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18 May 2005

Mr Sebastian Roberts
General Manager, Regulatory Affairs – Electricity
Australian Competition and Consumer Commission
470 Northbourne Avenue
CANBERRA ACT 2600

Attention: Mr Warwick Anderson, Director - Electricity, Regulatory Affairs Division

Dear Mr Roberts

Re: Application for Conversion to a Prescribed Service and a Maximum Allowable Revenue to June 2015

The Directlink Joint Venturers appreciate the opportunity provided by the Commission for them to comment on the Intelligent Energy Systems ('**IES**') report *Directlink Conversion Application – Review of interregional market benefits* of 26 April 26 2005 ('**IES Report**').

We provide this submission as an interim response to the IES Report. As you know, we have instructed TransÉnergie US ('**TEUS**') to conduct the additional modelling requested by the Commission staff and, with the results of that modelling, we will provide further relevant information if need be.

Our current comments on the IES Report are as follows:

- **Conduct of the IES consultancy and timely identification of key issues**—We wish to make the following points about how the IES consultancy has been conducted up to the release of the IES Report.
  - **Understanding of TEUS's approach and methodology**—While IES's consultancy has been conducted over a period of nearly 10 months, it appears that IES has only recently developed an understanding of TEUS's approach and methodology. This was apparent from IES's draft report of 11 March 2005.
  - **Information requests**—We believe that IES could have gained a better and earlier understanding of the approaches the TEUS took and the results that TEUS modelled if IES had requested all the information that it required, and at an early stage. IES could also have indicated the level of detail it required from TEUS, or provided timely feedback when TEUS's responses did not provide the level of detail IES required.

- **Murraylink decision**—IES's terms of reference required it to take account of the Murraylink decision. Had IES considered the Murraylink decision at an earlier stage in its consultancy, it would have understood sooner why TEUS took the approaches it did and placed some weight on the need for consistency with the Murraylink approach especially on arbitrary matters.

- **Subtleties and dynamics**—During the IES consultancy, TEUS has provided to IES several explanations of the subtleties and dynamics of its modelling results. IES recognises that some issues in its report can be resolved by further explanation. We hope that the TEUS advice enclosed with this letter provides many of the explanations required.

- **Consistency with previous IES views**—In its report on Directlink, IES has put forward views that appear to be inconsistent with views it expressed when it conducted its assessment of SNI, for example, in relation to the need for a least cost planning scenario.

We recognise that two principal issues arise from the IES Report:

(1) IES had not yet fully understood TEUS's results for the scenarios it modelled, none of which were intended to replicate realistic market outcomes; and

(2) IES believes that, despite the Murraylink decision, the Directlink Joint Venturers should be required to provide modelling that attempts to replicate realistic market outcomes.

The issue of whether the Directlink Joint Venturers are required to provide additional modelling that uses historical bidding in an attempt to simulate realistic market outcomes could have been identified and resolved in the beginning of IES's review.

We now appreciate the frequent and constructive level of interaction we and our advisers are having with the Commission staff and IES. Since Commission staff confirmed their requirement for additional modelling in April 2005, we have been working with them to conduct it in the shortest possible time.

- **Definition of alternatives projects**—In its report, IES has described Alternative 0 as the 'project case', Alternatives 1-4 and 6 as 'the alternative or competing project', and Alternative 5 as the 'no project or base case'.

  While these concepts are irrelevant to confirming the veracity of TEUS's modelling, the Directlink Joint Venturers believe that it is worth making the point that Alternatives 0, 1, 2, 3 and 5 are all alternative projects that could be built for the purpose of meeting network reliability standards in northern NSW and the Gold Coast. These projects should be considered side-by-side within the regulatory test. The 'no project or base case' is the case in which no investment is made at all. Given that the base case is not a technically acceptable option, the Directlink Joint Venturers have compared Alternatives 0, 1, 2, 3 and 5 against one another, with Alternative 5 designated as the reference point.

- **Status of PB Associates report**—In its report, IES claims that the PB Associates consultancy conducted by the Commission has established the suite of feasible

alternative transmission augmentations relative to Directlink, their respective costs, performance characteristics and network deferrals.

While PB Associates has provided its report to the Commission, many of its findings are not accepted by the Directlink Joint Venturers. We believe it is premature for unqualified weight to be placed on PB Associates' findings.

- **TEUS response to the IES Report**—We asked TEUS to provide its expert advice on several issues IES raised in its report and this advice is contained in **Attachment 1**. The key points raised in the advice are as follows:

  - **Murraylink approach**—TEUS describes the approach that it took to its market modelling in the light of the Murraylink decision and highlights that many of IES's issues are with the Murraylink approach itself. TEUS modelled a range of scenarios, including LRMC and SRMC bidding, and considered the sensitivity of its results to a number of factors to determine a range of likely benefits.

  - **Directlink's service level**—In January 2005, TEUS resimulated its Alt-0-1-2 medium growth LRMC bidding case using a revised PROSYM topology that includes a separate N-NSW and NSW subregion. While we believe that TEUS has provided sufficient detail in its previous explanation to IES that confirms TEUS's original results are robust, IES has dismissed TEUS's resimulation on the basis that it was not supported by 'analysis details'. We would be pleased to provide any other analysis details in the form specified by IES should this be required.

  - **New entrant costs**—For its new entry generation cost inputs, TEUS relied upon the 2003 ACIL Tasman Report and the SNI Stage 1 Report, as credible public sources available in the National Electricity Market at the time the application was prepared. It translated the ACIL Tasman costs into July 2005 dollars in accordance with the actual and forecast CPI. While the generation entry costs TEUS used for our modelling were appropriate at the time, TEUS recognises that the Directlink Joint Venturers are currently discussing with the Commission staff and IES how the 2005 ACIL Tasman Report will be incorporated into TEUS's additional modelling of the historical bidding cases.

  - **Least cost planning scenario**—TEUS continues to have the view that it is unnecessary for it to conduct an additional scenario to simulate least cost planning. This view has been implicitly accepted by the Commission in the Murraylink decision, and explicitly accepted by IES in its own assessment of SNI.

  - **Historical bidding scenario**—This issue relates to whether the Commission requires market modelling that uses historical bidding in an attempt to simulate realistic market outcomes. In the Murraylink case, the Commission did not require a historical bidding scenario. TEUS view is that models simplify and, at best, only approximate reality, and there are significant shortcomings in using a historical bidding approach if it is the Commission's intention that this modelling will produce a highly accurate estimate of Directlink's future market benefits. By definition, the approach assumes that historical bidding patterns will remain unchanged for 40 years despite inevitable changes to market conditions that affect the level of competition and how the market operates.

- **Determining generation entry in the With and Without case**—While IES provides some explanation of the dynamics involved, TEUS believes that further explanation is required so that the Commission can fully understand the usefulness and validity of its modelling approach.

- **Estimation of benefits beyond 2019**—TEUS explains that the benefits of an alternative project for the period beyond the end of the detailed modelling, through to the end of the asset's assumed life, can be extrapolated from the modelled period, and that this approach has been previously applied by IES.

The Directlink Joint Venturers believe that TEUS has explained these matters well and that the integrity of TEUS's modelling remains firm for the scenarios and sensitivities it modelled.

As previously mentioned, we are now working with the Commission staff and IES to conduct additional modelling to examine an historical bidding scenario with updated inputs, and we appreciate the cooperation of the Commission staff and IES as the work is undertaken and look forward to a timely conclusion. We would also be pleased to participate in discussions with the Commission staff as to how TEUS's modelling results might be used to inform the Commission's decision as to Directlink's appropriate asset value.

Please feel free to contact Ms Sandra Gamble of The Allen Consulting Group if you need her assistance on any matter pertaining to this submission.

Yours sincerely

Dennis Stanley
Directlink Joint Venture Manager

Encl.

ATTACHMENT 1

TransÉnergie US, *Response to the IES Final Report*, 16 May 2005

May 16, 2005

Response to the IES Final Report

Reviewing Directlink's Alternative Projects' Inter-regional Market Benefits

Prepared for

The Allen Consulting Group

By

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Executive summary

This report seeks to respond to issues raised by Intelligent Energy Systems (IES) in its report 'Directlink Conversion Application – Review of Interregional market benefits' of April 26, 2005 (the IES Report).

Over a period of ten months, TEUS has responded to all IES's requests for information and also provided additional explanation when IES mislaid our responses or misinterpreted our approach on a number of occasions. We believe that IES Report does not fully reflect the scope and extent of information we have provided.

It has only been in the latter stages of IES's consultancy that it has come to understand to a reasonable extent TEUS's modeling approach and methodology, which is not overly complicated for this kind of exercise.

For the Directlink conversion application, TransÉnergie US (TEUS) used a modeling approach and a methodology very close to the ones it applied for the Murraylink application and accepted by the ACCC in its Murraylink decision as being suitable. TEUS's choice of scenarios and sensitivities was guided by its experience in Murraylink.

It has only been in the latter stages of IES's consultancy that it has come to recognise the ACCC's views of the Murraylink decision and that the ACCC has previously accepted TEUS's approach as not inconsistent with the regulatory test.

Delays in IES understanding our approach and the Murraylink decision has left little time for IES to fully grasp the dynamics of our modeling and our results, and for TEUS to adequately address all IES's issues prior to finalising its report.

IES's remaining issues are in relation to:

- Directlink's service level;
- new entrant costs;
- least cost planning scenario;
- historical bidding scenario;
- determining generation entry in the With and Without case; and
- estimation of benefits beyond 2019.

We note that some of these are issues of clarification or matters of judgment, many of which reopen debate previously settled in the Murraylink decision.

The ACCC will understand that any modeling requires judgments and assumptions. We believe that IES adopts the position that unless all modeling assumptions are completely in agreement with its own current view of the NEM, as captured in a specific

representation reflecting a level of detail that IES deems appropriate, then the model results provide no useful indication or purpose. Even the differences between software models (Prosym used by TEUS, and Prophet used by IES) may introduce arbitrary differences.

TEUS is of the view that models simplify and, at best, only approximate reality. When simplifications can be shown to have minimal impacts on the results, then the results can still be usefully applied to the process of estimating the likely range of benefits for a 40 year horizon; over which period there is significant, even dramatic, uncertainty in many, if not most, of the modeling inputs. For example, is the same level of detail required for 40 year market benefits as would be required for the two-year view reflected in the NEMMCO Statement of Opportunities? Do today's constraint equations, which will change over time (and may contain errors and flaws even now), capture the performance of the evolving National Electricity Market for 40 years, or could their use engender a type of false security. We believe the latter.

Having said this, TEUS is working as quickly as possible to provide the Directlink Joint Venturers with the modeling that the ACCC staff have recently determined is required for their purposes. The ACCC staff have requested that the Directlink Joint Venturers provide an estimate Directlink's alternative projects market benefits using an historical bidding scenario with updated inputs, including our revised topology. The ACCC has also requested that the sensitivity of this modeling be tested with regard to load growth and new entry costs, and that a comparable SRMC bidding scenario be examined.

1 Murraylink approach

1.1 Nature of IES issue

IES notes that the modeling study submitted by the Directlink Joint Venturers (on the basis of modeling conducted by TEUS) in the assessment of inter-regional market benefits provided by Directlink closely followed the methodology that had been used in the application of the regulatory test to Murraylink, and which had been accepted by the ACCC in that application.

1.2 TEUS response

For the Directlink conversion application, TEUS confirms that it was instructed by the Directlink Joint Venturers to apply the same modeling approach and methodology for Directlink that TEUS had applied to Murraylink.

We understand that this was on the basis of the ACCC's clear statements in the Murraylink decision that the methodology employed by TEUS to calculate Murraylink's market benefits was not inconsistent with the regulatory test.[1]

It has only been in the latter stages of IES's consultancy that it has come to recognise the ACCC's views of the Murraylink decision and that the ACCC has previously accepted TEUS's approach as not inconsistent with the regulatory test.

Delays in IES understanding our approach and the Murraylink decision has left little time for IES to fully grasp the dynamics of our modeling and our results, and for TEUS to adequately address all IES's issues prior to finalising its report.

The following is a brief explanation of the 'Murraylink approach' and some simple refinements that TEUS has made to it for Directlink.

1.2.1 What is the Murraylink approach?

The Murraylink modeling approach and methodology is characterized by the following features:

- Multiple scenarios are examined with a discrete answer for each scenario;
- Scenario are designed to predict possible market outcomes in the future – with some scenarios more credible than others;
- The choice of scenarios is designed to provide results that span the range of likely benefits;

[1] ACCC, "Murraylink Transmission Company, Application for Conversion and Maximum Allowed Revenue", 1 October 2003, pages 71, 76 & 86.

- Scenarios are developed with regard for the regulatory test, but recognizing the practical difficulties and limited usefulness of some suggested in the regulatory test (e.g. actual bidding strategies, and least-cost planning);

- Modeling inputs are derived from public documents published by credible sources and extensively used within the National Electricity Market;

- All costs are expressed in real terms based on a common reference date (in the case of Directlink: 1 July 2005), and all benefits derived from real cash-flows and real (pre-tax) discount rates;

- Prosym software is used to calculate generation costs, spot prices and market entry schedules, and MARS software is used to estimate the reliability of the power system, the need for reliability entry plant and the level of expected unserved energy;

- Prosym and MARS are applied within a strict methodology to generate separate cash-flows for the With and Without cases; and

- NEMMCO Statement of Opportunities inter-regional 'notional' limits used for Prosym modeling.

1.2.2 Refinements

TEUS recognised the opportunity to refine its approach from comments made by stakeholders, the ACCC, and the ACCC's consultants during the Murraylink application process. Subsequently, for Directlink, TEUS implemented the following refinements to the approach it used originally for the Murraylink application.

- A "LRMC" case, designed to increase generation bids and prices to level sufficient to entice new coal generation entry, was further developed;

- The continuation of NEMMCO's reserve trader role and the entry of reliability entry plant was allowed for, while still recognizing changes in residual USE below reliability criteria;

- Network deferral benefits were calculated separately but using the same scenarios and discounted cash flow method – providing closer coupling of similar variables and results;

- Scenarios and sensitivities were developed in a more systematic manner – providing even closer coupling of similar variables and results; and

- Benefits for five termination years were averaged to provide a more robust result with less dependence on the choice of only one specific termination year.

1.2.3 Scenarios and sensitivities

As required by the regulatory test (in the light of the ACCC's Murraylink decision), TEUS estimated the inter-regional market benefits of the Alternative Projects under a number of credible market development scenarios. Each Alternative Project has been evaluated under four specific different scenarios:

- LRMC/Medium Economic Growth
- SRMC/Medium Economic Growth
- LRMC/Low Economic Growth
- LRMC/High Economic Growth

Each of these base case scenarios is based on a 9% discount rate and unserved energy valued at $29,600 per MWh. We conducted sensitivity testing of these scenarios with regard to discount rates of 7% and 11%, and unserved energy valued at $10,000 per MWh.

During the Murraylink application process, the ACCC and its consultants asked Murraylink Transmission Company to conduct additional scenarios and sensitivities when the ACCC staff believed the need arose. TEUS anticipated that this might occur in the case of Directlink but notes that such requests have come after a much longer period than in the Murraylink case.

2 Directlink's service level

2.1 Nature of IES's issue

IES has noted a number of times that an intra-regional constraint exists within the NSW region that constrains power flow north to 1200 MW and says that the original topology TEUS used for its PROSYM modeling did not recognise this intra-regional constraint.[2]

At only one point in its report, IES acknowledges that TEUS resimulated its Alt-0-1-2 medium growth LRMC bidding case using a revised PROSYM topology that includes a separate N-NSW subregion and recognises the 1200 MW intra-regional constraint. From these results and our understanding of the modeling dynamics, we have concluded that these changes to the inter-regional benefits can be characterized as minor, and indicated the original results are robust. In January 2005, we provided a detailed explanation as to how we came to this view (only a small proportion of which is quoted in the IES Report). However, IES concluded that our responses[3]:

> … were not support by 'analysis details' that demonstrate the reasons why the incorrect assumption regarding the increase in NSW Queensland interconnection capacity provided by Alternative projects 0,1,2 would only have a small impact on the modeling results.

Further, IES claims that TEUS results indicate 200 MW of Queensland deferred market entry and this would not be expected because Directlink does not alleviate the northward NSW to N-NSW 1200 MW intra-regional constraint.[4]

2.2 TEUS's response

TEUS continues to hold the view that, based on our resimulation of the Alt-0-1-2 Medium Growth LRMC Bidding case using our revised PROSYM topology, our original results are robust. IES has agreed with TEUS that our revised topology appropriately represents the 1200 MW intra-regional constraint and Directlink's service level.

Our full explanation to IES, which was provided in January 2005, reads as follows[5]:

> In response to this question, TEUS has resimulated the Alt-0-1-2 Medium Growth LRMC Bidding case using a revised PROSYM topology that includes a separate NNSW subregion. We have concluded that these changes to the inter-regional benefits can be characterized as minor, and indicate the original results are robust. The following is an explanation as to how we came to this view.

[2] IES Report, pages 1, 39-40, 47-48, & 73.
[3] IES Report, page 40.
[4] IES Report, pages 68-9.
[5] TEUS advice of 18 January 2005, pages 2-5.

The ACCC's question 6 posed on 21 July 2004 was: 'Directlink capacity and QNI capacity are currently treated as additive in determining total inter-regional capacity. Has the impact of Directlink transfer on Inter-regional and Intra-regional transfer capabilities (constraint equations) been considered?'

Our response on 24 August 2004 was that TEUS's PROSYM and MARS models do not model interface limits that vary dynamically as a function of flow on other interconnectors (although MARS can represent constraints using combinations of flows). TEUS indicated it was preparing an analysis in response to IES Question 12 of 14 July 2004 to determine if the dynamic constraint equation limits differ from the limits used in PROSYM and MARS by a sufficient magnitude or with sufficient frequency to cause a bias in the estimated market benefits. TEUS also noted that the use of static limits in the Directlink analysis is the same approach accepted by the Commission in an earlier analysis of Murraylink's market benefits.

In our supplementary report of September 15, 2004, "Directlink Alternative Projects' Market Benefits - Supplementary Report", we provided revised modelling results which recognised, among other things, more precise limits for our MARS modelling.

On September 28, 2004, we provided the our findings of our examination of the constraint equations that apply across the regional interfaces relevant to our PROSYM modelling and we concluded that the modelling simplification of using "notional limits" for the purposes of estimating changes in annual fuel costs and market entry between With and Without cases has had little or no impact on its estimates of inter-regional market benefits.

We now understand that IES's principal concern is that the topology TEUS used for our PROSYM modelling, unlike for our MARS modelling, does not include an extra subregion to specifically recognise the transmission limits between Northern NSW and the rest of the NSW region.

To address this concern, TEUS has resimulated the Alt-0-1-2 Medium Growth LRMC Bidding case for the years 2005-2019, using a revised PROSYM topology. The revised topology represents Northern NSW as a separate subregion connected to Queensland to the north by QNI and Directlink (or an Alternative), and to the remainder of NSW to the south. All other aspects of the PROSYM topology remained unchanged.

Transfer Limit MW	Positive Direction	Negative Direction
Northern NSW to NSW	**950**	1200
QLD to Northern NSW via QNI	**950**	700
QLD to Northern NSW via DL	**125**	180

Source: BRW memorandum, January 19, 2005

The revised topology allows a transfer limit between NSW and Northern NSW to be specified to directly address the issue raised by IES in its question. PROSYM does not provide the capability to specify "composite" limits for more than one interface (for example, Interface Flow A + Interface Flow B <= limit), but utilizing a limit for flows from

NSW to Northern NSW makes that unnecessary. PROSYM will not export power from Northern NSW to QLD if no surplus power is available.

To illustrate, assume Northern NSW load of 800 MW and QLD prices significantly higher than NSW prices. In this situation, PROSYM would attempt to export the maximum amount of low priced power from NSW to QLD. 1200 MW will flow from NSW into N-NSW. 800 MW will be used to meet the demand in N-NSW. 400 MW remains available for export to QLD via QNI or DL. The allocation of flow over the two interconnectors will be determined by their relative losses. Only 400 MW will flow in total, despite the fact that the combined interface limit between N-NSW and QLD is 880 MW (= 700 MW + 180 MW).

The full transfer capability into QLD will only be available for use when demand in N-NSW is <= 320 MW. Of course, there will be many occasions when even the available transfer capability will not be fully utilized, such as when QLD is exporting to NSW. The intraregional constraint will impact flows, and therefore prices and market entry primarily during high load conditions.

TEUS developed revised hourly load traces for the NSW and N-NSW regions. No changes were made to load traces for other regions. The N-NSW load trace was developed exactly as described in TEUS' supplementary report, utilizing the historical 2003 half-hourly load data for the region provided by Country Energy as the load shape. The load trace for the "rest-of-NSW" region was developed by subtracting the N-NSW hourly loads from the original Total NSW hourly loads, which were developed as described in TEUS' original report of April 2004 "Estimation of Directlink's Alternative Projects' Inter-regional Market Benefits".

The PROSYM resimulation for Alt-0-1-2 Medium Growth LRMC Bidding case showed that the timing and location of market entry combustion turbines changed a small amount. This is to be expected. As described above, the revised topology will have little impact during low and moderate load conditions when peaking units would not be running in any event. By altering flows and prices during high load periods, the conditions that drive peaking unit market entry are altered, and the entry schedule changes in response. Compared to baseload coal units, the combustion turbine market entry units have much lower capital costs, higher marginal costs, and low capacity factors. As a result, the interregional market benefits are not greatly sensitive to changes in the peaking unit entry schedule. Furthermore, the MARS reliability analysis tends to compensate for lower peaker entry by adding additional reliability entry peaking units to ensure the 0.002% USE criteria is met. Similarly, higher market entry of peaking capacity results in a lower reliability need.

The following changes to interregional market benefits were observed for the Alt012-LRMC-Med case:

Impact of NSW/N-NSW Intraregional Constraint on Interregional Market Benefits $K

		Discount Rate			
	Value of USE	7%	9%	11%	Average
Original Topology	$10k	108,361	107,888	102,928	106,392
	$29.6k	143,272	135,130	124,836	134,413
Revised Topology	$10k	128,023	101,937	84,053	104,671
	$29.6k	146,059	116,714	96,552	119,775
Change in IRMB	$10k	19,663	(5,951)	(18,875)	(1,721)
	$29.6k	2,787	(18,416)	(28,284)	(14,638)

Average Impact - All Cases (8,179)

TEUS believes these changes can be characterized as minor, and indicate the original results are robust, particularly when considering the $10k Value of Unserved Energy cases. Although the average decrease is larger for the $29.6k V-USE cases, the original value of market benefits for these cases was also higher.

Over the past months, at IES's request, TEUS provided its intermediate outputs and several explanations of other matters to assist IES to understand the dynamics of TEUS's modeling. Even thought IES has had ample opportunity to do so, IES did not ask TEUS for any further information to explain our response above in relation to the application of our revised topology. IES's view that our explanation of this was not adequately supported by "analysis details" only became known to TEUS at a time too late for TEUS to provide such details before IES finalised its report. In any case, IES has not indicated to TEUS the type of 'analysis details' it would require to be satisfied.

IES has commented that Directlink would have no ability to defer market entry generation in Queensland because it does not increase the northward transfer limit across the Queensland-New South Wales interface. TEUS believes this opinion arises from a limited view of competitive market dynamics that does not consider how the market responds from year to year to price changes caused by entry in prior years and in other regions of the National Electricity Market.

Under certain circumstances we would agree with IES. If you are evaluating an interconnector between two unconnected regions, then in the Without case prices in each region are completely independent. Adding a "one-way" interconnector could only lower prices in the receiving region and raise them in the sending region. However, as long as there is flow between the regions at some level in the Without case, adding additional capacity in one region will always have an impact on prices in the other regions, particularly if added to the higher price region.

In the analysis TEUS performed using the revised topology that incorporates the impacts of the intra-regional constraints in NSW, 100-200 MW of OCGT was temporarily deferred in some years. These deferrals were always offset by additions (negative deferrals) in NSW, or by coal entry in QLD. Even though Directlink may not increase northward flow

capacity over the Queensland-NSW interface, the 300 MW of northward transfer capacity that exists with or without Directlink allows the lower prices in NSW (caused by the additional entry in NSW) to be felt in Queensland. When the distribution of Queensland prices (not just the average price level, but the peakiness or flatness of prices over the year, as reflected in the shape of the annual price duration curve) are otherwise just high enough to support the entry of one more peaker, the addition of capacity in NSW (or even elsewhere in the NEM) can trim the high prices enough to make that entrant no longer profitable.

It is not necessary for power to be able to flow north for generation in NSW to affect prices (and therefore market entry) in Queensland. As long as power can flow south, high prices in NSW can end up setting the regional price in Queensland. If you lower the high price in those hours in NSW through greater entry, it will lower the Queensland price in the corresponding hours and potentially defer entry. TEUS believes you can and will see limited, temporary deferrals in Queensland when negative deferrals have occurred in NSW or other parts of the NEM, and that the more important concern is the reasonability of the total amount of the net market entry deferrals throughout the NEM.

3 New entrant costs

3.1 Nature of IES's issue

IES raises the following issues in relation to the new entry generation costs that TEUS used for its modeling[6]:

- the level of assumed fixed costs;
- the validity of implied assumptions that must be made in order to translate the fixed capital cost to an annualized cost; IES believes that the methodology used by TEUS implies the use of a weighted average costs of capital that is too high; and
- the 1.0778 escalation assumed to produce 2005; IES is concerned that TEUS takes no account of recent assessments of new entry costs.

IES claims that the generation costs used by TEUS were unsupported.

3.2 TEUS's response

The Directlink Joint Venturers have employed throughout the Directlink conversion application the practices of: (1) using the most credible public sources of market information available in the National Electricity Market at the time the application was prepared, and (2) expressing all costs and benefits in July 2005 dollars. While the generation entry costs we used for our previous modeling were appropriate at the time, we note that the Directlink Joint Venturers are currently discussing with the ACCC staff and IES how the 2005 ACIL Tasman Report will be incorporated into TEUS's additional modeling of the historical bidding cases.

In its original report and in its August 2004 response to IES questions, TEUS provided considerable support for the generation costs we used. We have confirmed that TEUS's modeling used annualized generator costs based on those the Inter-regional Planning Committee (IRPC) and NEMMCO developed and used for the purposes of their assessment of SNI[7]. TEUS updated the IRPC costs, as best it could, using the limited data available in the 2003 ACIL Tasman Report[8]. The 2003 ACIL Tasman Report did not provide sufficient information on its own to fully derive new annualized generator costs. TEUS method of calculating annualized generator costs for its modeling was intended to impute the same weighted average cost of capital (WACC), asset lives and depreciation scheduled used by NEMMCO and the IRPC for the purposes of their SNI analysis.

[6] IES Report, pages 1, 44-46, 73.
[7] Inter-regional Planning Committee, "IRPC Stage 1 Update Report", December 2000 (the SNI Stage 1 report).
[8] ACIL Tasman, "SRMC and LRMC of Generators in the NEM", published by the IRPC and NEMMCO in April 2003 (the 2003 ACIL Tasman Report).

As it derived annualized generation costs in July 2005 dollars for the purpose of its modeling in April 2004, TEUS made the following assumptions:

- The WACC, asset lives and depreciation scheduled used by NEMMCO and the IRPC for the purposes of their SNI analysis would continue to be valid;
- The total annualized generation costs used by NEMMCO and the IRPC for the purposes of their SNI analysis were made up of 90% capital cost and 10% fixed operation and maintenance (O&M) costs, and that fixed O&M costs are proportional to generation capacity;
- The costs expressed in the SNI Stage 1 report were in December 2000 dollars, and these costs would increase in line with the consumer price index until July 2005.

TEUS continues to hold the view that it has provided a good level of support for these assumptions and that they were reasonable at the time TEUS conducted its modeling.

Since TEUS conducted its modeling and prior to IES finalising its report on Directlink, NEMMCO has published the 2005 ACIL Tasman Report[9], which provides substantially more detail including all that required to derive new estimates of annualized generator costs. The 2005 ACIL Tasman appears to reflect a (potentially temporary) softening of generator capital costs in real terms, probably due to the recent firming of the AUD/USD exchange rate. It also reflects different assumptions with regard to generators' WACC, asset lives, and depreciation than those in the SNI Stage 1 report and those in IES's own report on SNI[10].

The views expressed by IES in its report on Directlink are informed by the 2005 ACIL Tasman Report, which does not on its own make TEUS's previous modeling assumptions unreasonable. In fact, as IES states: 'many views are expressed in the market over the fixed costs of generators, and the ACIL reported figures should be seen as such'.[11] In particular, IES has not explained why the 2005 ACIL Tasman approach to WACC, asset lives, and depreciation should be preferred to the IRPC or the IES approach for SNI for the scenarios that TEUS has modeled to date. We understand the Australian bond rate today is very similar to the rate that applied when the IRPC and IES assessed SNI.

However, we recognise at this point, the ACCC has endorsed the use of 2005 ACIL Tasman Report for the purposes of the additional modeling it has requested to assess an historical-bidding scenario. There has been discussion between TEUS, IES, and the ACCC over recent weeks as to how the 2005 ACIL Tasman Report will be applied. The matter has been substantially resolved; resulting in new entrant costs that are higher than those recently proposed by IES (based on the 2005 ACIL Tasman Report) and lower than originally proposed by TEUS (based on the SNI Stage 1 Report and the 2003 ACIL Tasman Report).

[9] ACIL Tasman, "Report on NEM generator costs (Part 2)", published by the IRPC and NEMMCO in February 2005 (the 2005 ACIL Tasman Report).
[10] IES, "Application of the ACCC Regulatory Test to SNI – Report for TransGrid", 27 November 2000, page 28.
[11] IES Report, page. 45.

For example, for CCGT plant, the differences between the IES and the TEUS annualized cost estimates can be explained as follows:

- 10% of the difference was due to IES not adding annualized fixed O&M to annualized capital costs to calculate total annualized cost;
- 5% of the difference was due to IES not allowing for inflation of the 2005 ACIL Tasman costs, which were expressed in '2003-04 dollars', to July 2005 dollars.
- 16% of the difference was due to a difference in WACC – 11% used in the IRPC Stage 1 Report compared to 9% in the 2005 ACIL Tasman Report;
- 4% of the difference was due to a difference in the type of depreciation applied – straight line used in the IRPC Stage 1 Report compared to annuity in 2005 ACIL Tasman Report;
- 10% of the difference was due to a difference in assumed plant life – 20 years in used in the IRPC Stage 1 Report compared to 30 years in 2005 ACIL Tasman Report;
- 26% of the difference was due to a difference in plant capital costs in the 2003 ACIL Tasman Report compared to plant capital costs in the 2005 ACIL Tasman Report, most probably due to exchange rate movement; and
- 28% of the difference was due to a difference in TEUS's calculation of fixed O&M for a 385 MW unit ($36.36/kW-yr) compared to that in the 2005 ACIL Tasman Report ($14.00/kW-yr).

In summary, while TEUS is willing to apply the costs in the 2005 ACIL Tasman Report, IES has provided no evidence as to why the generator costs that TEUS used for its original modeling were unreasonable other than to claim they are "unsupported". In fact, we believe that they are well supported and were very reasonable for the circumstances that existed at the time our modeling was conducted.

4 Least cost planning scenario

4.1 Nature of IES's issue

While IES notes that the ACCC did not require a least cost planning scenario for its Murraylink decision, IES believes that it is an important issue for the Directlink application that TEUS has not conducted a least cost planning scenario for Directlink.[12]

IES emphasizes that a least cost planning scenario and a SRMC bidding scenario have a "close connection", but it believes there is no basis to assume that these two scenarios are the same.[13]

4.2 TEUS's response

TEUS notes that, in its Murraylink decision, the ACCC considered explicitly the wording of regulatory test in relation to the requirement of a least cost planning scenario but did not require Murraylink Transmission Company to model one. TEUS has assumed this is because of the limited usefulness of such a scenario, especially given that a SRMC bidding case was modeled.

We made this point to IES in response to its question:

> The regulatory test requires that market benefits be determined under both market driven scenarios and a least cost planning scenario. Why was a least cost planning scenario not done? Do you consider that a least cost planning scenario would give the same results as the market driven scenarios performed?

As IES did not acknowledge in its report our answer or the points we made, we repeat them here[14]:

> TEUS believes that the results of the Short Run Marginal Cost (SRMC) bidding scenario are representative of, and comparable to, the likely results of a least-cost planning scenario. A least-cost planning scenario would, in fact, employ SRMC bidding in the dispatch of generating units within the NEM, which in turns yields the total fuel costs to the NEM.
>
> Furthermore, the iterative nature of TEUS's modeling of market entry units is comparable to the traditional dynamic programming algorithms used in determining generation entry. While the decision driver for generation entry was the first year profitability of each market-entry generating unit, TEUS has determined that each market-entry generating unit modeled in the SRMC scenario shows sustained profitability over the analysis horizon after its entry (see the response to Question 11 for additional discussion). In other words, no premature entry of market entry generation occurred.

[12] IES Report, pages 1, 13-14, 25, 72.
[13] IES Report, pages 13-14.
[14] TEUS advice of 17 August 2004, pages 10-11.

Finally, the annualized fixed cost for each market entry technology also acts to ensure that actual market entry (as determined in the SRMC bidding scenario) is aligned with the market entry that would occur under a least cost planning scenario. For example, if a market entry generator entering service in (say) 2009 showed a projected operating loss in that year, entry would be deferred until the first year in which an operating profit could be forecast (perhaps 2011). While that generating unit might be able to demonstrate a positive net discounted *lifetime* operating profit over the life of the plant even if the plant entered service in 2009, rational investors would defer entry until 2011, to achieve the higher net discounted lifetime profit.

Since the annualized costs used to determine the profitability of entry are also the annualized costs appropriate to timing decisions under a least-cost planning regime, the simplified "first year of profitability test" used by TEUS is consistent with a dynamic programming algorithm that would be used in a traditional least-cost planning process.

Hence, TEUS considers that a least cost planning scenario would give the same results as the SRMC bidding scenario that was performed.

TEUS notes that the same approach was employed in the application by the Murraylink Transmission Company for regulated status. On page 87 of the ACCC's final decision on this matter (see Australian Competition and Consumer Commission, Decision: Murraylink Transmission Company Application for Conversion and Maximum Allowable Revenue, 1 October 2003), the ACCC stated:

> *The Commission is therefore satisfied that SRMC, generation bids above SRMC and LRMC has been considered in the TEUS assessment of market benefits for Murraylink and its alternative projects.*

Further, the concern that IES expressed in its report on Directlink is inconsistent with its own application of the regulatory test for SNI. When considering SNI, IES modeled a scenario very similar in many respects to TEUS's SRMC bidding scenario and simply called it a 'least-cost planning scenario'. IES described its least-cost planning scenario in the following terms[15]:

> The "least cost planning" scenario is intended to mimic conventional central planning. It has been modeled to have the following characteristics:
>
> - All generators bid to the market and are dispatched on the basis of their short run marginal costs;
>
> - Power system reliability is maintained by determining new generation requirements based on meeting reserve requirements as stated by NEMMCO through the Reliability Panel. The assumption is that the reserve requirement as determined by NEMMCO is a proxy for least cost planning reserve requirements[16]; and

[15] IES, "Application of the ACCC Regulatory Test to SNI – Report for TransGrid", 27 November 2000, pages 24-25.

[16] The approach to reliability taken by IES in the SNI analysis was to add plant to meet the "largest unit" reserve requirement, but NEMMCO is now moving towards a more sophisticated approach that measures reliability in terms of expected unserved energy and the Reliability Panel's 0.002% USE criteria. The TEUS approach of meeting the 0.002% criteria with minimum reliability entry plant and valuing residual USE is very similar to the approach being adopted by NEMMCO.

- Only generators "committed" for retirement as per the NEMMCO SOO 2000 are retired. This means existing generation plant is not retired regardless of operating cost. This has implications for the new generation requirements.

That is, for its assessment of SNI, IES accepted that a SRMC-bidding case would suffice for a least cost planning scenario even though it acknowledges that this scenario is very different to conventional central planning.

TEUS continues to believe that it is unnecessary to conduct an additional scenario to simulate least cost planning. This view has been implicitly accepted by the ACCC in the Murraylink decision, and explicitly accepted by IES in its assessment of SNI.

5 Historical bidding scenario

5.1 Nature of IES's issue

IES notes that the ACCC stated in its Murraylink decision that a realistic bidding scenario was unnecessary, and IES acknowledges that LRMC bidding has no pretense of being realistic, but IES is concerned that TEUS's modeling, in particular its 'LRMC' scenario, does not replicate actual market bidding and prices.[17]

In particular, IES highlights that the key issue is the confidence that the market benefits determined are suitable for the purpose being used.[18]

5.2 TEUS's response

The issue is how the ACCC has communicated its requirements for market modeling that seeks to simulate realistic market outcomes. In the Murraylink case, the ACCC did not require realistic market modeling. Until 13 April 2005, the ACCC staff had not indicated any requirement for realistic market modeling in the case of Directlink.

The ACCC's position in the Murraylink case was very clear as to what modeling scenarios it required[19]:

> The Commission notes that since MTC's original application it has provided additional market developments including assessment of the market benefits under LRMC, and generation bids above SRMC. While SRMC and LRMC modeling has been considered in Murraylink and other applications of the regulatory test, actual bidding under note 6b of the regulatory test has not been determined due to the difficulty of modeling such behaviour. As part of its review of the regulatory test and in particular the issue of competition benefits, the Commission is looking at this issue.
>
> The Commission is therefore satisfied that SRMC, generation bids above SRMC and LRMC has been considered in the TEUS assessment of market benefits for Murraylink and its alternative projects.

TEUS also made it very clear to IES back in August 2004 that it had followed the ACCC's lead given in the Murraylink decision when, in response to a question from IES as to how TEUS's LRMC bidding scenario can be considered realistic, TEUS answered as follows. Our full response is provided below because the relevant quote in the IES Report[20] has been heavily edited to remove important detail with regard to our mention of

[17] IES Report, pages 1, 13, 48-52, 65-66, 73.
[18] IES Report, page 52.
[19] ACCC, "Decision: Murraylink Transmission Company Application for Conversion and Maximum Allowable Revenue", 1 October 2003, page 87.
[20] IES Report, pages 50-51.

average pool prices and the involvement of the ACCC's consultant in the development of scenarios in Murraylink process[21].

> TEUS does not consider either the SRMC or LRMC bidding strategies to be individually realistic, and does not understand that the Regulatory Test requires a proponent to construct their own view of "realistic bidding". Rather, TEUS believes these two bidding strategies produce results that likely bracket the results that would be produced by actual or realistic bidding behaviour, if it were possible to determine the true future bidding strategies of NEM generators. The table below illustrates the pool prices resulting from these bidding strategies, and compares them to recent actual NEM prices.

	Average Spot Price			
	NSW	QLD	SA	VIC
SRMC	15.0	15.1	28.3	13.6
2003 Actuals (esc to 2005 at 2.22%)	27.0	23.0	27.2	23.5
LRMC	34.9	35.0	47.0	31.4

> Lacking published estimates of LRMC bids for existing generators, TEUS felt it would be more appropriate to construct LRMC bids in a simple and transparent manner that would lead to higher NEM prices and significant baseload generation entry. The simple addition of $20/MWh to SRMC bids achieved this objective.
>
> IES has observed that the TEUS approach will not change the generator dispatch order. This was by design. TEUS believes any assumptions it made regarding which types of generators would adopt which approach to recovering their long run marginal costs would have been seen as arbitrary and potentially biased. Furthermore, TEUS believes that the discipline of a competitive market would restrain generators from deviating too much or too long from the dispatch order imposed by SRMC. Price competition from higher variable cost generators could prevent a low variable cost generator with a large bid price adder from being committed and dispatched, in which case it would earn no revenue and receive no contribution towards its long run fixed costs. While TEUS accepts that a bidding strategy that results in a changed dispatch order will produce different results, TEUS does not believe that large changes in the dispatch order are likely, and as a result, large changes in the results are not likely, except as caused by changes in market entry patterns.
>
> Finally, TEUS observes that it used a similar approach to the development of a LRMC bidding scenario in the earlier Murraylink Transmission Company application to the ACCC. The approach was developed in response to questions raised by the ACCC and their consultant in that proceeding, Saha Energy International. Ltd. (SEIL). SEIL indicated at the time that the simple approach of adding a fixed amount to SRMC allowed them to adequately understand how interregional market benefits might change in a market regime driven by bidding strategies approximating long run marginal costs.

TEUS notes that IES has persuaded the ACCC staff to request from the Directlink Joint Venturers a modeling scenario that assumes historical bidding patterns experienced in the National Electricity Market to date will continue in perpetuity, and that this scenario will provide the ACCC with a reasonable estimate of Directlink's actual market benefits.

While the Directlink Joint Venturers have agreed to the ACCC staff's request to modeling an historical bidding scenario, there are significant shortcomings in this approach if it is the ACCC's intention that this modeling will produce a highly accurate estimate of

[21] TEUS advice of 17 August 2004, pages 11-12.

Directlink's future market benefits. By definition, the approach assumes that historical bidding patterns will remain unchanged for 40 years despite inevitable changes to market conditions that affect the level of competition and how the market operates, for example, the market design and rules, regional boundaries, the existence and treatment of transmission constraints, the introduction of greenhouse emissions trading, and the diversity of ownership within the electricity industry.

6 Determining generation entry in With and Without case

6.1 Nature of IES's issue

IES acknowledges the significance of capital deferral benefits in the calculation of market benefits and reviews the economics and approach for the determination of investment timings undertaken in the market simulations.[22]

6.2 TEUS's response

While IES provides some explanation of their understanding of the dynamics involved in the TEUS modeling of competitive market entry, TEUS believes that further explanation is required so that the ACCC can fully understand the usefulness and validity of its modeling approach.

As IES notes, market entry deferral forms a large component of the future market benefits of an interconnector. It is therefore important to carefully consider how the market will respond over time to the permanent presence (or absence) of the interconnector. TEUS believes there is a difference between its own view of market dynamics and how they are modeled, and the views and methodologies of IES.

IES has also expressed the view that interconnectors cannot provide permanent market entry deferral, implying that if an interconnector was taken out of service after, for example, 15 years of operation, the pattern of market entry would have evolved to the identical pattern as would have occurred with the interconnector in place. This would also imply that after some point in time, removing the interconnector would have no impact on market prices. Since market entry responds to market prices, a difference in prices would have to lead to a difference in market entry. TEUS believes the IES view of competitive market dynamics is limited, overly simplified for the purpose of modeling long range benefits, and ultimately unrealistic.

A more realistic view recognizes that in the With case, the market will develop without reference to what would have happened in the Without case. At each point in time, potential market entrants in the With case will evaluate their prospects considering the fact that the interconnector is in place, and a particular pattern of market entry has evolved in response. This will lead to competitive responses that span multiple years. For example, if the market prices trigger the entry of a large coal plant in one year, prices will be depressed (probably in several regions) in the subsequent year and may well lead to deferred entry in that year. The pattern of entry and the associated market prices that would have developed in the Without case will be completely irrelevant to the profitability and competitive entry decisions made by market participants where the interconnector is in place.

[22] IES Report, pages 16-17.

Given the large size of the baseload coal candidate market entry plants, the market is highly unlikely to ever be at a precise competitive equilibrium. The "shock" created by one plant's entry can easily take several years to play out. With a similar dynamic causing different prices and entry at work in the Without case, it is very likely that in any particular year and region, the With case might lead to early entry of a coal plant, and the Without case might show delayed entry. A direct comparison for that one region in that one year would show a 1000 MW (2 x 500 MW) difference. Is that reasonable for an interconnector with at most a 180 MW transfer capability? The question can only be answered by looking at what is happening in the other regions in that year, and at what happens in subsequent years.

Dynamic markets respond over time, and the effects of an interconnector and market entry will ripple across many regions. The appropriate criteria to apply to the plausibility of the modeling results is not the maximum difference in market entry in a single region and year, but rather the net amount of deferrals throughout the total NEM over time in comparison to the size of the interconnector.

The table below (presented by TEUS at the April 13, 2005 meeting with the ACCC and IES) illustrates the stability of the modeling results when viewed as a whole.

Deferred Market Entry Plant
(MW at Year End)

	Termination Year					
Case	2015	2016	2017	2018	2019	Ave
LRMC-High-Alt012	200.0	600.0	500.0	200.0	200.0	340.0
SRMC-Med-Alt012	100.0	-400.0	-50.0	-100.0	100.0	-70.0
LRMC-Med_Alt012	0.0	50.0	300.0	0.0	200.0	110.0
LRMC-Low_Alt012	0.0	250.0	50.0	50.0	250.0	120.0
Average	75.0	125.0	200.0	37.5	187.5	125.0
LRMC-Med-Alt012-New Topology	200.0	200.0	200.0	150.0	200.0	190.0
Average All Cases	100.0	140.0	200.0	60.0	190.0	138.0

TEUS still believes the original "sanity test" it proposed in its original submission (i.e. that benefits can be reasonably approximated by fuel savings due to increased transfer limits, plus the deferral of 100 MW of OCGT capacity) is still more useful than simply concluding that the modeling results cannot be relied upon to be accurate because a subset of the results viewed in isolation does not agree with predictions that arise from a static view of competitive market dynamics. The issue is not accuracy, but rather the usefulness of the results in allowing a reasoned opinion to be formed of the likely range of future market benefits over an extended horizon during which conditions will be constantly changing and evolving. To a large extent, IES has focused on differences that don't make a difference, rather than assessing the overall magnitude of the forecasted market benefits.

On a practical level, TEUS agrees with comment that IES has made during our recent discussions that, in developing separate market entry schedules for the With and Without cases, care must be taken to apply the generation entry criteria consistently and to ensure that random generation outages are synchronized in each case. After reviewing the details of previously completed analyses, TEUS is able to confirm that for the modeling it has conducted to date its generation entry criteria has been applied

consistently and random generation outages in the With and Without case were synchronized in most cases. Furthermore, TEUS used PROSYM's "Convergent Monte Carlo" algorithm with 8 stochastic iterations in each run. This algorithm is expressly designed to eliminate the "noise" in results that could be caused by specific patterns of generator outages, whether synchronized or not between the With and Without cases. To eliminate this as a potential distraction in the additional modeling requested by the ACCC staff, TEUS will ensure that generator outages remain fully synchronized and will continue to use the PROSYM's Convergent Monte Carlo methodology.

7 Estimation of benefits beyond 2019

7.1 Nature of IES's issue

IES queries the manner in which TEUS has sought to extrapolate its modeling results from 2019 to 2045.[23]

IES also indicates care must be taken to confirm what benefits are likely to continue.[24]

7.2 TEUS's response

When evaluating long lived assets by simulating their impacts through market modeling, it is standard practice to perform detailed analysis for an initial period for which assumptions can be forecasted with reasonable accuracy. For periods beyond this, it is usually inefficient and ineffective to attempt detailed modeling. The effort required and the uncertainty in the required detailed assumptions outweighs the value of the detailed results produced. As IES has done in their analysis of SNI (using a ten year detailed analysis horizon), and as TEUS has done here (with detailed modeling over 15 years) in the analysis of Directlink's market benefits, benefits for the period beyond the end of the detailed modeling through the end of the asset's assumed life can be extrapolated from the modeled period.

The important issue here is that the approach used to extrapolate the results is reasonable and appropriate, and does not inject a bias into the overall findings. In the SNI analysis[25], IES

> … assumed that the market benefits have reached a "steady state". The annual market benefit chosen to continue into "perpetuity" is problematical. The value chosen is the average annual benefit of unserved energy and variable costs over the final three years of the forecast period, and a capacity benefit (for projects with shorter lives than the project) at 15 years after the last year of the forecast period (valued at the cost of open cycle gas turbines).

Once again, this is very similar to the approach used by TEUS, except that TEUS has used the final 5 years of modeled results as the basis for extrapolating benefits to the end of the horizon, and TEUS did not need to apply a 'capacity benefit' to adjust for project alternatives with shorter lives.

As discussed earlier in Section 6, market entry deferrals comprise a significant component of the projected interregional market benefits. Furthermore, with market entry coming in large discrete increments, market entry in the final simulated year could have an unduly large impact on future benefits if used as the only basis for extrapolation.

[23] IES Report, pages 1, 22-23, 70-71, 72.
[24] IES Report, page 23.
[25] IES, "Application of the ACCC Regulatory Test to SNI", November 2000, page 13.

Extrapolating future benefits from 5 different simulation termination years, and then averaging the results prevents this bias from occurring.

As described in section 6, interconnectors have a sustained impact on the market and the extrapolation of their benefits over their asset life is appropriate.