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9 October 2026

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ReCFIT - Future industries - Data Centres
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Submitted by file upload

Re Draft Expectations for Data Centres

To whom it may concern,

Thank you for the opportunity to provide comment on the Draft Expectations for Data Centres ('the document'). In this submission, the term 'data centre' also includes AI facilities.

I am a retired engineer with broad energy experience, including 5 years at Hydro Tasmania and another 5 with an international energy contractor. This submission addresses the document and is based on my knowledge, research and personal experience.

Initial comment on data centres

General comment on data centres is not requested, but I provide some in the context of energy, environment and economics, rather than the ethics of AI. I'm concerned that the Tasmanian Government may be leaping starry-eyed into data centres without sufficient controls in place, overestimating the likely benefits and underestimating the risks. The first question should be if, now how. Hosting data centres is a long way from having sovereign capability and being in 'the AI race'. We may just end up being part of an AI bubble. Data centres are incompatible with what makes Tasmania globally unique and they threaten our carbon neutral status. Most jobs associated with data centre construction are specialised and will not be local.

Yes, there is major investment in AI, as AI companies strive to win the AI race. In reality, some will fail, so much expenditure and infrastructure may be wasted at a time when we should be reducing waste, including unnecessary energy consumption. For each Google or Amazon equivalent, there will likely be a MySpace. In the USA around half of proposed data centres don't proceed, leaving utilities, investors and others hanging. Today, the Firmus IPO is7 faltering. It must be ensured that Tasmania is not exposed to failure of companies or their ventures.

Global opposition to data centres is increasing and spreading, due to noise, heat, pollution, visual impact, impacts on energy supply and costs, reduction in property value and other concerns. Big tech companies may not behave any better in Tasmania than elsewhere and their large-scale proposed data centre activity is likely to be inflationary in certain sectors. Recently, unapproved construction activity in Tasmania was claimed to be 'site maintenance' demonstrating that developers and their agents cannot necessarily be trusted and will attempt to take advantage when they can.

AI related internet traffic now exceeds human traffic and that threatens to impact us all. Big tech companies have thrown away their renewable energy and sustainability promises to save time and cost and are installing gigawatts of fossil fuel generation. In Tasmania, climate change effects are reducing available hydro energy, with less water in the tank, and the recent loss of Tungatinah Power Station has reduced both our renewable capacity and energy in storage. We narrowly survived an energy crisis just 10 years ago. Large renewable energy projects take longer to construct than data centres, with particular difficulty constructing transmission and no guarantee of approval. It is critical that additional renewable capacity and sufficient additional energy be installed and on-line before a data centre goes on-line and draws from the grid. A weak promise to contribute something to someone's future, possible project is not enough.

Fossil fuelled backup generators acting as 'bridging' generation often remain in place as primary, behind-the-meter generation for the long term, which would add greatly to the state's CO2 emissions. Hundreds of diesel generators suggested by Firmus will produce noise, the pollution of 1,000 large trucks and half a gigawatt of heat - in addition to hundreds of megawatts from the data centre - 24 hours a day. We once killed whales to light homes and AI might do less with more.

General comment on the document

The document is stated to be for guidance purposes. It includes *principles* and *expectations*. The *principles* appear reasonable, but some *expectations* are vague, and if read literally, could result in undesirable outcomes inconsistent with the *principles*. I'm concerned that a developer could demonstrate literal satisfaction of the *expectations* as stated, while not providing a satisfactory outcome for Tasmania.

Although not its purpose, it seems reasonable that the document should be suitable to shape a tool for project assessment or be used to evaluate competing proposals, i.e. to determine how well the Tasmanian Government's stated *expectations* will be or have been satisfied. The document suggests what is important to Tasmania but is sometimes unclear or silent on the extent to which a proponent or developer must address them, in order to meet *expectations*. The document uses vague words like 'should' and 'may' and other subjective terms..

It is appropriate that the Tasmanian Government intends to detail its expectations, but it must be ensured that those expectations are unambiguous and are then satisfied as far as is reasonably practicable. Tech companies and others may not want to comply, so there needs to be a mechanism to monitor compliance and ensure they do.

Specific comments on the Principles

Principle 1 - Economic development

1. Words such as productive, employment, opportunities, develop, etc. meaning little without targets or detail. They are all measurable or definable;
2. The word 'sustainable' needs definition as it means different things to different people;
3. 'Maximise' implies as much as possible, which no developer will want to do at the expense of profit and other objectives and priorities; and
4. 'Engagement' can mean many things, from simply informing, to full collaboration with stakeholders. Expectations should be better defined.

Principle 2 - Energy

1. ‘Unlocking’ new renewable energy (RE) sounds like simply adding load, to then encourage others to develop RE projects to then support that load. A more literal term should be used. AI companies need to instead bring their own, new RE prior to operation;
2. Yes, it is critical that our grid remains secure and reliable. Data centres threaten it; and
3. Communities in other countries have experienced higher electricity costs due to data centres. It should be clarified that any additional costs imposed on other customers due to data centres would constitute a ‘negative impact’.

Principle 3 - Environment and planning

1. Rather than ‘water and related infrastructure costs do not negatively impact existing customers’, which is subjective and difficult to measure, the principle should be that such costs do not increase due to data centres.
2. What is considered ‘material environmental harm’ changes with time and the person who judges the harm, including many forms of pollution. A precautionary approach should be taken. Diesel and CO2 emissions, noise, increasing urban heat and discharge of warm water might seem everyday or even acceptable, but they do cause harm when at large scale. Not long ago leaded petrol, CFCs, asbestos, DDT, PFAS, PCBs, etc. were great innovations, then their impacts and risks were known but considered acceptable, then they were not and the clean up and regret began.

Specific comments on the Expectations

Expectation 1 - Maximising benefits to Tasmania

Construction jobs will be short term, after which data centres will have as few employees as possible and they will continue to automate as much as possible. Employment projections may not be realised and cannot be binding. Most of the capital expenditure will leave the state and much will leave the country. Operational jobs are likely to be few and return little to the economy compared to the risks and community impacts.

Proponents are expected to ‘identify skills gaps and opportunities for training Tasmanians’ but there is no suggestion that they should act on those. Identification is cheap, but action is not.

Prioritising opportunities for apprentices is not linked to any identified gaps. A development may involve a global tech company client, a facility owner, a specialist data centre developer, a main constructor, main subcontractors in many disciplines, secondary subcontractors and numerous suppliers. Complex contractual arrangements between parties will make it difficult for such commitments by one party to be applied to other parties effectively.

Proponents will not want to share their intellectual property, so building local capability is unlikely. Having AI facilities in our state is not the same as Tasmania developing sovereign capability.

‘Should seek’ [community and regional benefits] is very weak. Even ‘must seek’ or ‘should ensure’ would not imply any certainty of benefits.

‘Should engage’ should be must engage. Early and meaningful engagement cannot be in any way optional.

Large construction projects in Tasmania inevitably require interstate or multinational constructors to handle the high cashflow and provide the most mature management systems, with key staff being imported and all profit leaving the state. Local companies are usually relegated to being minor joint venture partners, or subcontractors and suppliers bidding for competitive subcontracts.

Any additional costs imposed on existing customers would be 'Inappropriate cost shifting'. 'Inappropriate' is subjective.

Due to the impacts on land and communities and the risk of failure, financial arrangements - e.g. a bond - should be in place to provide for demolition and site rehabilitation, to reduce the risk of stranded assets or partially built facilities with environmental issues requiring cleaning up. Around half of proposed data centres don't progress to operation.

Yes, data centre companies should pay all relevant taxes and charges, transmission, distribution and facility upgrade costs, etc. with no discounts or holidays. They can afford it.

Expectation 2 - Early engagement

It is correct and important that 'understanding of the requirements, impacts and opportunities is still developing'. For this reason, it will be important to produce a document that is as comprehensive as possible, to err on the side of asking for more than enough, to closely watch what occurs elsewhere and to evolve the expectations and associated guidance as needed.

'Early engagement' appears in this case to mean simply informing communities - telling them how it's going to be - but this should be meaningful engagement. 'Appropriate advice' is only suggested to be obtained in relation to design and compliance, etc. Communities must be involved.

The suggestion of providing information on 'mitigation measures' implies community and other impacts that will require mitigation. Satisfactory mitigation to one person may be completely inadequate to another and a whole local community, or the broader community, may be difficult to satisfy.

Expectation 3 - Engagement with Tasmanian Government

Summary objective - 'Engagement with Tasmanian Government' should certainly happen early and throughout the life of a project, but the associated objective of 'delivery of commercially viable projects' requires more than engagement with government.

Expectation 4 - Supporting' Tasmania's energy system

Summary objective - 'Supporting' Tasmania's energy system implies supporting it in all places and at all times. 'Unlocking' projects is insufficient. New renewable generation providing 100% of a data centre's energy needs is required, not simply providing a catalyst for development. 'Protecting' energy security is not the best term. Even if a data centre provides energy or capacity greater than what it uses, that does not constitute 'protection'. 'Not negatively impacting' or similar may be more appropriate. What adds to 'system security' are actions such as reducing large load fluctuations, not exceeding available capacity, being flexible should load reduction be required and deploying on-site battery storage into peak periods.

‘Minimising’ existing customer costs is unrealistic, as the minimum cost is zero. Minimising cost increases would imply a cost increase, which is inappropriate. It is difficult to ensure exactly no increase, so the expectation can only be to reduce existing customer costs.

Data centres are being developed ahead of growth in capacity and energy and before release of the document. What additional renewable energy are the current developments bringing? The gigawatt of data centres proposed in Tasmania would operate 24x7 and almost double Tasmania’s minimum daily load to exceed our typical peak load. Peak load - subject to what happens with large industrial customers - would increase by around 60%. This can’t be accommodated, as it would exceed Hydro’s installed capacity, or certainly its available capacity allowing for environmental and maintenance constraints, and wind and solar generation cannot be relied upon to make up the difference. Revenue from export could also be affected. The 2016 Tasmanian energy crisis and its impacts should not be forgotten. We have years with low rainfall and things break, such as BassLink and Tribute and Tungatinah power stations. Data centres must have sufficient, new, renewable generation on line before they start operating.

Requiring data centres to ‘partner’ to ‘support their electricity demand’ is insufficient. ‘Proponents are required to bring on additional renewable energy generation’ is not specific as to the quantum. Both maximum power demand and annual energy need to be provided, particularly since data centres operate consistently at high load. A 250MW data centre requires several times that in intermittent wind and solar generation. If they bring just enough, their only benefit will be providing some labour during construction. Providing only their energy requirement will still place stress on generation for an overall negative impact. Instead, if required to over-build generation, there would be some benefit in adding more net energy to the state. I recommend the power be retained to shut down, or limit supply to data centres if they don’t, or can’t, meet their RE commitments.

Suggesting data centres ‘enter into commercial arrangements that are sufficient to support the development of new wind and solar projects’ is not sufficient and the level and meaning of support should be defined. It is reasonable to only mention wind and solar projects, as the cheapest and most readily constructible forms of electricity generation. The easiest place to construct solar generation is on the roofs of homes and commercial buildings and developers should consider incentivising owners to increase solar generation, that can then be firmed by Hydro. That would provide a small but significant part of the energy demand, but be cheap, easy and beneficial to property owners. Tasmania must not be exposed to costs if supply to data centres is interrupted, due primarily to their high demand. Load management arrangements should be considered, as has been done in other places.

Large industrial demand is currently lower, while Liberty Bell Bay is not operating, but it will hopefully recommence operation, so its demand should not be reallocated without thorough consideration.

Backup electricity supply is a different matter to bridging power, or ‘behind-the-meter’ generation that is preferred by many data centres. Providing full backup - plus some backup for the backup - is often achieved with large diesel generators. Although initially conceived for bridging power until a grid connection is available, generators are often used indefinitely in preference to grid power, despite their high cost and environmental impact. The consequences are extreme. Battery storage should be part of the picture, to level load fluctuations, but they are a net energy consumer. New technology such as aluminium fuelled generators are only just emerging and natural gas fuel cells

can be lower cost and cleaner than diesel generation in high use applications. Tasmanians will not want high-cost, polluting, diesel backup generation forming part of our energy system.

Proponents should not be allowed to utilise long-term diesel generation. One developer proposes to install hundreds of large generators. That would release emissions and heat in the local area similar to around 1,000 heavy trucks running full-time. Consider that each 1MW diesel generator releases 2MW of heat and noxious emissions, creating a hazardous atmosphere around the development and dramatically increasing CO2 emissions.

Their 'fair share' of costs is all costs attributable to data centres, with nothing paid by others.

Expectation 5 - Sustainable water usage

At what stage must proponents provide the suggested water use forecasts? This should be in the planning stage when this should be known with some confidence.

It is telling that individual proponents must consider 'water security' - a term that itself needs definition - meaning that their water use is so high that it could impact water security for others. More water-efficient cooling systems than open-cycle evaporative cooling are available, but they are not being adopted by developers, as reducing water consumption is well down their list of priorities. Developers should be encouraged to use such systems.

Data centres should not be permitted to operate until water networks and facilities have been upgraded, at the cost of the proponent, to reliably provide the additional water they need. Water security must consider modelled climate change effects on rainfall and water supply and usage over the life of the data centre.

Salt water cooling with heat exchangers, providing process heat to nearby industries and provision of district heating may be some ways to reduce water consumption, but noting that hundreds of megawatts or a gigwatt are enormous amounts of heat to sink into any waterway or other use. Use of, or recovery of energy from excess heat should be a priority.

Expectation 6 - Approval pathways

The individual buildings used to house data centre and AI infrastructure may not be 'unprecedented or out of scale' with other structures, but such facilities can consist of many such buildings and be of the scale of an industrial area. Large data centres are not of a familiar scale.

Data centres must not be located in proximity to residential or commercial areas, as the heat, pollution - especially in the case of fossil fuel generation - and noise impacts are too great.

Broad opposition to data centres in the USA has resulted in developers reverting to constructing smaller, distributed data centres and moving to backwaters like Tasmania. Construction of smaller facilities, with likely higher community acceptance and distribution of electricity and water demands and associated impacts may become the norm.

Expectation 7 - Transparency and reporting

The document mentions mandatory requirements in the proposed Australian Government framework, yet the document itself seems to provide too much wiggle room, with little if anything that is mandatory.

Summary points

In closing, I make the following summary points:

1. I believe too many of the expectations are weak suggestions, using words that should be avoided, such as ‘should’ (optional if one chooses to); ‘support’ (assist to an undefined extent); ‘seek‘ (look for, but not necessarily do); ‘consider’ (investigate, but not do); ‘minimise’ (minimum possible, which is zero); ‘maximise’ (maximum possible, irrespective of other factors); ‘encourages’ (a suggestion, rather than a requirement), etc;
2. Existing Tasmanian generation and interconnection have limited capacity to take on major new load, especially while providing for reasonable contingencies, such as seasonal variations and unplanned outages. Providing new renewable energy (RE) in excess of data centre requirements is necessary. Large wind and solar projects are difficult and take longer to construct than data centres. Data centres should not operate until their renewable generation is on line;
3. Fossil fuel backup generation should not be considered temporary, as delays in providing new RE may see it operating indefinitely, with high environmental impacts, health costs and great community dissatisfaction;
4. Water consumption is a big issue, so developers should be required to use low water technologies, unless there is a good reason - not cost - why they cannot;
5. No additional water, energy or other costs attributable to data centres should be borne by the government or the community; and
6. Community engagement must be early, meaningful, ongoing and more than just informing communities. Developers must understand communities’ concerns, address them as much as is reasonable and make changes to their developments accordingly.

Thank you again for the opportunity to provide a submission. I hope it will be useful.

Yours faithfully,

Andrew Fowler

Andrew Fowler
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