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Regulated and Merchant Interconnectors in Australia: SNI and Murraylink Revisited

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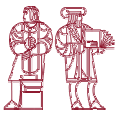

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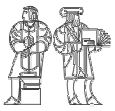

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Regulated and merchant interconnectors in Australia: SNI and Murraylink revisited

Stephen Littlechild[1, 2]

13 January 2004

Abstract

This paper examines the history of the various actual and proposed interconnectors between New South Wales and Victoria into South Australia. It covers the period from the earliest proposal for a regulated interconnector to the recent Victoria Supreme Court review and the latest ministerial proposals. It finds, inter alia, that the Supreme Court decision is likely to have strengthened, in a beneficial way, the regulatory regime for dealing with merchant interconnectors and the obligations on incumbent transmission companies. It finds that none of the proposals for regulated interconnectors did or would have passed the regulatory tests as formulated in terms of aggregate benefits to all market participants. It finds that neither of the merchant interconnectors (into South Australia and Queensland) are likely to have been profitable. It sees a possible explanation for the construction of regulated interconnectors in terms of the benefits to customers, or in terms of bringing about a single competitive market. Above all, it illustrates the political context in which decisions on interconnectors have been made, and the need to take account of such motivations when comparing the likely effects of regulated interconnectors versus merchant interconnectors.

Introduction

How far can merchant transmission sensibly replace or supplement investment by a regulated transmission company? Proponents suggest that merchant transmission could play a significant role and that only where there are market failures should regulators look to rate-based projects. Sceptics tend to see market failure as overwhelming in this area.[3] It is also suggested that experience with merchant interconnectors in Australia has not been successful and has delayed investment in efficient regulated interconnectors.

Australian experience with regulated and merchant transmission lines has certainly been characterised by controversies, litigation and delayed investment in regulated transmission. For example, after a protracted process of appraisal, the National Electricity

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I am particularly grateful to Robert Booth, and to many others including Greg Houston, Bruce Mountain, Hugh Outhred, Robert Outhred, Brian Wharmby and a referee, for information, comments and suggestions, but none of them should be held responsible for the views expressed herein.
[2] The author was invited by TransEnergie and Murraylink to comment on part of the regulatory process in Australia in 2001, and was called by these companies to testify in the August 2002 hearing before the National Electricity Tribunal. Neither TransEnergie nor Murraylink has provided financial support for subsequent work or for the writing of this paper, and they are similarly not responsible for the views expressed herein.
[3] Two leading papers are by Hogan 2003 and Joskow and Tirole 2003. For a fuller discussion of the literature see Littlechild 2003.

Market Management Company (NEMMCO) approved the proposed regulated interconnector SNI. The merchant interconnector Murraylink appealed this decision to the National Electricity Tribunal. Murraylink is now operational, but SNI was delayed and has so far not been implemented.

How to evaluate this episode is another matter. I have argued elsewhere (Littlechild 2003) that evidence from the Tribunal hearing showed that, once Murraylink was committed, to build SNI as a duplicate interconnector would be an inefficient rather than efficient use of resources. And whereas it is commonly suggested that merchant transmission could lead to insufficient investment, this episode suggested that regulated transmission is liable to produce excessive investment judged by conventional economic criteria. So it could be argued that the regulatory process was deficient rather than that merchant transmission was inherently unsatisfactory, and that in this particular case the litigation and delay to the regulated investment actually improved rather than reduced the efficient use of resources.

However, this particular episode was only part of a long-running saga that even now is far from complete. What would a broader appraisal show? The present paper examines Australian experience with these two interconnectors in a number of further respects, including looking back at the earlier history and updating the analysis in the light of further experience.

Part One of the paper presents some brief historical background. This makes the paper more self-contained and independent of the previous paper. It also provides a clearer picture of the political context in which policy in this area has developed.

Part Two looks at the finding of the Victoria Supreme Court, published after the previous paper was written, in its judicial review of the Tribunal decision. The Court finding is important in a number of respects: it comments on the reasoning of the Majority and Minority Decisions of the Tribunal, it upholds in two key respects Murraylink's appeal against the Tribunal decision, and it sets out guidance for how the incumbent transmission company and the regulator should act in future.

The previous paper took as given the construction of the merchant interconnector Murraylink and looked only at whether the regulated interconnector SNI was economic thereafter as a duplicate interconnector. It did not look at the process over a longer period of time, to establish which (if either) of these interconnectors was efficient in the first place. Accordingly, Part Three of this paper does this. It looks back at the thinking and actions in the period before the NEMMCO appraisal – that is, when SNI was first proposed, before Murraylink was built. It examines whether all or any of the proposed or constructed interconnectors were economically or financially viable and would have passed the "regulatory test". This appraisal is informed by the decision of Murraylink (subsequent to the previous paper) to accept a transfer from merchant to regulated status, and the associated report of the Australian Competition and Consumer Commission (ACCC) on the costs and benefits of various relevant alternatives.

Part Four examines the financial viability of the Queensland interconnectors, the suggested inefficiency of merchant relative to regulated interconnectors, and the

distributional implications of regulated interconnectors. It then examines the nature of the benefits assumed in the ACCC's recent application of the regulatory test, and the proposal by ministers to change yet again the nature of the test.

Part Five brings the results of the paper together. It argues the importance of recognising the different objectives of merchant and regulated investment in analysing and choosing the appropriate arrangements for transmission investments.

PART ONE HISTORICAL BACKGROUND AND THE INTERCONNECTORS

The historical background and political context

Until the last few years, each Australian state government owned the electricity supply system in that state. These systems were developed independently, with only two relatively small interconnectors between them.[4] There was little desire for further links.[5] The "split-savings" trading system between three vertically-integrated utilities sufficed until the concept of a national electricity grid arose in 1991.

In 1994 Victoria decided to adopt the UK model of a trading system with a view to introducing privatisation, competition and regulation. To a greater or lesser degree, other states remained to be convinced.

The building of further interconnectors was particularly controversial. One account suggests that the motivations of the governments in three relevant states may be summarised as follows.[6] New South Wales was keen to promote further interconnectors – initially with Queensland and then with South Australia - in order to export its surplus generation. In Queensland, a taskforce, looking for it to join the NEM, restructure and privatise, proposed that the government should construct a large interconnection with NSW, focusing on northward flow 'to discipline generators in Queensland'.[7] South Australia, having suffered a blackout in 1993, put in place an import agreement for its existing interconnector with Victoria and was initially keen to construct a second one to NSW. However, when South Australia decided to privatise the sector it withdrew its support.[8]

This account suggests that the decisions whether to construct – or not to construct, or to cancel the construction of – electricity interconnectors were essentially political as well

[4] The Snowy interconnector between NSW and Victoria was built in 1961, and the Heywood interconnector between Victoria and South Australia (SA) in 1989. The former line "was constructed not so much as an interconnection, but rather because the development of the Snowy Mountains [Hydroelectric] Scheme was paid for by the sale of electricity to each of these states." (Booth 2003 ch. 2. p. 19)

[5] Referring to the sometimes-heard description of Australia as "less of a nation and more like a series of warring tribes" (p. 13) Booth comments that "The 'warring tribes' have been very evident whenever 'linking up' or interconnection has been suggested." (p. 19).

[6] Booth (2003).

[7] In the event, Queensland did not privatise its electricity sector, new generation in Queensland lowered prices there, and the interconnectors often flowed southward.

[8] "The advisers hired to manage the sale process informed the government that SANI would probably halve the value of the generation assets in the state if allowed to proceed. The South Australian government then withdrew its support for SANI and actively opposed it in all available fora." Booth 2003, p. 89.

as economic in nature. State governments as owners of the state electricity systems made these decisions. The governments were variously driven by factors such as preferences for self-sufficiency rather than cooperation with other states, concerns about security of supply and actual or potential generation market power, ambitions to make profitable use of surplus capacity and to maximise proceeds of privatisation, and so on.

No doubt the extent of government interest varied over time, and from one minister to another. No doubt the interests of the government-owned transmission entities were also influential. And it is not that political considerations do not have economic dimensions, or that no economic calculations or cost-benefit analyses of any kind were made (though not all were published). Rather, the decisions to build or not build these interconnectors, and the sizes to build them, seem to have been conceived in political terms at least as much as in economic terms, and politicians took important decisions.[9]

The regulatory framework was changing, however. In 1996 the National Market Management Company (NEMMCO) and the National Electricity Code Administrator (NECA) were created.[10] Moreover, the ACCC was considering how best to discharge its impending responsibility for regulating transmission revenues in the National Electricity Market (NEM), as provided for in the National Electricity Code (the Code). Part of that Code deals with the criteria under which transmission augmentations may become part of the regulated asset base of a Transmission Network Service Provider (TNSP) and earn a regulated return thereon. At that time the criteria were set out in a "Customer benefits test", which "was designed to ensure that network investment would only be undertaken if customers benefited from that investment."[11] The Code also made explicit allowance for the existence, and indeed protection, of "entrepreneurial interconnectors" or what were later called Market Network Service Providers (MNSPs).[12]

But as indicated above, not all the States were equally convinced of the new framework, and moved towards it at different speeds. Many states retain substantial degrees of government ownership, there is State regulation of retail and distribution price controls, and some States operate tariff equalisation mechanisms to insulate generators, retailers and customers from market signals in the NEM. An interesting question, therefore, was how far and how fast the traditional political framework within a state monopoly context would give way to a new economic framework within a national competitive context. Would the two frameworks conflict?

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[9] See also contemporary political reports e.g. "The SA Government's backflip on the sale of ETSA and Optima saw it withdraw its one time support for the [interconnector] project (known as Riverlink or SANI) for fear of devaluing Optima. Equally NSW is hoping to improve the earnings and value of its power stations." There is also reference to other considerations: "if SANI goes ahead the mooted gas-fired power station at Pelican Point will be shelved. That's bad news for jobs and investment in South Australia and terrible news for the environment." *Inside Story*, Australian Democrats Newsletter, December 1998, p. 3.

[10] "The former was to become the short-term operator of the proposed National Electricity Market (soon called the "NEM"), and the latter was to take responsibility for a National Electricity Code (NEC, or "the Code") and its initial authorisation/acceptance under the modified TPA and the approval of any subsequent modification." Booth 2003 p. 193

[11] ACCC Issues Paper - Review of the Regulatory Test, 10 May 2002 (henceforth ACCC Issues Paper), p. 2

[12] The US term merchant transmission line was previously referred to in Australia as an entrepreneurial interconnector and is now called a market network service provider (MNSP). It will be convenient to use the term merchant interconnector here.

TransGrid and the SANI/SNI interconnector to South Australia

The issue nearly came to a head in Queensland. In 1997, the NSW and Queensland governments announced and approved a new regulated line between those two states, called QNI.[13] Because of its timing, QNI just avoided providing the first test of the potential tension between the political and economic frameworks for interconnector decisions.[14]

In contrast to the situation in Queensland, the regulated and merchant interconnectors into SA became inextricably enmeshed in the regulatory framework, and there has been substantial conflict throughout. Both political and economic considerations have played an active role in the subsequent history of both interconnectors. The earlier history has been recounted elsewhere[15]. Here, it will be useful to set out in a little more detail the early history of the project.

The SANI project and its successor SNI consisted of a 250MW AC interconnector between Buronga in NSW and Robertstown in SA, plus certain reinforcement work to the NSW transmission system. Figure 1.1 is a simple map of the SNI and Murraylink interconnectors.[16] In 2001 the history of the project was summarised as follows.[17]

> The SA electricity system already has one interconnection with Victoria, which entered commercial service in 1990, and which is at full capacity. Over the summer period SA experiences electricity shortages and now requires additional electricity capacity.

[13] QNI is an overground alternating current (AC) interconnector that covers a distance of about 550 km and has a present transfer capability of 1000 MW south to NSW and 750 MW north to Queensland. It went into initial operation in February 2001. In parallel, in 1998 TransEnergie proposed DirectLink, a much shorter (65 km) underground high voltage direct current (HVDC) unregulated interconnector (i.e. a merchant transmission line) between the two states, with a smaller capacity of 180 MW. TransEnergie is the transmission subsidiary of Hydro Quebec, a publicly owned electric utility company in Quebec. DirectLink began operation in June 2000. See "Interconnection of the NSW and Queensland Electricity Grids, submission to the ACCC", 24 September 1997, TransGrid (NSW), Powerlink Queensland, NSW Electricity Reform Taskforce and Queensland Electricity Reform Unit. "Applications for Authorisation, National Electricity Code", ACCC, 10 December 1997. Other sources include FERC evidence of TransGrid and TransEnergie, and Gordon Jardine (CEO, Powerlink Queensland), "Regulated vs Non-Regulated Interconnectors … there is a case study!!!!" submission to the *COAG Energy Markets Review*, April 2002. See also Littlechild 2003.

[14] "The Queensland interconnection project managed to gain the approval of the two state governments before the National Electricity Code took effect – which now can be seen as a merciful event, since, had the provisions of that Code been applied to that project, it is highly doubtful that it would have been approved and it would certainly have suffered years of delay." Booth 2003 p. 88

[15] Littlechild (2003). See also Mountain and Swier 2003, ACCC and NEMMCO publications, TransGrid annual reports, TransGrid and Murraylink FERC Comments 2002, and witness statements to the National Electricity Tribunal.

[16] Source: IRPC Stage 1 Report, Proposed SNI Intereconnector, 26 October 2001 (pages dated 1 November 2001), Figure 1.1 p. 8. At the end of this paper, Figure 1 shows Murraylink more explicitly (Source: ACCC Conversion Preliminary View). Figure 2 shows the extent of what later became known as Unbundled SNI (Source: Witness Statement of A S Cook, National Electricity Trinbunal, 14 May 2002).

[17] Issues Paper, TransGrid SA NSW SNI (Central Route) Interconnector Proposal, Major Developments Panel, South Australia, December 2001, p. 7. (Present footnotes added.)

In September 1994, the Chief Executives of Pacific Power and ETSA Corporation signed a Memorandum of Understanding to examine the feasibility of a direct interconnection between the electricity networks operated by their respective organisations. The technical and costing studies identified an option that appeared favourable from both technical and economic viewpoints. With the subsequent changes in industry structure in both states, the responsibility for this work in NSW was devolved to TransGrid[18], and in SA to ETSA Transmission (now ElectraNet SA), a subsidiary of ETSA Corporation.[19] This agreement culminated in the signing of the Memorandum of Understanding on 1st August 1996.[20]

[18] The State-owned Electricity Commission of New South Wales (ECNSW) was split into TransGrid responsible for the transmission network and system operation and control, and Pacific Power responsible for generation and some coal mines. Pacific Power was later subdivided into three separate generators that remain in the public sector. TransGrid is now the publicly owned Transmission Network Service Provider (TNSP) in NSW.

[19] The State-owned Electricity Trust of South Australia (ETSA) was corporatised as ETSA Corporation then (in stages) split into four entities: Optima Energy (a generation company, subsequently subdivided into three components), ETSA Transmission later called ElectraNet SA (a transmission company), ETSA Power (a retailer) and ETSA Utilities (a distribution company). All these entities were subsequently privatized.

[20] The 1996 Memorandum of Understanding was between Ministers, and referred to a feasibility report of the benefits of such an interconnector. In 1997 this report found that there would be benefits. "Independent review of interconnection of South Australia and New South Wales", London Economics, December 1997.

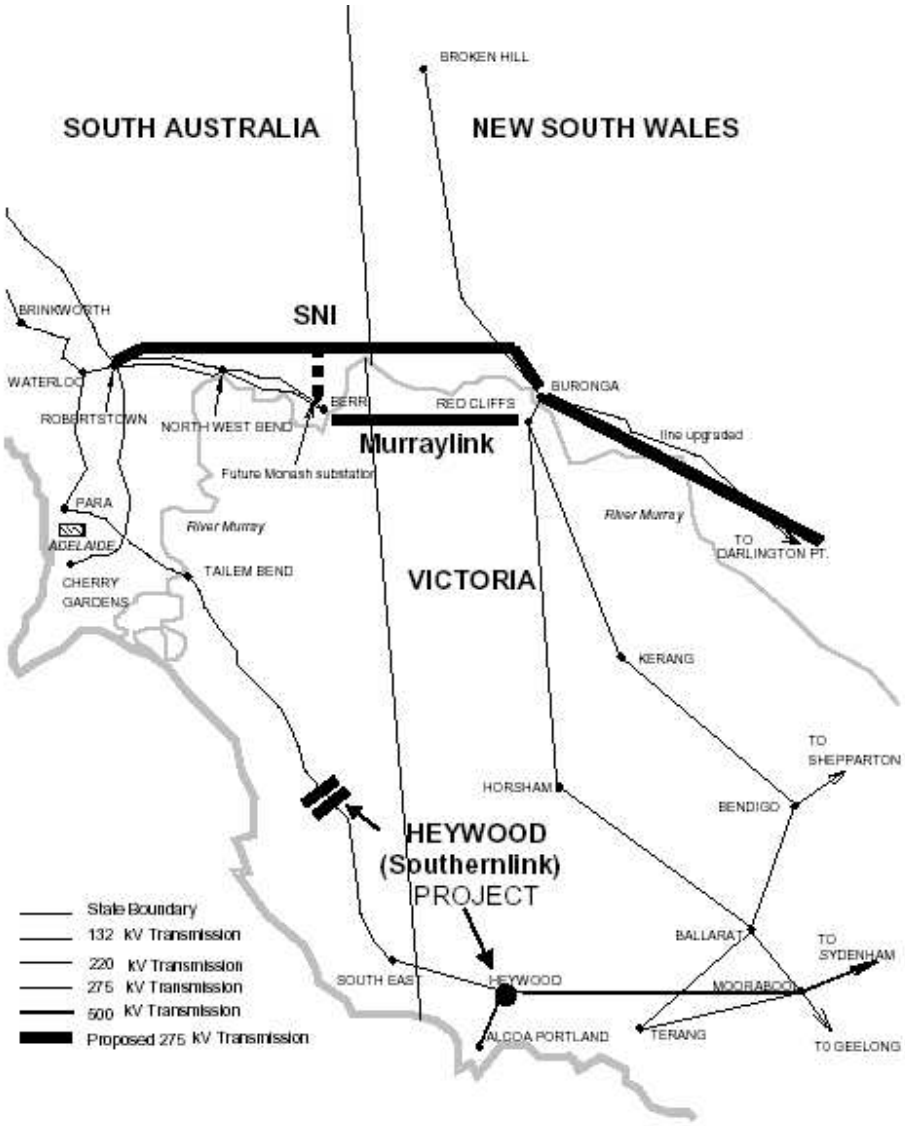

Figure 1.1 Geographic Overview of Interconnection Options for South Australia

In June 1998 the National Electricity Market Management Company (NEMMCO), the organisation responsible for managing the implementation and operation of the National Electricity Market (NEM), determined that the Riverlink/SANI proposal did not satisfy the test to qualify for regulated status and, therefore, a regulated rate of return paid by customers. The SA Government accepted this decision and proceeded to investigate alternative means of delivering the additional electricity capacity required by South Australia prior to the summer of 2001. The SA Government did not believe that the Riverlink/SANI proposal would meet this required time frame and ETSA Corporation subsequently withdrew the application.

> TransGrid nevertheless considers that the proposal is a viable development and consequently submitted [on 29 October 1998] a new application for a route south of the River Murray, known as the 'SNI'.[21]

Perhaps the proponents of SANI could have proceeded, as did the proponents of QNI, without submitting their project to NEMMCO for evaluation. However, "The objective was to ensure that the project was justified under the … Code and would enter the relevant regulated asset base."[22]

At the time that NEMMCO found that SANI did not pass the consumer benefits test, it also noted certain problems with the Code and the test. Following pressure from the NSW government, the ACCC was asked to review the consumer benefits test.[23] The ACCC initiated a review of the criteria by the consultants Ernst & Young.

Subsequent developments

Subsequent developments have been treated at length elsewhere (Littlechild 2003) so may be summarised briefly.

- In March 1999 Ernst & Young reported to the ACCC, recommending a change in the consumer benefits test.[24]
- On 28 April 1999 Murraylink[25] announced its intention to develop a merchant interconnector over a similar (but shorter) route to SNI.
- On 30 July 1999 TransGrid requested NEMMCO to suspend consideration of SNI pending finalisation of the revised regulatory test.
- On 15 December 1999, after a period of consultation, the ACCC published revised criteria for regulated transmision.[26] Amongst other things, these changed the "Customer benefits test" to a "Regulatory test" based on net public benefits or market benefits instead of net customer benefits.[27]

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[21] The section continues "This proposal was declared a Major Development by the Minister for Transport and Urban Planning on 27 January 2000. …in response to community opposition to the southern route, … TransGrid now proposes an alternative corridor that follows a route immediately north of the River Murray".

[22] ACCC Issues Paper p. 2

[23] "Two issues emerged following NEMMCO's rejection of the application for the proposed regulated South Australia - NSW interconnector: NEMMCO found the Customer benefits test to be highly volatile; and the NSW Government believed the test was deficient and placed it on the issues register, meaning the National Electricity Market (NEM) would not commence until the issue was resolved to their satisfaction". ACCC Regulatory Test for New Interconnectors and Network Augmentations, 15 December 1999, Executive Summary. It has been argued that the original Code provisions (including the Test and the decision to allow MNSPs to co-exist in the NEM) proved to be quite unworkable and were urgently in need of revision, quite apart from any pressure from NSW. Booth 2003, ch. 14. esp. pp. 226-7.

[24] Ernst & Young, "Review of the Assessment Criterion for New Interconnectors and Network Augmentation: Final Report to ACCC", March 1999.

[25] The term, variously written Murraylink or MurrayLink, commonly refers both to the link itself and also to Murraylink Transmission Company (MTC), an affiliate company of TransEnergie Australia established to manage and operate the Murraylink facilities.

[26] ACCC, "Regulatory Test for New Interconnectors and Network Augmentations". 15 December 1999

[27] ACCC Issues Paper p. 2. See also Ernst & Young, "Review" para 1.1.2.

- On 6 March 2000 TransGrid requested NEMMCO to recommence evaluation of SNI. It also extended the work to be carried out under SNI, so that it now included an upgrade to the NSW/Snowy - Victoria interconnection.
- In April 2001 Murraylink commenced construction along a similar route to SNI.
- On 19 September 2001 the draft report of the IRPC recommended that SNI still did not satisfy the regulatory test.
- In October 2001 TransGrid further revised SNI to include more transmission reinforcement works in NSW.
- On 1 November 2001 the final report of NEMMCO's Inter Regional Planning Committee (IRPC) recommended that SNI now satisfied the regulatory test. NEMMCO confirmed this in its Determination on 6 December 2001.
- On 21 December 2001 Murraylink applied to the National Electricity Tribunal for a review of this decision.
- In July 2002 Murraylink began commissioning and testing. It entered commercial operation on 4 October 2002.
- On 18 October 2002 Murraylink applied for conversion from merchant status to regulated status. The ACCC set in train a consultation process to consider Murraylink's application[28], which was contested by TransGrid and some other parties.
- On 31 October 2002 the Tribunal upheld NEMMCO's decision by a 2-1 majority.[29]
- On 28 November 2002 Murraylink secured a judicial review of the Tribunal's decision, in the Victoria Supreme Court.
- On 14 May 2003 the ACCC issued its Preliminary View, confirming that Murraylink could convert to regulated status and indicating that it would set the value of Murraylink's regulatory asset base and allowed revenue based on an application of the regulatory test.[30]

There have been at least three more recent developments[31]:

- On 24 July 2003 the Victoria Supreme Court held in favour of the Tribunal on most grounds but in favour of Murraylink's appeal on two quite fundamental grounds.[32] It remitted the decision back to the Tribunal for reconsideration.

[28] Murraylink Transmission Company Application for Conversion and Maximum Allowed Revenue: Preliminary View, ACCC, 14 May 2003.
[29] Reasons for Decision: The Hon Jerold Cripps QC (Chairperson) and Professor Douglas Williamson RFD, QC (Member) 31 October 2002 (henceforth Majority Decision). Reasons for Decision: Professor Gavan McDonell FTSE (Member) 31 October 2002 (henceforth Minority Decision). Application 1 of 2001. Available at www.netribunal.net.au. Ironically (in view of the later Court finding) both Majority members were lawyers. The Minority member said that he had expertise in engineering, economics and sociology.
[30] Murraylink Transmission Company Application for Conversion and Maximum Allowed Revenue: Preliminary View, ACCC, 14 May 2003.
[31] There is not space here to discuss another interesting development: the Basslink interconnector. This was proposed by the builder (a subsidiary of National Grid Company) as an unregulated interconnector but contracted to the Government-owned hydro-generator in Tasmania, hence it did not have to pass the regulatory test.
[32] MurrayLink Transmission Company Pty Ltd v NEMMCO, [2003] VSC 265

- On 1 October 2003 the ACCC confirmed its approach to conversion of status and set a revenue cap.[33] Murraylink accepted this proposal, relinquished its merchant status, and became a regulated network service provider as of 9 October 2003.
- On 11 December 2003 the Ministerial Council on Energy, comprising the Federal and State Energy Ministers, agreed the creation of a new Australian Energy Regulator (AER) to perform all national energy market regulation functions, and endorsed a package of reforms to electricity transmission regulation, including amendments to the Regulatory Test and the regulation of new interconnectors.[34] It also proposed to abolish the National Electricity Tribunal.

PART TWO THE VICTORIA SUPREME COURT DECISION

Summary of the Tribunal's decision

In order to understand the Court's decision it is necessary briefly to summarise the Tribunal's decision.

Following the ACCC's reformulation in December 1999, the regulatory test says that "A new interconnector or transmission system augmentation satisfies this test if it maximises the net present value of the market benefit having regard to a number of alternative projects, timings and market development scenarios."

TransGrid argued that SNI satisfied this test. Murraylink argued that an alternative project that came to be called Unbundled SNI (or USNI), comprising the system reinforcement part of SNI without the actual interconnector, had a higher net present value. TransGrid argued that Unbundled SNI was not a practicable alternative because it was not commercially feasible. Murraylink did not accept this.

To indicate the orders of magnitude involved, Table 1 summarises the numbers from the modelling put forward by TransGrid's own consultants IES. Full SNI had a positive Net Benefit of (Australian)$166 m. Unbundled SNI (the network reinforcement component) accounted for just under half the costs and more than all the benefits[35]. Its Net Benefit was nearly twice that of full SNI. The incremental cost of the interconnector component accounted for just over half the costs and its incremental benefit was negative. Consequently, its incremental Net Benefit was significantly negative. Note that all these calculations assume that Murraylink is going ahead, so that the incremental costs and benefits refer to SNI as a duplicate interconnector (or at least a parallel one, since the two technologies are not precisely the same).

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[33] Decision: Murraylink Transmission Company Application for Conversion and Maximum Allowed Revenue, File No M2002/468, ACCC, 1 October 2003. (Henceforth ACCC Conversion Decision)
[34] Ministerial Council on Energy, Reform of Energy Markets: Report to the Council of Australian Governments (CoAG), 11 December 2003; also Communique, Perth, same date.
[35] The reasons for the latter result were not explored or explained. Similarly for some of the surprising details - for example, that in several scenarios there was more generation new entry in SA if the interconnector SNI were built than if it were not. See Modelling the application of the regulatory test to SNI: A report to Clayton Utz, IES, 28 June 2002. Being the Witness Statement of Andrew James Campbell, 28 June 2002, Appendix Exhibit 25.

Table 1 NPV Benefits and costs ($m) of SNI projects, Realistic Bidding scenario 2

	Full SNI	Unbundled SNI	Interconnector SNI
Benefits	264.5	351.4	-86.9
Costs	-98.4	-41.2	-57.2
Net Benefit	166.1	310.2	-144.1

The precise numbers depend on the assumptions and scenarios used, but the general proposition was ultimately not in dispute. The Tribunal put it this way.

> The most significant issue in the proceedings was whether the Tribunal should have regard to USNI as an alternative project. It is common ground that USNI contributes a greater part of the net present value of SNI and if undertaken by itself would result in a higher rate of return than SNI. It is also common ground that acceptance of USNI as an alternative project would mean that SNI does not maximise net present value of market benefit.[36]

TransGrid argued that USNI was not commercially feasible because it had no proponent. TransGrid was unwilling to be a proponent because it said that it would be subject to a risk of asset stranding. It argued that Murraylink had market power and would have the ability and incentive to restrict the level of output across its own interconnector in order to increase its profit. That in turn could reduce the level of flow across the system reinforcement USNI. The ACCC, when it came to determine the value of TransGrid's asset base for purpose of determining its regulated revenue, could judge that the assets were underutilised, and therefore write them down. Murraylink at one point offered to be a proponent of USNI, but TransGrid declined to allow Murraylink to construct assets on its system.

Witnesses called by Murraylink testified that, in their view, Murraylink did not have the alleged degree of market power, and would not have the incentive to reduce output to the extent alleged. Even if it did, the impact on TransGrid and USNI would be negligible. And even if the impact were significant, it could more economically be dealt with by redesign of USNI or by a commercial arrangement between TransGrid and Murraylink, than by constructing the duplicate interconnector component of SNI.

The Tribunal Majority held that Murraylink did have an element of market power, which it might use to restrict output, and consequently that "the implementation of USNI would lead to a real risk of stranding or, at the very least, TransGrid's apprehension of the risk of stranding is real and not unreasonable". In consequence, TransGrid was not obliged to be a proponent of USNI. Nor was it obliged to allow Murraylink to construct USNI. Consequently USNI had no proponent and was not commercially feasible. So SNI maximised the net value of benefits and therefore passed the regulatory test.

The Tribunal Minority held that neither NEMMCO nor the Tribunal had carried out a full and proper cost benefit analysis as required by the regulatory test. The whole process was "fundamentally flawed". Consequently SNI was not justified.

[36] Majority Decision, p.26; see also p. 48 and Order for Costs para 21.

The Majority responded that the concern that the whole process was "fundamentally flawed" was not an issue that had been raised in the proceedings by any party, or by any of the expert witnesses. Rather, identified aspects of the modelling were subject to criticism. The Majority argued that the paramount task was to apply the cost benefit analysis conformably with the particular criteria specified in the regulatory test rather than by reference to cost benefit principles at large.

Judicial Review at the Victoria Supreme Court

Murraylink's application for judicial review of the Tribunal's decision cited eight grounds for appeal in terms of due process. The Victoria Supreme Court rejected most of these grounds but upheld two. It set aside the Tribunal's decision and remitted the matter to the Tribunal for reconsideration.[37] The Court's reasoning on the most interesting rejected ground and on the two accepted grounds were as follows[38]:

1. <u>The use of cost-benefit analysis</u>

The appellant claimed that "the Tribunal erred in law in holding or proceeding on the basis that it was not necessary to apply general principles of cost-benefit analysis in the application of the Regulatory Test". The Court held that the question was whether the cost benefit analysis had been carried out in accordance with generally accepted standards of cost benefit analysis as conditioned by the regulatory test. There was expert evidence before the Tribunal adequate to support a number of competing views as to whether or not it had been. On the basis of that evidence the Minority member Professor McDonnell took one view and the Majority took another. The Majority were entitled to do so.

2. <u>SNI as an alternative project</u>

The appellant claimed that the Tribunal should have considered USNI as a practicable alternative to the SNI proposal. The Court agreed that "the Tribunal was bound in law to make an objective assessment of whether unbundled SNI (USNI) was a practicable alternative and that it erred in law by deciding the question on the subjective basis that TransGrid refused to be a proponent of USNI."

[37] The Tribunal's intentions in this matter are as yet unknown. It would seem open to the Tribunal to consider a number of options, including explaining or rejecting its previous decision on the basis of previous evidence, or inviting new evidence on the issues in question. It is not clear whether it would need to proceed if one or both of the parties indicated a change in stance in the light of events subsequent to the Supreme Court hearing. But all this may well have been superceded by the MCE proposal to abolish the Tribunal.

[38] With respect to the five remaining grounds, the Court held that "practicable alternatives" are not different from "alternative projects", that it was a false dichotomy to regard interconnectors and augmentations as mutually exclusive, that a set of miscellaneous objections put forward were without substance or of limited practical appeal, and that the Tribunal did not treat certain specified projects wrongly. The remaining ground was held not to add anything to the two that were upheld.

3. Basis of significant risk of stranding

The appellant claimed, as the Court rephrased it, that the Tribunal had failed to make clear the basis of its finding that there was a significant risk of stranding if TransGrid constructed unbundled SNI. The Court agreed with this claim.

The use of cost-benefit analysis in the regulatory test

The Court has now indicated that either the rigorous cost benefit approach advocated by the Minority decision or the less detailed more applied version adopted by the Majority decision could have been acceptable. It did not take a view as between the two, limiting itself to saying that the Majority approach was acceptable.

This is understandable. The implications of requiring a "full" or "rigorous" cost benefit analysis could have been uncertain, time-consuming and costly. It ought to be possible to remedy the more specific deficiencies identified by some witnesses and the Minority member within the framework of the approach adopted by the Majority. But does the Court decision give reason to believe that this will happen?

Consider for example one of the more serious errors or economic oversights in the NEMMCO and Tribunal decision processes. Witnesses argued that these processes failed to examine the incremental benefits of the different components of the SNI project (as set out in Table 1 above), and in doing so were led into error. The Minority report made a similar point in its general reference to comparisons between investments of different scale. Another commentator has made essentially the same point with respect to the possible combination of SNI with another line SNOVIC.[39]

How to prevent such economic oversights in future? Is it necessary and sufficient to set out a series of prescriptions as to how the regulatory test should be carried out? If so, does this fall to the ACCC to remedy, or can certain economic oversights be sufficiently serious to constitute an error of law?

There is no doubt scope for improved guidance in some respects,[40] although the independence, economic competence and attitude of the regulatory bodies are at least as important. The Court's decisions on the other two grounds - assessing a practicable project and the risk of stranding – while of interest and importance in their own right, also seem of relevance to the adequacy of the cost-benefit analysis. It will therefore be helpful to explain these decisions in more detail.

[39] According to data from the Minority report, SNI + SNOVIC combined had a benefit in the range $160m to $311m against a cost of $146m. Without further enquiry the combined project may have seemed worthwhile. However, SNOVIC alone had a benefit in the range $160m to $233m against a cost of $44m. The case for it was strong. In contrast, SNI alone had a benefit in the range $34m to $135m against a cost of $110m. It would be difficult to make a case for it alone. Moreover, the incremental benefit of SNI beyond SNOVIC is in the range zero to $78m, against an extra cost of $102m. There would seem no case for SNI at all. But the Tribunal did not look at it in this way. Peter Garlick, P M Garlick & Associates Ltd, ACCC Review of the Regulatory Test, 28 March 2003, p.3.

[40] E.g. Garlick 2003, p. 5, Littlechild 2003 pp. 18-20. Some changes have already been made (see Mountain and Sweir 2003) and the ACCC is presently reviewing the regulatory test again, as noted below.

The Court on assessing a practicable project

The Court held that "the Tribunal was bound in law to make an objective assessment of whether unbundled SNI (USNI) was a practicable alternative and that it erred in law by deciding the question on the subjective basis that TransGrid refused to be a proponent of USNI."? What did the Court mean? The main steps in its decision were as follows.

The Court agreed with a point made in evidence, that a favourable decision on the regulatory test would itself influence the practicability of an alternative project. This had to be taken into account in assessing practicability, which was not a separate process from the regulatory test, but rather one that was "substantially informed" by that test.[41]

The Court continued

> "But the majority rejected that approach in favour of an assessment of commercial feasibility which was based upon the subjective preferences and motivation of TransGrid. I consider that the majority were in error to do so. Their error was an error of law."

That is, the Tribunal was wrong to determine the issue of whether an alternative was practicable on the basis of whether TransGrid had a real and not unreasonable reason for refusing to build USNI. The range of possible proponents "must include those entities who would be willing to construct USNI if given the chance to do so".[42]

The Court gave an example. Suppose a transmission operator was unwilling to construct an alternative project to its own proposal, but the net present value of that alternative exceeded the value of its own proposal. Then it cannot be right that the alternative should not be regarded as a practicable alternative.[43] "The purpose of the regulatory test is to

[41] "…the act of determining that an interconnection proposal satisfies the regulatory test favourably alters conventional perceptions of the project's practicability. Projects that would be utterly impractical without regulatory protection, perhaps because of overwhelming transaction costs, can become practical if they are deemed fit to be regulated. What matters is how large the net market benefit is likely to be, as the magnitude of the net market benefit determines the value/merit of overcoming any of the (typically fewer) remaining obstacles to implementation. // Practicability is an economic concept that, when applied to regulated investments, can be substantially achieved by a finding that a project – that can otherwise be legally implemented – passes the regulatory test. *It is crucial to recognise the existence of inherent and unavoidable circularity with respect to the overall evaluation process. Practicability is not strictly an exogenous factor to be assessed by NEMCO or the IRPC – it is a characteristic that is substantially conferred by a favourable determination."* Evidence of Mr Thomas, emphasis added by the Court.

[42] Furthermore, "… it is inevitable that there will be occasions when the proponent of an augmentation or interconnector is for good reason unwilling to construct an alternative (which only that entity has the legally enforceable right to construct), and yet the alternative should be regarded as a practicable alternative."

[43] " … assume a proposed augmentation comprised of a 275 MW upgrade of a transmission line. Let it be supposed that similar results can be achieved with a technically feasible 150 MW upgrade, which costs considerably less, and some demand-side alterations. Let it further be supposed that the proponent of the 275 MW upgrade is the only entity with a legally enforceable entitlement to construct the alternative 150 MW upgrade, and yet, for reasons based in commercial conservatism and philosophical disposition (which reasons are real and not unreasonable), that entity is unwilling to construct the 150 MW upgrade. Assume then that despite that entity's reservations it is shown by the cost benefit analysis which is prescribed by the regulatory test that net present value of the market benefit of the 150 MW upgrade

assess alternatives on the basis of the economic criteria prescribed by the test, and not on the basis of subjective preferences."

The Court clarified its conception of the duty of the operator as follows.

> "The question was whether USNI was a practicable alternative and, assuming technical feasibility, that should have been decided objectively by reference to economic criteria derived from the regulatory test. The test was whether an objective operator, if acting rationally according to the economic criteria prescribed by the regulatory test, would be prepared to construct USNI if SNI were not approved. The error in the majority's process of reasoning was to substitute for that test an assessment of the subjective predilections and motivations of TransGrid."

The Court did not rule out the possibility that a reasonable operator might refuse to construct SNI, because of the risks involved. However, that needed to be shown, and in this case had not been shown.[44]

The Court examined the Tribunal's treatment of the evidence of the risk implied by Murraylink, and found that the Tribunal had considered only part of the question. The Tribunal had looked at the likely effect of Murraylink's actions on the usage of USNI. However, it had not looked at the likely financial effects for TransGrid if the under-usage eventuated.[45]

The Court then commented on the numbers involved. Evidence before the Tribunal calculated a restriction of 0.00175% of USNI total flow if Murraylink was contracted and 0.013312% of USNI total flow if Murraylink was not contracted. The Tribunal had pointed out that some witnesses thought it reasonable for TransGrid to regard its risk as

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coupled with the demand side alterations far exceeds the net present value of the market benefit of the 275 MW proposal. In those circumstances it cannot be right that the 150 MW alternative is not to be regarded as a practicable alternative."

[44] "That is not to deny the possibility of drawing permissible inferences from the reality and reasonableness of TransGrid's reticence. Conceivably, one possibility is that any objective operator acting rationally according to the regulatory test criteria would, like TransGrid, be unwilling to construct USNI if SNI were not approved. But while the finding of reality and reasonableness of TransGrid's reticence may suggest that possibility, it does not compel it; and it may not even support it if the assessment of reasonableness were based upon considerations at odds with the regulatory test conception of practicability. It is one thing to say that TransGrid had a real and not unreasonable fear of the risk of stranding, and it is quite another to conclude that an objective operator acting rationally according to the regulatory test criteria would not be prepared to wear the risk. An inference that such an objective operator would not be prepared to wear the risk could not be drawn without first considering all of the competing evidence as to the likelihood of objective behaviour and forming a view as to why the inference should be preferred. The majority did not do that."

[45] "There was a body of expert evidence before the Tribunal as to the likely effect of the usage of MurrayLink on the usage of USNI and as to the likely financial effects for TransGrid if the risk of under-usage were realised. And the majority paid regard to the first part of that evidence, concerning the probability and extent of under-usage of USNI. … But that is as far as it went. The majority did not say anything about the likely financial effects on TransGrid if the feared risk of stranding [under-usage?] eventuated. Consequently, so far as can be told from the reasons for decision, the majority did not consider the question of whether an objective operator acting rationally according to the economic criteria prescribed by the regulatory test would be so much deterred by the risk of such financial effects as to decline to construct USNI if approval to construct SNI were withheld."

substantial; other witnesses considered that it had not been demonstrated that the degree of risk would be other than trivial. In the Court's view it required more than mere acceptance of the statistical analysis to resolve the competition between these alternative views as to what this possible restriction in usage meant for TransGrid.

> "It requires an analysis of why a risk of that order of magnitude which was calculated in the statistical analysis should be regarded as economically significant in the context of concern. My own uninformed view is that it is difficult to imagine that a restriction of 0.013312%, or even a figure of 100 times that amount, could ever be regarded as more than negligible; although, of course, that is not my decision to make. And it is not the point. The decision is one for the Tribunal to make. And the point is whether a risk of restriction of that order of magnitude would so much deter an objective operator, acting rationally according to the economic criteria prescribed by the regulatory test, as to refuse to construct USNI if SNI were not approved. The majority's failure to make that decision was an error of law."

The Court on the risk of stranding

The Court's view of the risk of stranding was in much the same vein as its view on assessing a practical project. It agreed with the appellant that the Tribunal Majority had failed to explain why there was a significant risk of stranding:

> "a great part of the contest before the Tribunal centred on the question of whether the risk of stranding was anything more than negligible. As a result, the majority seem to have lost sight or, perhaps more accurately, were led to lose sight of the real question: was the risk (whatever its proportions) sufficient to deter an objective operator, acting rationally according to the economic criteria of the regulatory test, from constructing USNI if SNI were not approved."

A "related problem was the way in which the majority approached the matter, and that is that they appear to have treated the risk that MurrayLink would restrict flows as if it were synonymous with the risk of stranding (as opposed merely to being causative of it)."

The majority accepted statistical analysis that there would be a risk of MurrayLink reducing flows by significant percentages. However, it left out of account that the consequential percentage reduction in flows along USNI assets would be vastly less.[46]

The Court noted that distinguished witnesses had said there would be a risk to TransGrid, and asked whether it was not sufficient to rely on this? Ordinarily perhaps, but not in the circumstances of this case, because it was impossible to tell how the majority reached their conclusions.[47] Moreover, the majority had failed to mention, or give reasons for

[46] In the worst-case scenario, with MurrayLink completely uncontracted, it would be only 16% of 64% of 13% or, in other words, only 0.013312% of USNI total flows.

[47] "The problem is the way in which the majority expressed their reasons. It is impossible to tell whether they reached their conclusion because they regarded the orders of magnitude calculated by Mr Campbell as in themselves expressing a significant risk of stranding or because, notwithstanding the orders of magnitude calculated by Mr Campbell, they accepted the opinions of Dr Bishop, Professor Kahn and Mr Houston that such orders of magnitude are properly to be regarded as a significant risk of stranding, or because, in the final analysis, they overlooked or did not understand the distinction drawn in Mr Campbell's analysis between the risk of reductions in flows along MurrayLink and the risk and size of consequential reductions

rejecting, evidence that the calculated reductions in flows were too small to notice or to attribute.[48]

> "[This evidence] was at once so strikingly relevant and cogent that the Tribunal could not give fair and sensible reasons for its decision without adverting to it and assigning reasons for its rejection. Their failure to do so is to be characterised as a breach of the principle that justice must be seen to be done."

Implications of the Court's view on the reasonable operator

TransGrid argued that it had a real and not unreasonable fear of the risk of stranding if it acted as a proponent for USNI. It also declined to allow Murraylink to be a proponent. The Tribunal accepted this, and said that it had no powers to compel TransGrid to do otherwise.

I argued earlier[49] that this passive stance seemed unsatisfactory, and inconsistent with regulatory regimes in competitive markets elsewhere. Given the cost benefit calculations put forward, TransGrid, NEMMCO and the Tribunal were accepting that the network reinforcement had a positive net benefit, and that adding the duplicate interconnector reduced this net benefit significantly. They were contending further that the network reinforcement would be too risky to adopt on its own, and that the duplicate interconnector element of SNI had to be bundled in as well in order to reduce the risk to TransGrid. But they were not looking at the whole picture.

The regulatory process should have raised the question whether TransGrid (and NEMMCO and the Tribunal) looked adequately at the risk involved in bundling SNI as well as unbundling it. Witnesses for Murraylink argued that the former was much greater than the latter. And should TransGrid and the regulatory bodies not have looked actively for the most effective or least cost way in which the risk to TransGrid could be reduced to an acceptable level? At least two possibilities were suggested: that TransGrid could redesign USNI (explicitly to take account of the possibility that Murraylink as a merchant interconnector might find it profitable to restrict output), and that TransGrid might enter a contractual arrangement with Murraylink to limit the risk to TransGrid. These suggestions were ignored or rejected.

Does TransGrid have no obligation to explore and adopt either of these actions if they would be more economic than building the duplicate interconnector? Examination of TransGrid's duties might seem to suggest this. Section 6B(1) of its governing Act says that "The principal objectives of an energy transmission operator are as follows (1) to be a successful business …". From a competition perspective this is perhaps not an

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in flows along the USNI assets. // In my opinion the appellant is correct in its contention that failure of the majority to make clear its reasons for finding the stranding risk to be significant was an error of law."

[48] The Court heard evidence that "the reductions in USNI flows as calculated by Mr Campbell were so tiny that TransGrid could not discern, let alone identify the causes of such a trivial difference in utilisation. Logically the majority could not have reached the conclusion that the risk of stranding was a significant risk without rejecting that evidence. Yet, unless the majority's rejection of the evidence is intended to be encompassed in the passing reference to 'the differing views of the economists and others' (which is plainly inadequate) there is no mention of the evidence in the majority's reasons for decision; let alone any reasons for its rejection. I regard that too as an error of law."

[49] In evidence to the Tribunal, and in Littlechild 2003.

auspicious beginning. Arguably the second objective is more relevant: "(2) to operate efficient … facilities for the transmission of electricity". However, according to the testimony of the NSW minister for Energy, this Act "does not impose any duties on TransGrid" and "even if it were expressed in different language … it would express no more than aspirations or ideals which are not enforceable by a court". Moreover, no regulatory body is charged with ensuring that a transmission operator abides by these principal objectives.[50]

Does the Victoria Supreme Court's decision change this state of affairs? It may seem not. The immediate obligation placed on the Tribunal is essentially to establish whether or not TransGrid was exposed to a significant risk of stranding. This may suggest that in cases where a significant risk of stranding *can* be established, the incumbent transmission operator need do no more: that it has the right simply to decline to be a proponent of an alternative scheme, and that it does not need to examine alternatives such as redesign or a contractual relationship.

However, it may be argued that the Court's decision implies a greater duty than this. The Court emphasised several times that "The test was whether an objective operator, *if acting rationally according to the economic criteria prescribed by the regulatory test*, would be prepared to construct USNI if SNI were not approved." (emphasis added) The regulatory test says that "A new interconnector or transmission system augmentation satisfies this test if it maximises the net present value of the market benefit having regard to a number of alternative projects, timings and market development scenarios."

The Court thus seems to envisage that it should be part of the legally enforceable duty of the transmission operator - and for that matter of any regulatory body supervising it – to act in such a way as to maximise the net present value of the market benefit - at least, when dealing with new interconnectors and transmission system augmentations. In other words, if there is an alternative set of arrangements that would lead to greater market value than the project being evaluated – where these alternative arrangements might include a different (risk-minimising) design or a new contractual relationship – then it is the duty of the transmission operator to explore, pursue and if appropriate adopt those alternative arrangements. Likewise, it is the duty of the regulatory body to satisfy itself that such alternatives have been reasonably explored and not unreasonably been rejected.

In this way, it seems that the Victoria Supreme Court has taken a step to remedy an apparent deficiency in the obligations of transmission operators and their regulatory bodies in the new competitive national electricity market.

PART THREE EVALUATING THE INTERCONNECTORS

A regulated interconnector perspective

Assuming that the merchant interconnector Murraylink is already constructed or at least committed leads to a rather critical assessment of policies and decisions (by TransGrid, NEMMCO and the Tribunal) in relation to the proposed regulated interconnector SNI,

[50] These arguments are set out in Littlechild 2003.

which by this time would largely duplicate the service provided by Murraylink. Does a longer perspective – starting from the time when SNI was first proposed, before Murraylink was built, and looking also at the economics of Murraylink - yield a different perspective on the regulated interconnector SNI, on Murraylink, and on the actions of the incumbent transmission company?

Such a 'different perspective' - what might be called a 'regulated interconnector perspective'[51]- on the three main issues might be as follows:

(1) on the original proposal for a regulated interconnector SNI
- that economic or cost benefit analysis as far back as 1997 showed that an additional interconnector between New South Wales (NSW) and South Australia (SA) was economically efficient
- that the most efficient form of interconnector was of the alternating current (AC) open access variety, supported by upstream reinforcement of the NSW transmission system
- that the administrative criteria originally formed to evaluate this interconnector were specified in a way that caused certain benefits to be excluded
- that the process of correcting the 'regulatory test' caused a delay of more than three years in the evaluation and approval of such a NSW/SA interconnector, even though an a priori net benefit had already been established;

(2) on the merchant interconnector Murraylink
- that this administrative delay – which was out of the hands of the incumbent transmission company or companies proposing the regulated interconnector – provided the opportunity for a merchant interconnector to be designed and built in the interim
- that this merchant interconnector suffered from two significant economic inefficiencies, i.e.
    1) the need to use Direct current (DC) technology to control power flows across the merchant interconnector – which is critical for taking advantage of arbitrage opportunities – caused it to be significantly more costly than its AC equivalent, and
    2) the absence of the upstream reinforcement component limited usable capacity of the merchant interconnector, especially at peak times
- that having two essentially parallel interconnectors is unlikely to be economic compared to having one interconnector of the appropriate capacity, and that the optimal capacity seems likely to be larger than that installed by Murraylink
- that Murraylink's support for the network reinforcement component of the regulated interconnector SNI could easily be construed as an attempt for it to secure the upstream reinforcement works needed to allow its merchant interconnector to operate at full capacity without needing to meet the full cost of those works

[51] I am grateful to Greg Houston for outlining this possible perspective (personal communication 9 July 2003), without implying that he or any of the parties involved necessarily endorses it.

- that imperfections and inordinate delays in the administrative criteria and process for evaluating regulated transmission in Australia have therefore caused the construction of an interconnector that is clearly sub-optimal (ie more expensive, and perhaps under-sized) from an economic or social welfare perspective;

(3) on the subsequent stance of the regulated transmission company (TransGrid)

- that the economic benefits of SNI as a second interconnector, after the building of the merchant interconnector Murraylink, depend to a material extent on the operating regime of Murraylink to the extent that the latter possesses and exercises any market power
- that in responding to the process for evaluating a second (regulated) interconnector, Murraylink as a merchant interconnector has a strong incentive to say one thing (i.e. downplay its market power) and do another (i.e. take full advantage of its market power) once it has successfully fought off the competing proposal, and
- that on the other hand, the incumbent regulated transmission company (TransGrid) has no incentive to withdraw its proposal for a second (regulated) interconnector until such time as there is an irrevocable commitment from the merchant interconnector not to exercise any market power it may have – which can only be achieved through conversion to regulated, open access status.

The next few sections seek to evaluate the plausibility of this perspective. They approach the questions in reverse chronological order, by attempting to ascertain whether any or all of the following four interconnectors represented an economic investment:

- The regulated interconnector SNI, given that the merchant interconnector Murraylink had already been built or committed?
- The merchant interconnector Murraylink, assuming no regulated interconnector?
- SANI, the predecessor of SNI, before or instead of the construction of Murraylink?
- A different and hypothetically most efficient interconnector between South Australia and NSW?

It will become apparent that "economic investment" may have a variety of meanings. The discussion will initially interpret this in terms of passing the regulatory test and alternatively in terms of financial profitability derived from providing interconnection in the market. Later, an alternative and arguably more customer-oriented criterion will be explored.

The regulated interconnector SNI assuming Murraylink committed

In light of the foregoing, SNI post-Murraylink can be dealt with briefly. NEMMCO and the Tribunal Majority held that the SNI interconnector passed the regulatory test. However, this was only because they ruled out Unbundled SNI. That is, they did not admit the option of simply reinforcing the NSW transmission system without building a duplicate interconnector. The Tribunal accepted that USNI was more economic than SNI if it were commercially feasible. In effect, it agreed that the additional value of SNI as a

duplicate interconnector did not exceed the additional cost. But it ruled out USNI as not commercially feasible.

The Victoria Supreme Court has now ruled that the Tribunal did not properly justify ruling out the alternative of simply reinforcing the system. The Court also expressed some scepticism that the Tribunal could justify its decision on the evidence available. Thus, in the light of the ACCC criteria that NEMMCO must follow, the calculations put to the Tribunal by TransGrid's consultants, the testimony of other witnesses, and the Court's ruling, there seems no basis for arguing that the regulated interconnector SNI was economic – in the sense of passing the regulatory test - once Murraylink was constructed (or committed to construction).

The merchant interconnector Murraylink and the regulatory test

It will be convenient to take separately the questions whether Murraylink would or did pass the regulatory test, and whether Murraylink was a profitable investment.

When Murraylink applied for regulated status, the ACCC said that it would evaluate the investment by carrying out the regulatory test. Murraylink suggested that the regulatory value of its own interconnector was the lesser of the cost of constructing it, the cost of the most economic alternative, and the benefit conveyed by the interconnector. It said that it would accept a value equal to the cost of the most economic alternative. Murraylink proposed four alternative transmission projects that would provide the same power transfer capability (220MW) and essentially the same benefits as Murraylink. It calculated that the benefit of an interconnector exceeded the cost of the most economic project. Murraylink also said that its actual capital costs of building Murraylink (which it did not reveal) were greater than the level of the asset value of the most economic alternative that it was proposing to the ACCC.

The ACCC evaluated – and, where it considered appropriate, modified - Murraylink's calculations of the regulatory cost of each alternative, defined as capital cost plus network augmentation cost plus lifetime O&M cost. It calculated the gross market benefits of Murraylink and its alternatives under a number of market development scenarios and sensitivities.

The ACCC concluded that the benefits of an interconnector ranged from approximately $166m to $347m (present value). Within this, "The market simulation suggests that the credible range is between $170m and $220m."[52]

The ACCC set a revenue cap based on the cost of what it judged the most economic alternative (which was different from the alternative that Murraylink judged the most economic). It set allowed revenue at about $12m per year.[53]

The ACCC said that this revenue was about 50% of the level that Murraylink had proposed. The clear implication is that Murraylink as actually designed and constructed

[52] ACCC Conversion Decision, p. xvi.
[53] Slightly less initially, at $11.88m, rising gently over time to $12.72m in 2012/13.

would not have passed the regulatory test as carried out by the ACCC. There existed a more economic alternative whose costs were about half those of Murraylink. (Or less than half insofar as Murraylink's actual costs were higher than the revenue it requested.)

The profitability of Murraylink: general context

The ACCC evaluation sheds new light on the question whether the merchant interconnector Murraylink was a profitable investment. Its proponents took a commercial judgement in building it, but some commentators have claimed that it could not be profitable. For example, Booth has calculated that "such interconnectors require sustained Pool price differentials of $12 - $15/MWh even at full utilisation, to have a chance of earning a reasonable return on investment"[54]. It was said that it was unrealistic to expect sustained price differentials of this magnitude between South Australia and NSW/Victoria. It was also suggested that this potential lack of profitability presumably lay behind Murraylink's decision to seek regulated status.

Murraylink's costs and profitability are not publicly known. However, the ACCC calculations contain some relevant information. In round figures, the ACCC's allowed revenue of about $12m per year would represent average revenue of just over $6/MWh if Murraylink's 220 MW capacity were fully loaded throughout the year.[55] The ACCC said that its allowed revenue was about 50% of the level that Murraylink was proposing. In effect, Murraylink was proposing required revenue averaging nearly $13/MWh at full utilisation. Murraylink indicated that its actual costs were above the level of revenue requested. This is all consistent with the estimated range of $12 - $15/MWh at full utilisation.

What was the general picture at the time of investment in Murraylink? The 1997 study by London Economics had predicted a generation capacity shortage in SA and concluded that an interconnector between SA and NSW was economic. At first, the predicted shortage seems to have been born out by events. The 1999 NEMMCO Statement of Opportunities showed an installed SA capacity of 2980 MW, with a peak demand of 2650 MW at a 10% probability of exceedance (POE).[56] This suggests that there was a relatively small margin of capacity over peak demand in SA at that time (about 12%).

Table 1 shows that average wholesale or pool prices in SA reflected this relative shortage: the average price there rose from $40/MWh or less in the four years up to 1997/98 to nearly $60/MWh in 1999/2000 and 2000/01. In contrast, average prices in NSW and Victoria in the three years leading up to1998/1999 did not exceed $26/MWh.

Table 1 Average Electricity Wholesale/Pool Prices (A$/MWh)

	Average Prices				Price Differentials		
Period	SA	NSW	Vic	Q'land	SA-NSW	SA-Vic	Q-NSW
Financial years							

[54] Booth 2003, p. 89.
[55] $11.88m/(365 days x 24 hrs x 220 MW capacity) = $6.16/MWh, rising to $6.60/MWh at $12.72m.
[56] Len Gill (GM-Trading, TXU Australia), "TXU's Perspective on Supply, Pricing and Competition in Australia", Presentation at SA Power conference, 29 April 2003.

1994/95	40.0	52.0	45.0	50.0	-12.0	-5.0	-2.0
1995/96	39.3	45.2	30.0	50.6	-5.9	9.3	5.4
1996/97	38.3	22.0	24.7	55.0	16.3	13.6	33.0
1997/98	38.3	17.5	19.2	55.0	20.8	19.1	37.5
1998/99	43.4	25.5	25.3	60.4	17.9	18.1	34.9
1999/00	58.7	27.7	25.7	46.5	31.0	33.0	18.8
2000/01	57.3	38.2	45.4	41.5	19.1	11.9	3.3
2001/02	31.6	34.5	30.9	35.1	-2.9	0.7	0.6
2002/03	30.4	33.5	27.7	38.7	-3.1	2.7	5.2
Calendar years							
1999	54.0	22.8	22.5	42.5	31.2	31.5	19.7
2000	57.9	35.7	38.6	51.1	22.2	19.3	15.4
2001	42.3	33.3	36.0	35.5	9.0	6.3	2.2
2002	35.3	40.0	33.2	48.4	-4.7	2.1	8.4
2003	26.8	26.4	23.1	22.6	0.4	3.7	1.1

Source: Booth 2003 p. 211 and personal communications.[57]

Over the four years from 1996/97 to 1999/2000 the differentials between the yearly average prices for SA and Victoria averaged $21/MWh – sufficient to cover the midpoint of Murraylink's calculated $12 - $15 cost range if operating at about two-thirds capacity utilisation and ignoring transmission losses. In 2000/01 the differential was still just about within the range assuming full capacity utilisation and again ignoring losses. And even in August 2001 witnesses for TransGrid were arguing the cost and difficulty of building additional generation in SA, relative to NSW and Victoria.[58]

In the event, however, many of the assumptions of the 1997 study, including about capacity shortage in SA, were not fulfilled.[59] Approximately 1117 MW of new capacity (including Murraylink) has been installed in SA since 1999, but the demand has grown by only 400MW.[60] This implies that the SA capacity margin is now very considerably higher (about 34%). The average price in SA fell to under $32/MWh in 2001/02, and the differential between SA and Victoria fell to under $1/MWh in that year. The average price in SA has since fallen further, to under $27/MWh in 2003. The price in Victoria has fallen even further, and the average differential recovered to nearly $4/MWh in 2003. Nevertheless, such differentials are far below what Murraylink would need to cover all its costs, even at full utilisation.

What of the future? Table 2 shows the prices for the next few years that are presently obtaining in the forward markets. This is not a "thick" market as yet – maybe half a

[57] The price data prior to the competitive markets (Victoria 1995, NSW 1996, others by 1998) are a mixture of published bulk supply tariffs, calculated wholesale prices based on the revenue and sales of generation companies, and effective wholesale prices published by regulators. Subsequent price data are from NEMMCO/NECA published sources. Differentials are calculated by subtraction. The Australian financial year is July to June. These are time-weighted averages; demand - weighted averages are typically around 10% higher.
[58] As cited in Littlechild 2003, Appendix 2
[59] Garlick, 2003, see next section
[60] Gill, 2003.

dozen observations per price, hence it can be variable over time – but it does give an idea of how market participants are thinking.[61]

Table 2 Electricity Forward Price Curves (A$/MWh)

	Median Prices*				Price Differentials		
Period	SA	NSW	Victoria	Q'land	SA-NSW	SA-Vic	Q-NSW
Q1 2004	58.00	38.75	37.31	36.00	19.25	20.69	-2.75
Cal yr 2004	37.00	31.925	29.75	29.00	5.075	7.25	-2.925
Cal yr 2005	38.00	34.75	33.75	31.80	3.25	4.25	-2.95
Cal yr 2006	38.00	36.00	34.79	33.50	2.00	3.21	-2.5
Cal yr 2007	38.25	36.50	36.00	35.125	1.75	2.25	-1.375

*Median prices for flat (100% load factor) profiles on AFMA as at 26 November 2003

Table 1 shows that the average price in SA is expected to rise to nearly $60/MWh in first quarter 2004. T The market prices suggest the expectation of a shortage of capacity in South Australia. This may pull up prices in SA and Victoria too. Nonetheless the forward differential between SA and those regions rises to around $20 for first quarter 2004. However, this quarter is exceptional. Over the next few years there is apparently not expected to be a shortage in South Australia and any surplus in the exporting markets NSW and Victoria (and for that matter Queensland too) is expected to be gradually eliminated. For the year 2004 as a whole the SA – Victoria differential is a little over $7. It then gradually declines over the next three years, to a little over $2 in 2007.

On this basis, trading in the markets in 2004 might yield about half the revenue that Murraylink as a merchant interconnector would require in order to cover all its costs – if it could achieve full capacity utilisation and ignoring losses. Over the next three years it would receive a gradually declining proportion, perhaps about one sixth by 2007 on the same assumptions.

The profitability of Murraylink: some further calculations

The above calculations have been based on differentials in annual average prices in each region. This ignores the scope for profitable trading to take advantage of fluctuations in prices – more precisely price differentials – from half hour to half hour, or even from one five minute interval to the next. If price differentials repeatedly reverse over time it is possible and indeed likely that the actual trading revenue would be greater than calculated from any given differential in average annual prices. In the extreme, there could be substantial flows (in absolute terms) and trading revenues even if there was a zero differential between average prices over the year as a whole.

[61] It has been said (in the context of a retail price control review) that "Origin's OTC market experience confirms that contracting for substantial volumes usually occurs at levels significantly above the AFMA curve. A $3/MWh - $4/MWh premium to AFMA is an average uplift to account for this risk, however market premiums have been observed up to $6/MWh." Origin Energy, letter to Essential Services Commission of SA re '2004 Electricity Standing Contract Price, Discussion Paper', 2003, 14 November 2003. It is not clear that any such premiums would affect the price differentials between markets.

Against this has to be set two other realities. First, an interconnector is unlikely to run at full capacity utilisation all or most of the time. In some hours the absence of price differentials would not justify operation at all. In other hours, even a free interconnector operating to eliminate price differentials would not find flow to fill its capacity to the limit. And a merchant interconnector concerned to maximise its revenues would not find it profitable to expand usage to reduce the price differential entirely.

In practice, load factor is a significant consideration. In the last few years the overall load factor of the two regulated interconnectors QNI and Heywood has been about one half.[62] The two merchant interconnectors Directlink and Murraylink (see below) have had a positive flow only about half the time, and when they do flow their load factor averages about one third. So their overall average load factor has been of the order of one sixth.

Second, use of an interconnector incurs transmission losses. In 2003 these were typically a little over 5% of the power transmitted.[63] The price differential available to the interconnector is effectively about 5% less than the observed differential in the market.

Data is commercially available on the actual operation of all generating plant in the NEM, and on the prices obtaining in each half hour, which can be used to build up a picture of the revenues of each plant. The same applies to interconnectors.[64] Murraylink was in commercial operation for about a full year, from 4 October 2002 to 9 October 2003 when it transferred to regulated status. During this period it had positive flow about [41%] of the time, and its absolute flow when positive averaged about 73.5 MW, or about one third of its 220 MW capacity. Its average achieved price differential net of losses was about $12/MWh.[65] This is about three and a half times the [$3.50] differential in annual average prices over this period. However, its overall load factor was only about 14%. Murraylink's achieved revenue during this year is estimated at about $3.2m.

There might have been other sources of revenue open to Murraylink.

- Its stated policy was to offer contracts for capacity. These would provide it with a more secure income than the uncertain price differentials, but it would not necessarily be a higher income than trading at spot prices. At the Tribunal hearing it said that it had not yet signed such contracts.

[62] QNI 2001 45%, 2002 40%, 2003 53%. Heywood 2002 38%, 2003 (to Oct 9th) 67%. Source: R Booth personal communication.

[63] Heywood 5.7%, Murraylink 6.9%, QNI 5.6%, Directlink 3.4%. "By observation, the losses on Directlink are negative (compared to the flow direction) a surprising portion of the time, and increased flow reduces losses in the system. This is due to the fact that Directlink is well embedded in the system and affects the losses in the supplying and receiving systems." R Booth, personal communication 2 January 2004.

[64] "Merchant transmission links lodge a similar bid to a generator (10 pairs of volume and price data) with the price being the differential in pool prices at which they offer a band of capacity. Their bands of capacity get dispatched if the exporting region pool price plus their bid price exceeds the importing pool price (adjusted for losses). They subsequently get allocated their share of the 'settlement surplus' (total amount due to different pool prices) — effectively the amount dispatched times the difference in pool prices (adjusted for losses)." R Booth, personal communication 2 January 2004. I am indebted to Mr Booth for carrying out the calculations reported herein.

[65] This calculation is based on average half-hourly prices. It is conceivable that higher revenues could be obtained from exploiting 5minute variations in prices, but this is likely to give a higher revenue only to the extent that there were changes in direction of flow during the half hour periods.

- Murraylink might offer ancillary services such as voltage support. It did indeed provide such support in terms of responding to requests to increase the voltage. However, the incumbent transmission networks have not been receptive to paying for such services. The ACCC subsequently put the value of the service provided at $6m.[66]
- A feature of the SANI, SNI and Murraylink regulatory assessments was the value of deferring investment in the SA transmission system in the Riverland area. Again, however, no such benefit was paid or available to Murraylink as a merchant interconnector. After discussion, the ACCC subsequently put the value at $24m.[67]

In assessing the profitability of Murraylink it is important not to lose sight of the broader business policy context for TransEnergie and Hydro-Quebec. A particular interconnector project may be more profitable to the proponents than the immediate revenues and costs imply, in terms of acquiring and publicising expertise in a new technology with a view to future business.[68] The net revenue from one project, while important, is only part of the whole picture for the company.[69]

If Murraylink turned out to be an unprofitable investment, its shareholders could be expected to recognise and salvage their position as soon as possible on as good terms as could be gained. Murraylink in fact applied for regulated status exactly two weeks after the interconnector began commercial operation. It cited regulatory uncertainty and 'non-commercial market design risks'.[70]

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[66] ACCC Conversion Decision p. 104. London Economics had previously said that direct interconnection could be expected to bring about a significant stability benefit to the NEM, and that Riverlink would result in a more meshed network, but could not quantify that strategic benefit within the scope of the study.

[67] ACCC Conversion Decision p. 75 although pp. 69-70 seem to suggest $18m. London Economics 1997 initially estimated $14.4m. Murraylink proposed $25m, ElectraNet SA initially suggested $1m a year until 2008.

[68] DirectLink and MurrayLink were two of the earliest HVDC transmission links constructed by TransEnergieUS. Murraylink was an innovative technology and concept, was constructed in record-breaking time, and won environmental awards (Littlechild 2003, fn 69). The company has subsequently participated in three HVDC projects in the US (Lake Erie Link, Harbor Cable between New York and New Jersey, and Cross Sound Cable between New England and Long Island). It advertises its expertise in "Innovative solutions for power transmission … We have a singular focus on the technical, commercial and regulatory aspects of interconnections across state and national borders." (www.transenergieus.com/projects.htm, accessed 18 November 2003). In addition, buying for several such interconnectors could conceivably reduce the list-price costs of equipment.

[69] Against this, however, TransEnergie's website stresses that such business is only taken on a profitable basis. And TransEnergie's partner in Murraylink is a commercial organisation presumably looking to this particular venture being profitable in its own right.

[70] "Over the past three years, during Murraylink's development, the NEM has experienced a high level of uncertainty particularly in relation to the interaction between the competitive and the regulated segments. As a consequence of that uncertainty, MTC now believes that Murraylink is now most appropriately operated to provide a prescribed service in the same manner as most other transmission assets in Australia." Application for Conversion to a Prescribed Service and a Maximum Allowable Revenue for 2003-12, Murraylink, 18 October 2002, p. ii. Murraylink also pointed out that "According to the Safe Harbour Provisions, one purpose of the conversion process is to assist non-regulated interconnectors to avoid 'non-commercial market design risks'. In fact, the Murraylink Transmission Partners would not have decided to invest in Murraylink had it not been for the explicit opportunity stated in the Code for Murraylink to be converted to a prescribed service." Murraylink Letter to ACCC (re Application), 8 April 2003, pp. 2,3.

The revenue offered by the ACCC for a regulated interconnector was about $12m per year. This was about four times what Murraylink had earned in its first full year's operation. Present forward market expectations suggest that average differentials might be a little higher for the next couple of years, but a little lower thereafter, than applied during Murraylink's year of commercial operation. In these circumstances Murraylink's decision to apply for and accept regulated status, even at a revenue less than half what its costs were, seems understandable.

The regulated interconnector SANI/SNI instead of Murraylink

If it was uneconomic to build SNI as a duplicate AC interconnector after the merchant interconnector Murraylink was committed, would it have been economic to build the regulated AC interconnector SANI or SNI before and *instead of* the merchant interconnector?

The two State electricity companies, acting for the two State governments that were proposing to build the interconnector, commissioned an independent study from London Economics in 1997. This found that additional capacity was required to meet demand growth in SA, and that an interconnector would be less costly than new generation.[71] Other studies around this time supported this conclusion.[72] TransGrid relied on these studies in its application for regulated status.[73]

However, NEMMCO's formal review in June 1998 found that the SANI project was not justified under the original consumer benefits test.

It has been suggested that this original test contained a 'technical flaw' or even a 'drafting error', and that the revised or corrected test would have found SANI to be worthwhile.[74]

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[71] For present purposes the main comparison was between commissioning Riverlink (250 MW) in 1999/2000 plus 250 MW of additional generation by 2004/05, and commissioning 200 MW of generation capacity in 1999/2000 plus 300 MW of additional generating capacity by 2004/05. The former would cost $92.5m + $114.9m less $14.4m savings from reduced transmission works, total $193.0m (present value). The latter would cost $121.5m + $142.7m, total $264.2m. The difference of $71.1m would be further augmented by estimated net benefits from fuel cost savings, of which $37.2m were assumed to be passed through to customers. Additional unquantified benefits were noted, associated with system reliability, system security, market power and dynamic investment efficiency.

[72] E.g. "Report on technical issues, costs and benefits associated with the Riverlink interconnection – between the electricity networks of South Australia and New South Wales", Interconnection Options Working Group (IOWG), 22 December 1997.

[73] "TransGrid have not provided an economic analysis of the project with their application. TransGrid have referred to the Interconnection Options Working Group (IOWG) report previously published during the SANI (Riverlink) review 'Technical Issues, Costs and Benefits of Interconnector Options for Capacity Support to South Australia'. TransGrid have also advised that the route for the proposed interconnection has not yet been finalised." NSW – SA Interconnection: Application for Regulated Status, PL/IRPC/001, NEMMCO, 1 December 1998

[74] E.g. "Paul Price, a spokesman for the National Electricity Market Management Co (NEMMCO), said the South Australian problem stems from the refusal by NEMMCO, which is owned by all of the States, to 'approve the TransGrid interconnect project proposal in 1997 between NSW and SA, because the rules at the time meant it had to be declared unviable.' / Price admits that the rules were flawed and the project should have gone ahead. The test of viability has subsequently been amended and there are now plans afoot for the SA - NSW interconnection." *Australian Energy News* Issue 20, June 2001. "[SANI] initially failed

Ernst & Young did indeed report a belief that the precise wording had not been intended. However, this referred to a restriction of the term 'customer' to 'wholesale customer'. Ernst and Young explained that NEMMCO had not in fact adopted this strict and possibly unintended interpretation.[75]

Ernst & Young related their recommendation for changing the test to what they called "the measurement problem". This was "estimating how much of the overall economic benefits associated with an augmentation will be passed through to Customers in the form of lower wholesale prices or greater reliability", and when this pass-through would take place. (They did not seem to see a similar problem in estimating the overall economic benefits in the first place.) They identified two arguments for restricting the Test to assessing customer benefits only as opposed to including producer benefits as well.[76] Having dealt with these two arguments, Ernst & Young recommended a change to the public or market benefit test (the sum of producer and consumer surplus).

There was no suggestion in the statements by Ernst & Young or the ACCC that the original formulation was in error in a material respect. It was a considered decision, rather than an error.[77] Moreover, London Economics had supported the original criterion and cautioned against a reformulation.[78]

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the regulatory test due to a technical flaw in the legal drafting of that test" and "Specifically, the test excluded the inclusion of infra-marginal benefits to generators due to a drafting error." TransGrid FERC comments 2002, p. 18 and fn 14, resp. The latter paper references the ACCC Issues Paper.

[75] "In our discussions with stakeholders, we have found nobody who believes that limiting the analysis to *wholesale* [emphasis added] customer benefit would be appropriate. It is also widely believed that limiting that this was not the intention of the Code drafters. It has been suggested that *Customer* initially referred to both wholesale and retail customers and when this definition was changed the implication for the augmentation provisions was not realised. // In the SANI review, NEMMCO chose to use a wider interpretation of "Customer": i.e. to include both wholesale customers (i.e. retailers) and retail customers (i.e.consumers)." Ernst & Young, March 1999, p. 23.

[76] The first argument (which was more a claim that the precise wording of the test did not matter) was that net overall benefits would be passed on to customers anyway, assuming there was sufficient competition, in which case public benefit and customer benefit are largely interchangeable terms. Ernst & Young believed that the assumption of adequate competition might sometimes be contentious, and therefore a less ambiguous expression of the test was required. The second argument identified by Ernst & Young was that since customers paid use of system charges they should not have to pay for augmentations that did not benefit them. Ernst & Young believed that any equity or efficiency considerations concerning who pays transmission use of system charges were better dealt with under the ACCC's then-ongoing review of transmission charges. Ernst & Young, "Review of the Assessment Criterion for New Interconnectors and Network Augmentation: Final Report to ACCC", March 1999, p. 26.

[77] E.g. "The Customer benefits test was designed to ensure that network investment would only be undertaken if customers benefited from that investment." ACCC Issues Paper, p. 2.

[78] "It has been suggested that the criteria for determining the merits of alternative investments that are currently specified in the Code should be extended to incorporate the 'benefits' enjoyed by other market participants, in particular generators. … Given the market power concerns that have been identified in various regions of the NEM, including generator benefits as an objective for evaluating transmission or generation investment raises serious concerns." London Economics 1997, pp. 6, 8.

Ernst and Young and the ACCC were cautious in suggesting that the previous test was problematic in practice.[79] They made no attempt to assess whether the change in criterion would be likely to facilitate a project passing the test in future. Indeed, Ernst & Young pointed out that in some circumstances a test limited to customer benefits would be easier for a transmission augmentation to pass.[80] Neither Ernst and Young nor the ACCC suggested that failure to include producer surplus had played any role in the failure of SANI to pass the test, or that SANI would have passed the revised test.

Do more recent events validate the initial proposal? It seems not. London Economics had rejected an additional gas-fired base load station as a viable option, and relied instead on gas peaking plant to provide additional generation as an alternative to interconnection.[81] They pointed out that their calculations of the benefits from reduced generation plant build were particularly vulnerable to this assumption.[82] In the event, additional base load generation was constructed in SA. In fact, a recent evaluation of the 1997 study, six years afterwards, has found that most of the underlying assumptions are no longer valid.[83]

A final piece of evidence about the economic viability of SANI/SNI before Murraylink was built derives from the ACCC's assessment of Murraylink's request for regulated status. The ACCC explained that one of the alternative projects considered (Alternative 1) was essentially SNI.[84] After examining the evidence and arguments, the ACCC found that the regulatory cost of the SNI-equivalent project was the highest regulatory cost of all four transmission projects considered as alternatives to Murraylink.[85] The cost of the SNI-equivalent project ($245m) also exceeded the top end of the ACCC's credible range of benefits ($170m to $220m) of an interconnector.

To summarise, Riverlink/SANI/SNI as originally proposed was supported by an independent study. But it did not pass the consumer benefit test before Murraylink appeared, there is no reason to believe that it would have passed the reformulated market

[79] E.g. "Additionally, in its review of SANI, NEMMCO found the *Customer* benefits test to be highly volatile, which *might* [emphasis added] make it difficult for any proposal for inter-regional augmentation to satisfy the criterion." Ernst & Young, March 1999, para 1.1.2.

[80] "… if only consumer surplus were counted in the analysis, a transmission augmentation would pass the test more easily because the loss of generator monopoly profit would be ignored." Ernst & Young, 1999, p. 3.

[81] London Economics 1997, pp. 41-2.

[82] "There is an important proviso to Table 7, since it assumes that no additional new generating plant will be commissioned in south Australia beyond the capacity support plant that has been valued here. Any additional plant build that is not reflected in this analysis would significantly undermine the relative benefits of either of the interconnect options." London Economics 1997, p. 60.

[83] Briefly, a new gas-fired power station was commissioned leading to a fall in SA power prices and reduction of trading benefits, a second source of natural gas is being introduced into SA, an existing power station was refurbished instead of retired, new peaking capacity was installed in SA at lower costs than assumed, high SA pool prices in the summer peak brought forward some demand management, and contrary to expectations NSW switched from winter to summer peaking and therefore no longer had surplus capacity to supply the SA peak. Garlick 2003.

[84] Or at least the interconnector part of it extending from Buronga in NSW to Monash in SA, and excluding the section from Monash to Robertstown that lies entirely within SA.

[85] Adding in the cost of the Monash-Robertstown link, the implied cost of SNI much exceeded the level of cost assumed in the NEMMCO and Tribunal proceedings. Littlechild 2003, Appendix 2. The main reasons for the higher cost were the allowance for undergrounding about 30km of line for environmental reasons and the inclusion of other costs previously omitted e.g. for interest during construction and contingencies.

benefit test, the assumptions underlying the case for it did not turn out to be valid in practice, and the SNI-equivalent project would not have passed the regulatory test as carried out by the ACCC.

A hypothetical more economic interconnector between South Australia and NSW?

Would it have been possible to design a regulated interconnector that would have been more economic than SNI or Murraylink? The ACCC found that the lowest cost alternative project (Alternative 3) was essentially along the Murraylink route[86] with 220kV AC mostly overhead line instead of 140kV DC underground line. This project had a regulatory cost of $142m, which was below the ACCC's credible range of gross benefits.

An issue of interest is the cost of AC versus DC interconnector systems. DC is generally cheaper than AC for overground links, and also less costly to underground, except that a DC converter system and control equipment are normally required, where this is not normally the case for AC systems. This usually puts DC cost above AC cost. The Code requires merchant links to be dispatchable. This can be done for AC links by means of (eg) phase linking transformers, but it increases their cost. Murraylink argued that the cost of alternatives should include the $19m cost of phase shifting transformers.The ACCC initially did not accept that these were required to facilitate power system transfers, but after further work accepted that they would be required.

Murraylink argued that the costs of Alternative 3 would have been higher than the ACCC assumed because of the need to underground more line. The ACCC acknowledged the difficulty of forming a judgement here but took a more optimistic line - or a less environmentally sensitive one – and was not convinced.[87] Accordingly, the ACCC used this hypothetical project as the basis for setting Murraylink's allowed revenue as a regulated interconnector. The ACCC effectively deemed that this hypothetical project passed the regulatory test.

Would this hypothetical project have been sustainable in the market if a merchant interconnector had chosen, and been allowed, to build and operate it? It appears not. As noted above, the ACCC set Murraylink's allowed annual revenue as a regulated interconnector at about $12m, based on the costs of the hypothetical project. Murraylink is estimated to have earned only about a quarter of that in the year it was in commercial operation. The prospects are not significantly better over the next four years as a whole. Yet the ACCC effectively deemed that such an interconnector would pass the regulatory test.

[86] That is, from Red Cliffs in Victoria to Monash in SA, rather than the SNI route from Buronga in NSW to Monash. In effect, the ACCC found that the most economic interconnector of the type proposed by the NSW transmission operator did not terminate in (or pass through) NSW.

[87] "Clearly, there are wildly divergent views on the degree that social and environmental issues should affect the development of transmission lines. MTC [Murraylink] perceived that potential (not actual) opposition to overhead transmission lines from environment agencies and local communities provided sufficient imperative to develop Murraylink as an underground line. The Commission considers that whilst it may have been difficult to obtain approval for an overhead line, sufficient evidence has not been presented to show that such approval could not be obtained." ACCC Conversion Decision, p. 108.

Re-evaluation of the regulated interconnector perspective

It is now possible to evaluate what was earlier called a 'regulated interconnector perspective' on the history of the last few years.

As regards the originally proposed regulated interconnector Riverlink/SANI/SNI before the creation of Murraylink, a study at the time found this interconnector to be the least cost option for meeting increased demand in SA. However, the SANI proposal did not pass NEMMCO's customer benefits test, and later experience has falsified many of the key assumptions underlying the original study. A recent ACCC assessment has effectively found that the proposed interconnector would have cost more than was previously estimated, would not have been the most cost-effective routing, and would not have passed the regulatory test. By the criteria of the regulatory test, any delay to the regulated interconnector was beneficial rather than harmful in terms of conventional resource allocation.

As regards the merchant interconnector Murraylink, its additional costs seem primarily due to the additional cost of undergrounding (to avoid any environmental damage and associated delay) rather than the additional cost of control. Although the ACCC held that not all the undergrounding was necessary, it acknowledged that this was an issue on which "wildly divergent views" were held. If additional upstream reinforcement of the transmission network (unbundled SNI) would be economic in order to make best use of Murraylink, it would seem incumbent on the transmission network service provider TransGrid to take forward such investments on normal terms; there seems no basis for suggesting that Murraylink was attempting to avoid an appropriate share of the cost of this, and the Victoria Supreme Court could see none of the alleged risk to TransGrid in carrying out this reinforcement. Finally, the size of both Riverlink/SANI/SNI and Murraylink was constrained by the state of the associated transmission systems[88], and there is no evidence to suggest that a larger interconnector would have been more economic. The apparent unprofitability of Murraylink may even suggest that a smaller interconnector or none at all could have been more economic. To the extent that this is true, any uneconomic costs of Murraylink were born by its shareholders, and not by customers of the regulated transmission company.

On the subsequent stance of the transmission company, the evidence of TransGrid's consultants to the Tribunal showed that the incremental net benefit of a duplicate interconnector was significantly negative. Moreover, a duplicate interconnector was not justified (and surely cannot be) in terms of protecting customers against any market power that Murraylink possessed and would exercise – the extent of which market power was strongly contested. The stance of Murraylink seems understandable in terms of protecting its own competitive investment against an uneconomic duplicate interconnector cross-subsidised by transmission users generally. The stance of the incumbent transmission company in maintaining its uneconomic proposal seems inconsistent with the findings of the Court and the ACCC (in its evaluation of alternative projects further to Murraylink's application for conversion of status) and might even be

[88] E.g. "On the advice of TransGrid and ETSA Transmission, London Economics' market modelling has assumed an upper limit on flows of 250 MW." London Economics 1997, p. 46.

construed as predatory. The stance may reflect what the Court called that company's "subjective preferences and motivation", but it is difficult to see how it is consistent with the proper duties of an incumbent transmission company "acting rationally according to the economic criteria prescribed by the regulatory test".

PART FOUR THE CALCULATION AND DISTRIBUTION OF BENEFITS

The Queensland-NSW interconnectors

The calculations above suggest that SANI, SNI, Murraylink and the alternative interconnector projects between NSW and SA examined by the ACCC would all yield trading revenues less than sufficient to cover their costs of construction. Even for the most economic project (Alternative 3) the prospective revenues would not exceed about half its costs of construction.

This is a rather significant finding. Is the same true of the two interconnectors actually built between Queensland and NSW?

It has been estimated that the merchant interconnector Directlink "reportedly cost $130m for its 180 MW capacity, or $722/kW" and that

> "a sustained average pool price differential of about $11/MWh would be needed to allow the owners to achieve a full commercial return. And this is with full utilisation – more practical utilisation levels would require a higher average pool price differential. // But since QNI has been commissioned, the Queensland - NSW pool price differential has been only around $2/MWh in 2001 and $8/MWh in 2002 - much less than that required to make Directlink pay its way, given its actual low utilisation".[89]

According to Table 1, the differential between annual average prices in Queensland and NSW has not exceeded $5/MWh since mid-2000, and in 2003 the differential was little over $1/MWh.

More precise calculations show how Directlink revenues have declined. Table 3 estimates that Directlink earned $5.8m in the second half of 2000.[90] If all units had been available for the full year, this could conceivably have yielded revenue to cover the estimated commercial requirement of just over $15m.[91]

Since then, however, its average load factor with positive flow has not exceeded 50% on an annual basis, and it flows only about half the time. On actual flows over the last three years it achieved an average price differential about three times the differential in annual prices. However, its overall load factor has ranged between 8% and 27% on an annual basis. The estimated annual revenue from trading has not exceeded $8m, and has averaged under $6m. This is less than half the estimated requirement. My understanding

[89] Booth 2003, p.220
[90] Its first unit went into commercial operation in July 2000 and its final unit by the end of that year.
[91] Booth said that Directlink could carry 1400 GWh if fully utilised, which at his estimated required differential of $11/MWh equals $15.4m per year.

is that Directlink did not enter into contracts that might have increased such income, at least during the first few years.

Table 3 Operating Experience of Directlink (180 MW)

Year	Overall Load Factor %	Proportion Non-zero Flow %	When operating at positive levels: Load Factor %	Ave. Load MW	Price Differential $/MWh	Total Revenue $m
2000				56.0	29.6	5.8*
2001	15	56	26.8	48.3	25.2	5.8
2002	8	42	19.4	35.0	51.1	7.9
2003	27	54	50.0	90.0	8.8	3.6

* Revenue in 2000 covers about six months operation.
Source: R Booth calculation based on commercially available data, personal communication

How far this unprofitable outcome has been due to the construction of QNI (now 1000 MW), and how far to the commissioning of more generation in Queensland (now over 2500 MW), is an interesting question. The figures do not prove whether Directlink would have profitable or unprofitable in the absence QNI. However, the decision to build Directlink was taken in the knowledge that QNI was under construction, and some increase in generation investment in Queensland was presumably to be expected in view of the high prices there.

What about the regulated interconnector QNI? It is estimated that QNI will have cost $350/kW for its 1000MW capacity when fully commissioned.[92] Taking these figures at face value, and assuming that QNI's capital costs were half those of Directlink, this implies that if QNI were financed by usage charges it would require a sustained pool price differential of about $5.50/MWh (half the $11/MWh required for Directlink) at full utilisation in order to achieve a commercial return. Since QNI has recently operated at about half utilisation, that implies a required differential of about $11/MWh.

In fact, the actual differentials between Queensland and NSW annual prices from 2000/01 onwards have averaged less than a third of that, about $3/MWh. The differential in forward prices is presently projected to fall to less than half that level over the next three years.[93]

Thus, it presently seems that revenue from trading in the market would have covered less than about half the costs of the merchant interconnector DirectLink and only a small fraction of the costs of the regulated interconnector QNI. The picture over the next few years is for even lower revenues.

[92] Booth 2003 p. 220.
[93] Interestingly, the forward prices in Queensland are now lower than in NSW, and the net interconnector flows are presently from Queensland into NSW.

The criteria for evaluating interconnectors

Price differentials will of course fall after an interconnector is built, but a merchant interconnector would not aim to reduce them below the level needed to finance construction. Should a regulated interconnector do so? If the prospective market benefits of regulated interconnectors, as reflected in their actual or potential trading revenues, are significantly less than the costs of constructing them, why are they nonetheless advocated and built? If consumer groups would ultimately have to pay for uneconomic investments, one would expect them to object. Yet, on the contrary, they and government ministers seem to support regulated interconnectors. Indeed, it has been claimed that "The QNI interconnection was a great success."[94] Why is this?

One argument for a regulated interconnector is that it would operate at a lower (regulated) margin rather than at the higher monopolistic margin associated with a merchant interconnector.[95] To the extent that this relates prices more closely to costs, it might be argued to increase consumers' welfare (in a static context). But it assumes that an interconnector of some kind is beneficial in the first place, and does not address the issue of size.

The main argument seems to be that the criterion for judging an interconnector should be the benefit to consumers, not to consumers plus generators, and not measured in terms of trading revenue or profit. Eliminating regional price differentials, including price spikes, is desirable in itself.[96] Even if an interconnector (merchant or otherwise) did operate on a margin that only just covered its costs, with no monopoly profit, this would be unsatisfactory because it would not eliminate the price differentials between markets. For example, some regard a usage-based charge as itself undesirable.[97] Booth comments that "such [merchant] interconnectors require sustained pool price differentials of $12 - $15/MWh even at full utilisation to have a chance of earning a reasonable return on investment - quite the opposite effect to that required for an efficient NEM".[98] A related concern is that a merchant interconnector would have inadequate capacity, or would be used to an inadequate extent, because it would need to recover its capital costs from the difference in prices between the markets at either end of the interconnector; as a result it

[94] Booth 2003, p. 88

[95] "The Transenergy-Murraylink interconnect works by buying energy effectively at a low margin in New South Wales/Victoria, and then selling it at a higher margin into the South Australian market. Riverlink, by contrast, buys at a low margin in the New South Wales and Victorian market, and then is forced by the regulator to effectively sell that energy at a low margin again in South Australia. And the obvious difference being is that the Riverlink interconnect produces a much lower price for South Australian customers. The Transenergy-Murraylink project produces the highest profits and prices for the investor, that is, Transenergy." Danny Price, London Economics, interviewed in radio program Power Games - The Politics of Electricity, produced by Tom Morton, Sunday 19 March 2000.

[96] These concerns are understandable. There are references to high prices at various places in this paper, and I am told that price spikes (over $300/MWh) contributed some 28% of generator revenue last year.

[97] "If prices are not set to produce an efficient outcome then this form of investment [unregulated merchant] will result in lower social welfare. For example, a pricing structure based on a usage-based charge … may undermine the benefits of interconnects on the remainder of the NEM. This is because usage-based prices may distort energy prices and hence reduce the potential for arbitrage across networks." London Economics 1997, p. 15.

[98] Booth 2003, p. 89

could not extend capacity or output to the extent necessary to eliminate the average price differential.

The implied contrast is with a regulated interconnector that would not need to maintain such price differentials because it would recover its capacity cost by inclusion in the regulated asset base.[99] The implication is that even cost-related price differentials are in themselves inefficient, which would seem to imply that merchant interconnectors are less economic than regulated interconnectors, almost regardless of the circumstances.

The optimal size of an interconnector

To analyse these points, put aside the issue of market power possibly exercised by a merchant interconnector, and consider the optimal size of investment in regulated interconnector capacity and its relation to the financing of that interconnector. Assume for simplicity of exposition that the interconnector capital costs are constant per unit of capacity; that operating costs are negligible; that demand is uniform in each period of the day and year; and that the criterion of benefit is net value of output (consumer plus producer surplus). In Figure 1, let D and S denote, respectively, the net demand curve in the importing market and S the net supply curve in the exporting market (ie after taking account of increases or reductions in supply from generators in each market).

Consider first an interconnector financed by usage charges on the amount transmitted across it. Assume that capacity and output equals OY in each period, such that the differential in prices ($P_2 - P_1$) is equal to the unit cost of capacity per period. Then total revenue is equal to (P_2-P_1) times throughput OY, which equals the total cost per period of installing the capacity. This interconnector could be financed by a usage charge equal to this differential in prices.

In contrast, consider an interconnector financed through the interconnector rate base. Assume capacity and output OY* in each period, at the point where the demand and supply curves intersect at B. In this case the price differential would be eliminated, interconnector revenue would be zero, and a uniform price P* would obtain across both markets. Total cost would be covered by increasing rate base revenue by the amount ($P_2 - P_1$) times OY* per period.

The suggestion seems to be that financing via the rate base leads to the optimal capacity and trade OY* and that financing by usage charges leads to a welfare loss due to the restriction in capacity and trade from Y* to Y. The amount of this loss is said to be equal to the area of the triangle ABC. The upper part of this triangle reflects restricted use of electricity in the importing market, the lower part reflects restricted output from the exporting market.

If the criterion is aggregate net benefit to all market participants, and if costs (or supply curves) are taken as given, this suggestion would be incorrect, or incomplete, for at least

[99] "In contrast, under Chapter 6 of the Code a significant proportion of charges is postage stamped and as a regulated interconnect under the Code, there is only an indirect link between use of asset and payment for it. To the extent that charges are fixed, they are less likely to influence energy flows across the interconnect." London Economics 1997, p. 15.

three reasons. First, it is incorrect to assume there is a net welfare gain in these two markets from reducing the price differential to zero. On the contrary, there is a net welfare loss. The additional capacity costs a total of (Y* - Y) times ($P_2 – P_1$) to provide, equal to the rectangle AEFC, but the additional benefit it provides is only the triangle ABC.

The net welfare loss associated with the extra capacity is the difference in area between the rectangle and the triangle, namely the triangle BCF plus the triangle ABE. Assuming straight line demand and supply curves as an approximation, the benefit of the additional trade made possible by abolishing usage fees amounts to only half the cost of providing the additional capacity.

Second, the analysis assumes there is no welfare loss associated with collection of the cost of the interconnector through the rate base. In practice, price needs to be increased on some other good or service in order to provide enough revenue to cover the total cost, equal to the whole area P_1EFP_2 in Figure 1. That will reduce consumption and output by a certain amount, yielding a comparable welfare triangle to the purported welfare loss triangle ABC. This may or may not be of a significant magnitude. It might be argued that the demand for use of the electricity transmission grid is relatively inelastic, and that the distortionary costs of collecting transmission revenue from connection or use of system charges is relatively small. However, it should not be ignored in principle.[100]

Third, this discussion has hitherto assumed that the designers of a regulated interconnector know what size to build it and indeed build it to that size. In practice, however, they have to estimate the demands and costs involved and come to a judgement on size. Financing by usage charges provides an immediate feedback on the extent and value of demand. It provides input on the wisdom of the decision to build the interconnector to that size, or indeed at all. Financing by adding to the asset base provides no such input. Coase and others made the same point half a century ago in the earlier discussions on marginal cost pricing. More recent discussions of ownership and efficiency make a similar point. Having to cover costs from the value of output provides a greater stimulus to accurate forecasting and efficient investing than does recovery of costs from a general asset base.

To summarise, some commentators have argued that, other things being equal, recovery of the costs of an interconnector through the rate base in order to reduce or eliminate price differentials between markets is more efficient than recovering it via differentials calculated to recover those costs. In fact, if the criterion is the aggregate net benefit to all market participants, and if costs are taken as given, then the opposite is the case.

The value to customers

If an interconnector financed via the rate base is less efficient than an interconnector financed by price differentials in the market, why is there such pressure for the former

[100] The earlier discussions of marginal cost pricing, in the 1940s and 1950s, established this point. Even if the government met non-marginal costs, they would still have to be funded in some way. If they were recovered from income tax, for example, this would still represent a tax on labour or enterprise and hence would have a disincentive effect. See Coase 1946.

type of investment? One answer seems to be that, in plausible circumstances, such investment can bring benefits to customers.

Consider the representation of the investment decision in Figure 1. Take the limiting case where the supply curve S is flat. This might reflect a situation where new generation can be supplied by the exporting at low and constant long run cost, whereas in the importing area there is a higher and upward sloping long run supply curve. (Such conditions were commonly thought to apply in the exporting and importing areas of Australia where interconnectors were proposed.) In this case there is no distinction between P* and P_1, both of which are equal to the constant long run cost of generation in the exporting area. The cost of an interconnector is still $P_2 - P_1$ per period. Such a situation is shown in Figure 2. For the moment, assume that competitive conditions apply in both areas.

In these circumstances, the additional value to all market participants of extending the interconnector capacity from Y to Y* is still only about half the extra cost of doing so. (The triangle A'BC is approximately half the area of the rectangle A'BFC.) However, the impact of this extension is beneficial to customers in the importing area in three respects.

- First, it provides consumer surplus on that part of the additional output YY* that extends consumption, and producer surplus on that part that replaces more costly domestic generation, where the total of these two benefits is given by the triangle A'BC.
- Second, it reduces the revenue paid by these customers on the output of the previous interconnector capacity OY, by an amount $(P_2 - P_1)$ x OY.
- Third, it reduces the price paid by these customers on the whole quantity of electricity purchased in the importing area before the construction of the interconnector, by an amount $(P_2 - P_1)$ times this quantity.

The first of these items is a net welfare gain, the second item is a transfer of the interconnector cost from consumers in the importing area to system users generally (and hence a transfer of income in the opposite direction), and the third item is a transfer of income from producers to consumers in the importing area. The sum of these three benefits to customers in the importing area exceeds whatever share of the additional cost A'BFC they might have to pay.

From the point of view of importing customers, extending the capacity of the interconnector beyond what usage charges in the market would sustain, and instead paying for it by an addition to the regulated asset base, may thus be a rational economic decision. Under the assumed conditions, market participants in the exporting area are no better or worse off, except to the extent of their share of the additional costs of the larger interconnector. The main burden falls on generators in the importing region, in the form of loss of producer surplus on their previous volume of output. How far these generators count in the political calculus may depend on the circumstances.[101]

[101] For example, whether the generators are state owned or privately owned, and whether privatisation and flotation are imminent. For another discussion of the magnitude of the transfer effects of interconnectors, see Greg Houston, Efficient electricity transmission: where to from here? Presented to the Australian conference of economists, Adelaide, South Australia, 3 October 2002.

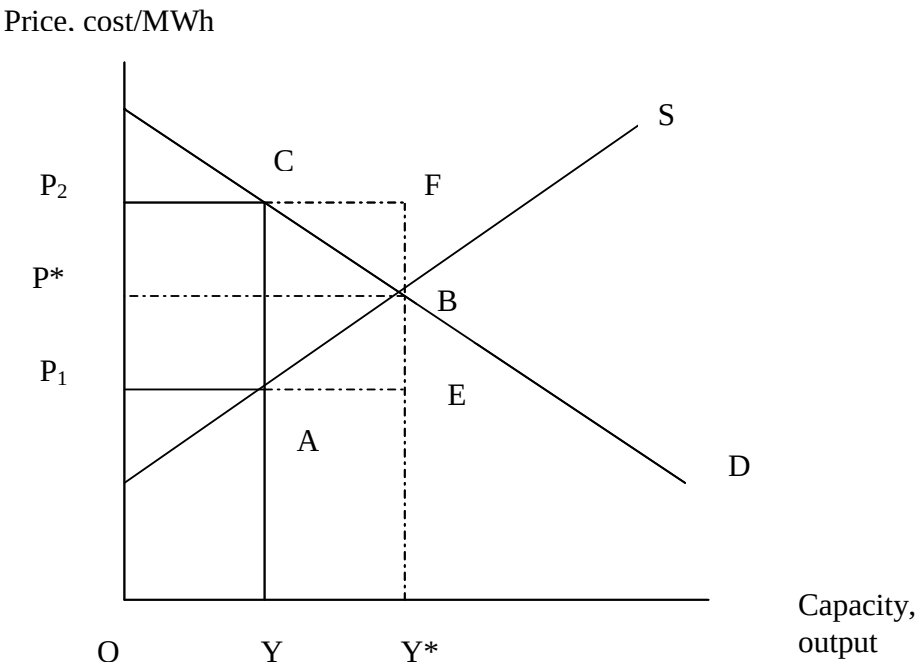

Figure 1

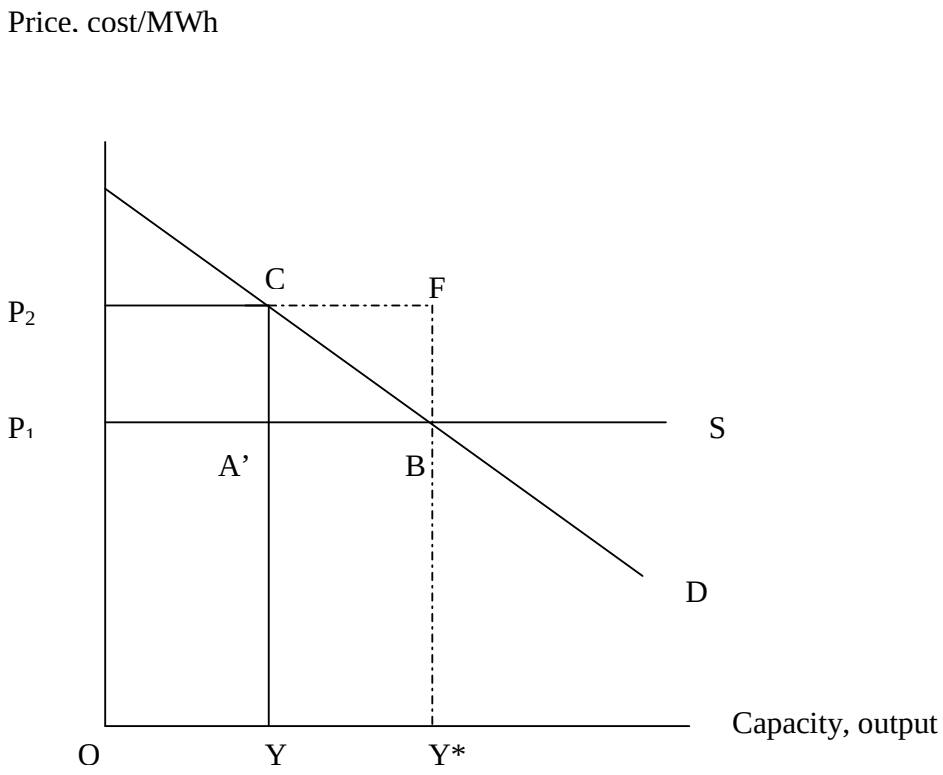

Figure 2

Proponents of regulated interconnectors effectively acknowledge – and welcome - this distributional impact. For example:

> The experience with this interconnection [QNI] has been extremely encouraging – quite dramatically reducing both average pool prices, the level of volatility, and the cost of ancillary services in Queensland and New South Wales. It proves a strong recommendation for planned and regulated interconnections.[102]

The perceived benefit evidently lies in the reduction in prices (and price spikes) to customers, not offset by any reduction in prices to producers. The criterion is not the aggregate benefit to customers and producers.

The same approach is reflected in calculations of whether the benefits of a regulated interconnector exceed the cost:

> To put this another way, had Directlink had been the only interconnection, and had it been used to maintain a pool price differential of $11/MWh, Queensland, with 42,000 GWh of generation, would have sustained additional wholesale pool costs of over $460 million per year, enough to pay for the installation of QNI in just 12 months of operation. // Similar sums can be conducted for the Murraylink project between Victoria and South Australia, where it can be calculated that, if Murraylink is operated to provide a full commercial return, a Victoria – South Australia pool price differential of almost $14/MWh is required – compared to an actual differential of around $5/MWh since January 2001. South Australia would be forced to experience an additional wholesale cost of around $78 million. Enough to pay for the free-flowing SNI link in about 15 months of operation.[103]

Here, 'paying for the installation of the interconnector' evidently means that the benefits to customers (as a result of lower prices) cover the cost, not that the aggregate net benefits to all market participants do so.

Generation market power

So far the analysis has proceeded without reference to generation market power. However, higher prices in the importing areas may be attributed in whole or in part to market power in those areas. Four implications for the foregoing analysis might be noted. One relates to income transfers, the other three to real or net welfare effects.

First, an assumption of market power in the importing area gives a boost to the moral case for taking account of transfers of income from generators to customers. If customers are being exploited, if the generators' income is excessive or ill-gotten, why should a reduction in such income count against a proposed interconnector?

Second, it may be argued that generation market power restricts capacity and output in the importing area, causing a net welfare loss relative to a competitive outcome. If an interconnector increases output this is a net welfare gain. The extent of this is more

[102] Booth 2003, p. 218

[103] Booth 2003, pp. 220-1. The calculation in the first cited paragraph references Bardak Ventures, *An Assessment of the First Six Months of Operation of QNI*, available from www.bardak.com.au

debatable. The net increase in output is not simply the capacity of the interconnector. A monopolist will typically respond by reducing output, as for example with limit pricing. If, in the limit, the monopolist absorbs all the interconnector output in terms of reducing its own output, there is no welfare gain to consumers. In practice, it will be profitable to concede something on price and something on output.

Third, with competitive markets it is assumed that price reflects generation cost at the margin and that imports will only displace domestic generation if they are less costly. With market power that is no longer the case. Domestic price exceeds domestic cost at the margin. There could be a welfare loss insofar as the cost of the imported energy (export cost plus interconnector cost) is less than price but exceeds the cost of the domestic generation that it replaces.

Fourth, with competitive markets it is conventionally assumed that generation is productively efficient. In contrast, the 'competitive benefits' argument discussed below assume (in part) that generators with market power are not necessarily productively efficient, so that interconnectors can increase productiveness by stimulating greater competition in generation. A similar argument is extended to the benefits of increasing competition in retail and financial markets, and the advantage of a single price throughout the market, which may facilitate trading or hedging. Typically, such benefits are noted in principle but not quantified.[104] The ACCC's recent review includes whether competition benefits should be included in the regulatory test, and if so how.[105]

The analysis and calculation of benefits in the regulatory test

The foregoing discussion has established that there are conflicting objectives and criteria for assessing the benefits and size of regulated interconnectors, quite apart from concerns about regulated versus merchant interconnectors. In view of this, how have the regulatory bodies resolved these conflicts?

One might conjecture that they have felt torn. The political context broadly demands more (and bigger) interconnectors as a way of reducing price to customers in the potentially importing regions and improving the National Electricity Market. Yet conventional economic criteria do not justify such price reductions at face value.

Consider the three broad categories of benefit discussed hitherto that might be used to justify such proposals:

- the net benefits of trading between high and low price regions
- the price reductions to customers in the high price regions
- the benefits of a more competitive market.

Trading benefits are the obvious starting point, and past, present and forward prices and price differentials in the markets provide one means of estimating these. But experience increasingly suggests that market differentials would not suffice to cover costs. There is pressure to extend capacity and trade beyond what cost-related price differentials would

[104] E.g. London Economics 1997, sections 2.3.2 and 5.3.1
[105] Review of the Regulatory Test Discussion Paper, ACCC, February 2003.

justify. Price reductions to customers reflect the criterion that many have argued for. However, such reductions are inconsistent with the general thrust of economic thinking on cost-benefit analysis, and with the 1998 reformulation of the regulatory test that explicitly substituted benefits to the market as a whole (consumer plus producer surplus) for customer benefits alone. A more competitive market brings benefits in principle, but measuring them is difficult.[106]

In the most recent calculation, dealing with Murraylink's application for regulatory status, the ACCC found that interconnector project Alternative 3 would be the most economic design and routing, at a cost of $142m. It assessed the credible range for interconnector benefits at $170m to $220m. Alternative 3 would therefore pass the regulatory test. But the calculations above suggest that even this project, if financed by user charges, would not be able to recover its costs in the market. By implication it would not have a positive net market benefit. How can it then pass the test?

The ACCC took the view that "there are four broad types of benefits that Murraylink and its alternatives can bring to the NEM. These are energy benefits, deferred market entry benefits, reliability benefits, and Riverland deferral benefits." (p. 76) The energy benefits would comprise savings from less expensive generation in one region displacing more expensive generation in another region, and reducing the expected frequency and magnitude of voluntary load reductions or curtailments. The deferred market entry benefits would be the associated deferrals of capital expenditure. The reliability benefits are the reductions in unserved energy as demand is less likely to exceed supply, where these unserved demands are valued at the Value of Lost Load specified in the Code ($10,000 MWh). Riverland deferral benefits, as explained above, are the value of deferring the need for major transmission reinforcements in the Riverland area.

With two small modifications[107], the ACCC accepted Murraylink's consultants' calculations of these benefits over a 39.5 year horizon. These are set out in Table 2 for the most economic project (Alternative 3). The figures are the same or similar for other alternatives including Murraylink itself.

Table 2 Gross market benefits of the economic project (Alternative 3) ($m)

Energy	77
Merchant entry (capital)	49
Merchant entry (O&M)	5.4
Reliability (VoLL = $10,000/MWh)	62
Riverland deferral	22
Riverland O&M	1.9
Total	218

[106] Explicitly assigning benefits to reducing prices to customers and competitive benefits may also raise questions as to whether this is the most economic way of achieving those ends, and why other steps are not being taken to increase competition in the generation market.

[107] The modifications were to reduce the Riverland deferral benefits, and to bring forward the timing of possible augmentations to the Victorian network, thereby reducing these benefits also.

These benefits sum to $218m. As noted, the ACCC's market simulations suggested that the most credible range was $170m to $220m – that is, predominantly lower than $218m.

Transfers of income to consumers are evidently not included in the calculation. Nor are benefits to competition.

London Economics had argued that an interconnector would have greater system reliability benefits than more generation.[108] It estimated that Riverlink would have less unserved energy; valued at VoLL of $5000/MWh this would be worth $3m. NEMMCO's evaluation of SNI substantially increased this element.[109] Murraylink and the ACCC, using VoLL of $10,000/MWh, estimated reliability benefits at $62m, over a quarter of the total benefits, and twenty times what London Economics had estimated.[110]

These calculations assume that the building of an interconnector means a net increase in reliability that could not or would not be matched by additional generation. Whether and how generation capacity could otherwise be appropriately rewarded in the ancillary services and other markets is unclear. But $62m is a rather large amount of money to attribute in this way, and it would be surprising if some form of market test could not be designed.

The two largest benefits in the test are related to Energy and Merchant entry, totalling over $131m. It is not clear why these would not be reflected in market prices and hence in the value of market trading. Since Alternative 3 had a regulatory cost of $142m, which led to allowed revenue of about $12m per year, this suggests that market benefits of $131m would be associated with annual revenue of about $11m a year. It was calculated above that trading in 2003, and prospectively over the next few years, might recover about half that amount. In other words, over the foreseeable future, the market seems to expect that the trading benefits of an interconnector are of the order of one half the level that the ACCC has assumed in its calculation.

The ACCC report does not mention forward price curves. It is not clear whether the ACCC takes a different view of future prices than the market, or whether the kinds of energy and entry benefits it measures are assumed not to be available in the market.[111]

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[108] "The availability of a peaking generating unit typically ranges from 90% to 98%. This is substantially lower than that for HV transmission lines which is typically in excess of 99.9%. Further interconnection between South Australia and the NEM also provides access to a larger pool of generation resources (increased supply diversity). Hence interconnection of a given capacity is likely to bring greater gains in terms of increased reliability than commissioning a corresponding local generator". London Economics 1997, p. 60

[109] "It is notable that in the only significant interconnector investment (SNI) evaluated by the IRPC/NEMMCO, by far the greatest proportion of the value is attributable to reliability benefits rather than regional price arbitrage benefits." Mountain and Swier 2003, fn 1.

[110] If a higher value of VoLL were assumed, this item would be even larger. At VoLL = $29,600/MWh, which was actively canvassed, the reliability benefit would be three times larger, at $182m, and would account for over half of the total benefit of $339m.

[111] The ACCC says that "The regulatory test is based on the traditional cost-benefit analysis with key features that include … calculating the net benefits of the various options with reference to the underlying economic cost savings and not with reference to pool price outcomes which may be distorted by market participants exercising market power." ACCC Conversion Decision p. 5. This would not seem to preclude using past, present and forward prices as a check on the plausibility of the assumptions made about the

The final element in the benefit is the Riverland deferral benefit. This is assumed to account for about an eighth of the total benefit. Presumably it could have been paid to Murraylink for providing the same benefit as a merchant interconnector, but there was no provision for this.[112]

It thus seems that, in the latest application of the regulatory test, 60% of the benefits were related to market benefits; they were estimated equal to about twice the level that the forward market indicates as recoverable, but this direct comparison was not made. The remaining 40% of the benefits were reliability benefits and transmission deferral benefits that at present are not recoverable or testable in the market. In this way, regulated interconnection, with a prospect of eliminating or narrowing price differentials between the regional markets, has been reconciled with the traditional and specified criterion of economic benefits for the market as a whole rather than benefits for consumers only.

This obviously raises the question of how the accuracy of estimates used in the regulatory test can themselves be tested, or whether indeed it is intended that they be tested. It also raises the much-debated question about 'competitive neutrality' between merchant and regulated projects. That aim of policy was emphasised at one time, but seems to have been abandoned or at least downplayed recently.[113]

Latest developments in policy

Ministers seem to have witnessed the continuing conflicts and delays about regulated interconnectors with growing impatience. At the State level, construction of a duplicate regulated interconnector between SA and NSW/Victoria was a recent election commitment in South Australia.[114] The governments of NSW and SA, as well as the incumbent NSW transmission company, have filed an appeal against the Victoria Supreme Court judgement.

At a national level, Ministers had previously encouraged the ACCC to review the customer benefits test that had not approved the first proposed regulated interconnector. Subsequently, the ACCC has been reviewing the regulatory test that replaced it, and considering the case for taking account of 'competition benefits'. This review now seems

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nature and timing of future investments, with due allowance for any assumed market power. In fact, the regulatory test requires that "modelled projects should be developed within market development scenarios using two approaches" where one of these called market-driven market development "mimics market processes by modelling spot price trends". Reprinted in ACCC Conversion Decision p. 79.

[112] Although payments have been made to generators for transmission network support and discussed for distribution networks.

[113] Ernst & Young recommended that "The relevant benefits to measure are those that can also be captured by non-regulated alternatives." Final Report, March 1999, paras 4.2.9 and 8.1. This recommendation did not find its way into the ACCC's actual changes in the wording of the test.

[114] E.g. "The Minister for Industry, Science and Resources, Senator Nick Minchin, has called for 'State Governments to remove whatever road blocks there are and take some tough decisions on getting interconnectors in place'." *Australian Energy News*, Issue 20, June 2001. "One of Labor's key pledges in this campaign is to see an interconnector to NSW built that will give us access to cheaper power. We will fight to see it happen." State Labor Leader Mike Rann (Australian Labor Party), *Labor's Bold New Plan to Tackle Power Price Rises*, Press release in 2002 State Election, 3 February 2002.

to have been overtaken by ministerial thinking. In June 2001 Ministers commissioned a Review whose final Report issued in December 2002.[115] This found that:

> The current state of transmission is one of the most significant problems facing the NEM. … Inadequate transmission links, and the poor transmission arrangements, effectively 'regionalise' the NEM and remove most of the benefits that were envisaged with a national market. The NEM is largely five trading markets, not one. This is seen in the price separation that occurs between markets.

The Report identified five main transmission problems, including "a flawed system for augmenting transmission investment, which sees inadequate links being built:

- There is confusion in having both regulated and unregulated interconnectors, and they have crowded each other out.
- In the case of regulated interconnectors, the currently applied regulatory 'benefits' test is inappropriate. This is because the test is not a commercial one as it ignores the market power that can be exercised when transmission lines bind.
- For unregulated interconnectors, the key problem is that they cannot address intra-regional constraints."[116]

The Report proposed to introduce Firm Transmission Rights. The price of these would be the key indicator of the need for transmission augmentation. NEMMCO would publish information that would trigger a competitive tender process.

> "The trigger proposal would replace the regulatory benefits test for new interconnects, and transform the assessment process from a pure 'economic' test to a 'commercial' test that would more adequately capture the wider benefits resulting from alleviating inter-regional constraints, particularly in terms of improving inter-regional trade and strengthening competition throughout the NEM." (p. 144)

The Ministerial Council on Energy - established by the June 2001 CoAG meeting to oversee the review process – considered the Parer Report and other submissions, and reported on 11 December 2003. On transmission, its principles included that

- "There is a central and ongoing role for the regulated provision of transmission, with some scope for competitive (market) provision. …
- The regulated framework should maximise the economic value of transmission, including through the efficient removal of regional price differences in the operation of the NEM."

Its proposed package of reforms included two new statutory commissions: an Australian Energy Market Commission (AEMC) with responsibility for rule-making and market

[115] "The Council of Australian Governments (CoAG) at its 8 June 2001 meeting endorsed a national energy policy framework that acknowledged the strategic importance to the economy and national prosperity of reliable, competitively priced energy. At this same meeting, CoAG agreed to commission an independent review of the strategic directions for energy market reform in Australia – the Energy Market Review." *Towards a truly national and efficient energy market*, Council of Australian Governments' Independent Review of Energy Market Directions (Hon Warwick Parer, Chair), Canberra, 20 December 2002, p. 59.

[116] Parer Report p. 23. The other four problems were: fragmented planning, lack of firm financial transmission rights, a lack of market incentives for regulated interconnectors, and state-based regions that do not reflect the needs of the market.

development, accountable to and subject to the power of direction of the MCE, and an Australian Energy Regulator (AER) with responsibility for market regulation, and to be a constituent part of the ACCC. The MCE also proposed:

- "A last resort planning power, to be exercised by the AEMC (a new Australian Energy Market Commission, to direct that inter-connection projects be subjected to the regulatory test. …
- A new regulatory test will be implemented to recognise the full economic benefits of transmission, including where transmission is the most efficient means of mitigating market power. The new test will remove impediments to regulated transmission in dispute resolution, and information requirements. The MCE will develop Code changes for implementation in July 2004. These changes will take account of the ACCC's current review of the regulatory test. ……
- The MCE believes that the current arrangements for the coexistence of regulated and market provision of transmission have not resulted in optimal outcomes, and supports removal of biases towards unregulated investment. The MCE will develop Code changes that establish a level playing field between regulated and market transmission for implementation in July 2004."

Three points might be noted here. First, the Parer Report, and presumably the MCE too, see the cost of the inadequate interconnection as the cost to customers rather than to market participants generally.[117]The removal of price differences between regions and the achievement of more competitive markets are seen as desirable in their own right. Second, the Parer Report saw the solution to the interconnection problem in terms of more accurate price signals including via financial transmission rights. The MCE seems less sympathetic to market approaches. Financial transmission rights, whatever their merits in other respects, do not feature in the proposed solution.[118] Third, however, the solution is still to be found in redefining the nature of the regulatory test to include "the full economic benefits of increased competition".

What will this mean? A key issue is whether "competition benefits" will be limited to increased productive and allocative efficiency, or will include benefits transferred from generators to consumers, in the form of lower or less volatile prices. The latter is what the proponents want, and arguably it would formalise what has been happening in practice, via the measurement of benefits deemed to relate to the market as a whole. But it is not what the regulatory test has hitherto allowed.[119] Which outcome is desirable is beyond the scope of this paper. The point here is that economists can no longer assume that regulated investment is chosen to seek the same ends as unregulated investment.[120]

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[117] As an instance of the inadequate interconnection between regions, the Parer Report (p. 129) reported calculations that there were 88 'price separation events' in the NEM during 2001-2, costing a total of $651.5m. A price separation event is where the price in any region is more than $300/MWh higher than the minimum price in the NEM. The cost of this event is calculated as the amount of the excess over $300/MWh multiplied by the total load in that region (rather than the marginal load that might have been met by more imports).

[118] "The MCE considers that the primary role of financial transmission rights (an inter-regional trading instrument) is to provide a risk management tool for energy trading, and that further development of such arrangement may be desirable." MCE 2003, p. 11

[119] See for example Discussion Paper Review of the Regulatory Test, ACCC, 5 February 2003.

[120] In the simple terms of Figure 1, if merchant investment is assumed yield a welfare loss by restricting capacity and output to less than OY, then regulated investment has to be assumed to yield a welfare loss by

PART FIVE ANALYSING ALTERNATIVE APPROACHES

Alternative models of transmission investment

I have suggested previously (Littlechild 2003) that the debate about merchant versus regulated transmission has hitherto largely been couched in terms of the "market failure" paradigm. This paradigm takes as given the demand curves for electricity, the state of technology, and the cost curves for generation and transmission. Proponents of merchant transmission suggest that, with locational prices reflecting marginal costs, transmission investment could be a competitive and efficient activity. Sceptics suggest various market failures: merchant investment in transmission is likely to restrict output and investment in order to maximise profit in a situation of market power; it may ignore certain externalities (e.g. loop flow); and the transactions cost of accommodating it in the operation and maintenance of an existing network could be significant.

The implication of this paradigm is that the alternative of regulated transmission would avoid these market failures and achieve the social optimum without all the problems of merchant investment. In the absence of any countervailing argument in favour of merchant investment, other than a philosophical preference for markets over regulation or a vague feeling that the prospect of losses would sharpen decision-making, why bother with it? Experience with merchant interconnectors in Australia is perceived to have confirmed this negative view – to have shown that involvement of merchant investment is indeed problematic, and in particular has prevented or delayed efficient regulated investment.

The problems and costs of integrating merchant transmission into an existing regulated network should not be underestimated, but neither should they be overestimated.[121] However, this paper is not a plea for any particular mix of merchant and regulated transmission. My concern here is with the representation in economic analysis of the natures of merchant and regulated investment. Focusing on interconnectors - a subset of transmission investments where the problems of externalities and transactions costs are minimal (though not non-existent) - enables a clearer perception of the nature of merchant and regulated investment per se.

My argument is that the implicit characterisation of merchant and regulated investment in some of the economic literature is at variance with reality. This was certainly the case with the two Australian interconnectors studied, and there is no reason to doubt that it is the case more generally.

Take first the characterisation and reality of merchant investment. Far from costs and technology being given, the merchant interconnector chose a technology that was not

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extending capacity and output to greater than OY, possibly to OY*. The proper comparison is between two non-optimal points.

[121] For what it is worth, my impression (e.g. from policy and experience in Argentina and elsewhere) is that a greater role for market decision-making in the transmission sector (not necessarily limited to merchant transmission per se) could be achieved at reasonable cost if the will to do so is there. But this lies beyond the scope of this paper.

even considered by the incumbent proponent of the regulated interconnector. Far from the merchant interconnector being constructed at lower cost, it deliberately chose a technology that was more costly, in part to facilitate control and charging. Far from ignoring externalities, another part of the reason for adopting the more costly technology was to facilitate undergrounding in order to avoid imposing the environmental externalities that the conventional overground regulated interconnector would undoubtedly have done – which in turn would have precluded or delayed the project. Far from restricting output and investment below the efficient level, and exploiting market power to make excessive profits, the evidence at present is that the merchant interconnector was unprofitable and that output and investment was greater than the efficient level (in the sense of maximising the benefits to market participants as a whole).

Now take the characterisation and reality of regulated investment as applied to SANI/SNI. Far from the regulatory process operating in an independent, efficient and dispassionate way, it has been characterised at various stages by political involvement and inadequate economic analysis, and the Victoria Supreme Court identified a fundamental legal error. Far from the proposed regulated interconnector SNI constituting an efficient solution after the construction of the merchant interconnector, it was an uneconomic duplication by that stage, despite having passed the regulatory test and been confirmed by the appeals Tribunal. Far from the actions of the merchant interconnector delaying an efficient regulated investment, they delayed an inefficient and duplicative regulated investment. Far from the proposed regulated interconnector SANI constituting an efficient solution before the construction of the merchant interconnector, NEMMCO found that it did not pass the consumer benefits test, the main assumptions underlying the economic case for it later proved to be invalid, and the ACCC effectively found that it would not have passed the regulatory test because the ACCC identified a more economic project, compared to which the proposed regulated interconnector represented an excessive investment.

A retrospective analysis of alternatives to the merchant interconnector did identify a hypothetical regulated interconnector potentially capable of passing the regulatory test. However, the regulatory process did not find this alternative at the time, and the market process rejected it as unlikely to obtain environmental approval because it was not undergrounded. A merchant interconnector may have replaced a regulated interconnector, but there is no reason to think that latter would have been more efficient in the conventional sense.

Even if the hypothetically most economic alternative had received environmental approval and had been built as a merchant interconnector, it would not have been able to cover its costs from trading in the market. Quite apart from the ability of merchant and regulated interconnectors to compete on an even basis, there remains a question mark over the nature of the benefits that a regulated interconnector is deemed to bring, that can justify incurring a cost several times higher than the market value of transmitting electricity from low price to high price markets.

But if regulation has not unambiguously promoted efficient investment in interconnectors as economists conventionally define it, regulation has not been arbitrary. In various ways it has responded to pressure to build interconnectors in order to protect or advance the

interests of customers in relatively high-priced regions of Australia. And price differentials have indeed reduced. How far this is due to the interconnectors, and how far to new generation in those regions, is outside the scope of this paper. It is plausible that regulated interconnectors did make, or would have made, a contribution. For present purposes, the main point is that regulation does not seem to have been driven by the aim of maximising aggregate benefits to all market participants, but by the interests of a particular – and important – subset of them.

Merchant and regulated decision-making

It might be argued that Austrlian experience with interconnectors simply represents an unfortunate example of regulation, but that if the regulatory framework were improved then the problem would disappear or at least be much reduced. It is true that the Australian national electricity market is as yet in a transitional stage. Not all the State governments and electorates have yet accepted the case for change, or come to terms with the kind of regulatory framework that a competitive market entails (and the kinds of intervention or influence that it precludes). As and when their stance changes, more independent regulation might be hoped for.

It is also true that potential improvements in the regulatory framework can be identified and are under discussion. Some changes have already been made, though not necessarily all for the better.[122] The ACCC is again reviewing the regulatory test,[123] and energy Ministers have indicated some further reforms. The recent judgement by the Victoria Supreme Court establishes or clarifies an essential obligation on the regulatory body and the incumbent transmission company that was previously missing or not recognised.

Nevertheless, it would be overoptimistic, and missing the point, to expect that regulatory reform would solve the problem or remove the necessity for choice between merchant and regulated investment. Analyses of such investment need to incorporate the fundamental difference between private and public decision-making. This is a difference that is well explicated and empirically validated in the literature on public choice and economic regulation, but that is so far largely absent from the models of transmission investment

To indicate briefly some implications of this difference, the private sector in general, and merchant investment in particular, can be expected to seek out and seize new ways of meeting the demands of users and customers, wherever these promise to repay the costs of doing so. Investors will of course hope to recover more than their costs if the opportunity presents itself, but this opportunity is limited by the actions of competitors and the threat of further technical change – and, significantly, by the willingness to pay of their potential customers. At the time of decision-making, all these things are unknown. Merchant investments may turn out to be unprofitable because they misjudge what the market will bear. To the extent that investments are not profitable, the shareholders rather than customers suffer the consequences – indeed, customers typically benefit from the additional investment. For that reason merchant investors can be expected to take steps to

[122] C.f. Mountain and Swier 2003
[123] E.g. Discussion paper Review of the regulatory test, ACCC, 5 February 2003.

limit the drain on resources as soon as it becomes apparent, and to try to avoid such mistakes in future.

The public sector in general, and regulated investment in particular, are characterised by different goals and constraints. Public sector proponents of regulated investment can be expected to seek out and adopt new ways of meeting the demands of those to whom they feel answerable. These may include governments, politicians, regulators, the management of the incumbent transmission company, potential entrants into transmission, generators in different regions, customer groups, employees, suppliers, investment analysts, the media, and so on. The precise weighting of these influences is difficult to specify, and varies over time. However, the views of government are surely influential, and the better organised and better-financed interest groups tend to have more influence than the less organised and less-financed ones. Of course, private sector proponents may be expected to use regulated investment to further their own ends of greater profitability.

The need to cover the cost of a regulated investment from the potential beneficiaries is not a constraint, since the cost is to be spread over users generally, at a level that is unlikely to excite adverse comment. Consequently the need to assess in advance what the market will bear is much reduced. So, too, is the need to monitor subsequent costs, revenues and benefits associated with this investment. Customers or the taxpayer bear the consequences of any decision. For this reason, at least, there is a regulatory process for examining and approving the project in the first place, which in principle involves all the potentially interested parties. By its nature this process is liable to be prolonged and costly, because this is where and how the interest groups compete.

With regulated investment there is less if any pressure to take remedial action in the event of misjudging costs and demands, and less if any pressure to avoid repeating mistakes in future. Indeed, what might be perceived as a mistake from a market or economic standpoint is not necessarily a mistake from the perspective of the interest groups that seek to advance a regulated investment. Consequently, there may be no pressure to avoid it and every pressure to continue.

Conclusions

The first part of this paper has reviewed the decision of the Victoria Supreme Court. That decision effectively established that the regulatory authorities in Australia (NEMMCO and the Electricity Tribunal) erred in finding that SNI as a duplicate interconnector would pass the regulatory test. Duplicate SNI can no longer be argued to be an economic proposition. The decision has also clarified and strengthened the obligations on an incumbent transmission company in a competitive electricity market.

Second, this paper has examined the history of the previous interconnectors between South Australia and Victoria/NSW. Neither SANI that was proposed as a regulated interconnector before SNI, nor the merchant interconnector Murraylink, would have passed the regulatory test as subsequently carried out by the ACCC. And neither of these two interconnectors, nor the most economic interconnector project (Alternative 3) identified by the ACCC, would have been financially viable based on trading in the market.

Third, the merchant and regulated interconnectors into Queensland have not covered their costs based on trading.[124] Indeed, some commentators have supported regulated interconnectors precisely because they do not require the price differentials that merchant interconnectors need. Building regulated interconnectors to the capacity necessary to remove or substantially to reduce price differentials is not economically efficient in the sense of maximising the sum of consumer and producer benefits. However, under plausible circumstances, the resulting narrowing of price differentials is likely to reduce many electricity prices (prices said to be unreasonably high), and thereby redistribute income in favour of electricity consumers and away from producers, even though the revised regulatory test requires regulated interconnectors to maximise total market benefits. Application of the regulatory test has not looked at price differentials obtaining in the forward markets, hence has not questioned why (for example) the energy and capacity benefits attributed to an interconnector are apparently above those prospectively obtaining in the markets.

The economic literature and some of the practical debate has focused on the question whether merchant or regulated interconnectors are more likely to maximise the aggregate net benefits to electricity market participants. Experience with Australian interconnectors – the way the regulatory framework is set up and the way the process actually operates – raises a more fundamental question. Is a regulatory framework really intended, or ever likely, to identify and build those interconnectors most likely to maximise the net benefits to all market participants? Or is it geared to achieving other ends, however laudable they may or may not be?

The ultimate conclusion of this paper is that regulating transmission investment is not simply a way of achieving the same ends as merchant investment without some of the biases and costs and market failures that merchant investment is alleged to involve. Rather, it is a way of substituting a quite different set of objectives and constraints for those determined by the market. It is a way of ensuring that other objectives are pursued *instead* of market objectives (or instead of perceived monopoly market objectives). Indeed, as the regulated framework with respect to interconnectors in Australia has developed over time, and as some would like to see it develop in future, it is scarcely an exaggeration to say that its purpose is not to ensure that regulated interconnectors are built if and only they are economic in the conventional sense, but precisely to ensure that they *are* built despite *not* being economic. The choice between merchant and regulated investment is thus not a choice between different ways of getting to the same destination. It is a choice between different destinations.

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[124] Whether Directlink could have done so in the absence of QNI is unclear, but doubtful.

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Figure 1 Murraylink Cable Route

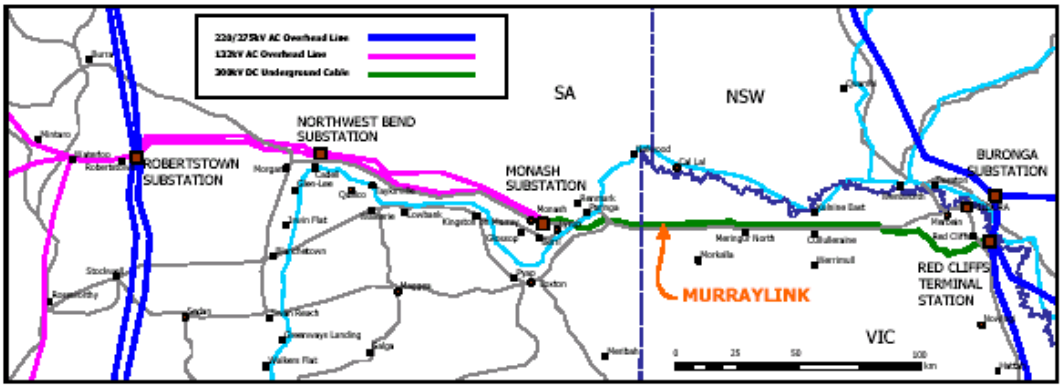

Figure 2 SNI and Murraylink showing Unbundled SNI