Australian Government
Department of the Environment and Energy

COVER SHEET FOR SUBMISSIONS

Independent Review into the Future Security of the National Electricity Market

Overview

Please include this cover sheet with your submission on the Preliminary Report of the Independent Review into the Future Security of the National Electricity Market.

Background

The Preliminary Report outlines the Panel's observations about the current state of the NEM and offers questions on the major issues the Panel has identified. The questions are designed to elicit suggestions or answers that may help form the Panel's final recommendations.

The Preliminary Report serves as an issues paper for broad public consultation. As such, the questions and views will be subject to further consideration and discussion, in anticipation of the final blueprint being produced in 2017.

Stakeholders are encouraged to keep their submissions as succinct as possible, and include a one-page executive summary.

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Submission Instructions

The submission period will be open until close of business on Tuesday **21 February 2017**.

All submissions should be emailed to the NEM Security Review at the mailbox: NEMSecurityReview@environment.gov.au

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Department of the Environment and Energy
National Electricity Market Security Review

By Email: NEMSecurityReview@environment.gov.au

Tomago Aluminium Submission to "Independent Review into the Future Security of the National Electricity Market"

Executive summary

Tomago Aluminium Company Pty Ltd (TAC) is a world scale, primary aluminium smelter that has been operating since 1983. The smelter is located just north of Newcastle in the Hunter Valley in NSW. It produces 590,000 tonne of aluminium per annum, employs 1,150 staff and contractors, and consumes approximately 8,300 GWh of electricity per annum (some 12% of NSW electricity consumption). The business makes a contribution of $1.5 billion in revenue to the Australian economy and $800 million of gross regional product in the Hunter Valley.

TAC's owners have a wide range of other investment opportunities internationally and it is important therefore to maintain TAC's international competitiveness, particularly with respect to its electricity supply, which is the major input cost.

As most of TAC's production is exported, it competes in an international market where many of its competitors have access to competitive power prices and little or no exposure to any form of carbon pricing.

The price for TAC's aluminium is set by the London Metal Exchange (LME) as a global commodity and therefore TAC Aluminium is a price taker; there is no opportunity to pass on increases in operating costs.

TAC has the following primary concerns with future electricity supply arrangements:

1. **Affordability.** If the trend of rising electricity prices continues, electricity will no longer be affordable for TAC. Entering into hedge contracts may limit TAC's exposure to these price increases in the short to medium term, however any sustained increases will be reflected in future hedge prices. The current operation of the NEM as it relates to pool prices means that even small exposures to this market are frequently uneconomic.
2. **Reliability.** Improvements to potline cell technology (to improve energy efficiency) have lowered the thermal reserve of the cells. Put simply, they cool faster than previous generations of cells. As a consequence, power supply can be interrupted for a maximum of 3 hours before irreversible damage is sustained (potline freezing). The December 2016 events at Portland Aluminium (Victoria) illustrate the very real risk and economic consequences.

3. **System security and restart capability.** TAC recognises its role in contributing to system security by being able to shed large loads at very short notice. It has performed a 'managed blackout' on a number of occasions to prevent uncontrolled and potentially widespread outages. As we have seen in South Australia, the potential exists for a 'system black' event of network security is not maintained. In the event of a full NSW 'system black' event, TAC is concerned that the capability that to quickly and restore supply before a potline freezes is inadequate.
4. **Carbon Pricing.** The uncertainty surrounding the current carbon pricing regimes remains a major concern for TAC and its owners. Energy intensive trade exposed entities such as TAC should not be disadvantaged in competing in international markets

The "policy instability and uncertainty" acknowledged by the Review should be addressed. This will require a demonstration of a stable and predictable regulatory environment. This will only be achieved by bi-partisan and national support for simple, clear and consistent energy policy.

Without this clear long term energy policy, any material investment in the industry or indeed the TAC smelter is highly unlikely, essentially stifling any growth and potentially causing a premature closure of the facility.

Introduction

Tomago Aluminium Company Pty Ltd (TAC) is pleased to provide a response to the "Independent Review into the Future Security of the National Electricity Market" (the Review). We are pleased to note that a key question that you are seeking input on is *"How do we ensure the needs of large-scale industrial consumers are met"*[1]

As TAC is the largest electricity consumer in NSW, this submission will provide input from that perspective.

Introduction to TAC

TAC is a world scale, low cost primary aluminium smelter that has been operating since 1983. The smelter is located just north of Newcastle in the Hunter Valley in NSW and is currently the largest facility in Australasia.

TAC is an independently managed joint venture that operates on the basis of a tolling model for its joint venture owners. The joint venture owners are Rio Tinto Alcan, Gove Aluminium Finance and Hydro Aluminium.

TAC has been working hard to maintain its international competiveness and continues with an extensive business improvement program which has been delivering lower costs and higher output. The AP2X technology used in the 3 potlines is state of the art as a result of being continuously upgraded and delivers benchmark levels of efficiency and power consumption.

TAC is a wholesale customer in the National Electricity Market and has power supply and transmission contracts in place until at least 2028.

TAC currently employs 1,150 staff and contractors, produces 590,000 tonnes of aluminium metal per annum and consumes a steady load of 960 MW of electricity or approximately 8,300 GWh per annum.

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[1] Independent Review into the Future Security of the National Electricity Market – page 18

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TAC makes an important economic contribution to NSW and Australia:

- Contributes a revenue of $1.5 billion each year into the Australian economy
- Supports 1,804 jobs and approximately $800 million of gross regional product in the Hunter Valley in NSW
- Constitutes approximately 11% of the electricity demand in NSW

The major inputs to the operation of TAC are alumina, labour and electricity; electricity being about one third of the input costs of TAC. Aluminium prices are established in US$ by the London Metal Exchange (LME) trading system. The reference price does not allow for individual producers to pass on increases in input costs. In that sense, TAC is a price taker, not a price setter. It is also worth noting that there is strong competition between smelters located in a wide range of countries and that almost all of these countries have no effective price on carbon.

Importance of electricity supply

Given that electricity is a major input in the operation of TAC, it is crucial that an affordable, reliable and secure electricity supply is assured. This has generally been the case since the smelter began operating in 1983.

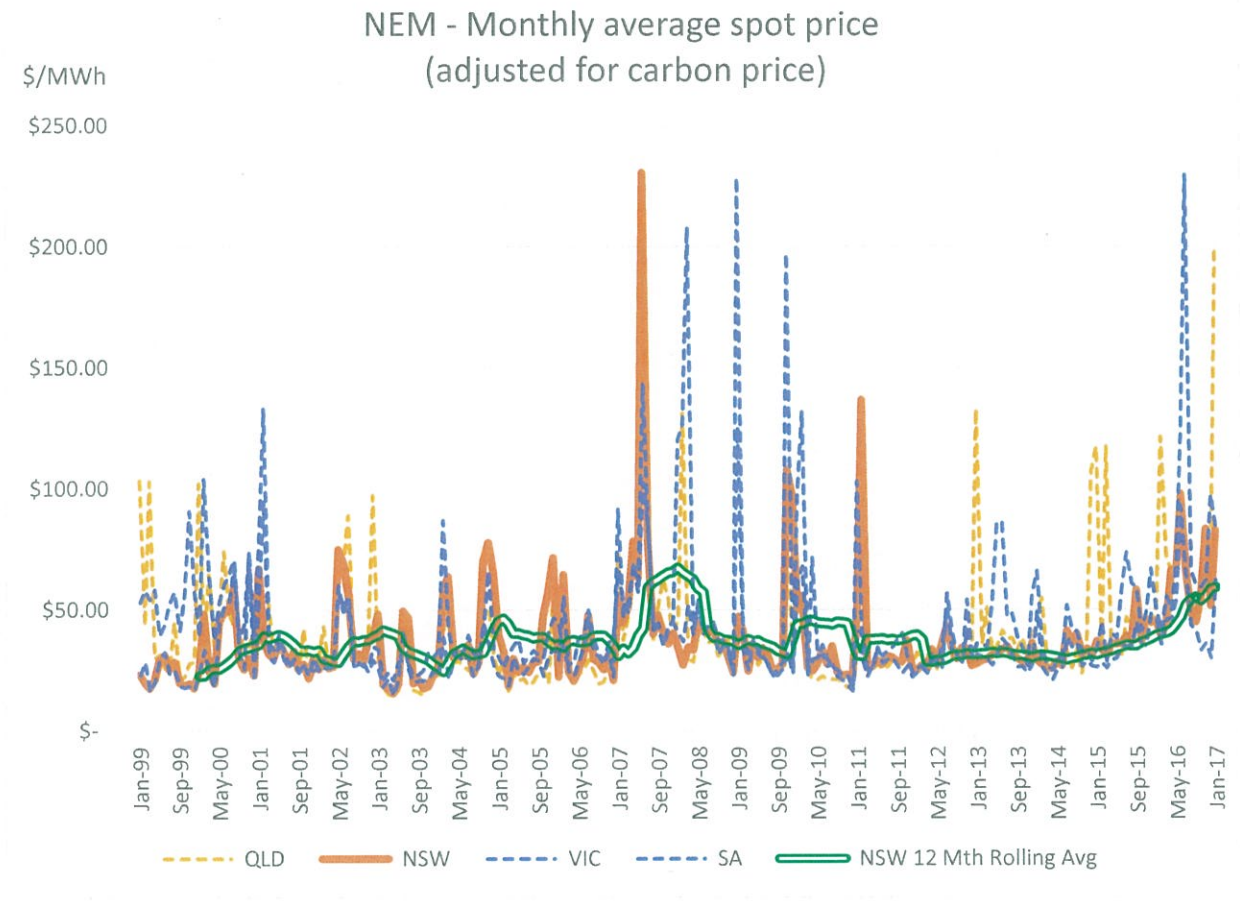
However over recent years, TAC has become increasingly concerned that this may no longer be the case and that affordability, reliability and security has already declined and that this trend may continue unless urgent corrective action is taken.

The recent experiences in South Australia with a number of black outs, one of which was a complete state-wide blackout combined with significant price increases are causes for concern. Of particular concern to TAC is the failure of the electricity supply to the Alcoa smelter at Portland and the resulting damage to the potlines. The risk of these outcomes occurring in NSW is a significant concern for TAC and its owners.

It is important to note that the joint venture partners that own TAC have a wide range of other investment opportunities internationally and that if TAC begins to lose its international competiveness they will no longer invest in the continuing improvement of TAC. This will result in the long term decline and ultimate closure of the smelter with the consequent loss of jobs and economic benefit to Australia.

Historical trends in electricity pricing

The graph below shows the history of NEM spot prices since January 1999. The prices are time weighted monthly average prices and are adjusted remove the increase in spot prices that occurred between 1 July 2012 and 30 July 2014 directly due to the imposition of the carbon tax on emissions.



Since 2014 there is a clear trend of increasing average prices and some indications of increased frequency of price spikes. The only other time average prices were previously at this level was in the period around 2007 when prices rose significantly as a result of generators reducing output due to an extensive and protracted drought.

The concern is that as the amount of renewable generation increases that conventional generation will be forced to retire. As a result when wind and solar generation is not able to produce, prices in the wholesale market will increase significantly resulting in an overall trend of increasing prices. The price outcomes in South Australia clearly indicate that this is a likely outcome.

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Concerns regarding future electricity supply

TAC has a range of concerns regarding future electricity supply. These are:

1. **Affordability**

   Given that electricity is the major input cost for TAC, affordability of electricity is central to long term viability. Currently TAC has a 5% exposure to spot pricing and frequently modulates 50 MW to avoid material financial losses on this load. This is an opportunity cost to the business when NEM pool prices are uneconomic. A new power contract comes into effect in late 2017 and this exposure is reduced.

   The volume covered by the new power contract is capped at a fixed quantity. As TAC continues to improve the performance of the smelter, the amount of electricity consumed may increase. If this increases beyond the cap in the contract, the cost of this incremental consumption will be at the prevailing market price, which trends show to be volatile.

   In addition, when the existing power arrangements have to be renewed this is likely to result in a significant increase in electricity costs if the current price trends continue. This process will be likely to commence in about around 2025. It is worth noting that the aluminium smelter at Boyne Island is currently taking pots out of service and reducing production as a result of affordability issues with some of its electricity supply arrangements.

2. **Reliability**

   TAC requires to the maximum extent possible, a continuous baseload electricity supply. Whilst renewable technologies could form part of our energy supply mix, the problem of intermittency has not been addressed for a time-sensitive load such as the potlines. In the event of wind or solar not generating, TAC needs immediate alternative supplies and until utility scale energy storage is commercially viable, that means thermal generation.

   The time critical nature of the smelting load is an outcome of advances in cell technology to achieve greater efficiency and lower power consumption. The cells operate at around 960 degrees Celsius and rapidly lose heat when power is interrupted. Uncontrolled freezing causes physical damage to the cell, requiring a costly and time consuming rebuild. For a complete potline, this can run into over A$100 million and take 12 months to effect.

   When the AP18 cells were first introduced in 1983, the thermal reserve was approximately 8 hours. This meant power could be cut and as long as it was re-established within 8 hours, the cells would not freeze and be irreversibly damaged. Subsequent generations of cells (with a lifespan of approximately 6 years), have reduced the thermal reserve to less than 3 hours. An enforced load curtailment event in January 2016, followed by 4 failed restart attempts, pushed one of our lines to 2 hours & 35 minutes without power. A total of 12 cells were scrapped and many weeks of instability followed.

   Most of the new investment in generation is likely to be renewable, both wind and solar. As the proportion of wind and solar generation increases, the economics of conventional power generation deteriorates, resulting in some generation exiting the market. When renewables generation falls because of natural variations of wind & solar output, the power system is reliant on a smaller number of thermal generators and interconnections. The consequences of failure of these supply options is increased as the range of options has been reduced. This is evidenced in part by the increasing frequency of blackouts in South Australia.

As a result, if the reliability trends that have occurred in South Australia are allowed to occur in NSW this will create two concerns for TAC:

- Increased frequency of interruptions to supply. While TAC accepts it has a role to play in achieving power system security, increasing the frequency of these interruptions increases the risk of smelter plant failure (inability to quickly re-energise). As stated above, there is a very limited window of time before irreversible damage is sustained; the recent experience at Portland Aluminium demonstrates this risk.
- The other concern is that when the system becomes less reliable due the intermittency of wind and solar, the entire system suffers through short term pool price volatility and in the longer term, higher prices.

3. System security and restart capability

TAC recognises its role to assist in ensuring system security by performing load curtailments 'managed blackouts', at short notice. For up to an hour duration on each potline, TAC can and does provide system security benefits to the wider community.

Given the increased reliability and security risks however, it is important to consider the capability that is in place to quickly and effectively restore supply in following a 'system black' event. The time sensitive nature of TAC's load would require a minimum of approximately 700 MW to be available within 2.5 to 3 hours maximum.

TAC regularly works with TransGrid to model the impact of a system black event and how long it will take to get sufficient energy to the smelter. The modelling indicates a time of around 6 hours, which would result in a complete freeze of all three TAC potlines.

TAC contributed to a submission prepared by Russ Skelton & Associates[2] to explore this issue as part of a recent review by the AEMC Reliability Panel into the System Restart Standard. This submission raised concerns about the settings in the current standard. Again this was demonstrated in South Australia where both of the System Restart resources that were contracted failed to operate as planned. The restoration of supply and load in South Australia was entirely dependent on the interconnector with Victoria.

4. Impact of carbon pricing

To meet the Australia's international commitments on renewable energy, some form of carbon pricing is required. Currently this takes the form of the Renewable Energy Target – which results in increased cost to most electricity consumers and the Direct Action policy which imposes a cost on all tax payers. Another option being considered is the introduction of an emissions intensity scheme.

The key elements that should be present in any future carbon pricing regime are:

- Energy intensive trade exposed entities (EITE's) such as TAC should not be disadvantaged in competing in international markets because of the carbon price regime in Australia. At a minimum, the arrangements for EITE's that were in place for the carbon tax should be replicated but with the rate of decline in the assistance provided linked explicitly to the rate of imposition of a carbon price in competing countries.
- The impact on electricity prices to consumers of electricity should be minimised – to ensure that affordability is not unnecessarily impacted.

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[2] Russ Skelton & Associates – Submission to Review of the System Restart Standard - http://www.aemc.gov.au/getattachment/d44375e8-c6a8-4cad-bb45-0011280448ae/Russ-Skelton-Associates.aspx

- The regime should be stable and predictable to enable investors to make decisions with confidence. One way to achieve this may to be incorporate the regime in the National Electricity Market Rules.
- The regime should be as simple as possible – at a maximum comprise a single national renewable energy target and a single national carbon pricing regime. This will make it easier for investors to understand and be able to estimate impacts on investments with more certainty.
- The targets should be set at the minimum required to meet international obligations.
- A number of entities have entered into long term contractual arrangements on the basis of carbon pricing regimes that existed at the time. This includes TAC. The future introduction of a carbon price should allow for an appropriate transition for these existing arrangements as was contemplated in previous carbon pricing regimes.

Concerns regarding investment environment

The Review acknowledges that *"investment in the electricity sector has stalled ... due to policy instability and uncertainty driven by numerous reviews into the RET and a lack of clarity about the policies to reduce emissions after 2020."* [3] TAC would endorse this acknowledgement.

In addition to the changes to the RET it is worth noting that since the election of the Rudd Government in 2007 there has been a succession of emissions reduction policies.; The CPRS which was legislated but never put into place. The carbon tax implemented by the Gillard Government but which was subsequently repealed by the Abbot Government. Currently the Direct Action policy is in operation but this does not have bi-partisan support.

The uncertainty created by this environment does not just affect investment in the electricity sector but also businesses such as TAC who are highly dependent on outcomes in the electricity market. As a result the owners of TAC will be more reluctant than they otherwise would be to continue to invest in TAC to maintain its international competitiveness. It is important for not just TAC and its owners but also the community that this uncertainty is minimised. This will ensure that the community will derive enduring benefits from the continued operation of TAC.

The "instability and uncertainty" in the investment environment must be addressed. This will require a demonstration over time of a stable and predictable regulatory environment. This will only be achieved by bi-partisan and national support for simple, clear and consistent energy policy.

Responses to Consultation questions

In addition to the general comments made above, we would like to respond a range of relevant questions put in the Review.

Question 2.3 How do we ensure the needs of large-scale industrial consumers are met?

> The needs of large-scale industrial consumers are met if each of the concerns, outlined above, of affordability, reliability of supply, security of the power system, system restart capability, the design of emissions reduction policy and the investment environment are addressed.
>
> There are very few bone-fide, large, time sensitive loads in the NEM. Hospitals for example, could be considered as time sensitive loads, however most modern facilities have backup generators on site to provide essential power. A backup supply to an aluminium smelter is a power station and on that basis, it is reasonable to expect that conventional thermal generation is maintained and available until such stage renewables and energy storage are commercially viable.

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[3] Independent Review into the Future Security of the National Electricity Market – page 22

Question 2.4 How can price structures be made more equitable when consumers are making different demands on the grid according to their electricity use and their investments behind the meter?

Price structures can be made more equitable and efficient if they are as cost reflective as possible. This will create the right incentives for both customers and suppliers. The large and stable load of TAC, coupled with our demonstrated ability to provide system security benefits through rapid load curtailment justifies a priority pricing status.

Question 3.1 What is the role the electricity sector should play in meeting Australia's greenhouse gas reduction targets?

Ideally the role of electricity in meeting greenhouse reduction targets should be determined based on the cost of abatement in the sector compared to other sectors. For a large EITE such as TAC, our international competitiveness must not be undermined by a carbon penalty that our competitors are not exposed to.

Question 3.2 What is the role for natural gas in reducing greenhouse gas emissions in the electricity sector?

Potentially natural gas could be a useful fuel for reducing greenhouse gas emissions. Currently however limitations on the development of unconventional gas in a number of states are limiting supply. Also, currently the available gas, including that from unconventional sources is relatively high cost. This will threaten the affordability of electricity for major users.

Question 3.3 What are the barriers to investment in the electricity sector?

Investments in the electricity sector are in general high value long life assets. For investors to be confident that they can earn a return on their investment the current *"policy instability and uncertainty"* acknowledged above must be eliminated. This will require stable bi-partisan support for simple and clear policies.

Question 3.4 What are the key elements of an emissions reduction policy to support investor confidence and a transition to a low emissions system?

The key elements of an emissions reduction policy are outlined above. These are minimising impact on electricity prices, stability and predictability, simplicity and clarity, appropriate targets in light of actual action being taken by other countries, appropriate acknowledgment of international competition for EITE's and appropriate transition arrangements.

Question 3.5 What is the role for low emissions coal technologies, such as ultra-supercritical combustion?

This could be significant and low cost contributor to achieving abatement in the electricity sector. However, these are high cost and long life investments and consequently, require policy certainty. TAC would form an ideal foundation load for such a facility due to its reliable offtake and system security benefits.

Question 4.1 What immediate actions could be taken to reduce the emerging risks around grid security and reliability with respect to frequency control, reduced system strength, or distributed energy resources?

There are a range of rule changes already proposed to the AEMC to improve system security such as introduction of an inertia market and by the South Australian Government to improve system security and reliability. These should be dealt with as soon as possible. Also a rule change to create a market for spinning reserve should also be considered.

In addition, Governments should work with generators that are planning to exit the market to ensure that the transition is managed in such a way that it minimises the risk of unacceptable grid security and reliability.

Question 4.2 Should the level of variable renewable electricity generation be curtailed in each region until new measures to ensure grid security are implemented?

Given importance of ensuring reliable and secure supply this would be appropriate particularly in regions where there are already high levels of renewable generation. Until utility-scale energy storage becomes a commercial reality, the growing proportion of renewables, coupled with the fact of intermittency, places extreme demands on the existing NEM.

Question 4.3 Is there a need to introduce new planning and technical frameworks to complement current market operations?

It is not clear that these are necessary.

Question 4.3.1 Should there be new rules for generator connection and disconnections?

The impending closure of Hazelwood power station without a clear transition plan may provide a clearer answer to this question.

Question 4.3.2 Should all generators be required to provide system security services or should such services continue to be procured separately by the power system operator?

It would be much more effective to create a commercial incentive to generators to provide these services than rely on compulsion. Refer to answer to question 5.6 below.

Question 4.7 Should the rules for AEMO to elevate a situation from non-credible to credible be revised?

There is no need to revise the current rules but AEMO should apply them consistently and transparently.

Question 5.1 Are the reliability settings in the NEM adequate?

The settings for reliability of supply are adequate. However, as detailed above we are concerned that the standards that have been set for restoring the system in event of a state wide black out as occurred in South Australia are inadequate.

Question 5.2 Is liquidity in the forward contract market for electricity adequate for the needs of commercial and industrial consumers and, if not, what can be done?

The levels of liquidity are adequate. Again, however a concern is the ongoing policy uncertainty and instability.

Question 5.5 Rule changes are in process to make the bid interval and the settlement interval the same, both equal to 5 minutes. Are there reasons to set them to a longer or shorter duration?

There is no evidence of any real benefits from changing current settlement arrangements. However, this change would create significant costs to the market, including to businesses such as TAC.

Question 5.6 What additional system security services such as inertia, as is currently being considered by the AEMC, should be procured through a market mechanism?

Both inertia and spinning reserve should be explicitly purchased as additional ancillary services. Both these services are essential to maintaining a reliable and secure electricity supply. To date they have been provided at no charge by conventional generation. However, the renewable generation that is displacing existing generation is not currently capable of supplying these services and they have been free riding on existing generators. To ensure that adequate levels of inertia and spinning reserve are always available they should be procured as additional ancillary services.

Question 5.6.1 How can system security services be used as 'bankable' revenue over a sufficient period of time to allow project finance to be forthcoming?

> This is no different than an investment in merchant generation. Actually being able to access additional revenue streams in addition to energy could improve the ability of investors to invest in merchant generation.

Question 5.6.2 How will generators and retailers mitigate price risk in such a market?

> Again, managing these risks are no different to managing energy price risk. As has occurred in the energy market if necessary a hedge market will develop naturally. This has been the case for the existing OTC and futures markets. The only role for Governments is ensuring a stable regulatory environment and that primary markets are stable and transparent.

Conclusion

As a large-scale industrial electricity consumer has a wide range of concerns about the current trends in the electricity sector.

Unless these concerns are addressed urgently the future of TAC and its contribution to the Australian and Hunter Valley economies will be threatened.

The key issue is for Governments at State and Federal level to demonstrate a commitment to a stable and predictable regulatory environment with simple and clear rules and regulations. This will only be achieved by bi-partisan and national support for simple, clear and consistent energy policy.

If you have any questions in regard to this submission please do not hesitate to contact myself or Mr Steve McIntyre, CFO, on 02 4966 9277 or steve.mcintyre@tomago.com.au.

Yours sincerely

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