

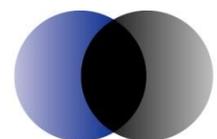


Energy transmission network planning

The emerging role of the
Australian Energy Market
Operator

Prepared for Infrastructure Australia

2 September 2010



ACIL Tasman

Economics Policy Strategy

© ACIL Tasman Pty Ltd

Copyright in this document is and remains the property of ACIL Tasman Pty Ltd. This document must not be reproduced in whole or in part without ACIL Tasman's prior consent. Its content must only be used for the purposes of evaluation with a view to contracting ACIL Tasman to carrying out the work that is the subject matter of the document. No other use whatsoever can be made to any material or any recommendation, matter or thing in the document without ACIL Tasman's prior written agreement.

ACIL Tasman Pty Ltd

ABN 68 102 652 148

Internet www.aciltasman.com.au

Melbourne (Head Office)

Level 6, 224-236 Queen Street
Melbourne VIC 3000

Telephone (+61 3) 9604 4400
Facsimile (+61 3) 9600 3155
Email melbourne@aciltasman.com.au

Darwin

Suite G1, Paspalis Centrepoint
48-50 Smith Street
Darwin NT 0800
GPO Box 908
Darwin NT 0801

Telephone (+61 8) 8943 0643
Facsimile (+61 8) 8941 0848
Email darwin@aciltasman.com.au

Brisbane

Level 15, 127 Creek Street
Brisbane QLD 4000
GPO Box 32
Brisbane QLD 4001

Telephone (+61 7) 3009 8700
Facsimile (+61 7) 3009 8799
Email brisbane@aciltasman.com.au

Perth

Centa Building C2, 118 Railway Street
West Perth WA 6005

Telephone (+61 8) 9449 9600
Facsimile (+61 8) 9322 3955
Email perth@aciltasman.com.au

Canberra

Level 1, 33 Ainslie Place
Canberra City ACT 2600
GPO Box 1322
Canberra ACT 2601

Telephone (+61 2) 6103 8200
Facsimile (+61 2) 6103 8233
Email canberra@aciltasman.com.au

Sydney

PO Box 1554
Double Bay NSW 1360

Telephone (+61 2) 9389 7842
Facsimile (+61 2) 8080 8142
Email sydney@aciltasman.com.au

For information on this report

Please contact:

Dr John Söderbaum

Telephone (02) 6103 8200

Mobile 0404 822 302

Email j.soderbaum@aciltasman.com.au

Contributing team members:

Guy Dundas

Contents

Introduction	1
Energy market context	1
The evolution of AEMO's role	6
AEMO today	11
Conclusions	19
References	22
Glossary	24

List of figures

Figure 1	Energy market governance	2
----------	--------------------------	---

List of tables

Table 1	Present and historic regulatory and planning functions	11
---------	--	----

Introduction

Infrastructure Australia commissioned ACIL Tasman to provide a short report explaining the role of the Australian Energy Market Operator (AEMO) in relation to the planning of electricity and gas transmission networks. Infrastructure Australia is interested in obtaining a better understanding of how AEMO exercises these planning powers and what lessons, if any, AEMO's operations may provide for the planning and management of the national freight transport network.

Accordingly, this report:

- explains the governance and regulatory environment in the broader energy market
- describes the historical evolution of AEMO's planning functions
- describes in more detail AEMO's approach to electricity and gas network planning, including methodology, consultation and planning horizons
- concludes with some broad observations on the nature and development of AEMO's planning functions.

Readers should note that this report focuses exclusively on energy market governance and planning in the states of Queensland, New South Wales, Victoria, Tasmania and South Australia, and the Australian Capital Territory, as these jurisdictions define the geographic scope of AEMO's functions and powers.

Energy market context

Energy market governance

AEMO's energy network planning and other functions exist within a broader framework of energy market governance in Australia.

The Ministerial Council on Energy (MCE), formed and acting under the guidance of the Council of Australian Governments (COAG), is the primary executive decision-making body for the energy sector in Australia. The MCE consists of energy ministers from the Commonwealth and all states and territories. Reflecting the historic and constitutional basis of energy legislation in Australia as a state function, MCE's legislative power is exercised through a state-based cooperative regime. 'Lead legislation' is passed in the South Australian Parliament and adopted as law in largely the same form in other jurisdictions through implementation legislation.

Lead legislation established by the MCE consists primarily of:

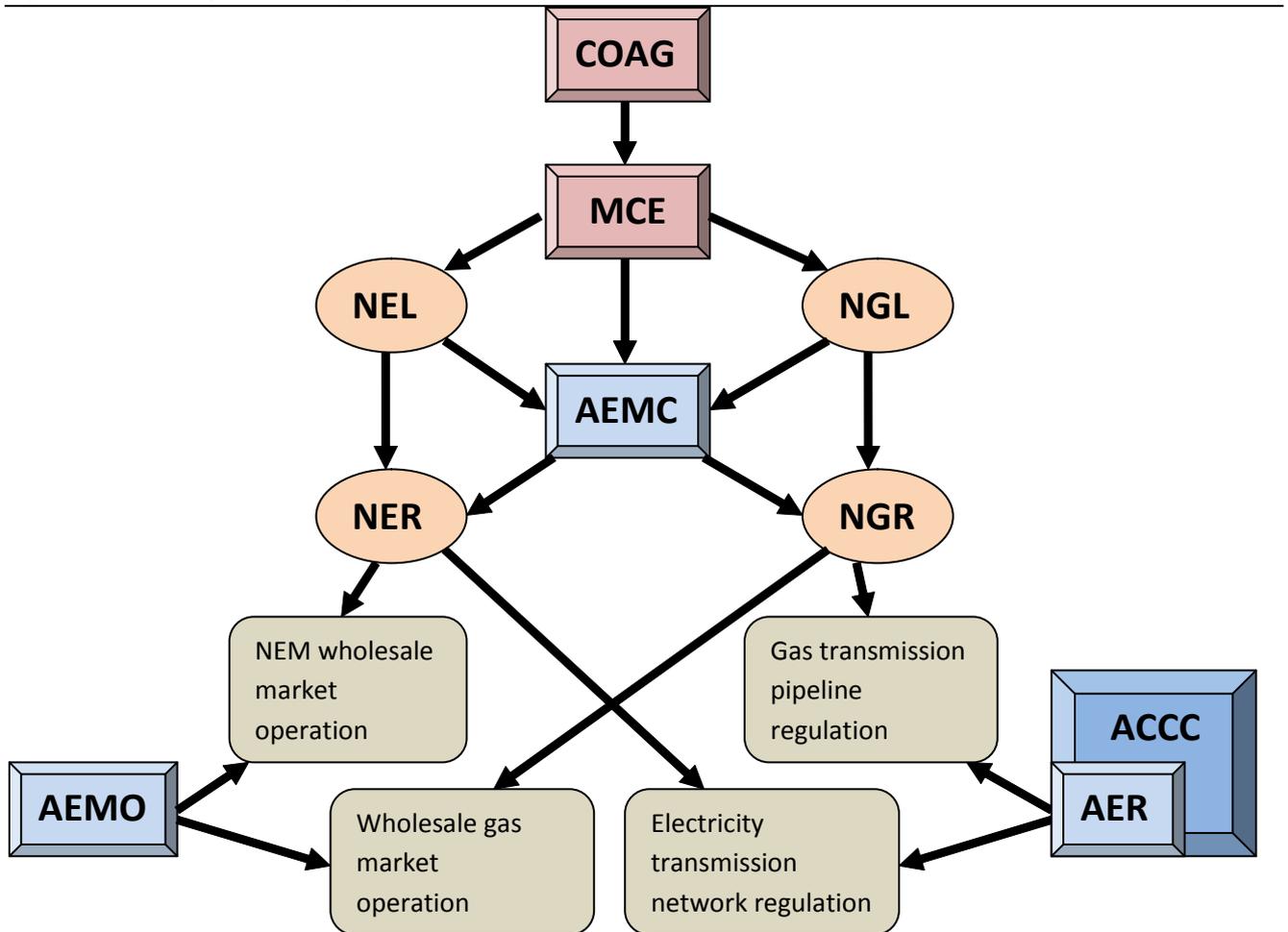
- the National Electricity Law (NEL)
- the National Gas Law (NGL).

Reflecting the level of technical complexity in energy legislation, the MCE has provided for many issues to be resolved through subordinate legislation known as the National Electricity Rules (NER) and the National Gas Rules (NGR).

In turn, MCE has provided that a statutory authority, the Australian Energy Market Commission (AEMC), can amend these rules according to processes enshrined in the NEL and NGL. This creates a more streamlined process to adapt energy market rules without relying on parliamentary processes.

Finally, the MCE has empowered the Australian Energy Regulator (AER), which is part of the Australian Competition and Consumer Commission and established under the *Trade Practices Act 1974* (TPA), to enforce the Law and Rules. The AER also undertakes a range of economic regulatory functions under the law and rules, which are described in more detail below.

Figure 1 **Energy market governance**



A range of state-based legislation sits beneath this national governance framework to address a range of matters such as technical reliability standards for networks, safety standards and consumer protection. Whilst the MCE has made progress in standardising some of these legislative areas, they can be considered to sit outside the national governance framework at this time.

Subject matter of the Law and Rules – markets, networks and retailing

Broadly, the NEL and NGL regulate three elements of the energy supply network:

- wholesale markets
- networks
- retailing.

The extent of regulation differs between electricity and gas for each element of the supply chain.

This paper focuses on the networks element of the Law and Rules as this is most relevant to AEMO's planning function.

However, it is relevant to note that AEMO's primary roles in the energy market are as operator of the wholesale National Electricity Market and of the Victorian, Sydney and Adelaide wholesale gas markets¹, rather than as a planning body.

Regional and national electricity network planning

The NER empowers AEMO with the functions and powers of national transmission planner (NTP) for electricity.

The NER requires the NTP to produce an annual National Transmission Network Development Plan (NTNDP) to guide the efficient development of the national transmission grid over the coming 20 years.

It is important to note that the role of NTP in electricity is separate to the region-focused² role of a 'jurisdictional planning body' (JPB), also enshrined in the NER.

¹ The Victorian wholesale gas market has been operated by AEMO and AEMO's predecessor, VENCORP, since market start in 1999. The Sydney and Adelaide 'hub-based' wholesale gas markets officially commenced operation on 1 September 2010.

² Note that the regional boundaries of NEM regions and transmission network service areas correspond very closely to state boundaries. This report uses the NER term 'region' and the political terms 'state' and 'jurisdiction' interchangeably, unless referring to state legislation or state governments when the term 'state' is used exclusively.

Energy transmission network planning

The NER requires each state's JPB, which is a body nominated by the energy minister of the relevant jurisdiction, to publish an annual planning report that examines emerging network constraints in their region and considers possible network investments to address these constraints.

In the case of New South Wales, Queensland, South Australia and Tasmania, the JPBs are the various owners of the networks: the 'transmission network service providers' or TNSPs (which are all government-owned corporations).

In the case of Victoria, AEMO is the nominated JPB. AEMO has succeeded the Victorian Energy Networks Corporation, or VENCorp, in this role.

AEMO also publishes an annual document known as the Electricity Statement of Opportunities (ESOO), which looks at demand and supply trends in the wholesale electricity market. The ESOO interacts with network planning processes by utilising demand forecasts from the various annual planning reports and identifying the need for new generation in each NEM region.

Gas network planning

There are no equivalent planning bodies for gas networks, with one exception: due to the importance of gas as a household and industrial fuel in Victoria, when that state privatised its principal gas transmission system it also empowered VENCorp to oversee the development of this network. AEMO has also succeeded VENCorp as the planner of Victoria's gas network and is required to undertake an annual planning review of that gas network under section 323 of the NGR.

The NGR also requires AEMO to publish a document known as the Gas Statement of Opportunities (GSOO) in its role as gas market operator. The GSOO is not a formal planning document but rather seeks to support good market outcomes through disseminating relevant and high quality information. The GSOO considers both upstream/wholesale and network elements of the gas supply chain.

Economic regulation of electricity transmission networks

Electricity transmission networks are subject to economic regulation by the AER under the NEL/NER to ensure access to the network for users at economically efficient prices. This 'third party access' regulation reflects the natural monopoly power of these networks, and originates from the concept of an access regime for natural monopoly infrastructure established under the TPA.

Economic regulation of electricity networks is critical to the pattern of investment in these networks, and so understanding this element of the

regulatory framework is crucial to understanding the scope and limitations of the planning powers of AEMO and the JPBs.

The tariffs that electricity TNSPs can charge are restricted through periodic regulatory revenue determinations as approved by the AER (typically five years in duration). Broadly, the NER requires the AER to make revenue determinations that allow TNSPs to only recoup the efficient costs of providing transmission services through their regulated tariffs.

This means that, in general, electricity TNSPs will only undertake capital expenditure that is approved by the AER. If this is not the case they will not have a regulated revenue stream from which to recoup the costs of their investment.

Broadly, expenditure on the transmission network will only be approved if it satisfies one of two conditions:

- the expenditure is deemed necessary to meet applicable reliability standards
- the expenditure is considered to have positive and maximal ‘market benefits’ (that is, it maximises the aggregate economic benefits to producers and users of electricity in the NEM out of all feasible options identified).

Accordingly, the revenue determination proposals put forward by the TNSPs and approved by the AER are critical to determining what capital expenditure is undertaken and therefore the future shape of the transmission network.

The emergence of AEMO’s role as the NTP is driven in part by the need to provide a holistic perspective on the future of the transmission network to guide these network-by-network regulatory decisions and thereby the pattern of investments undertaken by TNSPs.

Economic regulation of gas transmission networks

Gas transmission networks are also subject to economic regulation by the AER, under the NGL/NGR. However, whilst this regulation is similar in structure it is substantially different in practice to that of electricity.

Under the gas regulatory regime commercially negotiated tariffs have primacy over regulated tariffs. Regulated tariffs, where they are established, simply act to constrain negotiated tariffs by acting as a fall-back offer that access seekers are entitled to receive in the event that commercial negotiations fail and are referred to statutory arbitration processes.

The significance of this is that significant network augmentations in the gas sector are typically underpinned not by regulatory approval guaranteeing a regulated rate of return from consumers at large, but by long-term ‘foundation contracts’ with specific pipeline users.

This in turn means that both the AER and any potential planning body has, or would have, fewer powers to guide network development in the gas sector than is true for the electricity sector, where regulatory processes are crucial to shaping investment patterns. Instead, developments will tend to reflect the commercial motivations of key gas suppliers and users.

The evolution of AEMO's role

Historical context

Planning of electricity and gas networks was historically undertaken by government-owned vertically integrated monopoly energy utilities in each state.

Following the Hilmer Report of 1993, government policy moved towards disaggregating the natural monopoly segments of the energy supply chain (largely the network component) from those that could be potentially opened to competition (the electricity generation/gas production and retail components).

In this environment of restructuring, privatisation and corporatisation, governments retained influence over the planning of electricity transmission in a variety of ways.

The most powerful drivers of electricity network planning over the NEM period have been various technical reliability standards mandated by state legislation. Satisfying these standards has necessitated a range of investments to incrementally expand capacity and 'de-bottleneck' transmission networks as peak and average loads increase, within a relatively static network structure (reflecting fairly constant geographical concentrations of generation and demand).

The annual planning reports put out by TNSPs and JPBs have tended to focus on region-level demand trends to identify investments necessary to maintain reliability in the face of growing demand.

In turn, the economic regulatory framework has provided a secure regulated rate of return on investments that are deemed necessary to satisfy these reliability standards. It has proven fairly straightforward to identify investments necessary to achieve these reliability standards: for example, such investments could involve replacing components reaching the end of their technical operating life, or augmenting existing network elements to allow greater flow of energy to areas of growing demand.

By contrast, obtaining regulatory approval for investments by demonstrating broader market benefits has been more challenging and occurred less

frequently, not least due to the technical and economic complexity of demonstrating that any proposed network investment satisfied this test.

The need for enhanced electricity network planning

Whilst the regulatory and planning framework for electricity networks has been successful in maintaining reliability whilst meeting steadily growing demand, several failings of the framework became evident:

- TNSPs and JPBs were primarily identifying investments based on regionally focused analysis without fully considering the impact of these investments on the national network
- TNSPs and JPBs appeared to have insufficient motivation to consider augmentations that may have broader market benefits, particularly where those benefits spilled across regional boundaries
- revenue determinations approved by the AER were overwhelmingly shaped by the TNSPs' proposals, and therefore entrenched this regional focus.

The role of NTP has largely evolved out of increasing recognition that there is a need for a higher-level and more holistic perspective to guide the investments identified by the TNSPs and approved by the AER.

First steps

The first step in this direction was the requirement placed on AEMO's predecessor, the National Electricity Market Management Company (NEMMCO), to publish an Annual National Transmission Statement (ANTS) from 2004. The ANTS analysed and modelled the effect of augmentations proposed by TNSPs and JPBs from each region on the operation of the national market and network.

While this document ranked augmentations proposed at the regional level according to the level of economic benefit they offered to the national network, the ANTS was not accompanied by any formal powers to require TNSPs to pursue augmentations identified as having national benefits. The document largely existed to provide an overview of the possible future development of the network.

In 2005 the MCE directed the AEMC to make a rule giving the AEMC a new Last Resort Planning Power (LRPP). Under this power (which came into effect in 2007) the AEMC could require a TNSP to undertake an evaluation of the market benefits of a particular transmission augmentation. This power remains with the AEMC (i.e. it has not transferred to become part of the broader NTP function) but to ACIL Tasman's knowledge it has never been used.

A further mechanism that supported a more national approach to transmission planning was the Inter-Regional Planning Council (IRPC), which consisted of representative from NEMMCO and each of the TNSPs/JPBs.

The IRPC had various functions, including:

- providing advice to the AEMC on the exercise of its LRPP
- assisting NEMMCO to develop the ESOO and ANTS documents
- developing criteria for use in the ANTS process for identifying investments that are likely to have a material inter-regional impact
- developing criteria for assessing whether a particular augmentation should be assessed as being purely for reliability purposes and therefore not relying on wider market benefits
- publishing guidelines on when intra-regional developments should be assessed for their impact on transfer capability of inter-regional interconnectors.

The IRPC established various working groups to undertake these functions.

A broader vision: the Energy Reform Implementation Group

The January 2007 report of the Energy Reform Implementation Group (ERIG) to COAG included a range of important recommendations. In the context of this report the most relevant were:

- the proposal to pursue a single national energy market operator (NEMO³) as a long-term objective of energy market reform
- the need to strengthen the quality of national transmission planning
- the need to streamline the operation of the test used to determine whether an investment delivered maximum market benefits to ensure that this test delivered projects of national benefit.

ERIG's recommendations in this area were broadly accepted by the MCE.

MCE's subsequent deliberations established that:

- VENCORP's gas market operations and energy network planning functions and South Australia's Electricity Supply Industry Planning Council's (ESPIC's) electricity network planning function would be integrated with NEMMCO's electricity market operations function to form AEMO⁴
- AEMO would take on the new role of NTP.

³ ERIG's conception of the NEMO included market operation functions in Western Australia and the Northern Territory, and so differs from AEMO as constituted.

⁴ The South Australian Government subsequently determined that the role of JPB for that state would transfer to its TNSP, ElectraNet, rather than to AEMO, although some functions previously undertaken by ESIPC transferred to AEMO.

MCE referred the matter of the function of national transmission planner to the AEMC, which undertook a detailed review through 2008.

The AEMC's recommendations established the broad shape of the NTP function including:

- the requirement on the NTP to publish an annual NTNDP
- the need for the NTP to outline new development strategies in the NTNDP beyond those investment plans proposed by TNSPs
- the requirement that annual planning reports at the regional level and network revenue determinations take the conclusions of the NTNDP into account
- that the NTP would be able to make submissions to network revenue regulatory processes to motivate consistency with the NTNDP.

Gas network planning: less motivation for change

The evolution of network planning in the gas sector is substantially different to that in electricity.

From the early moves towards privatisation and corporatisation, this sector has been characterised by less government or regulatory influence on network planning. Governments appear to have regarded statutory gas network planning functions as unnecessary (except in Victoria) for several key reasons:

- gas is generally regarded as a discretionary fuel rather than an 'essential service' (with the possible exception of Victoria)
- gas use is concentrated with large industrial users, reflecting a more 'empowered' supply side and a reduced need for government intervention
- commercial rights to gas pipeline access are more easily defined due to the physical nature of the commodity, which has meant that network expansion through commercial negotiation has generally proceeded in an economically rational manner that doesn't require strong government oversight.

This last point is evidenced by the fact that, under a more 'laissez-faire' planning regime, a largely privatised gas pipeline industry has delivered substantial new investment with minimal evidence of market failure. This investment has not simply involved upgrades and asset replacements to deliver reliable supply, but major extensions of the network to connect new production basins and load centres. These extensions include:

- the Carpentaria Pipeline connecting the Cooper-Eromanga basin to Mt Isa (commissioned in 1998)
- the Eastern Gas Pipeline linking Victoria's Gippsland Basin supply centre, Longford, with the Sydney gas market (2000)

Energy transmission network planning

- the South East Australia gas (SEAGas) pipeline linking western Victoria's Otway basin with the Adelaide gas market (2004)
- the North Queensland gas pipeline linking northern Bowen Basin gas reserves near Moranbah to Townsville (2004)
- the Central West and Central Ranges pipelines connecting the Moomba to Sydney pipeline to Dubbo, Tamworth and surrounding areas (2000 and 2006)
- the 'QSN Link' (Queensland-South Australia-NSW) linking major pipeline systems in those three states, effectively allowing coal-seam gas from Queensland to supply the Adelaide and Sydney markets (2009).

This 'on-the-ground' success has resulted in lower motivation for increased government involvement in the planning of the gas network sector.

The Gas Market Leaders Group

Despite the success of the gas network sector (and broader gas industry) in meeting consumer needs, in parallel with the ERIG process, the MCE sought advice on gas market reform from an industry group known as the Gas Market Leaders Group (GMLG).

The GMLG reported to the MCE in June 2006 with a series of proposals, including:

- the formation of a national gas market operator (building on VENCORP's gas functions and various regulatory bodies in NSW, SA, Queensland and WA)
- the publication of a Gas Statement of Opportunities by the national gas market operator to mirror the electricity equivalent.

The GMLG's recommendations were largely accepted by the MCE, which, in combination with the ERIG recommendations and the AEMC processes, resulted in the proposed national gas market operator becoming part of AEMO, and AEMO taking on the role of publishing the GSOO.

AEMO published the first GSOO in 2009.

AEMO's lesser role in gas network planning (especially at the national level, i.e. excluding the Victorian state-level planning) fundamentally reflects the lower initial involvement of government planning bodies in this sector and the success of commercial negotiations in delivering beneficial investments under the existing regulatory and planning framework without significant government intervention.

Summary of the evolution of AEMO's role

Table 1 below illustrates present and historic market operations, regulatory and planning functions for the wholesale market and transmission network elements of the electricity and gas sectors.

Table 1 **Market and network functions summary**

		Wholesale market		Transmission network	
		National	Regional	National	Regional
Electricity	Present	AEMO operates NEM; ES00 provides overview of supply and demand	N/A (Note: NEM operates on a regional basis)	AEMO produces NTNDP, takes on IRPC functions	JPBs produce annual planning reports. AER produces five-yearly revenue determinations
	Historic	NEMMCO operates NEM; ES00 provides overview of supply and demand	N/A (Note: NEM operates on a regional basis)	NEMMCO produces ANTS, IRPC undertakes limited functions	JPBs produce annual planning reports. AER produces five-yearly revenue determinations
Gas	Present	GSOO provides overview of supply and demand	AEMO operates Victorian, Sydney and Adelaide markets	N/A	AEMO produces Victorian planning report. AER regulates tariffs in some cases
	Historic	N/A	VENCorp operates Victorian market	N/A	VENCorp produces Victorian planning report. AER regulates tariffs in some cases

Data source: ACIL Tasman analysis.

AEMO today

AEMO's corporate governance

As noted above, AEMO has several functions other than network planning, particularly the operation of the NEM and wholesale gas markets. AEMO's corporate governance and decision-making is essentially the same for all functions.

AEMO operates on a cost-recovery basis as a corporate entity limited by guarantee under the *Corporations Act 2001*. The ownership of AEMO is comprised of 60% by government members (state, territory and Commonwealth) and 40% by industry members, but this make-up will be reviewed in 2012.

AEMO operates under the governance of a Board comprised of nine non-Executive Directors and the Chief Executive Officer.

AEMO's Board has adopted a Charter governing its operations. This Charter includes agreement that Directors will comply with AEMO's Conflicts of Interest Protocol and declare interests, and that Board minutes will document

decisions of the Board not to disqualify a Director from discussion or voting on a matter with a material or other interest in a matter under consideration⁵.

Electricity network planning

The discussion here focuses on AEMO's role as NTP, that is, it does not consider AEMO's role in planning the Victorian network at the regional level (a detailed analysis of region-level planning by AEMO and the Queensland, NSW, South Australian and Tasmanian TNSPs is beyond the scope of this report).

Section 5.6A of the NER requires AEMO as the NTP to develop an annual NTNDP, and specifies the contents of and processes for developing this document (see following sections for more detail).

ACIL Tasman notes that AEMO's first NTNDP is due for publication in December 2010 and so AEMO's approach to meeting the requirements of the NER is still being developed. Firm evidence of how AEMO implements this new function will only become available over the coming years. Similarly, the successes and failings of the new function and any potential policy changes from the MCE will take time to become clear.

Consultation

The NER requires AEMO to publish an NTNDP by the end of each calendar year.

Whilst the NER provisions are generally non-specific, they do set out minimum consultation processes, including:

- a requirement for preliminary consultation through a 'statement of material issues' during January of each year
- publishing detailed modelling inputs
- identifying the national transmission flow paths for primary analysis.

Reflecting AEMO's desire to shape not only the 2010 NTNDP document but the ongoing process for developing future NTNDPs, the consultation process to date has considered the framework for preparing the NTNDP as well as its structure and content. It is likely that future NTNDP consultations will be more content-oriented.

On 29 January 2010 AEMO released a consultation paper that discussed the purpose, scope, methodology and modelling inputs to be used in developing

⁵ Australian Energy Market Operator, *Board Charter*, <http://www.aemo.com.au/corporate/0000-0162.pdf>.

the NTNDP. Consultation closed on 12 March 2010 and AEMO received submissions from 16 organisations, namely:

- Alinta Energy
- the Australian Academy of Technological Sciences and Engineering
- the AER
- the Clean Energy Council
- ElectraNet
- Ergon Energy
- Geodynamics
- the Institute of Environmental Studies at UNSW
- International Power Australia
- Macquarie Generation
- MirusWind
- the National Generators Forum
- the Tasmanian Office of Energy Planning and Conservation
- Origin Energy
- Powerlink Queensland
- TransGrid⁶.

AEMO's next step will be to release a report addressing the issues raised during the consultation process and provide information about the modelling approaches they propose to use and the final input data they have adopted. The date of the release of this report has not been announced. AEMO must publish the NTNDP itself by 31 December 2010.

Content

The NER specifies a 20 year planning horizon for the NTNDP (rule 5.6A.2(c)(1)). This is an extension of scope beyond NEMMCO's historic ANTS processes, which typically looked at periods of 10-13 years.

The NER requires AEMO to take various matters into account when developing the NTNDP, including:

- forecast demand growth
- forecast constraints and losses
- jurisdiction level developments in the network
- annual planning reports of the JPBs

⁶ Australian Energy Market Operator, *Summary of Submissions to the 2010 NTNDP Consultation Paper*, June 2010, <http://www.aemo.com.au/planning/0418-0006.pdf>.

- its own ESOO and GSOO
- recent revenue determinations for the TNSPs.

AEMO also has discretion to take into account any other matters it considers relevant.

The NER also requires the NTNDP to use scenario-based analysis to specify a development strategy for each national transmission flow path. AEMO must also consider how various augmentations considered by the TNSPs relate to the NTNDP. Meeting these requirements is clearly fundamental to any energy network planning exercise. However, what will ultimately distinguish the NTNDP from the ANTS and other processes is the way these matters are analysed (which, as noted above, is a work in progress).

Importantly, AEMO has flagged its intention to ‘work cooperatively with Transmission Network Service Providers to develop further options [i.e. beyond those in the annual planning reports] (including non-network options⁷) ranging from incremental developments to ‘big concept’ projects, driven by the long-term needs posed by particular scenarios⁸.

This is a quite substantial change from the approach taken by NEMMCO in the preceding ANTS processes.

The NTP will proactively identify emerging needs within the national network, rather than only reactively considering the merits of needs identified by bodies that, by definition, adopt a more localised and region-centric view (as was done in the ANTS process).

AEMO has also flagged its intention to identify areas where ‘there might be synergies between meeting regional reliability requirements and delivering national economic benefits’⁹. This consideration might bring forward augmentations identified for local reasons (due to supporting national benefits), or identify alternative ways of achieving both the local and the national objectives (through AEMO’s ‘big concept’ planning processes discussed above).

⁷ ‘Non-network options’ generally refers to investments that substitute for transmission augmentation. This could include measures to moderate electricity demand, but more typically involves investing in ‘distributed’ generation sources to meet a greater portion of electricity demand using local supply.

⁸ Australian Energy Market Operator, *National Transmission Network Development Plan: Consultation Paper*, January 2010, p.3, <http://www.aemo.com.au/planning/0418-0002.pdf>.

⁹ Ibid.

This approach to the NTNDP illustrates the overall focus on providing a holistic picture of network trends that both draws on developments at the regional level and informs future regional and national investment patterns.

AEMO has also outlined its intention to model a broader range of scenarios than in the ANTS processes. The 2010 NTNDP will consider up to 10 scenarios, a substantial advance on the two scenarios considered in previous ANTS processes.

Importantly, these scenarios will be less mechanistically defined than the ANTS scenarios, which simply considered medium average demand growth levels and two levels of maximum demand: the level the system will experience once every 10 years on average (known as the 10% probability of exceedence, or POE, case) and the level it will experience every other year on average (the 50% POE case).

By contrast, AEMO proposes to use five core scenarios in the 2010 NTNDP. These were chosen through detailed analysis of possible economic, technological and social trends including:

- rates of economic and population growth
- global and local climate change policy settings
- trends towards centralisation or decentralisation of electricity generation
- demand-side trends such as energy efficiency and responses to peak pricing.

Reflecting the importance of carbon pricing policy, each core scenario involves two carbon price sensitivities (with some modelling cases involving no carbon price at all).

This more nuanced approach is important for picking up changes in locational and temporal patterns of demand, and the physical composition of supply, as well as aggregate changes in their overall level. This is critical when studying longer time periods that are likely to be characterised by historically unprecedented levels of technological change and demand patterns in the energy sector.

Implementation

As noted above, the economic incentives of the regulatory regime administered by the AER are the main drivers on the pattern of transmission investment.

AEMO has no direct power to implement any findings in the NTNDP. Rather, the NTNDP will indirectly affect investment patterns by influencing the AER's deliberations on capital expenditure proposals. This influence is underlined by the NER requirement that the AER must take into account both

the NTNDP itself and any submissions made by AEMO on operating or capital expenditure in respect of a particular revenue proposal.

Prior to the AER's consideration of a revenue proposal, the NER also requires TNSPs to take the NTNDP into account and include a statement of whether their revenue proposals are consistent with the NTNDP. This places a 'soft' requirement on TNSPs to shape their planning and capital expenditure programs with the NTNDP in mind.

TNSPs and JPBs must also take the NTNDP into account in their annual planning reports.

Of course, the NTNDP must also take into account the committed and proposed investment plans of TNSPs as set out in their annual planning reports and as approved in their revenue determinations. In this sense, these planning documents are inter-linked, with each document both informing and building on the others.

However, it is important to bear in mind that the long term focus of the NTNDP means that it will provide a picture of potential investments over a 5-20 year timeframe, well before these would be considered in any detail by the TNSPs. In this way, the NTNDP can help influence or guide longer-term investment plans. It is likely that this situation will strengthen over time. Early NTNDPs will inevitably be shaped by committed investments that were approved before any NTNDP existed, whereas future NTNDPs will take into account committed investments that were themselves shaped by earlier NTNDPs.

The other mechanism by which the NTNDP may influence future investment in electricity networks is through the engagement it will foster. The substantial consultation requirements placed on AEMO provide TNSPs with an opportunity to shape the NTNDP, which is particularly significant given the requirement on TNSPs to outline whether or not their annual planning reports are consistent with the NTNDP. AEMO's intention to work closely and cooperatively with TNSPs is supported by the NER requirement on JPBs to provide reasonable assistance to AEMO in exercising its NTP functions.

The requirement on AEMO to publish a comprehensive modelling database may build acceptance within TNSPs that the NTNDP is a valuable resource for their own planning processes. Proactive and positive engagement by TNSPs with the NTNDP process, and the perception that the outputs are well-founded, will enhance its long-term influence over TNSPs' planning.

If the positive scenario described above is realised, and there is greater convergence between regional and national planning processes over time, the outcome should be that all parties have a greater understanding of the

interactions and trade-offs between local and national priorities when planning investments.

Governance and accountability

As noted above, the AEMO has no direct power to implement any findings in the NTNDP. Accordingly, there are no formal review mechanisms of its NTNDP function per se.

If AEMO failed to satisfy the strict requirements of the NER in relation to its NTP function, it would be in breach of the rules and face potential sanction from the AER. However, given the general nature of AEMO's requirements in this area, it appears highly unlikely that this would occur.

Essentially, the primary accountability mechanism driving AEMO's exercise of its NTP function is that, unless it engages with the AER and industry in a collaborative and constructive way, the NTNDP will not be influential. Good regulatory practice, strong planning and genuine consultation is required for the NTNDP to be an effective document and for the NTP function to deliver on the objectives set out by the MCE.

Gas network planning

As has been noted earlier in this document, AEMO (and statutorily-empowered bodies generally) has far fewer formal planning functions in relation to gas networks than electricity networks.

Implementation

The NGR requires AEMO to publish the GSOO annually.

The NGR requires the GSOO to consider reserves and demand trends over a period of 20 years in total, *if practicable*.

However, for all other matters, the GSOO uses a planning horizon of only 10 years. These matters must include:

- capacity of production and storage facilities
- transmission pipeline capacity and constraints
- committed and proposed production facilities, storage facilities and pipelines
- demand trends by demand zone.

There are no formal powers in the NGR for any party to take the GSOO into account in performing functions or powers or undertaking any commercial behaviour.

Even more so than for the NTNDP, the GSOO's influence will be determined by its perceived quality and usefulness as an information source to commercial parties and, to some extent, the AER in performing its economic regulatory function.

Governance and accountability

Given that the GSOO has no power of compulsion or direction, there are no particular governance and accountability mechanisms associated with the publication of the GSOO.

The primary accountabilities of AEMO in exercising this function are to:

- the AER as enforcer of the law and rules: if AEMO failed to publish a GSOO it would technically be in breach of the NGR
- the MCE as legislator and the AEMC as rule-maker: if the function is considered to be inadequately reinforced or superfluous, these bodies are the only ones in a position to amend the nature of the function
- to industry participants: AEMO's operating expenditure, including expenditure associated with preparing the GSOO, are recovered from market participants through annual fees, so if industry participants feel the GSOO publication is not delivering value to justify expenditure on it they can lobby the MCE for change or put a rule change proposal to the AEMC.

Relationship between electricity and gas network planning

There is no formal relationship between electricity and gas network planning established through the NEL, NGL, NER or NGR. However, decisions made by private parties, the AER and AEMO in the electricity sector profoundly affect investment patterns in the gas sector, and vice versa.

With climate change policies likely to drive greater use of gas as a fuel in electricity generation, the influence of each sector on the other is likely to increase strongly over the coming 10-20 years.

The absence of (and legislative difficulty of creating) formal relationships between the electricity and gas market operation, network planning and network regulation functions supports a 'soft integration' by combining consideration of these issues into common bodies, namely AEMO and the AER.

The benefits of AEMO taking on electricity and gas network planning and market operations functions can only emerge over time. The primary benefits

are likely to emerge from the integrated governance of the unified organisation and knowledge-sharing at the operational level.

The creation of AEMO has combined diverse skill sets, particularly:

- the electricity market operation expertise of NEMMCO
- the gas market operation expertise of VENCORP
- the more strategic planning focus of VENCORP and ESIPC's planning staff.

Whilst the combination of electricity and gas market operation functions may offer benefits over time, the combination of the short-term market operation focus and the longer-term planning focus of the three core successor organisations is likely to prove most significant for AEMO's work in the planning area.

For example, the NTNDP must take into account likely patterns and locations of electricity generation when planning the needs of the electricity transmission system. This will benefit from a nuanced understanding of the location of gas supply and developments to overcome gas pipeline transmission constraints, particularly given the increasing role for gas-fired generation. Internal access to expertise from the development of the GSOO can only enhance AEMO's NTNDP function in this respect.

In essence, the integration of gas and electricity planning functions is nascent and informal. This is necessary, given the divergent planning regimes in the two sectors. The practical evidence of increased integration of understanding of the two sectors within AEMO will take time to emerge. Nevertheless, this was a significant area of potential benefit identified by ERIG in recommending the creation of the AEMO¹⁰.

Conclusions

To understand the potential for, and limitations of, AEMO's role as national transmission planner, one must understand its interaction with the economic regulation of electricity networks undertaken by the Australian Energy Regulator.

The regional-level planning undertaken by TNSPs and JPBs is driven overwhelmingly by the incentives created by the AER's determinations of

¹⁰ ERIG endorsed VENCORP's view that establishing a single national energy market operator would produce 'more efficient outcomes for the energy market arising from information sharing leading to an improved understanding of market operations and interactions between the gas and electricity sectors': Energy Reform Implementation Group, *Energy Reform: the way forward for Australia*, 2007, p. 117.

which capital expenditure proposals can earn a regulated return under that regime.

Historically, in the absence of an influential and coherent national-level planning process, the projects analysed by the TNSPs and approved by the AER have typically been justified on the grounds of satisfying regional-level reliability standards. These standards will continue to be a critical driver of transmission investments.

However, if done well, the annual NTNDP process of consulting with industry and regulators can shape these region-level processes so that they, over time, align with and support a longer-term holistic plan for the development of the national transmission network.

The ability of AEMO to proactively identify transmission augmentations (or non-network solutions) that deliver national market benefits may encourage investments of a different form or timing than might otherwise be the case if taking a purely regional view.

Potential investments identified by AEMO are more likely to be looked on favourably by TNSPs and the AER on technical and regulatory grounds if the NTNDP is produced collaboratively with these bodies, is based on genuine consultation and provides the industry with valuable new information.

The NTNDP process as conceived and mandated by the MCE is essentially a 'soft' guiding process with few coercive powers. The longer term influence of the NTNDP will be closely related to the value it offers to the organisations with the financial and regulatory control of the regional networks (i.e. the TNSPs and the AER).

The evolution of the NTNDP process in the electricity sector stands in contrast to the minimal role of AEMO and other planning bodies in the gas sector.

The gas sector has delivered new network investments in a way that suggests limited need for additional government influence, whether through stronger economic regulation or planning functions.

The contractual basis of the gas economic regulatory regime reflects not only a more limited role for economic regulation in the gas sector, but also the limited ability of a document similar to the NTNDP to influence investment in this sector. Any national plan for the gas network would struggle to influence the pattern of gas pipeline investments as it would be less able to use influence within the regulatory process to support the achievement of the plan indirectly.

In this context, the combination of gas and electricity market operations and network planning functions within AEMO appears to be a sensible, if



ACIL Tasman

Economics Policy Strategy

Energy transmission network planning

minimalist, step toward integrating consideration of planning needs in the two sectors. Harmonised governance and increased operational information-sharing can support ERIG's vision for more integrated analysis of these two sectors in a way that does not seem possible or desirable through seeking to align their respective regulatory and planning regimes, given their fundamental differences.

References

Australian Energy Market Commission, 2008, National Transmission Planning Arrangements: Final Report to MCE.

Australian Energy Market Commission, 2007, National Transmission Planning Arrangements: Issues Paper.

Australian Energy Market Operator, 2010, Electricity Statement of Opportunities.

Australian Energy Market Operator, 2010, Summary of Submissions to the 2010 NTNDP Consultation Paper.

Australian Energy Market Operator, 2010, National Transmission Network Development Plan: Consultation Paper.

Australian Energy Market Operator, 2010, Board Charter.

Australian Energy Market Operator, 2009, National Transmission Statement.

Australian Energy Market Operator, 2009, Gas Statement of Opportunities.

Australian Energy Market Operator, 2009, Electricity Statement of Opportunities.

Australian Energy Regulator, 2009, State of the Energy Market report.

Electricity Supply Industry Planning Council, 2009, Annual Planning Report.

Energy Reform Implementation Group, 2007, Energy Reform: the way forward for Australia (a report to the Council of Australian Governments).

Gas Market Leaders Group, 2006, National Gas Market Development Plan: GMLG report to the Ministerial Council on Energy.

Ministerial Council on Energy, 2008, National Transmission Planning Arrangements: MCE response to the AEMC Final Report.

Ministerial Council on Energy, 2008, Australian Energy Market Operator Establishment – Legislative Framework: Statement of Proposed Approach.

Ministerial Council on Energy, 2008, Synopsis: Australian Energy Market Operator Implementation Plan.

Ministerial Council on Energy, 2005, Statement on NEM Electricity Transmission.



ACIL Tasman

Economics Policy Strategy

Energy transmission network planning

National Electricity Market Management Company, various years, Electricity Statement of Opportunities (incorporating the Annual National Transmission Statement).

Victorian Energy Networks Corporation, 2009, Annual Planning Report.



ACIL Tasman

Economics Policy Strategy

Glossary

AEMC – Australian Energy Market Commission
AEMO – Australian Energy Market Operator
AER – Australian Energy Regulator
ANTS – Annual National Transmission Statement
COAG – Council of Australian Governments
ERIG – Energy Reform Implementation Group
ESIPC – Electricity Supply Industry Planning Council (of South Australia)
ESOO – Electricity Statement of Opportunities
GMLG – Gas Market Leaders Group
GSOO – Gas Statement of Opportunities
JPB – Jurisdictional Planning body
LRPP – Last Resort Planning Power
MCE – Ministerial Council on Energy
NEL – National Electricity Law
NEMMCO – National Electricity Market Management Company
NER – National Electricity Rules
NGL – National Gas Law
NGR – National Gas Rules
NTNDP – National Transmission Network Development Plan
NTP – National Transmission Planner
POE – Probability of Exceedence
TNSP – Transmission Network Service Provider
VENCorp – Victorian Energy Networks Corporation

Melbourne (Head Office)

Level 4, 114 William Street
Melbourne VIC 3000

Telephone (+61 3) 9604 4400
Facsimile (+61 3) 9604 4455
Email melbourne@aciltasman.com.au

Brisbane

Level 15, 127 Creek Street
Brisbane QLD 4000
GPO Box 32
Brisbane QLD 4001

Telephone (+61 7) 3009 8700
Facsimile (+61 7) 3009 8799
Email brisbane@aciltasman.com.au

Canberra

Level 1, 33 Ainslie Place
Canberra City ACT 2600
GPO Box 1322
Canberra ACT 2601

Telephone (+61 2) 6103 8200
Facsimile (+61 2) 6103 8233
Email canberra@aciltasman.com.au

Darwin

Suite G1, Paspalis Centrepoint
48-50 Smith Street
Darwin NT 0800
GPO Box 908
Darwin NT 0801

Telephone (+61 8) 8943 0643
Facsimile (+61 8) 8941 0848
Email darwin@aciltasman.com.au

Perth

Centa Building C2, 118 Railway Street
West Perth WA 6005

Telephone (+61 8) 9449 9600
Facsimile (+61 8) 9322 3955
Email perth@aciltasman.com.au

Sydney

PO Box 1554
Double Bay NSW 1360

Telephone (+61 2) 9389 7842
Facsimile (+61 2) 8080 8142
Email sydney@aciltasman.com.au



ACIL Tasman

Economics Policy Strategy

ACIL Tasman Pty Ltd

www.aciltasman.com.au