MURRAYLINK Transmission Company Pty Ltd

On behalf of

Application for Conversion to a Prescribed Service and a Maximum Allowable Revenue for 2003-12

18 October 2002

Murraylink Transmission Company Pty Ltd
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on behalf of
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Executive Summary

Nature of this Application

By this application Murraylink Transmission Company ("**MTC**"), on behalf of the Murraylink Transmission Partnership ("**MTP**") seeks from the Commission a determination that:

1. the network service provided by Murraylink be classified as a prescribed service for the purposes of the National Electricity Code ("Code"); and

2. for the provision of this prescribed service, MTP be eligible (subject to the service standards proposed in section 6.4 of this Application) to receive the maximum allowable revenue from transmission customers (through a Coordinating NSP) for a regulatory control period from the date of effect of the Commission's final decision on this Application to 31 December 2012, as proposed in this Application.

This application has been prepared on the basis of the principles outlined in the Commission's *Draft Statement of Principles for the Regulation of Transmission Revenues*[1] ("**Draft Regulatory Principles**") and the Commission's *Regulatory Test for New Interconnectors and Network Augmentations*[2] ("**Regulatory Test**").

The Significance of the Murraylink Project

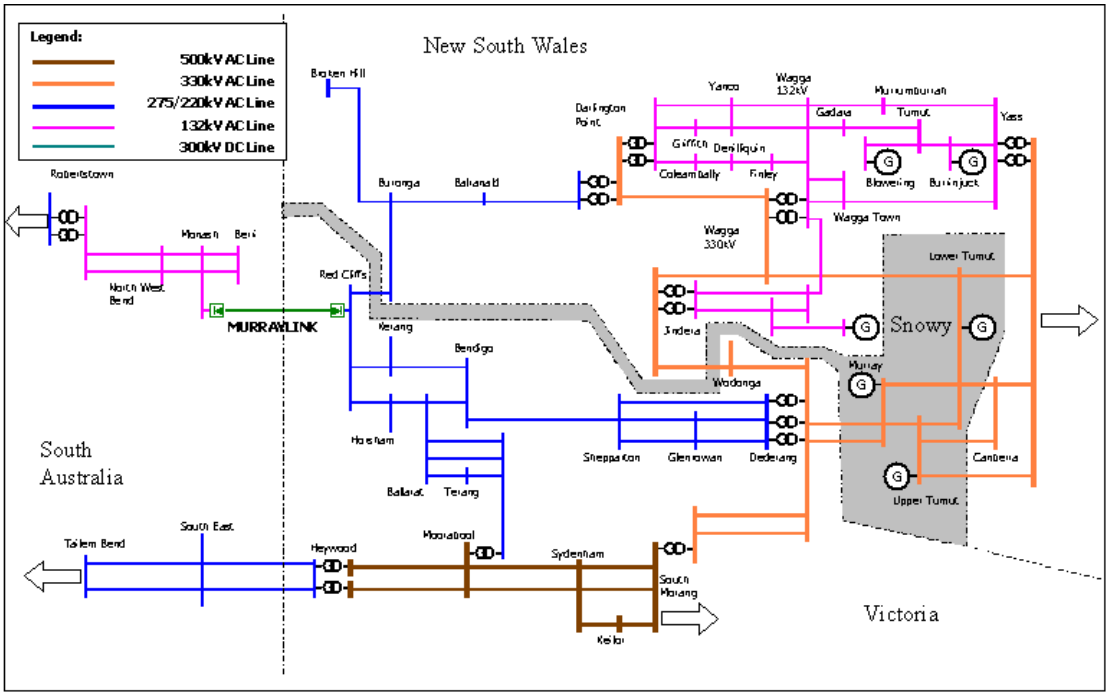
Murraylink is a privately funded electricity transmission asset owned by MTP and operated by MTC on behalf of MTP. It includes the world's longest underground power cable (180 kilometres) and connects the Victorian and South Australian regions of the National Electricity Market ("**NEM**") as an efficient, innovative and environmentally sensitive solution to the electricity supply and market requirements of these two regions.

Physically, Murraylink transfers power between:

- Red Cliffs substation in the Victorian region, and
- Monash substation in the South Australian region.

[1] ACCC 1999a.
[2] ACCC 1999b.

Figure E.1 Murraylink's Connection within the NEM



Murraylink has the capacity to deliver 220 MW into either of the Victorian or South Australian market regions. It came into operation in early October 2002.

MTC has introduced new transmission technology that will provide major benefits to market participants, and to customers, mostly in South Australia and Victoria. Because of the technology chosen, MTC was able to bring this new asset to market in record time, while gaining community acceptance and environmental awards.

Clause 2.5.2(a) of the Code allows a network service provider to voluntarily classify its network services as market network services, provided certain conditions are satisfied. MTC has registered as a network service provider in the NEM and the network service provided by Murraylink is currently classified as a market network service.

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 more appropriately operated to provide a prescribed service in the same manner as most other transmission assets in Australia.

MTP has been established for the sole purpose of owning the Murraylink transmission project. MTP is a partnership established in the State of Victoria

between **Murraylink HQI Australia Pty Ltd** (49.5%), **SNC-Lavalin Investment Australia Pty Ltd** (49.5%), and **Murraylink Transmission Company Pty Ltd** (1%). MTC will be primarily responsible for the implementation of ongoing operation and maintenance of Murraylink on behalf of MTP.

Connection and Operation

On behalf of the Inter-regional Planning Committee, the Interconnection Options Working Group performed a detailed technical assessment of Murraylink, and, in August 2001, its *5.6.6(b) Assessment of Murraylink*[3] was published. The assessment provided information to facilitate the negotiation of connection agreements with relevant network service providers.

While many of the Interconnection Options Working Group's findings remain current, some have been superseded by subsequent studies conducted by TransÉnergie Australia and independently verified by Power Technologies. The relevant reports are contained in Appendices A and B of this Application. Murraylink was designed and built as a highly efficient asset requiring minimal operating and maintenance activities. This efficiency is reflected in Murraylink's low operation and maintenance costs.

MTC will bear the cost of a range of uninsured risks given that effective risk management, such as insurance, is either unavailable or uneconomic. In the near future, MTC will lodge an application supplementary to this Application for the recovery of the efficient costs of self-insurance according to the guidelines set down by the Commission.

Circuit availability is a standard measure of performance that is widely used for HVDC facilities such as Murraylink. It is the most relevant performance measure for Murraylink as it fully accounts for outage duration and reduced capacity over the interconnector due to factors within the control of MTP. An international CIGRÉ Working Group has established a protocol for calculating and reporting the availability of HVDC transmission systems: *Protocol for reporting the Operational Performance of HVDC Transmission Systems*[4]. MTC recommends that the methodology presented in this document be used for the calculation of availability for the Murraylink asset.

Murraylink's Prescribed Service

All Murraylink technical capability will be available to the NEM in exchange for its regulated revenue. Murraylink will provide a prescribed service that includes a number of valuable features, unique in the NEM, including but not limited to:

[3] Interconnection Options Working Group 2001.
[4] CIGRÉ Working Group 14-04 1997.

- A continuous power transfer capability of 220 MW available to the NEM that can be used to transfer power between the Victorian and South Australian regions in accordance with NEMMCO's merit-order dispatch instructions, subject to power transfer limits imposed by constraints in other parts of the NEM as described in sections 3.3 and Appendix A of this Application.

- A power transfer capability that is controllable to a high degree of accuracy, and independent of other power flows, impedances, loads and generation in the NEM, including any derating of the Heywood interconnector due to lightning activity.

- Reactive support and assistance with the regulation of the voltage profile of the AC networks at both the sending and receiving ends of Murraylink.

- A runback scheme that provides an intelligent alternative to contingency tripping of Murraylink. If a contingency occurs in the NEM that would otherwise result in an unacceptable overload or under-voltage condition somewhere in the network, Murraylink can, if appropriate, be "run back" (that is, its power flow rapidly reduced) to alleviate the condition, rather than completely switched off as would be the case for a normal AC transmission line.

MTP has already funded a number of augmentations to the AC networks in South Australia and Victoria. Those augmentations are described in section 2.5 of the Application. Additionally and as part of the transfer capability analyses conducted by TEA and verified by PTI, MTC has identified a number of additional network augmentations that will further enhance Murraylink's transfer capability. Those additional augmentations, and their costs, are listed in the TEA Report.

As part of this Application, MTP undertakes to fund the appropriate portion of the cost of these additional network augmentations (or otherwise cause them to be developed), up to a maximum amount of $8.97 million as part of Murraylink's initial development budget. These additional augmentations will be optimised in coordination with other TNSPs.

Regulatory Asset Valuation of Murraylink

A methodology has been developed to confirm a regulatory asset value for an existing interconnector at which the interconnector satisfies the Regulatory Test.

- Define the Prescribed Service

  While an interconnector might assist TNSPs to meet the technical requirements of Schedule 5.1 of the Code, an interconnector can also deliver more sophisticated technical services, such as inter-regional transfer capacity.

- Calculate the Gross Market Benefits

  Using appropriate modelling tools, the gross market benefits of the existing interconnector can be determined.

- Select the Alternative Projects

  An independent assessment needs to be made of the several ways in which the electricity system could be notionally reconfigured to provide the same prescribed service as the existing interconnector. Notional reconfigurations take the form of alternative projects.

- Estimate the Cost of the Alternative Projects

  The full life-cycle cost of each alternative project needs to be determined as the present value of its capital, operating and maintenance costs. There is a range of uncertainties associated with the costs and timing of each of the alternative projects. For example, there is considerable uncertainty associated with the environmental and easement costs and constraints of constructing overhead transmission lines. As the regulatory valuation approach is designed to assess the actual costs that a potential new entrant would experience, an analytical framework needs to be applied that enables the relative risks associated with alternative projects to be taken properly into account.

- Determine the Regulatory Cost for Interconnector

  The regulatory cost for an interconnector is the sum of its regulatory asset value and the net present value of its future operating and maintenance costs.

  For an interconnector to satisfy the Regulatory Test, its regulatory cost must be less than or equal to, the lesser of:

  - the value of the gross market benefits the interconnector provides,
  - the full life-cycle cost of the lowest cost alternative project, and
  - the estimated life-cycle cost of the existing interconnector itself.

  In this way, the regulatory cost of the interconnector is set such that the interconnector would provide a positive net market benefit that is greater than or equal to any of the net market benefits provided by any of the alternative projects selected, and no greater than the actual cost of the interconnector. Thus the interconnector would pass the Regulatory Test.

- Determine the initial regulatory asset value

  The regulatory asset value of the interconnector is equal to its regulatory cost minus the net present value of its future on-going operating and maintenance costs.

Deloitte Touche Tohmatsu provided advice in relation to the appropriate commercial discount rate that should be used for the calculation of net present values in the regulatory asset valuation process, and a value of 9.25% per year, real pre-tax, was recommended.

TEUS conducted a detailed study to determine Murraylink's gross market benefits. The study has been independently verified by Charles River Associates and both reports are contained in Appendices D and E, respectively. The gross market benefits provided by Murraylink are due to its ability to reduce overall energy costs, improve system reliability and defer capital expenditure within the NEM. According to TEUS's studies, Murraylink will provide to all those who produce, consume and distribute electricity $214.240 million in gross market benefits.

BRW identified and assessed six possible alternatives to Murraylink. They were:

1. Buronga to Monash 275 kV AC mostly overhead transmission line, initially operating at 220 kV, with substation augmentations at Buronga and Monash;

2. Red Cliffs to Monash 140 kV DC mostly overhead transmission line, with substation augmentations at Red Cliffs and Monash;

3. Red Cliffs to Monash 220 kV AC mostly overhead transmission line, with substation augmentations at Red Cliffs and Monash;

4. Robertstown to Monash 275 kV AC overhead transmission line, Heywood to South East substation 275 kV AC overhead transmission line, with substation augmentations at Robertstown, Monash, Heywood and South East substation, and series capacitors at Tailem Bend;

5. Generation in South Australia and the Riverland; and

6. Demand side management.

Of this selection, BRW estimated that Alternative 3 was the lowest cost alternative with a total cost of $240.4 million, inclusive of lifecycle O&M costs.

Given that the net present value of Murraylink's life-cycle operating and maintenance costs is $37.334 million, Murraylink's regulatory asset value is $176.906 million (equal to $212.24 million minus $37.334 million). This initial regulatory asset value is lower than the actual capital cost of Murraylink.

Capital Financing & Taxation

Professor Robert Officer was engaged to assist MTP to determine its cost of capital and the value of its tax imputation credits. Professor Officer's report is contained in Appendix G. Based on this report and current market variables, MTP proposes a vanilla WACC (post-tax nominal WACC) of 9.00%.

Total Revenue Path

MTP proposes that the regulatory control period, during which the revenue cap determined by the Commission in accordance with this Application is to apply to MTP, commences from the date of effect of the Commission's final decision on this Application and expires on 31 December 2012.

This regulatory control period is justified given the high on-going efficiency of MTP's operation and maintenance practices, the absence of forecasted capital expenditure, and the savings to the Commission, the NEM participants and MTP associated with deferring the next regulatory review process until 2012. In addition, a regulatory period of 10 years provides certainty that encourages private sector investment and attracts new entrants to the NEM and enables more effective smoothing of MTP's revenue.

MTC has determined the revenue requirement that is required for it to operate Murraylink and provide its prescribed services, using the building block approach.

Table E.1 Revenue Requirement, 2003 to 2012 (nominal $m)[5]

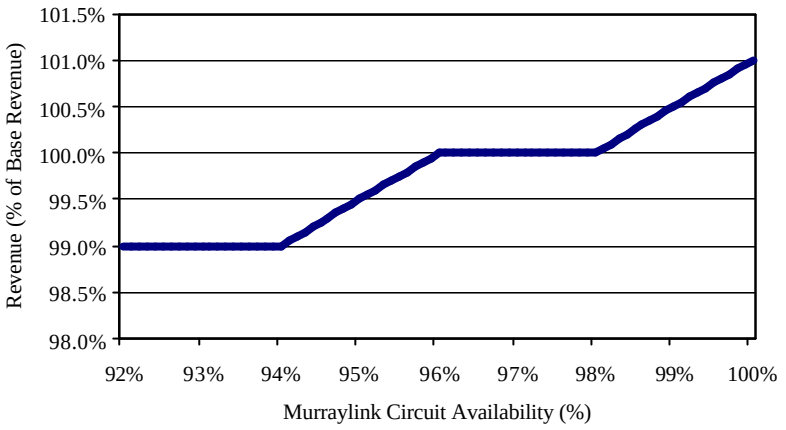
	Financial years ending 31 December									
	2003[6]	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Operating & maintenance	2.5	3.7	3.8	3.8	3.9	4.0	4.1	4.1	4.2	4.3
Depreciation	6.1	9.2	9.2	9.2	9.2	7.6	6.8	6.8	6.8	6.8
Nominal return on capital	10.5	15.6	15.1	14.5	14.0	13.4	12.9	12.4	12.0	11.5
Less RAB indexation for inflation	(2.5)	(3.5)	(3.1)	(2.8)	(2.4)	(2.3)	(2.1)	(1.8)	(1.5)	(1.2)
Net tax allowance	0.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Raw revenue requirement	**17.2**	**26.0**	**25.9**	**25.8**	**25.7**	**23.7**	**22.6**	**22.6**	**22.5**	**22.4**
Smooth revenue requirement	**17.2**	**25.5**	**25.2**	**24.9**	**24.6**	**24.3**	**24.0**	**23.7**	**23.4**	**23.2**

Consistent with the recent Commission's draft decision on the South Australian Transmission Network Revenue Cap[7], MTP is proposing that part of MTP's allowed revenues be placed "at risk" as an incentive to meet the benchmark

[5] Source: MTP forecasts.
[6] This is data for an eight month period, 1 May 2003 to 31 December 2003.
[7] ACCC 2002b, p 124-6.

service standard. In the case of Murraylink, circuit availability captures all of the appropriate service standards, as described in section 3.5. The appropriate benchmark for this service standard is 97%. Hence, MTP has chosen 97% as the mid-point of the "dead-band" zone for circuit availability. MTC's proposed performance incentive scheme is shown in figure E.1.

Figure E.2 Proposed Performance Incentive Scheme



On-going Issues for MTP's Regulated Revenue

MTP proposes to remain consistent with the revenue allocation approach currently being applied to other interconnectors. Hence, it will allocate its regulated revenues between the Victorian and South Australian regions on the basis of the geographic split of the Murraylink investment in those regions.

Regarding the collection of Murraylink allowed regulated revenues, MTP anticipates the need to negotiate with TNSPs in the Victorian and South Australian regions to reach agreement on how the intent of the Code will be carried out in practice such that the interests of the parties are taken into account appropriately. This Application contemplates that MTP would enter into an agreement with a "Coordinating TNSP" in each region, whereby each regional Coordinating TNSP would collect its portion of MTP's regulated revenues, and provide those revenues to MTP.

MTP has endeavoured to identify all the efficient costs associated with the provision of Murraylink's prescribed service, including the procurement of appropriate insurance. However, events could occur that are outside of MTP's control and that could substantially increase MTP's costs and/or decrease the value of its regulatory asset base. In the near future, MTC will lodge an application supplementary to this Application setting out the pass-through rules that may be appropriate for Murraylink.

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Glossary, Abbreviations, Terms and Acronyms

This glossary supplements, and in some case duplicates, definitions contained in Chapter 10 of the National Electricity Code.

ABB	ABB Power Systems AB of Sweden
AC	alternating current electrical energy
ACCC	Australian Competition and Consumer Commission
Application	this application and all appendices to this application
BRW	Burns and Roe Worley Pty Ltd (ABN 98 000 886 313)
CAPM	capital asset pricing model
CIGRÉ	International Council on Large Electric Systems
Code	National Electricity Code
Commission	Australian Competition and Consumer Commission
CPI	consumer price index
Coordinating NSP	[a] Coordinating network service provider who is responsible for the allocation of all relevant aggregate annual revenue requirements within a region with multiple transmission network owners, and appointed under clause 6.3.2(b) of the Code
CRA	Charles River Associates (Asia Pacific) Ltd of Wellington, New Zealand
DC	direct current electrical energy
DORC	depreciated optimised replacement cost
Draft Regulatory Principles	*Draft Statement of Principles for the Regulation of Transmission Revenues* (ACCC 1999a)
ElectraNet SA	ElectraNet Pty Limited (ACN 094 482 416), trading as ElectraNet SA, a transmission network owner and transmission network service provider whose network assets are located in the South Australian market region
energy benefits	the economic benefits to the NEM that Murraylink creates by reducing fuel and operating and maintenance costs, deferring new merchant entry generation, and avoiding voluntary load shedding.
ESIPC	[the South Australian] Electricity Supply Industry Planning Council
HQI	Hydro Québec International Inc.
HVAC	high voltage alternating current
HVDC	high voltage direct current
HVDC Light	the latest ABB Power Systems HVDC transmission technology

Information Guidelines	*Decision: Statement of Principles for the Regulation of Transmission Revenues: Information requirements guidelines* (ACCC 2002a)
IOWG	Interconnection Options Working Group
IRPC	Inter-regional Planning Committee
KBR	Kellog Brown & Root Pty Ltd (ABN 91 007 660 317)
kV	kilovolt, a unit of electrical voltage equivalent to 1,000 volts
MAR	maximum allowable revenue
net market benefit	the net present value of the gross market benefits that an augmentation provides to all those who produce, distribute and consume electricity in the NEM, less the full life-cycle cost of the augmentation
MTC	Murraylink Transmission Company (ACN 089 875 080)
MTP	[the] Murraylink Transmission Partnership (ABN 79 181 207 909) formed to own and operate Murraylink
Murraylink	the underground HVDC transmission system between Red Cliffs, Victoria and Monash, South Australia and all associated equipment and facilities in relation to that transmission system, including the associated augmentations to the AC networks in the Victorian and South Australian regions
MVAr	megavolt-amperes reactive, a unit of reactive power equivalent to 1,000,000 volt-amperes reactive
MW	megawatts, a unit of real power equivalent to 1,000,000 watts
NECA	National Electricity Code Administrator Limited (ACN 073 942 775)
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company Limited (ACN 071 010 327)
net present value	the value of a past or projected income and expenditure cash flow, at a particular point in time, given the time value of money, which is expressed as a discount rate.
NSP	network service provider
PI	performance incentive
Powercor Australia	Powercor Australia Ltd (ACN 064 651 109)
prescribed services	transmission services provided by transmission network assets or associated connection assets to which the revenue cap applies
PTI	Power Technologies (formerly Power Technologies Inc.), a division of Stone Webber Consultants, Inc., of Schenectady, New York, United States of America.
RAB	regulatory asset base

Regulator	unless otherwise stated in this application, the Australian Competition and Consumer Commission
regulatory control period	a period in which a revenue cap is imposed on a transmission network owner by ACCC
Regulatory Test	*Regulatory Test for New Interconnectors and Network Augmentations* (ACCC 1999b)
reliability benefits	the economic benefits to the NEM that Murraylink creates by reducing expected unserved energy
revenue cap	the maximum allowed revenue for each year of a regulatory control period determined by the Regulator for prescribed services applicable to a transmission network owner
Riverland deferral benefits	the economic benefits to the NEM that Murraylink creates by deferring major transmission augmentations for the Riverland region.
SPI PowerNet	SPI PowerNet Pty Limited (ABN 780 079 798 173), a subsidiary of Singapore Power International, a transmission network owner and transmission network service provider whose network assets are located in the Victorian market region
SNI	an interconnector project to connect the New South Wales and the combined South Australian and Victorian regions
TEA	TransÉnergie Australia Pty Ltd (ACN 084 240 602)
TEUS	TransÉnergie US Ltd
TNSP	transmission network service provider
unserved energy	the amount of energy, measured in megawatt-hours, that can not be supplied because of either (i) a NEM-wide shortage of operating generating capacity, or (ii) a lack of transmission capacity to transfer energy from generators with spare generating capacity to locations at which that energy is demanded
VENCorp	The Victorian Energy Networks Corporation, a transmission network service provider in the Victorian market region
WACC	weighted average cost of capital
X factor	the extent by which a TNSP's smoothed revenue requirement decreases each year in real terms, expressed as a percentage
$	the dollar sign represents Australian dollars

References

Australian Competition and Consumer Commission 1999a, *Draft Statement of Principles for the Regulation of Transmission Revenues*, Canberra

Australian Competition and Consumer Commission 1999b, *Regulatory Test for New Interconnectors and Network Augmentations*, Canberra

Australian Competition and Consumer Commission 2001, *Applications for Authorisation: Amendments to the National Electricity Code: Network pricing and market network service providers – Determination*, Canberra

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Electricity Supply Industry Planning Council 2001b, *Riverland Augmentation Final; Technical Report*, Adelaide

Electricity Supply Industry Planning Council 2002, *Annual Planning Review*, Adelaide

Interconnection Options Working Group 2001, *5.6.6(b) Assessment of Murraylink*, National Electricity Market Management Company, Melbourne

National Electricity Code Administrator 2002, National Electricity Code, Adelaide

National Electricity Code Administrator Working Group on Inter-regional Hedges and Entrepreneurial Interconnectors 1998, *Entrepreneurial Interconnectors: Safe Harbour Provisions*, Adelaide

1 Introduction

1.1 Purpose of this Application

By this Application, Murraylink Transmission Company ("**MTC**"), on behalf of the Murraylink Transmission Partnership ("**MTP**") requests that the Australian Competition and Consumer Commission ("**Commission**") determine that:

1. the network service provided by Murraylink be classified as a prescribed service for the purposes of the National Electricity Code ("Code"); and

2. for the provision of this prescribed service, MTP be eligible (subject to the service standards proposed in section 6.4 of this Application) to receive the maximum allowable revenue from transmission customers (through a Coordinating NSP) for a regulatory control period from the date of effect of the Commission's final decision on this Application to 31 December 2012, as proposed in this Application.

This Application sets out a description of Murraylink and its network service, and the relevant information necessary for the Commission to make its determination.

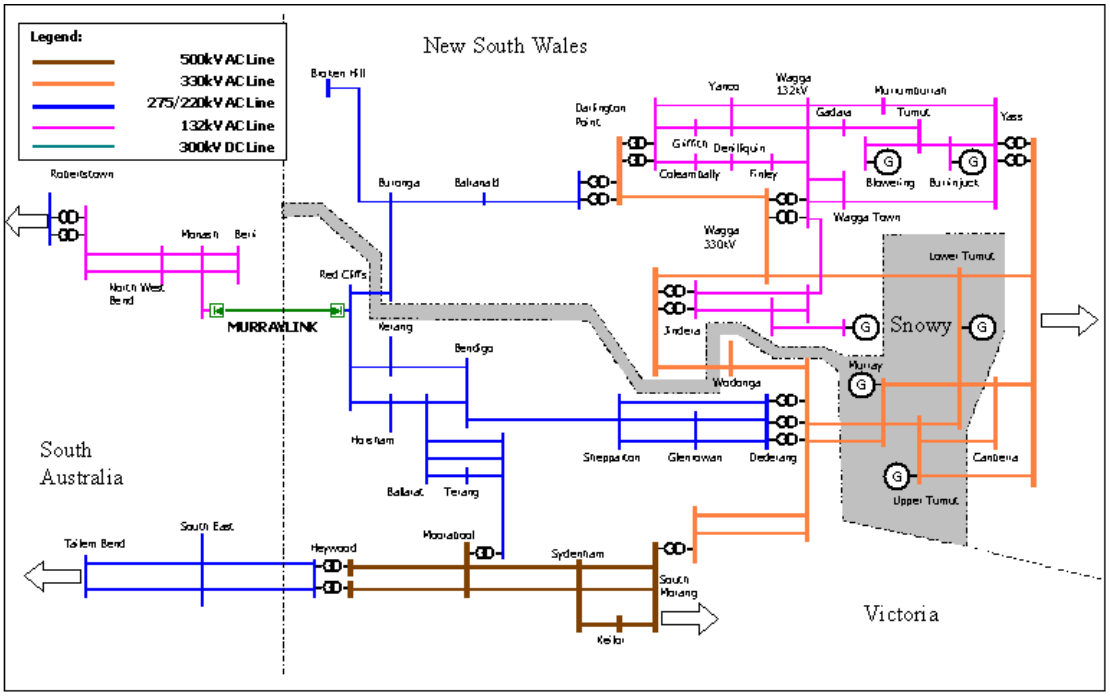
1.2 Background

Murraylink is a privately funded electricity transmission asset owned by MTP and operated by MTC on behalf of MTP. It includes the world's longest underground power cable (180 kilometres) and connects the Victorian and South Australian regions of the National Electricity Market ("**NEM**") as an efficient, innovative and environmentally sensitive solution to the electricity supply and market requirements of these two regions.

Physically, Murraylink transfers power between:

- the Red Cliffs substation in the Victorian region, and
- the Monash substation in the South Australian region.

Figure 1.1 Murraylink's Connection within the NEM



Murraylink has the capacity to deliver 220 MW into either of the Victorian or South Australian market regions. It came into operation in early October 2002.

MTC has introduced new transmission technology that will provide major benefits to market participants, and to customers, mostly in South Australia and Victoria. Because of the technology chosen, and the consultative manner in which MTC operates with the community, MTC was able to bring this new asset to market in record time, while gaining community acceptance and environmental awards.

Clause 2.5.2(a) of the Code allows a network service provider to voluntarily classify its network services as market network services, provided certain conditions are satisfied. MTC has registered as a network service provider in the NEM and the network service provided by Murraylink is currently classified as a market network service.

MTC and its partners have supported the development of the *Entrepreneurial Interconnectors: Safe Harbour Provisions*[8] ("**Safe Harbour Provisions**") and the Code changes[9] implementing these provisions. However, 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

[8] NECA Working Group on Inter-regional Hedges and Entrepreneurial Interconnectors 1998.
[9] ACCC 2001 pp. 126-51.

and the regulated segments. As a consequence of that uncertainty, MTC now believes that Murraylink is more appropriately operated to provide a prescribed service in the same manner as most other transmission assets in Australia.

Murraylink provides a unique and valuable network service that results in substantial economic benefits to all those who produce, consume and transport electricity in the NEM. In fact, this Application demonstrates how Murraylink provides the highest net market benefits to the NEM, in comparison to equivalent alternative projects, according to the Commission's *Regulatory Test for New Interconnectors and Network Augmentations*[10] ("**Regulatory Test**").

1.3 Basis and Process of the Commission's Determinations

1.3.1 Authority Responsible

For the purposes and timing of this Application, the Commission is the authority responsible ("**Regulator**"):

- for determining whether a market network service should become a prescribed service for the purposes of clause 2.5.2(c) of the Code; and
- for transmission network service revenue and pricing in the Victorian and South Australian jurisdictions and market regions in which Murraylink is located for the purpose of clause 6.2.1 of the Code.

1.3.2 The Safe Harbour Provisions

During the development of the Code provisions facilitating the operation of market network services in the NEM, it was contemplated that the owner of a market network service should have the option to convert to a prescribed service at any time.

In particular, the Safe Harbour Provisions developed by the NECA Working Group on Inter-regional Hedges and Entrepreneurial Interconnectors ("**NECA Working Group**") recommended that the rules governing the participation of entrepreneurial interconnectors in the NEM should include the following[11]:

> *Option to convert to regulated status.* The interconnector owner can apply to convert to regulated status at any time. The revenue entitlement will be assessed at that time.

The NECA Working Group considered that this option to convert was necessary to help ensure that investment in non-regulated interconnectors, which it acknowledged to be an experimental concept,

[10] ACCC 1999b.
[11] NECA Working Group on Inter-regional Hedges and Entrepreneurial Interconnectors 1998, p. 9.

would not be "inefficiently inhibited" by the risks proponents of such interconnectors may face, in addition to usual commercial risks. The NECA Working Group particularly referred to potential (unidentified) market design deficiencies that might become apparent once the first interconnectors are operational[12].

1.3.3 Clause 2.5.2(c) of the Code

The Commission authorised changes to the Code to implement the Safe Harbour Provisions. These amendments to the Code came into effect on 21 October 1999[13].

These provisions, authorised by the Commission, include clause 2.5.2(c) of the Code as proposed by NECA[14], to implement the "Option to convert to regulated status" provision described above.

Clause 2.5.2(c) provides as follows:

> 2.5.2(c) If an existing *network service* ceases to be classified as a *market network service* it may at the discretion of the *Regulator* or *Jurisdictional Regulator* (whichever is relevant) be determined to be a *prescribed service* or *prescribed distribution service* in which case the *revenue cap* or *price cap* of the relevant *Network Service Provider* may be adjusted in accordance with chapter 6 to include to an appropriate extent the relevant *network elements* which provided those *network services*.

1.3.4 Determination to be a Prescribed Service

Consistent with the intent to provide an owner of an interconnector with the option to convert, clause 2.5.2(c) does not require an applicant for conversion to provide justification for its desire to convert—a point acknowledged by the Commission in its September 2001 final determination authorising the amendments to the Code[15].

Nevertheless, the Commission is to exercise its discretion when making the determination.

In the exercise of that discretion, MTC submits that the Commission may take into account whether the Regulatory Test[16] is satisfied, being the test that is relevant to applicants seeking prescribed status for new large network assets under clause 5.6.6 of the Code.

MTC has sought guidance from Commission staff on the exercise of this discretion and notes that Commission staff have confirmed that in

[12] NECA Working Group on Inter-regional Hedges and Entrepreneurial Interconnectors 1998, p. 9.
[13] By reason of the interim authorisation granted by the Commission. The Commission's final determination granting authorisation was made on 21 September 2001 (ACCC 2001).
[14] In NECA's letter to the Commission dated 18 August 1999.
[15] ACCC 2001, p. 137.
[16] As prescribed in clause 5.6.5A of the Code.

the exercise of its discretion the Commission will apply the Regulatory Test.

1.3.5 Adjustment to Revenue or Price Cap

Having determined that the network service is to be a prescribed service, the Commission may adjust the revenue cap or price cap in accordance with Chapter 6 of the Code.

Part B of Chapter 6 of the Code, clause 6.2, sets down the principles governing regulation of transmission revenue to be applied by the Commission to transmission network service providers. The Commission has published its Draft Regulatory Principles to describe in more detail the manner in which it will apply the Code's principles.

The Draft Regulatory Principles require that an application submitted by a transmission network service provider in respect of the determination of transmission revenue for each regulatory control period must comply with the Commission's information requirements, currently set out in its *Decision: Statement of Principles for the Regulation of Transmission Revenues: Information requirements guidelines*[17] ("**Information Guidelines**").

MTP acknowledges that the Commission "will consider the prudence of the network service at the time the conversion to a prescribed service occurs, rather than consider any earlier investment decision"[18]. As such MTC would not be shielded from normal commercial risks and would bear the risk of the Commission optimising down the value of the asset.

As part of this process, MTC also understands that a depreciated optimised replacement cost ("**DORC**") valuation will be used to value the asset base of the network service provider. The Commission has stated, "[t]hus the process of changing status of network services requires the network service provider to submit to a valuation process that delivers outcomes consistent with the intent of the regulatory test"[19].

1.3.6 When the Determination may take Effect

MTC understands that the Commission's final determination of this Application may take effect only when MTC ceases to classify Murraylink, an existing network service, as a market network service, which it intends to do.

1.3.7 Process for Determinations

The Code is silent on the detail of the process to be adopted in respect of clause 2.5.2(c). Any process employed must have proper regard to

[17] ACCC 2002a.
[18] ACCC 2001, p. 138.
[19] ACCC 2001, p. 138.

the subject matter of the application and the impact on the rights of the applicant and other affected parties.

Consistent with the above, the Commission's September 2001 authorisation determination[20] indicated that the Commission would adopt the same process set out in the Draft Regulatory Principles. Commission staff have also provided MTC with an indication of the process anticipated for its determination of this Application. This process includes:

- MTP to submit Application;
- the Commission calls for submissions from interested parties;
- the Commission's consultant's reports released for public comment;
- the Commission releases draft decision for comment;
- a public forum is held if required; and
- the Commission releases decision.

This Application has been prepared on the basis of specific guidance received from the Commission and its staff, relevant provisions of the Code, and corresponding Commission guidelines. Overall, MTP understands that the Commission will, and submits that it should, assess this Application in a manner that ensures a process and outcomes consistent with the process required to establish a new prescribed network service.

Given that this process is without direct precedent, MTC requests that the Commission promptly advise MTC if, at any stage during this process, the Commission:

- considers other matters may be taken into account in the exercise of its discretion to determine the application to convert;
- proposes to adopt a process that differs materially from the process outlined above; or
- proposes to adopt an approach to determining a revenue cap that differs from that proposed in the Application.

This will allow MTC to vary or resubmit the Application.

[20] ACCC 2001, p. 138.

1.4 Content and Structure of this Application

This Application contains all the information required by the Commission's Information Guidelines and other information that supports the Application.

Substantial portions of this Application have been prepared on the basis of work done or reviewed by a range of independent and internationally recognised expert consultants, including Power Technologies, Charles River Associates (Asia Pacific), Burns and Rowe Worley, Kellog Brown and Root, and Professor Robert Officer of the Melbourne Business School. Deloitte Touche Tohmatsu provided additional advice on financial matters.

Section 2 describes MTP and the Murraylink asset itself in terms of its technology and its physical layout.

Section 3 describes Murraylink's technical assessment and performance standards.

Section 4 describes the methodology for the regulatory valuation for the Murraylink asset, the application of this methodology and MTP's determination of Murraylink's regulatory asset value.

Section 5 covers capital financing and taxation issues, including the determination of an appropriate cost of capital and a net tax allowance.

Section 6 describes the manner in which MTP's proposed revenue path and incentive payments are calculated.

Section 7 proposes approaches to deal with on-going issues for MTP's regulated revenue such as the allocation of MTP's regulated revenue between regions, and pass-through for identified events.

Consultants' reports and schedules required by the Commission are contained in the appendices of this Application.

Appendix H of this Application contains schedules and information prescribed by the Commission's Information Guidelines and is considered by MTC to be commercially sensitive and, accordingly, has been marked "Sensitive Business Information – Confidential". MTC requests that the Commission keep all of the information in Appendix H confidential.

2 Murraylink Development

MTC developed Murraylink and is now responsible for it ongoing maintenance and operation. MTP owns Murraylink.

Because of the technology chosen, and the consultative manner in which MTC operates with the community, MTC was able to bring this new asset to market in record time, while gaining community acceptance and environmental awards.

2.1 Murraylink Transmission Partnership

MTP has been established for the sole purpose of owning the Murraylink transmission project. MTP is a partnership established in the State of Victoria between **Murraylink HQI Australia Pty Ltd** (49.5%), **SNC-Lavalin Investment Australia Pty Ltd** (49.5%), and **Murraylink Transmission Company Pty Ltd** (1%).

All contract and intellectual property costs incurred for Murraylink have been transferred to, and effectively incurred by, MTP.

2.1.1 SNC-Lavalin Investment Australia Pty Ltd

SNC-Lavalin Investment Australia Pty Ltd is wholly owned by **SNC-Lavalin Inc.**, which is in turn wholly owned by the **SNC-Lavalin Group Inc**.

SNC-Lavalin Group is one of the leading engineering and construction firms in the world, and a key player in the ownership and management of infrastructure. The company provides engineering, procurement, construction, project management and project financing services to a variety of industry sectors, including chemicals and petroleum, mining and metallurgy, pharmaceuticals, agrifood, infrastructure and buildings, power, mass transit, environment, defence and telecommunications.

SNC-Lavalin has been active internationally for nearly 40 years and has built a business network that spans every continent. The company combines first-hand knowledge of diverse geographical regions with respect for the cultures and customs of the countries in which it works. The group and its companies have offices across Canada and in 30 other countries and are currently engaged in projects in approximately 100 countries. SNC-Lavalin Group is listed on the Toronto stock exchange.

SNC-Lavalin Investment Australia Pty Ltd was formed by SNC-Lavalin Group Inc. to manage its investment in Murraylink as well as identify and evaluate other investment opportunities in Australia.

SNC-Lavalin Group's year 2001 revenues were approximately $3.0 billion with total assets as at 31 December 2001 of approximately $3.0 billion.

Further information on SNC-Lavalin Group Inc. is available from the web site: http://www.snc-lavalin.com.

2.1.2 Murraylink HQI Australia Pty Ltd

Murraylink HQI Australia Pty Ltd is a wholly owned subsidiary of **HQI Australia Pty Ltd,** itself a subsidiary of **Hydro-Québec International Inc** ("**HQI**"). HQI is wholly owned by **Hydro-Québec**.

Hydro-Québec is the largest utility in Canada and offers energy-related services to its retail, commercial and industrial customers, either directly or through subsidiaries. Hydro Québec ranks among North America's largest electric utilities in terms of assets and revenues.

Hydro-Québec's 2001 revenues were approximately $14.5 billion with net income of $1.3 billion. Total assets were approximately $69 billion. Hydro-Québec's transmission business unit, TransÉnergie, operates approximately 32,000 kilometres of transmission lines up to 735 kV AC and cables up to 450 kV DC valued at approximately $23 billion, and transmits almost 200 billion kilowatt-hours of electricity per year.

HQI's investments in Australia are managed through HQI Australia Pty Ltd. Along with its local project partner, Country Energy, HQI Australia Pty Ltd has developed, constructed, and is now operating the 180 MW Directlink project linking the New South Wales and Queensland regions.

TransÉnergie Australia Pty Ltd ("**TEA**") and TransÉnergie US Ltd ("**TEUS**") are subsidiaries of Hydro-Québec. Further information on Hydro-Québec, TEA and TEUS is available from the web sites: http://www.hydro.qc.ca, http:/www.transenergie.com.au and http:/www.transenergieus.com, respectively.

2.1.3 Murraylink Transmission Company

MTC will be primarily responsible for the implementation of ongoing operation and maintenance of Murraylink on behalf of MTP. SNC-Lavalin Investment Australia Pty Ltd (50%) and Murraylink HQI Australia Pty Ltd (50%) own MTC.

2.2 HVDC Light Technology

Murraylink utilises the latest ABB high voltage direct current ("**HVDC**") transmission technology known as **HVDC Light**. This technology has been specifically designed to meet both high reliability and technical standards and has been used previously in Australia, the United States of America and

Sweden. TEA and TEUS have used the technology for the Directlink project in Australia and the Cross Sound Cable project between Long Island, New York and Connecticut in the north-eastern United States of America.

The HVDC Light system consists of two elements: converter stations (one at each end of the system) that convert alternating current electrical energy ("**AC**") to direct current electrical energy ("**DC**"), or vice versa; and a pair of DC transmission cables.

Further technical details on the HVDC Light technology can be obtained from the web site http://www.abb.se/pow/home.htm.

2.2.1 HVDC Light Converter Stations

The converter stations are voltage source converters employing state-of-the-art turn on/turn off insulated gate bipolar transistor power semiconductors.

HVDC Light does not rely on the AC network's ability to keep the voltage and frequency stable. This robustness provides additional flexibility regarding the location of the converters in the AC system.

The HVDC Light design is based on a modular concept with a number of standard sizes. Most of the equipment is installed in enclosures at the equipment supplier's factory, which makes the field installation and commissioning shorter and more efficient compared to more traditional systems.

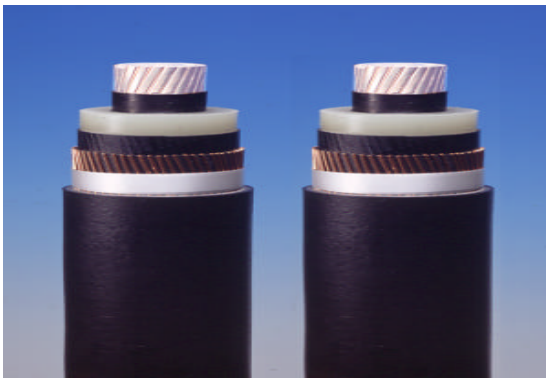
The converter stations are designed to be unmanned and are virtually maintenance free. The estimated maintenance requirement is approximately 2 days per year. Maintenance will be scheduled during off-peak periods or as otherwise directed by the National Electricity Market Management Company ("**NEMMCO**").

Dispatch of the facilities can be carried out remotely or could even be automated based on the needs of the interconnected AC networks.

2.2.2 HVDC Light Cables

HVDC Light cable is made from material that gives the cables a high mechanical strength, high flexibility and low weight. Extruded HVDC Light cable systems in a bipolar configuration have both technical and environmental advantages because the cables are small yet strong, and can be installed by a number of installation techniques.

Figure 2.1 Murraylink's HVDC Cable



The physical size of cables used for Murraylink was determined after extensive geothermal testing along the entire cable route. The soil characteristics at the installed depth were measured in a laboratory from over 500 samples taken from more than 250 locations. The cables were specifically designed to suit the soil characteristics in which they are installed, allowing the cables to be buried directly in the ground. This procedure eliminates the need for a controlled back-fill and maximises power transfer capability.

Murraylink has two underground electric cables buried at a depth of approximately 1.2 metres along the entire route between the Red Cliffs substation and the Monash substation.

2.2.3 HVDC Light Characteristics

Controllability

HVDC Light has superior control capabilities compared to traditional HVAC and HVDC technology. Control signals sent to a converter can almost instantaneously change the output voltage and current to the AC network. That is, active power transmission in either direction can be combined with generation or consumption of reactive power.

From the AC system viewpoint, an HVDC Light installation corresponds to an electrical machine without inertia. It can operate as a generator or motor and be rapidly changed between these operational modes.

Availability / Reliability

The HVDC Light technology is very reliable, with Murraylink's availability expected to be approximately 97%.

Reactive power support and control

The reactive power generation and consumption of the HVDC Light converter terminals can be used for compensating the needs of the connected network within the rating of a converter. As the rating of the converters is based on maximum currents and voltages, the reactive power capabilities of a converter can be traded against the active power capability.

2.3 Murraylink Converter Terminal Sites

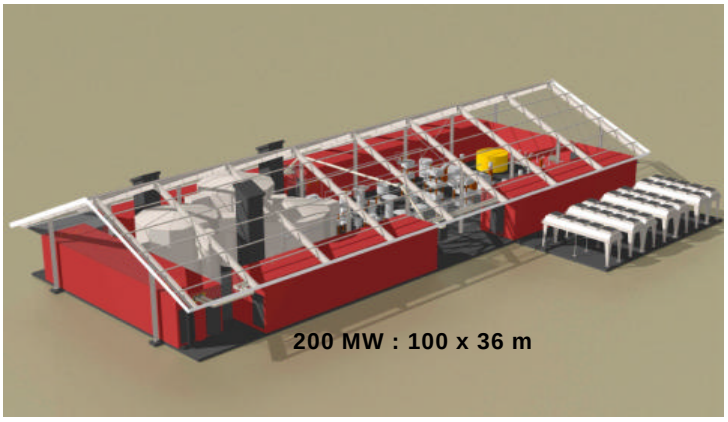
The Murraylink converter station sites are located at Red Cliffs in Victoria and Monash in South Australia.

The eastern Red Cliffs converter terminal is built on the site of the old Red Cliffs power station and is immediately adjacent to the point of connection to the Victorian transmission network at the Red Cliffs transmission substation (operated by SPI PowerNet). A traditional HVAC underground cable owned by MTP (and part of the Murraylink project) connects the Red Cliffs converter terminal site to the Red Cliffs substation.

The western Monash converter station has been established on farmland just north of the Murray River, east of Berri.

ElectraNet SA purchased the land immediately west of the converter station for the establishment of a new transmission substation called the Monash substation. The first stage of the Monash substation was developed by MTC as part of the development of the Murraylink interconnector and has become the point of common coupling to the South Australian transmission network. A short length of traditional HVAC underground cable owned by MTP (and part of the Murraylink project) connects the Monash converter station to the Monash substation.

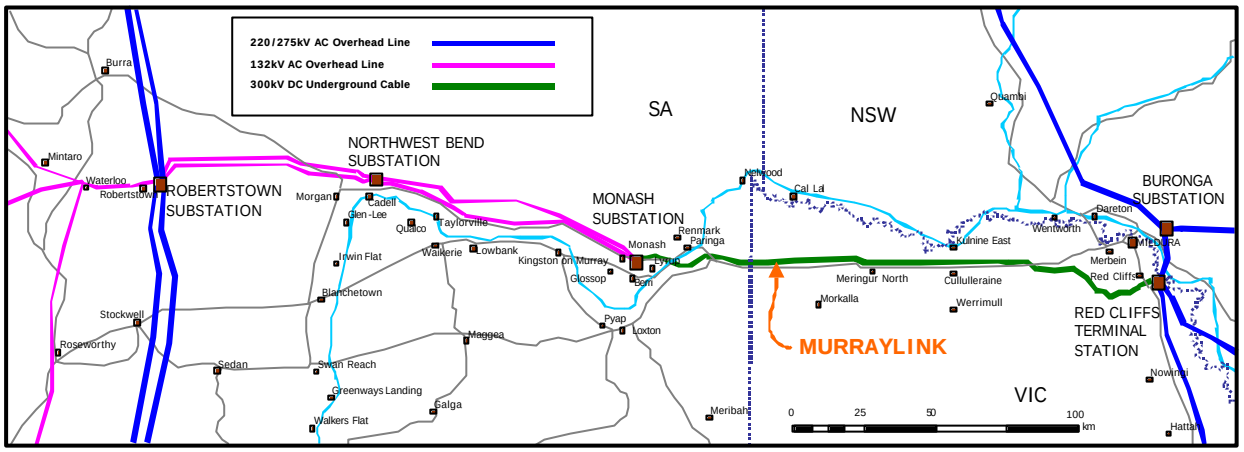
Figure 2.2 One of Murraylink's HVDC Light Converter Stations



2.4 Murraylink Cable Route

The Murraylink route for the transmission cables is a total of 180 kilometres, approximately 145 kilometres in Victoria and 35 kilometres in South Australia, along roads and highways.

Figure 2.3 Map of Murraylink Cable Route



The Murraylink cable is underground for the full 180 kilometres and is therefore secure and reliable, and not susceptible to lightning, accidental vehicle damage or vandalism.

The route is situated along existing road reserves, and did not require any new rights-of-way, easements or resumptions involving private land holdings. This enabled MTP to construct the Murraylink line with no land-use impact, no visual impact, no ground current, and minimal electromagnetic fields.

Cumulatively, the environmental and community impacts of the Murraylink are far less than the environmental and community impacts that would have resulted from the construction of a conventional overhead transmission line (either HVAC or HVDC) between Murraylink's converter station sites.

2.5 Scope of Murraylink Network Augmentations Completed to Date

For the Murraylink project, MTP has funded major transmission network augmentations that include:

- The Murraylink converter stations at Red Cliffs and Monash substations;
- 300 kV underground transmission cable between the Red Cliffs and Monash substations;

- the new Monash substation;
- a new 132 kV transmission line into Monash substation;
- the replacement of wave traps at North West Bend;
- line protection and signalling upgrades at North West Bend and Robertstown;
- line protection and signalling upgrades for the 66 kV Ballarat to Horsham subtransmission line owned by Powercor Australia;
- fault limiting reactors at Red Cliffs substation;
- a runback scheme for the Victorian region; and
- a runback scheme for the South Australian region.

2.6 Development Features

In summary, Murraylink has a number of important features that have assisted its development and enabled Murraylink to be constructed, and to deliver substantial new benefits to the NEM, in a relatively short period of time:

- In order to facilitate timely environmental permitting, the HVDC Light cables were buried underground using existing road reserves for the entire 180 kilometre route;
- The cables were buried deeper than required by statutory requirements in a cooperative arrangement with local farmers and other citizen groups with interests in the regions;
- The cables were custom designed with a stronger and more resistant outer sheath to resist termite and other rodent attacks;
- The cross sectional area of the aluminium conductor in the cable was sized to maximise the use of natural back-fill material and eliminate the need for imported bedding materials;
- The width of the cleared cable corridor was reduced to 3 to 4 metres wide, and revegetated, to satisfy concerns of the Victorian Department of Natural Resources and Environment about the need to preserve the only existing remnant vegetation that was located along the cable route;
- The cable laying contractor developed a unique trenching machine and cable trailer to allow the use of the reduced width cable corridor;

- TEA worked cooperatively with the Victorian Office of the Chief Electrical Inspector to ensure that design and construction standards adopted for Murraylink would meet and generally exceed any new standards being developed by the Office of the Chief Electrical Inspector for HVDC underground transmission lines; and

- MTC developed operational procedures that incorporate the most stringent requirements of the Victorian and South Australian laws and regulations[21].

2.7 Environmental Awards

2.7.1 Royal Australian Planning Institute Commendation

At its Excellence in Planning Awards in 2001, the Royal Australian Planning Institute awarded the Murraylink project with an Environmental Planning or Conservation Commendation.

The Awards category was introduced to emphasise the importance of preserving the environment through sustainable planning processes.

Commending the Murraylink project, the award judges said it was "thorough and precise" in the way it addressed technical, environmental, consultation and cross-state legislative issues. Key planning and environmental issues within South Australia and Victoria were also assessed and clearly detailed as part of the project. The commendation acknowledges that the route selected as well as the infrastructure itself will result in significant benefits to the entire Riverland community.

2.7.2 Case EARTH Award

The cable laying for Murraylink has been named Australia's foremost environmental construction project in 2002 being judged the overall winner of the 2002 Case EARTH Award for Environmental Excellence.

The awards made by the Civil Contractors Federation of Australia, recognise and reward organisations that achieve best practice and innovation in the environmental management of civil construction and related projects. MTC, ABB Transmission & Distribution and Western Australian based contractor, PIHA Pty Ltd, received the award for minimising environmental impacts during cable laying. The Award recognises the collective efforts of these companies who installed the underground Murraylink HVDC cables.

[21] Including, but not limited to: *Electricity Act (SA) 1996*, *Electricity (General) Regulations 1997 (SA) 1996*, *South Australian Switching Manual Revision 1*, *Code of Practice on Electrical Safety for Work on or Near High Voltage Apparatus (Victoria)*, *Electricity Safety Act (Vic.) 1998*, and *Electricity Safety (Network Assets) Regulations (Vic.) 1999*.

The Murraylink project won the Victorian Division Category 2 award, for projects between $2 million and $10 million, as well as the national Category 2 award and the national overall award. National judges said the Murraylink project was a clear winner against much larger infrastructure projects in the overall category.

3 Murraylink Connection and Operation

3.1 Initial Technical Assessment

At the time Murraylink was developed the Inter-regional Planning Committee ("**IRPC**"), established by NEMMCO, performed technical assessments of all applications seeking to establish any new interconnector, pursuant to the Code[22].

On 3 March 2000, GPU PowerNet[23] notified NEMMCO that a connection application had been received from TEA in respect of Murraylink. The IRPC requested the Interconnection Options Working Group ("**IOWG**") to assess the Murraylink interconnector proposal in accordance with (then) clause 5.6.6(b) of the Code. The principal aims of the IOWG were to:

1. Assess the capability of existing networks to support Murraylink (that is, identify any limitation in the existing networks);

2. Determine the impacts on other regions, including impacts on interconnection flows;

3. Determine the performance requirements of Murraylink that were necessary for it to operate; and

4. Determine the cost of any augmentations to existing networks (network enhancements) that were necessary to support Murraylink.

The analysis carried out and presented in the IOWG report concentrated on defining network capabilities from a technical and operational viewpoint.

In November 2000, NEMMCO published the IOWG's *5.6.6(b) Assessment of Murraylink (Interim Report)*, and, in August 2001, NEMMCO published the IOWG's *5.6.6(b) Assessment of Murraylink*[24].

The assessment provided information to facilitate the negotiation of connection agreements with relevant network service providers.

While many of the IOWG's findings remain current, some have been superseded by subsequent studies conducted by TEA and independently verified

[22] When the Network and Distributed Resources Code Change package came into effect on 8 March 2002, the responsibilities of the IRPC and relevant Code provisions changed.
[23] Now SPI PowerNet.
[24] Interconnection Options Working Group 2001.

by Power Technologies ("**PTI**"), as described in section 3.3. The relevant reports of TEA and PTI are contained in Appendices A and B of this Application, respectively.

3.2 Connection Agreements

MTC entered into a connection agreement with SPI PowerNet Pty Ltd ("**SPI PowerNet**") and a use of system agreement with The Victorian Energy Networks Corporation ("**VENCorp**"), to enable connection of Murraylink in the Victorian region.

MTC entered into a connection agreement with ElectraNet Pty Limited ("**ElectraNet SA**") to enable connection of Murraylink in the South Australian region.

These connection agreements:

- define the network augmentations that were required as preconditions for connection of Murraylink and that MTC was required to fund;
- cover the terms under which Murraylink will remain connected to the existing transmission systems; and
- require MTC to pay an annual connection fee to each other party.

For the purposes of this Application, the annual connection fee payable under these agreements has been included as part of the annual operations and maintenance costs for Murraylink, and is reflected in the development of the proposed maximum allowable revenue.

3.3 Power Transfer Limits

TEA has provided technical advice on the network constraints in the NEM that could limit occasionally Murraylink power transfers between the South Australian and Victorian regions during system normal operating conditions. This advice ("**TEA Report**") is contained in Appendix A of this Application and sets down power transfer limits that may be used for the purpose of determining Murraylink's market benefits and for selecting equivalent alternative projects. PTI independently verified significant elements conducted by TEA, and PTI's report is contained in Appendix B.

In its report, TEA proposes the additional network augmentations (beyond those listed in section 2.5 of this Application) that will allow Murraylink to operate up to the transfer limits described in the TEA Report and in section 4.6 of this Application as part of Murraylink's prescribed service. These additional network augmentations are not extensive, and, they represent ideal opportunities to increase major asset utilisation for a low relative cost. They include the installation of static capacitors and network control schemes unique to Murraylink, known as "runback" schemes.

As part of this Application, MTP undertakes to fund some portion of the cost of these additional network augmentations (or otherwise cause them to be developed), up to a maximum amount of $8.97 million, as part of Murraylink's initial development budget. These additional augmentations will be optimised in coordination with other TNSPs.

The findings in the TEA Report include:

1. In the case where spare generation is available within the Victorian region, Murraylink can deliver up to 220 MW to the South Australian region under summer peak load conditions with:

   - 1900 MW being imported into the Victorian region from the NSW/Snowy regions, and
   - the implementation of the augmentations listed in section 5 of the TEA Report.

2. In the case where no spare generating capacity is available from within the Victorian region, Murraylink can deliver up to 110 MW transfer into the South Australian region from excess New South Wales ("**NSW**") generation, simultaneous with 1900 MW being imported into the Victoria region from the NSW and Snowy regions across the Snowy-Victoria interconnector. The augmentations listed in section 5 of the TEA Report are required to achieve this power transfer capability.

3. Power imports the Victorian region from the NSW/Snowy region, and Murraylink dispatch into South Australia, both compete for spare capacity on certain parts of the network, particularly in south-west NSW. At times when power flow into the Victorian region from the NSW region is less than 1900 MW, spare generation capacity in the NSW region can be dispatched to achieve the 220 MW transfer capability.

4. With runback in place, Murraylink transfer capability for power transfers from the South Australian region to Victorian region is limited by the pre-contingent loading capability of the two 132 kV lines between Robertstown and North West Bend. Murraylink's transfer capability can be expressed using the following equations:

Table 3.1 Murraylink's South Australia to Victorian Region Constraint Equations

ML <= 222 – RL (MW)	(summer)	To a maximum of 150 MW
ML <= 280 – RL (MW)	(winter)	To a maximum of 150 MW

ML = Murraylink transfer capability

RL = Riverland load

3.4 Operation and Maintenance

Murraylink was designed and built as a highly efficient asset requiring minimal operating and maintenance activities. This efficiency is reflected in Murraylink's operation and maintenance costs.

3.4.1 Operation

HVDC Light technology enables fully remote operational control. Murraylink will be operated 24 hours per day, 7 days per week from a control centre with communication links to NEMMCO. The cost of its operational services will be determined on a commercial arms-length basis.

3.4.2 Maintenance

MTP, through MTC, will outsource Murraylink's maintenance activities and is presently having detailed discussions with local service providers and asset managers regarding their service capabilities. A tender for competitive bids will be issued. First level call-out, routine maintenance, and field service technicians will all be contracted through that tender process.

ABB Power Systems will provide advanced technical support for Murraylink, as necessary.

Advanced technical support will also be available on an arms-length basis through TEA who has access to engineering personnel with relevant expertise based in Australia, United States of America and Canada.

3.4.3 Efficiency Improvements

Given the low operational and maintenance costs that will be incurred for Murraylink from the start of the regulatory control period, the scope for additional efficiencies is limited, and no efficiency improvements are contemplated over the proposed regulatory period.

3.4.4 Cost of Uninsured Risks

MTC will bear the cost of a range of uninsured risks given that effective risk management, such as insurance, is either unavailable or uneconomic. In the near future, MTC will lodge an application supplementary to this Application for the recovery of the efficient costs of self-insurance according to the guidelines set down in the Commission's *Draft Decision: Victorian Transmission Network Revenue Cap 2003-2007/8*[25].

[25] ACCC 2002c, pp. 65-6.

3.5 Standards of Service

The Commission requires TNSPs to propose a single set of service standards, and proposed benchmarks for each standard, as part of their regulatory review application[26].

3.5.1 Appropriate Service Standards

The Commission is currently reviewing the application of service standards to the TNSPs that come under its regulatory control. As indicated in a recent draft decision by the Commission[27], the Commission's consultant, Sinclair Knight Merz, has proposed a TNSP performance incentive ("**PI**") scheme consisting of 5 service standards, namely:

- circuit availability;
- loss of supply event frequency index;
- average outage duration;
- minutes constrained – intra-regional; and
- minutes constrained – inter-regional.

The following discusses the relevance of each service standard for the Murraylink asset.

Circuit Availability

Circuit availability is a standard measure of performance that is widely used for HVDC facilities such as Murraylink. An international CIGRÉ Working Group has established a protocol for calculating and reporting the availability of HVDC transmission systems: *Protocol for reporting the Operational Performance of HVDC Transmission Systems*[28] ("**CIGRÉ Protocol**").

MTC recommends that methodology presented in this document be used for the calculation of availability for the Murraylink asset. In general terms, circuit availability is calculated by:

Formula 3.1 Circuit Availability

Circuit availability = 100% – EU

where:

[26] ACCC 1999a, p. xvi.
[27] ACCC 2002b, p. 121-6.
[28] CIGRÉ Working Group 14-04 1997.

Energy unavailability (EU) = (EOH/PH) x 100% [29]

EOH = equivalent outage hours accounting for full and partial scheduled and forced outages over a reporting period

PH = hours in the reporting period.

MTP proposes to calculate the circuit availability for Murraylink in accordance with the CIGRÉ Protocol, with an appropriate level of reporting detail. *Force majeure* events are excluded from the calculation of equivalent outage hours.

While Murraylink contains several different types of power equipment (underground cable, transformers, capacitors etc.), it is most appropriate to treat the interconnector as a single circuit. Constraints on Murraylink's power transfer capability that are due to any limitation in the Murraylink equipment will be accounted for in the calculation of circuit availability.

In section 6.4 of this Application, MTP proposes a benchmark level for circuit availability and a PI scheme that appropriately creates incentives for MTP to maximise the circuit availability of Murraylink.

Loss of Supply Event Frequency Index

Murraylink is an inter-regional transmission link that does not directly supply load in either region to which it interconnects; therefore, loss of supply event frequency index is not a relevant performance measure for the asset.

Average Outage Duration

Outage duration is implicitly accounted for in the annual calculation of circuit availability. Considering this, and the fact that the asset will not supply load, this index is not appropriate for Murraylink.

Minutes Constrained – Intra-regional

Since Murraylink is an inter-regional interconnector, this is not an applicable index for the asset.

Minutes Constrained – Inter-regional

Although Murraylink is an inter-regional interconnector, it is a stand-alone asset. MTP and MTC cannot control the presence, absence, magnitude, calculation or reporting of any intra-regional constraints in the upstream and downstream networks that could impact the inter-regional constraints. Hence, any constraints on power transfer over Murraylink will be fully reflected in the calculation of circuit

[29] CIGRÉ Working Group 14-04 1997, p. 6.

availability. Another measure such as "minutes constrained" would unnecessarily duplicate and complicate the PI scheme for the asset.

Example for Circuit Availability Calculation

Murraylink is an interconnector as it clearly links the two defined regions in the NEM, namely, the Victorian and the South Australian regions. As such, the presence of Murraylink does impact the inter-regional transmission capacity, and full or partial outages of Murraylink can result in constraints on inter-regional power transfers. Therefore, it is recognised that Murraylink outages should be reflected in the service standard for the asset and the following example demonstrates how full and partial outages will be well accounted for in the proposed circuit availability service standard:

Assume a base calculation period (PH) of 1000 hours.

Over a period of 1000 hours, Murraylink has a full forced outage for 12 hours, has a capacity limited to 50% of nominal rating for 8 hours due to Murraylink equipment problems, and has a capacity of 75% for 24 hours due to Murraylink equipment problems. Circuit availability would be calculated as:

Equivalent outage hours (EOH)	= 12 + 8 x 0.50 + 24 x 0.75
	= 18 hours
Energy unavailability (EU)	= (EOH/PH) x 100%
	= 18/1000 x 100%
	= 1.8%
Energy availability (EA)	= 100 – EU
	= 100 – 1.8
	= 98.2%

As shown in the above example, both the depth and duration of a Murraylink outage is reflected in the proposed calculation of circuit availability. The periods for which full Murraylink capacity is not available (that is, "minutes constrained") are converted to equivalent outage duration for input into the circuit availability calculation. Consequently, "minutes constrained" are effectively captured in the single proposed service standard.

In summary, circuit availability is the most relevant performance measure for Murraylink as it fully accounts for outage duration and reduced capacity over the interconnector due to factors within the control of MTP or MTC.

3.5.2 Proposed benchmarks

The appropriate benchmark for Murraylink's circuit availability is 97%. Section 6.4 describes the application of the proposed PI scheme using this benchmark.

4 Regulatory Asset Valuation of Murraylink

This section describes the manner in which MTC has applied the Commission's Draft Regulatory Principles to the calculation of Murraylink's regulatory asset valuation. The resulting regulatory asset value enables Murraylink to satisfy the Regulatory Test.

As submitted in section 1.3.4 and 1.3.5, this analysis provides the Commission with the basis upon which the Commission can determine:

- that the network service provided by Murraylink may be classified as a prescribed service; and
- the maximum allowable revenue that may be recovered by MTP.

The following describes:

- the relevant sections of the National Electricity Code, the Regulatory Test and the Draft Regulatory Principles;
- the methodology to confirm the regulatory asset value for an existing interconnector at which the interconnector satisfies the Regulatory Test; and
- the application of this methodology to Murraylink.

As MTP currently has no regulatory asset base, MTP will establish its regulatory asset base ("**RAB**") with the inclusion of the Murraylink asset at its initial regulatory asset value.

4.1 National Electricity Code

Clause 5.6.6 of the Code specifies that any party proposing to connect a new large network asset[30] (such as a new interconnector) to the network must apply the Regulatory Test as part of the party's technical and economic evaluation of the new large network asset.

Under clause 5.6.5A of the Code, the Commission is required to promulgate a regulatory test.

5.6.5A The *ACCC* must:

(a) promulgate the *regulatory test* (and may vary the *regulatory test* from time to time);

(b) have regard to the need to ensure that the *regulatory test* is consistent with the basis of asset valuation determined by the *ACCC* for the purposes of clause 6.2.3; and

[30] A new large network asset is defined in the Code as an augmentation to enlarge or increase the network and has a capital cost greater than $10 million, subject to any Commission requirement that the threshold level of capital cost be otherwise.

(c) have regard to the obligations imposed on *Network Service Providers* to meet the *network* performance requirements set out in Schedule 5.1 and relevant legislation and regulations of a *participating jurisdiction*, in developing and maintaining the *regulatory test*.

4.2 Application of the Regulatory Test

In December 1999, the Commission promulgated the *Regulatory Test for New Interconnectors and Network Augmentations* ("**Regulatory Test**"). In essence, the Regulatory Test[31] states that:

> A new interconnector or an augmentation option 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.
>
> …
>
> "**Market benefit**" means the present value of the total net benefits of the proposed augmentation to all those who produce, distribute and consume electricity in the National Electricity Market [underlining added].

The total net benefits provided by an augmentation are more accurately described as its "**net market benefits**".

In determining the net market benefit of a new interconnector, any benefit or cost that cannot be measured as a benefit or cost to producers, distributors or consumers of electricity in terms of financial transactions in the market should be disregarded. That is, only direct costs and benefits (associated with partial equilibrium analysis) should be included and any additional indirect costs or benefits (associated with a general equilibrium analysis) should be excluded.

A reasonable interpretation of the Regulatory Test would be that the net market benefit of a new interconnector would be the total gross benefits[32] less the interconnector's "cost", defined in the Regulatory Test[33] as the total cost of the augmentation to all those who produce, distribute or consume electricity in the National Electricity Market [underlining added], that is, the augmentations full life-cycle costs: the net present value of the capital costs of a new interconnector plus the net present value of its future on-going maintenance and operating costs.

In order to ensure that regulated network investments are undertaken in a competitively neutral way in comparison to generation and non-regulated investments, the Commission has accepted the argument that a commercial

[31] ACCC 1999b, p. 20.
[32] The gross market benefits provided by a new interconnector may be calculated as the extent to which it has the ability to reduce overall energy costs, improve system reliability and defer capital expenditure within the NEM.
[33] ACCC 1999b, p. 20.

discount rate should be used to calculate the net present value of market benefits and augmentation costs[34].

The calculation of the net market benefits and costs should encompass sensitivity analysis with respect to the key variables, including capital and operating costs, the discount rate and the commissioning date, in order to demonstrate the robustness of the analysis.

There is an implicit expectation within the Regulatory Test that, if a proposed new interconnector satisfies the Regulatory Test, then the capital cost of the new interconnector (estimated for the purpose of the Regulatory Test) may be added to the value of the regulatory asset base of the proponent TNSP.

Conversely, MTP has an expectation that if it proposes a regulatory asset value at which Murraylink satisfies the Regulatory Test, the Commission will:

- determine that the network service being provided by Murraylink should be a prescribed network service; and
- allow MTP to incorporate Murraylink into its regulatory asset base at that regulatory asset value.

4.3 Draft Regulatory Principles

The Commission's Draft Regulatory Principles set out the basis of asset valuation determined by the Commission for the purposes of clause 6.2.3 of the Code. In particular, the Draft Regulatory Principles prescribe that a DORC valuation should be adopted for any initial valuation[35].

More particularly, the Commission[36] has indicated that its Draft Regulatory Principles and the DORC valuation process will apply when conversion of a market network service to a prescribed service is sought and has said that:

> The Draft Regulatory Principles set out that a DORC valuation will be used to value (or revalue) the asset base of the [network service provider]. The Commission considers that the DORC valuation allows for consideration of all possible options for replacing existing network services, as well as consideration of current and future utilisation rates.

The DORC value of the regulatory asset base is the sum of the depreciated replacement cost of the assets that would be used if the system were notionally reconfigured so as to minimise the forward looking costs of service delivery, and is determined at the start of the regulatory period[37]. The rationale of the DORC approach is that it enables the regulatory asset base to reflect the costs of a potential new entrant and the impact on the asset value of potential bypass[38].

[34] ACCC 1999b, p. 5.
[35] ACCC 1999a, p. xi.
[36] ACCC 2001b, p. 138.
[37] ACCC 1999a, p. 39.
[38] ACCC 1999a, p. 39 and 44.

As required in the Regulatory Test, the DORC valuation process requires the selection and evaluation of alternative projects that provide services similar to those being provided by the network asset that is being valued.

It is important to note that the Draft Regulatory Principles do not restrict the definition of "service delivery" to that only associated with basic technical service, particularly just those associated with reliability requirements. The Draft Regulatory Principles encourage the services provided by the network asset to be considered in the broadest possible perspective[39].

In assessing the cost of the alternative projects, the Draft Statement of Regulatory Principles requires that operating and maintenance costs are taken into account, for example, by capitalising in net present terms the future accumulated operating and maintenance costs[40].

In terms of considering the assets' replacement cost, the Draft Regulatory Principles also indicate that "fortuitous circumstances" should not be assumed[41]. Appropriate judgment and/or analysis are required to reflect the impact of a lack of fortuitous circumstances.

4.4 Methodology for Regulatory Valuation

A methodology has been developed to confirm a regulatory asset value for an existing interconnector at which the interconnector satisfies the Regulatory Test. This methodology is derived directly from the practices, principles and factors described and defined in:

- the National Electricity Code;
- the Regulatory Test; and
- the Draft Regulatory Principles.

The methodology consists of the following steps that are described below and illustrated in the flow chart in figure 4.1.

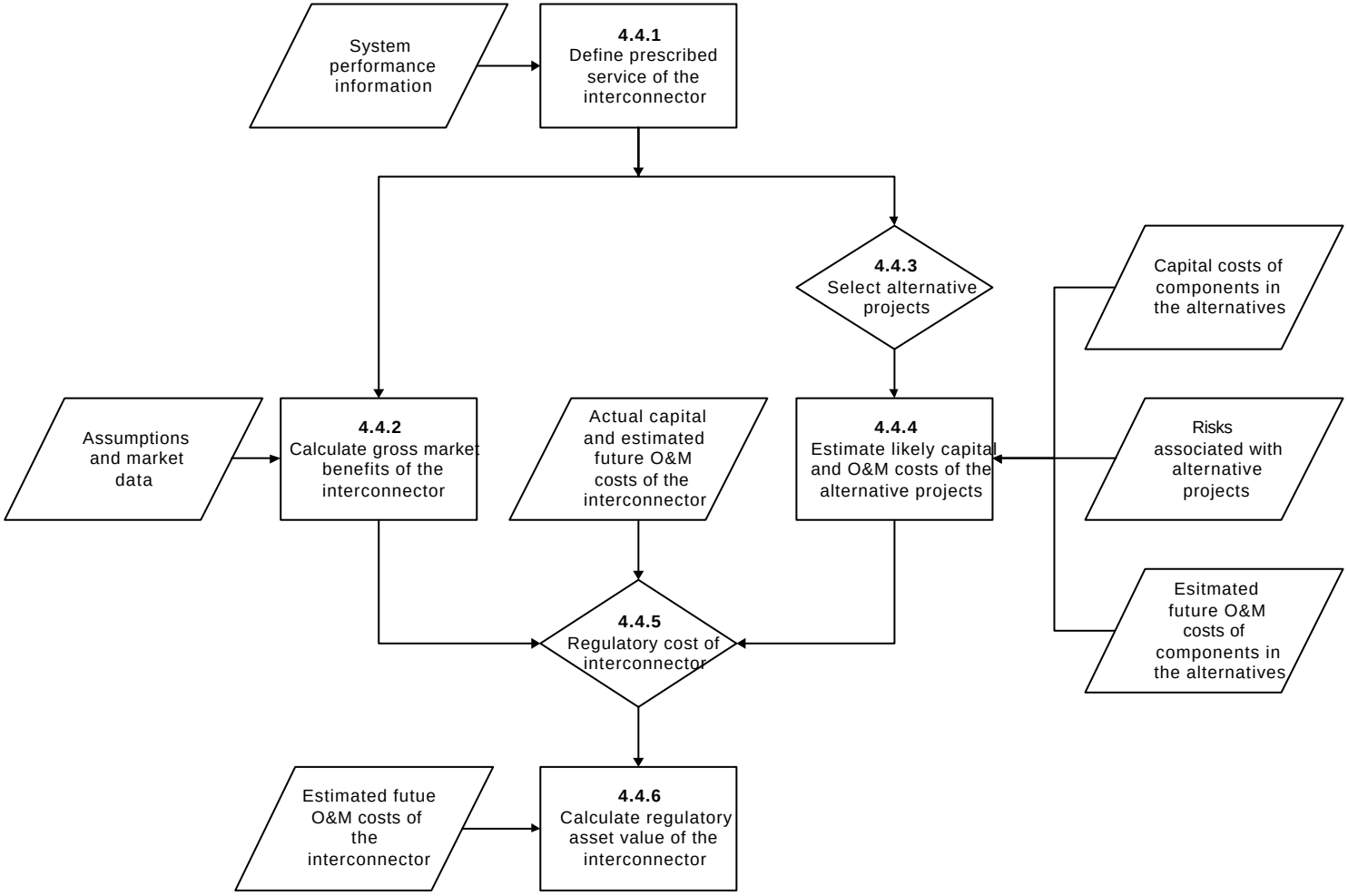
4.4.1 Define the Prescribed Service

While an interconnector might assist TNSPs to meet the technical requirements of Schedule 5.1 of the Code, an interconnector can also deliver more sophisticated technical services, such as inter-regional transfer capacity.

Murraylink's prescribed service is defined in section 4.6 of this Application.

[39] ACCC 1999a, p. 43.
[40] ACCC 1999a, p. 44.
[41] ACCC 1999a, p. 44.

Figure 4.1 Methodology for Regulatory Valuation – Flow Chart



4.4.2 Calculate the Gross Market Benefits of the Existing Interconnector

Using appropriate modelling tools, the gross market benefits of the existing interconnector can be determined.

Murraylink's gross market benefits are defined in section 4.7 of this Application.

4.4.3 Select the Alternative Projects

An independent assessment needs to be made of the several ways in which the electricity system could be notionally reconfigured to provide the same prescribed service as the existing interconnector. Notional reconfigurations take the form of alternative projects.

4.4.4 Estimate the Cost of the Alternative Projects

The full life-cycle cost of each alternative project needs to be determined as the net present value of its capital, plus the net present value of its future operating and maintenance costs. There is a range of uncertainties associated with the costs and timing of each of the alternative projects. For example, there is considerable uncertainty associated with the environmental and easement costs and constraints of constructing overhead transmission lines. As the regulatory valuation approach is designed to assess the actual costs that a potential new entrant would experience, an analytical framework needs to be applied that enables the relative risks associated with alternative projects to be taken properly into account.

4.4.5 Determine the Regulatory Cost

The regulatory cost for an interconnector is the sum of its regulatory asset value and the net present value of its future operating and maintenance costs.

For an interconnector to satisfy the Regulatory Test, its regulatory cost must be less than or equal to, the lesser of:

- the value of the gross market benefits the interconnector provides,
- the full life-cycle cost of the lowest cost alternative project, and
- the estimated life-cycle cost of the existing interconnector itself.

In this way, the regulatory cost of the interconnector is set such that the interconnector would provide a positive net market benefit that is greater than or equal to any of the net market benefits provided by

any of the alternative projects selected, and no greater than the actual cost of the interconnector. Thus the interconnector would pass the Regulatory Test.

4.4.6 Determine the initial regulatory asset value

The regulatory asset value of the interconnector is equal to its regulatory Cost less the net present value of its operating and maintenance costs.

The outcome of these calculations for Murraylink are contained in section 4.9 of this Application.

4.5 Commercial Discount Rate

The Commission requires that, for the purposes of computing the net present value of market benefits and costs in the Regulatory Test, a commercial discount rate must be used. Deloitte Touche Tohmatsu ("**DTT**") was engaged to develop an appropriate value for the commercial discount rate and DTT's advice is contained in Appendix C of this Application. The value recommended by DTT is 9.25% per year, real pre-tax and is derived from market data and rationale also used for the purpose of determining MTP's regulated cost of capital. MTC requested that Burns and Roe Worley and TEUS apply that commercial discount rate to all their net present value calculations. Hence all the net present values in this Application were calculated using the same commercial discount rate.

4.6 Prescribed Service to be Provided by Murraylink

All Murraylink technical capability will be available to the NEM in exchange for its regulated revenue. Murraylink will provide a prescribed service that includes a number of valuable features, unique in the NEM, including but not limited to:

- A continuous power transfer capacity of 220 MW available to the NEM that can be used to transfer power between the Victorian and South Australian regions in accordance with NEMMCO's merit-order dispatch instructions, subject to power transfer limits imposed by constraints in other parts of the NEM as described in the TEA Report contained in Appendix A of this Application.

- A power transfer capability that is controllable to a high degree of accuracy, and independent of other power flows, impedances, loads and generation in the NEM, including any derating of the Heywood interconnector due to lightning activity.

- Reactive support and assistance with the regulation of the voltage profile of the AC networks at both the sending and receiving ends of Murraylink. Murraylink has a dynamic reactive capability of up to +140 MVAr and –150 MVAr.

- A runback scheme that provides an intelligent alternative to contingency tripping of Murraylink. If a contingency occurs in the NEM that would otherwise result in an unacceptable overload or under-voltage condition somewhere in the network, Murraylink can, if appropriate, be "run back" (that is, its power flow rapidly reduced) to alleviate the condition, rather than completely switched off as would be the case for a normal AC transmission line.

4.7 Gross Market Benefits Provided by Murraylink

By increasing the capacity for energy to flow between the Victorian region and the South Australian region, Murraylink provides substantial and sustained economic benefits to those that produce, consume and distribute energy in the NEM.

On behalf of MTP, TEUS conducted an extensive study to determine the scope and magnitude of these benefits and its report is contained in Appendix D. Charles River Associates (Asia Pacific) ("**CRA**") was engaged to independently review and verify the work of TEUS, and CRA's report can be found in Appendix E.

TEUS used the transmission limits described in sections 3.3 and Appendix A of this Application in the calculations of the gross market benefits of Murraylink. PTI and CRA, in their reports contained in Appendices B and E, confirm that the manner in which TEUS applied these limits is appropriate.

The following is a brief description of the market benefits that Murraylink brings to the NEM and the results of the TEUS study.

4.7.1 Energy and Deferred Market Entry Benefits

Murraylink provides the opportunity for less expensive generation in one region to displace more expensive generation in another region.

By doing so in the short run, Murraylink continuously reduces the short run variable operating and maintenance ("**O&M**") costs, and fuel costs in the NEM. Murraylink also reduces the economic costs associated with voluntary load reductions and/or curtailments by reducing the expected frequency and magnitude of such events.

Over time, Murraylink also defers the entry of new market entry generation plant and hence defers the major capital expenditures associated with that plant. Together, these short-run marginal cost reductions and the benefits from deferring new market entry generation plant are described in this Application as "**energy benefits**".

4.7.2 Reliability Benefits

Probabilistic system modelling has shown that with Murraylink in service, there is less likelihood of events where electricity demand in the NEM outstrips the ability of the NEM generation and transmission

system to supply that demand. The impact of these events is measured as the projected amount of "**unserved energy**". The probabilistic system modelling has quantified the expected reductions in unserved energy associated with Murraylink. TEUS has valued unserved energy at $10,000 per megawatt-hour, which is the value of lost load set down by the Code. By reducing expected unserved energy, Murraylink provides significant "**reliability benefits**".

4.7.3 Riverland Deferral Benefits

Murraylink provides additional supply capacity to the Riverland area, from the summer of 2002–03, deferring the need for major transmission augmentation up to 2012–13.

4.7.4 Gross Market Benefits

The results of the study by TEUS are documented in Appendix D. Those calculations demonstrate that the gross market benefits provided by Murraylink are valued at $214.240 million[42].

4.8 Selection and Assessment of Alternative Projects

Engineering firm, Burns and Roe Worley ("**BRW**"), has independently selected and costed alternative projects that could have provided the same technical service and gross market benefits as Murraylink. Kellog Brown and Root ("**KBR**") provided advice to BRW in relation to the environmental costs and constraints that would confront a developer of any of the alternative projects to assist BRW to determine the likely impact of these costs and constraints upon the projects' costs. BRW's report can be found in Appendix F.

The following is a brief description of the outcomes of the BRW's selection and costing of alternative projects.

BRW identified and assessed six possible alternatives to Murraylink. They were:

1. Buronga to Monash 275 kV AC mostly overhead transmission line, initially operating at 220 kV, with substation augmentations at Buronga and Monash;

2. Red Cliffs to Monash 140 kV DC mostly overhead transmission line, with substation augmentations at Red Cliffs and Monash;

3. Red Cliffs to Monash 220 kV AC mostly overhead transmission line, with substation augmentations at Red Cliffs and Monash;

4. Robertstown to Monash 275 kV AC overhead transmission line, Heywood to South East substation 275 kV AC overhead transmission line, with substation augmentations at Robertstown, Monash, Heywood and South East substation, and series capacitors at Tailem Bend;

[42] Net present value as of 1 May 2003.

5. Generation in South Australia and the Riverland; and

6. Demand side management.

BRW examined alternatives 5 and 6 for completeness. They represented possible options for meeting the Riverland load requirements, however in all other respects they were not equivalent to Murraylink, and they were discarded early in the analysis for reasons given in the BRW report.

For the remaining alternatives, a detailed base estimate was developed for the capital and operations and maintenance costs of the assets. The base estimates were further subjected to a quantitative analysis of the cost risks so as to determine an appropriate contingency for each alternative. The contingency plus base estimate was used as the capital cost base for the project alternative and a net present cost of annual operations and maintenance over a 40-year period was added to develop a total net present cost for each of the alternative projects.

BRW recommends that the upper limit be placed on the regulatory asset value of Murraylink such that the total net present cost of Murraylink, inclusive of and its estimate of its future on-going operating and maintenance costs, does not exceed $240.4 million.

4.9 Initial Regulatory Asset Value of Murraylink

The method for determining an initial regulatory asset value for Murraylink is set out in section 4.4.5 of this Application.

According to this method, the regulatory cost of Murraylink is $214.240 million, the lesser of the gross market benefits provided by Murraylink, the full life-cycle cost of the lowest cost alternative, and the actual cost of Murraylink itself.

The net present value of Murraylink's estimated future operating and maintenance costs is $37.334 million.

This leads to an initial regulatory asset value for Murraylink of $176.906 million (equal to $212.24 million minus $37.334 million). This initial regulatory asset value is lower than the actual capital cost of Murraylink.

5 Capital Financing & Taxation

Having determined the initial regulatory asset value of Murraylink and included it in MTP's regulatory asset base, one of the most significant issues in developing a revenue cap over the regulatory control period is to determine the allowed rate of return on the regulatory asset base. The rate of return is a forward-looking concept based on estimated future returns and future expected risk.

In competitive capital markets, the forces of supply and demand for capital determine the rate of return. For a regulated entity, the rate of return should be set at a level that is equal to the cost of attracting capital to fund a particular asset given its level of risk, that is, commensurate with what would be expected in a competitive market. If conservative assumptions are made, which result in a high rate of return, the prices charged to end consumers will be above the level that is truly reflective of costs, including the true cost of capital. If aggressive assumptions are adopted, the allowed rate of return is too low, which will mean that investment by the asset owner will be financially constrained and the quality of service offered to customers will eventually decline over time to suboptimal levels.

Subsequently, the methodology of determining the cost of capital for revenue regulation can result in justifiable outcomes. However, it is MTP's view that a regulated asset owner must earn sufficient returns to continue attracting necessary investment capital to the electricity supply industry.

Accordingly, this section 5 sets forth:

- the methodology used to determine the cost of capital and the net tax allowance proposed for MTP;
- an estimate of the vanilla weighted average cost of capital ("**vanilla WACC**") for a benchmark company in MTP's operating and regulatory context; and
- estimates of a net tax allowance that is consistent with the WACC methodology being used.

The substance of this chapter is drawn from an expert report by Professor Robert Officer, contained in Appendix G of this Application.

5.1 Methodology for Determining the Cost of Capital and Net Tax Allowance

In line with the Commission's approach in recent decisions, MTP has used the post-tax nominal vanilla WACC to develop the revenue cap proposed in this Application.

There are a variety of methodologies and resultant WACCs that could be used to develop the revenue cap for a regulated asset. MTP considers the post-tax

vanilla WACC to be the most appropriate because of its simplicity and the fact that it is less prone to error and confusion than other formulas available.

Mathematically, post-tax vanilla WACC is represented as:

Formula 5.1 Post-Tax Vanilla WACC[43]

$$WACC = r_e \cdot \frac{S}{V} + r_d \cdot \frac{D}{V}$$

where:

r_e is (post-tax) return on equity;

r_d is the return on debt;

D/V is the debt to value ratio; and

S/V is the equity to value ratio.

Whilst the use of a post-tax return on equity and a pre-tax cost of debt may make the formula appear inconsistent, this treatment ensures that the formula is 'free of any taxation effects'.

The pre-tax WACC approach has been the predominant method used in the past in the electricity and gas industries. However, regulators, led by the Commission, have in recent years been moving to the post-tax vanilla approach. MTP concurs that the post-tax vanilla WACC is the most appropriate methodology to adopt for the purposes of this Application, with the corresponding use of an appropriate net tax allowance.

When a vanilla WACC is used to determine a regulated return on capital, all tax must be accounted for in the cash flows. Separate compensation for tax, which excludes the value to the infrastructure owner of dividend imputation credits, is made as a tax cash flow allowance.

This tax cash flow allowance, known as the **net tax allowance**, is most dependent on the tax depreciation deductions that would be allowed with reference to Australian tax rules.

The formula for deriving the net tax allowance is reproduced below.

Formula 5.2 Net Tax Allowance[44]

$$NetTax_t = \frac{\left[(AssetValue_t \times WACC) + Depreciation_R - Depreciation_T - AssetValue_t \times \frac{D}{V} \times r_d \right] \times T_C \times (1-g)}{(1 - T_c \times (1-g))}$$

where:

[43] Professor Officer 2002, p. 7 (Appendix G)
[44] ***Insert reference – Deloitte to advise.***

(AssetValue$_t$ x WACC) represents the earnings before interest and tax of the business,

Depreciation$_R$ represents the add-back of the regulatory depreciation amount,

Depreciation$_T$ is the depreciation allowable for tax purposes, and

(AssetValuet x D/V x r_d) represents the interest cost of the business. The quantum of the variables is consistent with those used in the derivation of the WACC.

5.2 Estimate of Vanilla WACC in the Current Context

For the purpose of setting a revenue cap for MTP's prescribed service, a post-tax vanilla WACC needs to be estimated that represents an efficient benchmark for a transmission company that provides a prescribed service on a stand-alone basis under the same operating and regulatory conditions as proposed for MTP.

Based on the formulation of the vanilla WACC in the equation above, deriving a suitable benchmark requires consistent estimation of:

- the nominal return on equity;
- the nominal return on debt; and
- the gearing (debt to value) ratio.

Nominal return on equity

Following the approach that has been progressively refined in recent regulatory decisions, MTP has sought to use the capital asset pricing model ("**CAPM**") as the primary tool for estimating the nominal return on equity. The CAPM is the most popular procedure for estimating the required returns for assets or securities (equity) where there is no contractual right for a particular amount of return to the capital providers.

The risk that is accounted for in the CAPM is non-diversifiable or beta-risk. For the purposes of this Application, while there is a greater amount of information available on overseas betas, primary weight has been given to Australian capital markets evidence because of the theoretical and empirical difficulties inherent in translating overseas evidence in a reliable manner. A beta for an electricity company in the United States of America or the United Kingdom measures the risk of a company relative to those markets. Although such a beta may be indicative of the type of relative risk experienced by an Australian electricity company, certain conditions must apply before one can derive an Australian electricity beta from a beta derived from the United States of America or the United Kingdom.

Nominal cost of debt

Given the early stage of its operations, MTP does not yet have a track record of debt issuance. As such, no observable actual cost of debt exists for the

company. Accordingly, the nominal cost of debt has been estimated on the assumption that a TNSP such as MTP could issue debt at an "A" rating. This assumption is based on the stability of a regulated TNSP's cash flows and leverage. MTP has adopted a debt margin of 150 basis points over the risk free rate as a realistic margin for "A" rated debt.

As is the convention in Australia, the Commonwealth Government bond yield has been used as the proxy of the risk-free rate as Commonwealth Government bonds are highly liquid securities that provide a good reflection of the expected yield on long-term government securities. The duration of the risk-free rate used in the CAPM should reflect the period of the regulatory decision for which it is to be used. Accordingly, for the purposes of determining the debt cost benchmark for the 10-year regulatory period proposed under this Application, the 10-year Commonwealth Government bond yield has been adopted.

Gearing ratio

MTP proposes to maintain consistency with recent regulatory precedents that have seen the universal adoption of 60% leverage. The relative stability of cash flows for electricity transmission companies means that TNSPs such as MTP can take on higher levels of debt relative to most companies.

Vanilla WACC

The proposed vanilla WACC is comprised of the parameters and variables listed in the table below. Parameters are those inputs to the vanilla WACC that are relatively constant over time and are not expected to change between the date of this Application and the end of the regulatory period. By contrast, the variables are inputs that, by their nature, change more frequently than on an hourly basis.

MTP proposes that the parameters in the vanilla WACC be adopted at the values indicated in the table below. However, for the variables, it is proposed that a more up-to-date market sample be taken prior to the Commission making its final decision on the revenue caps. The variables are currently set at their values at the time of lodging this Application.

Based on the current values for each variable, MTP proposes a vanilla WACC (post-tax nominal WACC) of 9.00%, derived as follows:

Table 5.1 Proposed WACC Parameters and Variables

Parameters	**Value**
Gearing ratio (D/V) %	60%
Asset beta β_a	0.60
Debt beta	0.2
Equity beta	1.13
Debt margin (over R_f) %	1.50%
Market risk premium (R_m-R_f) %	6.00%
Variables	

Nominal risk free interest rate (R_f)%	5.4%
Expected inflation rate (F) %	2.2%
Outcomes	
Cost of debt $R_d = R_f$ + debt margin %	6.90%
Nominal post tax return on equity	12.15%
Vanilla WACC (as at time of this Application)	**9.00%**

Based on current forecasts, and the value of MTP's regulatory asset base, the nominal return on capital proposed is as set out below.

Table 5.2 Proposed Return on Capital, 2003 to 2012 (nominal $m)

	Financial years ending 31 December									
	2003[45]	2004	200	2006	2007	2008	2009	2010	2011	2012
Return on capital	**10.5**	**15.6**	**15.1**	**14.5**	**14.0**	**13.4**	**12.9**	**12.4**	**12.0**	**11.5**

5.3 Net Tax Allowance

For the calculation of its net tax allowance, MTP has adopted proposed tax depreciation rates based on its expected taxation position and rates adopted by other TNSPs and in accordance with Australian Taxation Office guidelines.

In relation to the treatment of dividend imputation, MTP proposes to adopt a g factor set at 45% for the calculation of the tax allowance. This is based on recent studies that indicate a value of 40 cents per dollar of franking credits as opposed to the 50 cents adopted in recent regulatory decisions. MTP proposes to adopt an average between 40 and 50 cents in the dollar to account for the outcomes of the recent studies but to also acknowledge earlier studies and recent regulatory decisions.

MTP's proposed net tax allowance for the regulatory period is as set out in table 5.3. This will need to be updated prior to the Commission's final decision on this Application.

Table 5.3 Proposed Net Tax Allowance, 2003 to 2012 (nominal $m)

	Financial years ending 31 December									
	2003[46]	2004	2005	2006	2007	2008	2009	2010	2011	2012
Net tax allowance	**0.6**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**

[45] This is data for an eight month period, 1 May 2003 to 31 December 2003.
[46] This is data for an eight month period, 1 May 2003 to 31 December 2003.

6 Total Revenue Path

MTP's revenue proposal for Murraylink is based on a "building block approach" to determine the maximum allowable revenue to be earned[47]. This is the predominant approach used in the regulation of electricity transmission assets and is in accordance with the Commission's Draft Regulatory Principles.

The revenue cap proposed in this section 6 has been determined in two steps:

- calculation of "raw" revenue requirements for each of the 10 revenue periods between 2003 and 2012; and
- calculation of a smoothed revenue stream to remove price fluctuations from the raw revenue requirements within the regulatory control period.

The smoothed revenue stream represents the proposed revenue cap. Murraylink believes that the revenue cap proposed would deliver a competitive, fair and reasonable outcome.

6.1 Regulatory Control Period

MTP proposes that the regulatory control period, during which the revenue cap determined by the Commission in accordance with this Application is to apply to MTP, commences from the date of the Commission's final decision on this Application and expires on 31 December 2012.

This regulatory control period is justified given the high initial and on-going efficiency of MTP's operation and maintenance practices, the absence of forecast capital expenditure, and the substantial cost savings to the Commission, the NEM participants and MTP associated with deferring the next regulatory review process until 2012.

In addition, a regulatory period of 10 years provides certainty that encourages private sector investment and attracts new entrants to the NEM. Transmission investments are very long term investments for which investors seek as much certainty as is reasonably possible, especially for regulated investments where returns are designed to reflect lower levels of risk. Upon appropriate conditions, such as those presented by Murraylink, the Commission's acceptance of an almost 10 year regulatory control period would provide a positive signal to investors that the Commission is willing to provide a good level of certainty where it can.

Given Murraylink's asset depreciation profile, a regulatory period over ten years would enable the smoothing of MTP's revenue over a longer period and the avoidance of an abruption change on revenue after five years, as shown in table 6.2.

[47] ACCC 1999a, p. x.

6.2 Raw Revenue Requirement

The raw revenue requirement for each year of the regulatory period is presented in table 6.1 below. This requirement is calculated as the sum of the following items:

- operating and maintenance expenditure;
- regulatory depreciation;
- nominal post-tax return on capital; and
- net tax allowance.

Table 6.1 Raw Revenue Requirement, 2003 to 2012 (nominal $m)[48]

	Financial years ending 31 December									
	2003[49]	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Operating & maintenance	**2.5**	**3.7**	**3.8**	**3.8**	**3.9**	**4.0**	**4.1**	**4.1**	**4.2**	**4.3**
Depreciation	**6.1**	**9.2**	**9.2**	**9.2**	**9.2**	**7.6**	**6.8**	**6.8**	**6.8**	**6.8**
Nominal return on capital	**10.5**	**15.6**	**15.1**	**14.5**	**14.0**	**13.4**	**12.9**	**12.4**	**12.0**	**11.5**
Less RAB indexation for inflation	**(2.5)**	**(3.5)**	**(3.1)**	**(2.8)**	**(2.4)**	**(2.3)**	**(2.1)**	**(1.8)**	**(1.5)**	**(1.2)**
Net tax allowance	**0.6**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**
Raw revenue requirement	17.2	26.0	25.9	25.8	25.7	23.7	22.6	22.6	22.5	22.4

6.3 Smoothed Revenue Requirement

As can be noted from table 6.1, Murraylink's raw revenue requirement is comparatively smooth. However, it still needs to be converted to a CPI-X form in order for the actual maximum allowable revenue to be determined.

The formula to smooth the revenue requirement is as follows:

Formula 6.1 Smoothed Revenue Requirement[50]

$$R_t^c = R_{t-1}^c(1 + CPI_t) * (1 - X)$$

where:

R_t^c is the revenue cap in year *t*

[48] Source: MTP forecasts.
[49] This is data for an eight month period, 1 May 2003 to 31 December 2003.
[50] ACCC 1999a, p. 90.

R_{t-1}^{c} is the revenue cap in the previous year

CPI_t reflects inflation for year *t*, being

a) the Consumer Price Index: All Groups Index Number Average of Eight Capital Cities published by the Australian Bureau of Statistics for December quarter immediately preceding the start of the year *t*

divided by

b) the Consumer Price Index: All Groups Index Number Average of Eight Capital Cities published by the Australian Bureau of Statistics for December quarter immediately preceding the December quarter referred to in paragraph (a)

minus one.

X is the "**X factor**", which represents efficiencies.

MTP's revenue path is derived using an X factor of 0%. A neutral X factor has been adopted for the new assets because of their relatively low value and the highly efficient nature of its operations will not provide opportunities for material reductions in expenditure over the 10 year regulatory period.

Applying a smoothing process that creates a smoothed revenue requirement with the same present value as the raw revenue requirement, results in a smoothed revenue path that increases from $11.3 million for the 8 months to 31 December 2003 to $21.0 million in 2012 ($nominal) as shown in table 6.2.

Table 6.2 Smoothed revenue requirement, 2003 to 2012 (nominal $m)[51]

	Financial years ending 31 December									
	2003[52]	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Smoothed revenue requirement	**17.2**	**25.5**	**25.2**	**24.9**	**24.6**	**24.3**	**24.0**	**23.7**	**23.4**	**23.2**
Raw revenue requirement	17.2	26.0	25.9	25.8	25.7	23.7	22.6	22.6	22.5	22.4
Difference	0.0	(0.6)	(0.8)	(0.9)	(1.1)	0.6	1.4	1.1	0.9	0.7

In applying this formula Murraylink's smoothed revenue requirement is not significantly different from the raw revenue requirement disclosed in table 6.2 This is primarily due to the minimal movement expected in operating and maintenance expenditure.

[51] Source: MTP forecasts.
[52] This is data for an eight-month period, 1 May 2003 to 31 December 2003.

6.4 Performance Incentive Scheme

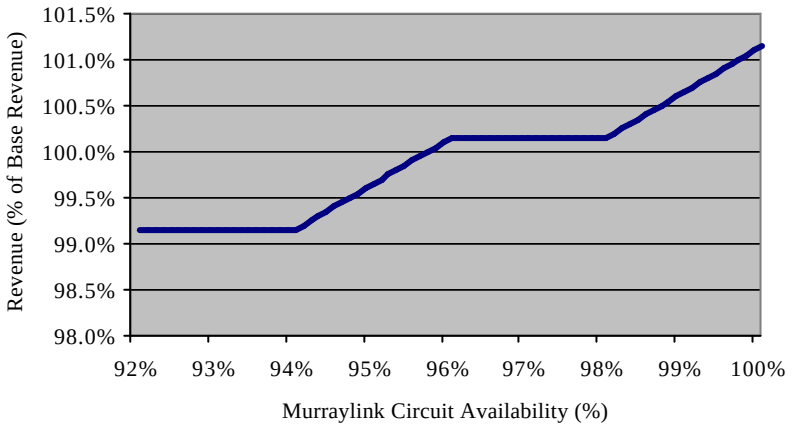
Consistent with the recent Commission's draft decision on the South Australian Transmission Network Revenue Cap[53], MTP is proposing that part of MTP's allowed revenues be placed "at risk" as an incentive to meet the benchmark service standard. In the case of Murraylink, circuit availability captures all of the appropriate service standards, as described in section 3.5. The appropriate benchmark for this service standard is 97%. Hence, MTP has chosen 97% as the mid-point of the "dead-band" zone for circuit availability.

The dead-band zone would extend from 96% to 98% circuit availability (calculated monthly). If Murraylink's actual availability for any month is within this zone, then no adjustment would be made to the allowed revenue.

If Murraylink's actual availability for any month is less than 96%, then MTP's allowed revenues would decrease at a rate of 0.05% of the baseline allowed revenue per 0.1% shortfall in availability below 96%, up to a maximum decrease of 1% in MTP's allowed revenues. If Murraylink's actual availability in any month is greater than 98%, then MTP's allowed revenues would increase at a rate of 0.05% of the baseline allowed revenue per 0.1% additional availability above 98%, up to a maximum increase of 1% of the baseline allowed revenue.

MTC's proposed performance incentive scheme is shown in figure 6.1.

Figure 6.1 Proposed Performance Incentive Scheme



[53] ACCC 2002b, p 124-6.

7 On-going Issues for MTP's Regulated Revenue

While these are not matters for the Commission to determine, MTP recognises that it must allocate its revenue across the South Australian and Victorian region and establish arrangements with other TNSPs to recover its regulated revenue from transmission customers.

MTP is also conscious that while not likely, major events may occur for which no account has been taken in its maximum allowable revenue. It understands that, in general, the ACCC will consider applications for pass-through costs on a case-by-case matter. However, MTC signals that it will put forward to the Commission, as a supplementary application, rules that may describe the procedure under which MTC would seek, and the Commission may grant, cost pass-through under extraordinary circumstances.

7.1 Allocation of Revenue Across Regions

Under the current arrangements set down in the Code, MTP's maximum allowable revenue will be allocated each financial year firstly across the Victorian and South Australian regions, and then to transmission customers by a Coordinating NSP as set out in section 7.2 below.

MTP proposes to remain consistent with the revenue allocation approach currently being applied to other interconnectors. Hence, it will allocate its regulated revenues between the Victorian and South Australian regions on the basis of the geographic investment in those regions.

7.2 Revenue Recovery

The Code[54] contains provisions in relation to the recovery of revenue by a transmission network owner, which owns and operates a regulated interconnector that provides a prescribed service. On the basis of these provisions, it is proposed that:

1. MTP and the other transmission network owners in the South Australian region will appoint a Coordinating network service provider ("**Coordinating NSP**") in that region;
2. MTP and the other transmission network owners in the Victorian region will appoint a Coordinating NSP in that region;
3. MTP will provide to each Coordinating NSP in each region, information on electrical characteristics, historical load, assets and revenue relevant to revenue allocation for the relevant region;
4. the Coordinating NSP, in each region, will allocate the sum of all the regional TNSPs' revenue (adjusted for the over/under-recovery during the previous year and the estimated settlement residue auction proceeds for the coming year) to create the basis of transmission use of system charges that will apply to the transmission customers in that region; and

[54] Specific provisions of the Code include clauses 3.6.5, 3.18.4, 5.3.6(g), 5.3.6(h), 6.3.2, 6.3.4(a), 6.4.3, 6.4.6(a), 6.5.4(a), 6.7.3, 6.7.4, 6.9.1, 6.9.2, 6.19, and Schedule 6.4.

5. the Coordinating NSP, in each region, will pay MTP an annual sum in 12 monthly instalments, based on the maximum allowable revenue for MTP.

MTP anticipates the need to negotiate with TNSPs in the Victorian and South Australian regions to reach agreement on how the intent of the Code will be carried out in practice such that the interests of the parties are taken into account appropriately.

7.3 Pass-through for Identified Events

MTP has endeavoured to identify all the efficient costs associated with the provision of Murraylink's prescribed service, including the procurement of appropriate insurance. However, events could occur that are outside of MTP's control and that could substantially increase MTP's costs and/or decrease the value of its regulatory asset base.

MTP proposes that, on the occasion that one of the following identified events occurs, MTP would seek adjustment of its maximum allowable revenue and/or a capital expenditure program, in accordance with pass-through rules to be developed by MTC and approved by the Commission, to enable these costs to be passed-through:

- **Service standards event** – Any change to the scope of standards or benchmark levels to which MTP's maximum allowable revenue would be indexed, including changes to the National Electricity Code, and relevant decisions of the National Electricity Code Administrator ("**NECA**"), NEMMCO, the Commission or any Commonwealth or State Government;

- **Connection agreement event** – Any material change to MTC's connection agreement that results in a material change to MTP's or MTC's costs.

- **Regulatory event** – Any change to the National Electricity Code or and relevant decision of NECA, NEMMCO, the Commission or any Commonwealth or State Government, which materially changes MTP's operating costs;

- **Tax event** – Any change to the scope or levels of tax payable by MTP;

- **Terrorism event** – Any act of terrorism, which includes threats associated with terrorism;

- **Insurance event** – Any material change to the extent of available cover or cost of insurance, relative to that forecast as part of MTP's revenue path;

- **Uninsured event** – Any event causing loss to MTP for which MTP has been unable to procure insurance cover at an economic cost or because insurance cover was not available at all; and

- **Non-contestable capital works event** – Any event where MTP is required under a connection or network service agreement to undertake non-contestable capital works, as defined in the Code, and the establishment costs of these works is rolled into MTP's regulatory asset base.

MTC notes that the Commission is assessing the implications of pass-through rules prepared by another TNSP[55] and has reserved its position. In the near future, MTC will lodge an application supplementary to this Application setting out the pass-through rules that may be appropriate for Murraylink.

[55] ACCC 2002c, p. 54 & 66-7.