Economic benefits of interconnection in the NEM

Options for improving the effectiveness of the regulatory test for transmission investment

Prepared for Stanwell Corporation

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ACIL Tasman

Economics Policy Strategy

ACIL Tasman Pty Ltd

ABN 68 102 652 148
Internet www.aciltasman.com.au

Melbourne
Level 6, 224-236 Queen Street
Melbourne VIC 3000
Telephone (+61 3) 9600 3144
Facsimile (+61 3) 9600 3155
Email melbourne@aciltasman.com.au

Canberra
Level 1, 33 Ainslie Avenue
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

Brisbane
Level 15, 127 Creek Street
Brisbane QLD 4000
GPO Box 32
Brisbane QLD 4001
Telephone (+61 7) 3236 3966
Facsimile (+61 7) 3236 3499
Email brisbane@aciltasman.com.au

Sydney
PO Box 170
Northbridge NSW 1560
Telephone (+61 2) 9958 6644
Facsimile (+61 2) 8080 8142
Email sydney@aciltasman.com.au

Perth
Level 12, 191 St Georges Terrace
Perth WA 6000
PO Box 7035
Cloisters Square
Perth WA 6850
Telephone (+61 8) 9485 0300
Facsimile (+61 8) 9485 0500
Email perth@aciltasman.com.au

Darwin
GPO Box 1000
Darwin NT 0801
Telephone +61 8 8981 2101
Facsimile +61 8 8981 2702
Email darwin@aciltasman.com.au

For information on this report

Please contact:

Owen Kelp
Telephone (07) 3236 3966
Mobile 0404 811 359
Email o.kelp@aciltasman.com.au

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1 Background

The regulatory test[1] is a decision framework used to assess whether proposed network augmentations should be included in the regulated asset base of a Transmission Network Service Provider's (TNSP). A regulatory test assessment is required for all network augmentations valued over $1 million.

An investment may satisfy the regulatory test via one of two limbs:

- The reliability limb: used for considering reliability driven augmentations, which are based on the service obligations imposed on network service providers. An augmentation will satisfy the test if it represents the least cost option
- The market benefits limb: used for considering market driven augmentations. A proposed augmentation satisfies the regulatory test if it results in market benefits which have a positive NPV and also results in the maximum NPV having regard to alternative options, timing and market developments.

The reliability limb is used for transmission augmentations within jurisdictional regions, while the market benefits limb can be used for either intra-regional augmentation or inter-regional connections (interconnectors).[2]

The regulatory test itself is not overly prescriptive in its practical application and there exists scope for different interpretations of allowable benefits and the appropriate means for their estimation. Applications of the test to-date have estimated the following benefits:

- Energy benefits: reduced energy costs, counted in terms of the marginal costs of supplying the load and including fuel and variable O&M, and reductions in the frequency and level of voluntary load interruptions
- Deferred market entry generation benefits: reduced capital and fixed O&M costs from the deferral of new investments in generation
- Reliability benefits: reduced capital and O&M costs arising from the deferral of reliability entry generation and also from lower levels of unserved energy (USE)
- Deferred network benefits: reduced capital costs from related network deferrals.

Competition benefits were explicitly provided for within the latest regulatory test review in 2004. Competition benefits arise from the impact upon

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[1] ACCC, *Review of the Regulatory Test Decision*, August 2004

[2] The context of this report is focused upon the market benefits test as it applies to interconnectors, however arguments within are equally applicable to the market benefits of intra-regional transmission augmentations.

consumption brought about by the changes in regional prices. To-date, competition benefits have not been estimated within an application of the test.

Benefits are estimated on an NPV basis across a range of different scenarios for the proposed augmentation and as well as alternative augmentation options. These are then offset against the present value of capital expenditure and ongoing operating costs for the augmentation.

The current approach applied in the regulatory test is similar to that used in typical benefit cost analyses for major items of publicly owned infrastructure, such as dams and roads. However, it differs in that it attempts to measure whether there is any change in the total of consumer plus producer surplus within a partial equilibrium framework. Partial equilibrium theory examines the conditions of equilibrium in an individual market or in part of the national economy. It usually looks at the relationship between two economic variables – price and quantity – assuming others are held constant.

This analytical framework treats an increase in surplus as a benefit and a decrease as a cost. If prices fall by the industry becoming more competitive but the underlying costs of meeting demand don't change, this approach will not measure a benefit. It will simply note a reduction in producer surplus and a corresponding increase in consumer surplus. The only benefit recorded might be if consumption increases slightly, the so-called competition benefit. The economy wide benefits from a fall in industry prices will not be identified within a partial equilibrium framework.

A general equilibrium framework is required for this. General equilibrium analysis considers a simultaneous equilibrium in a group of related markets (which can be a national economy). Within this framework, the effects of a price reduction in the electricity market would have effects in other markets, particularly heavy users of electricity. Computable general equilibrium (CGE) models have been developed to model such changes in many related markets simultaneously. CGE models in Australia were developed in the 1980's mostly to assist in estimating the effects of major micro-economic reforms, such as lowering import tariffs, achieving trade liberalisation and reforming major utility sectors, like electricity.

The applicability of a CGE framework for this type of decision making is discussed further below.

1.1 Purpose

Stanwell Corporation Limited (Stanwell) has engaged ACIL Tasman to evaluate whether within the regulatory test framework there is an economic basis for:

- A 'customer benefits' test (as opposed to the current market benefits test);
- Or, incorporation of 'full' economic benefits.

Given the potential to include wider economic benefits from interconnector augmentation in the decision making process, Stanwell has asked for a discussion of possible economic models (and appropriate measurable indicators) that would capture these benefits and identification of limitations to their application.

This report begins by detailing the evaluation criteria of the current regulatory test and the rationale behind its development. It then examines whether a shift toward a consumer orientated test has merit and lastly examines potential methods by which broader economic benefits may be calculated.

2 Rationale for current criteria

The original regulatory test for transmission augmentation was drafted in the form of a consumer benefits test as specified within the National Electricity Code. The test's focus was upon changes to consumer surplus arising from the augmentation. This test was applied by NEMMCO to the proposed SANI/SNI augmentation in 1999. Due to problems arising from NEMMCO's application of the test (definitional and practical implementation) the ACCC, as an independent body, was asked to review it.

Fundamental to the original ACCC review of the regulatory test in 1999 (and subsequent structural changes) was the study completed by Ernst & Young.[3] This study examined the assessment criterion for network augmentations in the context of Chapters 5 and 6 of the National Electricity Code. As a result of recommendations within this report, the ACCC amended the fundamental structure of the test to focus on 'market benefits' rather than 'consumer benefits'.

The Ernst & Young report used four key criteria stemming from the objectives and principles within the national electricity code for network augmentations. These were:

- Competitive neutrality
- Economic efficiency
- Practicability and simplicity
- Regulatory certainty.

The first of these – competitive neutrality – was taken directly from the code objectives and implied that the criterion should not discriminate between generators nor regulated transmission options over other investments. The cost-benefit framework for the criterion was deemed to meet this objective as it allows for other investments (typically merchant investments) to provide the service in the 'without augmentation' scenario. To the extent that the augmentation scenario provides superior outcomes and all participants are treated equally, the neutrality objective was seen to be met.

The economic efficiency criterion was derived from various chapters within the code, although no explicit reference was made within the NEM objectives. Economic efficiency broadly encompasses three parts:

[3] Ernst & Young, *Review of the Assessment Criterion for New Interconnectors and Network Augmentation: Final Report*, March 1999.

- *Productive efficiency*, defined as using the least amount of resources to produce a given good or service so that it is being produced at the lowest possible unit cost;
- *Allocative efficiency*, concerned with the market condition whereby resources are allocated in a way that maximises the net benefit attained through their use. Generally this occurs where prices represent marginal costs of production and are free from distortion. Perfect allocative efficiency is also referred to as Pareto Efficient Allocation, that is, resources cannot be readjusted to make one consumer better off without making another worse off;
- *Dynamic efficiency*, occurs over the long-term where sufficient incentives exist to innovate and invest.

Cost-benefit analysis considers all costs and benefits arising from the project in question. It does not single out benefits to certain groups over others and is intended to result in Pareto improvements (albeit potential Pareto improvements[4]). The ACCC notes:[5]

> The cost/benefit framework is robust and supports economically efficient decision making; that is, where incremental benefits are greater than incremental costs. A decision criterion that emphasised certain individual benefits and ignored other individual costs may well result in an over investment in networks. Consequently, the Commission maintains its view that the regulatory test should not be based on the customer benefits criterion but should be based on the cost/benefit framework which emphasises an assessment of net public benefits in aggregate.

The cost-benefit test criteria, which involved no distinction between benefits amongst different market participants, were seen to meet the efficiency criteria.

The final two criteria were seen to have significant merit to the market in general and all else being equal, a test which exhibited these attributes should be considered superior.

2.1 Arguments for a consumer benefits test

Given the rationale described above, the suggestion has been made that a return toward a consumer benefits test is warranted. These views have been encouraged by the recent change to the NEM objective, which is now couched in terms of the long-term interests of consumers:

> To promote efficient investment in, and efficient use of, electricity services for the long-term interests of consumers of electricity with respect to price, quality, reliability,

[4] A potential Pareto improvement occurs when the gains from those who benefit exceeds the losses of those who are made worse off. Whether winners compensate losers is generally not considered, with the result still being considered economically efficient.

[5] ACCC, *Regulatory Test for New Interconnectors and Network Augmentations*, December 1999, page 6

> and security of supply of electricity and the reliability, safety and security of the national electricity system.

The ACCC/AER sees the current regulatory test as being applicable under the revised market objective:[6]

> …the regulatory test attempts to limit or prevent the possibility of non-commercial or inefficient transmission investment decisions in order to ensure efficient development of commercial generation investment together with the efficient development of transmission. This will best promote the long term interests of customers as required by the NEM objective.

A consumer benefit test would ignore the welfare impacts on producers. This would represent a divergence from the currently adopted cost-benefit framework which considers all impacts in equal fashion. This change to the test could be accused of lacking competitive neutrality, in that benefits and costs are treated differently depending upon where they fall.

2.2 Benefit scope

Given that 'efficient investment' is a central pillar of the NEM objective, the regulatory test should strive to facilitate *efficient* investment in interconnection between regions[7].

Within the previous reviews, the ACCC has stated its position that a cost-benefit test results in potential Pareto improvements and therefore represents an efficient decision making tool. Cost-benefit tests in this context refer to *public* cost-benefit tests, that is costs and benefits which accrue to all members of the economy. However, the scope of the regulatory test has been purposely limited to a partial equilibrium framework which takes into considerations costs and benefits *within* the electricity market only.

It is not clear how considering the aggregate benefits for a single industry results in economically efficient outcomes (potential Pareto improvements) for the remainder of the economy, which has been excluded from the analysis. Potentially, benefits from sectors outside the industry could outweigh net costs from within, resulting in a different outcome. The reverse situation is also true.

The decision on the scope of the test derives from the recommendations of the Ernst & Young report to the ACCC in the context of the original test review in 1999. The report gives two main reasons why the analysis should retain a partial equilibrium scope:

[6] ACCC/AER, *Submission to ERIG issues paper*, August 2006, page 8

[7] Note that the function of the regulatory test is not to assist in planning but as part of a regulatory approval process.

- Casting the benefit net too widely will create new measurement problems; and
- It coincides with the traditional central planning environment, where planners would undertake "least-cost planning", which would typically consider costs associated with generation and transmission and the opportunity costs associated with unserved load.

The first of these arguments, while potentially valid, seems included primarily for convenience. Many commentators – the ACCC included – raised similar concerns about the introduction of competition benefits within the latest review. Moving towards a general equilibrium framework and attempting to estimate economy-wide (second round) effects would add a layer of difficulty to the test. However, the derivation and analysis of these second round effects would remain within the traditional cost-benefit framework. This approach would also tend to coincide with the way in which governments typically view large public projects and the derivation of second round effects would probably be no more difficult than estimating competition benefits.

The second argument put forward in favour of the partial equilibrium scope is provided almost as justification for avoiding the potential measurement problems. The centrally planned provision of transmission is usually considered analogous to a 'least-cost planning' approach. It typically involves the identification of a problem and choosing the lowest cost means of overcoming that problem. A cost minimisation approach will result in second best outcomes in situations where more costly options offer incremental benefits which outweigh the additional costs. The lowest cost option does not always provide the best ratio of benefits to costs. Additionally, limiting the consideration of available solutions to those solely within the industry excludes the other potentially efficient options, such as a gas pipeline, which exist outside the industry.

It would appear therefore that the decision to restrict the regulatory test scope to a partial equilibrium analysis has been based primarily on the measurement problems associated a more traditional cost-benefit scope. Giving equal weighting to changes in consumer and producer surplus appears to be a relatively arbitrary decision based on analytical convenience. It does not necessarily follow that a full *public* benefits test would yield the same results. To our knowledge no quantitative work has been commissioned on the validity of this decision which the industry has appeared to accept largely at face value.

From the material within the Ernst & Young report and subsequent comments made by the ACCC, it appears that if no measurement problems existed with general equilibrium analysis, a full public cost-benefit test would represent the ideal criterion for the regulatory test.

3 Estimating economy-wide benefits

As electricity is an important input to almost all economic activity within the economy, it is likely that the impact of even small changes in prices to consumers will have significant impacts for downstream sectors. In this chapter we look at what a CGE model could add to the decision making process and the way in which such a model would estimate additional benefits and costs. In this case we have used the CGE model called Tasman Global, which is maintained and run by ACIL Tasman as our in-house macro-economic model.

3.1 General equilibrium modelling

General equilibrium models capture the economic relationships between the different economic sectors (57 in the Tasman Global case) and in different regions (the Australian states and territories, or more local regions when required). They show how a defined change – in this case the installation of a new interconnector – has direct and indirect effects on other sectors and on the different regions. The new interconnector will have direct effects on the electricity industry and will also have effects on the industry's customers and their customers, and on capital and labour markets.

CGE models are essentially a very large set of equations built up from data on the Australian and international economy, the input and output relationships between the different sectors and regions, and the links between trade, consumption and investment. Although the different models in Australia are broadly similar, Tasman Global separates electricity generation from transmission and distribution, and has separate treatment of gas, different coal types and other energy types. The equations solve simultaneously to capture the immediate, second round and subsequent effects. Tasman Global has also been extended to cover dynamic, inter-period effects.

The initial effect of a new electricity interconnector is to reduce electricity prices in the region that imports electricity. Conversely, the exporting region will generally experience an increase to its electricity price such that the prices in the two regions will tend to converge. Generators in the exporting region see an increase in output, while generation in the importing region will decline. Industry benefits therefore accrue to consumers in the importing region and generators in the exporting region. Disbenefits (negative benefits) accrue to consumers in the exporting region and generators in the importing region.

The public net benefit may be much larger, however, because of the effect of the lower prices on:

- Electricity consuming industries (reduced prices and increased output)

- Consumers (lower prices and increased consumption)
- Investment and capital (less electricity investment needed for a given level of output, hence capital resources available to other sectors)
- The end result is that incomes (GDP or GSP) and employment are both higher.

General equilibrium modelling can show that the overall benefit to the economy is much larger than shown in the traditional market benefits test.

The following sections discuss how CGE models work and how Tasman Global's energy sector enhancements may be used to show the impacts of interconnector augmentations.

3.2 Tasman Global and inter-connector analysis

Tasman Global provides a modelling framework through which a given change in an economy can be traced through to measure the overall economic welfare impacts.

As stated above, Tasman Global is a multi-sector dynamic model of the Australian and world economy, covering Australia's six states, two territories and foreign countries. It models each region as an economy in its own right, with region-specific prices, region-specific consumers, region-specific industries, and so on. Since Tasman Global is dynamic, it is able to produce sequences of annual solutions linked by dynamic relationships.

The economics in Tasman Global can be most easily understood in terms of a set of equations, conditioned by the model's database, that determine the behaviour and outputs of the model. The equations plus the database provide a detailed representation of the economy.

Since Tasman Global has well developed energy and electricity sectors and the ability to estimate economy wide impacts, it possible to use the model to assess a range of different scenarios regarding the electricity market. However by default, Tasman Global does not explicitly model the operation of interconnectors in the NEM. With further development of the model it may be possible to introduce further detail into the wholesale electricity market representation which included notional interconnectors.

With that in mind, the following discussion traces through a general productivity improvement in the electricity sector through to the wider economy. In order to keep the discussion relatively simple and to focus on the flow through of impacts, the analysis is centred on a single economy where there is an increase in capital productivity in the electricity sector.

This means the single region could be Australia (or the NEM states), while the productivity change represents an expansion of interconnector capacity. While, strictly speaking, a notional productivity improvement is not the same as an interconnector augmentation between two trading regions, the flow on impacts are similar and the analysis is much less complex.

3.2.1 Flow on impacts – industry

Initially, with no change in electricity demand conditions or prices and thus no change in output, an increase in capital productivity will bring about a fall in the demand for capital used in electricity production. With lower production costs in the electricity sector plus competition, the price of electricity falls.

The falling demand for capital in the electricity industry leads to an initial fall in the price of capital resources (i.e. the available capital stock), essentially freeing up some capital to be used in other competing industries. Basically, the fall in capital demand in the electricity industry means there is a greater capital resource pool in the rest of economy to increase production of other goods and services.

Other industries in the economy, therefore, initially face a falling price of capital (cost savings) and an effectively larger pool of capital allowing production to expand.

As production expands, the demand for resources, mainly labour and capital, increases, causing a rise in the price of labour (real wage) and adjustments in the capital market to restore equilibrium in that market. Hence, the expansion in non-electricity output and associated resource demand offsets the initial fall in the price of capital, restoring equilibrium to the capital market and the economy at a higher level of output and production.

With no other changes to the factors affecting the capital market, such as movements in international rates of return and exchange rates, the capital market will in general reach equilibrium at a rental price of capital price close to the original.

However, there are additional cost savings to industries in the economy via the fall in the electricity price. The fall in the electricity price represents a cost saving to all other industries, allowing production to expand further. The production expansion will be most noticeable in industries that consume relatively large amounts of electricity. Once again this leads to higher labour and capital demand. As a consequence, factor prices climb. Therefore, the price of capital has risen above its original starting level.

The above processes lead to an increase in total value added and hence GDP. With a fixed stock of capital and fixed labour supply, both now receiving higher returns, total value added has increased. Furthermore, the higher level of economic activity creates increased taxation receipts for the government which is a further rise in GDP as calculated from the income side.

3.2.2 Flow on impacts – households and aggregate expenditure

While the above discussion traced the flow-on benefits from the production side it is also worthwhile to follow the path on the demand side. Changes in production of electricity cannot occur without compatible changes on the demand side.

The initial fall in electricity prices leads to two initial effects on households:

1. Substitution effect, the relatively lower price of electricity induces households to expand their consumption of electricity; and
2. Income effect, the fall in electricity prices leads to a small fall, initially, in the general price level and hence a rise in disposable income and consumption of all goods and services.

The relativities of magnitude of these impacts is determined by various elasticities (cross price and income) in the household consumption function.

Compounding these impacts are second and subsequent substitution and income effects as the prices of all goods and services change slightly in response to the movements in labour and capital and electricity prices. The end result sees real household consumption expand above its initial level.

Furthermore, as prices for labour and capital rise the level of household income also rises, leading to further increases in economy-wide consumption and GDP.

The general increase in household demand places upward pressures on prices across the economy, offsetting the initial price reductions and helping to restore equilibrium in product markets. The final price outcome for the output from each industry is a function of the relative labour, capital and electricity intensity of each industry.

Other components of final demand

The increase in government revenue through the higher levels of production results in additional government spending.

The processes through which the other components of GDP change are a little more complex due to the dynamic nature of Tasman Global.

In summary:

- Imports will generally increase through higher household incomes
- Exports will generally expand if the more electricity intensive industries are trade exposed
- Aggregate investment will increase generally in line with changes to total output and somewhat enhanced by a higher rate of return on capital.

3.2.3 Expanding the analysis

The above discussion is based on the analysis of a single economy. The process is similar for the more realistic case where there is one region exporting electricity and another importing coupled with the building of a new interconnector or the augmentation of an existing one.

In this case, the final welfare gains are shared across the regions. The exporting region experiences benefits through higher capital and labour prices and the expansion of final demand through increased exports, offset by rising domestic electricity prices. The importing region benefits from lower electricity prices and a fall in domestic electricity production that frees resources to be used in other industries for production expansion.

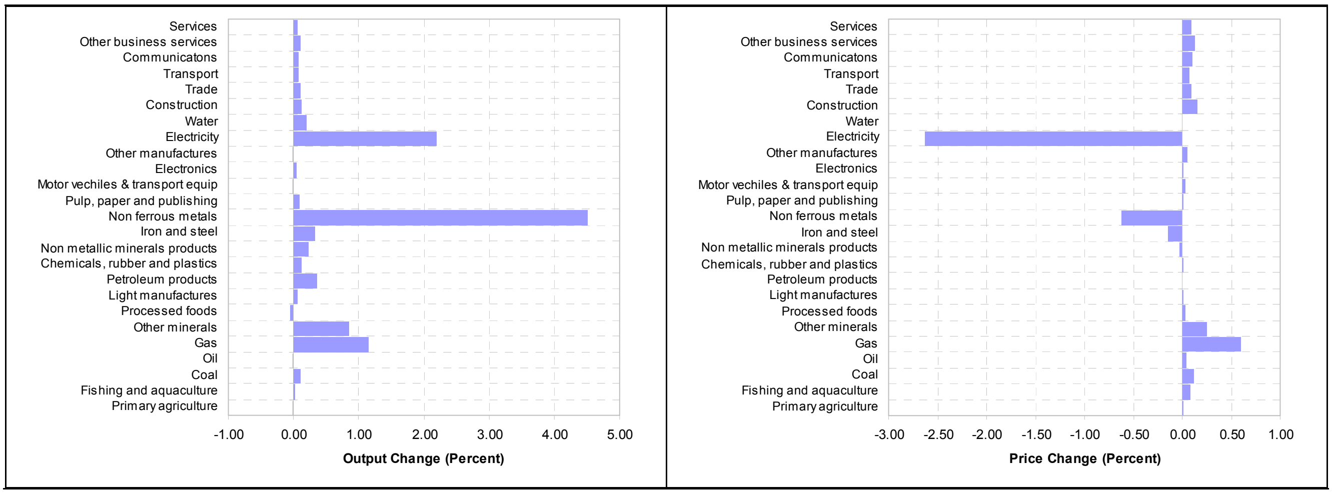
The following section provides a brief overview of the results of a practical application to CGE modelling in relation to the wholesale electricity market.

3.3 Illustrative example of GE application

Figure 1 shows the results from an example of a 10% price cut in the production and transmission of electricity throughout Australia as a result of an assumed productivity improvement. This changes results in an aggregate increase to real GDP of 0.16%. The non-ferrous metals sector experiences the largest increase in output (4.5% higher), followed by electricity (2.2% higher). ‘Other minerals’ and gas industries also increase output by around 1%.

Price changes are less pronounced, with equilibrium prices in most industries rising only slightly due to the increased economic activity. Notable exceptions are electricity, non-ferrous metals and iron and steel (electricity being a key input). Aggregate exports increase by 0.22%, however this is more than offset by increased imports (up 0.25%) due to higher real wages.

Figure 1 **Output and price change from a 10% price reduction from increased productivity**



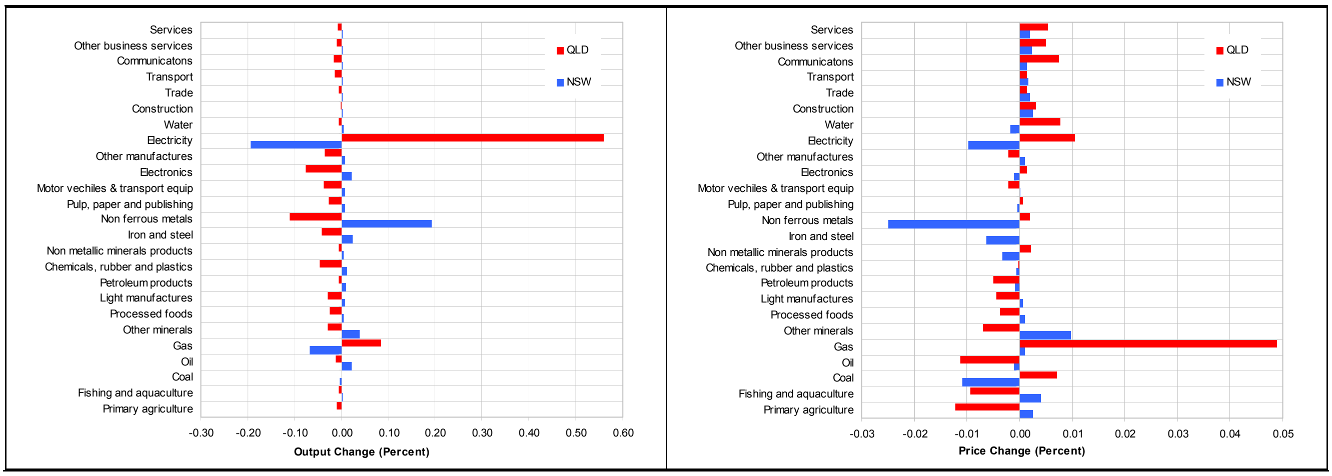
Data source: ACIL Tasman (Tasman Global results)

While the example is designed to be illustrative only, it highlights the complex relationships that exist in a modern economy. The example above shows the result of a relatively large shock to the industry – a 10% reduction in delivered price to consumers. This would equate to a reduction of approximately $10-$15/MWh.

An interconnector – particularly a small augmentation of an existing interconnector – is likely to have a much smaller impacts. Figure 2 shows the sectoral impact of a 10% increase in productivity of the interconnection between QLD and NSW.

In this example gross State product (GSP) has increased in both regions but by very small amounts: 0.004% in NSW and 0.002% in QLD.

Figure 2 **Output and price change from 10% increase to interconnector productivity**



Data source: ACIL Tasman (Tasman Global results)

The augmentation (modelled as a productivity improvement) results in increased output for Queensland electricity and gas sectors, with decreased output in most other industry sectors. The reverse situation generally occurs in NSW.

Price changes are also relatively modest, with the biggest impacts occurring in the Queensland gas sector, but even this change represents a movement of only 0.05% relative to the original case.

The example above illustrates is the small macro-economic changes which are likely to result from interconnector augmentations. Arguably, the changes in the modelled example above are approaching the lower end of the model's resolution and impacts may be influenced by rounding errors.

4 Conclusions

The partial equilibrium framework used in the regulatory test confines the analysis to the treatment of costs and benefits within the wholesale market for electricity. It treats an increase in overall producer and consumer surplus as a benefit and treats a decrease as a cost. If prices fall by the industry becoming more competitive but the underlying costs of meeting demand don't change, this approach will not record a benefit. It will simply note a reduction in producer surplus and a corresponding increase in consumer surplus. The only benefit recorded might be if consumption increases slightly, the so-called competition benefit. The economy-wide benefits from a reduction in wholesale prices will not be identified within this partial equilibrium framework.

The justification for constraining the consideration of benefits and costs within this framework comes from the original Ernst and Young report to the ACCC in the context of the original test review in 1999. The two reasons put forward for constraining the test in this way were:

- Casting the benefit net too widely will create new measurement problems; and
- It coincides with the traditional central planning environment, where planners would undertake "least-cost planning", which would typically consider costs associated with generation and transmission and the opportunity costs associated with unserved load.

The first point refers to difficulties in measuring what are sometimes called "second round" or macro-economic effects. In reality it is these effects that the economic reforms introduced over the last 20 years, including the NEM, have been intended to achieve. They are often measured (or at least estimated) when policy changes are being considered that are intended to make the economy more competitive or efficient. Such measures frequently lead to a reduction in surplus in a particular industry but an improvement in overall GDP in the Australian economy. To suggest that these effects should be ignored because they do not fit into a utility based least cost planning framework, does not appear to us to be particularly persuasive.

However, the first point raised above, that the second round effects are difficult to measure, does appear to have some substance. CGE models were generally developed to estimate the impacts of changes in tariffs or the terms of trade. In most cases they will not have the resolution to make reliable estimates of changes brought about by a small augmentation to an existing interconnector. Their use may be more applicable for augmentations which involved major investments – such as the construction of a significant new interconnector.

Incorporation of economic impacts within the regulatory test

Our initial investigations have highlighted a number of potential deficiencies in the use of CGE modelling directly within applications of the test. CGE models are complex, often difficult to interpret and are not widely available. The application of macro-modelling to a problem which is, essentially a micro-economic issue, would entail significant cost and produce results which may be difficult to verify. It is also likely that CGE modelling could only be realistically applied to large interconnector augmentations. For these reasons, we believe that it would not be practicable to include macro-modelling in the regulatory test.

A more indirect approach to the incorporation of wider economic benefits may be more appropriate. This could involve the use of relationships and/or multipliers from a CGE model to make estimates of the second round effects from changes to consumer and producer surplus. Further work in this area may be able to demonstrate the flow-on impacts from a unit change in consumer surplus as distinct from a unit change in producer surplus. These macro multipliers could then be used directly within the partial equilibrium framework currently used. While this approach is less than perfect, it is still likely to result in a more accurate assessment of economic benefits accruing from network augmentations compared with the current approach of assuming equal importance of consumer and producer surplus.

We feel that further work in this area is warranted:

- to provide a better understanding of the wider economic impacts of interconnector augmentations in general; and
- to quantify the impacts of changes to consumer and producer surplus separately with a view to estimating reliable multipliers.

A Terms of reference

Within stage one of the project, Stanwell is seeking advice on the following:

- Establish whether there is an economic basis for a Customer Benefits Test and/or full competition benefits (inclusion of pool price impacts) in the current Market Benefits Limb of the Regulatory Test. Stanwell requires a discussion of possible economic models (and appropriate measurable indicators) that would capture these benefits and identification of limitations to their application/implementation in the context of the NEM. In examining this question, the following points need to be taken into consideration:
  - Stanwell is currently of the view that treating the electricity market as an isolated system (and ignoring its role in the broader economy) fails to take into account externalities, or spillover effects. It is commonly recognised that transmission exhibits "externalities" in terms of benefits to customers (i.e. wealth transfers) and economic "spillovers" relating to international competitiveness which are not captured in the existing economic framework for transmission.
  - Stanwell questions whether micro-economics alone is able to capture these broader benefits. Based on the complex nature of electricity, the applicability of traditional micro-economics models requires further testing.
  - Although recognising that further work is required on this issue, Stanwell notes the difficulty of measuring market benefits in the context of a static (or partial equilibrium) model. These models fail to capture the flow-on impacts in terms of a possible increase in electricity consumption following a fall in energy prices.