Geoff Glazier
CPEng. BEng (Electrical), BCom (General Management), MMkting.
Perth
29 April 2025

**RE: Submission to Public Consultation on Proposed Regulatory Changes in the Pilbara**

I appreciate the opportunity to comment on the consultation documents:

- Evolution of the Pilbara Electricity Access (PNAC) Regime Consultation Paper (4 February 2025) (PNAC Paper).
- Evolution of the Pilbara Networks Rules (PNR) Consultation Paper 4 February 2025) (PNR Paper).

This is a private submission to provide feedback on both discussion papers above, as published at:

https://www.wa.gov.au/organisation/energy-policy-wa/regulatory-changes-the-pilbara#:~:text=The%20public%20consultation%20date%20has,the%20Energy%20Policy%20WA%20website.

This feedback is based on my significant and extended experience in the Pilbara and is submitted due to my desire to ensure that the electricity industry in the Pilbara evolves to further support the region's substantial contribution to our State and National productivity and living standards.

# 1 Introduction and Background

## 1.1 Background of the author

By way of background, I have been involved in the operation, management, development of infrastructure, and legislative reform of the Pilbara electricity sector for over 25 years. This experience includes:

1. The management of the Horizon Power networks in the Pilbara including all capital and operational expenditure and the support for the development of new industry.
2. Negotiating power purchase agreements (PPAs) with Rio Tinto for Horizon Power's operations in the Pilbara.
3. Negotiation of power sale agreements with large customers in the Pilbara including the first power sale agreement between Horizon Power and FMG.
4. The commercial development of the Karratha Power Station now owned and operated by ATCO.
5. The initial scoping for the South Hedland Power Station.
6. For Horizon Power, development of the first material to lobby Government for a regulatory framework to support better use and development of electricity infrastructure in the Pilbara.
7. As a consultant, leader of the first economic studies demonstrating the significant economic and environmental value of multi-user power infrastructure in the Pilbara.

These studies were repeated four years later and demonstrated the same or larger benefits.

8. Lead negotiator in the negotiations between Alinta and Horizon Power for a transmission open access regime in the Pilbara. This resulted in a fully developed regime that was only limited by the need for regulatory immunity or insurance. This regime is very similar to the arrangement ultimately established in legislation.
9. Advisor to Horizon Power on the development of the existing PNR and PNAC.
10. Advisor to the Pilbara ISOCo on the implementation and evolution of the PNR.
11. Advisor to BHP on the operation and opportunities offered by the PNR.
12. Creating of the scope of work for Energy Policy WA (EPWA) for the reforms proposed by the discussion paper.

I have also supported the evolution of the SWIS regulations over the past 19 years and supported electricity infrastructure development across Australia and other international jurisdictions.

## 1.2 Summary of the structure of this paper

This paper provides a short summary of the situation in the Pilbara and what I believe should be the Objectives of the latest round of reform in the Pilbara (Sections 1.3 and 1.4 respectively).

This paper then discusses the three most key items of feedback with the EPWA discussion papers and provides options to resolve these issues (Section 2).

This paper then provides detailed feedback on the PNR Paper and the PNAC Paper proposals as they are raised (Section 3).

The Appendices attached provide supporting details to the discussions through the paper.

## 1.3 Summary of the situation in the Pilbara

Each of the stand-alone systems, whether forming part of the North West Interconnected System (NWIS) or not, are operated by capable vertically integrated providers. Rio Tinto, Horizon Power and BHP provide their own requirements and smaller customers in separate towns. Rio Tinto provides for Parabadoo, Tom Price, Panawonica, Dampier and Wickham; Horizon Power provides for Karratha, Point Sampson, Roebourne and Hedland; BHP provides for the town of Newman. Woodside is vertically integrated to meet their own requirements and FMG contract from other generators. APA operates generation, network and retail to supply multiple large mining companies.

These vertically integrated providers may or may not own the generation connected to their systems but have historically been capable of dispatching and controlling generation to meet their aggregated requirements.

When I was operating in the Pilbara there was one transmission connected customer on the Horizon Power network and two transmission connected customers on the APA network. In addition, there were approximately 40 contestable customers on the Horizon Power distribution system. I understand there is now another transmission connected customer seeking to connect to the NWIS, but this connection has been delayed multiple years. There were no customers on the Rio Tinto or BHP networks that were not supplied by Rio Tinto or BHP respectively.

All the existing interconnections of the stand-alone power system occurred before the latest reforms. These interconnections delivered better economic and security outcomes for all parties than operating independently. Before the 2021 reforms, system security was managed informally. Further, before the 2021 reforms, Horizon Power was acting as the entity that commercially settled energy imbalances. Neither of these arrangements were supportive of efficient industry growth in the Pilbara. The issues of certainty of supply security and independent commercial settlement of supply imbalances and Essential System Services (ESS) were resolved by the introduction of the PNAC and the PNR in 2021.

## 1.4 Objectives for further reform in the Pilbara

The studies referenced in the EPWA discussion papers (2025 Studies) are supported by at least five previous studies in the conclusion that providing for increased multi-user infrastructure for the provision of electricity in the Pilbara provides the lowest cost delivered electricity, particularly as investment is made to lower carbon emissions. These finding have been consistent across the multiple studies completed over the last 20 years (the first detailed economic study being completed in 2005)[1].

### 1.4.1 Reduce barriers and cost of interconnection

Historically, the interconnection and multi-user infrastructure has occurred when the commercial and supply security benefits exceeded the administrative and asset development costs. This economically rational decision-making should continue to be the basis for parties to interconnection.

**The reform activities should aspire to reduce barriers and costs and increase certainty of outcome of increased interconnection and shared use of assets.**

The 2025 Studies and all previous studies concluded that the decarbonisation of industry and the support of new industry in the Pilbara is best supported by network elements that are used by multiple parties. I believe that these multi-user network assets should not be funded or underwritten by Government. Given the significant financial resources in the Pilbara, Government funds are better deployed elsewhere.

### 1.4.2 Provide a framework for private investment in multi-user infrastructure

The development of new network assets on a multi-user basis is a challenge in many jurisdictions.

In the National Electricity Market (NEM) we have network interconnectors funded by recovery of costs through users of the primary network service providers (NSP)s that are interconnected[2]. Recently, the Dedicated Connection Asset / Dedicated Network Asset (DCA/DNA) Framework has been implemented.

[1] References to these studies can be provided to EPWA if requested.
[2] Fact-sheet-how-transmission-frameworks-work-in-the-NEM.PDF

In the South West Interconnected System (SWIS), there is some third-party ownership of transmission the network. However, these outcomes are not well supported by the regulatory regime and in one case predate the establishment of the ENAC 2004.

As discussed above, the electricity industry in the Pilbara is very different to most other jurisdictions.

**The reform activities should provide a framework for revenue certainty for private networks investment from multiple network users without Government funding or under-writing.**

### 1.4.3 Objectives not supported

I do not support the following published objectives of regulatory changes in the Pilbara:

- *Implementing appropriate mechanisms to manage market power of vertically integrated participants*.

  All participants are currently vertically integrated, the mechanism should be to improve the efficiency of these participants' operations. Smaller customers supplied by three of the vertically integrated utilities are protected by the State's uniform tariff policy. These reforms are not to deliver full retail contestability that requires market power control of vertically integrated entities.

- *Changing the governance arrangement of the Pilbara Independent System Operator*.

  Governance outcomes are not an objective but a tool to achieve outcomes. Increasing or decreasing the cost and complexity in governance should only be introduced if it can demonstrably deliver increased benefits to the wholesale market participants in the Pilbara.

# 2 Core feedback on the PNAC and PNR Papers

I provide three points of core feedback to the discussion papers. These are:

1. The PNAC Paper does not provide a framework for private investment in multi-user networks without Government funding or under-writing.
2. The PNR Paper introduces significant additional costs and complexity that will not deliver material benefits, creating a barrier to interconnection, and adding unnecessary costs to existing participants.
3. The PNR Paper fails to properly define the roles for technical coordination that have created barriers to interconnection for Woodside. Instead, it proposes further unworkable patches.

Each of these points is discussed further below.

## 2.1 No commercial framework for private investment in multi-user network infrastructure has been proposed.

The Pilbara is unique in that it has separate network owners providing parallel path to deliver a secure (N-1) power supply solution to loads.

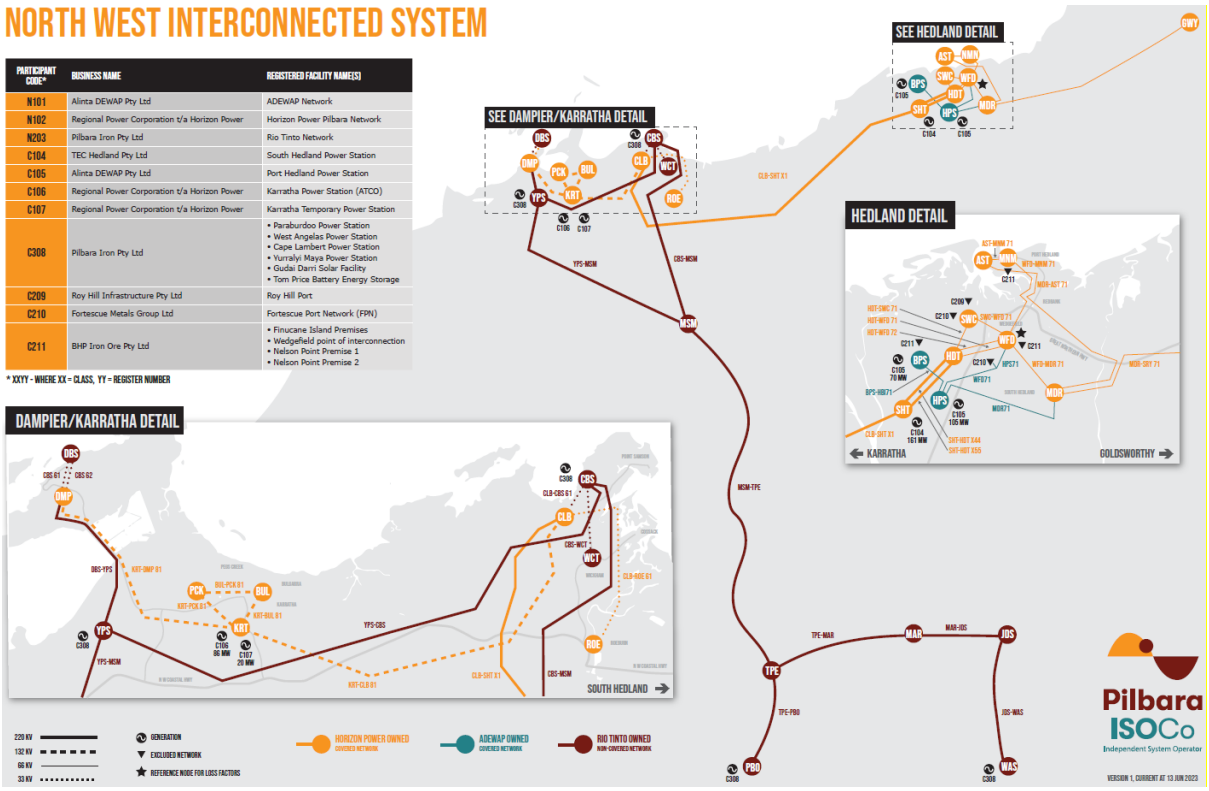


*Figure 1: Current NWIS*

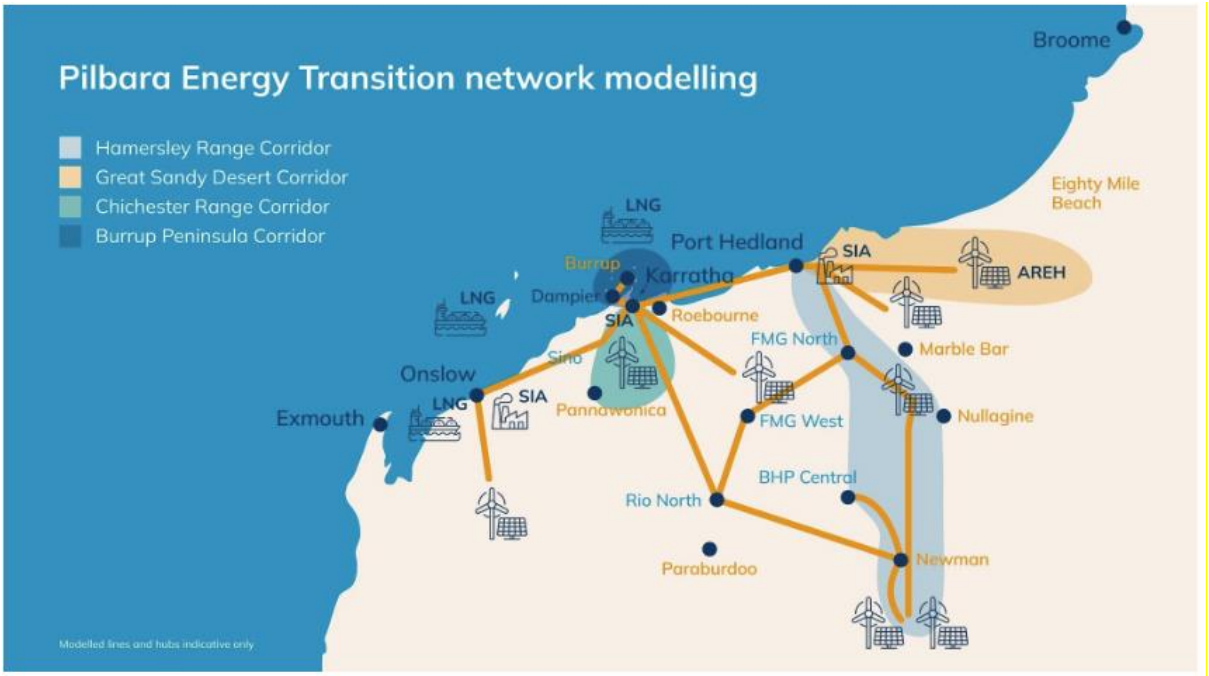


*Figure 2: Proposed Future NWIS*

Figure 1 shows that the Rio Tinto and Horizon Power networks provide parallel paths that back up supply to covered customers in Dampier and Point Sampson. Similarly, the APA network and the Horizon Power network parallel each other to provide secure supplies to customers in Port Hedland.

Figure 2 shows the increased use of parallel paths in future designs. It has not been stated that each of these new assets will be owned by the same party so it is expected that the most qualified owners with the lowest capital return requirements will be selected to own and operate the new assets.

This arrangement is unique in that it has multiple owners of parallel network assets providing network services. For comparison, in the SWIS there is one single Network Service Provider (NSP) (Western Power) that owns most of the network assets and recovers the charges for Transmission Use of System (TUOS) services. In the NEM there are single NSPs that service all of the customers in a given area that recover most of the TUOS charges. In some cases the area NSPs recover from their customers the payments for the owners of interconnection networks. Under the new Dedicated Connection Asset / Dedicated Network Asset (DCA/DNA) regime, new customers may need to negotiate with two network service providers, the DNA owner to get to the area network and the NSP of the area network. None of these systems require most of the NSP assets in the NEM to supply most of the users.

The PNAC proposal describes the separation of connection services and transmission use of system services (TUOS). This is a very helpful distinction in the Pilbara and is somewhat reflective of the SWIS arrangements of Interconnection Works Contract (IWC) for network connections and the Electricity Network Access Code (ENAC) that provides for ongoing services.

Under this division, the critical requirements to provide certainty for investor and users are:

1. How can TUOS users rely on the provision of TUOS services from assets that they may not be contracted from?
2. How will those that fund the new network investment get paid by the multiple customers that their new network provides TUOS for?

Question 1 is resolved by the statement in proposal 3.1 that states that the right to TUOS services will *be enshrined in the PNR and will apply to all networks, covered and non-covered, new and existing*. This well resolves requirement 1.

Addressing item 2 appears to be attempted by proposals 3.2,3.3 and 5 of the PNAC paper but no detail is provided beyond it will be negotiated with participants and EPWA. These proposals do not provide certainty and transparency on the biggest structural issue facing the evaluation of electricity infrastructure in the Pilbara Pilbara – how will investors in the required network assets get paid?

The recovery and distribution of TUOS payments has been discussed for many years. The most effective solution I have examined is for each of the transmission customers to pay into a TUOS pool and for the revenue requirements for each of these asset owners to be funded by the pool. Effectively this is a standard network pricing regime with:

a. Each of the covered Network Owners receiving a regulated return based on an approved Regulated Asset Base and efficient operational costs. The sum of all of the network owners' regulated returns creates a total revenue requirement.
b. This total revenue requirement is used to establish TUOS pricing that recovers these costs based on typical network pricing approaches.
c. The arrangement must allow for initial long term TUOS contracts that help support the financing of new network assets independent of the State balance sheet.

In the absence of any other proposed solution in the PNAC Paper, this paper refers to the mechanism to recover TUOS charge from multiple Users and distribute to multiple network owners/investors as the TUOS Settlement Pool mechanism. Importantly recovery for new investment through the TUOS Settlement Pool must be the subject of an efficiency test such as the New Facilities Investment Test (NFIT) of the SWIS and the PNAC.

There are other mechanisms. But, in my previous analysis, the TUOS Settlement Pool best meets the specific requirements of the Pilbara.

Although the funding mechanism is central to future multi-user network investment, there are other issues that must be resolved, these are:

1. How to determine what is the most efficient / prudent network infrastructure to be built including:
    a. Collecting User requirements.
    b. Undertaking analysis on the most effective form of network asset.
    c. Getting User acceptance of the design and the likely impact on charges.
2. How is a party selected to finance and construct the asset?
    a. Low cost of equity (pension funds) – Can this reduce the WACC?
    b. Capable construction and operation.

Each of these questions must be resolved to support efficient multi-user infrastructure development in the Pilbara.

## 2.2 Introduction of mechanisms that significantly increase costs and add limited demonstrable value

The PNR Paper effectively copies the IMO implemented at inception in the SWIS. The PNR Paper proposals 12 (Introduction of a Day Before Market), 15 (Requirement for a dedicated inhouse real time control desk) and 16 (Independent Board) will significantly increase costs.

Under the PNR Paper proposals, the ISOCo functions become almost identical to the IMO in 2010. Table 2 in Appendix A provides a more complete comparison of functions between the IMO and the PNR Paper proposals to demonstrate this. The IMO had about 20 Wholesale market participants at the time of inception[3], the ISOCo will have 5-10 so the number of participants is of the same order and will not materially impact the costs. Using the pre 2013 IMO as a reference, the Pilbara ISOCo costs and System Management costs will increase from circa $5 million per annum to $25 million per annum (refer Table 1 Appendix A for more detail) under the proposals in the PNR Paper. For a 200 MW system this increase in cost could represent a circa 8% increase in the cost of energy (4% for a 400 MW system).

The following summarises the discussion in section PNR Paper Proposal Feedback3.1 of this paper on proposals that will materially increase cost with limited benefits.

[3] From memory

**Proposal 6** – This entire proposal is not required nor commercially workable. Any generator can sell capacity to any Balancing Nominee independent energy sales agreements under the existing PNR. This proposal can be replaced by the existing regime that does not allow loads to be added unless they have capacity credits allocated or allows them to connect but can trip them through manual load shedding (makes them non-firm supplies) - until such time that their required capacity is built.

**Proposal 7.4** – The proposed Contingency Reserve Lower is not required to maintain system security. All generators (including rooftop generation) will respond in frequency / MW droop as required by the Harmonised Technical Rules (HTR) and AS4777 and (because of the technologies applied in the Pilbara) there will always be adequate reserve (downward headroom). At a minimum the "as required" component of this proposal should be clarified.

**Proposal 12** – The existing Balancing mechanism can deliver the majority of the required benefits (exception being central dispatch that only provides material benefits with large variations in the marginal cost of energy). I propose only to move to a new solution only when the existing mechanisms proves in efficient. Before that time, I suggest an investigation into options for setting the balancing prices other than a day before market. These options should include a central buyer of balancing energy that can arrange standing offers to sell balancing energy at different locations and times. This solution may work well in the Pilbara due to the homogenous gas turbine (GT) generation fleet drawing from single fuel market resulting relatively homogenous costs of energy. Further, this will avoid over investment in systems to set the balancing energy price for when the system can operate fossil fuel off, and the marginal cost of balancing energy is zero. At this time the capacity services will be the key driver of all investment. This solution could easily be implemented through the same mechanisms to procure ESS.

The proposed day before market will drive a significant proportion of the likely $20 million increase in costs. It will also increase the administrative burden on market participants that will add additional cost to this. If alternatives can deliver the dispatch flexibility required by increased renewables they should be further explored.

**Proposal 15.1** – The ISOCo can continue to outsource the eyes and arms functions of 24/7 System Control to parties that can provide the functions as a small incremental effort on an existing control desk (competitively). All sensitive decisions should be made by the ISOCo and implemented in procedures for the contracted control desk under all circumstances.

**Proposal 16** – The ISOCo Board should remain constituted of the current and potential wholesale customers of the Pilbara that the ISOCo is established to serve. The Wholesale participants can provide better representatives at limited or no marginal cost. There are a limited number of resources that understand the requirements of a secure power supply in the Pilbara who are not working for participants in the Pilbara or are otherwise conflicted. Once there are more than five wholesale market customers, participation on the Board can rotate to maintain a comprehensive view of the challenges in maintaining power system security.

## 2.3 Confused definition of roles for technical coordination.

From inception, the PNR has poorly implemented the roles of Network Service Provider and User. This has caused significant confusion in the connection of new facilities (Woodside Pluto Facility) resulting in "patch-up" solutions in the PNR that have increased complexity and cost.

For a party to design a facility to connect to a central network (which they do not control) requires certainty on the technical parameters of the supply from the central network. To achieve this, the industry nominates one party (the NSP in the HTR) to do things to maintain the standard of supply on the multi-user central network. This standard is defined in Part 2 of the Technical Rules. The NSP is the central role in a technical coordination process that allows multiple parties to successfully design facilities to operate safely and securely as an integrated system.

In the SWIS, a Network Service Provider is defined as a network operator that connects to multiple parties (the network is not solely for self-use). The NSP must maintain the supply on the network to the requirements of Part 2 of the HTR. It does this by enforcing Part 3 of the HTR (or WEM Rules A12), to those connecting to its network (being Users in the SWIS / Controllers in the Pilbara).

Sole use networks are an integral part of a broader facility that is designed as a whole (from the point of supply through the specification of the consuming equipment) by one party. Enforcing HTR Part 2 limitations on these networks can unnecessarily increase the cost and complexity of project development. There is no need for a published coordinating mechanism on sole use network as it is all done by one party.

The PNR defines all physical networks as NSPs and then attempts to make a range of complicated exemptions including:

1. Integrated Mining Network.
2. Excluded Networks - Only meet the HTR as a Controller.
3. Connection Point Compliance Facilities (Only where there is a HTR non-compliance as a Controller) (PNR 25.A – Excluded Network (limited to 10 MW).
4. A new proposal for Self-Contained Networks (limited to 10 MW) – unsure how this will work.

These exemptions are complicated, ambiguous and are unnecessary if Network and NSP are defined as per the SWIS and all facilities connected to the NSP's network meet the requirements of a Controller at the point of interconnection.

The new definition of a self-contained network has an arbitrary limit of 10 MW injection that is not based in any technical limits or requirements.

As in the SWIS, I propose that only the covered networks, and networks that otherwise elect to be an NSP, undertake the role of the NSP and maintain the HTR Part 2 supply standard on their networks. Non covered networks will default to a User / Controller demonstrating compliance with Part 3 at the Point of Connection but otherwise able to apply any standard across their network.

Non NSPs will need to demonstrate compliance as a Controller at any point of connection with a covered network. This will require a computer model of the complete transmission system behind the meter. This is necessary to ensure supply reliability across the NWIS which is critical for BHP's operations. This allows sole use network to facilitate development in the most technically prudent and economically efficient manner as part of their integrated operations if they choose to do so. This will become increasing important with hydrogen producing facilities that must be optimised as a compete facility to deliver the lowest possible cost.

# 3 Detailed feedback on proposals

Supported proposals are not repeated for brevity.

## 3.1 PNR Paper Proposal Feedback

| PNR Proposal Number | Topic | Feedback |
|---|---|---|
| **1** | **Long Term Planning** | |
| 1.1 | | Supported |
| 1.2 | Pilbara System Plan | It is unclear how the PSP will inform private investment in multi-user infrastructure. |
| 1.3 | | Supported. |
| 1.4 | | Supported. |
| 1.5 | In years where an updated PSP is not published, the ISOCo will prepare a generation statement of opportunities. | Supported, although some consideration should be made to whether the cost of this reports delivers adequate benefits. |
| | The default network planning and operation standard for the NWIS will be N-1. | The default standard for operation in the PNR is already N-1. Refer to discussion below. |

| 2 | Network Reliability Standard | |
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| 2.1 | The default network planning and operation standard for the NWIS will be N-1. | Operational N-1 is achieved through constraining the operation of generation. The PNR currently requires the NWIS to be operated at N-1 where possible - refer to the definition and use of the Operating in a Secure State.<br><br>The planning of a network identifies when new network assets should be considered. Investment in, and the construction of, network assets requires either the supporting commercial arrangements with new users or regulatory approval to charge existing users more before it commences.<br><br>Currently the planning of the network is defined by the NSPs. A system can be planned N-1 with or without the constraint of generation. The existing PNR states the NWIS will operate as a constrained network, this appears to remain unchanged. Therefore, the NSPs, planning on a constrained basis will allow for the constraint of generation to avoid the need to consider investment in the network. This will result in limited ability for providers behind the constraint to sell electricity. They may seek to trigger network investment to resolve this constraint.<br><br>In summary, the investment in new network assets on a constrained network is most likely to be driven by commercial considerations of a subset of network users and they will trigger the necessary investments. This outcome is economically efficient but requires two mechanisms in the PNR:<br>1. The presentation of constraints in a format that users can forecasts the impact of constraints on their commercial arrangements.<br>2. An ability for constraints to be modified for those that commercially underpin the required network investments.<br><br>The PNR has existing mechanisms for item 1 but not for item 2. Without item 2 the investment in networks under the PNR / PNAC to maintain efficient outcomes cannot occur. This issue must be resolved. |
| 2.2 | Parts of the network can be planned and operated to a higher or a lower standard with the agreement of affected parties. | As discussed above, the planning criteria cannot directly drive investment in a constrained transmission network. However, this clarification can be helpful. |
| 2.3 | NSPs can use alternative, non-network solutions | What is the difference between a constraint equation and a non-network solution?<br>Both use generation to avoid constraints. Given there are only 40+ contestable customers in the Pilbara and this |

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| | to achieve an N-1 standard. | number is not likely to increase materially (size of customers will but number will not) and only two on the existing covered transmission system. Why would these large customers not just directly invest in non-network solutions?<br><br>The use of generation and storage to resolve network constraints is confused in the SWIS and I have experienced that they impede sensible investment due to uncertainty on who is responsible.<br><br>More effort should be made to simplify the solutions in the Pilbara. I refer to the above discussion on how transmission reinforcements will likely be driven by the impact of constraint equations on effective dispatch. The paper is unclear on how the framework will encourage clarity on investment in a simple manner.<br><br>Given the scale and maturity of the two customers on the covered transmission system, and the scale and maturity of future customers, I suggest that the NSP not be required to consider non network investments as the customers are more than capable of efficiently implementing these solutions themselves. |
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| **3** | **Capacity Forecasting** | |
| 3.1 | The ISO will forecast capacity requirements for the NWIS. | Supported, noting comment below on the definition of capacity. |
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| **4** | **Individual Capacity Requirements** | |
| 4.1 | The ISO will set the method for participants to calculate their required contribution to the capacity requirement. | The existing PNR has a mechanism has a simple method of determining individual capacity requirement based on the Contracted Maximum Demand in the Access Contracts. No case has been made to change this. |

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| 4.2 | Participants can nominate part of their demand as non-firm, to be excluded from the firm capacity requirement. | When a power system is short of supply the frequency drops and customers are tripped off under the Under Frequency Load Shedding Scheme (UFLS). To avoid all customers having lower security due to non-firm supplies, any non-firm supplies must have arrangement to automatically or manually (refer discussion on manual load shedding) trip when there is not sufficient capacity to meet the load plus the installed continency reserve requirement. |
| 4.3 | Participants do not have to account for consumption served by co-located generation. | Supported, as long as installed contingency reserve is properly accounted for. |
| 4.4 | | Supported. |
| 4.5 | The final NWIS capacity target will be the sum of individual participant requirements. | Clarifying this includes the installed reserve requirements. |
| | | |
| **5** | **Capacity certification** | |
| 5.1 | A participant can self-certify the capacity contribution of its own facilities. | I support this proposal as long as the calculation of available capacity is undertaken consistent with the ISOCo Certification calculations. |
| 5.2 | | Supported. |

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| 5.3 | The ISO will certify all other capacity:<br>• Firm generation will be certified according to maximum output under peak demand conditions, supported by test results.<br>• Variable generation will be certified by a probabilistic method that accounts for the variability and the correlation with other variable generation.<br>• Storage will be certified by linear deration | System Security is served by adequate supply being available to meet loads at almost all times (within the Unserved Energy Standard). Firm Generation supplies energy when required, we can determine the probability that variable generation will provide the energy at the required times. Storage does not supply energy therefore it is not capable of proving a system security service independently. It must draw from firm or variable generators to contribute to system security.<br><br>The linear de-rate method does not consider this requirement. At its best, the linear de-rate method results in the installation of storage above levels that are economic as the storage technologies compete with other technologies without having to create the required electrical energy (do not have to provide the same service). At worst, the linear de-rate method can result in capacity obligations met through storage without enough energy generation to meet security requirements. This is particularly the case as traditional generators retire. This will result in inadequate available energy to meet security requirements. This approach is applied in the SWIS that currently has significant amounts of excess energy available (rooftop solar etc). The Pilbara will not start with this excess of energy supply. The capacity mechanism will need to ensure it exists as Firm Generation is retired. If established in a considered way, this issue can be resolved in the Pilbara with the certification of storage that demonstrates adequate links to available electrical energy production. This definition of how storage contributes effectively to system security is critical for the security of the Pilbara (and will become critical in the SWIS as the coal units retire). The linear de-rate method should be augmented in the Pilbara to recognise the need for adequate electricity to be created to supply customer needs. |

| 6 | **Backup capacity procurement** | |
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| 6.1 | If participants do not present evidence of sufficient capacity to meet their individual requirements for a particular year (including a reserve margin), the ISO will seek to procure additional capacity to meet the shortfall in that year. | This proposal is fundamentally flawed and should be reconsidered. See discussion below.<br><br>*How it works now for existing capacity*<br>To date in the Pilbara, all new loads must have adequate network capacity and generation capacity before the Balancing Nominees will let them connect. This has always been a requirement. There is no need to change or undermine this system.<br><br>The existing PNR allows for any capacity provider to allocate capacity to any party with a capacity obligation. This can be done independent of electricity sales. Therefore, the ISO is not required to trade existing capacity except to provide information on whom may have available capacity.<br><br>*Requirements for the installation of new capacity*<br>The installation of new capacity requires a long-term offtake agreement. The longer the term the lower the cost in $ per MW. So, to contract for new capacity the ISO will need to enter a 10–20 year contract. If the party with the capacity shortfall only uses this for two years (perhaps whilst their own installation is being completed), who funds the now excess capacity?<br><br>*Proposed Solution*<br>The better solution is to put the obligation on the wholesale participants (Balancing Nominees) to have adequate capacity before connecting a new load or accepting a new load into their portfolio. This is currently the norm for most participants in the Pilbara who ensure they have enough capacity before adding new loads. This solution is already partially in the PNR but does require some clarification. Each Balancing Nominee must have adequate capacity before they are permitted to transfer or connect any new load. Each new significant load connecting to the NWIS must have adequate capacity arrangements (either directly or through a balancing nominee) in place before it is permitted to connect by an NSP. The ISO would require evidence of adequate capacity before authorising a churn in the Balancing and Settlement process.<br>These existing arrangements can be supported through effective non-firm supply arrangements. If a load needs to connect before their capacity supply has been certified (it may be new capacity that is late) it can connect as a non-firm load with the automatic and manual controls discussed in item 4.2 above. |

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| 6.2 | | Not required. |
| 6.3 | | Not required. |
| 6.4 | | Not required. |
| 6.5 | | Not required. |
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| **7** | **Proposal 7: ESS framework** | |
| 7.1 | | Supported. |
| 7.2 | | Supported. |
| 7.3 | When energy storage penetration increases, a new Contingency Reserve Lower service will be introduced to manage unplanned loss of load. | With all solar, wind and BESS reserve required to provide 4% droop by the HTR, it is unclear why this service is required. Every generator on the system will be providing downwards contingency headroom available with a response reflective of its scale.<br>The only time the downward deviation reserve is required is when multiple generators are running close to minimum stable generation and there is not sufficient headroom. All solar (including rooftop solar as required by AS4777), wind and gas turbines (GTs) online will respond with downward deviation in response to a frequency rise (as defines a contingency response). The GTs are the only technology that may have a minimum stable generation at about 10%. It is unlikely that the system will be running with GTs only all at minimum.<br><br>This service is not required to maintain system security and will create cost and complexity for no benefit to system security. |
| 7.4 | | Supported. |
| 7.5 | Power system studies will be conducted to assess Rate of Change of Frequency (RoCoF) ride-through capability of generators. | The RoCoF requirements of generators is specified in the HTR (clause 3.3.3.3.c) and can be monitored under the compliance monitoring program required by 4.1.3.c of the HTR.<br>This RoCoF requirement and the compliance monitoring program has been in the HTR and its predecessor documents at 4 Hz per second for over 20 years. What additional guidance is required?<br>The RoCoF arrangements in the SWIS are extremely costly and complex. Partially as the result of being unnecessarily conservative and the complexity of a central dispatch solution for energy. Do not repeat this outcome in the NWIS. |
| 7.6 | | Supported. |
| 7.7 | | Supported. |

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| 7.8 | | Supported. |
| | | Supported. |
| 8 | ESS cost recovery | |
| 8.1 | ESS costs will be recovered from causers where practical, on a trading interval basis. | Supported. However, it should be clear that a covered network, that cannot buy or sell energy, cannot be a causer of the need for ESS. |
| 8.2 | | Supported, |
| 8.3 | Contingency reserve raise costs will be allocated to supply facilities based on their output in each interval, according to the runway method. | Supported - However, recovering this from Balancing Nominees based on per interval injection would simplify calculations and could achieve a similar result. |
| 8.4 | Contingency reserve lower costs will be allocated to a load based on their demand in each interval, according to the runway method. | Refer discussion on 7.3. This Contingency Reserve Lower service and cost is not required to maintain system security and therefore should not be introduced. |
| 8.5 | Facilities will be exempt from Contingency Reserve Raise costs if they provide evidence that a facility trip would be automatically offset by load curtailment by the same participant | Supported (this would require testing and a compliance monitoring program to confirm). |
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| **9** | **System strength** | |
| 9.1 | | Supported. |
| 9.2 | The ISO will approve system strength requirements for different parts of the network. | This should be framed as design minimum fault level as there are currently the requirement for design fault levels. System Strength is typically framed as Short Circuit Ratio (MVA/MW). The MW changes with the size of the generator and load. The MVA fault level can be defined absolutely at each location on the network. |

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| 9.3 | | Supported. |
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| **10** | **Outage Planning** | |
| 10.1 | | Supported. |
| 10.2 | | Supported. |
| 10.3 | | Supported. |
| 10.4 | | Supported. |
| 10.5 | | Supported. |
| 10.6 | | Supported. |
| 10.7 | If a network outage would affect power system reliability the network operator must include a plan to mitigate the reliability impact. | This is supported as long as NSPs are not required to buy energy or ESS as party of the mitigation process. This creates confusion with obligation in the PNAC for ring-fencing. |
| 10.8 | | Supported. |
| 10.9 | | Supported. |
| | | |
| **11** | **Outage plan timing** | |
| 11.1 | | Supported. |
| 11.2 | | Supported. |
| 11.3 | | Supported. |
| 11.4 | | Supported. |
| 11.5 | | Supported. |
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| **12** | **Balancing mechanism** | |

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| 12.1 | The ISO will operate a day-ahead trading mechanism in which participants can trade energy around their bilateral positions in half hour increments. | This proposed solution will have a likely establishment cost in excess of $20 million per annum (refer reference in Appendix A). It will require significant time investment from the ISO and all Balancing Nominees.<br><br>No significant analysis has been undertaken on how far the existing mechanisms can support the required objectives and the required trigger. The following is a description of what is required for the Balancing Mechanism to support the exchange of energy required by increasing the volume of variable sources<br>a) A price must be set for the exchange.<br>b) The settlement engine must be able to implement the agreed commercial exchange to the actual dispatch of energy from each generator. The existing solution A) has a single administered price for exchange based on the higher SRMC on the system. B) Allows parties to define the basis of exchange between them and to change it as required month in advance. Given that most of the costs of new generation will be paid in bilateral contracts I expect that this existing arrangement would work sufficiently up to around 10 balancing nominees. The existing discussion does not explore how the existing arrangement fails to meet the requirements of participants. The connection of islanded systems is easily supported by the existing regime with the Balancing control delivered by metering the points of interconnection. The existing discussion does not detail how the day before market can resolve constraint equations. I am not aware of a day before market that has implemented constraint equations. This will be a level more complicated and costly that that delivered by the AEMO at disaggregation in the SWIS. |
| 12.2 | Participants must nominate:<br>• planned consumption by portfolio loads;<br>• planned supply by portfolio generation and storage, including contracted supply from other parties; and<br>• expected dispatch order for facilities in their portfolio nominations must balance. | |
| 12.3 | Participants may choose to offer to deviate from their initial position, by making $/MWh bids (to sell energy) and offers (to buy energy). | |
| 12.4 | The ISO will clear the day-ahead trading mechanism. | |
| 12.5 | Trading positions and prices will be determined a day ahead of real time. | |
| 12.6 | Traded energy will be settled at the marginal clearing price at the point supply offers and demand bids intersect. | |
| 12.7 | Participants can nominate specific | |

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| | facilities to provide balancing energy. | |
| 12.8 | Participants from whom the ISO has procured backup capacity must provide balancing offers for the contracted facilities. | |
| 12.9 | During the trading day, the ISO will designate and dispatch balancing facilities according to their bids and offers. | |
| 12.1 | The ISO will determine a balancing price for compensating the balancing facilities based on the marginal price of the last facility dispatched | |
| | Balancing energy will be settled at:<br>• for additional energy dispatched from balancing facilities, the balancing price; and<br>• for uninstructed imbalances (from trading outcomes) outside a small tolerance range, the balancing price multiplied by a penalty factor. Penalty factors will be different for positive and negative imbalances. | There is no need for penalty factors. If the administered price is set at the marginal cost of energy at that time and location, why are penalty factors required? The penalty factors will depend on the mechanism used to establishing the price for balancing energy. |
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| **13** | **Metering** | |
| 13.1 | | Supported. |

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| 13.2 | | Supported. |
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| **14** | **Manual load shedding plan** | |
| 14.1 | Participants must use best endeavours to manage their portfolios to balance their consumption and supply according to the trading and balancing mechanism provisions. | This requirement changes materially depending on the solution to item 12.<br><br>For example, if a central buyer model is used for imbalance energy, the requirements to remain in balance or reflective of a day before resource plan can be relaxed to the extent of the imbalance energy that the central buyer has procured.<br><br>Alternatively, the energy provided by the Regulation Reserve provider could also provide for a relaxation of the balancing obligation.<br><br>Relaxing the balancing obligation removes the real time metering obligation inherent in the existing balancing regime without the need for all participants to provide day before load forecasts to the Iso as required by the proposed day before market.<br><br>The form of the solution does not consider or describe the following:<br><br>a. Any manual load shedding must be implemented pre-contingent. That is, when the load exceeds the available generation capacity minus the Contingency Reserve requirements, or generation cannot be reconfigured to avoid network overloads post contingency.<br>b. The non-firm supplies described in proposal 4.2 must be the first manually curtailed on a pre contingent basis if the load exceeds the available capacity minus the contingency reserve requirements.<br>c. This should be the first solution for any Balancing Nominee that otherwise has a load higher than the allocated capacity credits.<br>The manual load shedding arrangements, implemented pre-contingent should replace Proposal 6 to avoid the cost and complexity of this solution. |
| 14.1 | The ISO must seek to maintain the power system in a secure operating state at all times, including using powers of direction to avoid involuntary load shedding. | |
| 14.2 | If the ISO forecasts a real-time supply shortfall, it must notify participants of the forecast time of the shortfall, and the quantity of expected unserved load. | |
| 14.3 | In preparing the priority list, the ISO must:<br>• If possible, ensure that consumption relating to contracted energy volumes and contracted capacity volumes is disconnected later than consumption not associated with contracted capacity. | |

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| | • Ensure that consumption by foundation users of transmission network elements is prioritised ahead of others when network congestion is the cause of the shortfall.<br>• Take account of network equipment serving both load and generation.<br>• Attempt to achieve an equitable distribution and rotation of load disconnection across participants in proportion to their consumption.<br>• Consult with NSPs and other connected parties to ensure the priority list is practical. | |
| 14.4 | If load shedding is required, the ISO must endeavour to follow the load shedding priority list | |
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| 15 | ISO functions | |
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| 15.1 | Over time, the remit of the ISO will expand to cover additional functions. | This will increase costs materially for limited to no benefit.<br><br>No benefit: The control room should only ever implement pre-agreed procedures. These procedures should reflect the guidance of the Rules. No control desk should be making judgements that could be conflicted by other operations. 24 h 7 days per week capability is costly, both in labour and the required SCADA Master Station. Based on my experience with the Management of the Western Power control desk in the Pilbara in early 2000s, I would expect that the investment required to establish an independent master station will be in the multiple of millions of dollars and the annual staff and operating costs (labour, accommodation, SCADA technical support etc.) would exceed $5 million per annum. This is supported by the System Management annual costs of prior to 2013 of between $6.5 million and $7.5 million (Refer Appendix A of this paper). System management undertook a similar function for a marginally larger system.<br><br>The opportunity to procure the hands and feet of the ISO from existing control desks at a marginal or shared cost provides opportunity for significant cost savings. The existing cost is 1.2 million[4]. The existing arrangement of competitive outsourcing for the 24/7 eyes and hands of the ISO operating under clear directions provides an adequate lowest cost option. A fully costed inhouse solution should always be a competitive option but there is nothing in the 24/7 role that requires independence as everything must be proceduralised. The need for procedures is because the large number of staff required to deliver 24/7 service and the short timeframes to make decisions. |
| 15.2 | The ISO will take control room functions in house by January 2027. | Refer above. |

[4] Refer ISO 2024- 2025 mid-year budget review.

| 16 | ISO Board | |
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| 16.1 | The ISO Board will continue to have five members, including a Chairperson and the Pilbara ISO Chief Executive Officer (CEO, Managing Director). | The ISO is for the ISOCo wholesale customers, my view is the ISO Board should be expanded to include interested wholesale customers in the Pilbara (BHP, Woodside, etc). The requirements of smaller new entrants are championed by their Wholesale providers (APA / Horizon Power).<br><br>Independent operation and reform of the SWIS has resulted in significant increases in costs and complexity that have not delivered reflective benefits to wholesale participants (refer summary of cost changes since introduction of AEMO / ISO). The Pilbara should embrace the industry led development that was lost in the SWIS with the introduction of the AEMO and EPWA resulting in step changes in cost and complexity.[5]<br><br>There are very few people with the required knowledge of maintain a secure power supply in the Pilbara that are not working for participants in the Pilbara or otherwise conflicted out from a true independence.<br><br>A review of the existing Board members of the Pilbara reflects a level of training and experience in maintaining a secure power system in the Pilbara that compares well with the level of training and experience in the members of the independent boards of the SWIS.<br><br>For effective operation of the Pilbara, participants will need to be engaged in Working groups at many levels. Therefore, the ACCC challenge will remain whether wholesale participants are on the Boards or engaging through the required working groups. The ACCC challenge has been proven to be manageable. |
| 16.2 | ISO directors must be independent of participants. | |
| 16.3 | Directors (except for the CEO, who is appointed by the board) will be appointed by the Minister for Energy. | |
| 16.4 | To be appointed, any new Director must meet selection criteria, including any requisite skill requirements. | |
| 16.5 | Directors will be appointed for staggered three-year terms, with eligibility for reappointment twice. | |
| 16.6 | ISO cost recovery should be amended at the same time as board composition changes. | |

[5] Refer Cost of Operating the SWIS in Appendix A with the introduction of the most recent reforms.

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| **17** | **ISO budget** | |
| 17.1 | The ISO Board must consult on a draft budget. | Supported, noting the ISO Board should be constituted of existing and potential future wholesale customers. |
| 17.2 | | Supported. |
| 17.3 | | Supported. |
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| **18** | **ISO fees** | |
| 18.1 | ISO costs will be recovered from participants based on gross injection and withdrawal figures into and from the NWIS. | Support revising cost recovery mechanism.<br><br>Solution should more clearly define how gross injection and withdrawal will be defined on non-covered networks. |
| 18.2 | The fee (in $/MWh) will be determined annually. | An alternate option to apply on gross capacity obligation as this is more reflective of the impact on power system security. |
| 18.3 | | Supported. |
| 18.4 | | Supported. |
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| **19** | **Confidential Information** | |
| 19.1 | | Supported. |
| 19.2 | | Supported. |
| 19.3 | | Supported. |
| 19.4 | | Supported. |
| 19.5 | | Supported. |

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| **20** | **Compliance monitoring** | |
| 20.1 | | Supported. |
| 20.2 | | Supported. |
| 20.3 | The ISO will publish quarterly compliance reports on the activities it monitors. | Propose consideration of a non-compliance report by exception. This will reduce ongoing operating costs. |
| 20.4 | The ERA will continue to monitor behaviour, with additional focus required from the start of the balancing mechanism. | I note the balancing mechanism is already operational. I assume this refers to the proposed day before market that will introduce the opportunity for gaming and will therefore require additional regulatory oversite. This is simplified if a more fit for purpose solution to pricing balancing energy is adopted. |
| | | |
| **21** | **Compliance enforcement** | |
| 21.1 | | Supported. |
| 21.2 | | Supported. |
| 21.3 | | Supported. |
| 21.4 | The ERA will have power to restrict participation in the trading mechanism for participants who persistently fail to meet their traded energy quantities. Participant energy will still be settled in balancing | This only works if the participant sets the marginal cost. If they are not setting the marginal cost not participating in the proposed day before market does not change the outcome for the participant. They are still settled based on the actual energy flow at the top marginal cost.<br><br>Again, this complexity and oversite is avoided with a more fit for purpose balancing arrangement. |
| 21.5 | | Supported. |
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| 22 | NSP to NSP connection arrangements | |
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| 22.1 | The PNR will include a process for the interconnection of additional networks to the NWIS. | When network and NSP are effectively defined (refer to the discussion in section 2.3 of this report), this section need only apply when two networks used to supply third parties (covered networks) are interconnecting. For example, when network and NSP is properly defined, Woodside is not a NSP and simply connects under the requirements of Part 3 and 4 of the HTR with compliance at the point of connection. This provides certainty to most connecting networks that are operating for self-use ,and provides them flexibility to design and operate their network as a whole to meet the requirements (unless covered). |
| 22.2 | | Supported. |
| 22.3 | Connecting networks must show compliance with Chapter 2 of the HTR, unless they are self-contained (established for the purpose of the participant serving only its own facilities). | Supported - this results if NSP is properly defined as per section 2.3 of this report and the SWIS. |
| 22.4 | Generation, storage, and load facilities on the connecting network must demonstrate compliance with Chapter 3 of the HTR. | If network and NSP are properly defined a single user integrated grid (network, generator, load) will need to be compliant with Part 3 of the HTR at the point of compliance. |
| 22.5 | Self-contained network infrastructure may opt to demonstrate compliance at the interconnection point to the NWIS. | Achieved with definition change to network and NSP as per section 2.3 of this report and the SWIS. |
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| **23** | **Preferential supply for transmission foundation customer** | |
| 23.1 | Foundation customers of transmission infrastructure will be entitled to firm supply for their loads when using the network components they have funded. | The concept is supported. However, implementation is most simply and directly done through the constraint equations for network and system limitations. Investors in network infrastructure to resolve constraints will most likely be generators (refer discussion on proposal 2). If a generation facility funds a network investment, it should be the last constrained for the constraint equations that reflect the constraints the investment resolved. |
| 23.2 | Foundation customers of transmission infrastructure will be allocated energy from other sources if their generation is constrained in balancing. | This is most easily implemented through a central buyer for imbalance energy on a longer-term basis. |
| 23.3 | Foundation customers of transmission infrastructure will be settled without imbalance penalties if their dedicated generation is constrained after trading positions are finalised. | This requirement is significantly simplified without the introduction of a day before market with central dispatch. |
| | | |
| 24 | **Self-contained network** | |
| 24.1 | The PNR will distinguish between a network operator which provides services to third parties, and the operator of network infrastructure that is used to serve load and generation of that network operator | Achieved with definition change to network and NSP as per section 2.3 of this report and the SWIS, no further action is required to achieve these outcomes. |

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| 24.2 | Network operators who use their network equipment solely to service their own generation and load, can choose to be treated as a network user (demonstrating compliance at the connection point with the NWIS), or a network (compliance of all critical equipment within the network). | Achieved with definition change to network and NSP as per section 2.3 of this report and the SWIS, no further action is required to achieve these outcomes. |
| 24.3 | New connections must provide standing data and real-time data for individual pieces of critical equipment to the ISO, including if their facilities are subject to connection point compliance | Achieved with definition change to network and NSP as per section 2.3 of this report and the SWIS, no further action is required to achieve these outcomes. |
| 24.4 | An Excluded Network can have a maximum of 10 MW of injection or consumption. If injection or consumption exceeds 10 MW for more than a set percentage of time over a rolling horizon, the Excluded Network status will be revoked. | Achieved with definition change to network and NSP as per section 2.3 of this report and the SWIS, no further action is required to achieve these outcomes. |
| 24.5 | A network owner which wants to be treated as a user but is not an Excluded Network is not required to show non-compliance with | What is the technical or commercial basis for this? What is the difference between a 100 MW injecting generator with a long connecting network and a 100 MW injecting generator with a long connecting network with an internal load if Part 3 HTR compliance is demonstrated at the point of compliance by both? |

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| | the HTR to be able to opt for Connection Point Compliance. | Achieved with definition change to network and NSP as per section 2.3 of this report and the SWIS, no further action is required to achieve these outcomes. |
| | | |
| **25** | **Storage participation** | |
| 25.1 | Controllers of storage works above 5 MW must register their facilities. | Registration of facilities does not result in significant burdens if the complexity of item 12 can be delayed or avoided. Currently the Balancing Nominees control the dispatch of the facilities through the relevant bilateral commercial arrangements. |
| 25.2 | | Supported. |
| 25.3 | | Supported. |
| 25.4 | | Supported. |
| | | |
| **26** | **Demand side participation** | |
| 26.1 | Load participation in the PNR will be focused on ESS provision and mechanisms for flexible load to take advantage of available variable renewable energy. | The operation of these requirement must be linked to Proposal 14 to be fair and equitable. |
| 26.2 | Flexible load can be designated as non-firm in the capacity adequacy process, so that it is not required to be matched by supply capacity. | |
| 26.3 | Owners of flexible loads can bid in the proposed trading mechanism to purchase additional energy, and then manage their load to match their position. | Proposed Trading mechanism is not required for this. The existing balancing mechanism allows for loads to participate in balancing obligations of responsible Balancing Nominee(s). |
| 26.4 | Owners of flexible loads can bid in the proposed trading | Contingency Reserve Lower is not required for system security as is it more than provided for in the HTR and the online facilities. There is no need for it to be procured. |

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| | mechanism to purchase additional energy, and then manage their load to match their position. | |
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| **27** | **HTR standards** | |
| 27.1 | | Supported |
| 27.2 | NSPs will not have technical standards for connections in addition to the HTR. | I participated in the original drafting of the HTR. During this drafting, important element were removed by others that resulted in a Standard without all of the elements typically relied on to maintain system security. This proposal is supported once the HTR, or other mechanisms, contains the items removed and otherwise missing. |
| 27.3 | In the medium term, the HTR will set a minimum standard for connection. | The HTR was always intended for negotiation and derogation. The existing PNR allows for this with ISO oversight to ensure systems security. This proposal is likely to be either unworkable or will result in cost increases necessary to maintain the covered systems within the requirements of Part 2 of the HTR. It is important to note that the Part 3 requirements do not deliver the Part 2 requirements in all circumstances. I have been involved in connections recently where the Access Seeker met the Technical Rules but in doing so the network was not within the requirements of Part 2. In this case the NSP requested the user to request an exemption from that requirement and to change the control of the facility so that it was non-compliant. This is a right and proper outcome from the connection studies process. |
| 27.4 | Connection will not be allowed for equipment that falls short of the minimum standard. | Refer discussion above. If, in a particular circumstance, a connecting User can demonstrate to the NSP and the ISO that a derogation continues to allow the covered network to meet part 2 of the HTR, why not allow this exemption / derogation? |
| | | |

| 28 | HTR negotiation framework | |
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| 28.1 | NSPs must negotiate with access seekers and consult with the ISO on requested departures from the default standard, and the ISO will have final power of approval (as it does for all connections). | The term negotiation is troublesome as it does not describe the process. The access seeker must demonstrate that deviating from the relevant requirements of Part 3 of the HTR will not result in the network not meeting Part 2 of the Technical Rules for the relevant Planning Criteria. If this can be demonstrated under all reasonable forecasts, then a derogation / exemption can be provided. The NSP and the ISO must both agree with the studies demonstrating ongoing compliance under Part 2 under the proposed derogation / exemption. There is no negotiation, only assessment of studies to demonstrate ongoing compliance. |
| 28.2 | The ISO may provide guidance for acceptable bounds of negotiation, evidence, and mitigation measures. | Supported - However, these are already defined in Part 2 of the HTR once the planning criteria are re-included. |
| 28.3 | NSPs must publish estimated and actual timeframes for connection assessment activities in their control. | Users should propose the exemption and do the studies to demonstrate the compliance with Part 2. This is because the exemption is established as part of the connection applicants design and the integrated studies process. Connection applicants can undertake both the Single Machine Infinite Bus (SMIB) and Wide Area Network (WAN) studies on the NWIS. NSPs and ISO can assess the case made by the applicants. |
| 28.4 | NSPs and access seekers can escalate disputes to the ISO, and where the ISO is a party to the dispute, to an appropriate dispute resolution mechanism. | Supported - If the mechanism is established properly in the Rules the dispute will be technical in nature. Does the Network remain with the requirement of Part 2 for the Planning Criteria (of part 2) and for all reasonable forecasts? The dispute resolution should support resolution of these issues. |
| 28.5 | | Supported. |

## 3.2 PNAC Paper Proposal feedback

| PNAC Proposal Number | Topic | Feedback |
|---|---|---|
| **1** | **Coverage** | |
| 1.1 | All new Pilbara transmission assets will be automatically covered, with the exception of certain connection assets. There will be no revocation of coverage for these assets. | This position is supported for new interconnecting multi-user transmission assets. However, it should be made clear that transmission assets within self-use systems will not be covered. For example, if BHP, FMG or Rio Tinto (referred to in this discussion as 'the miner') constructs a third transmission line to support increased load growth on an inland mine (three transmission lines supplying the mine instead of two) it would make little sense to cover this asset. This is because:<br>a) Only the miner requires the use of this asset.<br>b) To cover this asset requires the interface between this third transmission line and the existing non-covered assets to be metering points in the balancing regime. It is unclear how this requirement would be resolved.<br>c) The covered asset may need to be designed and operated to different technical standards under the HTR than the existing two parallel assets.<br>To cover a reinforcement asset within a self-use system introduces cost and complexity without benefit. There is no benefit as there is no other user of this asset.<br>If another user requires the use of the new asset, they probably require the use of the existing assets that work with the new transmission line to transport energy. In this case, under the existing regime, they can negotiate with the miner for the services or apply to have all of the required network assets covered.<br>Non-covered networks currently contribute to the security of supply for users on the covered networks. The Rio Tinto network provides parallel paths for users on the Horizon Power covered network that support in the event of |
| 1.2 | Regulation of these assets will be 'PNAC-style' unless the Minister separately imposes ENAC-style regulation by way of a form of regulation decision, or an NSP opts in to ENAC-style regulation. | |
| 1.3 | Certain small single user connection assets (still to be defined) may be exempted from automatic coverage until their circumstances change. | |
| 1.4 | Transition for early projects: Early projects will be expected to opt in to PNAC-style regulation. | |
| 1.5 | Legacy for existing networks: (a) Existing covered networks will be subject to the above arrangements. They will stay covered and, like new networks, will not be able to seek revocation. (b) Existing uncovered networks will continue with the status quo, i.e. will be exempted from automatic coverage but, as now, may be subject to a coverage application. Any such coverage application will be assessed against the ENAC's general coverage criteria, and not any special coverage criteria (if any) which may be prescribed for new PET networks. | |

| PNAC Proposal Number | Topic | Feedback |
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| | | failures on the Horizon Power covered networks. This has been the case for at since the early 2000s. If a non-covered network owner does not wish to get paid for services provided by its network, and no third parties are connected to that network, the benefit of automatic coverage is unclear.<br><br>Coverage creates a significant overhead burden and can impact system design resulting in reduced flexibility and increased cost. If no parties wish to access (connect to) a system, there is no reason for that party to be covered.<br>The existing framework supports a light-handed response to requests for coverage - this could be improved and reinforced.<br>Confirm that this includes all existing networks, not just those connected to the NWIS. What happens if a transmission reinforcement is completed within the existing uncovered network? |
| | | |
| **2** | **Managing Vertical Integration** | |
| 2.1 | It is proposed to reframe the objectives of PNAC Chapter 8 to include a recognition of the role of incentives. To the extent any proposed measure does not eliminate an NSP's ability to engage in harmful behaviour, it must effectively remove or negate any incentive to do so. | All of the existing wholesale customers in the Pilbara also own and operate electricity networks (APA, Horizon Power, Rio Tinto, FMG). Some also own and operate generation (APA, Rio Tinto), and Horizon Power has operational control over generation it does not own. Likely connecting wholesale customers are also vertically integrated (Woodside, BHP). The NWIS is, and will remain for the foreseeable future, the interconnection of vertically integrated utilities.<br><br>Vertical integration is the state of the Pilbara of wholesale participants in the Pilbara. The vertically integrated utilities have improved labour productivity consistently since the inception of the Pilbara. The option for this must remain. |
| 2.2 | It is proposed to establish the measures and benchmark (as set out in Box 5, page 28) as a way of evaluating outcomes in managing vertical integration. | |
| 2.3 | Feedback is sought on three possible options for managing vertical integration:<br>• Option A: Require either ownership separation or full operational separation.<br>• Option B (preferred): Permit vertical integration to remain, but | |

| PNAC Proposal Number | Topic | Feedback |
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| | implement a granular and possibly staged process in which 'sensitive functions' are either transferred from the NSP to the ISO, or left with the NSP but placed under the ISO's supervision or approval, with the outcomes evaluated against the benchmark set out in Box 5 (page 28). (This assumes the ISO has been reconfigured to be truly independent and is adequately resourced.)<br>• Option C: Expand existing PNAC requirements regarding administrative separation, with likely addition of legal separation, with measures and outcomes once again evaluated against the benchmark set out in Box 5 (page 28). | When I last reviewed the data in 2020, there are a total of circa 40 contestable customers across two covered networks. Of these, three customers were connected to the transmission system. Further segmenting the operators in the Pilbara will introduce cost and complexity and result in the high overhead costs, high complexity and poor asset development outcomes I have experienced in the SWIS.<br><br>It should be recognised that the intent of the Pilbara reforms is different from the SWIS in the 2000s. The reforms in the SWIS reforms were based on those in the NEM. These reforms were intended ultimately to support all customers being contestable full retail contestability (FRC) and to achieve obligations set externally for significant payments from the Federal Government.<br>Arguably, FRC has not served the NEM well, with WA reviewing the results and not moving to a FRC policy.<br><br>I understand that FRC is not what the State wishes to achieve in the Pilbara. If it is, the objective for FRC should be stated in the discussion paper.<br><br>Disaggregation and increased ring fencing, or the threat of disaggregation, will create confusion and uncertainty and result in increased risk to new industrial wholesale customers making them avoid using the multi-user system.<br><br>The challenge in the Pilbara is to support interconnection with the use or common user infrastructure and to allow access to shared generation developments. This should always be presented as an option competing with internal development by the vertically integrated wholesale |
| 2.4 | It is planned, wherever possible, to use transparency as a supplementary measure to mitigate vertical integration risks. | |
| 2.5 | The revised regime will include sanctions for non-compliance by way of civil penalties and other remedies. | |
| 2.6 | If transmission operators are required or permitted to operate energy storage or energy producing equipment to provide system strength, security and reliability services, the measures to manage vertical integration may need to specify certain limited exceptions. | |
| 2.7 | Transition for early projects: Early projects will be regulated under the existing PNAC regime, supplemented by any commitments made to the State in the course of contractual negotiations. | |

| PNAC Proposal Number | Topic | Feedback |
|---|---|---|
| 2.8 | Legacy arrangements for existing networks: • Existing covered networks: Consideration is still being given as to whether to provide any legacy protection from the above measures, and if so in what form. Any such protection would only apply to existing assets. • Existing non-covered networks: The PNAC imposes no ringfencing obligations on these networks and, with one qualification, there is no plan to change this. The qualification is that this position may need to be revisited if a non-covered network were to propose to materially change the nature of its interconnection with the shared grid, such that it became materially meshed or looped. It is proposed to address any such situation at that later time, in close consultation with the relevant NSP and recognising that the PNR rule 5 principles may require a bespoke solution. | participants. This should not be confused with the challenges of past reforms in other jurisdictions just because this is what we know.<br><br>The ISO is currently well placed to manage any areas of concern for the three transmission connected customers on the covered systems that may wish to churn. It may also assist in any issues with the churn of the remaining 40-odd contestable customers. The paper should clarify the scope of this option.<br><br>The reforms in the Pilbara are to allow the major industrial customers most effectively deliver against objectives for the meet the energy transition and increased labour and capital productivity. These wholesale customers will necessarily remain vertically integrated utilities. |
| | | |
| **3** | **Managing multiplicity of contracts – splitting access in two** | |
| 3.1 | The right to access a network will be split into: (a) First, a right to connect (or interconnect) to a network, and a right to inject or withdraw electricity at the connection/interconnection point. This right will be governed by contract, with the contract to be negotiated or arbitrated under the PNAC (or ENAC if applicable) in the usual way. This service will only be available as an enforceable statutory right in covered networks, as is now the case. (b) Second, a transmission use of system (TUOS) right to have electricity pass through a | The separation of the right to connect and the right to use (TUOS) is a necessary step in the evolution of a multi-user – multi-owner transmission system.<br><br>However, the PNAC discussion paper does not adequate resolve how the revenue for TUOS will be recovered from the multiple users (connected to different networks) and be paid to the investors in the networks supplying the TUOS.<br><br>As discussed in section 2.1 of this paper and alluded to in the PNAC discussion paper, the this will likely require a pool approach to revenue recovery similar to |

| PNAC Proposal Number | Topic | Feedback |
|---|---|---|
| | network from one connection/interconnection point to another. This right will be enshrined in the PNR and will apply to all networks, covered and non-covered, new and existing. See below for the transitional implications of this. | that used for ESS cost recovery. This is because where there are different owners of a network rings (such as exists in all future design presented for the Pilbara, all of the TUOS users use all of the networks at some time.<br>The nature of this pool cost recovery arrangement for TUOS services will recovery $100s of millions in revenue for billions of dollars of investment in transmission assets. The design of this pool cost recovery mechanism will inform if participants trust the multi-user system enough to avoided making independent investments to meet future requirements and will be a key to supporting private investment with competitive capital return requirements.<br><br>The PNAC discussion paper suggests that new applicants can negotiate for TUOS in the absence of clarity in future arrangements *without hindering the reforms or disrupting commercial certainty for either party*. I do not see how this is practical and possible.<br><br>The PNAC paper suggests the state will negotiate these arrangements on an ad hoc basis. This approach significantly increases the likelihood that the state will need to financially guarantee investments in transmission system the absence of the commercial TUOS pool arrangement being established under this reform activity.<br><br>The nature and details of the TUOS Pool mechanism impact the approach to proposals 4-6 and 8-12 of the PNAC paper. Without clarity on this mechanism, it is difficult to provide clear feedback on these proposals<br><br>The TOUS Pool Commercial mechanism is the single biggest challenge for delivering lower cost lower carbon energy solutions (consistent with the modelling) |
| 3.2 | Transition for early projects: a) Early project NSPs and their users will negotiate access contracts as usual under the current PNAC and PNR, including TUOS components as required. (b) The contracts must be able to transition into the new regime whereby TUOS matters are managed under the PNR. (c) EPWA will work with each early project proponent and its access seekers to establish the best way to achieve this, without hindering the reforms or disrupting commercial certainty for either party | |
| 3.3 | 3.3 Legacy arrangements for existing networks: (a) These measures will be developed in consultation with the affected parties, with treatments different for covered and non-covered networks. (b) Covered networks: Endeavours will be made to protect core financial aspects of these contracts (revenue streams, overall risk parameters), but otherwise require all access contracts to be amended to incorporate the new split, with TUOS matters transitioning to be regulated by the PNR rather than the contract. (c) Uncovered networks: EPWA will discuss this individually with each non-covered NSP. | |

| PNAC Proposal Number | Topic | Feedback |
|---|---|---|
| | | to participants in the Pilbara. The solution to this challenge must be established and articulated before any legislative or regulatory changes are made. |
| | | |
| **4** | **Managing how interconnection agreements affect users' access contracts** | |
| 4.1 | The PNAC or PNR will impose boundaries on matters which can be addressed by an interconnection agreement, and specifically will prohibit an interconnection agreement from seeking directly or indirectly to impose obligations or restrictions on other network users. | Proposal 3.1 states that the right to TUOS services will *be enshrined in the PNR and will apply to all networks, covered and non-covered, new and existing*.<br><br>It is expected that this enshrinement in regulation will over-ride any interconnection agreements.<br><br>Based on my knowledge of the interconnection agreements, if the:<br>b. Access to TUOS services is provided in regulation.<br>c. HTR is universally applied.<br>d. The constraint regime properly implemented to maintain the integrated system within the Technical Envelope.<br>There is limited or no need for an interconnection agreement except for topics of technical coordination for technical parameters that a cumulative such as harmonics and fault level. |
| 4.2 | Any matters currently dealt with (or proposed to be dealt with) by an NSP-NSP interconnection agreement which would be precluded by proposal 4.1, should be incorporated in the PNR or HTR. (Possible limited exception: if there are specific matters regarding the interconnection point which are particular to one user, they could be negotiated into the user's access contract as primary obligations). | |
| 4.3 | Each NSP must review its current and proposed interconnection agreements for compliance with proposal 4.1, and identify any matters which should be considered for inclusion in the PNR under proposal 4.2. | |
| 4.4 | Subject to limited exceptions relating to purely commercial matters, each interconnection agreement will be transparently visible, at least to the ISO and all network users, but ideally publicly. | |
| 4.5 | Transition for early projects: Early project NSPs will be free to negotiate interconnection agreements as usual under the current PNAC and PNR, pending these reforms. They should | |

| PNAC Proposal Number | Topic | Feedback |
|---|---|---|
| | prudently design contracts to accommodate, and be displaced by, the reforms referred to in proposals 4.1 and 4.2, as they come online. | |
| 4.6 | Legacy for existing networks: It will be discussed with the parties to the two existing interconnection agreements how best to implement the above proposals, with a view to disrupting existing arrangements as little as possible, and recognising that one of the existing arrangements involves an uncovered integrated mining network | |
| | | |
| **5** | **Proposal 5. Managing tariffs across multiple networks** | |
| 5.1 | There is no proposal to change the PNAC at this stage. Further work is being undertaken by EPWA to determine the best approach to address this matter. | As discussed above, this issue is fundamental to the success of a multi-owner interconnected multi-user network. No material network investment can occur before this is resolved.<br><br>No regulatory or legislative changes should be proposed until the solution to the TUOS Settlement Pool mechanisms services is proposed and consulted on. |
| | | |
| **6** | **Expanded powers to seek pre-approval of tariff and non-tariff elements** | |
| 6.1 | The PNAC will be amended to allow an NSP to seek pre-approval from the ERA of more elements than just new facilities investment. | Supported - certainty is necessary for investment.<br>How will this work with the TUOS Settlement Pool mechanism? |
| 6.2 | At present, it is proposed to extend the right to seek pre-approval to: (a) the Regulated | Supported - certainty is necessary for investment. |

| PNAC Proposal Number | Topic | Feedback |
|---|---|---|
| | Asset Base (RAB); (b) forecast operating and maintenance costs; (c) rate of return; (d) depreciation schedule; (e) reference service terms and conditions; and (f) tariff setting methodology. | How will this work with the TUOS Settlement Pool mechanism? |
| 6.3 | Consideration is still being given as to what safeguards (e.g. a reopener on certain trigger events) might be needed in respect of pre-approvals, with stakeholder feedback sought on this point. | Supported - certainty is necessary for investment.<br><br>How will this work with the TUOS Settlement Pool mechanism? |
| 6.4 | Transition for early projects: Early projects may achieve a similar effect by pre agreeing certain key elements with the State (if the State is willing to do so) as discussed in section 6.2 below. | Given the technical maturity and commercial capability of the wholesale customers in the Pilbara, the need for the state to underpin new network investment can only be seen as a policy failure.<br><br>Establishing certainty around the TUOS Settlement Pool mechanism from inception will relieve the need for the state to underwrite network investment in the Pilbara for selected parties.<br><br>The design of this pool mechanism must allow for long term initial offtake TUOS agreements that will underpin investment and provide participants certainty required to compete against self-investment in independent solutions. |
| 6.5 | Legacy for existing networks: Consideration is being given to also making the expanded pre-approval right available to existing networks | This cannot be operationally delivered through preferred positions in constraint equations. |
| | | |
| **7** | **Making provision for possible revenue control** | |
| 7.1 | The PNAC will be amended to allow a covered NSP to be made subject to revenue control. While the detail of this is still to be developed, it may include a form | Price and revenue control must be considered in the context of the TUOS Settlement Pool arrangements. In particular: |

| PNAC Proposal Number | Topic | Feedback |
|---|---|---|
| | of revenue cap with provision for incentives. | How will the revenue drawn from the pool by network owners be established?<br><br>Revenue control and price setting will be integral to any solution for the multi-owner, multi-user, ring-based transmission system (referred to in this paper as the TOUS Settlement Pool).<br><br>Will different covered owners be allowed to recover revenue on a different basis? If so, why?<br><br>Will different users be priced differently for services from the TUOS pool of network assets? If so, why?<br><br>The inclusion of this section in the discussion paper reflects a one transmission owner for each area model such as in the SWIS and the NEM. This is not the case currently in the Pilbara and will increasingly not be the case in the future.<br><br>More explanation is required on how these proposals are relevant to the reality of multiple users drawing services from multiple owners operating networks that work in parallel to provide services.<br><br>Most access pricing in the Pilbara is established through long term contracts required to provide the wholesale customers the required certainty. These long-term contracts will also be required for investors if we wish to avoid the State financially backing all investments (with the resulting impact on state debt and credit rating). 95% of the required revenue currently and will continue come through long term bilateral or internal TUOS contracts. All of the contracts that support the stated objectives will be longer term and will not be impacted by this proposal. |
| 7.2 | If revenue control is implemented on a network, negotiated outcomes should not result in an NSP earning more than an appropriate risk-reflective rate of return, subject to any incentive mechanisms specified in the revenue control. | |
| 7.3 | The revenue control model should incentivise efficient growth in network utilisation, and share the benefits of utilisation growth appropriately between the NSP, existing users and new users. | |
| 7.4 | Revenue control will not necessarily apply automatically to all new networks. It may apply to a network only if the NSP opts in, or only after a trigger event occurs. | |
| 7.5 | Transition for early projects: Early projects may be required to commit to revenue control as part of their development agreement with the State. The model chosen should accommodate future-ready uncontracted capacity. | |
| 7.6 | Legacy arrangements for existing networks: Revenue control will not apply to existing covered networks unless a specified trigger event occurs. | |

| PNAC Proposal Number | Topic | Feedback |
|---|---|---|
| | | In short, this proposal appears to be a solution looking for a problem that does not exist. |
| | | |
| **8** | **Managing tariffs for future-ready capacity** | |
| 8.1 | It is proposed that the PNAC will remain unchanged in relation to this matter until a case for change emerges. | Without considering options for the TUOS Settlement Pool, no position can be made on how tariffs will be set for spare capacity. |
| | | |
| **9** | **Model access terms and conditions** | |
| 9.1 | The PNAC will be amended to set out a set of model terms and conditions for access contracts, as is done with Appendix 3 to the ENAC. | The contract in Appendix 3 of the ENAC is foremost a TUOS contract. With the right to TUOS services *enshrined in the PNR and will apply to all networks, covered and non-covered, new and existing*. What will this contract look like?<br><br>The connection arrangements in the SWIS are managed through the Interconnection Works Contract (IWC).<br><br>Why would different network owners have a different TUOS contract for services drawn from a pool of assets, only some of which they own and control?<br><br>If the State is not to carry the required transmission investment on its balance sheet, the wholesale customers and the new network owners will need to enter long term TUOS agreements that support the required debt funding. It is unlikely that the TUOS terms historically applied in the NEM and WEM with multiple smaller access customers will meet these requirements. |
| 9.2 | The NSP's published services and pricing policy will be encouraged, but not compelled, to adopt these model terms. The NSP will be required to identify and explain any departures. | How does an NSPs pricing policy for TUOS services apply when the network assets they recover costs for only provides part of the TUOS service used by customers connected to its network? How does the NSPs pricing policy work to recover costs from users of TUOS |

| PNAC Proposal Number | Topic | Feedback |
|---|---|---|
| | | services its network assets provide that are not connected to its network? |
| 9.3 | In an access dispute, the arbitrator would apply the model terms as a benchmark. | Access disputes should only relate to connection matters as the TUOS services are enshrined in the PNR. |
| 9.4 | Transition for early projects: The development agreement between the proponent and the State may append a set of model terms, to be used in the above manner pending PNAC reforms. The agreement will specify what happens to any such appended model terms, once the PNAC is amended to prescribe a set of model terms | The State only needs to be involved due to the failure of properly resolving the challenge referred to in this paper as the TOUS Settlement Pool. |
| 9.5 | Legacy arrangements for existing networks: The PNAC model terms will apply to existing covered networks in the same way as new covered networks. Existing contracts will be unaffected and continue on their negotiated terms. This reform will have no impact on non-covered networks. | |
| | | |
| **10** | **Dealing with foundation user requirements** | |
| 10.1 | The paper proposes to supplement the Act's "purpose" test, to better regulate foundation user and other contractual rights which have the effect of preventing or hindering access by others. | This is supported. This is an important and delicate balance. Without sufficient rights for the Foundation Customers, these customers will not underwrite this solution as required to avoid the asset being on the states balance sheet. However, access to future customers is critical to meet the objectives. These requirements interact with solutions to incremental capacity.<br><br>How these contracts operate in a multi-user, multi-owner transmission system (TUOS Settlement Pool) needs to be carefully considered.<br><br>In a multi-user, multi-owner transmission system, TUOS rights are largely implemented through the application of constraint equations. This |
| 10.2 | Suitable transparency measures will be introduced, to ensure that any breaches of these prohibitions can be detected | |
| 10.3 | Transition for early projects: These matters may be managed by a development agreement between the proponent and the State. | |
| 10.4 | Legacy for existing networks: No general legacy is planned. All future access contracts on existing covered networks will be | |

| PNAC Proposal Number | Topic | Feedback |
|---|---|---|
| | expected to comply. The State will work with each covered NSP to determine which (if any) specific legacy treatment for pre-existing contracts is needed and appropriate. | implementation mechanism should be specifically identified so it is not lost in implementation. |
| | | |
| **11** | **Improved accountability** | |
| 11.1 | It is proposed to supplement arbitration of access disputes with other accountability measures, which may have a lower threshold of activation and so improve accountability generally. | This is generally supported. How it is implemented is heavily dependent on the solution to proposal 5 (TUOS Settlement Pool) and the role of the ISO in the connection process. If new connections are processed by the ISO, and the TUOS is provided from a multi-owner pool service, the influence network owners can have for access is more limited than it currently is. |
| 11.2 | 2 Measures under consideration include: (a) Activating the Electricity Industry Act 2004's civil penalty and other enforcement regimes for both the PNAC and PNR. (b) A form of rapid (likely binding) expert determination for technical matters. (c) Formal published advisory opinions by an agency or independent expert. (d) Triggers which activate more stringent regulation, including possible triggers to switch a network from PNAC-style to ENAC-style regulation | This may not be necessary depending on the solution to proposal 5. I suggest the increased complexity introduced by these requirements and the specific behaviour or events it seeks to resolve be considered in the context of a fully developed solution to proposal 5. |
| | | |
| **12** | **A transitional "fixed principles" mechanism** | |
| | Consideration is being given to implementing a transitional mechanism in the form described under "Option under consideration" in section 6.2.2. | A solution to Proposal 5.1 is required before new investment is made to solve being trapped in unworkable frameworks that we then need to create increasing more elaborate work arounds as we have in the SWIS. Proposal must solve the actual problems now, not just apply solutions from other jurisdictions that were implemented to solve different problems. |

# 4 Conclusion

1. The next round of reforms must clearly articulate how investment by multiple private network owners will be supported by multiple users to deliver a lower cost, high security solutions when compared to self-development. With this challenge met, the majority of the PNAC proposals will benefit from review.
2. The proposed PNR changes fully match the IMO at establishment. Using the published data on the cost of the IMO prior to 2014 corrected for inflation, this will result in annual Pilbara ISO and System Operations costs of around $25million. This is a $20 million increase on the existing Pilbara ISO costs of $5.6 million. Two thirds of these costs are currently recovered across approximately 200-300 MW of customers on the covered networks. Even if the non-covered networks are included, the load increase to 400-500 MW across which a $20 million increase in cost, for no demonstrated value, appears inefficient.
3. The transition from the existing arrangements for balancing energy settlement to future arrangements should be as demonstrated required. The benefits demonstrated by the 2025 modelling can be delivered with the existing balancing arrangements for a small number of Balancing Nominees. When this is no longer sufficient the evolution should be developed at the lowest cost considering:
    a. The marginal cost for energy in the Pilbara is largely homogenous with LM 6000 GTs drawing from the same gas market. This provides opportunity for pricing to be offered for a longer period than the half hourly offers and bids proposed in the day before mechanism.
    b. When the Pilbara meets all of the technical challenges to operate without traditional generation, the marginal cost of energy will be zero. At this time investment in the required capacity will be largely underpinned by the capacity market. The operation of the balancing mechanism will have little impact on the commercial efficiency of the system.

    I believe points a and b above tend to lend themselves to a central buyer of balancing energy setting the price for imbalance energy. There would be flexibility for pricing to be set at different locations and times to support the impact of constrained operation. This would operate similar to the existing central procurement of ESS and create very little incremental cost.

    However, the presentation of multiple options for the pricing of balancing energy and the articulation of their relative benefits would support more fulsome feedback.
4. The definition of NSP and network as roles in the required technical coordination on a multi-user system should be aligned with the SWIS and normal industry standard. Covered network and those that choose to be NSPs and responsible for Part 2 of the HTR should be NSPs under the HTR. All operators of facilities that are for self-use should be Controllers in the HTR demonstrating compliance with Part 3 of the HTR at their point of interconnection with the NSPs networks. This solution achieves the following:
    a. provides clarity by removing the patchwork of definitions in the PNR.
    b. allows for user of self-use networks flexibility to apply suitable standards and reduce costs within their networks.

c. Avoids the confusion and delay during connection as experienced by Woodside in the recent connection process.
d. Aligns the approach with the SWIS and other jurisdictions.

# 5 Appendix A

*Table 1: Historic IMO, System Management, AEMO and ISOCo Operating Costs*

| | Period as per proposed design | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 |
| CPI Escalation (ABS) | 95.8 | 99.2 | 100.4 | 102.8 | 105.9 | 107.5 | 108.6 | 110.7 | 113.0 | 114.8 | 114.4 | 118.8 | 126.1 | 133.7 | 138.8 |
| CPI Escalation Factor 2024 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.0 | 1.0 |
| | | | | | | | | | | | | | | | |
| AEMO (w System Management) | | | | | | | 35.7 | 33.5 | 31.6 | 35 | 34.7 | 34.7 | 34.7 | 47.4 | 47.4 |
| System Management (control desk with no market functions and separate distribution network control | 6.5 | 7.1 | 7.5 | 12.6 | 13.2 | 13.6 | | | | | | | | | |
| IMO | 10.8 | 11.3 | 11.7 | 15.8 | 16.2 | 16.6 | | | | | | | | | |
| Total | 17.3 | 18.4 | 19.2 | 28.4 | 29.4 | 30.2 | 35.7 | 33.5 | 31.6 | 35.0 | 34.7 | 34.7 | 34.7 | 47.4 | 47.4 |
| Total AEMO System Management Costs In 2024 dollars | 25.1 | 25.7 | 26.5 | 38.3 | 38.5 | 39.0 | 45.6 | 42.0 | 38.8 | 42.3 | 42.2 | 40.6 | 38.2 | 49.2 | 47.4 |
| Delta with existing Pilbara ISO Costs | 19.5 | 20.1 | 20.9 | | | | | | | | | | | | |
| Per MWh @200MW existing peak load | **15.9** | **16.4** | **17.1** | | | | | | | | | | | | |
| % increase in cost for $200 per MWh | 7.9% | 8.2% | 8.5% | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| **Capital costs** | | | | | | | | | | | | | | | |
| AEMO (w System Management) | | | | | | | | | | | | | | | |
| System Management (control desk | | 1.3 | 1.3 | 2.1 | 1.3 | 0.5 | 13.4 | 10.4 | 8.3 | | | | | | |
| IMO | | 2.6 | 2 | 1.7 | | | | | | | | | | | |
| | | 3.9 | 3.3 | 3.8 | | | | | | | | | | | |
| Pilbara ISOCo Operating Budget | | | | | | | | | | | | | | 3.7 | 5.6 |

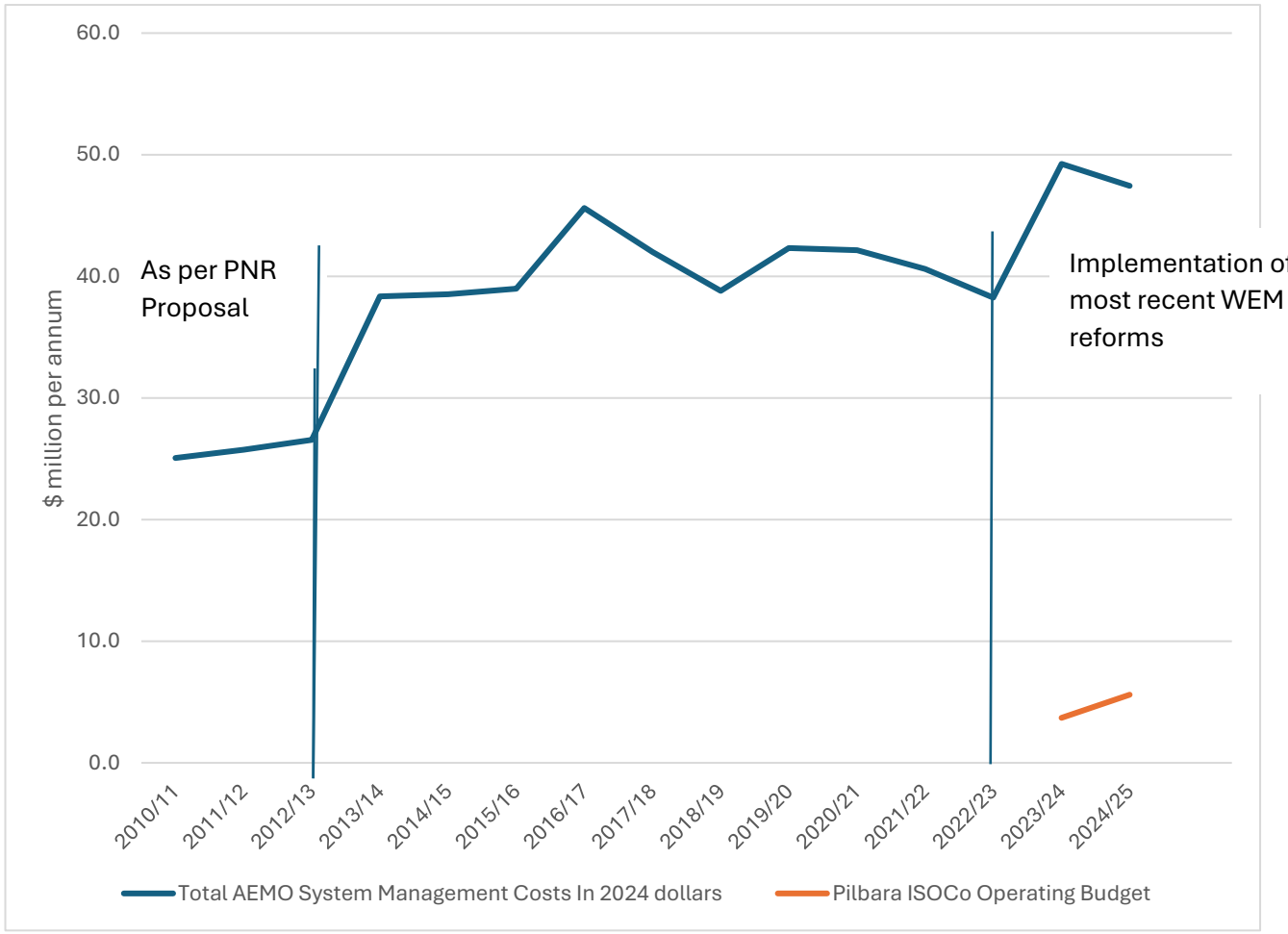


*Figure 3: Historic IMO, System Management, AEMO and ISOCo Operating Costs*

*Table 2: Comparison of proposed Pilbara ISO function versus 2013 IMO..*

| Pre 2013 / RTB Market IMO (Clause 2.1.2 of the Market Rules in 2012) | PNR Proposals increasing scope |
|---|---|
| The reserve capacity mechanism | Proposals 3, 5 and 6 |
| The short-term energy market (STEM) and the balancing process; | Proposal 12 |
| to settle such transactions as is required under the Market Rules | Proposal 12 |
| to carry out a long term projected assessment of system adequacy (PASA) study and to publish the statement of opportunities report | Proposal 3 |
| to administer tender processes for network control services where required by the Market Rules and to enter into network control service contracts | Proposal 3 |
| to process applications for participation, and for the registration, deregistration and transfer of facilities; | Proposal 5, 12 (as required by day before market) |
| to release information required to be published by the Market Rules | Proposal 1, 3,12 |
| to develop amendments to the Market Rules and replacements for them | No specific requirement, can and has been done through rule change process. |

| Pre 2013 / RTB Market IMO (Clause 2.1.2 of the Market Rules in 2012) | PNR Proposals increasing scope |
|---|---|
| to monitor other rule participants' compliance with the Market Rules, to investigate potential breaches of the Market Rules, and if thought appropriate, initiate enforcement action under the Regulations and the Market Rules | Proposal 12, 17, 20, |
| to support the Authority in its market surveillance role, including providing any market related information required by the Authority | Proposal 12 |
| to carry out any other functions conferred, and perform any obligations imposed, on it under the Market Rules. | N/A |
| Independent Board | Proposal 16 |
| Stand Alone System Management functions | Proposal 15.2 |
| **Items in Proposal not required to be completed by IMO in 2014** | |
| ERA and NSP (Western Power) | Compliance enforcement – Proposal 21 |
| | Manual Load Shedding Plan, Proposal 14 |