DEVELOPMENT OF THE QUEENSLAND – NEW SOUTH WALES INTERCONNECTOR

Methodology for Assessing Competition Benefits

Consultation Paper

April 2013

Disclaimer

This document has been prepared and made available solely for information purposes. Nothing in this document can be or should be taken as a recommendation in respect of any possible investment. This document does not purport to contain all of the information that a prospective investor or participant or potential participant in the National Electricity Market, or any other person or interested parties may require. In preparing this document it is not possible nor is it intended for TransGrid and Powerlink to have regard to the investment objectives, financial situation and particular needs of each person who reads or uses this document.

In all cases, anyone proposing to rely on or use the information in this document should independently verify and check the accuracy, completeness, reliability and suitability of that information and the reports and other information relied on by TransGrid and Powerlink in preparing this document, and should obtain independent and specific advice from appropriate experts or other sources.

Accordingly, TransGrid and Powerlink make no representations or warranty as to the accuracy, reliability, completeness or suitability for particular purposes of the information in this document. Persons reading or utilising this document acknowledge that TransGrid and Powerlink and their employees, agents and consultants shall have no liability (including liability to any person by reason of negligence or negligent misstatement) for any statements, opinions, information or matter (expressed or implied) arising out of, contained in or derived from, or for any omissions from, the information in this document, except insofar as liability under any New South Wales, Queensland and Commonwealth statute cannot be excluded.

Table of Contents

1. Introduction

1.1. Purpose

TransGrid and Powerlink are publishing this report to consult with interested parties and seek feedback on the proposed methodology for assessing competition benefits as part of the process for quantifying net market benefits associated with increasing the transfer capability across the Queensland – New South Wales Interconnector (QNI).

1.2. Background

In June 2012, TransGrid and Powerlink published a Project Specification Consultation Report (PSCR) as part of the first stage of formal consultation prescribed under clause 5.6.6 of the National Electricity Rules (NER) for the purposes of identifying options to alleviate transmission congestion across QNI.

Within the PSCR, Powerlink and TransGrid provided details on a number of credible network options that the two organisations currently consider could increase the transfer capability across QNI, and consequently help with alleviating potential transmission congestion. The network options ranged in size from lower cost incremental options, capable of providing a modest increase in transfer capability to large transmission projects involving significant lead times and costs, capable of providing a substantial increase in the transfer capability across QNI.

As part of the consultation process, TransGrid and Powerlink also set out the technical characteristics that a non-network, or market network service option, would need to deliver to address the identified need, and invited submissions from interested parties who might be able to provide a suitable non-network option.

In economic terms, increasing the transmission capability across QNI and alleviating congestion results in an increase in the sum of consumer and producer surplus, or economic surplus, across the NEM. The increase in economic surplus is referred to as market benefits, and an expenditure to upgrade the transmission capability across QNI would need to generate sufficient market benefits to justify the costs of doing so.

The National Electricity Rules prescribe that any regulated transmission investment is required to satisfy the Regulatory Investment Test for Transmission (RIT-T)[1] promulgated by the Australian Energy Regulator (AER). The AER has also published Guidelines[2] to assist with the application of the RIT-T.

The RIT-T details the classes of market benefits which network service providers are required to quantify if they consider that the benefits could materially change the outcome of the economic assessment of the identified credible options. Powerlink and TransGrid have provided an assessment of which classes of market benefits could potentially be material when increasing the transfer capability across QNI, and have provided discussion on these benefits within the PSCR.

One of the classes of market benefits that could potentially be material are competition benefits. TransGrid and Powerlink intend to assess and quantify competition benefits as part of the economic viability of increasing the transfer capability of QNI.

However, the two organisations note that quantifying competition benefits is not an area of assessments under the RIT-T which is well established and mature. Furthermore, TransGrid and Powerlink are aware of work[3] which indicates that competition benefits could potentially form a significant component of the total market benefits when increasing the transfer capability across interconnectors.

Powerlink and TransGrid also note that a number of submissions received in response to the PSCR for QNI have requested more clarity and transparency on the assessment of market benefits, including the assumptions and methodology that will be used to quantify competition benefits.

In light of these factors, Powerlink and TransGrid have elected to consult on the methodology proposed to be used to quantify competition benefits within the economic assessment for QNI.

1.3. Regulatory Obligations

Powerlink and TransGrid have published and consulted on the PSCR in accordance with the requirements of the National Electricity Rules (NER) and the Regulatory Investment Test for Transmission (RIT-T). The PSCR is available on both the TransGrid and Powerlink web-sites[4].

Submissions for the PSCR closed on 30 November 2012, and Powerlink and TransGrid are now in a position to commence market modelling studies to quantify the market benefits of the identified credible options.

This consultation paper is not a regulatory requirement. However, Powerlink and TransGrid have elected to conduct this additional stage of consultation to provide an added degree of robustness to a methodology which is not as developed and mature as those for other classes of market benefits (such as fuel cost savings).

TransGrid and Powerlink intend to review comments and feedback received in response to this consultation prior to commencing the detailed computational studies required to quantify the market benefits.

The second stage of the RIT-T consultation involves publishing and consulting on the Project Assessment Draft Report (PADR). The PADR is required to be published within 12 months of the end of completion of the PSCR consultation, or within a longer period as agreed by the AER.

At this stage, TransGrid and Powerlink intend to publish the PADR prior to December 2013. The PADR will include information on the market benefits calculated for each identified credible option.

1.4. Submissions

Powerlink and TransGrid invite written submissions from registered participants and interested parties on the information contained within this report.

Whilst Powerlink and TransGrid welcome feedback on any item contained within this report, feedback on the highlighted items is sought in particular.

Parties should note that their submissions may be made public, and that any aspects of their submissions which are considered confidential should be identified.

Please address submissions to:

Greg Hesse

Manager Grid Planning

Powerlink Queensland

PO Box 1193

Virginia QLD 4014

networkassessments@powerlink.com.au

OR

Nalin Pahalawaththa

Manager System Planning and Analysis

TransGrid

PO Box A1000

Sydney South NSW 1235

network.analysis@transgrid.com.au

Submissions are due on or before 6 May 2013.

2. Competition Benefits

2.1. Introduction

The RIT-T states that each class of market benefit for credible options are required to be quantified unless the particular class of benefit is not likely to materially affect the outcome of the economic assessment.

Powerlink and TransGrid have already outlined which classes of market benefits they consider could potentially be material when considering options to alleviate transmission congestion across QNI within the PSCR. One of the classes of market benefits is competition benefits.

The AER has provided guidance to the computation of competition benefits within the RIT-T Guidelines[2]. Within these Guidelines, the AER considers that:

> " *the computation of the market benefits of a credible option in a given reasonable scenario includes competition benefits where the modelling process explicitly takes into account the likely impact of the credible option on the bidding behaviour of generators (and other market participants) who may have a degree of market power relative to the base case."* [2]

The concept of market power within the Guidelines has been discussed as:

> " *A market participant has a degree of market power in a given dispatch interval if it can, by varying its bid or offer, alter the pricing, dispatch and flow outcomes in the market (including possibly inducing 'clamping') in that dispatch interval in a manner that is profitable for that firm."* [2]

It was recognised that a key factor in assessing competition benefits is a robust approach to modelling realistic bidding behaviour. Within those Guidelines, the AER stated that it did not wish to prescribe the methodology for determining realistic bidding behaviour other than to suggest that it should:

> " • *be based on a credible theory as to how participants are likely to behave in the wholesale spot market over the modelling period, and*
>
> " • *take into account the impacts of other participants' behaviour on the bidding behaviour of any given participant."* [2]

The Guidelines also discuss two potential methodologies for separately identifying that component of market benefit which is attributable to competition benefits. The Guidelines note that the difference between the two approaches is how the overall market benefits are divided between competition benefits and other benefits.

TransGrid and Powerlink are not seeking feedback on how to separately identify that component of market benefit which is attributable to competition benefit. Rather, TransGrid and Powerlink are seeking feedback on the methodology used to quantify market benefits which has a component attributable to competition benefits.

The proposed approach for modelling realistic generator bidding behaviour forms an integral part of this process, and comment on this aspect of modelling is also sought.

2.2. Previous Assessment of Competition Benefits

The concept of competition benefits was first referred to within the second version of the Regulatory Test promulgated on 11 August 2004. Since that time, there has been a significant level of discussion on techniques to quantify competition benefits, and whether competition benefits are a material component of market benefits when increasing inter-regional transfer capability.

There have been several interconnector upgrade projects within the NEM where an assessment of potential competition benefits has been made. These projects include:

Snowy to Victoria Interconnector (SNOVIC) (2004)

In 2004, the Australian Consumer and Competition Commission (ACCC) commissioned Frontier Economics (Frontier) to develop a framework[3] for quantifying interconnection competition benefits using the previously commissioned Snowy to Victoria interconnector upgrade as a case study.

The Frontier approach comprised of a five-step process which calculated the economic benefit by determining the change in the demand weighted wholesale pool price and corresponding consumer response between the base case and augmented system case.

The Frontier assessment found that net market benefits associated with a 400 MW increase in the capability of SNOVIC to be in the order of $40 million for a single year where it was assumed that demand for electricity is responsive to price changes. Where it was assumed that demand was relatively inelastic to price, the benefits were estimated to be only around $4 million for the year.

QNI (2008)

In 2008, Powerlink and TransGrid published the outcomes of detailed investigations[5] into the technical and economic viability of increasing the transfer capability of QNI. As part of this work, the two organisations commissioned specialist market modelling consultants to quantify the market benefits.

Within this assessment, realistic bidding was based on Supply Side Equilibrium modelling, which involved finding the market equilibrium point where no generating portfolio is able to improve their profitability by changing the shape of the load supply curve. However, the demand response from changes in electricity price was assumed to be inelastic, apart from a relatively small amount of scheduled load demand side participation. New entry was based on market driven criteria rather than the least cost expansion.

The studies indicated that the level of competition benefits appeared to be low, and in some cases, negative. This was generally attributable to differences in the allocation of market driven new entry to portfolios between the base case and augmented cases. For example, brownfield new entry attached to an existing generating portfolio within the interconnector upgrade case could potentially result in less competitive market outcomes (and possibly negative competition benefits) compared to new entry unattached to any existing portfolio within the base case.

Heywood (2012)

In late 2011, ElectraNet and AEMO commenced consultation[6] as part of a joint RIT-T process to investigate increasing the capacity of the existing 275 kV interconnector between Victoria and South Australia. The specific assumptions used included:

" • *The Price Elasticity of Demand (PED) estimates published by AEMO in its 2012 NEFR were used. The price elasticity published in this report applies to retail electricity prices. ElectraNet scaled these values by forty per cent to reflect the contribution of the spot price to the retail price.*

- *New entrant generation was assumed to be unattached to any existing portfolio. The implication of this assumption is that competition benefits will reduce over time. As a consequence, ElectraNet has focussed on the first 10 years of the proposed augmentation's life.*
- *Generation contracting levels have been assumed to be at 90%."* [6]

Within the second stage consultation PADR document, ElectraNet and AEMO outlined their experiences with the quantification of competition benefits for the central scenario, and reported that the magnitude of competition benefits associated with the credible options within the RIT-T appeared to be very low. It was confirmed that price outcomes under Nash Cournot bidding were higher, and this led to a reduction in consumption. However, the resultant change in consumer surplus was found to be small and volatile.

On this basis, ElectraNet and AEMO concluded that competition benefits were not material, and that the quantification effort required would be disproportionate to the expected levels of such benefits.

As part of the 2010 and 2011 National Transmission Network Development Plans (NTNDPs), AEMO assessed the market benefits associated with a significant increase in inter-regional capability within the NEM regions (referred to as NEMLink). However, the evaluation of competition benefits was not included as part of this assessment.

> Powerlink and TransGrid are interested in the views of parties who are experienced in economic and market modelling as to whether they consider competition benefits could form a significant component of economic benefits associated with increasing the transfer capability across interconnectors, and in particular, QNI.

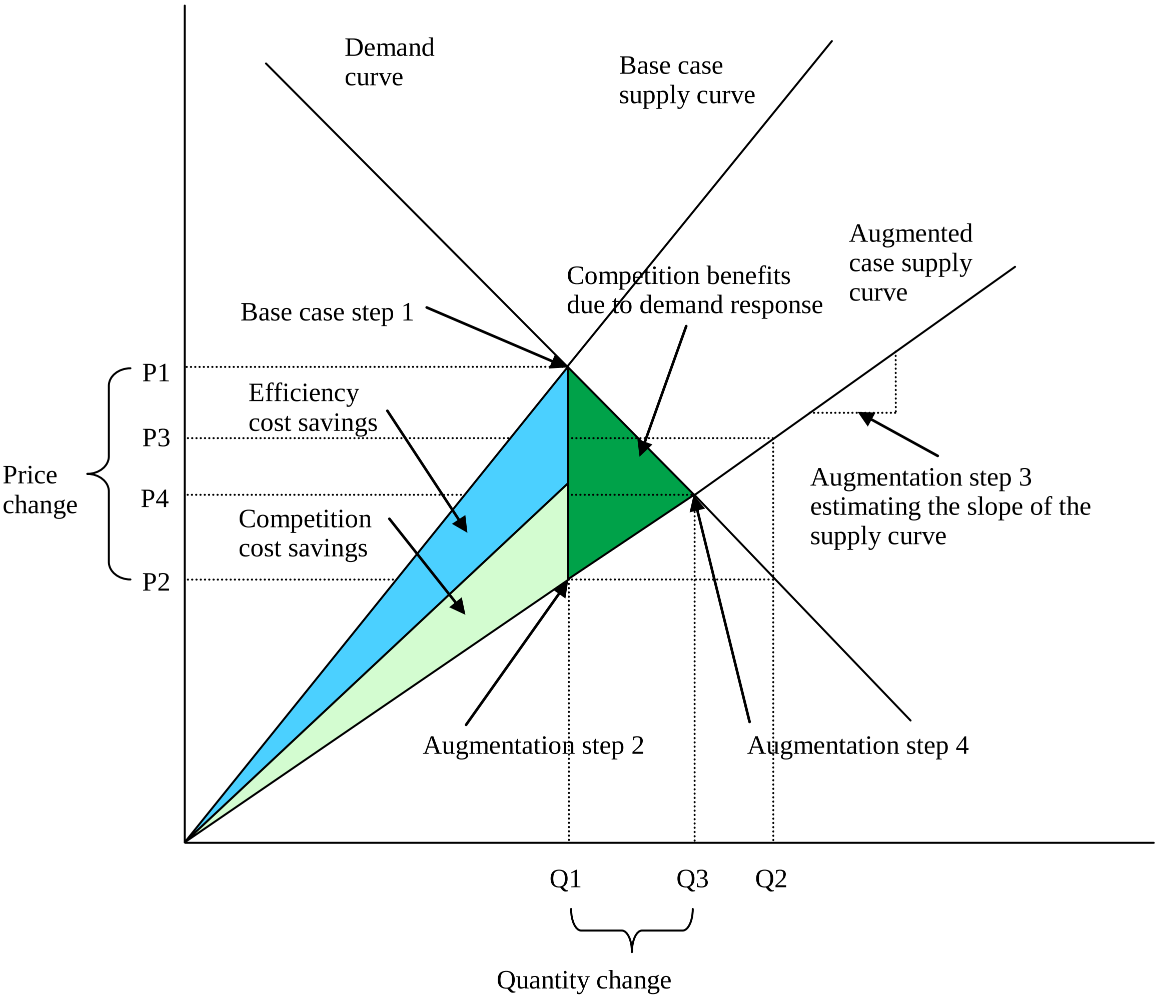
2.3. Quantifying Competition Benefits

TransGrid and Powerlink consider that the Frontier five-step approach is a reasonable approach to quantifying competition benefits, and propose to use this approach for assessing market benefits associated with alleviating transmission congestion across QNI.

The Frontier approach has been detailed within a published paper prepared for the ACCC, and applied to the Snowy to Victoria interconnector upgrade as a case study. The Frontier paper can be found on the AER's website[3].

An illustration of the change in economic surplus arising from an increase of inter-regional transfer capability was represented graphically within the Frontier report, and has been reproduced below.

The total change in consumer and producer surplus is the sum of the blue, light green and dark green shaded sections, and represents the market benefits.



<u>Source</u>: Frontier Economics, Evaluating Interconnection Competition Benefits (Final Report), September 2004.[3]

Frontier uses the change in demand weighted average pool prices across the year to determine the change in consumer demand to prices, and indicate that demand weighted average annual prices are more appropriate compared to time-weighted prices, since:

> *" Demand weighted prices reflect the average price paid per MWh for electricity by consumers, and is an appropriate measure of price for use with an elasticity of demand to determine demand changes."* [3]

The Frontier five-step approach can be summarised as follows:

Step 1

This step involves calculating the demand weighted average pool price across the year for the base case (unaugmented system) using market modelling techniques. The pool prices are determined using models of realistic generator bidding behaviour.

In terms of the supply–demand curve representation above, this stage denotes the pre-augmentation equilibrium point (P1,Q1).

Step 2

This stage involves calculating the demand weighted average pool price across the year for the augmented system using market simulations excluding a consumer demand response. Again, pool prices are determined using realistic generator bidding behaviour models.

This stage is denoted by the post-augmentation point (P2,Q1) within the supply–demand curve representation on the previous page.

Step 3

This step involves estimating the slope of the supply curves within each region post-augmentation, by finding the average price on the augmented supply curve that results from a small increase in demand quantity. It is assumed that the slopes of the supply curves are linear about the point of interest.

This enables the inverse cross-elasticity of supply matrix to be developed.

Step 4

This step involves compiling the inverse elasticity of demand matrix from available data.

A linear approximation of the supply curve about the point of interest is derived. The post-augmentation equilibrium point (P4,Q3) is estimated by calculating the intersection points of the linear approximations of the regional supply and demand curves.

The change in production costs due to the augmentation is calculated.

Step 5

The sum of the consumer and producer surplus, representing the blue, light green and dark green areas, are calculated using the information derived in the steps above.

TransGrid and Powerlink intend to apply the Frontier methodology to quantify the market benefits of alleviating congestion across QNI.

Powerlink and TransGrid are seeking feedback as to whether any particular technical or market characteristic of QNI limits the application of Frontier's methodology for calculating economic benefits associated with alleviating transmission congestion across QNI.

3. Realistic Generator Bidding Behaviour

3.1. Realistic Bidding Models

The RIT-T states that the market benefits of identified credible options be quantified using a scenario based approach. The number and choice of scenarios are required to be appropriate to the credible options under consideration, and that the choice of reasonable scenarios are required to reflect any variables or parameters that are likely to affect the ranking of the credible options.

TransGrid and Powerlink intend to incorporate variations in generator bidding behaviour as part of the formulation of scenarios within the assessment of options for increasing the transfer capability of QNI. It is proposed that scenarios including both short run marginal cost (SRMC) generator bidding and realistic generator bidding behaviour be incorporated within the set of scenarios for the QNI development assessment.

There are several theories and frameworks for modelling realistic generator bidding behaviour. As mentioned previously, the AER states that it does not wish to prescribe the methodology for determining realistic generator bidding behaviour, other than to suggest that it should be based on a credible theory on how participants are likely to behave in the wholesale spot market, and should take into account the impacts of other participants bidding behaviour on the bidding behaviour of any given participant.

Frontier states that one of the approaches which has emerged as the most preferable is based on game theory, which they described as:

> " *Game theory is a branch of mathematical analysis which is designed to examine decision making when the actions of one decision maker (player) effects the outcomes of another player, which may then elicit a competitive response that alters the outcome for the first decision maker."* [3]

Furthermore, Frontier considers that Game theory is well suited to application in electricity markets, where the game is governed by a well defined set of rules on a repeated basis:

> " *Lessons learned in one trading period about the bidding practices of competitors will be drawn upon to formulate bids for subsequent trading periods."* [3]

The three main approaches used to assess market behaviour within the electricity supply industry are Cournot Nash Equilibrium, Nash Equilibrium and Supply Side Equilibrium. All three approaches are based on game theory, and aim to find the most profitable operation of the market as a whole (that is, the highest equilibrium price).

Supply Side Equilibrium involves developing an aggregate supply curve for each region as continuous functions, and determining the market price at which the supply curves intersect the demand curves. A sensitivity analysis is performed to determine price versus output curves for each generating portfolio, and supply curves are subsequently varied until the highest market equilibrium state is reached. Generator minimum stable operating levels and portfolio contract obligations are assigned prior to optimising the portfolio position.

Once the portfolio optimal output and market clearing prices have been determined, generator quantities within each portfolio are determined and allocated.

Powerlink and TransGrid intend to adopt Supply Side Equilibrium modelling to model realistic bidding for the QNI upgrade studies since this approach provides the most computationally manageable method for modelling game theory outcomes.

If it is considered that Supply Side Equilibrium is not a suitable framework for modelling generator bidding behaviour within the realistic bidding scenarios, Powerlink and TransGrid are seeking feedback as to why the framework is not considered suitable (including supporting research and documentation).

3.2. Disorderly Bidding

Disorderly bidding is associated with the regional pricing structure of the National Electricity Market (NEM). It can occur when intra-regional congestion provides market conditions such that incentives arise for generating stations that have access to the regional reference node and are favourably located, to participate in activities which are not reflective of their costs or technical characteristics.

Disorderly bidding behaviour may include generating stations rebidding to negative price bands or changing technical characteristics (such as ramp rates) to maintain or increase volume during times of congestion and high pool prices. The consequences of disorderly bidding include market outcomes which are not reflective of the cost of production, counter-price inter-regional flows, and increased price volatility, all of which ultimately manifest in increased levels of risk and cost to market participants.

In December 2012, the AER published a special report[7] on congestion and disorderly bidding within the NEM, and highlighted recent events where congestion within the transmission system in Central Queensland, and the NSW to Victorian border, have distorted economic dispatch, impacted inter-regional trade, and increased volatility.

The RIT-T Guidelines state that realistic generator bidding can involve modelling of disorderly bidding, and:

> " *to the extent a credible option attenuates the incentives for a generator to engage in disorderly bidding, the calculation of that credible option's market benefit could include the market benefit arising from more cost-reflective generator bidding."* [2]

However, the RIT-T Guidelines also acknowledge that modelling disorderly bidding behaviour is difficult, and may not be warranted in the majority of RIT-T assessments.

The incidences of disorderly bidding observed within Central Queensland are the result of intra-regional transmission congestion across the Gladstone grid section. In late 2010, Powerlink commenced a regulatory test consultation process to address emerging reliability limitations within the Central and North Queensland areas. As a result of that process, Powerlink commenced construction of a new 275kV transmission line between Calvale and Stanwell substations, which is due for completion by late 2013.

It is anticipated that this transmission augmentation will alleviate transmission congestion across the Gladstone grid section, and reduce the opportunity for conditions which give rise to disorderly bidding. Powerlink and TransGrid intend modelling the Calvale to Stanwell project, and the associated increases to transmission limits, as a committed project within the QNI market models.

As part of the assessment of market benefits for QNI, Powerlink and TransGrid intend to model disorderly bidding within locations where the issue has occurred previously, and potential future locations where the issue could arise due to new entry generation and emerging network constraints. Powerlink and TransGrid note, however, that there has not been a significant amount of published works regarding modelling of disorderly bidding, and this is a relatively new area.

Where future incidences of congestion are encountered and identified within the market simulations which could potentially give rise to disorderly bidding outcomes, Powerlink and TransGrid intend to investigate whether any incremental changes to the technical characteristics of credible options are economically justified.

It is not anticipated that disorderly bidding outcomes will be observed within the SRMC generator bidding scenarios, since this bidding strategy is intended to reflect generation cost of production.

Powerlink and TransGrid are seeking feedback on the modelling of disorderly bidding, and whether alleviating disorderly bidding could form a material component of market benefits.

3.3. Supply Side Assumptions

Powerlink and TransGrid intend to model the characteristics of generating units (such as minimum stable generating levels, intermittency of generation, variable operating costs, emission levels, and equivalent forced outage rates) based on data published by AEMO for the 2012 NTNDP.

Where possible, this information will be updated with the most recently available published data prior to commencement of the market simulations.

3.4. Market Modelling Tools

Powerlink and TransGrid intend to use the commercially available software package PROPHET[8] designed to replicate and simulate the operation of the NEM. The market rules, trading arrangements, dispatch and clearing engine, and network and technical constraints modelled within PROPHET are consistent with those within the NEM. It is proposed to quantify the market benefits using time sequential market simulations.

PROPHET also incorporates a dynamic generator bidding module which is capable of determining both Nash Equilibrium and Supply Side Equilibrium market outcomes.

4. Demand Elasticity

The response of consumers to changes in annual demand weighted average wholesale pool price outcomes forms an integral assumption within the Frontier approach to quantifying market benefits.

Where it is assumed that some form of price elasticity to consumption exists within the electricity market, lower wholesale pool prices leads to higher levels of energy consumption and economic activity, which translates to an increase in economic surplus. The higher levels of consumer demand and economic activity more than compensates for the increased cost of production to meet the demand.

The regional spot price of the importing region is expected to decrease when transmission congestion between regions is alleviated. However, it should be noted that, under some circumstances, this may be accompanied by higher pool prices within the exporting region. The market benefits associated with increasing the transmission capability between two regions needs to assess the increase in economic surplus across the NEM as a whole.

In June 2012, AEMO published the National Electricity Forecasting Report (NEFR)[9] which provides information on long run responses to changes in electricity price based on historical observations. The report indicated that price elasticity to demand has ranged from 0.14% for the Victorian region with a 12 month lag (ie a 1% increase in electricity price 12 months ago will result in a 0.14% decrease in electricity consumption today) to 0.69% for the Tasmanian region.

TransGrid and Powerlink have developed regional demand elasticity models as an input to the Frontier approach for calculating competition benefits based on the information published within the 2012 NEFR. Characteristics of the model include:

(1) Scaling of retail price elasticity figures published within the NEFR by 50% to represent the contribution of wholesale pool price to retail price.

(2) An assumption that changes in wholesale pool prices within adjacent (or other) regions will have a negligible impact on consumer demand within the region. For example, a decrease in wholesale pool price for the Victorian region is assumed to have negligible impact on long run consumer demand for customers within NSW.

The inverse elasticity of demand matrix proposed to be used as part of the Frontier approach (that is step 4) is shown below.

Region	QLD	NSW	VIC	SA	TAS
QLD	-11.11	0.00	0.00	0.00	0.00
NSW	0.00	-6.90	0.00	0.00	0.00
VIC	0.00	0.00	-14.29	0.00	0.00
SA	0.00	0.00	0.00	-8.00	0.0
TAS	0.00	0.00	0.00	0.00	-2.90

AEMO have also published short term market driven demand reductions based on surveys of stakeholders within the 2011 ESOO[10]. These have been modelled as scheduled load blocks with price and quantities consistent with those detailed within the ESOO.

Powerlink and TransGrid are seeking comments relating to the suitability of the proposed demand elasticity data and models as an input to the Frontier methodology.

5. References

1. AER, *Regulatory investment test for transmission*, Final, June 2010.
   www.aer.gov.au/sites/default/files/Final%20RIT-T%20-%2029%20June%202010.pdf

2. AER, *Regulatory investment test for transmission application guidelines*, Final, June 2010.
   www.aer.gov.au/sites/default/files/Final%20RIT-T%20-%2029%20June%202010.pdf

3. Frontier Economics, *Evaluating interconnection competition benefits*, Final Report, September 2004.
   www.aer.gov.au/sites/default/files/Frontier%20Economics%20report%20-%20evaluating%20interconnection%20competition%20benefits%20-%20September%202004.pdf

4. TransGrid and Powerlink, *Project Specification Consultation Report - Development of the Queensland - NSW Interconnector*, June 2012.
   www.transgrid.com.au/network/consultations/Pages/CurrentConsultations.aspx
   www.powerlink.com.au/Network/Network_Planning_and_Development/QNI_upgrade_study.aspx

5. Powerlink and TransGrid, *Potential Upgrade of Queensland/New South Wales Interconnector (QNI) – Assessment of Optimal Timing and Net Market Benefits*, Final Report, October 2008.
   www.powerlink.com.au/Network/Network_Planning_and_Development/QNI_upgrade_study.aspx
   www.transgrid.com.au/network/consultations/Pages/currentConsultations.aspx

6. AEMO and ElectraNet, *South Australia - Victoria (Heywood) Interconnector Upgrade RIT-T: Project Assessment Conclusions Report*, January 2013.
   www.aemo.com.au/Electricity/Planning/Regulatory-Investment-Tests-for-Transmission-RITTs/Heywood-Interconnector-RIT-T

7. AER, Special *Report - The impact of congestion on bidding and inter-regional trade in the NEM*, December 2012.
   www.aer.gov.au/node/18855

8. IES (Intelligent Energy Systems), *PROPHET Electricity Market Model*.
   www.iesys.com/iesdownloads/Brochures/Prophet.pdf

9. AEMO, *National Electricity Forecasting Report for the National Electricity Market (NEM)*, 2012.
   www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2012

10. AEMO, Electricity *Statement of Opportunities for the National Electricity Market*, 2011.
    www.aemo.com.au/Electricity/Planning/Archive-of-previous-Planning-reports/Electricity-Statement-of-Opportunities-2011