should no longer be obligated to deliver water, or be obligated to be able to deliver water, as specified under the delivery entitlement, and
  - any obligation to pay on-going access fees in relation to the delivery entitlement are cancelled.

## **3 Security over on-going access fees**

- 3.1 The requirement to provide security over an obligation to pay on-going access fees should not be a general condition of sale of water entitlements. Infrastructure operators should only seek appropriate security as a condition of the sale of water entitlements where:
  - the value of the seller's remaining water entitlements (at the time of sale) is less than 50 per cent of the termination fee associated with any remaining delivery entitlements, and
  - the infrastructure operator has significant concerns with respect to the possibility of the seller defaulting on the payment of ongoing access fees.
- 3.2 These arrangements for security of future payment of access fees should form part of any future review of the proposed regime, in order to appraise the effectiveness of, and ongoing need for, this instrument.

## **4 Calculation of access fees**

- 4.1 The annual access fee should be levied on the delivery entitlement to recover the fixed costs of providing on-going access to core water delivery services to customers within the infrastructure operator's area of operations. This includes:
  - Fixed operating expenditure (e.g. annual maintenance, administration costs, debt servicing costs).
  - Any annuity for operating expenditure associated with periodic network maintenance and renewal, based on forecasts of prudent and efficient costs.
- 4.2 The following costs should not be included in the access fee:
  - Bulk water charges: Costs associated with bulk water should be levied on water entitlements.
  - Variable operating costs: Operating costs that vary with the quantity of water delivered should be levied on the volume of water delivered
- 4.3 The access fee should not include any costs associated with future capital expenditure that improves quality of service or increases capacity of the network, rather than maintains the current design level of service.

- 4.4 Future capital expenditure of this nature can be financed through the collection of a separate levy that should not be applied to water entitlements. The levy should be separate from any access fee and thus should not be included in any termination fee calculation. An irrigator terminating all of their delivery entitlement should not be obliged to continue to pay this levy.

## **5 Calculation of termination fees**

- 5.1 The termination fee should be based on the actual annual access fee levied on the delivery entitlement at the time of termination.
- 5.2 Where an infrastructure operator has a tariff structure that has access fees lower than the fixed costs of providing services, the infrastructure operator can charge a termination fee based on the shadow access fee until June 2010.
- 5.3 The shadow access fee is the actual access fee plus the fixed costs collected via variable fees (per ML of delivery entitlement).
- 5.4 The holder of the delivery right must be given the choice between paying the termination fee and continuing to pay the actual, not shadow, access fee
- 5.5 An infrastructure operator that chooses to set termination fees based on a shadow access fee should be required as part of any monitoring regime to provide all information necessary to demonstrate that the shadow access fee has been calculated appropriately.
- 5.6 Any avoided future fixed costs that can be identified at the time of terminating delivery entitlements as arising directly and immediately as a result of the delivery entitlements being terminated should be subtracted from the access fee used in the calculation of any termination fee. The infrastructure operator should use its best endeavours to identify and subtract any avoidable fixed costs from the termination fee.
- 5.7 The termination fee should be a multiple of the actual annual access fee levied on the delivery entitlement at the time of termination. The termination fee should be no more than Y times the access fee (adjusted for any avoidable fixed costs), where Y follows the following schedule:

Financial Year	Y
2007–08*	12.0
2008–09	11.5
2009–10	11.0
2010–11	10.5
2011–12	10.0
2012–13	9.5
2013–14	9.0
2014–15	8.5
2015–16	8.0

\*includes pre 30 June 2007

- 5.8 Termination fees should only be grossed up to account for tax if the infrastructure operator can demonstrate that a significant, inexorable, real tax timing disadvantage will be experienced.<sup>1</sup>
- 5.9 The access fee and termination fee should not include the collection of any contributions to cover ex ante agreed obligations relating to specific capital expenditure. Any payments owing under such obligations should be collected separately to the termination fee, in accordance with the particular arrangements.
- 5.10 A process for further determining maximum termination fees after 2015-16 should be considered as part of any review of the efficacy of the proposed regime.

### **Benefits of the regime**

The unbundling of water rights and delivery rights, and recovering the fixed costs of providing access to the water delivery network through an access fee levied on the delivery rights removes the need for exit fees that would otherwise act as a barrier to the trade of water. Irrigators will be able to maintain access to delivery infrastructure independently of their holding of water entitlements, and can therefore:

- sell excess water without incurring an exit fee
- adopt different water sourcing options, such as leasing or buying seasonal allocations, and
- make decisions about their holdings of water entitlements and holdings of delivery entitlements independently, based on information relevant to each asset available at the time.

Adjustment of the pricing structure for water delivery services to align the fixed charges (access fee) and variable charges (usage fee) for water delivery services with the fixed and variable costs of providing those services will encourage the efficient use of the delivery infrastructure.

The provision for irrigators wishing to exit the delivery network to pay a termination fee will assist infrastructure operators manage the effects of permanent trade of water out of their serviced areas, including the risks associated with efficient future investment to maintain and renew water delivery assets.

The proposed cap on the maximum level of this termination fee:

- achieves a fair balance between those irrigators that remain in the district and those that exit in respect of bearing the costs associated with stranded assets that may arise with the removal of restrictions on water trade, and
- ensures that infrastructure operators and irrigators will receive timely signals for necessary long-term structural adjustment of irrigation networks.

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<sup>1</sup> This issue will be subject to any further consideration of the tax treatment of water trading arrangements.

The specifics of the regime are relatively straightforward and provide clarity and certainty both for infrastructure operators in implementing the regime and for irrigators in respect of their future rights and obligations. This will minimise on-going administration and compliance costs.

The regime allows time for transition from current arrangements where infrastructure operators will need to implement certain components (such as creating well defined and tradeable delivery entitlements) and to gain irrigator acceptance of substantial changes in the structure of their fees and charges.

Once implemented on a consistent basis by all relevant infrastructure operators in the southern Murray–Darling Basin, the proposed regime will be competitively neutral in terms of its affect on interstate water trading and should assist the New South Wales, South Australian and Victorian Governments meet their obligations under the National Water Initiative.

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# 1 Introduction

## 1.1 Request for ACCC to undertake current role

On 21 June 2006 the Federal Minister for Agriculture, Fisheries and Forestry requested the Australian Competition and Consumer Commission (ACCC) to act as an independent third party to develop a consistent inter-jurisdictional framework for the use of exit and access fees so as to assist the Victorian, New South Wales and South Australian Governments meet their obligations under the National Water Initiative (NWI).

In particular, the three state governments sought the following advice:

- a theoretical analysis of access and exit fees, including taking into consideration:
  - the broader pricing arrangements for water delivery services and the costs associated with provision of those services; and
  - concerns about exit fees acting as a barrier to the efficient trade of water.
- in light of the above analysis, an assessment of current and proposed arrangements for the setting of access and exit fees, focussing on irrigation areas in the connected areas of the southern Murray–Darling Basin that can participate in interstate water trade;
- a well defined methodology for the calculation and application of exit fees and access fees charged by providers of water delivery services within the context of the broader pricing arrangements for water delivery services; and
- case studies (one in each jurisdiction) for specific irrigation areas where exit fees are being used, or are required, to facilitate trade and recommending actual fees to demonstrate the above methodology.

The preferred timeframe of the state governments for the completion of this report was four months so that the interim arrangements for interstate trading can be finalised.

## 1.2 Objectives

In requesting the ACCC to provide the advice outlined above, the relevant governments identified multiple objectives for the proposed regime. In particular, the regime is to:

- enable governments to meet their obligations under the NWI in terms of managing stranded assets while also ensuring that exit fees, access fees and other jurisdictional arrangements do not become barriers to trade
- address short-term price shocks on infrastructure operators and remaining irrigators resulting from permanent trade of water out of serviced areas, rather than dampening long-term signals for necessary structural adjustment within irrigation networks, and
- be ‘competitively neutral’ in terms of its affect on interstate water trading.

In respect of the second objective, the ACCC notes that the proposed regime is not intended to address third party impacts associated with the broader social and economic impacts of water trade, as these impacts will be monitored and considered under separate sections of the NWI.

The ACCC's understanding of the objective that the regime be 'competitively neutral in terms of its affect on interstate water trading' is discussed in Chapter 5.

In addition to the above objectives, the ACCC has sought to develop a regime that:

- leads to pricing arrangements that encourage the efficient use of, and investment in, water delivery infrastructure
- takes into consideration the equity issues in relation to third party effects that arise with the opening up of markets for trade of water
- increases regulatory certainty for all stakeholders
- provides scope for the timely transition from current arrangements, and
- minimises on-going administration and compliance costs.

### **1.3 Consultation process**

The ACCC met with representatives of the following infrastructure operators and government departments and agencies, initially through informal meetings and then through two roundtable workshops on 14 September 2006—the first with representatives of government departments and agencies; the second with representatives of the infrastructure operators. Following the workshops the ACCC received further comments and submissions from some stakeholders.

In addition to the above, the infrastructure operators provided information about their operations, including any current and proposed arrangements for exit and access fees. Furthermore, three infrastructure operators provided additional information to allow the ACCC to undertake the case studies presented in Chapter 7.

The ACCC thanks all of these organisations for their cooperation and assistance in completing this report.

#### **Infrastructure operators**

- Central Irrigation Trust (SA)
- Coleambally Irrigation Cooperative Limited (NSW)
- First Mildura Irrigation Trust (Vic)
- Goulburn-Murray Water (Vic)
- Jemalong Irrigation Limited (NSW)
- Lower Murray Water (Vic)
- Murray Irrigation Limited (NSW)
- Murrumbidgee Irrigation (NSW)
- Renmark Irrigation Trust (SA)
- Sunlands Irrigation Trust Inc. (SA)
- SunWater (Qld)
- Western Murray Irrigation Limited (NSW)



**Government departments and agencies**

- Australian Bureau of Agricultural and Resource Economics
- Department of Agriculture, Fisheries and Forestry
- Department of the Prime Minister and Cabinet
- Murray–Darling Basin Commission
- National Water Commission
- New South Wales Cabinet Office
- New South Wales Department of Natural Resources
- Productivity Commission
- Queensland Department of Natural Resources, Mines and Water
- South Australian Department of the Premier and Cabinet
- South Australian Department of Primary Industries and Resources
- South Australian Department of Water, Land and Biodiversity Conservation
- Victorian Department of Sustainability and Environment
- Victorian Essential Services Commission

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## 2 Context of ACCC's consideration of proposed regime

### 2.1 Background

Historically, the right to access water outside riparian zones came in the form of licences issued by state and territory governments to landholders to access and use water for irrigation.

In conjunction with this, many of the irrigation districts within the Murray–Darling Basin were developed by governments as part of wider social and economic policies. The infrastructure associated with delivering water, which was often initially funded by governments and managed by state authorities, was designed to provide services to the landholders that held licences.

With increasing policy recognition of water as a scarce resource, particularly following the cap on water use in the Murray–Darling Basin, it was also recognised that a market for water would facilitate more efficient use of water, both through making the value of water (that is, its opportunity cost) transparent and providing a mechanism for water to move from lower to higher value uses (that is, increase allocative efficiency).

The process for developing water markets was formalised through the 1994 COAG water reform framework, in which the state and territory governments agreed to introduce arrangements for water trading.

The various jurisdictional governments subsequently developed separate **water entitlements** that were, for the most part, perpetual, separate from land titles, and provided guaranteed access to a share of the consumptive water pool. In general, the entitlements were allocated on a 'grandfathering' arrangement on the basis of existing licences and irrigation activities.

Consistent with the acceptance that expanded permanent water trading will increase allocative efficiency, the associated change in the demand for water delivery services will provide signals for how the water delivery networks should be efficiently maintained, renewed and ultimately configured in the future.

The tariff structures of infrastructure operators do not generally reflect the cost structure of their operations—revenue collected through fixed access charges is less than the cost of providing the capacity to deliver water, and revenue collected through variable delivery charges is greater than marginal costs associated with delivering that water.

Further, the fixed charges have tended to be levied on the water entitlements held, and there has been very little use of formal agreements for long-term supply of water delivery services.

Prior to the commencement of water trading, the above arrangements did not pose a significant problem, and there may have been sound reasons for adopting this pricing structure. For example, the recovery of a relatively high proportion of total costs

through variable charges created an incentive for irrigators to conserve water, and assisted irrigators in managing their cash flows.

However, with the introduction of water trading, these legacy arrangements have significant implications for the infrastructure operators.

When there is a permanent decrease in the demand by irrigators for water delivery services, the assets of infrastructure operators can become under-utilised and are said to be stranded.<sup>2</sup> This is because irrigation networks are characterised by relatively high fixed costs that remain largely unchanged, at least in the short to medium term. This can result in an increase in average fixed costs, and may lead to higher prices for remaining irrigators.

These ‘third party effects’ impose a monetary cost rather than economic cost on remaining irrigators. Furthermore, when infrastructure operators have an efficient pricing structure, these third party effects do not have real economic efficiency implications.

However, infrastructure operators and remaining irrigators are concerned about the potential impact of these third party effects, particularly in light of the perception held by some in the irrigation industry that there may be significant movement of water in the first few years of expanded permanent water trading as the initial allocation of water adjusts to a more efficient outcome.

Thus, a major issue is who should bear the ‘stranded costs’. If it is not solely the infrastructure operator and/or remaining customers, then the subsequent issue is what arrangements should be implemented so as to minimise the inefficiencies that arise when fees and charges are imposed on an ex post basis to ‘recover’ what are, for the most part, effectively sunk costs.

## **2.2 Removing impediments to inter-jurisdictional water trade**

The issue of access and exit fees sits within the broader context of interstate water trading arrangements.

Interstate water trade is complicated by differences in the various states’ legislative and institutional approaches to water management. These differences have resulted in variations between the corporate governance structures of the infrastructure operators responsible for delivering water within the state, the way water as a product is defined and priced, and the regulation and oversight of the rural water industry.

Despite these complications the Victorian, New South Wales and South Australian Governments have reached various in-principle, bilateral agreements on interstate water trade. However, the application of access and exit fees as a means of managing stranded assets remained a key outstanding issue to be resolved.

Exit fees are not specifically disallowed under the NWI. Section 62 of the NWI states:

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<sup>2</sup> It is the fixed costs associated with these assets, rather than the actual assets, that become stranded.

Recognising the need to manage the impacts of assets potentially stranded by trade out of serviced areas, the Parties agree to ensure that support mechanisms used for this purpose, such as access and *exit fees* and retail tagging, do not become an institutional barrier to trade.<sup>3</sup>

Other mechanisms for dealing with stranded assets also exist within the NWI, including:

- Limits on permanent trade out of water irrigation areas, up to an annual limit of four percent of the total water area's entitlement. This is subject to review by 2009, with a move to full open trade by 2014 at the latest (60iv).
- Where appropriate, implementing measures to facilitate the rationalisation of inefficient infrastructure or unsustainable irrigation supply schemes, including consideration of the need for any structural adjustment assistance (60v).

The states recognised the need for consistency in the application of access and exit fees, and in 2004–05 developed through the Murray–Darling Basin Commission (MDBC) a set of principles for the development of access and exit fees. The principles were subsequently revised and are now included in Schedule E of the Murray–Darling Basin Agreement as a protocol on Access and Exit Fees (see appendix 1).

As an aid to developing these principles the MDBC commissioned a study<sup>4</sup> that recommended water delivery charges be 'unbundled' into a multipart tariff that includes:

- a water resource right: with a fee charged to recover wholesale infrastructure or bulk water costs (i.e. storage costs of others) levied on the owner of the water entitlement
- a water use right: with a variable fee set equal to the marginal cost of delivery of one unit of water (i.e. pumping costs) levied on the actual mega litres (ML) of water used, and
- a water delivery right: with a fixed infrastructure access fee charged to recover fixed retail infrastructure costs levied on the landowner serviced by the infrastructure.

However, within the southern Murray–Darling Basin only Victoria has gone down the path of unbundling water delivery tariffs in this way (with tradeable delivery shares to be introduced in 2007).

The principles contained in Schedule E of the Murray–Darling Basin Agreement are high level and relatively broad. In addition the key objective of access and exit fees in respect to whether they should be used as an adjustment tool or as a long-term means of managing infrastructure assets was not clearly detailed resulting in differing approaches across jurisdictions.

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<sup>3</sup> COAG (Council of Australian Governments) 2004, *Intergovernmental agreement on a national water initiative*.

<sup>4</sup> Hassall & Associates Pty Ltd and Scrivco Pty Ltd *A Guide to Dealing with Stranded Irrigation Assets*, August 2004.

Given the unresolved details and ensuing lack of consistency that developed in the use and setting of exit fees across the infrastructure operators, in February 2006 the COAG Water Trading Group agreed to convene an Exit Fee Working Group (EFWG) to further develop an agreed approach to exit fees. The objectives of the EFWG were:

To assess whether exit fees are a suitable mechanism for managing the impacts of assets stranded by trade out of service areas, including consideration of whether exit fees are able to be constructed and applied consistent with NWI objectives for open and competitively neutral water trade and adjustment in irrigation systems.

If agreed that exit fees are a suitable mechanism, assess options and issues for developing and applying exit fees such that they do not become an institutional barrier to trade or adjustment and ensure trade is open and competitively neutral.

The EFWG final report developed proposed principles on the use, operation, calculation and regulatory oversight of access and exit fees.<sup>5</sup> However, some of these principles were relatively high level because agreement could not be reached on several significant issues, including: ongoing obligations of the infrastructure operator upon payment of an exit fee, how to account for inward trade, the specific methodologies and costs to be included/excluded for calculating access and exit fees, whether exit fees should be transitional, and the extent and nature of ongoing regulatory oversight. The EFWG developed some possible options for resolving these issues, and the ACCC took these into consideration in undertaking this project.

## **2.3 Water use and trade in the southern Murray–Darling Basin**

The southern portion of the Murray–Darling Basin extends across the jurisdictional boundaries of Victoria, Australian Capital Territory, New South Wales and South Australia. The region:<sup>6</sup>

- accounts for around 70 per cent of irrigated agriculture in Australia
- is characterised by the provision of large scale public and private infrastructure to regulate water delivery on a district basis, and
- is hydrologically linked enabling interregional water trading.

Diversions by irrigation districts represent the vast majority of total diversions (water extracted) from the water bodies of the southern Murray–Darling Basin as is indicated in table 2.1 below.

The majority of trade in the Murray–Darling Basin has been temporary trade in seasonal allocations. Within irrigation districts around 10–20 per cent of the seasonal allocation is traded per year. Permanent trade in water entitlements is less common, with less than 1 per cent of diversions traded in 2001–02.<sup>7</sup>

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<sup>5</sup> Exit Fee Working Group, *Final Report to the COAG Water Trading Group*, 20 June 2006.

<sup>6</sup> Heaney et al, 'Third-party effects of water trading and potential policy responses', Proceedings for the *American Agricultural Economics Association*, Providence, Rhode Island, 25–27 July 2005.

<sup>7</sup> Heaney et al.

In Victoria and South Australia permanent water trading in the recent past appeared to be moving water to the higher value industries of horticulture, viticulture and dairy that have perennial plantings.<sup>8</sup> It is not clear that this trend will continue. For example, given the variability of Australia's climate, irrigators with annual crops may be more able to adapt to periods of low water availability by reducing the area of their planting.

**Table 2.1 Infrastructure operator diversions as a percentage of southern Murray–Darling Basin diversions in 2004–05**

State	Total diversions (GL) <sup>1</sup>	Diversions by irrigation districts (GL) <sup>2</sup>	Percentage of total diversions by irrigation districts
New South Wales	3666	2570	70
Victoria	3137	2693	86
South Australia	623	165	27
<b>Total</b>	<b>7426</b>	<b>5429</b>	<b>73</b>

<sup>1</sup> Includes diversions for irrigation, stock and domestic, town and industrial uses, (source: MDBC, *Water Audit Monitoring Report 2004/05*, June 2006, p7).

<sup>2</sup> Includes all diversions into Infrastructure Operators supply systems. These diversions are predominately for irrigation but figures also include some diversions for stock and domestic and town supply (source: ANCID, *2004/05 Australian Irrigation Water Provider Industry Benchmarking Report*, 2006, p14).

Trade in the southern Murray–Darling Basin is not limited to intraregional trade, although the volume of interregional trade has only represented approximately 1 per cent of traded volumes in both the temporary and permanent markets.<sup>9</sup>

Interstate trade has been possible since 1998 initially through the MDBC's pilot project for permanent interstate water trading. This project has resulted in a net permanent export of water entitlements from New South Wales and Victoria. However, temporary interstate transfer volumes have more than negated this export of water entitlements, with South Australia in most years exporting seasonal allocations to New South Wales and (to a lesser extent) Victoria.<sup>10</sup>

### Permanent trade

To date, interregional permanent water trade has resulted in some districts reaching their net permanent outward trade limits. In the last trading season (2005-06) six of the eight customer groupings used to regulate permanent water trade within Goulburn-Murray Water (G-MW) reached their 2 per cent net permanent outward trading limit.

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<sup>8</sup> Marsden Jacob Associates, *Water Trading Development and Monitoring*, report prepared for the Department of Land and Water Conservation, NSW, May 1999, pp. 3.17–18.

<sup>9</sup> Heaney et al.

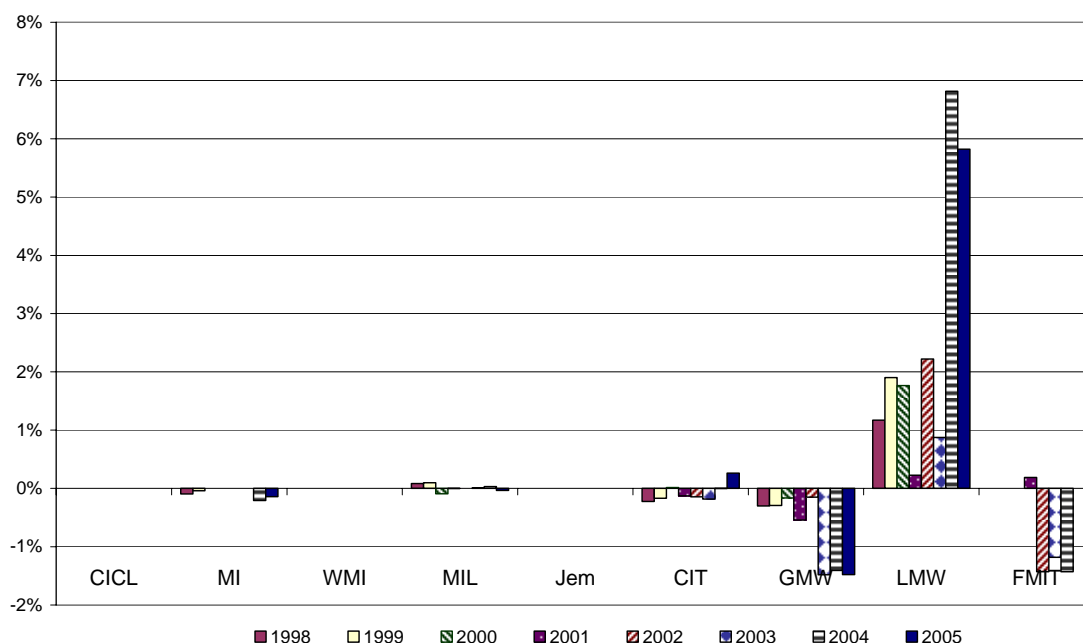
<sup>10</sup> Peterson et al, *Modelling Water Trade in the Southern Murray–Darling Basin*, Staff Paper, 2004, p. 9.

In South Australia, the largest of the irrigation trusts, Central Irrigation Trust (CIT), has also experienced a net export of permanent entitlements. Irrigators serviced by CIT have been able to participate in the MDBC interstate trade pilot project subject to an absolute, cumulative limit on permanent outward trade of 2 per cent. This limit has been reached in some of CIT's districts.

There is a perception in the industry that the largest movement of water entitlements will occur in the first few years of expanded interstate trading, as the allocation of irrigation water entitlements that have developed over the past 100 years adjust to an open trading environment.

Many infrastructure operators fear that water entitlements will flow out of their districts with any expansion in interregional trade. To date G-MW and First Mildura Irrigation Trust (FMIT) have experienced the largest outflow of permanent water entitlements. Since 1998 the cumulative net permanent trade out of these regions has represented approximately 5.8 and 4 percent of their current water entitlements respectively. This can be seen in figure 2.1.<sup>11</sup>

**Figure 2.1 Annual net permanent trade as a percentage of the transferable water entitlement—by infrastructure operator**



Notes:

- <sup>1</sup> Trading data sourced from infrastructure operators.
- <sup>2</sup> Transferable water entitlement equates to the sum of the infrastructure operator's (or irrigators') high and general security entitlement holdings as at 2005-06, with the exception of FMIT and LMW where 2004-05 holdings have been used.
- <sup>3</sup> LMW trading data incorporates trade to/from private diverters managed by LMW.
- <sup>4</sup> MI = Murrumbidgee Irrigation; MIL = Murray Irrigation Limited

<sup>11</sup> Data used to construct chart is included in appendix B.



Coleambally Irrigation Co-operative Limited (CICL) and Western Murray Irrigation (WMI) have both determined exit fees, but do not currently allow the subdivision of their entitlement as a means to permitting permanent water trading out of their network. WMI has experienced significant pressure to allow outward trade in water entitlements. However, it currently only permits outward trade under retail tagging arrangements.<sup>12</sup> WMI estimates that around 18 percent of its water entitlement is owned by irrigators based in South Australia<sup>13</sup> who transfer water temporarily each year from WMI to their South Australian properties under what could be considered to be a perpetual annual trading agreement.

Net permanent trading data also suggests that Lower Murray Water (LMW) has been the major beneficiary of water entitlement outflows from these regions. However, a large proportion of water entitlements flowing into LMW probably relate to purchases by private diverters managed by LMW.

The cumulative net permanent trade out of all of the districts managed by the infrastructure operators as a group (that is, excluding trade between the infrastructure operators) equated to 12 GL since 1997. This represents approximately 0.25 per cent of the water entitlements held by, or in, the districts of these infrastructure operators.

The patterns in permanent trade (with water entitlement moving into LMW's district) and the marginal cumulative outflow from irrigation districts<sup>14</sup> is consistent with comments frequently expressed by infrastructure operators that purchases by private diverters were responsible for the majority of water entitlements sold out of their districts. These trading patterns may have been influenced by the favourable tax treatment of some industries, typically operating as private diverters.

It should be noted that the direction of future water trading flows is difficult to predict from past trends because of the potential influence of:

- changing commodity prices, such as the recent 'wine glut'
- possible purchase of water for the environment, and
- previous permanent trading restrictions.

It has been suggested that past restrictions on volumes of permanent trading may not have been a critical factor in determining the level of trade.<sup>15</sup> However, the fact that trading limits have been reached early in the season in some Victorian districts suggests that restrictions have an impact. Furthermore, it is possible that these limits are

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<sup>12</sup> Retail tagging involves water entitlements being sold to a buyer located outside the seller's irrigation district (or infrastructure operator's network) but the water entitlement remains on the registry of the seller's region and retains all its original characteristics, including the obligation for the buyer to pay fees and charges levied on the water entitlement by the seller's infrastructure operator.

<sup>13</sup> Pers comm. 14 October 2006.

<sup>14</sup> The cumulative outflow from all of the districts managed by the infrastructure operators as a group (that is, excluding trade between the infrastructure operators) represents less than 0.25 per cent of their total transferable water entitlements since 1997.

<sup>15</sup> H Roper, C Sayers, and A Smith., *Stranded Irrigation Assets*, Productivity Commission Staff Working Paper, Melbourne, June 2006, p. 46.

distorting patterns of trade. For example when a limit is reached in one district it may potentially accelerate trade out of another district.<sup>16</sup>

The perception in the industry is that water purchases for the environment will be the primary driver of future permanent water trading and result in water entitlements flowing out of irrigation districts.

As at 26 November 2005, 260GL were still to be recovered by 2009 under the Living Murray first step program, representing approximately 3.3 per cent of the 2004–05 diversions from the Murray–Darling Basin.

The Australian Government intends to purchase water entitlements for the environment via a pilot tender process whereby irrigators elect the quantity of water entitlements they are prepared to surrender in return for funding of various on farm water saving projects. From the perspective of infrastructure operators this is tantamount to entering the market and purchasing these entitlements.

It is not clear whether concerns regarding stranded assets are warranted in many districts. In some respects a number of other factors create a natural limit on the extent of trade in entitlements. Irrigators appear to exhibit a preference for temporary trade or leased entitlements due to differential tax treatment, policy uncertainty, administrative complexity and transaction costs associated with permanent trade and the perception that water rights are an inherently valuable part of their assets.

### **Temporary trade**

Temporary trading in seasonal allocations can be considered a substitute for permanent trade. To date, temporary trading has been responsible for a significant proportion of the changes in water use patterns as it is subject to fewer trading restrictions and lower transaction costs. However, temporary water prices in the market can vary significantly depending on the seasonal allocation. Therefore irrigators relying solely on the temporary market may face risks relating to this price volatility.

Of the southern Murray–Darling Basin infrastructure operators, irrigators within Murray Irrigation Limited (MIL) appear to be the major buyers of temporary water (see figure 2.2<sup>17</sup>). This may be related to the low seasonal allocations made available to irrigators in recent years, the nature of the water entitlements held (general security) and the type of crops grown.

Generally WMI, LMW, FMIT, CIT and Murrumbidgee Irrigation (MI) experience a net outward trade of seasonal allocations. Irrigators within these infrastructure operators' networks primarily hold high security entitlements.<sup>18</sup> Therefore in periods of low seasonal allocations, these irrigators are more likely to receive their full allocation and hence more likely to have excess seasonal allocations to sell.

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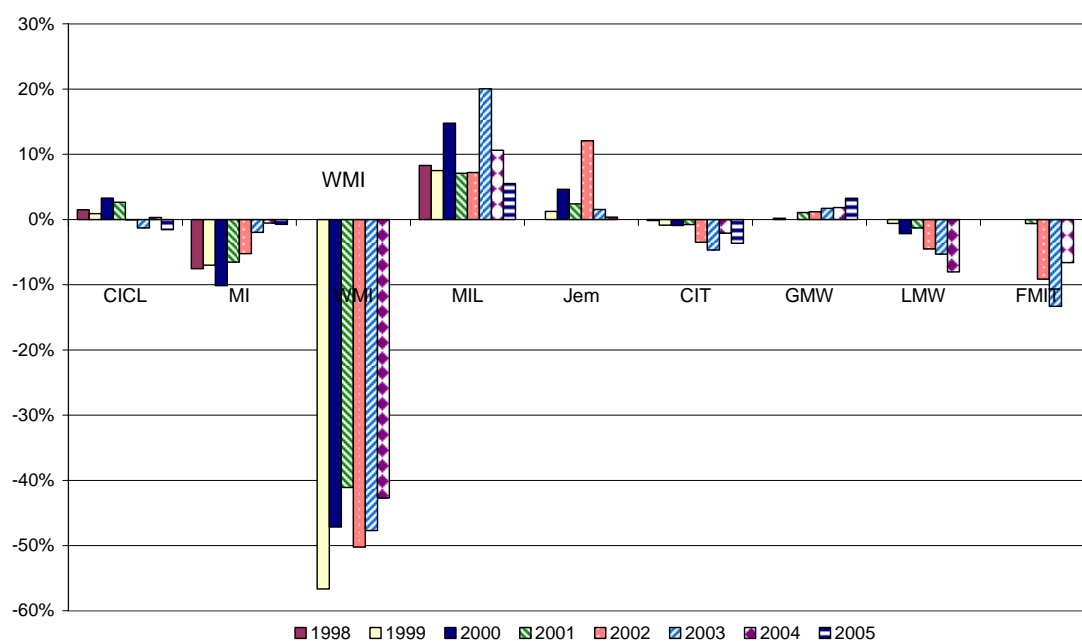
<sup>16</sup> Pers comm., Victorian Department of Sustainability and Environment, 26 October 2006.

<sup>17</sup> Data used to construct chart is included in appendix B.

<sup>18</sup> With the slight exception of Murrumbidgee Irrigation, which holds a significant High Security Licence but an even larger General Security Licence.

As can be seen in figure 2.2, WMI is the major seller of seasonal allocations. However, these figures are partially distorted by WMI's use of retail tagging as a means for managing permanent trade. Under retail tagging arrangements irrigators outside of WMI can purchase a share of WMI entitlement. However, the share of the entitlement is not removed from WMI's licence; rather the seasonal allocation associated with the share is temporarily traded into the buyers' region every year under an ongoing contract. This goes part of the way to explaining WMI's relatively large quantities of net outward trade in seasonal allocations.

**Figure 2.2 Annual net temporary trade as a percentage of the transferable water entitlement—by infrastructure operator**



Notes:

- <sup>1</sup> Trading data sourced from Infrastructure Organisations.
- <sup>2</sup> Transferable water entitlement equates to the sum of the infrastructure operator's/irrigator's high and general security entitlement holdings as at 2005–06, with the exception of FMIT and LMW where 2004–05 holdings have been used. (NB: data limitations prevented showing temporary trade as a percentage of the annual allocation).
- <sup>3</sup> WMI trading data includes water traded under retail tagging arrangement.
- <sup>4</sup> MI = Murrumbidgee Irrigation; MIL = Murray Irrigation Limited.

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### 3 Theoretical analysis of exit fees and access fees

The first task that the ACCC was asked to undertake was a theoretical analysis of access and exit fees, including taking into consideration:

- the broader pricing arrangements for water delivery services and the costs associated with provision of those services, and
- concerns about exit fees acting as a barrier to the efficient trade of water.

#### 3.1 Economic characteristics of irrigation water delivery networks

Water delivery services for irrigation are characterised by certain economic features that need to be taken into account when designing appropriate delivery charges.

First, these services require a substantial investment in long lived assets (such as the network of pipes and channels for delivering water). These assets tend to have few alternative uses and the investment, once made, is largely rendered sunk. Furthermore, even after the initial investment in delivery infrastructure has been made, there are relatively high on-going fixed costs that must be incurred to operate and maintain the infrastructure, such as clearing and relining channels, maintaining bridges, culverts and drains, and repairing and replacing pipes. Whilst some of these costs are relatively stable over time, expenditure on periodic maintenance and renewal of assets can be lumpy (see box 3.1).

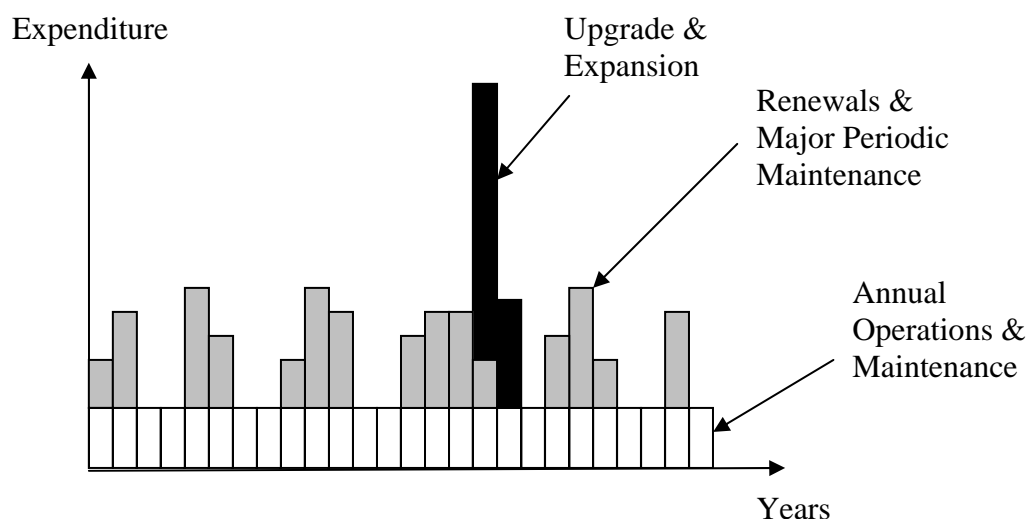
Second, a substantial proportion of the sunk and on-going fixed costs of delivering water tend to be common to the irrigators who benefit from these services. For example, under a gravity-fed channel system of irrigation, it might be the case that a main channel will deliver water downstream to irrigators located on various lateral spurs branching off the main channel at different points. In this case, the largely sunk and fixed costs of developing and maintaining the main channel will be common to all irrigators located on the lateral spurs that branch off the main channel.

Third, water delivery services also display the features of club goods, being both excludable and partly non-rivalrous. The services are excludable in the sense that irrigators can feasibly be excluded from using these services. They are partly non-rivalrous in the sense that up to the point of congestion, the use of the service by any one irrigator does not diminish the amount of the service available for other irrigators. When coupled with the substantial common costs of providing these services, irrigators have a strong incentive to form a “club” to benefit from sharing the high sunk and fixed costs of providing these services.

Fourth, these services exhibit substantial economies of scale making it mostly uneconomic to duplicate the pipes and channels that deliver water. At the level of demand typically exhibited for these services in an irrigation district, it is almost always efficient to have only one infrastructure operator managing a single, albeit elaborate, network of channels or pipes for delivering water to the irrigators in the district. Thus, water delivery services in irrigation have natural monopoly features and this has an important implication for the pricing of these services.

### Box 3.1: Expenditure profile of infrastructure operators

A stylised example of the expenditure profile of an infrastructure operator is shown below.



Annual operations and maintenance expenditure typically relate to the following activities:

- Operating the network—monitoring flows and water levels, processing and scheduling water orders and meter reading.
- Maintaining the network—channel clearing, bank/pipe leakage repairs, repairs to concrete structures and erosion control work.
- Water planning and environmental compliance functions—reporting on water use and discharge water quality.
- Administration—customer billing, administration of water trading, financial and business management and operation of the board.

Renewals and major periodic maintenance for water delivery networks typically relates to the replacement or renewal of parts of the network according to their useful life so that the operating capacity of the network is maintained. Examples include replacing sections of pipes, relining sections of channels, and replacing or overhauling major components of pumps.

Expenditure on upgrades and expansions is less common, and can include replacing a channel network with a pressurised pipe system to improve the level of service, or extending the network in order to supply new customers.

Given the large fixed costs of supplying these services relative to the demand for them, the average cost of delivering the total volume of water demanded will tend to be higher than the cost associated with delivering the last ML of water. This means that if infrastructure operators were to make their pricing decisions solely on the basis of the cost of providing these services at the margin, they would be unable to recover all their costs.

Together, these characteristics of water delivery services present three challenges for the design of efficient water delivery charges:

- What pricing structure will enable infrastructure operators to fully recover their costs while also encouraging allocative efficiency in the use of delivery services?
- How should the fixed costs of delivery infrastructure be allocated among irrigators?
- What mechanism will allow infrastructure operators and irrigators to manage the risks associated with possible changes in future demand, in order for infrastructure operators to commit to the high fixed costs of building and maintaining delivery infrastructure?

These issues are discussed in the following three sections.

### **3.2 Structure of delivery charges**

To promote allocative efficiency, the price charged for water delivery services should reflect the cost of providing them at the margin. That is, the price for having an additional ML of water delivered to the farm-gate should equal the marginal cost incurred in delivering this extra ML of water. Since irrigators use delivery services up until the point where the marginal benefit they derive equals the price of the service, this ensures that water is delivered up to the point where the marginal benefits are equal to the marginal costs. At present, some infrastructure operators in the southern Murray–Darling Basin have usage fees for delivery that are substantially greater than the marginal cost of delivery (see box 3.2)

If prices are set solely on the basis of marginal cost, the fixed costs of building and operating the network will not be recovered. A common way to address this problem is to use a two-part tariff, which consists of a fixed (access) fee used to recover the fixed costs of providing the delivery network, and a variable (usage) fee levied on the actual quantity of water delivered. This pricing structure is possible because many irrigators have a willingness to pay a higher price for delivery services than the marginal cost of providing these services.

### **3.3 Allocation of fixed costs**

The total fixed costs of providing and maintaining the network infrastructure need to be distributed between irrigators in the form of individual access charges.

Where it is possible to attribute separable costs to individual irrigators, it is efficient to allocate these costs to them as they will internalise these costs in making decisions about use of delivery services. However, in respect of attributing common costs, there is a degree of arbitrariness since they are jointly incurred by irrigators.

### Box 3.2: Water use efficiency and water delivery pricing structure

Sections 65 and 66 of the NWI set out the actions for *Water Storage and Delivery Pricing* in respect of the agreed outcomes in section 64 for *Best Practice Water Pricing and Institutional Arrangements*. In particular, s. 65 states that:

‘...the States and Territories agree to bring into effect pricing policies for water storage and delivery in rural and urban systems that facilitate efficient water use and trade in water entitlements, including through the use of: (i)consumption based pricing; ...’

Some infrastructure operators have interpreted consumption based pricing to mean variable fees (i.e. those charged on the basis of per ML of water delivered) should be higher than the actual variable cost of delivering water, and revenue collected through fixed charges should be less than the fixed costs of operating the network. Prior to the establishment of arrangements for full and open trade of water, this pricing arrangement encouraged irrigators to use water efficiently (technical efficiency).

For example, suppose that an infrastructure operator has adopted the following pricing structure:

fixed charge        \$15 per ML of water entitlement

variable charge    \$35 per ML of water delivered

when its cost structure would actually corresponded with a pricing structure of:

fixed charge        \$30 per ML of water entitlement

variable charge    \$20 per ML of water delivered

If irrigators are not able to trade their water entitlements (or seasonal allocations), this pricing structure encourages water use efficiency because the variable cost of having water delivered is \$35/ML compared to \$20/ML.

However, with the establishment of water markets, the value of water in the market sends a direct signal as to its opportunity cost, that is, the value of water when employed in its next best alternate use.

Assuming that seasonal allocation can be traded in the temporary market for \$100/ML (net all trading costs), then the opportunity cost to the irrigator of using each additional ML will be at least \$100/ML, irrespective of the pricing structure for delivery.

Furthermore, the above pricing structure with higher variable charges will actually result in underutilisation of the delivery assets, since the price for delivery of an additional ML of water is higher than the marginal cost of delivery.



As noted in section 3.1, water delivery services display the features of club goods. Allocation of fixed costs among club members will achieve an efficient outcome if each club member is charged a contribution to common costs such that total contributions are equal to common costs and no member is sustained in the club whose separable costs exceed the benefit they derive from using the service.<sup>19</sup>

Simple average pricing such as postage stamp pricing, which is currently the approach adopted by most irrigation districts in the southern Murray–Darling Basin,<sup>20</sup> would achieve the first of these objectives but may fall short in achieving the second objective.

Rather than average pricing, another method of allocating common costs is to charge differentiated prices according to some characteristic of the irrigators. One approach in this vein is the serial cost sharing approach,<sup>21</sup> which has desirable efficiency properties.<sup>22</sup>

However, some cost allocation approaches with more desirable efficiency properties also face significant transaction costs in identifying location specific delivery costs and/or irrigators' willingness to pay.<sup>23</sup> These costs are exacerbated in complex physical networks and where there are a large number of irrigators in a given stand alone system.

The benefits of implementing a more complex mechanism for allocating common costs will tend to be greatest when there is a relatively high degree of heterogeneity among irrigators and significant differences in their capacity to pay.<sup>24</sup> Thus, adopting postage stamp pricing is likely to contribute less to any loss of allocative efficiency when irrigators are highly homogenous.

### **3.4 The role of long-term contracts in facilitating new investment**

When the building of infrastructure involves committing capital that has little, if any, value for other uses, the infrastructure owner faces the risk that customers could walk away from the arrangement once the capital has been committed. Faced with this risk of becoming saddled with a stranded cost, the infrastructure owner may refrain from

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<sup>19</sup> SC Littlechild, 'Common Costs, Fixed Charges, Clubs and Games', *The Review of Economic Studies*, Vol. 42, No. 1, 1973, pp. 117–24.

<sup>20</sup> Although postage stamp pricing is used, there is some differentiation between customer types and locations.

<sup>21</sup> Under the serial cost sharing approach, irrigators in a given stand alone system would be ranked by increasing magnitude of demand for delivery services. The cost of providing the lowest level of demand would then be shared by all irrigators. Next, the incremental cost of providing the next level of demand would be shared by all irrigators except the irrigator with the lowest level of demand and so on.

<sup>22</sup> H Moulin and S Shenker, 'Serial Cost Sharing,' *Econometrica*, Vol. 60, No. 5, 1992, pp. 1009–37.

<sup>23</sup> S Beare, A Heaney and L Pechey, 'Irrigation Infrastructure Charging: Non-rival access, cost sharing and exclusion', *Australian Agricultural and Resource Economics Society Meeting*, Sydney, 8–10 February 2006.

<sup>24</sup> Heterogeneous irrigators will have individual benefits significantly different from the costs allocated under simple postage stamp pricing.

committing to what could otherwise be an economically viable investment. This is known as ‘the hold-up problem’.

One way of managing the risk of stranded cost is for the infrastructure owner and irrigators to enter into ex ante long-term contracts<sup>25</sup> that contain an early termination clause.<sup>26</sup> A common type of ex ante contract that contains a form of early termination payment is the take-or-pay contractual arrangement as often used in the natural gas industry. For example, foundation customers of natural gas pipeline companies commit to pay for a minimum quantity of delivery services for a specified period of time, whether or not they actually use those services.<sup>27</sup>

Ex ante long-term contracts can therefore play a similar role in dealing with the potential hold-up problem for new investment in water delivery infrastructure. Long-term contracts could be specified where, in return for access to the infrastructure, the irrigator would agree to repay (either over time or as a lump sum) some share of the fixed costs<sup>28</sup> associated with the new infrastructure. The contract would have a clause specifying early termination payments to be paid by each irrigator to the infrastructure operator upon early termination of the contract. The payment would decline over the duration of the contract as more and more of the sunk capital costs were recovered.<sup>29</sup>

Contractual agreements of this nature would provide certainty to irrigators and infrastructure operators as to their respective obligations. They would guarantee transparency to the funding of these investments and ensure that irrigators are aware of their future obligations prior to the construction of infrastructure. Moreover, because irrigators are made aware of their obligations before entering into the contract, early termination payments would not affect any decision to leave the irrigation system; rather, they would be treated as a sunk cost by exiting irrigators. Thus the use of long-term contracts would impose a market test on new investments and in doing so increase

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<sup>25</sup> One drawback of simplistic long-term contracts is their inflexibility in the face of demand and supply fluctuations. A Creti, and B Villeneuve, *Long-term Contracts and Take-or-pay Clauses in Natural Gas Markets*, ([www.toulouse.inra.fr/lerna/english/cahiers2003/0310116.pdf](http://www.toulouse.inra.fr/lerna/english/cahiers2003/0310116.pdf)).

However, this problem can often be mitigated by contract renegotiation—the parties can either agree to renegotiate the contract to trade on different terms or, failing this, one party could unilaterally terminate the contract (although this course of action may result in penalties for termination of contract).

<sup>26</sup> Joskow, provides some empirical evidence for this view (source: PL Joskow, ‘Contract Duration and Relationship-Specific Investments: Empirical Evidence from Coal Markets.’ *American Economic Review*, Vol. 77, No. 1, 1987, pp. 168–85).

<sup>27</sup> Early termination payments are also a feature of customer contracts in other market sectors, such as mobile telephony.

<sup>28</sup> These could include both fixed capital costs and fixed operating costs.

<sup>29</sup> There are two principle requirements for a well specified early termination payment:

- the magnitude of the payment should decline over time as the investor recovers their capital costs, and
- the magnitude of the payment should be inversely related to the value of the next best alternative available to the infrastructure owner at the time of termination (i.e. the higher the value and availability of alternatives, the lower should be the termination payment).

The first requirement recognises the fact that the magnitude of any stranded cost is reduced the further into the contract that the termination occurs. The second requirement ensures that the cost of termination is minimised where there is an alternative use for the asset.

the likelihood that these investments would only be undertaken where they are economically viable. Contracts would prove to be an effective way of sharing the risk associated with large capital outlays between infrastructure operators and the relevant irrigators.

However, as discussed in Chapter 2, many of the irrigation districts in the southern Murray–Darling Basin were developed by governments as part of wider socioeconomic policies and delivery infrastructure was, in the main, initially funded by governments and managed by state authorities. Since it was not envisaged that water rights could be traded, the irrigation networks were built without complete ex ante contracts in place. With the advent of water trading, there is a question of how to share the resulting stranded costs between the infrastructure operators/remaining irrigators and the exiting irrigators. As discussed below, there are a number of obstacles to designing contracts that define the obligations of parties going forward once the initial investment has been made.

### **3.5 Problems with implementing ex post contracts**

With the establishment of arrangements for water trading, infrastructure operators are likely to seek to implement ex post long-term contracts—that is, after the network has been built—to manage the risks associated with both future and previous capital investment.

As discussed in section 3.1, expenditure on renewal and refurbishment of network assets is a substantial proportion of the total costs of infrastructure operators. As this type of expenditure generally delivers benefits over a long time frame, it is appropriate to think of it as capital investment, which should only proceed if the long-term benefits exceed the upfront costs. In the absence of long-term contracts, the infrastructure operator is exposed to the risk of a future decrease in demand.

However, unlike investment in new systems, long-term contracts to cover the risks associated with this type of piecemeal investment can be difficult to implement because of the high degree of shared infrastructure (and thus common costs) within the network.<sup>30</sup> Decisions concerning on-going investment in the delivery infrastructure are therefore likely to have to be agreed on a collective basis<sup>31</sup> (in some instances by more than one thousand irrigators), even though some irrigators are likely to value the investment more than others.

If it is not possible to exclude those irrigators that place a low valuation on the investment from continuing to have access to the network (or at least exclude them

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<sup>30</sup> Rosen and Sexton, for example, have noted that substantial intra-organisational conflict can emerge within a water district in response to specific water trade proposals and this conflict may be sufficient to defeat or delay proposed transfers that would otherwise yield substantial net benefits (See: MD Rosen, and RJ Sexton, 'Irrigation Districts and Water Markets: An Application of Cooperative Decision-Making Theory', *Land Economics*, Vol. 69, No. 1, 1993, pp. 39-53.).

<sup>31</sup> Individual contracts are likely to be impractical because the infrastructure operator may not be willing to agree to provide an individual with the services provided through this infrastructure without securing contracts with the majority, if not all, of the other irrigators connected to the delivery network.

from receiving the benefits derived from the investment), there is an incentive for those irrigators that value the investment not to reveal their true valuation so as to endeavour to ‘free ride’ on the willingness of others to commit to pay. Relying on the use of long-term contracts to manage the risks associated with this type of capital expenditure may therefore result in asset renewal and refurbishment being forestalled and the assets run down, even though this investment would be efficient.

On the other hand, if those irrigators that do not value the investment are coerced into ‘agreeing’ to the new collective arrangement—which can happen when decisions are made by majority voting, peer pressure or simply introduced by the infrastructure operator under current contractual arrangements that require customers to pay whatever fees and charges are levied—they may be forced into committing to pay for the long-term renewal and maintenance of the network, possibly in perpetuity.

The introduction of exit fees by some infrastructure operators can be considered to be a collective ex post long-term contract of this nature, with the exit fee the equivalent of an early<sup>32</sup> termination penalty applied to irrigators that wish to decrease their demand for delivery services due to trading water out of the district.

In fact, where a minority of irrigators wish to trade water out of a district, the remaining irrigators and the infrastructure operator have both the incentive and relative bargaining strength to extract a substantial proportion of the monetary gains from the trades that would occur by imposing high exit fees.

As demonstrated below, ex post exit fees that are levied on the sale of water traded out of a district act as a barrier to efficient trade.

### 3.6 Ex post exit fees as a barrier to trade

The inefficiency of ex post exit fees in the context of water trade has been documented in recent publications by ABARE<sup>33</sup> and the Productivity Commission<sup>34</sup> among others. The discussion below follows this analysis.

To illustrate the potential gains from allowing water trade, figure 3.1 presents the marginal returns from water use in two hypothetical regions A and B. The line  $V_A$  represents the marginal value of water in region A for various quantities of water. Similarly,  $V_B$  represents the marginal value of water in region B, and is downward sloping with respect to the  $O_B$  origin as it is drawn such that the marginal value of water in region B decreases in moving from point  $O_B$  to point  $O_A$ .

Prior to trade, the total supply of water is assumed to be divided between the regions such that region A has  $O_A Q_{\text{initial}}$  ML of water and region B has  $O_B Q_{\text{initial}}$  ML of water.

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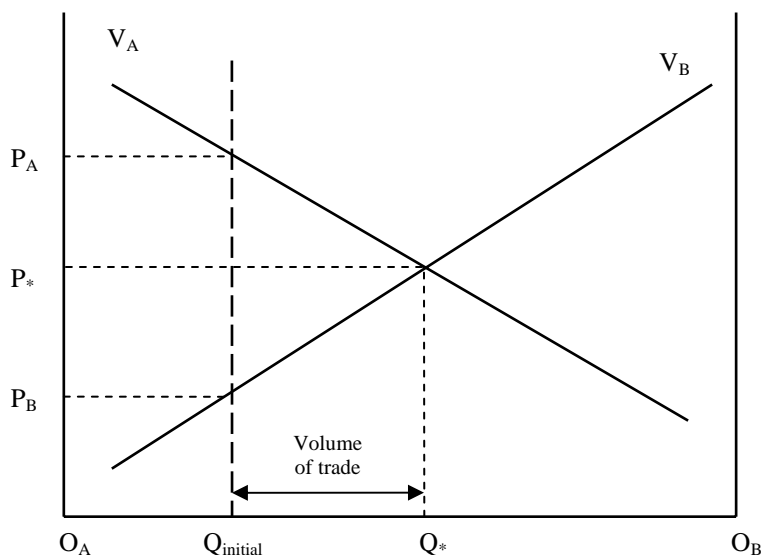
<sup>32</sup> An exit fee calculated on an ‘in perpetuity’ basis implies that all irrigators have agreed to their current level of delivery services on a take or pay basis forever. Thus, any action that reduces the demand for those services can be deemed to be an early termination of this ex post contract.

<sup>33</sup> Australian Bureau of Agricultural and Resource Economics (ABARE), *Exit Fees and Interregional Water Trade*, Research Report, June 2006.

<sup>34</sup> Productivity Commission, *Rural Water Use and the Environment: The Role of Market Mechanisms*, Research Report, 11 August 2006.

At this initial division of water it will be efficient for water to be transferred from region B to region A. The line  $V_B$  is therefore analogous to a supply curve in region A.

**Figure 3.1: Gains from water trade in the absence of an exit fee**



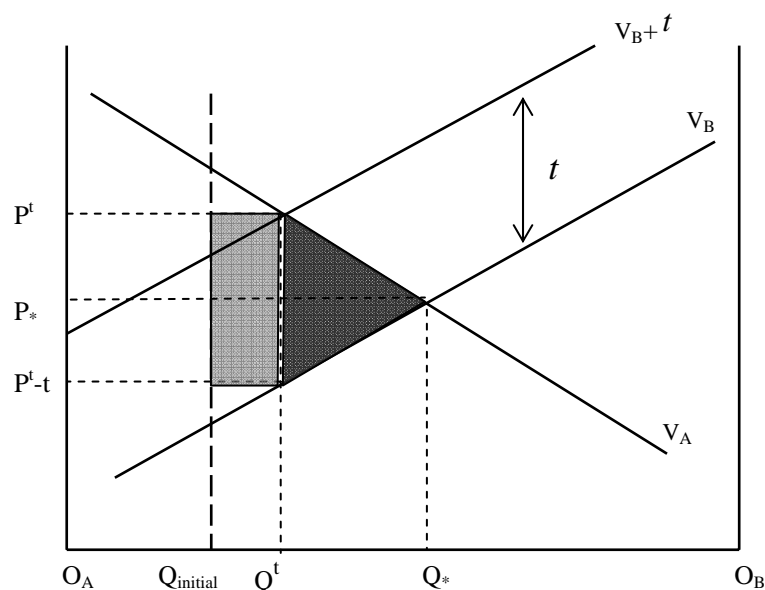
Under the initial distribution, the marginal value of water in region A, which is  $P_A$ , is higher than the marginal value in region B which is  $P_B$ . In the absence of transaction costs, there would be gains from water being traded from region B to region A up until the point where region A's share of water is increased to  $O_A Q_*$  ML and region B's share is reduced to  $O_B Q_*$  ML. At this new equilibrium, the marginal value of water would be  $P_*$  in both regions and all the gains from trade would be exhausted. Interregional trade would have facilitated the trade of water from relatively low value uses in region B to higher value uses in region A, resulting in an increase in allocative efficiency.

However, as demonstrated in figure 3.2, an exit fee applied to water trade in region B would diminish these gains from trade. An exit fee of  $t$  per ML of water means that irrigators in region B would now require a higher price than before to induce them to trade the same quantity of water.<sup>35</sup> Since the marginal value of water in region A is unchanged, less water would now be traded than before. Interregional trade now occurs only to the point where region A's share of water becomes  $O_A Q^t$  ML and region B's share becomes  $O_B Q^t$  ML. Buyers in region A now pay the higher price of  $P^t$  for each

<sup>35</sup> This will generally be equivalent to the size of the exit fee, as shown in figure 3.2, although in some circumstances it may be less than the exit fee. Where the exit fee is deemed to be a prepayment of the seller's fixed access fee and thus preserves the seller's delivery rights, an irrigator will add-on the difference between the exit fee and their valuation of the ongoing delivery right. While this may suggest that exit fees that involve a prepayment of future access fees are less inefficient than exit fees where the seller of water entitlements surrender their implicit delivery right, the infrastructure operator is obliged to maintain the network at the current level of service even when delivery services are not valued.

ML of water purchased from region B, and sellers in region B only receive  $P^t - t$  for each ML of water sold.

**Figure 3.2: Effect of exit fee on gains from trade**



### Welfare effects

There is a dead weight loss associated with the imposition of ex post exit fees, since the full potential gains from trade are not realised. The value of the allocative efficiency gains that are forgone is represented by the shaded triangle in figure 3.2, which represents the overall deadweight loss to both regions. The magnitude of this loss depends on the responsiveness of buyers and sellers to a change in price. If sellers and buyers are relatively unresponsive to price changes then less trade would be forgone from the imposition of exit fees.<sup>36</sup>

There is also a monetary transfer from the sellers in region B to the infrastructure operator in that region. The value of this transfer is represented by the shaded rectangle.

ABARE has undertaken research estimating the quantum of the welfare effect of exit fees when compared to a free trade scenario.<sup>37</sup> This is outlined in box 3.3.

<sup>36</sup> At the margin, the party that bears most of the cost of the exit fee will depend on the relative price elasticities of the buyers and sellers. For example, if buyers are relatively less responsive in their behaviour to a change in price compared to sellers, then it is likely that they would bear more of the cost than sellers. Moreover, the steeper the slope of the demand curve of buyers relative to the supply curve of sellers, the higher the proportion of the costs that the buyers would bear.

<sup>37</sup> ABARE, 2006.

### Box 3.3: Modelling of the extent of the barrier to trade

The imposition of an ex post exit fee will not necessarily prevent all trade from occurring. However, remaining irrigators and the infrastructure operator have an incentive to set exit fees at a level high enough to at least recover the future fixed costs that irrigators exiting the network would have otherwise paid.

A study by the Australian Bureau of Agricultural and Resource Economics, *Exit fees and Interregional Water Trade*, used a stylised three region model with one importing region and two exporting regions to investigate the impact of the introduction of an exit fee on the economic gains to irrigators and water authorities, regional water use and prices, and interregional trade.<sup>38</sup>

The study made a number of assumptions including that a single price of water prevails in each exporting region, which, net of the exit fee, must be no lower than the price of water in the adjacent downstream importing region. A constant elasticity of demand in each region is also assumed.

Using stylised estimates of the elasticity of demand in each region and initial water entitlements, the study reached the following conclusions:

- (a) The larger exit fees are as a proportion of the traded price of water, the larger would be the welfare loss (that is, gains from trade forgone). For example, a 10 per cent exit fee imposed in both regions was estimated to reduce efficiency by around 1.4 per cent compared with free trade, whereas a 30 per cent exit fee would reduce efficiency by 18 per cent. At an exit fee of 70 per cent of the traded price of water in both regions there would be no trade. The welfare loss therefore increases at an increasing rate as exit fees became a larger proportion of the traded price of water.
- (b) The loss in economic efficiency would be lower if only one exporting region imposed exit fees. For example, the imposition of a 30 per cent exit fee in only one exporting region would lead to a 3 per cent loss in economic gains as opposed to the 18 per cent loss that arises from the imposition of the same fee in both regions.
- (c) Simulation results suggest that the distortionary effects of exit fees on trade would be greater as other impediments were removed, such as the 2–4 per cent quota on out of scheme trade.
- (d) The presence of exit fees will tend to concentrate trade from regions where the fees are lower, creating an incentive for infrastructure operators to lift their exit fees to levels comparable with other regions. This escalation of exit fees would impose further efficiency losses.

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<sup>38</sup>

ABARE, 2006.

## **Distortion of incentives for rationalisation of assets**

Rationalisation may involve re-adjusting the infrastructure network by reducing the lengths of channels and drains, and the number of structures, or a reduction in the level of service, where the current level cannot be economically justified. When infrastructure charges fall below the level of avoidable costs, the infrastructure operator is faced with a choice of whether or not to decommission or rationalise parts of the asset. If the infrastructure operator does not rationalise under these circumstances, then irrigators elsewhere in the network must meet the shortfall in revenues.

Where water delivery is bundled with the water entitlement, an exit fee can become a barrier to efficient rationalisation of assets by two separate processes:

- The exit fee reduces allocative efficiency so that individual irrigators in the exporting region may continue to consume water at levels that do not reflect the higher marginal value in the importing region. Thus, some irrigators will sub-optimally remain in the network and this distorts the feedback demand signal to the infrastructure operator to rationalise assets.
- An exit fee that fully insulates remaining irrigators from an increase in charges may cause the infrastructure operator to delay or avoid rationalisation. That is, while total welfare might be increased if the infrastructure operator rationalised the network after some irrigators exit, some irrigators within the network would potentially resist any network changes since they would not face any change in fees and charges after the other irrigators had exited the network. This may influence the decision of the infrastructure operator to maintain the network in its current state.

Box 3.4 is used to illustrate these two different mechanisms.

## **3.7 Unbundling water and delivery rights**

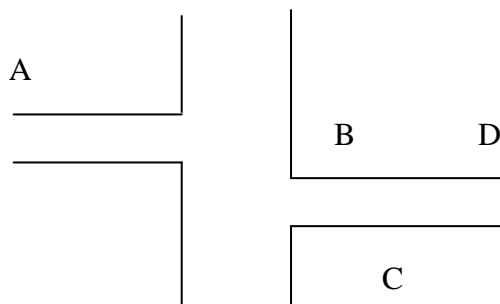
### **Unbundled water rights**

The separation of a delivery entitlement from a water entitlement can further promote the trading of water to more highly valued uses. Exit fees, as they are currently imposed, are levied on water entitlements that currently include an implied delivery access right (the current bundled situation).

In an unbundled situation, water access rights are unbundled from delivery access rights through the creation of separate water and delivery entitlements. Under this arrangement, the access fee paid by an irrigator to an infrastructure operator reflects the fixed costs of delivering a specified volume of water to a specified delivery point. This access fee is levied on the delivery entitlement rather than the water entitlement. As the access fee is independent of the water entitlement, the irrigator's decision to purchase or sell part of their water entitlement will not impact on the infrastructure access charges they pay. Similarly the infrastructure access charges have no direct impact on the irrigator's decision to buy or sell water entitlements.



### Box 3.4: Impact of exit fees on rationalisation of assets



Consider four irrigators (A, B, C and D) located within an irrigation network as above. The main centre channel is common to all within the network. There are two separate branch channels; channel A and channel BCD. The branch channels are only utilised by those irrigators located on them.

- Example 1: If an exit fee is applied to all water leaving the irrigation network, the difference between the market price of water and revenue received per ML by the seller is the level of the exit fee. Suppose that the market price for water is higher than the marginal value in use for irrigator A, but after paying the exit fee irrigator A would receive an amount below their marginal value in use. As a result, irrigator A stays connected to the network and does not sell their water entitlement. In the absence of exit fees, irrigator A would have left the network and the infrastructure operator would have been able to decommission channel A.
- Example 2: Assume irrigator B leaves the network and pays an exit fee that leaves fees to the remaining irrigators unchanged. It may now be the case that the avoidable costs for operating channel BCD exceed what irrigators C and D combined would be willing to pay to remain on the network. As a consequence, it would be welfare improving for the infrastructure operator to decommission channel BCD. However, due to the exit fee irrigators C and D do not face higher fees and therefore might resist any changes to the network.

Unbundling in this manner allows water to be traded to the most highly valued use. In addition, those irrigators remaining within the network are not faced with higher infrastructure charges as the proportion of fixed delivery costs paid by each individual irrigator would not change. Thus, unbundling reduces the need for an exit fee on water entitlements that leave an irrigation area.

Unbundling water entitlements and delivery rights and attaching access fees to the delivery right means water trade no longer affects the distribution of the fixed costs of delivery. Unbundling separates the fixed costs of operating the network from the volume of water held by irrigators in the area, allowing irrigators to trade water entitlements at prices that reflect the true costs and returns from water use.

Unbundling also allows irrigators to maintain access to delivery infrastructure independent of their water entitlements holdings. Irrigators could therefore:

- adopt different water sourcing options, such as leasing or buying seasonal allocations
- sell excess water without incurring an exit fee, and
- make decisions about their holdings of water entitlements and holdings of delivery entitlements independently and at different times, based on information relevant to each asset available at the time.

A further advantage of unbundling is that it would provide clearer signals to infrastructure operators about the demand for delivery services, and allow them to manage and operate their networks accordingly. For example, when water entitlements and delivery entitlements are bundled, it is not clear whether a seller of a water entitlement wants to cease having access to water delivery services, or proposes to purchase seasonal allocations in the future.

### **The market for delivery rights**

The value of a delivery entitlement will depend upon the valuation placed on it by all irrigators in the district. There are two cases that can be considered: the situation where delivery services are congested and the case where they are not.

Where delivery services are congested, infrastructure operators would be unable to make extra capacity available to irrigators (without investment to expand capacity). Thus, any irrigators wishing to obtain additional delivery entitlements would have to purchase existing entitlements from other irrigators. Those irrigators wanting to dispose of their delivery entitlements would therefore receive a positive price,  $P$ , as shown in figure 3.3.

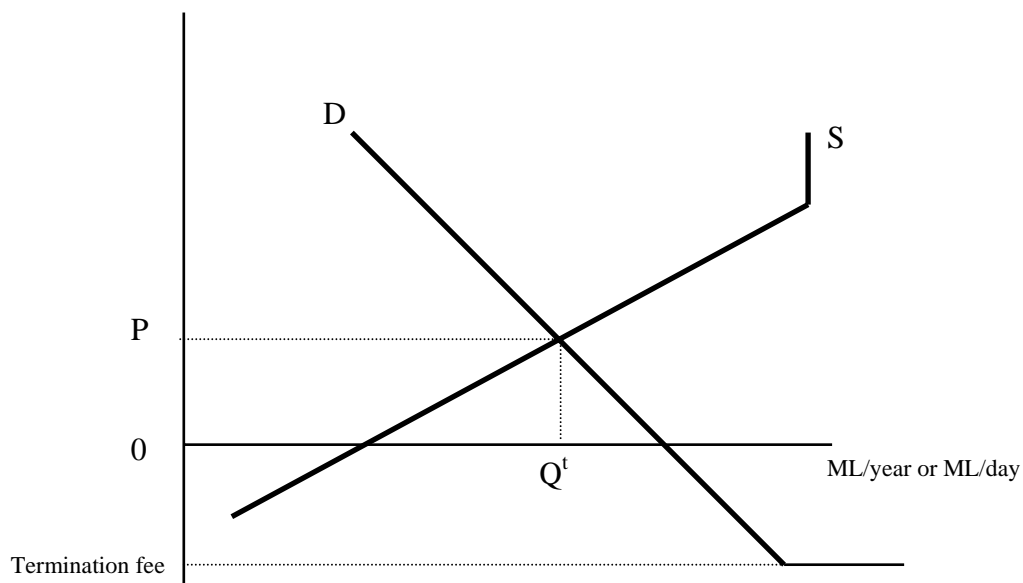
Since most infrastructure operators have some congestion in delivery capacity during peak periods, allowing the delivery entitlement to be transferable can therefore allow for more efficient allocation of the delivery capacity in the network. For example, the delivery entitlement could be traded to an irrigator who required a greater level of service i.e. higher security of delivery or higher supply rate. This may be a more efficient means of improving the purchaser's level of service than paying for additional supply headworks or additional on-site storage infrastructure.

Where delivery services are not congested, it is assumed that infrastructure operators would be prepared to make the spare capacity (i.e. additional delivery entitlements) available for free. In this case, irrigators wanting to dispose of their delivery entitlements would have to make a payment in order to transfer (to other irrigators) or surrender (to the infrastructure operator) their rights and obligations in respect to these delivery entitlements.

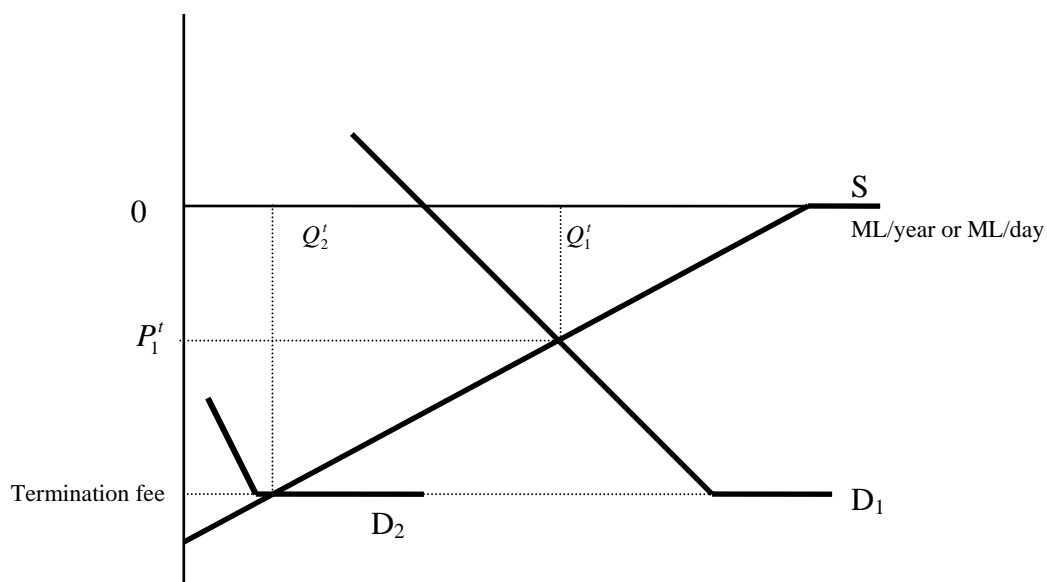
In figure 3.4, the supply curve is horizontal at a zero price because infrastructure operators are willing to give away spare delivery capacity up to the point where all capacity in the network has been taken up. When demand is as shown by schedule  $D_1$ , the value of delivery entitlements is  $P_1^t$  which is less than zero. Thus, an irrigator wishing to transfer their ongoing rights and obligations in respect of their existing delivery entitlement will have to pay another irrigator to take up the delivery entitlement. When demand is lower as shown by schedule  $D_2$ , any irrigator wishing to dispose of their water entitlements will have to surrender these to the infrastructure

operator and pay the termination fee. In effect, the infrastructure operator is the buyer of last resort.

**Figure 3.3: Market for delivery rights when delivery services are congested**



**Figure 3.4: Market for delivery rights when delivery services are not congested**



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## 4 Infrastructure operator specific information

The second task that the ACCC was asked to undertake was to conduct an assessment of current and proposed arrangements for the setting of access and exit fees, focusing on irrigation areas in the connected areas of the southern Murray–Darling Basin that can participate in interstate water trade.

This chapter provides specific information about the following infrastructure operators:

- New South Wales—Coleambally Irrigation, Murray Irrigation, Murrumbidgee Irrigation, Jemalong Irrigation and Western Murray Irrigation
- South Australia—Central Irrigation Trust
- Victoria—Goulburn Murray Water, Lower Murray Water and First Mildura Irrigation Trust
- Queensland—SunWater<sup>39</sup>

Sunlands Irrigation Trust and Renmark Irrigation Trust in South Australia are not included in this assessment as they have not fully unbundled water titles from land titles and therefore water cannot trade out of their areas. However, some general information on these infrastructure operators is included.

### 4.1 Corporate governance structure

The infrastructure operators have varying corporate governance arrangements.

**Murray Irrigation, Murrumbidgee Irrigation, Jemalong Irrigation and Western Murray Irrigation** are all privately owned, non-listed, not-for-profit companies. They were all privatised during the period 1995 to 1999 when the New South Wales Government issued shares in these companies to irrigators within their areas of operation.

**Coleambally Irrigation** changed from state ownership to ownership by the local irrigators in June 2000, and the shareholders subsequently adopted a dual co-operative structure. Coleambally Irrigation Co-operative Limited (CICL) is a trading co-operative that holds the irrigation licence and has the responsibility of providing irrigation water and associated services. CICL has never returned a dividend to its shareholders. Coleambally Irrigation Co-operative Mutual Limited (CIMCL) is a non trading co-operative, formed for the sole purpose of investing levy funds for the future replacement of the infrastructure. CIMCL does not have share capital and is not permitted to return a dividend to its members.

**Central Irrigation Trust (CIT)** and **Sunlands Irrigation Trust** operate under the *South Australian Irrigation Act 1994*, which sets out the governance arrangements for irrigation authorities. It details the powers of the irrigation trusts including: to enter and occupy land to build and maintain infrastructure, and to levy rates on users of the

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<sup>39</sup> SunWater does not operate in the southern Murray–Darling Basin. It has been included for the purpose of comparison.

irrigation and drainage services. CIT is a private trust, which has contracts with nine individual farmer-owned private trusts that own the assets. Members of each of the nine trusts are able to elect a CIT director, who are shareholders in CIT each holding one share of \$1. Sunlands is also a private trust, with the Board elected by members.

**Renmark Irrigation Trust** is established under the *Renmark Irrigation Trust Act 1936*, which has remained a stand alone Act for management of the Renmark irrigation district. It defines that individual growers have no legal right to the Trust's water licence itself, and the Trust may not impose rates without the ministers' approval.

**Goulburn-Murray Water (G-MW)** and **Lower Murray Water (LMW)** are statutory authorities owned by the Victorian Government. These authorities derive their powers from the *Water Act 1989* and submit their corporate plans each year to the responsible Minister to ensure compatibility of their business directions with government policy. Lower Murray Water commenced operations on 1 July 2004 when it assumed the property, rights, obligations, powers and functions of the Lower Murray Region Water Authority and Sunraysia Rural Water Authority.

**First Mildura Irrigation Trust (FMIT)** is a public Trust accountable to the Victorian Government under the *Water Act 1989*. Its Board is elected by the irrigators within the irrigation district.

**SunWater** is a statutory government owned corporation constituted under the *Government Owned Corporations Act 1993* on 1 October 2000. The Board of SunWater is accountable to shareholding Ministers. SunWater will change status from a statutory government owned corporation to a company government owned corporation in 2007 due to a planned change to the above Act.

## 4.2 Characteristics of water entitlements

### Water entitlement framework

In **New South Wales**, water entitlements are termed 'Water Access Licences'. Each licence specifies:

- A share component: detailed as a unit share of the relevant security pool or, on older licences, a volumetric water entitlement of which a proportion will be received in any one year.
- An extraction component: which entitles the holder to take water at specified times, rates, locations and circumstances.

Private diverters and infrastructure operators can own commercial water access licences, categories of which include regulated river (high or general security) access licences, regulated river (conveyance) access licences, and unregulated river access licences.

Irrigators within the districts of infrastructure operators hold a share of commercial water access licences. The rules relating to trade in shares are governed by the individual infrastructure operators.

In **South Australia**, entitlements are licences that are issued to private diverters and infrastructure operators. Individual irrigators within an infrastructure operator's district are granted their water entitlements from the relevant operator's water licence, under terms of the *Irrigation Act 1994* or other trust specific Acts.

In **Victoria**, the water entitlement framework is based around the issue of bulk entitlements to water infrastructure operators that define the volume of water that an operator is entitled to take from a river, aquifer or storage.

Sitting under the bulk entitlements are the water rights of individuals. In areas declared under the *Water (Resource Management) Act 2005*, individual water rights will be disaggregated into the following components by July 2007:

- **Water Share:** Authorises the holder to a seasonal allocation of water based on the share of the consumptive water pool. Can be either high or low reliability and is associated with a particular supplying authority (for the collection of bulk water charges).
- **Water-Use Licence/Registration:** The use of an allocation is subject to obtaining a water use licence (where applied to land) or registration (for any other use). Both transfer with the ownership of the land to which they relate.
- **Delivery share:** Due to the existence of supply constraints relating to physical delivery infrastructure in some water supply systems, infrastructure operators will be required to determine water delivery volumes and periods for each of the properties they service. Delivery shares can be traded subject to the infrastructure arrangement within the various irrigation areas.

Water entitlements within **Queensland** are generally held by the individual irrigators and coexist in a number of forms including licences, interim water allocations (IWA) and water allocations. IWAs and water licences are typically converted to water allocations when the relevant Resource Operation Plan (ROP) for the area is completed. The variety of interim arrangements will continue to exist until all ROPs are complete.

Water entitlements and water delivery rights are, in effect, unbundled in Queensland, with both supported by contracts with the water storage operator and the infrastructure operator respectively. The transport contract with the infrastructure operator (typically SunWater) defines the service standards and delivery conditions as well as the rights and payment obligations of the holder. The payment obligations of the holder are based on delivery of an explicit volume (which may or may not be associated with an original water entitlement holding).

### **Water entitlement reliability**

Water entitlements in the southern Murray–Darling Basin are typically in the form of high or general security entitlements. The exact reliability of individual water entitlements are defined in terms of the catchment from which they draw.

High security entitlements in New South Wales, South Australia and Victoria generally have a supply reliability of 95–100 per cent; that is, all of the entitlement is received in 95–100 years out of 100.

General security entitlements in New South Wales have a reliability of 70 per cent, while in Victoria this varies between 30–68 per cent. In New South Wales, the reliability of general security licences is enhanced by the allowance for the carry-over of unused allocations.

Water entitlements in Queensland are generally categorised into priority groups that are typically described as high or medium priority. High priority water allocations typically have estimated reliabilities in excess of 95 per cent whereas the estimated reliability of medium priority water allocations varies from 45–80 per cent. In some instances, these supply reliabilities are enhanced by carryover and forward draw arrangements.

### 4.3 Characteristics of infrastructure operators

Table 4.1 illustrates the variation in size of the infrastructure operators. G-MW is the largest infrastructure operator, with over 13 800 irrigation properties connected to its network and customers that hold water entitlements of over 1700 GL. The largest infrastructure operators in New South Wales are Murrumbidgee Irrigation and Murray Irrigation, both with more than 2400 customers and 1200 GL of water entitlements. In comparison, Sunlands in South Australia has only 65 irrigation customers with water entitlement of just under 9 GL.

Table 4.1 also sets out the percentage of general and high security water entitlements held in the areas of each infrastructure operator. Water entitlements in the Victorian and South Australian infrastructure operator areas are all high security, whereas four of the five infrastructure operators in New South Wales hold mostly general security. The exception is in WMI's area, where water entitlements are all high security. Water entitlements in SunWater's area are all general (medium) security.

There is a direct relationship between the security level of water entitlements in an irrigation district and the type of crops that are grown in the area. Perennial crops such as vines, citrus fruits and pasture are generally grown in areas with high security water entitlements, whereas annual crops such as wheat, rice, maize and sugar tend to be grown in areas with general security water entitlements.

Table 4.2 provides additional information on the infrastructure operators, including whether their networks deliver water using piped and pumped pressurised systems or open channel gravity systems. Infrastructure operators with high security entitlements generally have piped and pumped pressurised systems, whereas those with predominantly general security entitlements have open channel gravity systems.<sup>40</sup>

Table 4.2 also shows the value of infrastructure operators' assets relating to water delivery and the amount of revenue received from the delivery of irrigation water. Ratios of these values per ML of water entitlement have also been calculated to assist in comparing the data. It is worth noting that infrastructure operators adopt various methods to value their assets, depending on the purpose (see box 4.1).

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<sup>40</sup> The exceptions are Goulburn-Murray Water and SunWater, which have both types of delivery systems.



#### **Box 4.1: Valuation of assets**

Infrastructure operators use various asset valuation methods, over different timescales and for different purposes.

**Coleambally Irrigation** carries out a Modern Engineering Equivalent Replacement Amount (MEERA) assessment once every five years to review the effective life of assets. This in turn provides input into a review in setting the asset levy (members' contribution) charged by CIMCL. CICL use the current written down value for accounting and balance sheet purposes.

**Murrumbidgee Irrigation** maintains physical and financial asset databases and uses different valuations for specific purposes. For the financial statements assets are valued at historic cost or the net realisable value. For the purposes of asset management planning Murrumbidgee use MEERA.

**Western Murray Irrigation** determines its effective life of assets by using industry engineering standards. The Board assesses the effective life of major assets every three years with the operations and maintenance staff to assess the requirement (if any) for replacement of assets. Other minor assets are reviewed on an ongoing basis.

**Murray Irrigation** uses an engineering assessment to determine the replacement cost of its assets.

**Jemalong Irrigation's** assets have not been revalued in the last 10 years. When determining the value of its assets it uses the depreciated value of the assets.

**Central Irrigation Trust** uses the current written down value of assets for balance sheet purposes. It uses replacement value for replacement and renewals purposes. A licensed valuer values the assets and reviews the life of its assets every three years.

In Victoria, the Regulatory Asset Value (RAV) of the infrastructure operator is set by the Minister for Water. The RAV is rolled forward each year by adding any capital expenditure that the infrastructure operator undertakes and deducting regulatory depreciation and any asset disposals.

**Goulburn-Murray Water** uses a number of asset valuation methodologies, depending on the purpose for which the information is required. It uses renewal replacement cost to determine future asset expenditure requirements. Renewals cost is determined as the lowest cost needed to meet the existing service requirement and current standards. The condition of assets is assessed on a rolling basis with the aim of assessing all assets over a five year period.

**Lower Murray Water** uses an engineering estimate of the replacement cost assuming the current service potential and using modern engineering equivalent assets.

**First Mildura Irrigation Trust** does not have the information regarding the methodology used to value its assets; however it does undertake a review of the effective lives of the infrastructure every five years.

**SunWater** uses depreciated replacement cost to value its assets. The effective life of assets is reviewed through regular condition assessments.

**Table 4.1 Characteristics of infrastructure operators (2004–05)**

Infrastructure operator	Main crops	Number of irrigation customers	Irrigation entitlements ('000 ML)	Type of entitlement (%)		Corporate governance structure
				General security	High security	
<b>Coleambally Irrigation</b>	wheat, rice, maize, horticulture	342	490	98	2	Private dual co-operative
<b>Murrumbidgee Irrigation</b>	rice, wheat, vines, citrus	3287	1210	77	23	Private non-listed
<b>Western Murray Irrigation</b>	vines, citrus	313	61	0	100	Private non-listed
<b>Murray Irrigation</b>	rice	2405 <sup>1</sup>	1479	99	1	Private non-listed
<b>Jemalong Irrigation</b>	lucerne	119	81	98	2	Private non-listed
<b>Central Irrigation Trust</b>	grapes, citrus	1507	154	1	99	Private Trust
<b>Renmark</b>	citrus, nuts, vines pasture, fruits	654	48	0	100	Statutory authority
<b>Sunlands</b>	citrus, vines	65	9	0	100	Private Trust
<b>Goulburn-Murray Water</b>	annual and perennial pasture, stone fruit	13841 <sup>2</sup>	1741	0	100 <sup>3</sup>	Statutory authority
<b>Lower Murray Water</b>	vines, citrus, fruits	1350	109	0	100 <sup>3</sup>	Statutory authority
<b>First Mildura Irrigation Trust</b>	vines, citrus	1206	62	0	100 <sup>3</sup>	Public Trust
<b>SunWater</b>	sugar, cotton	2666	868	100	0	Statutory government owned corporation

<sup>1</sup> number of properties

<sup>2</sup> number of properties (including stock and domestic), based on 2005–06 data

<sup>3</sup> Victorian irrigation authorities will have lower reliability shares from July 2007

Source: Infrastructure operators

**Table 4.2 Value of assets (as at June 2006) and revenue (2004-05) relating to water delivery services**

Infrastructure operator	Predominant type of irrigation	Irrigation entitlements ('000 ML)	Assets <sup>1</sup> (\$m)	Assets per ML (\$)	Revenue (\$m)	Revenue per ML (\$)
<b>Coleambally Irrigation</b>	Gravity - Channels	490	141 <sup>2</sup>	287	8.3	16.92
<b>Murrumbidgee Irrigation</b>	Gravity - Channels	1210	600 <sup>2</sup>	496	18.7 <sup>3</sup>	15.45
<b>Western Murray Irrigation</b>	Pumped - Piped	61	38 <sup>2</sup>	623	2.8	46.05
<b>Murray Irrigation</b>	Gravity - Channels	1479	393 <sup>4</sup>	266	26.5	17.92
<b>Jemalong Irrigation</b>	Gravity - Channels	81	13 <sup>5</sup>	160	1.0	12.36
<b>Central Irrigation Trust</b>	Pumped - Piped	154	252 <sup>2</sup>	1636	6.3	40.94
<b>G-MW - Gravity systems<sup>6</sup></b>	Gravity - Channels	1709	1621 <sup>7</sup>	948	49.7	29.09
<b>G-MW - Pumped systems<sup>8</sup></b>	Pumped - Piped	32	43 <sup>7</sup>	1369	2.1	64.99
<b>Lower Murray Water</b>	Pumped - Piped	109	131 <sup>2</sup>	1203	11.8	108.26
<b>First Mildura Irrigation Trust</b>	Pumped - Piped	62	50 <sup>5</sup>	806	5.6	90.32
<b>SunWater</b>	Pumped (69%) Gravity (31%)	868	723 <sup>9</sup>	833	23.5 <sup>10</sup>	26.79

<sup>1</sup> may include land, buildings and vehicles

<sup>2</sup> engineering replacement cost

<sup>3</sup> average revenue for period 2000-2001 to 2003-04

<sup>4</sup> replacement value

<sup>5</sup> current depreciated value

<sup>6</sup> Shepparton, Central Goulbourn, Rochester, Campaspe  
Pyramid-Boort, Murray Valley, Torrumbarry

<sup>7</sup> renewals replacement cost

<sup>8</sup> Nyah, Tresco, Woorinen

<sup>9</sup> depreciated replacement cost

<sup>10</sup> estimate, as difficult to separate pricing and institutional  
arrangements for bulk supply and water delivery

Source: Infrastructure operators

There is a clear relationship between the type of irrigation delivery system and both the revenue per ML of water entitlement and the value of assets per ML of entitlement. Infrastructure operators with pumped and piped systems tend to have a relatively high value of assets per ML of entitlement and high revenue per ML of entitlement. Those with gravity fed channel systems have lower values for these ratios.

It should be noted that the data presented in tables 4.1 and 4.2 is not intended to be used for benchmarking purposes, because differences in the operations of the infrastructure operators (such as economies of scale and geography of the irrigation district) would need to be taken into consideration in forming any conclusions as to the relative efficiency of the infrastructure operators.

### **Water delivery charges**

The fixed fees paid by irrigators for access to the delivery infrastructure tend to be made up of many fixed charges, rather than a single access fee. Infrastructure operators in New South Wales and South Australia apply a range of fixed charges levied on water entitlements. By contrast, Victoria is moving towards the implementation of unbundling water entitlements into water shares, delivery shares, and water-use licences. Under these arrangements, the fixed charges of Victorian infrastructure operators are levied on the delivery share. In Queensland, SunWater's fixed charges are levied per ML of contracted volume. Some infrastructure operators also have some smaller fixed charges that are levied on a per customer, landholding, or outlet basis.

All infrastructure operators also charge variable fees levied on the quantity of water delivered. Furthermore, some have a supplementary variable charge for water delivered above a certain threshold. The purpose and level of this threshold varies across the infrastructure operators.

## **4.4 The relationship between cost and pricing structures**

The majority of infrastructure operators' fixed costs relate to the initial capital investment, maintenance and renewal of network assets, and overheads. Open channel systems can also have the fixed costs of conveyance water, which is the amount of water required to cover for evaporation and seepage.

Variable operating costs are those that vary per ML of water delivered. In pressurised piped and pumped systems, the cost of the electricity to pump water is the main variable cost.

Table 4.3 sets out the cost structure of the infrastructure operators. In general, piped and pumped systems have a higher proportion of variable costs than gravity channel systems. The table also sets out the infrastructure operators' pricing structure; that is, the proportion of revenue from delivery services that is collected through fixed charges and the proportion collected through variable charges.

The degree to which the pricing structure aligns with the cost structure varies significantly across the infrastructure operators, ranging from Western Murray and G-MW (pumped systems), which both have pricing structures that are very close to their cost structures, to CIT, Murrumbidgee and Murray Irrigation that have pricing structures with a disproportionately high variable component.

**Table 4.3 Estimates of proportion of total costs that are fixed and variable, and revenue recovered from fixed and variable charges  
—water delivery services**

Infrastructure operator	Predominant type of irrigation	Proportion of costs		Proportion of revenue	
		Fixed costs (%)	Variable costs (%)	Fixed charges (%)	Variable charges (%)
<b>Coleambally Irrigation</b>	Gravity—channels	95	5	83	17
<b>Murrumbidgee Irrigation<sup>1</sup></b>	Gravity—channels	84	16	41	59
<b>Western Murray irrigation</b>					
<b>Buronga<sup>2</sup></b>	Pumped—piped	67	33	73	27
<b>Coomealla<sup>2</sup></b>	Pumped—piped	67	33	74	26
<b>Curlwaa<sup>2</sup></b>	Pumped—piped	79	21	82	18
<b>Murray Irrigation<sup>2</sup></b>	Gravity—channels	87	13	49	51
<b>Jemalong Irrigation</b>	Gravity—channels	90	10	60	40
<b>Central Irrigation Trust<sup>3</sup></b>	Pumped—piped	49	51	17	83
<b>G-MW – Gravity<sup>4</sup></b>	Gravity—channels	95+	up to 5	70-83	17-30
<b>G-MW – Pumped<sup>4</sup></b>	Pumped—piped	85	15	82-88	12-18
<b>Lower Murray Water</b>	Pumped—piped	89	11	62	38
<b>First Mildura Irrigation Trust</b>	Pumped—piped	65	35	57	43
<b>SunWater</b>	Pumped and Gravity	86	14	70	30

<sup>1</sup> based on 2005–06 revenue

<sup>2</sup> based on average revenue from 2001–02 to 2005–06 (in 2005–06 prices)

<sup>3</sup> based on 2005–06 budget revenue

<sup>4</sup> based on 2003–04 revenue

<sup>4</sup> based on 2007–08 forecast

Source: Infrastructure operators

## 4.5 Funding of capital works

All infrastructure operators discussed in this report use a form of renewals annuity to fund future capital expenditure, with the exception of Goulburn-Murray Water.

Renewal annuities are considered useful for infrastructure assets with the following characteristics:<sup>41</sup>

- the network is renewable rather than replaceable, that is, individual assets forming the system will be replaced according to their own useful lives, but the operating capacity of the asset system as a whole is maintained indefinitely, and
- demand for the foreseeable future is sufficient to warrant continual extension of asset system life by an ongoing process of renewal.

To calculate the annuity, infrastructure operators forecast future asset renewal and/or replacement and the associated future expenditure profile for a fixed, future period (typically 30–50 years). This estimated future expenditure profile is typically based on an engineering assessment of the networks assets.

The future expenditure profile may include estimates of future renewals and major periodic maintenance expenditure as well as network upgrades and expansions. This is then converted into an annualised charge (annuity/levy) which covers these estimated expenses so as to smooth the ‘lumpy’ expenditure involved in operating a water delivery network over time. Typically, regular (mostly constant) annual operating and maintenance expenses are excluded from these annuities.

For most infrastructure operators this annuity is charged as a separate fixed levy based on the water share/entitlement holdings of customers. For example:

- Members of CICL pay a membership/infrastructure levy to CIMCL which goes into a sinking fund to pay for capital expenditure. The infrastructure levy is based on projected capital expenditure requirements using a rolling 50 year expenditure profile.
- Murrumbidgee Irrigation customers pay an asset levy that goes into a sinking fund to pay for capital expenditure. The asset levy is based on projected capital expenditure requirements using a rolling 50-year expenditure profile.
- Murray Irrigation customers are levied a water supply asset maintenance/renewal charge that is paid into an asset replacement reserve.
- Western Murray has a sinking fund charge to fund the replacement of its infrastructure into the future.
- Jemalong Irrigation has an asset refurbishment provision which reflects a contribution to the future cost of replacing and refurbishing the delivery asset base.

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<sup>41</sup> Ernst and Young, *SCARM Water Industry Asset Valuation Study—draft guidelines on determining full cost recovery*, August 1997.

- SunWater funds future capital works for refurbishments (not scheme extensions) through an annuity that is incorporated into its fixed charges. It calculates the annuity over a 30-year rolling annuity term.

Central Irrigation Trust does not charge a specific levy on customers, rather a calculated amount of CIT revenue is appropriated annually to an asset replacement reserve and invested. The reserve ensures that sufficient funds are put aside to replace assets in perpetuity when they reach the ends of their economic life.

Until recently, all infrastructure operators in Victoria recovered capital expenditure through an annuity approach. Lower Murray Water and First Mildura Irrigation Trust have retained the annuity method for some assets, however all assets constructed from 1 July 2006 are now subject to the Regulated Asset Value approach. Since 1 July 2006 Goulburn-Murray Water has funded future capital works through debt, prior to this capital works were funded by a renewals charge on customers.

## **4.6 Contractual arrangements with customers**

As discussed in chapter 2, the irrigation districts in the southern Murray–Darling Basin were developed without complete ex ante contracts in place.

The infrastructure operators have water supply agreements with irrigators that specify the rights and obligations of the parties to the agreement. Under these agreements, the irrigator is expected to pay the fees and charges determined by the infrastructure operator in accordance with the irrigator's water or delivery entitlements and volumetric use. The infrastructure organisations have the right to vary the number, type or quantum of fees and charges at any time in order to meet their actual or anticipated costs. Irrigators are informed of the actual quantum of any fees on an annual basis or as specified in the water supply agreement. Accordingly, these agreements are not complete long-term ex ante contracts of the nature discussed in section 3.4, as they do not specify the amount of any exit or termination fees (or formulae for how such would be calculated).

However, in recent years some infrastructure operators and customer groups have entered into ex ante long-term contracts prior to significant specific infrastructure investment being undertaken

## **4.7 Exit fees**

At present, Coleambally Irrigation, Murray Irrigation, Murrumbidgee Irrigation, Jemalong Irrigation, Western Murray Irrigation, Central Irrigation Trust and SunWater have exit fees. Table 4.4 provides details of the exit fees applied or proposed by these infrastructure operators.

These exit fees are levied on water entitlements when sold out of the district, with the exception of SunWater, where customers have transport contracts which define their individual delivery rights. SunWater's exit fees apply to any transfers of water out of channel segments where the transport contract is terminated, with the size of the exit fee based on the volume specified in the contract irrespective of any water entitlement holdings.

**Table 4.4 Level and key parameters of exit fees**

Infrastructure operator	Exit fee (\$/ML)	Discount rate (% real)	Time horizon (years)	Tax (%)	On-going supply obligation <sup>1</sup>
<b>Coleambally Irrigation</b>	(GS) 479.35 (HS) 871.55	4	Perpetuity	30	Yes
<b>Murrumbidgee Irrigation</b>	(GS) 275.00 (HS) 450.00	4	Perpetuity	0	No
<b>Western Murray</b>					
<b>Buronga</b>	738.18	5	50	0	No
<b>Coomealla</b>	534.06	5	50	0	No
<b>Curlwaa</b>	434.71	5	50	0	No
<b>Murray Irrigation</b>	447.43	4	50	30	Yes <sup>2</sup>
<b>Jemalong Irrigation</b>	269.00	5.5	25	30	No
<b>Central Irrigation Trust</b>	360.00	5.7	52 <sup>3</sup>	-	No <sup>4</sup>
<b>SunWater<sup>5</sup></b>	31.68 - 268.97 <sup>6</sup>	4.97	10	-	No

<sup>1</sup> This relates to whether the infrastructure operator considers it has a continuing obligation to supply water delivery infrastructure to a customer even if all their water entitlements are sold.

<sup>2</sup> Murray Irrigation requires all landholdings to retain five water entitlements, which provides landowners with access to one flow share.

<sup>3</sup> Based on weighted average useful remaining life of assets.

<sup>4</sup> The right to have water delivered would be retained if a customer intends to temporarily trade annually to cover water used. In this case a minimum service charge would apply.

<sup>5</sup> The exit fee is based on the volume of water entitlement specified in the contract. Customers do not have to terminate their contract; they can continue to pay annual fixed charges.

<sup>6</sup> Each channel segment has a different exit fee.

GS = General security

HS = High security

Source: Infrastructure operators

The Victorian infrastructure operators do not currently charge exit fees. As of 1 July 2007 water rights will be unbundled into water shares, delivery shares and water use licences. When unbundling has occurred customers will have the option of surrendering the delivery share on condition of payment of a delivery share surrender fee or otherwise continuing to pay the annual access fee. Customers will also have the option of trading their delivery share to another customer on the supply system, who would then assume responsibility for paying the annual access fees.

The New South Wales infrastructure operators and CIT have calculated exit fees by estimating the net present value of the fixed costs of providing the core water delivery service. The discount rate used in the net present value calculation varies, but most have used a long amortisation period to reflect the long life nature of the assets. In



general, the exit fees exclude bulk water charges, government funding contributions and variable costs, and include annual operations and maintenance costs and periodic maintenance expenditure. Some exit fees also include annuities relating to expenditure on the replacement of assets and other future capital expenditure. CICL, Murray Irrigation and Jemalong Irrigation gross up their exit fees to account for tax.

SunWater calculates its exit fee based on the present value of the lost fixed income to the channel system over a ten-year period. None of the other infrastructure operators base their exit fees on the actual access fees charged to remaining irrigators.

Some infrastructure operators consider that exit fees represent a prepayment of future access fees and therefore they have a continuing obligation to provide irrigators who have paid an exit fee with access to the supply infrastructure.

With the exception of SunWater, none of the infrastructure operators will allow customers to continue to pay annual access fees instead of an exit fee.

The Victorian infrastructure operators do not have the power to charge a delivery share surrender fee until after water entitlements are unbundled. LMW has not formulated a strategy for determining delivery share surrender fees, while G-MW and FMIT are currently in the progress of determining their surrender fees. G-MW intends that the delivery share surrender fee will be based on the same costs used to determine the access fee.

For all Victorian authorities the payment of a delivery share surrender fee will not entitle the customer to have water delivery maintained. However, G-MW proposes that a landowner may be able to have water delivered as a casual user while the distribution system that services the property remains in place and so long as this does not interfere with delivery of water to other landowners holding delivery share.

## **4.8 Assessment of current arrangements**

### **Corporate governance arrangements**

For the most part, infrastructure operators appear to be functioning on a not for profit/break even basis. In the case of the irrigation corporations in New South Wales the shareholders of these corporations are also the customers creating a quasi co-operative.

With the exception of the Victorian authorities (where charges are regulated by the ESC) most infrastructure operators seek approval of their charges (by majority vote) from irrigators. This suggests that even though many of these infrastructure operators are in a monopoly supply position they are unlikely to exercise market power in setting the fees levied on **all** irrigators.

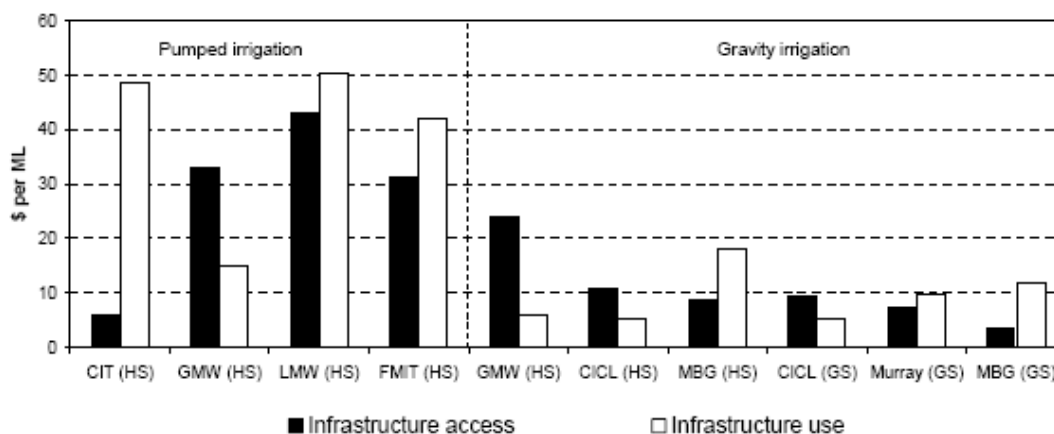
The exception is likely to be in the setting and application of exit fees, which are charged on irrigators wishing to cease or reduce demand for delivery services. Only a small proportion of irrigators are likely to incur an exit fee, whereas the majority of irrigators choosing to maintain delivery access will have an incentive to set exit fees as high as possible.

## Delivery charges

Charges for the delivery of water differ significantly across infrastructure operators. This would appear to be related to differences in the costs of operating and maintaining different networks, their charging structure and methodology adopted to calculate these charges.

Differences in the capital and operating costs of pressurised piped systems compared to gravity channel networks appear to account for a significant proportion of the difference in delivery charges between these types of irrigation networks. Figure 4.1 illustrates the difference in charges between primarily pumped and gravity irrigation infrastructure operators. In general pumped irrigation districts have higher average charges, and a higher proportion of revenue recovered through variable charges.

**Figure 4.1 Comparisons of access and usage charges—selected infrastructure operators, 2004–05**



Note: Excludes environmental or planning levies. HS refers to high security entitlements. GS refers to general security entitlements. MBG refers to Murrumbidgee Irrigation.

Source: Productivity Commission Staff Paper *Stranded Assets*, with estimates based on data supplied by infrastructure operators.

These differences in the pricing structure that result from differences in the operating costs can be expected to feed through to any exit fees or termination fees.

Section 65 of the NWI states that:

In accordance with NCP commitments, the States and Territories agree to bring into effect pricing policies for water storage and delivery in rural and urban systems that facilitate efficient water use and trade in water entitlements, including through the use of:...

...iii) consistency in pricing policies across sectors and jurisdictions where entitlements are able to be traded.

Although the networks have different costs and therefore different levels of charges, there appears to be a lack of consistency in the approach, structure and methodology for calculating delivery charges and exit fees across infrastructure operators within the southern Murray–Darling Basin.

While a couple of infrastructure operators appear to have charging structures that closely match their cost structure, the majority appear to be recovering a lower proportion of revenue through fixed charges than would be indicated by their fixed costs. Some have indicated this is to encourage water use efficiency and assist irrigators in managing their cash flows.

Infrastructure operators use a range of methodologies for calculating their charges. The charges (both fixed and variable) associated with operating and maintaining the water delivery infrastructure are either calculated based on past operating expenditure or through the conversion of future forecast operating expenditure into an annualised charge, in order to smooth this price path.

With the exception of Goulburn-Murray Water, all infrastructure operators use an annuity approach to fund future capital expenditure. Whether or not this is charged as a separate levy on customer's water entitlement holdings varies across infrastructure operators.

The estimated future expenditure profile used for calculating annuities often includes estimates of future renewals and major periodic maintenance expenditure and more often than not network replacement, upgrades and expansions.

The lack of consistency in the capital and operating costs of networks, the charging structure, approach, and calculation methodology also has implications for the proposed termination fee regime as considered in chapter 6.

## **Exit fees**

With the exception of the Victorian authorities, all infrastructure operators in the southern Murray–Darling Basin have bundled (water and delivery) entitlements. Therefore, where exit fees are applied they are applied to the water entitlement.

These exit fees typically represent a high proportion of the water entitlement value:

- Some appear to be up as high as 80 per cent of the market value of the water entitlement. This appears to be the case for both Murray Irrigation and Coleambally Irrigation.<sup>42</sup>
- Others are in the order of the 30–50 per cent of the market value of the water entitlement.

The higher exit fees as a proportion of the traded price of water, the larger the resulting welfare loss. As discussed in chapter 3, ABARE modelling has indicated that an exit fee of 30 per cent of the value of the water entitlement would reduce the gains from trade by around 18 per cent compared to a free trade scenario. Exit fees higher than 70 per cent can prevent all trade.<sup>43</sup>

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<sup>42</sup> Estimate based on quoted 2005–06 exit fees and the average water prices for the 2004–05 season as contained in ANCID Benchmarking Report 2004–05.

<sup>43</sup> ABARE 2006.

Given exit fees are levied on the sale of water entitlements they could be considered to be a barrier to trade. As a result, jurisdictions in which infrastructure operators levy exit fees could be considered not to comply with Section 62 of the NWI, which states that:

Recognising the need to manage the impacts of assets potentially stranded by trade out of serviced areas, the Parties agree to ensure that support mechanisms used for this purpose, such as access and exit fees and retail tagging, do not become an institutional barrier to trade.<sup>44</sup>

Furthermore, the relative quantum of these exit fees as a proportion of the market value of the water entitlement would suggest that in many areas exit fees may be a substantial barrier to trade.

Exit fees charged by infrastructure operators are typically calculated as the net present value of estimated annual fixed costs using an amortisation period of 50 years or greater in order to fully insulate the infrastructure operator against the decrease in future revenue.

The tendency of infrastructure operators to increase variable delivery charges above the level that would be indicated by variable costs, has resulted in fixed charges for access to the infrastructure that do not fully recover fixed costs. This has led to infrastructure operators calculating the exit fees with reference to the fixed costs rather than the (lower) fixed access fees charged on irrigators remaining within the network.

The protocol on access and exit fees contained within Schedule E of the Murray–Darling Basin Agreement states in Part 6 that any exit fee should:

- 2 (a) be calculated with reference to the same fixed costs associated with servicing the relevant land with irrigation infrastructure, as are the basis for setting access fees for other land serviced by that irrigation infrastructure;

Furthermore, most infrastructure operators do not provide irrigators that sell their water entitlements with the option to continue to pay access fees rather than an exit fee. However, Part 5 of Schedule E states that

- 3 (d) the owner of the land serviced by irrigation infrastructure should be able to choose whether to continue to pay access fees, or to pay a relevant exit fee instead.

The current arrangements for the calculation and implementation of exit fees therefore do not appear to comply with all aspects of Schedule E of the Murray–Darling Basin Agreement.

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<sup>44</sup> COAG 2004, *Intergovernmental agreement on a National Water Initiative*.

## 5 Competitive neutrality

One of the objectives specified by the relevant governments is that the proposed regime be ‘competitively neutral’ in terms of its effect on interstate water trading.

The ACCC understands that this is due to concerns that if infrastructure operators located in different states adopt varying arrangements for setting exit and access fees it is likely to affect the pattern of trade in water compared to that which would occur if all infrastructure operators adopted the same arrangements.

It is not possible to predict what pattern of water trade will occur as the market is opened up, as there are a wide range of factors that will ultimately determine how, when and where water is traded over time. These include:

- Differences in the marginal value of water in use, both between different agricultural commodities, and also between different categories of end users such as agriculture, industry, urban and the environment.

Factors that affect the relative marginal value of water in use include not only the relative price of outputs (eg commodity prices), but also the relative costs of end users such as:

- fees and charges of the irrigation water delivery businesses
  - costs incurred by private diverters
  - preferential tax concessions available to some end users, and
  - the extent to which end users pay the same amount for the water that they use.
- Natural restrictions on where water can be traded, such as the particular geography of river and storage systems, including any physical constraints on rivers (such as the Barmah Choke).
- The amount of rainfall that occurs and the amount of water that is available to be traded in any year (i.e. level of allocations), as well as expectations of future reliability of water entitlements.
- Institutional arrangements for water trade, such as limits on the amount of water that can be traded out of any area, across state boundaries, or between different user groups.
- Transaction costs involved in undertaking certain trades.

The fees and charges of the irrigation water delivery businesses are therefore just one factor that will affect interstate water trading, albeit a potentially significant factor considering that some exit fees are currently in the order of up to 80 per cent of the market value of the water entitlements.

Infrastructure operators have differing cost structures, depending on such factors as type of assets (e.g. piped or open channels), whether the system is predominantly gravity fed or pumped, and the degree of economies of scale. Infrastructure operators

also have differing responsibilities that affect their overall costs, such as environmental monitoring, and the maintenance of bridges and culverts.

Although some of these differences may arise because of the state in which each infrastructure operator is located, (for example, costs in respect of environmental monitoring), they are largely a function of the particular history of the development of each network.

The ACCC has therefore interpreted competitively neutral in the context of interstate water trading to describe a regime for the calculation and implementation of exit fees, access fees and termination fees that:

- takes into consideration the respective costs of the infrastructure operators, and
- is implemented on a consistent basis by all infrastructure operators across all jurisdictions.

It follows that a regime can be competitively neutral even if:

- the access fees and termination fees calculated using the regime vary across infrastructure operators, and/or
- the quantity of water traded out of (or into) irrigation districts varies across infrastructure operators and across jurisdictions.

## 6 Proposed regime

The third task that the ACCC was asked to undertake was to develop a well defined methodology for the calculation and application of exit fees and access fees charged by providers of irrigation water delivery services.

### 6.1 Unbundling of water rights and delivery rights

In general, fees and charges should be levied on the services to which they relate. Thus, fees and charges of infrastructure operators for water delivery services should be levied on those services, not on water entitlements held by irrigators (either directly or indirectly through a share in the infrastructure operators' water entitlements.)

Unbundling the right to have water delivered from any right to water, and recovering the costs of providing delivery services from holders of delivery entitlements rather than holders of water entitlements, allows irrigators to maintain access to delivery infrastructure independent of their holdings of water entitlements. Irrigators can therefore:

- sell water without incurring an exit fee
- adopt different water sourcing options, such as leasing or buying seasonal allocations,<sup>45</sup> and
- make decisions about their holdings of water entitlements and holdings of delivery entitlements independently and at different times, based on information relevant to each asset available at the time.

Unbundling also provides greater information to infrastructure operators regarding the demand for delivery services, and allows them to manage and operate their networks accordingly. For example, when water entitlements and delivery entitlements are bundled, it is not clear whether a seller of a water entitlement wants to cease having access to water delivery services, or proposes to purchase seasonal allocations in the future.

Because the fixed costs of operating the network are recovered from charges levied on delivery entitlements, there is no need to have exit fees levied on the sale of water entitlements. This prevents exit fees acting as a barrier to the trade of water.

⇒ **The right to have water delivered should be unbundled from any water entitlement, and should be recognised through a separate delivery entitlement.**

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<sup>45</sup> This is consistent with the section 58 of the NWI, which states that:

The States and Territories agree that their water market and trading arrangements will: ...

iii. enable the appropriate mix of water products to develop based on access entitlements which can be traded either in whole or in part, and either temporarily or permanently, or through lease arrangements or other trading options that may evolve over time.

- ⇒ **The rights and obligations of this delivery entitlement should be clearly specified including, permissible extraction/supply rates, specified times, locations, circumstances and service levels.**
- ⇒ **The fixed costs of providing delivery services should be recovered through an access fee levied on delivery entitlements.**
- ⇒ **There should be no fees levied on the sale of water entitlements out of an irrigation district (i.e. exit fees).**

Most infrastructure operators have some congestion in delivery capacity during peak periods. During these peak periods infrastructure operators typically utilise a queuing system or implement restrictions based on a flow share proportional to an irrigator's water entitlement in order to manage congestion issues. The latter arrangement implies many infrastructure operators already recognise irrigators have an implicit delivery entitlement proportional to their water entitlement holding. Some infrastructure operators also noted that better specification of delivery rights would assist with management of congestion within their network.

Allowing the delivery entitlement to be tradeable will allow for a more efficient allocation of the delivery capacity in the network. Furthermore, an irrigator who requires a greater level of service, that is, higher security of delivery or higher supply rate will be able to purchase additional delivery entitlements, rather than paying for additional supply headworks or additional on-site storage infrastructure.

- ⇒ **Delivery entitlement (and therefore any obligations associated with holding the delivery entitlement) should be tradeable. As delivery entitlements will be heterogeneous due to location specific factors, transfer should be subject to the infrastructure operator's approval to allow it to consider the implications of any proposed transfer on its overall water delivery operations.**

### **Pricing based on implicit separate water and delivery rights**

Creating fully defined, separate, tradeable delivery entitlements could involve considerable time and cost. For example, there may be significant work involved in determining where and when there may be congestion in the various components of the network to specify delivery rights into various components relating to different parts of the network.

Some infrastructure operators suggested that they would prefer (particularly in the short term) to be able to set fees 'as if fully unbundled'; that is, set access fees on the implicit delivery entitlements that are proportional to each irrigator's water entitlement. For example, if access fees were to be implemented on 1 January 2007, these could be based on the implicit delivery entitlement that corresponds to irrigators' water entitlement holdings as at 31 December 2006. This arrangement can therefore be achieved in a manner that has no impact on the fixed fees that irrigators currently pay where levied on their holding of water entitlements. It will only affect their fees and charges if they subsequently sell their water entitlements, or terminate their (implicit) delivery rights.

Setting fees and charges as if fully unbundled would realise most of the benefit of unbundling as detailed above, so long as irrigators wishing to sell their water



entitlements have the option to continue to pay delivery access charges. This means the decision about whether or not to terminate the delivery service is made independently of the decision to sell the water entitlement. If this is the case, charging ‘as if fully unbundled’ implicitly creates unbundled (albeit not well specified) delivery rights.

Allowing infrastructure operators to charge as if fully unbundled should not prevent them from moving to create explicit, well defined and tradeable delivery entitlements in the future. Once this interim arrangement is established, based on the experience in Victoria it is likely that progressing to a more explicit arrangement would be sought by irrigators.

Furthermore, it may be appropriate for state and federal governments to consider what assistance could be provided to infrastructure operators to meet the costs of moving towards having well-defined, tradeable delivery entitlements. For example, if it is considered that this outcome will contribute to economically efficient use of water resources through improvement and rationalisation of water delivery infrastructure, it may fall within the scope of the Raising National Water Standards programme administered by the NWC.

⇒ **Access fees can be charged on implicit delivery entitlements until June 2010, by which time water entitlements and delivery entitlements should be fully unbundled, and the latter tradeable.**

### **Retail tagging**

Retail tagging involves water entitlements being sold to an irrigator (or other water user) located outside of the seller’s irrigation district on condition that the new owner takes on the seller’s obligation to pay the fees and charges levied on the water entitlement by the seller’s infrastructure operator.

Water entitlements purchased under a retail tagging arrangement maintain the same rights and obligations as other water entitlement, since the owner could specify a delivery point within the irrigation network and the infrastructure operator would be obligated to deliver water to that delivery outlet subject to the physical capacity of the network to deliver to that point.

There is therefore no need for the proposed regime to differentiate between water entitlements that have been purchased under a retail tagging arrangement and other water entitlements. Fixed fees and charges currently attached to these water entitlements should be levied on the implicit delivery right, and owners of water entitlements purchased under a retail tagging arrangement should have the opportunity to continue to pay these on-going access fees or terminate their implicit delivery entitlement.

However, as retail tagging has a similar affect as exit fees in respect of acting as a barrier to the trade of water, water entitlements should no longer be sold under a retail tagging arrangement.

⇒ **The proposed regime should apply to any water entitlements that have previously been purchased under a retail tagging arrangement. Water entitlements should no longer be sold under a retail tagging arrangement.**

## 6.2 Termination of a delivery entitlement

If irrigators are required to pay access fees in perpetuity, there is no mechanism to signal to the infrastructure operator that the value of having access to delivery services is less than the access fee charged for those services.

It follows that if water delivery services are not required, the infrastructure operator should not be obligated to deliver water, or be obligated to be able to deliver water, to the irrigator. This will allow the infrastructure operator to efficiently manage and rationalise its network over time. However, while not obligated to be able to deliver water, the infrastructure operator could still negotiate service delivery on a casual basis.

- ⇒ **The owner of a delivery entitlement should have the right to be able to surrender (terminate) some part or all of that entitlement, subject to the payment of any termination fee. The process for such should be clearly specified.**
- ⇒ **Upon the termination of a delivery entitlement:**
  - **the infrastructure operator should no longer be obligated to deliver water, or be obligated to be able to deliver water, as specified under the delivery entitlement, and**
  - **any obligations to pay on-going access fees in relation to the delivery entitlement are cancelled.**

The ACCC considered the view that the payment of an exit fee is essentially a prepayment for access for a set period (possibly in perpetuity), and therefore the infrastructure operator is obligated to maintain the capacity to deliver water to that irrigator for the duration of that period. The ACCC does not support this approach. Although an exit fee or termination fee can be considered as being a prepayment of some proportion of future fixed costs of operating the delivery network, if the infrastructure operator is required to meet its previous obligations under the terminated delivery entitlement it would prevent efficient management and rationalisation of the network over time.

## 6.3 Security over collection of ongoing access fees

Some infrastructure operators have raised concerns with unbundling of water and delivery rights, suggesting that it may:

- give rise to a range of commercial, practical and social concerns surrounding the recovery of access fees, where access fees are no longer secured against the value of the water entitlement; and
- lessen the revenue surety of the infrastructure operator, thereby increasing its overall risk profile.

On the other hand a report prepared for the Australian Bankers Association (ABA) has identified that financiers are concerned that under the existing bundled arrangements, an exit fee is essentially applied as a priority claim to any mortgage which may have been registered over the water entitlement, even if this mortgage was registered prior to

the exit fee arrangements being established.<sup>46</sup> The ABA has suggested that this has the potential to compromise the rights of existing mortgagees by reducing the value of the water entitlement as a security and possibly discouraging financiers from lending to water entitlement holders.

Allowing irrigators to elect to maintain their delivery entitlements following the sale of their water entitlements would only deteriorate the revenue security of the infrastructure operator where there is a direct and consequential impact on the financial viability of a delivery entitlement holder that affects their capacity to meet their ongoing access fee responsibilities.

The sale of an irrigator's water entitlement will not necessarily mean they would be unable to meet their access fee obligations in the future. An irrigator may elect to sell their water entitlement, but then acquire a water allocation through temporary (inwards) trade each season with no operational impact on their farming practices or farm profitability. Selling a water entitlement may also permit the irrigator to raise capital to move into other farming methods or crops, thereby maintaining or improving their ability to pay the ongoing access fee.

Unbundling itself does not change the incentives for irrigators to meet their access fee responsibilities. Irrigators would remain contractually responsible for the payment of the access fee. Existing legal remedies for the recovery of any debts to the infrastructure operator would remain. The legal and social/community disciplines on an irrigator paying the access fee are unchanged.

It was suggested that providing infrastructure operators with a statutory 'preferred creditor' status would address their concerns regarding this issue. However, any elevation of infrastructure operator's priority of claim over an irrigator's assets in the event of a default in payment of the access fee raises some complex legal, economic and risk issues. Presently, the Corporations Act (s. 556) provides for priority claim, after secured creditors have been satisfied, for legal/administration costs of insolvency and employee entitlements.<sup>47</sup> These creditors rank above all other unsecured creditors.

There does not appear to be strong social or economic reasons for providing infrastructure operators with similar or equivalent priority creditor status. Rather, elevating an infrastructure operator's creditor status may introduce a number of 'moral hazard' type issues, where the infrastructure operator's management of access fee debts is affected by the knowledge that it has prior claim over other creditors.

In general, where infrastructure owners have long-term contracts with customers, such as in the natural gas industry, parties know that the contract will be enforced through standard legal processes if required. Specific security is therefore not sought. However,

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<sup>46</sup> Scrivco, *Finance and trade implicates of public and private sector entities managing the ownership of bulk water entitlements on behalf of individuals*, September 2006, prepared for the ABA.

<sup>47</sup> Employee entitlements are given preferential treatment on account of employees being ill-placed to assess an employer's credit risk and their inability to diversify this risk; administration/legal costs are preferred on the grounds that creditors have a 'community of interest in having a common agent to maximise a fund for distribution among them'.

in these circumstances there tends to be only a small number of large commercial customers.<sup>48</sup>

The ACCC recognises that in the case of irrigation water delivery networks, there are a large number of smaller customers. Furthermore, infrastructure operators have not developed appropriate credit risk management systems because in most cases they have had security of future payments because of restrictions on the trade of water entitlements.

The ACCC therefore proposes that infrastructure operators be able to seek alternative security (eg unmortgaged land or bank guarantees) as a condition of the sale of water entitlements where the irrigator elects to maintain their delivery rights—but only in specific circumstances.

The requirement on irrigators to provide an alternative form of security should not form part of the infrastructure operator's general conditions of sale, as this could impose considerable delays and transaction costs on all permanent sales and possibly impede trade. Rather the infrastructure operator should request this only in specific situations where it has particular and significant concerns regarding an irrigator's credit risk. This assessment should be relevant, robust and practical and able to be independently verified and understood by irrigators. For example factors that could be considered as evidence of creditor risk include poor history of past payments together with prior defaults.

The quantum of any security collateral requested could at most be the termination fee that would be required upon the termination of any delivery entitlements kept by the irrigator. However, given that irrigators wishing to sell all or a portion of their water entitlement have limited recourse to oppose an infrastructure operator's decision to seek alternate security as a condition of sale, as a minimum, this requirement should not be imposed where the value of the irrigator's remaining water entitlement holdings (as valued at the time of the application for termination) is greater than 50 per cent of the termination fee associated with the irrigator's remaining delivery entitlement holdings.

While the above arrangements may result in a small number of irrigators who may otherwise have sold all of their water entitlements continuing to hold some water entitlements, they would still be able to trade any allocations associated with those entitlements on a temporary basis.

The proposed approach is not the same as allowing the infrastructure operator to take priority creditor status over the value of the water entitlement as security for future payment of the access fee. Indeed the water entitlement need not be the collateral secured by the infrastructure operator. This provision has been based on the assumption that an irrigator with a 'reasonable' quantum of remaining water entitlements is more likely to have sufficient financial credit worthiness so as to not have to provide any additional security to the irrigation company.

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<sup>48</sup> It has been suggested that security over future access payments could be likened to the deposit of a bond for rental of land or property. However, as these assets can generally be re let to other users within a relatively short time frame, the analogy is not particularly relevant to the case at hand.

It could be argued that the allowance for infrastructure operators to seek security as a condition of approval for some trade could present an unnecessary barrier to trade. The ACCC therefore recommends that a review of these arrangements forms part of any future review of the proposed regime to ensure they do not unduly restrict trade or result in any significant implications for the ability of both infrastructure operators and financiers to manage credit risk.

- ⇒ **The requirement to provide security over an obligation to pay on-going access fees should not be a general condition of sale of water entitlements.**
- ⇒ **Infrastructure operators should only seek appropriate security as a condition of the sale of water entitlements where:**
  - **the value of the seller's remaining water entitlements (at the time of sale) is less than 50 per cent of the termination fee associated with any remaining delivery entitlements, and**
  - **the infrastructure operator has significant concerns with respect to the possibility of the seller defaulting on the payment of ongoing access fees.**
- ⇒ **These arrangements for security of future payment of access fees should form part of any future review of the proposed regime, in order to appraise the effectiveness of, and ongoing need for, this instrument.**

## **6.4 Calculation of access fees**

As discussed in chapter 3, access fees should be set to recover the fixed costs of providing water delivery services. Any variable costs associated with water delivery should be collected via a variable water delivery charge.

- ⇒ **The annual access fee should be levied on the delivery entitlement to recover the fixed costs of providing on-going access to core water delivery services to customers within the infrastructure operator's area of operations. This includes:**
  - **Fixed operating expenditure (e.g. annual maintenance, administration costs, debt servicing costs).**
  - **Any annuity for expenditure associated with periodic network maintenance and renewal, based on forecasts of prudent and efficient costs.**
- ⇒ **The following costs should not be included in the access fee:**
  - **Bulk water charges: Costs associated with bulk water should be levied on water entitlements.**
  - **Variable operating costs: Operating costs that vary with the quantity of water delivered should be levied on the volume of water delivered.**

Any upgrade or extension of the network that improves the quality of service or increases the capacity of the network, rather than simply maintains the current design level of service, is clearly new capital expenditure rather than a fixed operating cost of maintaining a prior investment. It would therefore not be appropriate for this to be included within any calculation of a termination fee.

In most industries where there are long lived capital assets, capital works are financed through a combination of debt and equity at the time the works are undertaken. However, given the practice of some infrastructure operators financing future capital expenditure through a levy based on an annuity of their future expenditure profile, the ACCC has not formed a view as to how future capital expenditure should be financed.

However, many infrastructure operators currently charge a single levy based on an annuity of their future expenditure profile that does not separate any proposed capital expenditure associated with upgrades or extensions of the network from other expenditure. Calculation of an access fee according to the above will therefore require some infrastructure operators to review how they classify future expenditure.

Where an infrastructure operator wishes to charge a levy to fund future capital expenditure of the above nature, this should not be levied on water entitlements. If levied on delivery entitlements or on some other basis as considered appropriate by the infrastructure operator, an irrigator that terminates all of their delivery entitlements should not be obliged to continue to pay this levy.

- ⇒ **The access fee should not include any costs associated with future capital expenditure that improves the quality of service or increases the capacity of the network, rather than maintains the current design level of service.**
- ⇒ **Future capital expenditure of this nature can be financed through the collection of a separate levy that is not applied to water entitlements. An irrigator terminating all of their delivery entitlement should not be obliged to continue to pay this levy.**

The ACCC also undertook some preliminary analysis of the extent to which access fees should include a return of capital and return on capital, especially when capital expenditure is 'pre-paid' through the collection of levies, or has been paid for by governments in the past. These questions raise numerous further issues, including how to value assets, assessment of risks faced by infrastructure operators, and how to take into account views of irrigators about intergenerational equity. Resolving these issues will take more time than available for the current task.

However, as the Essential Services Commission regulates the fees and changes of infrastructure operators in Victoria, and the ownership structure will provide a natural check on access fees of the infrastructure operators in New South Wales and South Australia, the proposed regime for the calculation of access and termination fees does not rely on the resolution of all of the above issues in respect of access fees.

The ACCC proposes to continue to undertake analysis of these issues, working in consultation with the relevant state-based economic regulators through the Utility Regulators Forum, with a view to producing detailed guidelines on the determination of access fees if requested.

## **6.5 Calculation of termination fees**

### **Linking the termination fee and access fee**

The purpose of a termination fee is to recover a share of the fixed costs that cannot be avoided upon termination of a delivery entitlement. It should therefore be based on the

access fee, which is levied to recover the fixed costs of providing customers with access to water delivery services. As a result of this approach, the termination fee will change with any changes in the access fee.

Only a small proportion of irrigators are likely to incur a termination fee, whereas the majority of irrigators will have an incentive for it to be set as high as possible. However, most of the fees and charges set by infrastructure operators are constrained through either an independent regulator or the particular ownership structure of the infrastructure operator. Basing the termination fee on the access fee will therefore provide a check on the level of the termination fee because irrigators who seek to terminate service will face fees based on the same costs that are incorporated into the ongoing fees faced by customers who remain serviced.

⇒ **The termination fee should be based on the actual annual access fee levied on the delivery entitlement at the time of termination.**

### **Use of shadow access fee for purpose of calculating termination fees**

Some infrastructure operators currently have a tariff structure such that the fixed access charges are substantially less than the fixed costs of providing delivery services. A termination fee based on the actual access fee would therefore be substantially lower than a termination fee based on the actual fixed costs.

Whilst the ACCC expects that these infrastructure operators will choose to align their tariff structure with their cost structure over time, it is proposed that it should be possible to base the termination fee on a 'shadow access fee' as an interim arrangement.

The shadow access fee is the access fee that would be charged to all irrigators if the access fees were set to recover fixed costs and variable charges were set at a level to recover variable costs.

To ensure the calculation for shadow access fees equates with the methodology used for calculating other water delivery charges, the shadow access fee should be calculated relatively simply by adding to the actual access fee the fixed costs collected via variable fee income, per ML of delivery entitlement. This addition will equate to the variable fee income less the estimated variable costs.<sup>49</sup>

Use of a shadow access fee to calculate the termination fee does not alter any other aspects of the proposed regime. In particular, an irrigator that sells their water entitlement must still have the option to continue to pay the actual delivery access charge rather than the termination fee.

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<sup>49</sup> The proportion of fixed and variable costs should be estimated based on actual costs over a period. These cost proportions can then be applied to the total fee income to generate estimates of variable and fixed costs. The ACCC does not hold a firm view on whether fee income should be based on actual or budgeted figures. However, it is critical that the basis of the total fee income and the variable fee income figures is the same and that variable/fixed costs are estimated based on a proportion of this total income. Furthermore the fee income and estimated cost figures should be based on the income generated by, and costs relevant to, providing water delivery to the relevant specific irrigation pricing group.

- ⇒ **Where an infrastructure operator has a tariff structure that has access fees lower than the fixed costs of providing services, the infrastructure operator can charge a termination fee based on the shadow access fee until June 2010.**
- ⇒ **The shadow access fee is the actual access fee plus the fixed costs collected via variable fees (per ML of delivery entitlement).**
- ⇒ **The holder of the delivery right must be given the choice between paying the termination fee and continuing to pay the actual, not shadow, access fee.**

Given that the calculation of a shadow access fee is not subject to the same checks and balances as actual access fees, use of a shadow access fee to calculate a termination fee will require the infrastructure operator to provide all relevant information as part of any monitoring requirement to demonstrate that the shadow access fee has been calculated appropriately.

- ⇒ **An infrastructure operator that chooses to set termination fees based on a shadow access fee should be required as part of any monitoring regime to provide all information necessary to demonstrate that the shadow access fee has been calculated appropriately.**

### **Treatment of identifiable avoided fixed costs**

There may be some situations where termination of delivery entitlements does not warrant the payment of a termination fee, such as when:

- The access fee charged to an irrigator (or group of irrigators) does not, or many not in the near future recover the specific (rather than common) cost of supplying that irrigator (or group of irrigators). This situation is more likely to arise for those irrigators located towards the end of a spur line/channel, and where access fees are set on a postage stamp pricing basis.
- Parts of the network suffer from congestion.
- Supply to the irrigator has negative environmental externalities that result in increased environmental management costs for the infrastructure operator.

The termination fee should therefore be reduced by the amount of any fixed costs that will be avoided directly as a result of delivery entitlements being terminated. This will provide irrigators with a clearer price signal when making decisions about their delivery entitlements, and also provides scope and encourages irrigators that share the use of particular delivery assets to collectively consider their demand for delivery services.

Such avoided fixed costs are likely to be a combination of annual maintenance costs as well as periodic renewal costs that may have a lumpy profile. Accordingly, future fixed costs that will be avoided should be converted to an annuity using the same methodology that the infrastructure operator uses to calculate the annual access fee. This can then be subtracted from the annual access fee upon which the termination fee is based.

- ⇒ **Any avoided fixed costs that can be identified at the time of terminating delivery entitlements as arising directly as a result of the delivery entitlements**



**being terminated should be subtracted from the access fee used in the calculation of any termination fee. The infrastructure operator should use its best endeavours to identify and subtract any avoidable fixed costs from the termination fee.**

### **Accounting for inward trade / take up of delivery rights**

It was suggested that exit fees (and possibly termination fees) could be based on net outward trade over a number of years. This would require some mechanism for estimating future net trade, or providing a (partial) refund of previously paid exit fees.

Any such arrangement would most likely be administratively expensive and impractical. For example, infrastructure operators would have to establish and maintain separate accounts and records for each sale of water out of their district. Furthermore, it is not clear how the size and allocation of any refund would be determined. The infrastructure operators all agreed with this view at the roundtable workshop.

Unbundling of water rights from delivery rights and adopting an efficient pricing structure for delivery services substantially addresses concerns about the impact of water being traded out of, and any subsequent trade back into, an irrigation district. This is because irrigators will be able to make decisions about trading water entitlements and decisions about delivery entitlements independently, based on the information relevant to each decision that is available at the time. Furthermore, in some cases an irrigator may have the ability to sell their delivery entitlement to another irrigator within their network who requires additional delivery entitlements in order to secure delivery of these additional water entitlements they have traded in.

The ACCC therefore does not recommend that termination fees should be based on net outward trade or net quantum of delivery rights terminated over a number of years.

### **Methodology for calculating termination fees**

The ACCC considered two methodologies for calculating a termination fee based on the access fee:

- Option 1: A multiple of the access fee, or net present value (NPV) calculation of the access fee using an amortisation period of specified number of years.
- Option2: NPV calculation of the access fee using an amortisation period of the cost weighted average remaining useful economic life of the infrastructure operator's assets.

For option 1, using a simple multiple of the access fee is similar to an NPV calculation with an amortisation period of specified duration and discount rate. It is also administratively simple.

In deciding against option 2, the ACCC took into account the following:

- All the infrastructure operators have long lived assets, with most having a cost weighted average remaining useful economic life of assets of between 35-50 years. None are able to quickly fully rationalise/reconfigure their networks.

- It would rely on being able to accurately estimate the remaining useful economic life of assets. Infrastructure operators engage engineers to assess the physical remaining useful economic life of assets, although this generally assumes that the system will continue to operate in perpetuity. However, given the potential for significant change in demand for water delivery services in coming decades, it may be difficult to make a robust assessment of the long-term economic life of some assets.
  - Monitoring of compliance with the proposed regime would require assessment of whether infrastructure operators' estimates of cost weighted average remaining useful economic life of assets are justified. Consistency in the application of this component of the calculation could be difficult to verify given the lack of common reporting standards and number of assumptions required in order to estimate this parameter.
  - Basing the termination fee on the cost weighted average remaining useful economic life of assets may create incentives for infrastructure operators to bring forward asset refurbishment and renewal so as to increase the size of the termination fee.
  - The discount rate that would otherwise be proposed would be the 10-year government bond rate to be used as a proxy for the risk free rate. Given this would be applied consistently across all infrastructure operators an equivalent multiple could be estimated instead.
- ⇒ **The termination fee should be a multiple of the actual annual access fee levied on the delivery entitlement at the time of termination.**

### **Determining the upper limit on termination fees**

The purpose of a termination fee is to have irrigators that no longer require delivery services to make some contribution to future fixed costs of operating the network that cannot be avoided.

However, a termination should not be based on the net present value of all future fixed costs calculated in perpetuity because:

- It is likely that some fixed costs will be able to be avoided at some stage in the future, but these cannot be identified at the time as arising directly from the delivery entitlement being terminated. For example, some cost savings will arise if the network can be reconfigured following a number of delivery entitlements being surrendered over a period of time.
- Given that most infrastructure operators charge a levy to fund future capital expenditure, it is likely that irrigators wishing to terminate their delivery entitlements will have already contributed to future capital expenditure for which they will receive no benefit.
- Additional delivery entitlements may be taken-up in the future, most likely due to water being traded back into the district.

Furthermore, setting termination fees on an ex post basis involves taking into consideration their equity implications as well as their effect on economic efficiency.

In respect of equity, there is no reason why all of the third party effects that arise as a result of delivery entitlements being terminated now that water can be traded should be borne by irrigators wishing to terminate their delivery rights. The problem of stranded assets arises because of legacy arrangements, and therefore any decision about who should bear the associated stranded costs requires a judgement as to what is fair and reasonable for both those irrigators that wish to exit the delivery network and those that remain.

In respect of economic efficiency, a termination fee that fully insulates the infrastructure operator/remaining irrigators from the third party effects will dampen the signal to infrastructure operators that rationalisation of the network may be warranted. It would also dampen the signal to remaining irrigators as to the actual cost of continuing to provide them with delivery services. This would not be consistent with the objective for the proposed regime to address short-term price shocks resulting from permanent trade of water out of serviced areas, rather than dampening long-term signals for necessary structural adjustment.

On the other hand, as discussed in section 3.5, if termination fees are low or zero, infrastructure operators would bear all of the risk associated with future expenditure on network renewal and replacement, including some works that are likely to result in greater water use efficiency. It is important that this investment is not forestalled where it is economically viable.

In weighing up the above factors, the ACCC considers that a termination fee of 8 times the access fee is appropriate as an upper limit in the mid to long term. However, given that it is likely that the most significant changes in the demand for irrigation water delivery services is likely to occur within the next 5 years as the irrigated agriculture industry adjusts to new trading opportunities, the ACCC proposes that the upper limit on termination fees commence at 12 times the access fee, and gradually phase down to 8 times the access fee over an eight year period. Section 6.5 discusses in detail why the ACCC proposes this rate of phase down of termination fees.

It is worth noting that a termination fee of 12 times the access fee equates to the net present value (using a discount rate of 4 per cent) of approximately 17 years of access fees, and more than half of the value of 50 years of access fees. A termination fee of 8 times the access fee equates to the net present value of almost 10 years of access fees.

⇒ **The termination fee should be no more than Y times the access fee (adjusted for any avoidable fixed costs), where Y follows the following schedule:**

<b>Financial Year</b>	<b>Y</b>
<b>2007–08*</b>	<b>12.0</b>
<b>2008–09</b>	<b>11.5</b>
<b>2009–10</b>	<b>11.0</b>
<b>2010–11</b>	<b>10.5</b>
<b>2011–12</b>	<b>10.0</b>
<b>2012–13</b>	<b>9.5</b>
<b>2013–14</b>	<b>9.0</b>
<b>2014–15</b>	<b>8.5</b>
<b>2015–16</b>	<b>8.0</b>

\*includes pre 30 June 2007

In setting this upper limit on termination fees, the ACCC gave consideration to various time periods identified through the consultation process, including:

- The time required to complete the rationalisation process.
- An estimate of the average life of irrigation enterprises (15–25 years).
- A time period related to the regulatory price setting period.<sup>50</sup>

It is recognised that the reconfiguration and decommissioning of underutilised assets will be more feasible in some areas than others for a variety of reasons, for example constraints relating to the existing network arrangement or ongoing water supply statutory obligations. However, identifying these constraints and adjusting a termination fee on a case by case basis to account for these is impractical.

Finally, it is noted that when water and delivery rights are unbundled and termination fees are levied on the delivery entitlement, there is no longer a direct link between the size of the termination fee and its effect on water trade. Although there can still be an indirect link between the size of any termination fee and irrigators' decisions to trade water, once water and delivery rights are unbundled an irrigator's decision to sell water entitlements will be independent of their decision to sell or terminate their delivery entitlements. As a result it is not possible to compare the size of termination fees to the market price of water in order to determine an "acceptable" trade off between the size of the termination fee and the dead weight loss from trade forgone. This approach is only applicable with exit fees, which are levied on the sale of water entitlement (see section 3.6).

### **Treatment of tax<sup>51</sup>**

It is recognised that infrastructure operators may be subject to income tax under either of the following regimes:

- Federal Income Tax (FIT) under the Income Tax Assessment Act, or
- the National Tax Equivalent Regime (NTER), which is a notional federal income tax that applies to certain government business enterprises that are exempt from federal income tax.

Even in the circumstances where an infrastructure operator is *prima facie* subject to income tax as a Federal income taxpayer, one of a number of exemptions may apply, including:

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<sup>50</sup> A five-year regulatory period has been adopted in Victoria and Queensland. In Queensland, Sunwater uses a ten year amortisation period for the calculation of its exit fee, which is based on two regulatory periods. It notes that this provides sufficient time for remaining irrigators to adjust to any potential increase in prices.

<sup>51</sup> The ACCC notes that its consideration of the treatment of tax relates solely to the extent to which termination fees should be grossed-up by infrastructure operators to take account of the fact that they may be subject to income tax. Nothing in this report should be interpreted as commenting on whether any entity, or any particular source of income of an entity, should be subject to FIT or NTER.

- Income tax exemptions for public authorities, state and territory bodies—these provisions exempt GBE's and statutory bodies from Federal Income Tax.
- Income tax exemption for a community service entity.
- Income tax exemption for associations established for the development of Australia's resources including horticultural, pastoral, agricultural and viticultural resources.

On the basis of information provided, the ACCC understands that some infrastructure operators are not subject to either FIT or NTER. Furthermore, in the circumstance where an exemption from income tax is not available, a not for profit organisation may, in some cases, be able to rely on the mutuality principle to treat certain of its receipts as non assessable, non-exempt income.<sup>52</sup>

In circumstances where an infrastructure operator is not subject to tax or it has received a determination such that termination fee income is non assessable income, it does not seem to be appropriate that any termination fees should be grossed up for reason of tax.

In the absence of any tax exemptions or other non assessable income determinations, it would appear that the income from access and termination fees would be assessable income under either the FIT or NTER.

However, the taxable income of an infrastructure operator equals its assessable income less any allowable deductions, including in the form of depreciation and maintenance costs in relation to its infrastructure.

Therefore, in any one year, an infrastructure operator would receive access fees which are prima facie assessable for income tax purposes, and would claim tax deductions in the form of depreciation, funding and maintenance deductions for the cost of its infrastructure.

Accepting that termination fees received by an infrastructure operator is assessable and calculated by reference to an aggregation of the access fees forgone, then in the year of receipt of the termination fee the infrastructure operator will bring a comparatively larger amount into its assessable income but in that year will only be able to claim the same tax deductions in respect of the underlying infrastructure.

However, the infrastructure operator will continue to claim tax depreciation and other costs associated with the maintenance of the network infrastructure such that over the life of the access fee arrangements, the after tax position of the infrastructure operator may be approximately the same (the extent of alignment will depend on the extent to which the termination fee paid up front reflects the net present value of the access

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<sup>52</sup> The principle of mutuality recognises that even a taxable entity cannot make a profit out of oneself, and that income can only be derived from sources outside of oneself (paragraph 14 of *Taxation Ruling IT2505: Bodies corporate constituted under strata title legislation*). The key condition for the principle to apply is that there be complete identity between the contributors to the fund and the participants in any surplus, not in the sense of individual identity but in the sense of identity as a class.

payments that would have otherwise been received). Therefore, the issue is one of timing.

There will be no resulting tax timing disadvantage where the infrastructure operator is in a tax loss position over the relevant period. The tax profiles of a number of infrastructure operators indicate that they are in this position and therefore grossing up the termination fee for tax by these infrastructure operators would not appear to be appropriate.

However, one circumstance where a real tax timing disadvantage could be realised is in the case where an infrastructure operator is currently tax paying, but in the future will have tax losses. In this case, the infrastructure operator will pay tax on the termination fee when received in a year in which the operator is taxable, while the future tax deductions in respect of the underlying infrastructure (depreciation and ongoing maintenance) will add to future tax losses.

⇒ **Termination fees should only be grossed up to account for tax if the infrastructure operator can demonstrate that a significant, inexorable, real tax timing disadvantage will be experienced. This issue will be subject to any further consideration of the tax treatment of water trading arrangements.**

### **Treatment of ex ante agreed debt obligations**

As discussed in section 3.5, ex ante agreements are those entered into prior to the specific infrastructure investment expenditure.

The proposed regime has not been designed to deal with the situation where parties have agreed to complete ex ante long-term contracts that specify obligations relating to specific capital expenditure. The balance of any payments owing under such obligations should be collected separately to the termination fee, in accordance with the agreed ex ante arrangements.

In order to collect the balance of any outstanding ex ante agreed payments at the time of termination, the agreement must:

- relate to past expenditure on specific infrastructure, and
- specify the quantum of (or calculation method) and finite timeframe for future repayments.

The quantum and method for calculating the balance of any payments owing at the time of termination should be in accordance with any arrangements agreed between the infrastructure operator and irrigators prior to the investment being undertaken. The magnitude of this payment would decline over the duration of the contract as more and more of the sunk capital costs were recovered.

⇒ **The access fee and termination fee should not include the collection of any contributions to cover ex ante agreed obligations relating to specific capital expenditure. Any payments owing under such obligations should be collected separately to the termination fee, in accordance with the particular arrangements.**

## 6.6 Options for reducing termination fees over time

The ACCC considered various options for reducing termination fees over time:

Option 1: Maximum termination fee **phased out** steadily over a 12-year period, from 12 times the access fee to zero.

Option 2: Maximum termination fee is a constant multiple of the access fee for a set number of years, and then reduced to zero (i.e. **drop dead** option).

Option 3: Maximum termination fee **phased down** at half the rate of option 1.

Under option 1, if an irrigator sells all of their water entitlements in year 0, they can either:

- pay an access fee of X in year 0 and continue to have an obligation to pay an access fee of X into the future and keep the right to delivery (unless they terminate this right in the future), or
- pay a termination fee of 12 times X in year 0 and remove their obligation to continue to pay an access fee of X in the future.

Suppose that an irrigator wishes to exit the network, and does not value the right to maintain access to the delivery network. If they are risk neutral, they appear much more likely to pay the access fee of X in year 0 and continue to pay the access fee because the present value of paying X per year for 12 years then a termination fee of 0 is less than paying the termination fee of 12X in year 0.

Under this phase out arrangement, for the first 12 years most irrigators will choose to continue to pay the access fee rather than pay the termination fee. However, once the termination fee decreases to zero all irrigators that do not value continued access would simply terminate their delivery rights.

Under option 2 where the maximum termination fee is reduced to zero at a drop dead date, the outcome will be the same since virtually all irrigators that would otherwise choose to terminate their delivery entitlements would instead decide to continue to pay access fees until the drop dead date—at which time all would choose to terminate.

Under option 3, which has a phase down rate half that of option 1, the termination fee may offer sufficient discount to be worth selecting. If termination fees start at 12 times the access fee, a phase down over a 24 year period would offer up to a 50 per cent discount on continuing to pay access fees. If the phase down truncates before 24 years, the discount is significantly larger.

Thus, the effect on the incentives of irrigators wishing to exit the delivery network will vary depending upon the option adopted for reducing the maximum termination fee:

- A drop dead date, or a phase out period equivalent or less than the multiple of the access fee, will be likely to cause irrigators that sell their water entitlements to continue to pay access fees rather than terminate their delivery entitlements—until the termination fee becomes zero.

- No phase out or a slow phase down period will generally not distort the incentive of those irrigators that sell their water entitlements and who do want to exit the industry towards continuing to pay access fees rather than pay any termination fee.

Furthermore, under any scenario where the termination fee becomes zero, there may be little incentive for any irrigator to continue to pay access fees simply to keep open the option of having access at some stage in the future. This would depend upon whether the irrigator thought it was likely that the infrastructure operator might decommission some of the assets used to provide delivery to their property.

The delay in termination under options 1 and 2 will therefore obscure the actual intentions of irrigators to terminate delivery rights. This will prevent the infrastructure operators from planning and implementing rationalisation of networks over time, and delays dealing with the problem of stranded assets and concurrent price shocks to remaining irrigators, rather than managing these effects.

However, a slow phase down of termination fees as proposed by the ACCC from 12 times the access fee to 8 times the access fee over an 8 year period will assist infrastructure operators manage these effects.

Given the uncertainty that surrounds the impact on the operation of irrigation water delivery networks following the opening up of water markets, the ACCC recommends a review in four-five years' time of the determination of termination fees post 2015-16. For example, it may be the case that concerns about the potential for stranded assets are greatly diminished.

- ⇒ **A process for determining maximum termination fees after 2015-16 should be considered as part of any review of the efficacy of the proposed regime.**



## 7 Case studies

The fourth task that the ACCC was asked to undertake was to prepare case studies (one in each jurisdiction) for specific irrigation areas to demonstrate the above methodology.

This chapter applies the proposed methodology for calculating termination fees to data provided by the following infrastructure operators:

- Goulburn Murray Water, Rochester District (Victoria)
- Western Murray Irrigation, Curlwaa and Coomealla districts (New South Wales)
- Central Irrigation Trust (South Australia)

Under the proposed regime, the maximum termination fee is calculated as a specified multiple of the actual annual access fee levied on the delivery entitlement at the time of termination.

The annual access fee should be levied on the water delivery entitlement to recover the fixed costs of providing on-going access to core water delivery services including fixed operating expenditure associated with the operation, maintenance (annual and periodic) and renewal of the network.

In undertaking these case studies, it has been assumed all infrastructure operators have, for pricing purposes, created implicit delivery entitlements that are proportional to the level of water entitlements held by irrigators as at a specific date. The fixed access fees charged to customers is assumed to be levied on the implicit delivery entitlement associated with a water entitlement of 1 ML.

The annual access fee should not include any annuities associated with future capital expenditure that improves the quality of service and/or increases capacity. Most infrastructure operators currently collect an annuity from customers based on an expenditure profile that may include future capital expenditure associated with upgrading the network. In order to account for this, it has been assumed that 20 per cent of these annuities relate to future capital expenditure that should be excluded from the access fee, and thus termination fee, under the proposed regime.

In estimating the termination fees in the case studies, it has also been assumed that there are no avoided immediate or future fixed costs that could be identified at the time of surrender of the delivery entitlement, as these will be specific to each irrigator or group of irrigators.

Where the infrastructure operator currently charges an access fee on a delivery entitlement, as is the case for Goulburn-Murray Water, the termination fee is calculated from this access fee.

Where the infrastructure operator has a pricing structure of fixed and variable charges that closely mirrors their fixed and variable costs, as is the case for Western Murray Irrigation, it has been assumed that the access fee will be equivalent to the fixed charges currently levied on irrigators. The termination fee is calculated from this implicit/proxy access fee.

Where the infrastructure operator has a pricing structure of fixed and variable that does not closely mirror their fixed and variable costs, as is the case for Central Irrigation Trust, the termination fee has been calculated on the basis of the shadow access fee, (as discussed in section 6.5).

The proposed methodology specifies that the termination fee should not include the collection of any payments relating to the discharge of ex ante agreed obligations relating to specific capital expenditure. The quantum and method for calculating the balance of any payments owing at the time of termination should be in accordance with the *ex ante* arrangements agreed between the infrastructure operator and customer prior to the investment being undertaken. By way of example, estimates of the balance of payments owing under ex ante arrangements for irrigators within Western Murray Irrigation districts have been identified.

## 7.1 Goulburn-Murray Water

Goulburn-Murray Water (G-MW) is a state owned authority that delivers water to ten distinct irrigation district customer groups. Three of these groups are service by piped irrigation networks (Nyah, Tresco, Woorinen), while the majority are serviced by channel systems (Shepparton, Central Goulbourn, Rochester, Campaspe, Pyramid-Boort, Murray Valley, Torrumbarry).

Only the Rochester district is considered for the purpose of this case study.

It is intended that water entitlements will be unbundled into a water share, delivery share and water use licence in Victoria on 1 July 2007. G-MW's infrastructure access fee will be levied on customer's delivery share. Separate fees will be levied on water shares to cover bulk water costs. No levy for future asset replacement and renewal is charged; instead, G-MW has a regulated asset base and utilises debt financing for future capital expenditure. The infrastructure access fee includes depreciation and return on investment to finance the debt. G-MW does not currently levy a termination fee, but proposes to do so based on the infrastructure access fee.

### Access and termination fees

G-MW's pricing structure for irrigation customers consist of an infrastructure access fee, which is charged per delivery share (defined in terms of ML/day of guaranteed delivery for any 100 days of the irrigation season).

The following table details Rochester's fixed infrastructure access fee that would become the base for calculations of the termination fee under the proposed methodology.

Goulburn-Murray Water - Rochester	
Access Fee	Notes
\$2459.24/ML/day of delivery share	Based on 2006–07 infrastructure access fee.

Estimates of G-MW's Rochester termination fees (per ML/day of delivery share) using the relevant infrastructure access charge is shown below:

<b>Current exit fee:</b>	\$0
<b>Termination fee: Y years of the access fee per ML/day</b>	
x 12 years	\$29,510

While G-MW's termination fee appears to be in the order of 100 times the size of other infrastructure operators, this is not the case. In Victoria water entitlements of 100 ML were converted into delivery shares of 1 ML/day of guaranteed water delivery capacity over any 100 days of the irrigation season. The access and termination fees calculated above relate to 1ML/day of delivery share, which was originally equated with 100 ML of water entitlements.

By contrast, the estimated termination and access fees of other infrastructure operators are based on implicit delivery entitlements associated with 1 ML of water entitlement. If this approach is adopted for the above example, the termination fee for Rochester would be \$295 (for a multiple of 12 years) per 0.01 ML/day of delivery share.

## 7.2 Western Murray Irrigation

Western Murray Irrigation Limited (WMI) has an allocation of 61,268 high security water entitlements which it delivers to three fully piped irrigation districts—Buronga, Coomealla and Curlwaa. Each of the three irrigation districts are operated independently, and have separate costs, charges and exit fees that relate to the management of the individual districts. Only the Curlwaa and Coomealla districts have been considered for the purposes of this case study.

The Curlwaa district, even though it is predominately piped, still has a relatively high ratio of fixed to variable costs (79/21). WMI on average over the past 5 years has collected approximately 82 per cent of its irrigation water delivery income from fixed charges in this district and therefore the current fixed charges have been used as a proxy for the access fee.

The Coomealla district has a lower ratio of fixed to variable costs (67/33). However, WMI on average during the past five years has collected approximately 74 per cent of its irrigation water delivery income from fixed charges in this district and therefore the current fixed charges have been used as a proxy for the access fee.

WMI's pricing structure for irrigation customers includes the following fixed fees relating to access to the infrastructure:

- Fixed standing charge based on a percentage (42 per cent for both Curlwaa and Coomealla) of the total standing charge per ML of entitlement.
- A sinking fund levy to fund the replacement of WMI's infrastructure into the future.

- Land and Water Management Plan (LWMP) levy which covers costs associated with implementing the LWMP to be recovered for a remaining 14 year period.
- A joint venture repayment levy which applies to Coomealla shareholders only, and generates funds for the repayment of the loan to the New South Wales Government to cover WMI's contribution to the Coomealla rehabilitation. WMI is required to repay 48.15 per cent of the total cost of the rehabilitation by way of thirty annual instalments.

For the purposes of this example it is assumed that WMI has created implicit delivery entitlement on which the fixed access charges of customers are levied. These implicit delivery entitlements are based on the level of water entitlements held by the irrigators, as at a specific date.

### Current exit fee

WMI has included both capital and 'fixed' operating costs in its calculation of exit fees. The components of the exit fee (excluding the LWMP and JV Repayments) have been calculated using the net present value of yearly payments (based on past costs) over a 50 year period, using a discount rate of 5 per cent per annum.

The components of WMI's Curlwaa exit fee are shown below:

Capital (sinking fund levy)	\$111.00	Replacement of infrastructure.
Operating O&M	\$305.50	
LWMP	\$18.21	Land and water management plan.
	\$434.71/ML	

The components of WMI's Coomealla exit fee are shown below:

Capital sinking fund	\$154.81	Replacement of infrastructure.
JV	\$ 99.10	Joint venture repayment
Operating O&M	\$266.69	
LWMP	\$ 13.86	Land and water management plan.
	\$534.06/ML	

WMI excludes government funding, return on capital and bulk water charges from its exit fee.

### Access and termination fees

The following tables estimate the fixed charges for each district that could be incorporated into the base access fees and therefore subsequently converted into a termination fee under the ACCC proposed regime.

WMI—Curlwaa	
Access fee base	Included costs
<b>\$19.51/year</b>	Based on WMI's 2006–07 fixed fees and levied per ML of the implicit delivery entitlement associated with a water entitlement of 1 ML.
\$14.49	<i>WM standing charge</i>
\$5.02	<i>Major periodic maintenance annuity</i> ( $= \$6.28 \times 0.8$ ) Assumed to be 80% of the sinking fund levy for future expenditure on infrastructure renewals, replacement & major periodic maintenance. 20% of the sinking fund levy has been excluded to account for excludable future capital expenditure under the ACCC definition.

WMI—Coomealla	
Access fee base	Included costs
<b>\$26.54/year</b>	Based on WMI's 2006-07 fixed fees and levied per ML of the implicit delivery entitlement associated with a water entitlement of 1 ML.
\$19.53	<i>WM standing charge</i>
\$7.01	<i>Major periodic maintenance annuity</i> ( $= \$8.76 \times 0.8$ ) Assumed to be 80% of the sinking fund levy for the future expenditure on infrastructure renewals, replacement & major periodic maintenance. 20% of the sinking fund levy has been excluded to account for excludable future capital expenditure under the ACCC definition.

Estimates of termination fees (per ML of the implicit delivery entitlement associated with a water entitlement of 1 ML) using WMI's revised base access fees are shown below:

	Curlwaa	Coomealla
<b>Current exit fee:</b>	\$435	\$534
<b>Termination fee: Y times the access fee (per ML of delivery entitlement)</b>		
x 12 years	\$234	\$319

Any additional lump sum debt repayments relating to ex ante agreements with customers (as discussed in section 6.4) are to be calculated in accordance with the infrastructure operator's existing methodology. WMI has identified the following additional lump sum ex ante agreed repayments that would be payable by an irrigator terminating their delivery entitlement.

### Additional ex ante agreed debt repayments

LWMP levy	\$18 <sup>53</sup>	\$14 <sup>54</sup>
Joint venture repayment		\$99 <sup>55</sup>
<b>Total</b>	<b>\$18</b>	<b>\$113</b>

## 7.3 Central Irrigation Trust

Central Irrigation Trust (CIT) owns high security water entitlements which it delivers to nine pumped and piped irrigation districts. CIT utilises postage stamp pricing across these districts, although the variable consumption charges vary depending on the water pressure provided.

CIT has indicated that its ratio of fixed to variable costs is 49/51, but has adopted a fixed/variable pricing structure of 17/83.<sup>56</sup> CIT notes the relatively high variable component assists customers manage their cash flow, effectively providing them with an insurance policy during dry years. This is also intended to encourage technical water use efficiency.

### Current exit fee

CIT states that its current exit fee has been calculated in accordance with MDBC guidelines contained in Schedule E of the Murray–Darling Basin Agreement. The exit fee has been calculated using the net present value of a shadow access charge (based on the budgeted irrigation income requirements in 2003–04). The following parameters have been used for the NPV calculation:

- Shadow access fee           \$21.78
- Amortisation period       52 years       (average remaining useful life of assets)
- Discount rate               5.7% pa       (10 year Commonwealth bond rate)
- Exit fee                       \$360/ML

Essentially, CIT included both future capital and ‘fixed’ operating costs in its exit fee of \$360/ML. Expenditure figures from which the shadow access fee is calculated include a set transfer into the asset replacement reserve which is designed to fund future expenditure for asset renewal and replacement. CIT exclude government funding and bulk water charges from its exit fee.

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<sup>53</sup> Additional lump sum ex ante agreed debt repayment associated with the LWMP. Contribution calculated assuming a NPV of the 14 remaining payments of the annual levy of \$1.84, with a 5% discount rate.

<sup>54</sup> Additional lump sum ex ante agreed debt repayment associated with the LWMP. Contribution calculated assuming a NPV of the 14 remaining payments of the annual levy of \$1.40, with a 5% discount rate.

<sup>55</sup> Additional lump sum ex ante agreed debt repayment associated with the Coomealla joint venture agreement. Contribution calculated assuming a NPV of the 19 remaining payments of the annual levy of \$8.20, with a 5% discount rate.

<sup>56</sup> Note this ratio will vary each year depending on the water sales.

## Revised shadow access fee

CIT's current pricing structure includes a relatively low fixed service charge and a fixed environmental charge (which it pays on to South Australian Government) per ML of water entitlement, and relatively high variable consumption charges.

CIT has expressed a preference to base its termination fee on a shadow access fee, given the disparity between its fixed fee income and fixed costs. The shadow access fee is based on incorporating any fixed costs that are recovered through variable fees. For the purpose of this calculation, the shadow access fee is based on collecting the budgeted irrigation income for 2003–04. This fee income does not include revenue associated with the catchment environmental levy as this is passed on to the South Australian Government.

For the purpose of this example, it is assumed that CIT has created implicit delivery entitlement on which the fixed access charges of customers are levied. These implicit delivery entitlements are based on the level of water entitlements held by the irrigators, as at a specific date.

### 2003–04 budgeted income from irrigation customers (\$'000)

Fixed	\$1034	2003–04 budgeted income from fixed charges
Variable	\$5362	2003–04 budgeted income from variable charges on customers with low pressure
Total	\$6397	

### Costs (\$'000)

Estimated variable costs	\$3250	Total budgeted irrigation income x 50.8% (percentage of costs that are variable).
Fixed costs collected via variable fees	\$2113	Budgeted variable fee income less the estimated variable cost.

### Shadow access fee

Fixed cost recovered through variable fees per ML entitlement	\$13.13	Fixed costs recovered through variable fees divided by 2003–04 levied water entitlements (160,957 ML)
Existing fixed access fee.	\$5.80	2003–04 fixed access charge
Excluded future capex adjustment	- \$1.49	Adjustment to exclude 20% of an implicit assets replacement reserve (ARR) levy to account for excludable future capital expenditure under the ACCC definition.
		Implicit ARR levy = $\frac{\text{ARR transfer}}{\text{water entitlements}}$
		= $\frac{1,196,000^{57}}{160,957}$
		= \$7.43
<b>Shadow access fee</b>	<b>\$17.44</b>	

<sup>57</sup> Figure relates to actual 2003–04 transfer to the asset replacement reserve derived from irrigator revenue. All data provided by CIT.

**Termination fee**

Estimates of CIT's shadow access fee and termination fees (per ML of the implicit delivery entitlement associated with a water entitlement of 1ML) using the shadow access fee and actual access fee under the ACCC's proposed regime are shown below.

<b>Current exit fee</b>	<b>\$360</b>
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<b>Termination fee: Y times the shadow access fee (per ML of delivery entitlement)</b>	
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x 12 years	<b>\$209</b>
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# **Appendix A: Murray–Darling Basin Agreement protocol on access and exit fees**

## **1. AUTHORISING PROVISION**

This Protocol is made under paragraph 6(1)(f) of Schedule E.

## **2. PURPOSE**

The purpose of this Protocol is to specify principles about access and exit fees relating to using infrastructure for delivering water to land in an irrigation district.

## **3. DEFINITIONS**

Expressions defined in the Murray–Darling Basin Agreement and Schedule E (including its Appendices) have the same meaning in this Protocol.

## **4. APPLICATION**

This Protocol applies to any access or exit fees determined by a state or a relevant water authority and payable in connection with interstate transfers of entitlements, whether by exchange rate trade or tagged trade.

## **5. PRINCIPLES ABOUT ACCESS FEES**

- (1) Every assumption made in order to calculate an access fee should be expressly set out in any determination.
- (2) Any access fee should:
  - (a) be set to recover fixed costs associated with servicing the relevant land by irrigation infrastructure and should be calculated in the same way as for any other land serviced by that irrigation infrastructure; and
  - (b) be payable by the owner of land serviced by the relevant irrigation infrastructure; and
  - (c) be calculated by reference to the share of the delivery capacity of the relevant infrastructure devoted to delivering water to the relevant land (in ML/day or a comparable volume/time measurement); and
  - (d) be adjusted, from time to time, to reflect any possibility that access to the relevant irrigation infrastructure may be limited in future, through planned reconfiguration of that infrastructure or for some other reason; and
  - (e) not include any component to recover bulk water charges; and

- (f) subject to state law, should be reviewed, approved or fixed (as the case requires) by any body with regulatory powers relating to the price of irrigation services for the relevant state.
- (3) Subject to state law:
  - (a) the owner of land serviced by irrigation infrastructure must be responsible for paying the relevant access fees, whether or not the owner transfers to another person any water entitlement that has previously been used on the land; and
  - (b) payment of an access fee in any water year should entitle the owner of the land to use the relevant share of delivery capacity of the irrigation infrastructure, in that water year; and
  - (c) where feasible, the share of delivery capacity assured by payment of an access fee, together with the responsibility for paying that access fee, should be transferable, subject to the consent of the relevant water authority; and
  - (d) the owner of the land serviced by irrigation infrastructure should be able to choose whether to continue to pay access fees, or to pay a relevant exit fee instead.

## 6. PRINCIPLES ABOUT EXIT FEES

- (1) Every assumption made in order to calculate an exit fee should be expressly set out in any determination.
- (2) Any exit fee should:
  - (a) be calculated with reference to the same fixed costs associated with servicing the relevant land with irrigation infrastructure, as are the basis for setting access fees for other land serviced by that irrigation infrastructure; and
  - (b) take into account:
    - (i) the estimated lifetime of the relevant irrigation infrastructure; and
    - (ii) the planning horizon for that infrastructure; and
    - (iii) the likelihood that entitlements or allocations may, in future, be transferred back into the relevant district, to be delivered by that infrastructure; and
  - (c) apply a discount rate that is either:
    - (i) equal to the nominal risk-free rate; or

- (ii) appropriate and justifiable, given the particular circumstances of the relevant irrigation infrastructure; and
  - (d) payable by the owner of the land serviced by the relevant irrigation infrastructure; and
  - (e) subject to state law, should be reviewed, approved or fixed (as the case requires) by any body with regulatory powers relating to the price of irrigation service for the relevant state.
- (3) Subject to state law:
- (a) payment of an exit fee should discharge the relevant water authority from any obligation to deliver water to the land in relation to which the exit fee was paid; and
  - (b) payment of an exit fee in relation to land should not prevent the owner of that land from subsequently obtaining access to the relevant irrigation infrastructure, with the consent of the relevant water authority.

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## **Appendix B: Water trading data**

	Year	Permanent Trading Volumes (ML)				Temporary Trading Volumes (ML)			
		Inward	Outward	Net	Net as a % of entitlement	Inward	Outward	Net	Net as a % of entitlement
Central Irrigation Trust									
Percentages based on: 160,346 ML of high security entitlements	1998-99	51	410	-359	-0.22%	120	365	-245	-0.15%
	1999-2000	310	582	-272	-0.17%	80	1483	-1403	-0.87%
	2000-01	488	461	27	0.02%	140	1625	-1485	-0.93%
	2001-02	59	262	-203	-0.13%	169	1381	-1212	-0.76%
	2002-03	209	443	-234	-0.15%	87	5652	-5565	-3.47%
	2003-04	45	336	-291	-0.18%	0	7490	-7490	-4.67%
	2004-05	116	120	-4	0.00%	2275	5648	-3373	-2.10%
	2005-06	486	65	421	0.26%	362	6214	-5852	-3.65%
	2006-07	0	302	-302	-0.19%	150	9672	-9522	-5.94%
	CIT Totals	1,764	2,981	- 1,217	-0.76%	3,383	39,530	- 36,147	-23%

	Year	Permanent Trading Volumes (ML)				Temporary Trading Volumes (ML)			
		Inward	Outward	Net	Net as a % of entitlement	Inward	Outward	Net	Net as a % of entitlement
<b>Coleambally Irrigation Co-operative Limited</b>									
Percentages based on: 8,187 ML high security entitlements & 479,762 ML general security entitlements*	1997-98	0	0	0	0%	15713	5085	10628	2.18%
	1998-99	0	0	0	0%	15402	8163	7239	1.48%
	1999-2000	0	0	0	0%	14297	9812	4485	0.92%
	2000-01	0	0	0	0%	19056	3024	16032	3.29%
	2001-02	0	0	0	0%	20136	7219	12917	2.65%
	2002-03	0	0	0	0%	11533	11743	-210	-0.04%
	2003-04	0	0	0	0%	4734	11057	-6323	-1.30%
	2004-05	0	0	0	0%	6064	4506	1558	0.32%
*These figures exclude licences held for conveyance, stock and domestic, supplementary and town water	2005-06	0	0	0	0%	4568	12195	-7627	-1.56%
	<b>CICL Totals</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0.00%</b>	<b>111,503</b>	<b>72,804</b>	<b>38,699</b>	<b>7.93%</b>

	Year	Permanent Trading Volumes (ML)				Temporary Trading Volumes (ML)			
		Inward	Outward	Net	Net as a % of entitlement	Inward	Outward	Net	Net as a % of entitlement
<b>Murray Irrigation Limited</b>									
Percentages based on: 1,191,885 ML of general security entitlements*  *This figures exclude licences held for conveyance.  Net temporary trade data includes any sales related to advances from snowy hydro	1998-99	1025	0	1025	0.09%			98764	8.29%
	1999-2000	1172	0	1172	0.10%			89533	7.51%
	2000-01	224	1342	-1118	-0.09%			175812	14.75%
	2001-02	40	73	-33	0.00%			84550	7.09%
	2002-03	0	0	0	0.00%			85819	7.20%
	2003-04	491	402	89	0.01%			238797	20.04%
	2004-05	377	0	377	0.03%			126613	10.62%
	2005-06	0	408	-408	-0.03%			65873	5.53%
	2006-07	0	1048	-1048	-0.09%			93474	7.84%
	<b>MIL Totals</b>	<b>3,329</b>	<b>3,273</b>	<b>56</b>	<b>0.00%</b>	<b>-</b>	<b>-</b>	<b>1,059,235</b>	<b>88.87%</b>

	Year	Permanent Trading Volumes (ML)				Temporary Trading Volumes (ML)			
		Inward	Outward	Net	Net as a % of entitlement	Inward	Outward	Net	Net as a % of entitlement
<b>Murrumbidgee Irrigation Limited</b>									
Percentages based on: 929,000 ML of high security entitlements & 259,000 ML of general security entitlements*  *These figures exclude licences held for conveyance and town water  Inward and Outward temporary trading data includes intraregional trade	1998-99	1551	2679	-1128	-0.09%	77937	167516	-89579	-7.54%
	1999-2000	3617	4074	-457	-0.04%	29205	112327	-83122	-7.00%
	2000-01	3377	3377	0	0.00%	13045	133392	-120347	-10.13%
	2001-02	1428	1428	0	0.00%	10263	88033	-77770	-6.55%
	2002-03	163	163	0	0.00%	35574	97787	-62213	-5.24%
	2003-04	1587	1587	0	0.00%	47091	70766	-23675	-1.99%
	2004-05	9902	12360	-2458	-0.21%	39333	45733	-6400	-0.54%
	2005-06	8088	9786	-1698	-0.14%	68410	77010	-8600	-0.72%
	<b>MI Totals</b>	<b>29,713</b>	<b>35,454</b>	<b>- 5,741</b>	<b>-0.48%</b>	<b>320,858</b>	<b>792,564</b>	<b>- 471,706</b>	<b>-39.71%</b>

	Year	Permanent Trading Volumes (ML)				Temporary Trading Volumes (ML)			
		Inward	Outward	Net	Net as a % of entitlement	Inward	Outward	Net	Net as a % of entitlement
<b>Western Murray Irrigation</b>									
Percentages based on: 61,268 ML of high security entitlements*	1999-2000	0	0	0	0.00%	0	34705	-34705	-56.64%
	2000-01	0	0	0	0.00%	433	29312	-28879	-47.14%
*This figures exclude licences held for conveyance.	2001-02	0	0	0	0.00%	38	25221	-25183	-41.10%
	2002-03	0	0	0	0.00%	240	31006	-30766	-50.22%
	2003-04	0	0	0	0.00%	691	29914	-29223	-47.70%
	2004-05	0	0	0	0.00%	412	26569	-26157	-42.69%
	2005-06	0	0	0	0.00%	522	29377	-28855	
	<b>WMI Totals</b>	-	-	-	<b>0.00%</b>	<b>2336</b>	<b>206104</b>	<b>-203768</b>	<b>-332.58%</b>

	Year	Permanent Trading Volumes (ML)				Temporary Trading Volumes (ML)			
		Inward	Outward	Net	Net as a % of entitlement	Inward	Outward	Net	Net as a % of entitlement
<b>Jemalong Irrigation Limited</b>									
	1997-98			0	0.00%			0	0.00%
		0	0			0	0		
Percentages based on:	1998-99	0	0	0	0.00%	12850	0		0.00%
200 ML of high security entitlements &	1999-2000	0	0	0	0.00%	1000	0	1000	1.25%
79,998 ML of general security entitlements*	2000-01	0	0	0	0.00%	3713	0	3713	4.63%
	2001-02	0	0	0	0.00%	4822	2900	1922	2.40%
*These figures are believed to exclude licences held for conveyance and stock and domestic	2002-03	0	0	0	0.00%	9825	152	9673	12.06%
	2003-04	0	0	0	0.00%	1744	501	1243	1.55%
	2004-05	0	0	0	0.00%	283	0	283	0.35%
	<b>Jem Totals</b>	-	-	-	<b>0.00%</b>	<b>34,237</b>	<b>3,553</b>	<b>17,834</b>	<b>22%</b>



	Year	Permanent Trading Volumes (ML)				Temporary Trading Volumes (ML)			
		Inward	Outward	Net	Net as a % of entitlement	Inward	Outward	Net	Net as a % of entitlement
<b>First Mildura Irrigation Trust</b>									
Percentages based on: 82,097 ML of high security entitlements  FMITs trading and entitlement data has been sourced from Roper et al, <i>Stranded Irrigation Assets</i> Staff Working Paper, Productivity Commission, June 2006.	1997-98	0	0	0	0.00%	0	0	0	0.00%
	1998-99	0	0	0	0.00%	0	0	0	0.00%
	1999-2000	0	0	0	0.00%	0	0	0	0.00%
	2000-01	0	0	0	0.00%	0	0	0	0.00%
	2001-02	162	8	154	0.19%	265	764	-499	-0.61%
	2002-03	252	1425	-1173	-1.43%	554	8068	-7514	-9.15%
	2003-04	313	1283	-970	-1.18%	1247	12182	-10935	-13.32%
	2004-05	68	1241	-1173	-1.43%	2215	7658	-5443	-6.63%
	2005-06	0	0	0	0.00%	0	0	0	0.00%
	<b>FMIT Totals</b>	<b>795</b>	<b>3,957</b>	<b>- 3,162</b>	<b>-4%</b>	<b>4,281</b>	<b>28,672</b>	<b>- 24,391</b>	<b>-15%</b>

	Year	Permanent Trading Volumes (ML)				Temporary Trading Volumes (ML)			
		Inward	Outward	Net	Net as a % of entitlement	Inward	Outward	Net	Net as a % of entitlement
<b>Lower Murray Water</b>									
Percentages based on: 358,132 ML of high security entitlements*  *This figure includes entitlements held by private diverters managed by LMW. (this was around 249,000 ML in 2004/05)  Intra regional trade data included within inward and outward trading figures	1997-98	382	0	382	0.11%	2470	5197	-2727	-0.76%
	1998-99	4307	108	4199	1.17%	4445	4441	4	0.00%
	1999-2000	7522	711	6811	1.90%	6850	9018	-2168	-0.61%
	2000-01	8677	2356	6321	1.76%	2478	10294	-7816	-2.18%
	2001-02	4026	3211	815	0.23%	7585	12159	-4574	-1.28%
	2002-03	10962	3008	7954	2.22%	9330	25504	-16174	-4.52%
	2003-04	4524	1395	3129	0.87%	12099	31134	-19035	-5.32%
	2004-05	26381	1970	24411	6.82%	12097	40859	-28762	-8.03%
	2005-06	25535	4687	20848	5.82%	0	0	0	0.00%
	2006-07	26676	2398	24278	6.78%	0	0	0	0.00%
	<b>LMW Totals</b>	<b>118,992</b>	<b>19,844</b>	<b>99,148</b>	<b>27.68%</b>	<b>57,354</b>	<b>138,606</b>	<b>- 81,252</b>	<b>-23%</b>

	Year	Permanent Trading Volumes (ML)				Temporary Trading Volumes (ML)			
		Inward	Outward	Net	Net as a % of entitlement	Inward	Outward	Net	Net as a % of entitlement
<b>Goulburn-Murray Water</b>									
Percentages based on: 1,740,974 ML of high security entitlements	1998-99	0	5241	-5241	-0.30%			0	0.00%
	1999-2000	0	5099	-5099	-0.29%	7289	4014	3275	0.19%
	2000-01	0	2868	-2868	-0.16%	2638	2906	-268	-0.02%
	2001-02	0	9458	-9458	-0.54%	20826	2264	18562	1.07%
	2002-03	194	2779	-2585	-0.15%	27325	6644	20681	1.19%
	2003-04	2	25771	-25769	-1.48%	37271	7367	29904	1.72%
	2004-05	200	24693	-24493	-1.41%	38442	6710	31733	1.82%
	2005-06	0	25719	-25719	-1.48%	59258	2284	56974	3.27%
	<b>GMW Totals</b>	<b>396</b>	<b>101,627</b>	<b>- 101,232</b>	<b>-5.81%</b>	<b>193,050</b>	<b>32,188</b>	<b>160,862</b>	<b>9%</b>
	<b>TOTAL</b>	<b>154,988</b>	<b>167,136</b>	<b>- 12,148</b>	<b>-0.23%</b>	<b>727,002</b>	<b>1,314,021</b>	<b>355,224</b>	<b>6.64%</b>