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# Land use planning challenges and tools—tradeable development rights: design considerations

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## Abstract

Tradeable development rights (TDRs) are market based instruments that allow a right to develop a parcel of land to move from one parcel to another.

We examine TDRs as a potential instrument for achieving the economic objective of allocating development to its highest value use in Victoria. TDRs are examined as a tool within Victoria's existing planning system for rural land, which has a number of objectives. Design considerations for applying TDRs in Victoria include the need to consider modifying development entitlements from a right to apply (RTA) to a right to develop (RTD). It will also be important to address potential infrastructure externalities. Additional challenges include developing a suitable metric, addressing potential development hotspots and non-quantity development attributes, considering potential leaks, clarifying distributional impacts, and addressing credible commitment mechanisms.

We consider the potential for TDRs to contribute to a series of land use outcomes. We find that using TDRs to protect agricultural does not appear to address underlying market failures that may contribute to excessive urban sprawl and encroachment on agricultural land. TDRs offer a potential source of adjustment income, although other instruments may assist in a more effective and transparent manner. TDRs can be directed to protecting native vegetation; however, Victoria has existing and emerging instruments in place to target this objective. Finally, TDRs offer potential for the more efficient allocation of well specified development rights, which would require modification of the existing planning framework to accommodate the design challenges noted above.

## 1. Introduction

Land can be allocated to alternative uses, each resulting in a different quantity and distribution of costs and benefits to the community. Agricultural production, amenity use, native vegetation and biodiversity habitat, and residential development each generate potential benefits and may impose tradeoffs on the community. The challenge for land use policy is to establish institutional arrangements that lead to land use that generates the greatest benefit for the community.

Developing land, including subdivision and construction, changes its use. Governments commonly have multiple land use objectives, including efficiency, equity and social

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dimensions. From an economic perspective, an important objective is to encourage high net value development and inhibit low value development. Landuse outcomes are the result of market transactions and the application of regulatory instruments. Perceived shortcomings with existing instruments have led to consideration of alternative approaches, including the creation of markets for those services for which land markets do not account. In this paper, we examine tradeable development rights<sup>2</sup> (TDR) as a potential policy tool for achieving efficient development outcomes. The paper is organised as follows:

- Section 2 provides a brief overview of the planning system in Victoria, including current policy objectives, mechanisms and the challenges facing existing instruments.
- Section 3 describes TDRs, both as a free standing instrument and as a tool within an existing planning framework.
- Sections 4 and 5 present some international and Australian experience with TDR respectively.
- Section 6 discusses design considerations for applying TDRs in Victoria, and section 7 considers potential applications for TDR in Victoria.
- Section 8 contains concluding comments.

The paper seeks to provide an economic analysis of one instrument—TDRs. It does not review the general planning system or analyse legal issues associated with TDRs. This paper draws on existing literature and considers the potential application of TDRs in a Victorian context.

## **2. Current planning system in Victoria**

The Victorian land use planning system does not use TDRs. Instead, regulatory tools such as zoning are used to influence land markets and achieve land use objectives. This section describes the objectives, mechanisms and some challenges of the current regulatory system.

### **2.1 Objectives**

Victoria has multiple land use objectives, as set out in the *Planning and Environment Act 1987* (Vic.) and summarised by the Victorian Auditor-General's Office (2008), including:

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<sup>2</sup> TDRs have also been labelled as transferable development rights, tradeable development credits (TDC), severable use rights (SUR) and development rights transfer (DRT). Some have design variations, but they commonly separate development rights from one parcel of land and permit transfer or sale to another parcel (Danner 1997, Turner and Pruetz 2010). For consistency and brevity, this paper uses the label TDRs.

- providing for the fair, orderly, economic and sustainable use and development of land
- protecting natural resources and maintaining the ecological processes and genetic diversity
- securing safe and liveable urban and rural environments
- conserving and enhancing culturally or socially significant buildings or areas
- protecting and enabling the provision of public utilities
- facilitating development
- balancing the present and future interests of all Victorians.

Some of these objectives involve tradeoffs—for example, 'protecting natural resources ...' versus 'facilitating development'. Others are difficult to define—for example, 'fair use and development of land'.

## **2.2. Mechanisms**

The Act and the Planning and Environment Regulations 2005 prescribe planning in Victoria for land use (using land for a particular application, such as a dwelling) and land development (the construction, alteration or demolition of buildings or works, subdivision and consolidation). Important statutory mechanisms for regulating land use and development include planning schemes and planning permits.

Planning schemes—administered by local governments—are statutory documents that set out objectives, policies and provisions for the use, development and protection of land in an area. Within a planning scheme, zones are the primary decision making tool to control land use in a given area such as residential, industrial and business use. All land in Victoria has a zone. Zones establish the types of land uses that are permitted and prohibited and, if permitted, whether the land use requires a planning permit and other controls relating to buildings and subdivision. In addition to a zone, an overlay may apply to a site or area to control how land can be developed—for example, there may be an overlay for heritage or vegetation protection.

Planning permits—also administered by local governments—are legal certificates that approve particular uses, developments or subdivisions on a parcel of land. They seek to ensure:

- land uses are appropriately located
- buildings and land uses do not conflict
- development will not detrimentally affect the character of the area

- development will not detrimentally affect the environment
- the objectives of the relevant zone or overlay are met.

Planning permits may apply to land use, buildings and works, or subdivision. They generally apply to the land, although may (in limited circumstances) be specific to a person or a developer. Planning permits are most commonly requested to:

- construct, alter, demolish or paint a building
- start a new use (including business activity) on the land
- display a sign
- apply for a licence (such as a liquor licence)
- subdivide land
- clear native vegetation from land
- change the use of a property.

The Act and Regulations (Victorian Auditor-General's Office 2008) specify the timeframes and processes for applying for planning permits and amending planning schemes. In Australia, there is no inherent right to develop a parcel of land: a landholder seeks development approval from the relevant responsible authorities. If approval is granted, development for the approved specific purpose can commence.

### **2.3 Challenges**

The Victorian Competition and Efficiency Commission's (2010) recent review of planning policy and arrangements in Victoria identified limitations in arrangements at both state and local government levels:

- State planning policy is often unclear and includes competing objectives, with insufficient guidance on how to resolve tradeoffs. A draft State Planning Policy Framework, for example, includes 73 objectives that planning officers may be required to consider when considering a planning permit. Planning officers have no guidance in how to weight the objectives.
- The land use planning framework is becoming increasingly complex, with controls and policy issues regularly added to the planning process for issues such as environmental outcomes, liquor licensing, gambling and rooming houses.
- Councils may be required to address complex planning issues with limited expertise and funding.

- Victorian Government legislation caps land use planning fees for all councils at levels that appear to be below cost. Councils thus find it difficult to deal with increasingly complex land use planning regulation.

The planning system also faces challenges in achieving efficiency objectives - encouraging patterns of land use that generate the greatest net value for the community. These challenges include accounting for externalities, overcoming information asymmetry, minimising transaction costs, engaging with potential rent seeking and strategic behaviour from parties that stand to lose or gain from planning outcomes. Planning must also address community return and equity considerations.

*Externalities:* Development of a parcel of land can impose costs and benefits on the community that the development transaction does not reflect. Negative externalities include, for example, the potential loss of native vegetation valued by the community, as recognised in the requirement for a planning permit to clear native vegetation from land. An additional externality relates to infrastructure costs, when land development places increased demand on infrastructure. Planning seeks to account for some of these infrastructure externalities through the strategic allocation of zones, although these externalities cannot always be adequately captured. Positive externalities include economies of agglomeration and the rehabilitation of land for development that improves visual amenity. If developers (and resulting land users) do not account for these externalities when making development decisions, inefficient development can result.

*Information asymmetry:* Information about the benefits and costs of development is asymmetrically distributed among agents. A developer, for example, will hold private information about the likely value (benefits) of development. They may not have incentive to accurately reveal this information to planners and regulators. Conversely government may have information about the potential costs of a development (for example, cost in the form of environmental damage). This information asymmetry makes it difficult for planners to assess the potential net benefits of a development, or to compare the net benefits of alternative developments. In other cases, the cost of development (such as lost amenity or increased noise) may be unknown to all agents, particularly if markets for amenity and noise are missing or incomplete.

*Transaction costs:* Transaction costs are the resources used to define, establish, maintain, enforce, modify and transfer property rights (Allen 1991, Williamson 1996, McCann et al 2005). The process of applying for, assessing and agreeing to development rights (through the approval of planning permits) can be costly and time consuming. Many of these costs are opaque to government, proponents and the community because they are embedded in the ongoing cost of running the planning system.

The Victorian Competition and Efficiency Commission (2010) estimated the cost to business of land use planning and building regulation administered by Victorian councils is \$500–875 million per year. Seventy-five per cent of this cost is attributed to complying with land use planning regulation. The cost to business of unexpected delays in the processing of permit applications is an estimated \$124 million per year. The Victorian Competition and Efficiency Commission (2010) calculated that improving land use planning regulation could reduce business costs by \$20–40 million; this is a conservative estimate that does not include the benefits of reduced complexity from better strategic planning. Unnecessary transaction and other costs act as an inefficient tax on development and divert resources from other areas of the economy.

*Rent seeking:* Planning decisions can create gains and losses for proponents and objectors, who may be granted or denied development rights. Proponents thus have incentives to undertake rent seeking and strategic behaviour to gain development rights at low cost. This behaviour can include seeking exemptions from planning obligations, lobbying for shifts in regulatory parameters (such as growth boundaries) and seeking to influence particular planning decisions (Corkingdale 2004, Veseth 1979). Rent seeking can also place costs on local residents who are required to participate in appeals processes (Weber and Arnot 2007).

*Community return and equity:* Victoria's planning objectives require planners to pursue social equity objective in both space ('providing for the fair ... use and development of land') and time ('balancing the present and future interests of all Victorians'). The allocation of public land in Victoria for private development can generate resource rent.<sup>3</sup> As with all community owned resources, communities reasonably expect to share in the returns from such land development. The presence of external costs and benefits, asymmetric information, inefficient community return, inefficient transaction costs, windfall gains/losses and rent seeking make it difficult to generate community return and meet equity objectives.

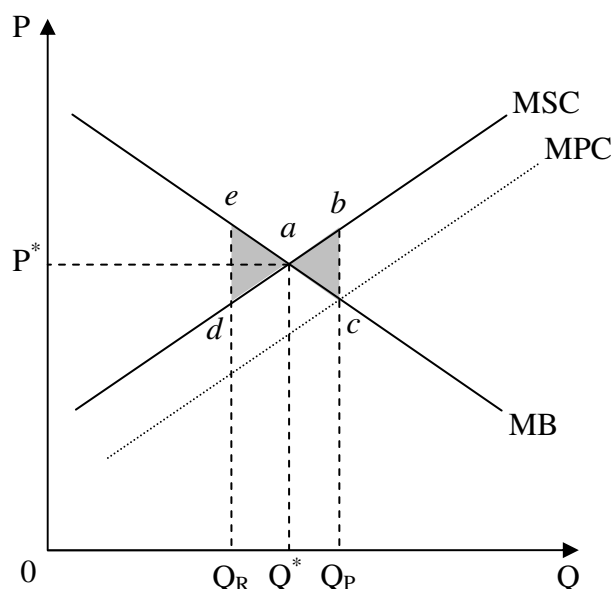
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<sup>3</sup> Resource rent is a return in excess of normal profit that can accrue to holders of rights to natural resources.

Diagram 1 presents aspects of the planning challenge in a partial equilibrium framework. For simplicity, it presents a case in which negative externalities are present.

**Diagram 1: Negative development externalities and regulatory responses**

The efficient level of development in an area is  $Q^*$ , where the marginal benefits (MB) of development equal marginal social costs (MSC), accounting for externalities such as loss of habitat and vegetation. However, private development decisions that consider only marginal private costs (MPC) will lead to a higher level of development at  $Q_P$ , resulting in social costs indicated in the triangle  $abc$ .



Governments commonly use regulatory tools to influence development outcomes. To achieve efficient outcomes, a regulator needs access to information about the marginal benefits and social costs of development, some of which will be asymmetrically distributed. Regulators also need to resist rent seeking and strategic behaviour by agents seeking to influence outcomes. In this example, if a regulator limits development to  $Q_R$  rather than  $Q^*$ , then the community will bear a social cost indicated in the triangle  $ade$ . As a regulator moves  $Q_R$  further to the left, the social cost of inefficient regulation will eventually exceed the social benefit of reducing inefficient development.

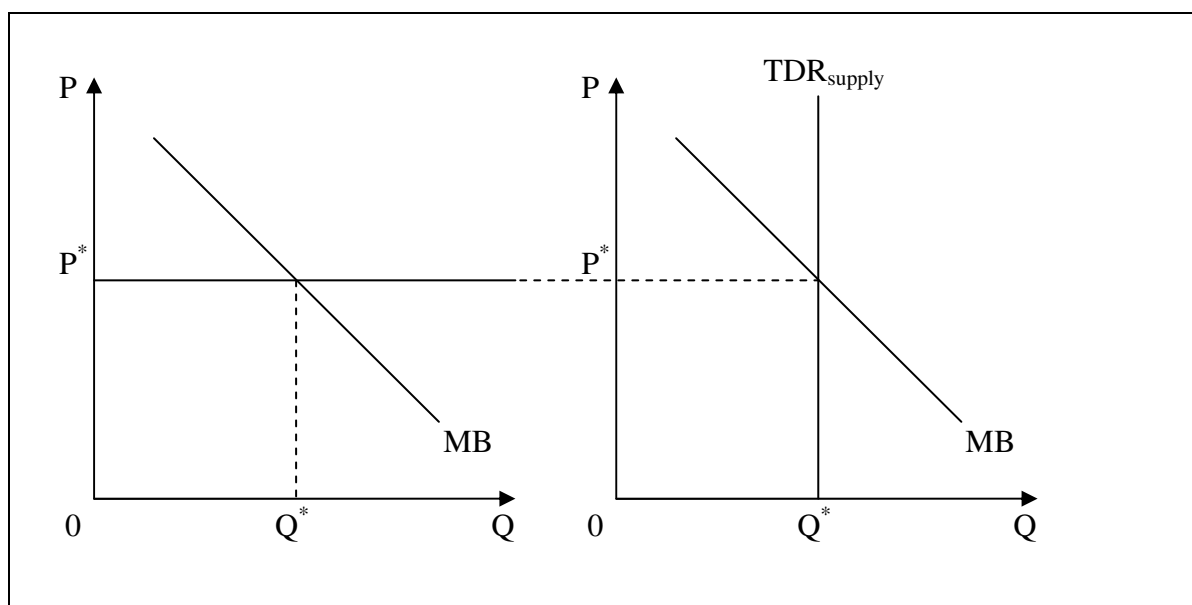
### 3. Market based instruments and tradeable development rights

The current planning system in Victoria applies regulatory instruments such as zoning to pursue development objectives. Alternative tools include market based instruments, both price based and quantity based. A price based instrument, such as a Pigovian tax, could set a tax on development such that the social costs are internalised to move development to an efficient level. In diagram 2, both panels show the same marginal benefit (MB) of development. In the left panel, a tax of  $P^*$  leads to development of  $Q^*$ . A TDR is a quantity based instrument that constrains the permitted quantity of development and allows the price to emerge through market transactions. This is shown in the right



panel, where the quantity of development is fixed at  $Q^*$ , and the price for development rights emerges as  $P^*$ .<sup>4</sup>

**Diagram 2: Market based approaches: price and quantity instruments**



Source: adapted from Gans et al. (2009).

TDRs allow a right to develop a specific parcel of land to move from one parcel to another. They set out the nature of the development rights that can be transferred. The right to exercise TDRs can be bought, sold or transferred between land bidders. Land ownership brings a bundle of rights, typically to use, exchange and develop land. TDRs allow the development right on a privately owned parcel of land to be separated from the land and transferred from the 'sending' parcel of land to a 'receiving' parcel of land (Walls and McConnell 2007).

TDRs have been directed at a range of policy objectives, including the protection of farmland, the conservation of environmentally sensitive areas, the prevention of urban sprawl, the preservation of historic landmarks, the development of more compact urban areas and the promotion of commercial growth in downtown areas (Messer 2007; Pruetz and Pruetz 2007; Reid 2007). In broad terms, TDR can be directed towards large scale or regional land use change, or smaller transfers of density on individual land parcels or single properties. In reality, many TDR programs target multiple objectives (Turner and Pruetz 2010).

TDRs can be voluntary or mandatory. In voluntary programs, landowners in sending areas can develop their land up to the zoning limit or choose to develop to a level below the

<sup>4</sup> In principle, both price and quantity instruments can deliver equivalent outcomes. These outcomes can diverge in the presence of uncertainty about the costs and benefits of development. For a discussion, see Clinch and O'Neill (2009).

allowable limit and sell the remaining development right. A mandatory program curtails the development rights of landowners, who receive transferable rights for those rights (Danner 1997, Weber and Arnot 2007).

In principle, TDRs could be used as a standalone mechanism or as a tool within a wider land use planning framework. We discuss these alternatives below.

### **3.1. Tradeable development rights as a standalone mechanism<sup>5</sup>**

TDRs are analogous to a 'cap and trade' or tradeable permit scheme (Messer 2007). Under a pure cap and trade scheme for TDRs, a regulator could set a total cap on the amount of development permitted in an area. This cap would be specified as a metric—for example, the number of residential dwellings allowed per hectare. Development rights would need to be created—for example, a permit would allow the holder to exercise their right to develop a parcel of land. Permits would then need to be allocated to proponents (landholders and developers) in some way, such as through a competitive auction. These permits could be tradeable to allow subsequent reallocation of development rights through a secondary market (Walls and McConnell 2007).

Pure cap and trade TDRs in which any landholder can trade with any other landholder have not been implemented before 2007 (Walls and McConnell 2007); to our knowledge, such 'standalone' TDRs have not been implemented to date. This may be due to a historical reliance on regulatory planning instruments and path dependence in instrument design. New policy instruments—such as a tradeable permit scheme, which involves innovations in the institutional framework of land use policy—will almost inevitably face opposition, at least in the initial stages (Nuisl and Schroeter-Schlaack 2009).

### **3.2. Tradeable development rights within a land use planning framework**

Commonly, TDRs operate within existing planning and zoning frameworks. Diagram 3 includes the key features of a hypothetical TDR program:

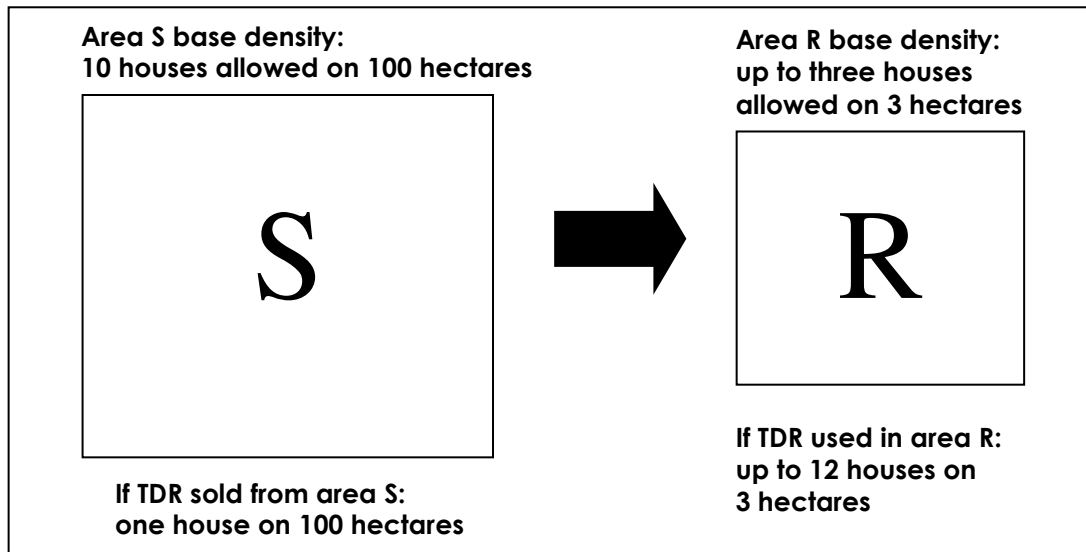
- Identification of a sending area (S) targeted for preservation, such as a site containing agricultural land or environmentally valuable land (wetland, wildlife habitat, native vegetation, site of historical or cultural significance). Under existing zoning, this site allows a baseline level of development—for example, it may allow the construction of 10 houses on 100 hectares.
- Identification of a receiving area (R) targeted for more dense development, such as an existing residential area. This area will also allow a baseline level of development under existing zoning—for example, three houses on three hectares.

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<sup>5</sup> Despite the term 'free standing', please note such a scheme relies on underpinning regulatory instruments—for example, to create property rights and enforce compliance.

- The creation of development rights for nine houses in area S. These rights can be sold to developers in area R. If all TDRs are sold, one house is allowed on 100 hectares in area S and 12 houses are allowed on three hectares in area R.
- The total number of houses in areas S and R will remain constant at 13. In practice, however, the total number would depend on design features of TDRs discussed below.

**Diagram 3: Hypothetical TDRs program**



Source: Adapted from Walls and McConnell (2007).

Prices for TDRs will be negotiated between landholders in receiving and sending areas. Once the development right has been transferred, the selling landholder is restricted from developing the land, usually by a restrictive covenant or easement that prevents the current, and any subsequent, landowner from undertaking development on their land (Clinch and O'Neill 2009).

Other design considerations for TDRs include (Walls and McConnell 2007):

- determining the underlying or baseline zoning in both sending and receiving areas, and whether that zoning is to be changed when TDRs are introduced
- the TDRs allocation rate—that is, the number of TDRs that landowners in the sending area are permitted to sell
- the density bonus in receiving areas—that is, the additional density (dwellings per hectare) allowed in the receiving area relative to the baseline zoning
- the requirement for TDRs in receiving areas—that is, the number of TDRs required for an additional dwelling in the receiving area.

### 3.3. Potential of tradeable development rights to address planning challenges

TDRs offer potential to address the challenges and market failures discussed in section 2.3. The degree to which TDRs address those challenges will be influenced by design features, but table 1 presents a broad summary.

**Table 1: TDRs and planning challenges**

<b>Challenge/ market failure</b>	<b>TDRs</b>
Externalities	TDRs allow the quantity of development in designated areas to be capped, in principle, at a socially desirable level.
Information asymmetry	In a well functioning market for TDRs, the value of development rights will be revealed through market transactions between those demanding and supplying rights.
Transaction costs	The transaction costs of TDRs will be influenced by the program's design features. An efficient mechanism that allows sellers and buyers to find each other and complete transactions can reduce some costs, but can create new costs such as legal costs.
Rent seeking	Incentives for rent seeking may shift to incentives to seek exemptions from a requirement to hold TDRs and efforts to influence the allocation of TDRs.
Community return and equity	The allocation of TDRs will influence community return and distributional outcomes. If development rights are allocated to incumbent landholders through a grandfathering process, then value (rents) will transfer from government (the community) to incumbent landholders. If these rights are allocated through a competitive process (such as auction), then (some of) the rents will flow to government/the community.

## 4. International experience with TDRs

TDRs have been applied or piloted in countries including China (Wang, et al. 2009), France (Renard 2007), the Netherlands (de Kam and Lubach 2007, Janssen-Jansen 2008) Germany (Henger and Bizer 2010) and most extensively in the United States. The first TDRs were introduced in 1916 in New York City, where owners of lots could sell their unused 'air rights' to adjacent lots, which allowed them to exceed their existing height and setback requirements (Johnston and Madison 1997).

In the United States, about 191 programs for TDRs have been run over the past four decades. TDRs have preserved over 142 000 hectares of farmland, natural areas and open space (McConnell and Walls 2009, Pruetz and Pruetz 2007). Table 2 shows broad categories of TDRs in the United States. Almost 40 per cent of those programs have been directed primarily at environmental objectives, such as protection of natural areas and open spaces, wildlife habitat, wetlands, hillsides and coastal areas, and 17 per cent have been directed at farmland preservation objectives. Another 20 per cent have been directed at joint environmental and farmland objectives.

**Table 2: Broad categories of TDRs in the United States, 2003**

<b>Category</b>	<b>Description</b>	<b>Proportion of TDRs (%)</b>
1. General environmental	Programs designed to achieve general environmental goals rather than focusing on one specific environmental objective	8
2. Specific environmental	Programs that focus on the preservation of one specific environmental resource such as coastal areas, ground water, hillsides, minerals, scenic views, surface water quality, wetlands and wildlife habitat	31
3. Farm land	Programs designed to preserve agricultural land	17
4. Environmental and farmland	Programs that give roughly equal importance to the goals of environmental and farmland protection	22
5. Rural character	Programs that use TDRs to protect rural areas from inappropriate development	5
6. Historic preservation	Programs that encourage the owners of historic landmarks to restrict their properties for historic preservation purposes. Some of these programs also encourage the rehabilitation of the landmarks.	8
7. Urban design and revitalisation	Programs intended to implement a jurisdiction's urban design and revitalisation goals	5
8. Infrastructure capacity	Programs that limit development within a planning district to keep future development from overwhelming the capacity of the transportation and other public service systems	3

Source: Adapted from Fulton et al. (2004).

While TDRs have preserved land in the United States as noted above, results across programs appear to be variable. One study found almost half of all programs for TDRs the United States had been revoked or had protected no land (Messer 2007).<sup>6</sup> Another study examined 111 programs for TDRs in the United States designed to preserve land: 46 had preserved less than two hectares (Bruening 2008). One study examined 16 programs in Florida and found five had each had only a few sales over periods exceeding 10 years. There are many examples of TDRs that operated for over five to 10 years and had only one or no transfers occur (Danner 1997).

#### **4.1. Success factors for tradeable development rights**

Reflecting mixed experience in the United States, practitioners and analysts have identified success factors for TDRs (table 3), as briefly explained below.<sup>7</sup>

<sup>6</sup> While these programs have pursued a range of specific outcomes, TDRs pursue objectives by preserving particular parcels of land.

<sup>7</sup> Success factors were identified by selecting the 20 US programs for TDRs that had preserved the most land to date. Twenty publications were used to assemble the 10 characteristics most commonly attributed to effective programs since 1972 (Pruetz and Standridge 2009).

**Table 3: Success factors of TDRs**

Factor	Level of importance
1. Demand for bonus development in the receiving area	Essential
2. Receiving areas customised for the community	Essential
3. Strict sending area development regulations	Important
4. Few or no alternatives to TDRs for achieving additional development	Important
5. Market incentives	Important
6. Ensuring developers will be able to use TDRs	Helpful
7. Strong public support for preservation	Helpful
8. Simplicity. A simple and uncomplicated program that is easy for the municipal staff to administer and the public to understand, with designated personnel to manage and track the program	Helpful
9. TDRs promotion and facilitation	Helpful
10. TDRs banks	Helpful

Source: Pruetz and Standridge (2009).

1. *Demand for bonus development.* For TDRs to work, developers in the receiving area must have demand for development density that exceeds that available under existing baseline density. Many TDRs have failed because developers are satisfied with the density already available (for free) without buying TDR.
2. *Receiving areas customised to the community.* This includes attributes in receiving areas such as adequate infrastructure to accommodate additional development, and political and community acceptability.
3. *Strict sending area development regulations.* Landowners in sending areas will be more inclined to sell TDRs when the alternative of development in the sending area is less attractive due to geographic, location or infrastructure constraints.
4. *Few or no alternatives to TDRs for achieving additional development.* Many TDRs have failed to preserve much or any land because developers have other pathways (through the planning process) for accessing additional development. Officials are regularly asked to make exemptions for developers which can make TDRs ineffective.
5. *Market incentives.* To create demand, many TDRs introduce incentives to make programs more attractive for participants.
6. *Ensuring developers will be able to use TDRs.* Some TDRs have failed because holders of TDRs were uncertain about accessing additional development density even though they could purchase TDRs. This issue can arise where holders face potential delay in approval, unanticipated costs and uncertainty about whether

their projects will be approved. It is linked to the willingness of the community in the 'receiving area' to accept the additional development.

7. *Strong public support for preservation.* TDRs are typically implemented over decades rather than years, and officials change in this time. Ongoing public support is thus important to ensure programs continue and alternative development pathways are not established that undermine TDRs.
8. *Simplicity.* Simplicity can be difficult to define, but the more complicated and inaccessible a program for TDRs, the more difficult it can be to gain support from landowners, developers, the community and relevant officials.
9. *TDRs promotion and facilitation.* For TDRs to function, developers, landowners and the public need to be aware of the program, how it works and its benefits. Such promotion can also help planning authorities maintain a credible commitment to requirements for TDRs and resist strategic behaviour.
10. *TDRs banks.* Banks for TDRs are institutions authorised to buy, hold and resell TDRs. They can reduce transaction costs and facilitate transactions over time.

Analysts suggest factors 6–10 are helpful, but not critical to success for TDRs. Factors 1–2 are essential, and factors 3–5 are important. Any one of these factors, however, could make a significant difference in a particular community, with particular policy settings and planning parameters (Pruetz and Standridge 2009).

## **5. Experience in Australia**

Compared to the United States, Australia has relatively limited experience with TDRs (Box 1). Experience to-date has been directed at heritage preservation objectives, the protection of environmentally sensitive areas, urban growth management and open space conservation.

**Box 1: TDRs in Australia**

In a rural/regional setting, The South Australian Government introduced TDRs in the Mount Lofty Ranges near Adelaide in 1992. The scheme proposed to allow the transfer of development rights from a water protection area where existing zoning did not allow additional housing and land subdivision, to areas more appropriate for urban expansion and infrastructure provision. It was abandoned and generally considered a failure (Williams 2004). A key reason for the failure was that planning authorities did not identify and resolve clear sending and receiving areas (Industry Commission 1998, Williams 2004).

TDRs, and/or instruments with similar features, have also been used in more urban settings to preserve heritage buildings in Adelaide, Brisbane, Melbourne<sup>8</sup> and Sydney (Arnold 1992). The owners of historic buildings can transfer unused development rights from a heritage site to a development site, which can then be developed to greater intensity than would otherwise be allowed. The owner of the heritage site then enters a binding agreement with the relevant planning authority to preserve the heritage building. They also receive compensation for the loss of development rights that can facilitate the refurbishment and rehabilitation of historic buildings (Williams 2004). Additionally, TDRs have been introduced for urban growth management objectives in Wellington Shire in New South Wales, and open space conservation on the New South Wales central coast and south coast (Williams 2004).

Possible reasons for the limited use of TDRs in Australia include a history of reliance on command-and-control regulation, incomplete understanding of TDRs by planning decision makers, and legal uncertainty about, and impediments (under existing statutory plans) to, more widespread adoption of TDRs (Williams 2010).

## **6. Design considerations for tradeable development rights in Victoria**

Drawing on the general success factors noted above, the discussion of land use planning and policy parameters discussed earlier, a number of design considerations for TDRs will require resolution in a Victorian context. Some of the challenges arise due to the nature of existing policy and institutional settings in Victoria, while others are common to TDRs more generally. This section highlights how the following such challenges might affect the design of TDRs in Victoria:

- better defining property rights
- improving infrastructure funding and costing arrangements
- developing a suitable metric, addressing potential development hotspots and non-quantity development attributes
- dealing with the potential for development leaks
- defining and targeting equity objectives

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<sup>8</sup> Melbourne has not incorporated provisions for TDRs in its planning scheme, but has used a bonus plot ratio program to preserve historic buildings and to compensate their owners for loss of development rights. Bonus plot ratio and TDRs differ in the sense that when TDRs are used, the owner of the heritage building loses the right to further develop the heritage site. Once transferred, TDRs are lost forever, whereas bonus plot ratio provisions last the life of a town plan (Arnold 1992).



- clarifying the cost of TDRs
- addressing credible commitment problems.

## **6.1. Design challenges arising from settings in Victoria**

### *Property rights*

TDRs require the development right to be clearly specified, because it is difficult for markets to efficiently trade rights that are not well defined. This is a particularly important issue in the context of the existing planning framework, legislation and regulations in Australia and Victoria.

As mentioned earlier, in Australia there is no inherent right to develop a parcel of land. A landholder may seek development approval from the relevant responsible authorities. If approval is granted, development for the specific approved purpose can commence. A landholder may have development expectations based on existing planning framework, and will have an implied probability of success for a certain type and quantity of development (Williams 2010). Development rights in rural areas and zones in Victoria generally consist of a right to apply (RTA) for a development permit. A rural landholding does not generally include a right to develop (RTD) (Sinclair 2002). An RTA involves applying to the relevant authority, and the result is subject to the authority's approval and also possible appeal by third parties. Victoria's planning system provides for third party appeal rights and has a strong culture of third party appeals (Trenorden 2009).

TDRs that employ RTA transactions may, in principle, operate more efficiently for sellers than for buyers. Sellers of TDRs could sell their RTA and enter a contract (easement or covenant) that extinguishes this right—an outcome that may have some value for the community.<sup>9</sup> However, the buyer of an RTA would be buying a right that they already hold. In principle, a local authority could, in some way, indicate they will treat a development application more favourably if the applicant has purchased an additional RTA. In this case, the value of the RTA would be to increase the probability of success for the landholder when they exercise their right. However, markets will likely find it difficult to value this enhanced probability accurately, which would hinder efficient transactions.

TDRs are likely to operate more efficiently when development rights are 'by right' and explicit.<sup>10</sup> In these circumstances, TDRs would be stronger property rights, and a clear

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<sup>9</sup> In purchase of development rights (PDRs) programs, governments purchase a right to develop land without intending to resell that right, as a land preservation instrument (Nelson 1990). Such purchase could, in principle, be applied to landholders that hold a RTA.

<sup>10</sup> In some programs in the United States, the use of TDRs is 'by right'. Programs that are not by right face more hurdles and face greater uncertainty (Walls and McConnell 2007).

value for TDRs would likely emerge in transactions. This factor is consistent with the success factor 'ensuring developers will be able to use TDRs' discussed in section 4.

#### *Infrastructure externalities*

New development and additional density places increased demand on existing infrastructure and requires additional infrastructure—for example, new housing requires sewerage, drainage, water, electricity, roads, public transport networks and facilities such as parks and libraries. These costs are covered by mechanisms including government revenue and debt, contributions from developers, and vehicles such as public private partnerships. Governments have increasingly shifted infrastructure costs towards the private sector. In Australian states and territories, developers contribute to the provision of basic infrastructure as a condition of receiving a planning approval; these contributions can include a transfer of land from the developer to government, infrastructure work-in-kind and monetary charges. In Victoria, local councils can specify contributions, but the Victorian Planning and Environment Act caps the contribution levied for community infrastructure at \$900 per dwelling (or 25 per cent of the cost of non-dwelling construction). If, however, contributions are too low from an efficiency perspective, the developer will not take into account the full cost of infrastructure when making development decisions, and vice versa (Chan et al. 2009).<sup>11</sup>

To improve efficiency, transactions for TDRs should incorporate infrastructure costs. In principle, councils can achieve this by setting reserve prices for TDRs that reflect efficient infrastructure costs, or by developing an efficient infrastructure pricing regime that complements TDRs. This approach is consistent with the success factor identified from overseas use of TDRs that receiving areas need to be customised to the community.

## **6.2. General design challenges applicable to Victoria**

### *Metric*

The metric for TDRs could be defined in a number of ways: density (dwellings per hectare), area, floor area ratio, height etc. (Messer 2007). Developing a suitable metric may be difficult, and a poorly designed metric may create perverse incentives. If the metric is dwellings per hectare of agricultural land, for example, developers may have incentives to build larger dwellings to maximise financial returns from development under the cap. This problem will be compounded by potential heterogeneity across different developments. Dwellings (per hectare) may be equivalent in size, but may vary in other important ways. A residential development, a school and an industrial plant of equivalent size, for example, may have different impacts on the land and surrounding landholders.

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<sup>11</sup> Prior to 2004 this cap was \$450 (Chan et al. 2009).

### *Development hotspots*

While TDRs can, in principle, allocate development within an overall constraint on development, development 'hot spots' may occur within this overall cap that generate high external costs. Concentrated development near an environmentally sensitive wetland in a rural area, for example, may be consistent with the overall development cap, but may have adverse impacts on adjacent vegetation and wildlife. The issue of development hotspots can potentially be dealt with using a zonal permit system that divides the regulated area into a number of zones (Henger and Bizer 2010): the authority issues a number of permits equal to the quantity standards in each zone. In extreme specification, permits can be traded only within each zone on a one-to-one basis, not an interzonal basis.

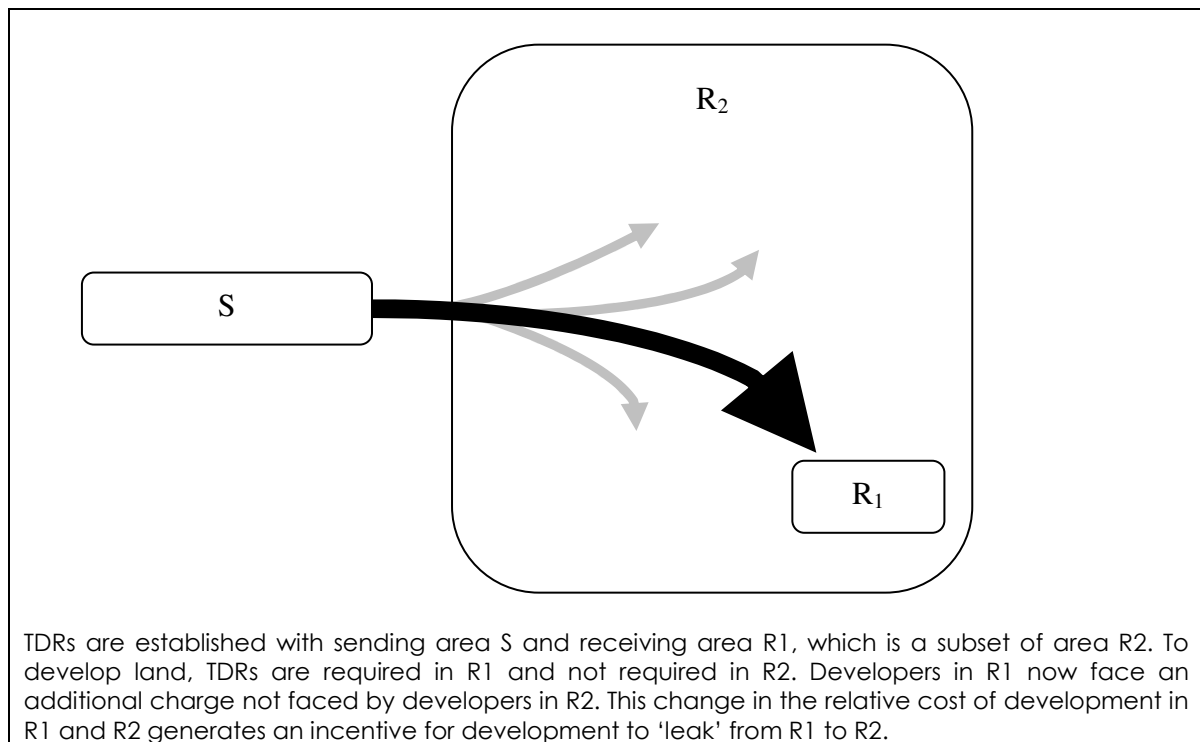
### *Non-quantity development attributes*

As a quantity instrument, TDRs can influence the overall amount of development in a specified agricultural or rural area. However, the character of development can also influence community welfare—for example, aesthetic sympathy with existing development in a receiving area. Non-quantity instruments may be required alongside TDRs to address such objectives (Brueckner 2000), such as constraints on the mixing of residential and industrial development.

### *Development leaks*

The geographic scope of TDRs will influence developers' incentives and ability to move development to locations beyond the TDRs boundary (Messer 2007). The requirement for developers to purchase TDRs in a receiving area increases the cost of development relative to areas in which TDRs are not required. As a result, development may move ('leak') to areas in which development is less costly (diagram 4), potentially undermining the objectives of the TDR program.

**Diagram 4: Development leak**



### *Equity*

TDRs have equity implications at both their allocation and transfer stages:

- Clarifying and unbundling development rights from land creates an additional source of value. The method for initially allocating this value will have equity implications. If development rights are allocated to incumbent landholders through a grandfathering process, then this value (rents) will transfer from government (the community) to incumbent landholders. If these rights are allocated through a competitive process (such as auction), then (some of) the rents will flow to government/the community.
- TDRs require a developer that wants increased density to fund land preservation, or related goals. The developer then passes these costs on to future residents/homeowners (Bruening 2008). Land preservation tends to have public good characteristics (non-excludability and non-rivalry), and these benefits can flow mainly to nearby communities or more widely across a region, jurisdiction or nation. As these public benefits become more widespread, the equity case for requiring developers (and new local residents) to fund these outcomes becomes increasingly tenuous.

In the US, historically TDRs grew out of the difficulty of funding programs that sought to purchase development rights from landholders in order to achieve conservation and land

use objectives (Thorsnes and Simons 1999). TDRs have been supported on the grounds that they can achieve conservation objectives by preserving natural resources at little or no cost to the public (Danner 1997). However once foregone rents and possible infrastructure externalities are taken into account, claims about a 'free lunch' do not withstand scrutiny.

### **6.3. Credible commitment**

A success factor from overseas experience with TDRs is to minimise alternative pathways for development approval. In a 'cap and trade' mechanism, this minimisation is akin to ensuring participants are not exempted from obtaining permits for activities subject to the cap, such as carbon emissions. This may also be an important issue in a domestic context, in both sending and receiving areas. In sending areas, governments and planning authorities will need to resist pressure to approve development in protected or target areas (Industry Commission 1998). In receiving areas, relevant authorities will need to resist demands for exemptions and exceptions to development without TDRs.

## **7. Potential for tradeable development rights in Victoria**

As noted, TDRs operate within an underlying planning framework. We consider the potential for TDRs to contribute in Victoria to four particular rural land use outcomes of current relevance: (1) to protect agricultural land from competing uses, (2) to provide a source of adjustment income for rural landholders, (3) to protect native vegetation and (4) as a more general tool, to efficiently allocate development rights.

### **7.1. Protecting agricultural land from competing uses**

TDRs can be used to direct development from agricultural land to other land types, often reflecting a concern that excessive urban expansion is encroaching on agricultural land. The validity of this concern can be questioned in settings where land markets function efficiently. The value of farm output will be reflected in the price that agricultural buyers are willing to pay for that land. If residential developers are willing to pay higher amounts, then society has determined the houses and other structures built on that land are more valuable than the farm output that is forgone. If farmland is productive and scarce, then its price will be high, making it more competitive relative to urban expansion. Conversely, farmland with low productivity and low value will be more attractive to alternative uses including urban expansion (Brueckner 2000).

A series of market failures, however, may lead to excessive urban growth<sup>12</sup> and competition with farmland. Market failures may include:

- a failure to account for travel congestion externalities, which leads to inefficient commuting and increases in the size and spread of cities
- as noted, a failure by developers (and residents) to bear the efficient costs of infrastructure associated with residential development. Development appears artificially cheap from the developer's view, encouraging excessive development and urban growth
- a failure to account for the social and amenity benefits of open space, such as the ability to enjoy nature and escape from the pressures of urban life.

Potential instruments to deal with these market failures respectively include congestion tolls, infrastructure pricing and charging reform, and development taxes that are applied when land is converted from agricultural to residential use (Brueckner 2000). TDRs are unlikely to be an effective tool for directly addressing congestion externalities. As noted, if TDRs facilitate additional transactions that do not account for infrastructure externalities, then they may place additional external costs on the community. As noted earlier, price and quantity instruments have important similarities, and both taxes and TDRs increase the cost of land conversion, slowing the development process and the rate of urban expansion. However a tax may offer advantages over TDRs, in particular, because a tax is generally more universal than TDRs—that is, taxes apply to all land conversion while TDRs increase conversion costs only in designated receiving areas. However, compared with taxes, TDRs may more precisely define sending and receiving areas.

In some cases, TDRs may work against open space preservation. TDRs that tax high density development may reduce the type of development that should be encouraged if open space preservation is the objective; TDRs that tax low density development may be more effective in achieving open space goals (Bruening 2008). Overall, TDRs do not appear to be an efficient instrument for preserving land in Victoria for agricultural use.

## **7.2. Providing adjustment income for rural landholders**

TDRs offer a potential source of adjustment income for rural landholders, because the sale of development rights offers a potential income source to complement or substitute for

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<sup>12</sup> Urban expansion and the spatial growth of cities are driven by fundamental factors, including population growth, rising household incomes (with residents demanding more living space as their incomes rise) and transport improvements (making travel faster and more convenient). Urban expansion driven by these factors is efficient. The question here is whether market failures lead to excessive (inefficient) urban expansion (Brueckner 2000).

other income streams. But the flow of gains and rent transfers from TDRs can be uncertain and subject to program design.

In addition, the value of the assistance delivered to landholders through TDRs may be opaque, making it more difficult for government and the community to make well informed decisions on the merits of the instrument. As a result, TDRs do not appear to be the most efficient tool for achieving adjustment objectives.

### **7.3. Protecting native vegetation**

TDRs overseas have been directed at a native vegetation objective (table 1). Victoria also has native vegetation objectives, which it addresses via both regulatory instruments and emerging market based instruments. In 1997 Victoria introduced *The Planning and Environment Act*, which required developers to obtain a permit from the relevant planning authority for any development involving the destruction of native vegetation. This Act was extended with the 2002 introduction of *Victoria's Native Vegetation Management Framework*, which requires an offset be procured to replace any native vegetation destroyed. Offsets are generally supplied by private landholders who choose to divert resources from activities such as livestock and crop production to increase the stock of native vegetation. Behind each offset supplied is a production function that converts land, labour and capital inputs into native vegetation outputs.

These legislative developments require transactions between those who demand and supply offsets. Construction of a highway, for example, may result in land clearing along the route. Offset buyers (developers) and offset suppliers (landholders) need to find each other and negotiate transactions—a process that can be slow and costly, taking many months. This delay can impede land development and native vegetation protection, reducing economic and environmental benefits for the community. An electronic web based 'smart market'—Native Vegetation Exchange (NVX)—is under development, that may enable offset suppliers and buyers to engage in quick and efficient transactions.

The NVX includes 'rules' to ensure transactions take place between 'like-for-like' offsets in terms of vegetation type, ecological function, landscape role, quality and volume. Importantly, the NVX can also allow packaging of offsets on both the supply and demand sides of the market, enabling the flexible formation of buying and selling entities in multilateral transactions—for example, several buyers can collectively purchase offsets from a group of sellers. The potential benefits of the NVX include environmental protection, efficient allocation of offsets, transparent market valuation of native vegetation, facilitated market entry and participation (such as by non-government organisations and philanthropic institutions), and reduced transaction costs. As a result, the NVX can help avoid inefficient outcomes, such as the clearing of high value

vegetation to make way for land development. Victoria has made a whole-of-government commitment to trial the NVX in 2010–11 (Plott et al. 2008).

If the native vegetation framework and the NVX prove effective in addressing native vegetation objectives, additional instruments such as TDRs may not be needed to address these objectives. However, if TDRs are directed at alternative objectives, then the NVX framework offers a potential trading platform<sup>13</sup> for TDRs that could reduce transaction costs. The clarification of NVX rules also offers a potential model for clarifying property rights for TDRs. Overall, while TDRs could be used for native vegetation conservation in Victoria, current and potential instruments are already in place to address native vegetation objectives.

#### **7.4. Efficiently allocating development**

The limitations of the planning system suggest scope to improve the general allocation of development rights to improve information revelation, allocate development rights to their highest value use, reduce transaction costs, reduce incentives for rent seeking and strategic behaviour, and increase community return.

There appears to be scope for market based instruments such as TDRs to contribute to this objective. But the existing land use planning framework would likely need modification in the following areas:

- clarifying the land use planning objectives. There may be scope to better define quantity based development objectives, which could then allow greater application of quantity based instruments to development problems.
- better defining the development right
- designing a mechanism for initially allocating development rights in a way that minimises windfall gains and provides a return to the community
- designing a trading platform that reduces transaction costs and facilitates trades between buyers and sellers of TDRs. The Victorian Government NVX may offer an example of such a platform in a native vegetation context. Augmenting existing platforms may be possible and desirable, rather than creating separate platforms.
- reviewing infrastructure funding and costing arrangements to ensure infrastructure externalities do not lead to development outcomes that impose net costs on the community
- considering mechanisms to enforce credible commitment by planning authorities.

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<sup>13</sup> The equivalent of a bank for TDRs, which is considered a helpful success factor of TDRs (Pruetz and Standridge 2009).



Overall, TDRs offer potential to improve current planning outcomes, but the existing planning framework in Victoria would likely require modification to accommodate TDRs.

## **8. Conclusion**

Governments typically have a range of objectives for land use. The planning system and land markets face challenges in meeting the economic objective of allocating land development to its highest value use, given the presence of externalities and information asymmetry, transaction costs and rent seeking. Planners also face difficulties in generating community return and defining and meeting equity objectives.

Historically, planners have applied regulatory tools to achieve planning outcomes. TDRs are a market based instrument that allows a right to develop a parcel of land to move from one parcel to another. TDRs can be thought of as a freestanding 'cap and trade' instrument, or as an instrument that operates within an existing planning framework. In principle, TDRs have potential to assist in achieving efficiency objectives by addressing many of the market failures noted.

Overseas experience with TDRs illustrates mixed results, and experience in Australia has been limited. Design challenges for applying TDRs in Victoria include the need to better define the development right – in particular to consider modification from a RTA to a RTD. It will also be important to address potential infrastructure externalities. Additional challenges include developing a suitable metric, addressing potential development hotspots and non-quantity development attributes, considering potential leaks, clarifying distributional impacts, and addressing credible commitment problems.

In this paper, we considered the potential to apply TDRs to outcomes relevant to Victoria's rural land uses. Using TDRs to protect agricultural land from competing uses does not appear to address underlying market failures that may be contributing to excessive urban sprawl and encroachment on agricultural land. Alternatively, TDRs can be directed to protect native vegetation, however Victoria has existing and emerging instruments (including the NVX) to target this objective. TDRs offer a potential source of adjustment income to rural landholders, but other instruments may more effectively and transparently provide such assistance. Finally, TDRs may allow the more efficient allocation of development rights, but this objective requires modification of the existing planning framework to accommodate the design challenges noted above.

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