



Regulatory framework for the Pilbara electricity networks: System operations arrangements

Detailed Design Consultation Paper

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Abbreviations

Term	Description
AEMO	Australian Energy Market Operator
EBAS	Energy Balancing Ancillary Service
ERA	Economic Regulation Authority
ESA	Electricity Supply Agreement
FCAS	Frequency Control Ancillary Service
FTB	Frequency Tolerance Band
ISO	The proposed Pilbara independent system operator
LRS	Load Rejection Service
MCB	Multiple Contingency Band
NSP	Network Service Provider
NWIS	North West Interconnected System, the common name of the interconnected system of networks described in the current Bill as the “interconnected Pilbara system”
PNAC	Pilbara Networks Access Code (to be implemented under these reforms)
Rules	Pilbara Networks Rules
SCB	Single Contingency Band
SRAS	Spinning Reserve Ancillary Service
SWIS	South West Interconnected System
ULFS	Under Frequency Load Shedding
WACC	Weighted average cost of capital
WEM	Wholesale Electricity Market (Western Australia)

Glossary

Term	Description
<i>Access Code</i>	The <i>Electricity Networks Access Code (2004) (WA)</i> .
<i>Act</i>	The <i>Electricity Industry Act (2004) (WA)</i> .
<i>administered price</i>	The price which energy generated under <i>EBAS</i> is paid
<i>allocation calculation period</i>	The last three <i>financial years</i> prior to the <i>financial year</i> which the <i>settlement month</i> is in. For example, the <i>allocation calculation period</i> for <i>settlement month</i> September 2020 is the period covering the <i>financial years</i> 2017/18 to 2019/20.
<i>ancillary service(s)</i>	Services related to the provision of an energy-related service to maintain <i>power system security</i> . The services comprise spinning reserve, frequency control and energy balancing.
<i>ancillary services procedure document</i>	The procedure document describing how ancillary services will be managed in the Pilbara by the <i>ISO</i> .
<i>ancillary service provider</i>	A <i>participant</i> registered as an ancillary service provider under the Pilbara Networks Rules.
<i>ancillary service requirement</i>	The amount of each <i>ancillary service</i> required for maintaining <i>power system security</i> .
<i>ancillary service standard</i>	The basis upon which the <i>ISO</i> determines the relevant ancillary service requirement amount.
<i>Australian Standard (AS)</i>	The edition of a standard publication by Standards Australia (Standards Association of Australia) as at the date specified in the relevant clause or, where no date is specified, the most recent edition.
<i>balancing energy</i>	The energy provided or absorbed in an interval by a generator providing the <i>energy balancing</i> ancillary service as the result of other generators having an <i>ESA imbalance</i>
<i>black start capability</i>	Sufficient small standby generation units (typically diesel generators) that can be started independently and can then be used to start/re-start one or more large (multi-MW) generating units in the absence of supply from the electricity system (because it is 'black')
<i>connection agreement</i>	An agreement or other arrangement between the <i>NSP</i> and a <i>User</i> that specifies the technical requirements that apply in relation to the connection of a <i>User's equipment</i> to the <i>network</i> .
<i>connection point</i>	The agreed point of <i>supply</i> established between the <i>NSP</i> and a <i>User</i> .
<i>constraint</i>	A limitation on the capability of a <i>network</i> , <i>load</i> or a <i>generating unit</i> preventing it from either transferring, consuming or generating the level of electric power which would otherwise be available if the limitation was removed.
<i>contingency event</i>	An event affecting the <i>power system</i> which the <i>NSP</i> expects would be likely to involve the failure or removal from operational service of a <i>generating unit</i> or <i>transmission/distribution</i> element.

<i>contingency exposure</i>	The <i>contingency exposure</i> of an <i>Entity</i> for a <i>settlement month</i> is the entity's single generator's largest electricity real time generation during the <i>allocation calculation period</i> (in MW)
<i>control centre</i>	The <i>facility</i> used by the <i>NSP</i> for directing the minute to minute operation of the <i>power system</i> .
<i>direction</i>	A <i>requirement</i> issued by the <i>NSP</i> to any <i>User</i> requiring the <i>User</i> to do any act or thing which the <i>NSP</i> considers necessary to maintain or re-establish <i>power system security</i> or to maintain or re-establish the <i>power system</i> in a <i>reliable</i> operating state in accordance with these <i>Rules</i> .
<i>dispatch</i>	The act of committing to service all or part of the <i>generation</i> available from a <i>generating unit</i> .
<i>EBAS settlement interval</i>	The 15-minute time interval in which the EBAS settlement calculations are made.
<i>Electricity Supply Agreement (ESA)</i>	An arrangement being a contractual arrangement or otherwise where <i>Generators</i> supply electricity to <i>Loads</i> through an network.
<i>energy</i>	<i>Active energy</i> or <i>reactive energy</i> , or both.
<i>Energy Balancing Ancillary Service (EBAS)</i>	An <i>ancillary service</i> that provides for any energy imbalance shortfalls between parties according to their <i>ESAs</i> . The associated balancing energy is provided from the online FCAS and SRAS capacities
<i>Entity</i>	The responsible person for one or more generators.
<i>ESA imbalance</i>	Extent to which the <i>real time</i> electricity generated and <i>real time</i> electricity consumed differ within an <i>ESA</i> , expressed in MWh.
<i>ESA imbalance penalty rate</i>	Penalty price paid by the responsible person of an <i>ESA</i> for its <i>ESA negative imbalance</i> .
<i>ESA negative imbalance</i>	The extent to which for an <i>EBAS settlement interval</i> the real time electricity generated is less than the <i>real time</i> electricity consumed within an <i>ESA</i> , expressed in MWh.
<i>ESA positive imbalance</i>	The extent to which for an <i>EBAS settlement interval</i> the real time electricity generated is more than the <i>real time</i> electricity consumed within an <i>ESA</i> , expressed in MWh.
<i>facility</i>	An installation comprising <i>equipment</i> and associated apparatus, buildings and necessary associated supporting resources used for or in connection with generating, conveying, transferring or consuming electricity, and includes: (a) a <i>power station</i> ; (b) a <i>substation</i> ; (c) <i>equipment</i> by which electricity is consumed; and (d) a <i>control centre</i> .
<i>fault clearance time</i>	The time interval between the occurrence of a fault and the fault clearance.
<i>FCAS agreement</i>	The agreement under which the <i>ISO</i> procures <i>FCAS</i> from the provider.
<i>FCAS down</i>	<i>FCAS</i> involving rapid withdrawal of electricity by the provider to bring the <i>frequency</i> back to the <i>FTB</i> (in an over frequency event)

<i>FCAS monthly payment</i>	The fixed monthly payment the <i>ISO</i> pays to the <i>FCAS</i> provider under the <i>FCAS agreement</i> .
<i>FCAS up</i>	<i>FCAS</i> involving rapid generation of electricity by the provider to bring the <i>frequency</i> back to the <i>FTB</i> (in a under frequency event)
<i>financial year</i>	A period of 12 <i>months</i> commencing on 1 July.
<i>frequency</i>	For alternating current electricity, the number of cycles occurring in each second, measured in Hz. The term Hertz (Hz) corresponds to cycles per second.
<i>Frequency Control Ancillary Service (FCAS)</i>	The online reserve of electrical generation that is capable of responding immediately to small changes in system frequency in <i>real time</i> .
<i>frequency operating standards</i>	The standards which specify the <i>frequency</i> levels for the operation of the <i>power system</i> set out in the Technical Rules
<i>frequency tolerance band</i>	The <i>frequency</i> band under the condition of 'No <i>contingency event</i> or load event' as defined in the <i>frequency operating standard</i> of the <i>Technical Rules</i> .
<i>Generator</i>	Any person (including a <i>User</i> or the <i>NSP</i>) who owns, controls or operates a <i>generating system</i> that supplies electricity to, or who otherwise supplies electricity into, a <i>transmission system</i> or <i>distribution system</i> .
<i>good electricity industry practice</i>	Means the exercise of that degree of skill, diligence, prudence and foresight that a skilled and experienced person would reasonably and ordinarily exercise under comparable conditions and circumstances consistent with applicable <i>written laws</i> and <i>statutory instruments</i> and applicable recognised codes, standards and guidelines.
<i>Integrated System Plan</i>	A document to be produced biennially by the <i>ISO</i> to facilitate network development coordination
<i>island</i>	A subnetwork operating independently from the rest of the <i>interconnected Pilbara system</i> due to an islanding event.
<i>islanding event</i>	A system event where the <i>NWIS</i> is split into two or more Islands due to failure of a <i>transmission network element</i> .
<i>Independent System Operator (ISO)</i>	The proposed entity with responsibility for managing the security of <i>Pilbara networks</i> and facilitating efficient operation of and investment in <i>Pilbara networks</i> . The <i>ISO</i> will operate in accordance with the <i>Rules</i> .
<i>Interconnected Pilbara system</i>	The interconnected <i>network</i> located in the Pilbara <i>region</i> of the state of Western Australia.
<i>load</i>	Either: <ul style="list-style-type: none"> (a) a <i>connection point</i> at which electric power is made available to a person; or (b) the amount of electric <i>power transfer</i> at a defined instant at a specified point on the <i>network</i> as the case requires.
<i>load rejection service (LRS)</i>	The service where by a provider rapidly reduces generation in response to a <i>frequency</i> increase above the <i>FTB</i> .

<i>load shedding</i>	Reducing or <i>disconnecting load</i> from the <i>power system</i> .
<i>load swing</i>	The sum of absolute values of the <i>positive load swing</i> and <i>negative load swing</i> within an <i>allocation calculation period</i> .
<i>month</i>	The meaning given to it in section 62 of the <i>Interpretation Act (1984)</i> (WA).
<i>negative load swing</i>	For a <i>load</i> , the maximum decrease in consumption relative to the average consumption during the <i>allocation calculation period</i> .
<i>net contingency exposure</i>	The <i>contingency exposure</i> net of the <i>FCAS up</i> requirement amount as set under the <i>ancillary service standard</i> for <i>FCAS</i> , expressed in MW.
<i>network</i>	Means the <i>NSP's transmission system</i> and the <i>distribution system</i> collectively, and owned, operated or controlled by that <i>NSP</i> .
<i>network congestion</i>	Temporary congestion of equipment in the <i>transmission network</i> giving rise to the inability to transfer power from one <i>sub-network</i> to another, where the transfer of power would have been possible without such congestion.
<i>network operating procedures</i>	The procedures to be followed by <i>Users</i> in carrying out operations and maintenance activities on or in relation to <i>primary equipment</i> and <i>secondary equipment connected</i> to or forming part of the <i>power system</i> or <i>connection points</i> , as described in the <i>Technical Rules</i> . These differ from power system operating standards (PSOPs) developed by the ISO for undertaking their role in controlling and operating the power system.
<i>NSP or Network Service Provider</i>	a person who owns, controls or operates a transmission system or distribution system which forms part of the NWIS.
<i>new capacity</i>	Any increase in electricity <i>generation, transmission</i> or <i>distribution</i> capacity which would arise from enhancement to or expansion of the electricity <i>generation, transmission system</i> or <i>distribution system</i> .
<i>non interconnected systems</i>	Any isolated <i>network</i> or power system located in other parts of the north west region of the state of Western Australia and not connected to the <i>interconnected Pilbara system</i> .
<i>North West Interconnected System (NWIS)</i>	The interconnected <i>network</i> located in the Pilbara <i>region</i> of the state of Western Australia. This is the common name of the interconnected system of networks described in the current Bill as the “interconnected Pilbara system”.
<i>participants</i>	The collective of Pilbara network owners and users
<i>peak load</i>	Maximum <i>load</i> .
<i>Pilbara network</i>	a <i>network</i> located in the Pilbara region of the State
<i>positive load swing</i>	For a <i>load</i> , the maximum increase in consumption relative to the average consumption during the <i>allocation calculation period</i> .
<i>power system</i>	The electric <i>power system</i> constituted by the <i>interconnected Pilbara system</i> and its <i>connected generation</i> and <i>loads</i> , operated as an integrated system.

<i>power system adequacy</i>	The ability of the <i>power system</i> to supply all demand for electricity in the <i>power system</i> at the time, allowing for scheduled and unscheduled outages of generation, transmission and distribution equipment and secondary equipment.
<i>power system operating procedure</i>	The procedures to be followed by the <i>ISO</i> and <i>NSPs</i> (and any other designated participants) in carrying out operational activities on or in relation to the secure and efficient operation of the <i>interconnected Pilbara system</i> .
<i>power system reliability</i>	The ability of the <i>power system</i> to deliver energy within <i>reliability standards</i> while maintaining <i>power system adequacy</i> and <i>power system security</i> .
<i>power system security</i>	The ability of the <i>power system</i> to withstand sudden disturbances, including the failure of generation, transmission and distribution equipment and secondary equipment.
<i>Projected Assessment of System Adequacy (PASA)</i>	A planning study conducted to assist the <i>ISO</i> in determining <i>ancillary service</i> requirements, outage planning, and reserve capacity requirements
<i>reserve capacity</i>	Installed generation capacity required to meet the maximum load on the system plus a margin to account for generation failures and variations in load forecasts
<i>separated sub-network</i>	A <i>sub-network</i> operating independently from the rest of the <i>interconnected Pilbara system</i> due to a <i>network congestion</i> event.
<i>single contingency</i>	In respect of a <i>transmission system</i> , a sequence of related events which result in the removal from service of one <i>transmission line</i> , <i>transformer</i> or other item of <i>equipment</i> . The sequence of events may include the application and clearance of a fault of defined severity.
<i>single contingency band</i>	The <i>frequency band</i> under the condition of ‘single contingency event’ in the <i>frequency operating standard</i> of the <i>Technical Rules</i> .
<i>spinning reserve</i>	The online reserve of electrical generation capacity required to respond to credible contingencies on the system
<i>spinning reserve ancillary service (SRAS)</i>	The online reserve of electrical generation capacity required to respond to a <i>frequency drop</i> below the lower bound of the <i>frequency tolerance band</i> due to a <i>credible contingency event</i> in the <i>power system</i> .
<i>SRAS agreement</i>	The agreement under which the <i>ISO</i> procures <i>SRAS</i> from the <i>ancillary service provider</i> .
<i>SRAS monthly payment</i>	The fixed monthly payment the <i>ISO</i> pays to the <i>SRAS</i> provider under the <i>SRAS agreement</i> .
<i>Statutory instruments</i>	Means all relevant instruments made under a <i>written law</i> including all <i>directions</i> , notices, orders and other instruments given or made under a <i>written law</i> .
<i>Sub-network</i>	Any subset of the <i>transmission network</i> .
<i>Supply</i>	The delivery of electricity as defined in the <i>Act</i> .

<i>Technical Rules</i>	The technical requirements to be met by <i>NSP</i> on the <i>transmission and distribution systems</i> and by <i>Users</i> who connect facilities to the <i>transmission and distribution systems</i> .
<i>User</i>	Users of the <i>network</i> who for the purposes of these <i>Rules</i> include: <ul style="list-style-type: none"> (a) every person including a <i>Generator</i> who seeks access to the network or makes a connection application in order to establish a connection point or modify an existing connection; (b) every person including a <i>Generator</i> to whom access to transmission and distribution capacity is made available (including every person with whom the <i>NSP</i> has entered into a connection agreement).

Executive Summary

The need for a regulatory framework for electricity networks located in the Pilbara region of Western Australia has been long recognised, and many reviews have identified potential efficiency improvements for participants in the region.

In August 2017, the Minister for Energy (the Minister) announced¹ the Western Australian Government's intention to implement a light handed regulatory regime to facilitate fair and reasonable access by third parties to Pilbara networks. The objective of this reform initiative was to establish a fit-for-purpose regulatory framework that can deliver better outcomes for electricity consumers and assist in driving regional development in the Pilbara region.

The Public Utilities Office was requested to develop the design of a new regulatory framework and associated arrangements for an independent system operator for Government's consideration. Over the period November 2017 to March 2018, the Public Utilities Office has engaged with stakeholders to progress the requirements of the design, culminating in the publication of a Design Report for a new regulatory framework for Pilbara electricity networks.

In April 2018, the regulatory framework for the Pilbara networks was presented to Government, and approval provided to commence the detailed design, comprising five workstreams.

1. System operations arrangements design - Establishing the formalised system operations environment, including the functions to be performed by the Independent System Operator (ISO).
2. Access regime design - Designing the light handed access regime.
3. ISO establishment - Establishing the necessary capacities and systems within Australian Energy Market Operator (AEMO) to enable that organisation to become the ISO.
4. Institutional arrangements - Drafting the Electricity Industry Amendment Bill 2019, the Pilbara networks access code (PNAC) and the Pilbara Networks Rules (Rules); and associated parliamentary and executive processes.
5. Transition - Working with Pilbara participants to ensure a smooth transition to the new regulatory environment.

This consultation paper addresses the specific design for Workstream 1 – System operations arrangements design, and where relevant, draws from the work completed in other workstreams.

As a part of the Detailed Design phase, and in developing this consultation paper, the Public Utilities Office has undertaken an extensive stakeholder consultation process.

In documenting the detailed design, the following assumptions have been applied:

- the AEMO is assumed to be appointed as the ISO;
- the Wholesale Electricity Market Rules (WEM Rules) will be adapted where appropriate;

¹ <https://www.mediastatements.wa.gov.au/Pages/McGowan/2017/08/Regulatory-reform-to-the-Pilbara-electricity-system.aspx>

- the Horizon Power Technical Rules will be adapted where relevant;
- improvement opportunities will be incorporated where possible, with emphasis on establishing a functional set of arrangements that reflect current operations and stakeholder support; and
- other workstreams will be integrated.

ISO governance and administration

Stakeholder feedback during the Detailed Design phase emphasised the need to avoid unnecessary cost and administrative complexity, and supported the proposal that AEMO be appointed as ISO.

The full suite of Pilbara reforms will likely include two bodies of rules - the *Pilbara Networks Access Code* (PNAC), discussed elsewhere, and the *Pilbara Networks Rules* (Rules), discussed in this paper. The Rules will likely include the technical rules. They will initially be made by the Minister, but thereafter are proposed to be managed by the Rule Change Panel, supported by an industry group provisionally named the NWIS Advisory Committee (NAC). This will roughly follow the WEM Rules model, although the NAC is intended to have a more explicit role, and more say in process matters than the MAC does in the SWIS. The regime for expediting and abridging (fast tracking) the rule change process is also intended to be more flexible.

The budgeting process will be very similar to the WEM Rules. The ISO must seek ERA approval for its proposed allowable revenue and forecast capital expenditure, for each three year review period.

Unlike in the WEM, system surveillance will largely be conducted by the ISO, which will investigate and report on all alleged breaches including its own, and report annually and publicly to the Minister. The ERA's role will be limited to oversight, on referral by a system participant who is unsatisfied with the ISO's initial investigation.

In terms of enforcement, the enabling Act will permit rules and regulations which create a civil penalty regime, but no such regime will be included in the initial rules. A regime may be created later, if it proves necessary and justified. There will be a staged dispute resolution process. Key decisions of the Rule Change Panel will be subject to procedural review.

The “Administrative ISO model” and the ISO’s functions

To assist with the design of the ISO functions and model, the Public Utilities Office engaged AEMO to review and make a recommendation regarding the ISO's role.

AEMO has recommended the implementation of an Administrative ISO model for the Pilbara.

The Public Utilities Office agrees with AEMO, that the Administrative ISO model meets the core objectives for the Pilbara electricity reforms in a 'least cost' and 'least intervention' manner, improves transparency in the operation of the interconnected Pilbara system, has been widely accepted by participants and places responsibilities on those parties best able to manage those risks.

Adopting the Administrative ISO model requires a redefinition of the ISO's primary function, as follows:

The ISO's primary function is to maintain and improve system security.

This does not refer to power system **reliability**, which is to remain the NSPs' responsibility.

Because the ISO will be operating almost exclusively in a coordinating and administrative capacity, and will have no real time visibility of the system, even the ISO's system **security** function will be largely delegated to the NSPs. As a result, it is proposed to extend the ISO's normal statutory immunity to its delegates, including NSPs when they act as its delegates.

The ISO will have numerous other functions,² including maintaining a whole of system model, determining the types and quantities of ancillary services needed in the interconnected Pilbara system, and procure those services, undertaking whole of system long term planning and performing post-incident reviews and analysis.

Planning, scheduling and dispatch

The proposed responsibilities in the planning, scheduling, and dispatch horizons and for post-incident investigations have drawn on provisions in the WEM Rules.

Consistent with the ISO's primary function set out above, the Rules will provide a harmonised approach to managing system security. Real time system management, including emergency response, will be provided by NSPs. The ISO will also develop and manage power system operating procedures (or their equivalent) for the long-term and medium-term planning activities and for post-incident investigations.

As with the WEM Rules, the Rules will define three operating states, normal, high risk and emergency. The ISO will undertake a Medium-Term Projected Assessment of System Adequacy (MT PASA) forecast using a whole of system model, and will apply this when assessing access applications.

The rules around confidential and commercially sensitive information need to be finely tuned, to balance the need on one hand to protect the information against disclosure (either explicitly or by enabling de-compilation of aggregated or anonymised data), and on the other hand to build and share effective and accurate models. The Public Utilities Office will do further work and consultation on this subject during the implementation stage.

The ISO will perform an outage coordination role, but will only intervene to stop or reschedule an outage when an outage may threaten system security. There will be a priority regime, and a dispute resolution mechanism.

Under the Administrative ISO model, the ISO will not have a reserve capacity function. This will be the NSPs' responsibility. Similarly, NSPs will be responsible for managing demand on their networks including under frequency load shedding, for scheduling, for the Short Term PASA, and for dispatch.

² Listed in section 4.4.3.

Emergency response will predominantly be managed by NSPs under pre-established operating protocols. If a contingency occurs for which there is no protocol, NSPs will manage, and the ISO will coordinate, in accordance with overarching principles set out in the Rules.

The ISO will coordinate all post-incident investigations. A key outcome from this will be any recommendations for procedure or rule changes.

Ancillary Services

Three types of Ancillary Service are proposed for the interconnected Pilbara system:

- Frequency Control Ancillary Service (FCAS), being an online reserve of electrical generation that can respond immediately to small changes in system frequency in real time (both FCAS Up to boost frequency when it is getting too low, and FCAS Down to prevent stop getting too high);
- Spinning Reserve Ancillary Service (SRAS) which is an online reserve of generation capacity, which can respond when frequency drops to a specified threshold, in effect picking up and taking over from FCAS Up service; and
- Energy Balancing Ancillary Service (EBAS), which is not a separate service as such, but rather a way of accounting for the additional electricity generated or not generated, when FCAS and SRAS are called upon.

The FCAS, SRAS and EBAS are intended to work hand-in-hand to maintain power system security in the interconnected Pilbara system.

The initial Rules will not provide separately for Black start or Dispatch support capability, but they could be brought in by rules changes if they prove necessary.

The Rules will outline the high-level design of the ancillary services framework. The Rules will require the ISO to create an ancillary services procedures document. The ISO will use this document to establish an ancillary services standard for FCAS and SRAS from time to time.³ FCAS and SRAS will be procured competitively, in accordance with the ancillary services procedures document. That document will also:

- allow the ISO to make use of the outcome of the dynamic system studies to the maximum extent possible in a timely manner; and
- promote operational flexibility to meet the potential changing needs of the interconnected Pilbara system's ancillary services requirements.

Simplified cost recovery provisions specific to each of the ancillary services are set out in this consultation paper.

Network Services

Under the proposed Administrative ISO model, NSPs will continue to be responsible for network investment decisions within their networks. Accordingly, NSPs will remain responsible for the connection process, in accordance with the requirements of the proposed 'harmonised' technical rules to be incorporated in the Rules and the proposed access regime.

³ No *ancillary services standard* is required for EBAS because it is a by-product of the FCAS and SRAS. However, metering and commercial arrangements for EBAS will be required.

The ISO will provide network development coordination and network connection governance services. The following provisions will be included in the Rules:

- In regard to network development coordination:
 - the ISO will produce (biennially) an *Integrated System Plan* giving both an assessment of current system capacity and risk, and load projections for the next decade;
 - to assist this, the ISO will publish an ‘inputs report’ seeking feedback on assumptions prior to developing and publishing the Integrated System Plan; and
 - an obligation on NSPs to provide the information required by the ISO for the purpose of developing the Integrated System Plan, denoting which parts of the information are confidential.
- In regard to network connection governance:
 - an obligation on each NSP to submit evidence to the ISO that it has diligently followed the requirements of the Rules, including accounting for constrained access provisions, in processing connection applications;
 - the obligation on the ISO to assess the potential impact on system security of each proposed new or upgraded connection, and either:
 - certify that the connection may proceed; or
 - take prescribed actions, working collaboratively with the NSP to resolve the ISO’s concerns.

There will be a dispute resolution mechanism, when the ISO and NSP disagree.

Cost recovery

As with the WEM (and the NEM), it is envisaged that the AEMO Pilbara ‘allowable revenue’ will be approved on a 3-yearly basis by the ERA. This will be determined as the sum of an approved budget for the forthcoming year, together with any true-up of costs over- or under-recovered in the previous year.

The Public Utilities Office proposes that the approved System Management Fee will comprise equal lump-sum charges to each of the ‘networks’, being to Alinta Energy, Horizon Power and Rio Tinto.

The covered networks (i.e. initially Horizon and Alinta) will be required to recover this cost on an equitable basis consistent with the Pilbara electricity objective, for example through a levy on generated output that is determined based on their total generation volumes.

AEMO will also be empowered to charge intending new generators or loads Application Fees for any connection-related costs, such as for system studies or to be able to provide advice to those parties on potential constraints. Such costs will therefore not be included in the System Management Fee referred to above.

Technical Rules

The proposed design reflects feedback from stakeholders that there was already a high degree of alignment between versions of the Technical Rules already in use in the Pilbara.

The Technical Rules will apply to all interconnected networks that form part of the interconnected Pilbara system. They will be changed by the same rule change process as the Rules.

There will be a central transparent process for the recording and management of exceptions, derogations and amendments.

The Technical Rules will still describe the technical performance requirements of the power system and the NSP's obligations to provide transmission and distribution systems that will allow these requirements to be achieved, largely being matters for the NSP, not the ISO.

Where harmonisation between different sets of current rules is not possible, a "minimum standard"/"automatic standard" mechanism will be adopted as in the NEM.⁴

Stakeholders did not support indefinite grandfathering. Rather, it is proposed that existing standards will remain in place for existing connected facilities for a period of time, probably 5 years, after which compliance is required to be demonstrated to the new Rules.

- Requirements for further studies – before some parameters can be determined, the ISO needs to develop a common system model to simulate the response of the power system.
- Transmission and Distribution System Planning Criteria – the recommended option is to remove the system planning criteria⁵, thereby reinforcing NSP's responsibility to comply with the system performance standards in the Technical Rules.

Transitional arrangements

A Bill is proposed to be introduced into Parliament in the first half of 2019. Once the Bill has passed Parliament and taken effect as an Act, the Minister for Energy will seek to formally appoint AEMO to be the ISO, and the AEMO will commence its establishment activities.

The Public Utilities Office will manage the preparation, publication and commencement of the delegated legislation required to enable the new framework to start on the intended go-live date of 1 January 2020. This includes the Rules, a PNAC (discussed in the separate access framework consultation paper), supporting regulations, and likely other instruments.

A transition plan will also be developed to ensure that all participants are ready to transition to the new regulatory environment at the intended go-live date of 1 January 2020.

Invitation for submissions

The Public Utilities Office invites written submissions on this consultation paper. Submissions are requested by 5.00 pm (WST) on 16 April 2019.

Electronic submissions are preferred and should be emailed to PUOSubmissions@treasury.wa.gov.au.

⁴ See section 9.3.3.

⁵ Comprising requirements for (i) Transmission system (including N-0 criterion and N-1 criterion); (ii) Medium Voltage distribution system (including N-0 criterion); (iii) Low Voltage Distribution System (including Pole to Pillar Connection Points Mandatory); (iv) Fault limits; and (v) Maximum fault currents

1. Introduction

1.1 Background to the Pilbara electricity reforms

For background to the Pilbara electricity reforms, please refer to the Design Report published on the Public Utilities Office website⁶.

1.2 Introduction of system operation arrangements

The interconnected Pilbara system is an interconnected power system supporting the iron ore, gas, minerals and tourism industries and residential communities in Western Australia's Pilbara Region. Residential and small business users represent about 25 per cent of the connected loads by number, with mining and industrial loads making up the majority of electricity demand.

Current arrangements

The Pilbara currently lacks a formally-appointed central system operator with legislated powers to undertake a system operator's typical functions and activities and recover its costs. Nor is any one party responsible for conducting and reporting the findings of post-incident investigations.

Horizon Power acts as a de facto system operator and absorbs the costs of doing so, including managing: (i) planning and scheduling; (ii) emergency response coordination; (iii) frequency control; and (iv) spinning reserve.

The absence of a harmonised approach to technical requirements and a formal operational framework for power system development, coupled with the existence of multiple Network Service Providers (NSPs) within the Pilbara has manifested in a number of operational issues and limited network access for third parties.

Although the overall reliability of supply and security of the Coastal Region network is satisfactory, the key issues⁷ with the current arrangements include:

- a small number of lines are performing unsatisfactorily;
- the network's current performance has been achieved at a sub-optimal overall cost;
- there are several network constraints that over time will either manifest in unacceptably high reliability and security risks and/or constrain efficient operation of the network (e.g. by restricting economically optimal power transfers between generators and loads); and
- there appear to be unnecessary barriers to entry for small renewable generators due to a lack of a coordinated approach to provision of ancillary services and the apparent ambulatory nature of the Technical Rules (each NSP is at liberty to change the rules).

⁶ http://www.treasury.wa.gov.au/uploadedFiles/Site-content/Public_Utilities_Office/Industry_reform/Pilbara-Electricity-Reforms-Design-Report.pdf

⁷ Refer to Design Report section 3.1 for more details

Benefits arising from establishment of an Independent System Operator

The benefits of establishing an ISO with adequate powers and authority⁸ include:

- existing and prospective participants can have confidence that the ISO has access to the necessary information to undertake its primary objective: maintaining and improving system security; and
- by acting independently and equitably, it has the necessary authority to (i) monitor compliance with agreed 'technical rules' to ensure power system security; (ii) ensure costs are equitably allocated amongst participants; and (iii) provide the network services described in Section 7.

The ISO's governance structure, obligations and functions will be set out in the Rules.

1.3 Scope of this consultation paper

This consultation paper discusses the detailed design for the system operations arrangements only. Details of other workstreams within this initiative, including the Public Utilities Office's consultation papers and stakeholders' submissions are available on the Department of Treasury's website.⁹

This consultation paper outlines the design decisions and considerations to the introduction of Rules to enable a 'whole-of-system' approach to the operation of the power system, outage and contingency management, procurement of ancillary services and budget management (cost allocation and recovery) by the ISO, and a harmonised set of Technical Rules. Stakeholders have been generally supportive of establishing an ISO, and the adoption of functions as outlined in the Design Report, subject to the changes discussed in this consultation paper.

1.4 Consultation process

The Design Report is provided as the Decision Regulatory Impact Assessment, demonstrating the application of regulatory analysis to support evidence-based decision making.¹⁰

As a part of the Detailed Design phase, the Public Utilities Office has undertaken an extensive stakeholder consultation process. As applied in previous phases of this reform initiative, consultation has involved:

- one-on-one stakeholder engagement;
- technical working group meetings;
- technical stakeholder workshops; and
- stakeholder reference group meetings.

⁸ Refer to Design Report section 3.2.1 for more details

⁹ www.treasury.wa.gov.au/Public-Utilities-Office/Open-consultations-reviews/NWIS-Regulatory-Reform/

¹⁰ https://www.treasury.wa.gov.au/uploadedFiles/Site-content/Public_Utility_Office/Industry_reform/Pilbara-Electricity-Reforms-RG1646.pdf

The consultation process has resulted in a strong consensus on the need for reform and support for the framework proposed in this consultation paper.

Full details of the consultation process, including the Public Utilities Office's consultation papers and stakeholders' submissions are available on the Department of Treasury's website.¹¹

1.5 Making a submission

The Public Utilities Office invites written submissions on this consultation paper. Submissions are requested by 5.00 pm (WST) on 16 April 2019.

Electronic submissions are preferred and should be emailed to PUOSubmissions@treasury.wa.gov.au.

Alternatively, submissions can be sent to:

Attn: Alyce Lines

Project Leader, Energy Networks Public Utilities Office

Department of Treasury

Locked Bag 11

Cloisters Square WA 6850

¹¹ www.treasury.wa.gov.au/Public-Utilities-Office/Open-consultations-reviews/NWIS-Regulatory-Reform/

2. Design process and assumptions

This section addresses issues relevant to the development of the detailed design for the system operations arrangements for the interconnected Pilbara system.

2.1 Alignment with the Design Elements

The Design Report proposed 35 design elements for a fit-for-purpose light handed regulatory regime, and establishment of an independent system operator to formalise this function and enhance network security, manage ancillary services and facilitate overall network coordination and planning in the region.

Of the 35 design elements, a total of 17 are associated with establishment of the system operations arrangements and addressed in this consultation paper. A summary of the alignment of the design elements with this consultation paper is provided in the table below. Each of the design elements are reproduced in Appendix A with an assessment of how each design element has been reflected into the detailed design.

Table 2.1: Summary of alignment with Design Elements

Alignment with this Consultation paper	Elaboration
Directly addressed	<p>17 Design Elements directly associated with design of the system operations arrangements and role of the Independent System Operator.</p> <p>Design Elements: 11, 13, 20 – 34</p> <p>Of these, the following are addressed with material variations from the Design Report position (see details in Appendix A):</p> <p>20, 21, 22, 24, 25, 31, 32</p>
Partly addressed	<p>Two Design Elements associated with transitional arrangements. These Design Elements are common to the network access arrangements and system operations arrangements workstreams and will continue to be a focus of future development.</p> <p>Design Elements: 18, 35</p>
Not addressed	<p>16 Design Elements that were not in scope for detailed design of system operations arrangements. These Design Elements are being addressed in the detailed design of the network access arrangements, or (in the case of Design Element 19, in the enabling Act).</p> <p>Design Elements: 1-10, 12, 14-17, 19</p>

2.2 Design principles applied

While Design Element 20 identifies design principles for the ISO, a number of additional, more specific design principles have been applied to the detailed design of the system operation arrangements described in this paper.

Table 2.2: List of design principles

Step	Elaboration
1	Apply Design (policy) decisions and key assumptions as described in the Design Report.
2	Except where adapting the design to respond to stakeholder feedback, adhere to the Design Elements as described in the Design Report, specifically those contained in Design Element 20 that: <ol style="list-style-type: none">1. the ISO's core function is to ensure the reliability and stability of the system;2. the ISO should act with impartiality and transparency;3. the ISO should act to maximise overall system efficiency;4. the cost of establishing and operating the ISO should be kept to a practical minimum;5. proposed arrangements should consider the commercial interests and priorities of privately-owned electricity network assets in the Pilbara;6. technical standards should not present a physical constraint to potential future interconnection of the interconnected Pilbara system, or a barrier to any technology type; and7. the effectiveness of the ISO should be reviewed periodically.
3	Confine the detailed design recommendations to the relevant workstream, and signal cross-boundary issues for discussion with other workstreams prior to a recommendation being made.
4	Adopt relevant aspects of existing instruments (e.g. WEM Rules, Technical Rules) wherever possible, with a focus on being fit-for-purpose for the Pilbara. This is likely to mean a level of amendment to simplify the requirements where it is prudent to do so, balancing risk management versus complexity/cost.
5	Except to the extent necessary to give effect to one of the proposed reforms, reflect the current arrangements in place in the Pilbara, by limiting the extent of change or improvement to existing provisions/requirements 'on the go'. Rather, codify requirements to accurately reflect current arrangements and provide the mechanisms to make changes and improvements into the future.
6	Provide opportunities for stakeholders to explore and challenge the nature and scope of provisions to be included into the Rules, consider feedback received from stakeholders during the consultation process in the detailed design, and where appropriate modify the design accordingly.

The Public Utilities Office acknowledges that a review of existing regulatory instruments is under way as part of reforms to the SWIS, including the WEM Rules, and Western Power's Technical Rules. The provisions for the Pilbara are not dependent on the outcomes of these reviews.

Further, the Public Utilities Office will undertake a post implementation review of the new regime in October 2022.

2.3 Key assumptions

In documenting the detailed design, the following assumptions have been applied.

The Australian Energy Market Operator (AEMO) will be appointed as the ISO

The Design Report¹² nominated AEMO as performing the functions of the ISO, and the adoption of the AEMO Board as the governing body for the ISO.

As a part of the development of the detailed design, the Public Utilities Office engaged AEMO to undertake a review of the functions and activities nominated for the ISO in the Design Report, and to provide recommendations for the appointment of a Pilbara ISO to perform certain functions in connection with maintaining the safety and, security of the interconnected Pilbara system.

In its report to the Public Utilities Office,¹³ AEMO has recommended the implementation of an Administrative ISO model for the Pilbara.¹⁴

The detailed design has incorporated the recommended Administrative ISO model for the Pilbara. This is discussed in greater detail in section 4 of this consultation paper.

Adaption of Wholesale Electricity Market Rules (WEM Rules)

The WEM Rules are the market rules made under section 123 of the *Electricity Industry Act 2004* (“Electricity Industry Act”). The WEM Rules govern the market and the operation of the South West Interconnected System, including the wholesale sale and purchase of electricity, Reserve Capacity, and Ancillary Services.

The Pilbara regime will not include capacity or energy markets, and so those parts of the WEM Rules that govern roles, responsibilities and functions relating to market operations will not be required. However, the WEM Rules also include roles and responsibilities for a system operator. These are considered to be a more reasonable reference for application to the Pilbara than market codes and rules in place for the NEM or overseas markets.

In addition, the WEM Rules include provisions that have a direct relationship to the institutional arrangements in Western Australia including legislation, regulation and governance bodies. Whilst these may not be applied to the Pilbara in the same way, collectively they provide a more relevant reference than other instruments and have been used as the basis for preparing the detailed design, including engagement with key stakeholders.

Adaption of Horizon Power Technical Rules

The Horizon Power Technical Rules cover the Pilbara Grid (formerly known as the Horizon Power North West Interconnected System, NWIS) and Horizon Power Microgrids (formerly known as Horizon Power’s *Non-Interconnected Systems*). They detail the technical requirements to be met by Horizon Power on the transmission and distribution systems and by Users who connect facilities to the transmission and distribution systems.

¹² Design Element 27

¹³ AEMO *Review of Independent System Operator Role in the North West Interconnected System: Final Report for the Public Utilities Office* November 2018 (**AEMO Final Report**).

¹⁴ AEMO 2018, *Review of Independent System Operator Role*, published on the Public Utilities Office website

Horizon Power (including its predecessor organisations) has been the dominant network and system operator in the Pilbara since its creation. Accordingly, the connections and operations of Alinta Energy, BHP and Horizon Power are now inter-related. Horizon Power has accumulated significant system information and knowledge of the operation of the power system and has reflected this in the current version of the Technical Rules.

Over time, Rio Tinto has established an extensive transmission network in the Pilbara that is largely geographically separated with limited interconnection with the remaining Pilbara networks. Its own Technical Rules were based on a version of Western Power's Technical Rules for the SWIS and modified to suit its own operations.

The Rio Tinto network and Horizon Power network make up the bulk of the network infrastructure in the Pilbara, and therefore were drawn upon to inform a harmonised set of Technical Rules. However, the Horizon Power Technical Rules were used as the foundation, given the more extensive scope of operations of Horizon Power in managing its network and relationship to other Users and have been used as the basis for preparing the detailed design, including engagement with key stakeholders.

Treatment of improvement opportunities

Improvement opportunities have presented themselves throughout the detailed design process and have been considered (and incorporated where necessary) into the design process. The nominated improvement opportunities have been either:

- accepted, and
 - immediately incorporated into the detailed design, where the improvement adds clarity and presents no discernible stakeholder impact (positive/negative); or
 - deferred for later investigation, where the improvement requires further work or the impact to stakeholders is not easily identifiable or measurable; or
- rejected, and not considered further where the improvement is not consistent with the design elements or policy objectives.

Where the improvement opportunities were accepted and not immediately implemented, the Public Utilities Office will monitor the transition and implementation phase for opportunities to implement these improvements into the design.

Works required by other workstreams

Consideration of the detailed design for the system operation arrangements identified a number of boundary issues and work required by other parties. For example, links to the governance framework and model adopted for the Pilbara, and the requirement for an operating procedure to be developed by the ISO (AEMO).

In these areas, the requirement for these works will be reflected into the 'Rules' and managed as part of the transition process.

2.4 Aspects of the detailed design

In documenting the detailed design, the design aspects included in this consultation paper when compared with the 'typical' system operations design contemplated in the Design Report are presented in the table below.

Table 2.3: Elements of typical System Operations design covered in this consultation paper

System Operations design	Included	Not included
Planning, scheduling and dispatch	Option planning Operating planning Scheduling Dispatch Emergency response Post-incident investigations Reserve capacity	-
Ancillary Services	Frequency control Balancing energy Spinning reserve	System restart capability ¹⁵
Network Services	Network coordination Network access and System Operator-related aspects of Network Connection Statement of opportunity	Network transport services, including NSP aspects of network connection
'Market' Services	Cost recovery for System Operator services	Economic dispatch and Market Operator services
Metering Services	-	Metering services
Technical Rules	Technical Rules	-

As in the Design Report, it is not proposed to include network transport services, economic dispatch and metering services.¹⁶

2.5 Design approach

In documenting the detailed design, the design steps described in the table below have been applied.

Table 2.4: Summary of design steps undertaken

Step	Elaboration
1	Start with the intent, policy positions, and Design Elements in the Design Framework report (this is our starting position of the desired 'future state')
2	Confirm understanding of current practice – established as the 'current state'
3	Seek to adopt or adapt relevant aspects of existing Western Australian instruments – aim is 'fit-for-purpose' (e.g. draw from WEM Rules, existing technical rules used in the Pilbara)
4	Present strawman positions for the adoption (or, more strictly, the adaption) of relevant provisions of existing instruments to stakeholders for review
5	Hold meetings and workshops with stakeholders to examine the strawman positions
6	Confirm policy positions, Design Elements and principles (or otherwise)
7	Integrate the positions into Design Advice (for Rules drafting) and this consultation paper, to be reflected into the 'Rules'

¹⁵ Noted as a possible subsequent rule change.

¹⁶ It is noted that certain metering requirements will be required to enact certain functions described in this consultation paper. An example of this is for energy balancing purposes. The requirements are increased for distribution-level 'retail' access.

3. ISO governance and administration

3.1 Introduction

This section describes the ISO's governance and administration, including AEMO's and other entities' roles and responsibilities. These arrangements will be set out in the proposed Rules.

3.2 Current arrangements

To a large extent, there are no "current arrangements" for the matters discussed in this section. As noted in section 1.2 above, the Pilbara has evolved in a relatively ad hoc manner, with no integrated system operations and no central regulatory regime.

The arrangements proposed below have largely been adapted from the WEM Rules. Departures from the WEM Rules are discussed under "design considerations".

3.3 Design considerations

3.3.1 A fit-for-purpose regime designed to minimise cost

As discussed elsewhere in this paper, some of the clear messages to emerge from stakeholder consultation during the preparation of this consultation paper were:

- a preference for the Administrative ISO model, in which AEMO's role is limited to a procedural and administrative one; and
- the need to avoid unnecessary cost and administrative complexity.

These two goals have led the Public Utilities Office to reconsider some details of the Design Elements, in order to produce a simpler governance model, which should also be less expensive. Departures from the Design Report are listed in Appendix A.

3.3.2 The Independent System Operator

Design Element 30 proposed that AEMO undertake the ISO role. Most stakeholders supported this because it would be a logical extension of its current functions in the South West Interconnected System, and not dissimilar to the role that AEMO now has in the Northern Territory.

The Public Utilities Office proposes that AEMO be appointed to be the ISO.

3.3.3 Making and changing the Rules

The enabling legislation will set out the broad principles governing the Pilbara regime – the detail will appear in a number of pieces of delegated legislation. This section deals with how that delegated legislation, especially the Rules, will be made and, more importantly, changed.

Three classes of rules, likely split between two instruments

The Pilbara regime will contain three broad classes of rules:

- access rules, which in SWIS terms is broadly analogous to the *Electricity Networks Access Code* (ENAC) made under Part 8 of the *Electricity Industry Act 2004* (EI Act);
- ISO rules, broadly analogous to some of the system management provisions in the SWIS *Wholesale Electricity Market Rules* (WEM Rules) made under Part 9 of the EI Act, although of course different in content, e.g. containing no market; and
- technical rules, broadly analogous to the Western Power's SWIS *Technical Rules* made under the ENAC.

A final decision has yet to be made regarding how many instruments will be used to house these provisions. At present the Public Utilities Office's thinking is that:

- the access rules will either be housed in one instrument, or in new chapters in the ENAC; and
- the ISO rules and technical rules will both be housed in a second instrument, the Rules.

These two instruments will be made and changed in different ways.

Different processes for making and changing the two sets of rules

This consultation paper is concerned only with matters which will be dealt with by the Rules. The matters to be dealt with in the access rules are discussed in a separate consultation paper - *Regulatory framework for the Pilbara electricity networks: Light-handed Regulatory Regime*. However a small amount of information about the access rules is provided here, to illustrate the difference between the two instruments.

As with the ENAC, the access rules will be made and amended by the Minister, and will be disallowable instruments.¹⁷ This reflects the fact that, dealing as they do with mandatory infrastructure access, all aspects of these rules must be carefully scrutinised by Government, to ensure that they strike a suitable balance between asset owners' and access seekers' interests. Like most legislation, the Government has a detailed interest in the content of these rules and can in a sense be said to 'own' the rules.

¹⁷ A "disallowable instrument" is a form of delegated legislation which is subject to Parliamentary scrutiny. Once made, the rules, including any amending rules, must be tabled in Parliament, and either House may pass a motion disallowing it.

The ISO rules and technical rules are different. For the reasons discussed throughout this consultation paper, the government has a policy interest in ensuring that there are such rules and a fair process to change them, and in ensuring that both the rules and the process meet the broad policy goals stated, such as complying with the Pilbara electricity objective, enhancing network security, managing ancillary services and facilitating overall network coordination and planning, but beyond that, the Government does not necessarily need to take a close interest in the detailed content of the rules. As a result, like the WEM Rules, they will not be formally classified as “subsidiary legislation”¹⁸ and will not be disallowable instruments.¹⁹ This was the approach taken regarding the WEM Rules, and also regarding the AEMO (formerly REMCo) gas retail market rules²⁰ for Western Australia. As such, it can be helpful to consider these rules as being in a sense ‘owned’ by industry participants.²¹

This differentiation as to who ‘owns’ the rules, affects the rule change process.

The rule change process for the access rules will be the ENAC process under Part 8 of the EI Act. The Minister made the ENAC, and makes all amendments. The EI Act requires the Minister to consult on Code changes, and to have regard to any submissions received.²²

In contrast, the Rules will broadly follow the model used for the WEM Rules. Thus, although in the interests of efficiency the Minister will make the initial set of rules, thereafter the Rules are intended to be changed by an industry-led process as described in the balance of this section 3.3.3.²³

The rules custodian

As with the WEM Rules, there will need to be a rules custodian to administer the rule change process and make the ultimate decision on any proposed rule changes.

Although the ISO rules and technical rules can be thought of as being ‘owned’ by industry, good regulatory practice dictates that, to avoid conflicts of interest, the final decision maker on rule changes should not be a system participant, including the ISO. This separation of the ISO from the rule change process is less critical if the ISO has a purely administrative role, but nonetheless the Public Utilities Office proposes to maintain the separation. Similarly, to ensure independence, it is not proposed that the rules custodian be another system participant such as Horizon Power.

¹⁸ EI Act section 123(2). The classification of a delegated instrument as being, or not being, “subsidiary legislation” for the purposes of the *Interpretation Act 1984* has some technical legal consequences, but few practical ones in day to day operations.

¹⁹ However, as with the WEM Rules, the initial body of rules to be made by the Minister, and any wholesale repeal and replacement by the Minister, must be tabled in Parliament: *Electricity Industry (Wholesale Electricity Market) Regulations 2004*, regulation 6(6).

²⁰ See *Energy Coordination Act 1994*, Part 2B which requires gas licensees to be a member of an approved “retail market scheme” comprising of a governing body and a set of rules which deal with a range of specified topics (s 11ZOG), without prescribing what that body should be or, largely, what the rules should say.

²¹ The reference to ‘ownership’ is a general philosophical observation, not a legal concept. The rules will be statutory instruments, under the governance and custodianship of the RCP. The concept of ‘ownership’ is intended to reflect a general policy position in which the Government is concerned to know that there are such rules and processes in existence, and that they meet certain high level objectives, but otherwise the Government is less concerned with the rules’ specific detail.

²² s 108 EI Act, unless the amendments are minor or urgent: s 109 EI Act.

²³ As with the WEM Rules, the Minister will be given a residual power to repeal and replace the rules in full: *Electricity Industry (Wholesale Electricity Market) Regulations 2004*, regulation 7(3)(a).

The Government does not wish to create a new entity to manage the Rules, and nor is it necessary to do so. The Rule Change Panel (RCP) created for the WEM Rules is a specialist rules administration body, with the necessary capabilities and processes, and already administers the WEM Rules from which the ISO rules will largely be derived.

Starting point – the WEM Rules rule change process

The rule change process for the Rules will be derived from the rule change process for the WEM Rules, but adapted as discussed below to suit the Pilbara's particular circumstances.

A NWIS Advisory Committee (NAC) will be given a central, expanded role

Although the RCP will be the independent rules custodian, the Public Utilities Office proposes to refine the rule change process to maximise industry consultation and engagement, subject to certain safeguards.

To this end, the RCP will be required to convene and support a NWIS Advisory Committee (NAC) which will fill a role analogous to, but expanded from, the WEM Market Advisory Committee (MAC)'s role in the SWIS.

Like the MAC, the NAC will be an advisory body, not a decision-making one. However, to maximise industry consultation and engagement, and in recognition of the Pilbara regime's greater emphasis on industry self-management (e.g. the Administrative ISO model) and much smaller number of rules participants,²⁴ the rules will give the NAC a more explicit role and a stronger voice in process matters.

The MAC is presently chaired by the RCP's Executive Officer. For consistency of approach, this could be replicated for the Pilbara. However stakeholders have suggested that to maximise industry engagement and 'ownership' of the rules, the chair could be a system participant. Tensions could arise if one of the NSPs were appointed, but in a recent workshop it was suggested that AEMO as ISO could chair the NAC.²⁵ The Public Utilities Office proposes, as in the WEM Rules²⁶, the rules will leave it to the RCP to determine whether its own Executive Officer or another person such as the ISO should chair the NAC from time to time.

The NAC will not be a complete substitute for the RCP's formal public consultation process, because some proposed rule changes may affect stakeholders who are not represented on the NAC. That consultation process will remain, although it may sometimes be accelerated or abridged, see [below](#).

*Technical rules*²⁷

In the SWIS, Western Power's *Technical Rules* are regulated under Part 8 of the EI Act (ENAC) rather than Part 9 (WEM), reflecting the importance of technical rules to the success of any access regime.²⁸

²⁴ It is envisaged that the only the NSPs will be rules participants, see section 3.3.98.

²⁵ This could be seen as creating a minor conflict of interest, given that AEMO is a system participant governed by the rules being changed and may also be a rule change proponent. However the NAC is an advisory body only, and the RCP will remain the ultimate decision maker on rule changes, which should enable this conflict to be managed.

²⁶ WEM Rules section 2.3.5(i)

²⁷ This section deals with rule change for the technical rules. The content of the technical rules is discussed in Section 9.

²⁸ A perceived structural weakness in the original third party access regime for Western Power's network in the *Electricity Transmission Regulations 1994* and the *Electricity Distribution Regulations 1996*, the precursor to the ENAC, was that it left

The RCP did not exist when the ENAC came into effect. As a result, when it was decided to appoint an independent decision maker with final rule-making power for technical rules under the ENAC, the ERA was given this role. Because some technical rules involve complex engineering matters, the ENAC *permits* (but does not always require) the ERA to convene and consult with a Technical Rules Committee.²⁹

For the Pilbara, it is proposed that the technical rules be managed by the RCP along with the ISO rules, whether or not they are housed (as is likely) in a single Rules instrument. Accordingly, the role currently filled by the technical rules committee in the SWIS, will be filled either by the NAC itself, or by a technical subcommittee of the NAC. However, the Rules will *require* (not just permit) the RCP to consult the NAC on all rule changes, which will include technical rule changes, thus ensuring industry technical expertise is heard.

The RCP secretariat is drawn from the ERA. On technical matters, the ERA can in turn draw on support from EnergySafety under the existing MOU between those two agencies.

Rules evolution

There is discussion in the SWIS about the need for a WEM Rules evolution function³⁰, such as was historically performed in the WEM by the IMO, and is performed today in the NEM by the Australian Energy Market Commission. The same issue will arise in the Pilbara.

The AEMC's market development function has been described in the following terms:

The AEMC has two roles. It advises the COAG Energy Council on energy market development and is the rule maker for energy markets.

In its role as adviser to the COAG Energy Council, the AEMC provides governments with advice they request on **ways to help the energy markets grow and develop so that consumers benefit from more efficiently operating energy markets**. The AEMC also initiates its own formal reviews in line with its strategic priorities for energy market development. If the COAG Energy Council agrees with the AEMC's energy reform recommendations they request rule changes to deliver those changes. (Emphasis added)³¹

Pending any possible broader reforms on this subject, it is proposed to give the RCP a rules evolution function for the Pilbara regime. The RCP will be required to consider and, subject to consultation with the NAC, progress general changes to the Rules with a view to furthering the Pilbara electricity objective and generally improving the operation, efficiency and transparency of the market consistent with its light-handed tenor.

RCP accountability

In the WEM Rules, market participants can seek Procedural Review of certain RCP decisions, namely:³²

authorship of the technical rules in the old, vertically integrated Western Power's hands. Some access seekers contended that Western Power's rules were too conservative and as a result were blocking access. The ENAC regime attempted to address this by moving the final decision on Technical Rule changes to the ERA.

²⁹ ENAC section 12.16

³⁰ There is at present only the Minister's ability to give the RCP a statement of policy objectives regarding market development: WEM Rules section 2.5.2.

³¹ *MOU between the AEMC and the AEMO Ltd* dated 25 August 2014, available [here](#), p 3. Footnotes omitted.

³² WEM Rules section 2.17.2(a)

- a summary rejection of a rule change proposal, i.e. refusal to progress it through the rule change process;
- a decision to use the fast track procedure;
- a final determination under the fast track procedure; and
- a final determination under the standard process.

This is neither a merits nor limited merits review. It is limited to a narrow examination of whether the RCP did or did not complete the necessary procedural steps.

The Public Utilities Office considers this to be an appropriate level of scrutiny. The task of making and amending the rules is a delegated legislative function. Under general Western Australian law and practice, the courts will usually not intervene to review legislative (i.e. law making) decisions. In this respect, a *rule-making* (legislative) decision is treated differently to an *administrative* determination, such as the ERA's decision when setting an asset's RAB. Unless a statute changes the position, the courts are prepared to review administrative decisions.

However, because of the potential significance of a rule change decision, it is appropriate to hold the RCP accountable to follow the correct procedures. But if the proper procedures have indeed been followed, the rule-making process is not likely to be improved by allowing a review tribunal to second-guess the RCP. An aggrieved system participant can always propose a further rule change, and try to build a consensus in the industry to support it.

The Public Utilities Office is still considering exactly which RCP decisions should be reviewable in this way, but is likely to follow the WEM Rules model discussed above.

To balance the RCP's various discretions and reinforce industry's engagement in the rules, a further transparency measure has been suggested: The RCP's annual report to the Minister will be required to detail each instance in which the RCP has overruled either the NAC or an individual participant's views on process (e.g. if the RCP decides, over a participant's objection, to abridge the consultation process, or to expedite its timeline). The report will outline the circumstances of each rejection, and give reasons. The counter-proposal is that this is unnecessary, because the RCP will normally record its reasons for diverging from a NAC recommendation.

As a final safeguard, should the above process miscarry completely and produce an unjust outcome for a participant, the Minister's residual power to repeal and replace the rules in full could be used. This power will match the existing WEM Rules one,³³ and would be used only in the most extreme circumstances. The main purpose of the power to repeal and replace is to facilitate substantial reforms.

Process - Flexibility and speed versus fairness and proper consideration

The Public Utilities Office proposes a number of departures from the WEM Rules' precedent. The objective is to balance the need to protect system participants' interests and investments, against the need to ensure that the rules remain adequately agile and appropriate.

³³ See *Electricity Industry (Wholesale Electricity Market) Regulations 2004*, regulation 7(3)(a)

The proposed design is intended to be sufficiently flexible to allow:

- minor or non-controversial changes to be progressed with the minimum of effort by all concerned;
- urgent but not minor changes to be progressed quickly but still with adequate consultation; and
- a light touch wherever possible, for example avoiding unnecessary process steps after consensus has emerged.

Not all urgent changes are minor, and not all minor changes are urgent. The WEM Rule change process combines these two very different concepts into a single fast track process with limited consultation. The Public Utilities Office sees an opportunity to improve this in the Pilbara regime. The mechanisms proposed are more flexible than the WEM processes, and are based on the following seven propositions.

Seven propositions about the rule change process

Proposition 1: Major changes need proper consultation, even if they are urgent, but the *timeline* can be accelerated: Rule changes can have substantial cost and other consequences for industry participants. Sometimes those consequences are intended or are an unavoidable consequence of a proposed change. But sometimes those consequences are unintended, and come to light only through the rule change consultation process. This presents a challenge when urgent changes are necessary.

The proposed process addresses this in three ways:

- First, even the accelerated ‘fast track’ process will provide for full consultation with all stakeholders, but on an accelerated timeline. That is, unless the process is abridged (see Proposition 2 below), all stakeholders will have an opportunity to comment on the initial proposal, and again on the draft determination, even if the consultation timeframe is extremely short. The rules will also permit the RCP, if necessary, to condense the consultation documentation when it adopts an accelerated process, to the extent it can do so consistent with a fair consideration of the proposed change. This should reduce the administrative burden for all parties.
- Second, the rules will allow any industry participant to ask at any time that the rule change be broken out of the fast track process.³⁴ To prevent inappropriate obstruction, the RCP will have a discretion as to whether it grants the participant’s request.
- Third, if urgent changes are made through this accelerated process, a system participant can ask the RCP to re-examine the changes more carefully once the immediate crisis has passed.

Proposition 2: The *process* should also be able to be abridged, if a broad consensus has emerged, regardless of the size of the change: In practice, in the MAC, industry discussion of some changes reaches a broad consensus before the process is fully completed. When this happens, the RCP will have a discretion to abridge steps in the remaining consultation process. Participants will again have the opportunity to object.

³⁴ Under the WEM Rules this is in the RCP’s hands only: WEM Rules 2.5.11(b).

Proposition 3: Minority interests should be protected: Sometimes, a rule change proposal would benefit all but one participant, or would benefit all NAC members but disadvantage another participant who is not a NAC member. In many instances, it will be appropriate for the RCP to follow the majority view, but the rules will make it clear that minority views must also be considered, and that the RCP's role is to reach the best decision having regard to the Pilbara electricity objective and any other requirements in the rules. This principle will apply also to procedural matters such as the decision to abridge or expedite the rule change process.

Proposition 4: The precursor stages should be prescribed, but flexibly: In practice, in the WEM, there is often considerable background work done between the RCP secretariat and a rule change proponent, before a formal rule change proposal is lodged or accepted, and also after it has been lodged but before the formal process starts. Sometimes the MAC is involved in this process. The rules will codify this process, but will give the RCP flexibility to allow precursor steps to be bypassed or iterated as necessary to achieve the highest quality rule change proposal, in the most efficient manner.

Codifying and clarifying the pre-submission process will work hand-in-hand with the RCP's ability to abridge or expedite the formal process, if a broad consensus has already emerged.

Proposition 5: Where practicable, the decision to fast track should itself be consultative: Consistent with the philosophy of treating industry as 'owning' the rules, and the desire to give the NAC as much say as possible in the rule change process, the decision to abridge steps or expedite timelines should where practicable be made in consultation with the NAC, and not by the RCP alone. This consultation may be done by email, out of session.

Proposition 6: The documentation requirements should be streamlined: The WEM Rules' treatment of process steps can be streamlined, to reduce the documentation and administrative burden on the RCP secretariat and stakeholders, without reducing transparency or consultation. For example, the RCP will publish every submission, and its decisions may cite relevant extracts from those submissions, but unlike the WEM Rules it will not be obliged also to *summarise* each submission. Similarly, and again unlike the WEM Rules, NAC minutes will be published, and the determination may cite relevant extracts from those minutes, but the RCP will not be required to include a summary of all NAC discussions in its draft determination.

The rules will also enable out-of-session communication and decision making, and will permit 'documentation light' communications wherever practicable.

Proposition 7: The RCP will remain ultimately in control: Although numerous changes from the WEM Rules will be made to give industry a greater say in both the process and content of rule changes, primarily through expanded and more explicit NAC involvement, the RCP will nonetheless remain in overall control of the process, to ensure that changes do not get inappropriately bogged down in committee.

Responsibility for drafting the actual amending rules

Drafting the actual legal wording of rule changes is a specialist skill requiring a thorough knowledge of the rules. In the WEM, this responsibility normally falls to the RCP. The Rules will continue this practice, although system participants will be free to draft their own proposed changes if they wish.

This means that the RCP will incur the cost of doing that work, but the Public Utilities Office considers that this is a more efficient approach than requiring each rule change proponent to spend time and money drafting the amendment, and each other participant to spend more time and money considering whether the resultant drafting may contain a conscious or unconscious partisan bias.

Procedure changes

As with the WEM, procedures will be developed by whichever agency will be applying the procedures. In the WEM this is split between AEMO (including as System Management), the RCP and the ERA.

However, the WEM Rules' procedure change process is not as prescriptive as the rule change process, even though a breach of a procedure is also a breach of the WEM Rules.

The Public Utilities Office is considering whether, having adopted a more flexible rules change process, that same process may also be suitable for procedures, because it can be abridged or expedited as necessary, whenever appropriate, but can be slowed down and conducted fully for more controversial procedure changes.

3.3.4 Budget and fees

The process for dealing with ISO and RCP costs will be broadly the same as that contained in the WEM Rules, although the cost allocation methodology will be simplified.

The cost of establishing and operating the Pilbara ISO should be kept to a practical minimum.

Because the ISO's primary function under the Administrative ISO model is system security, from which all system participants benefit, and also because the ISO's operations and costs will occur on a relatively small scale, costs are proposed to be divided equally between all interconnected networks (see Section 8).

The Public Utilities Office proposes a triennial allowable revenue and forecast capital expenditure process as is used in the SWIS, to align with current processes under the WEM Rules and the GSI Rules.

3.3.5 Surveillance

System surveillance includes:

- monitoring compliance with the rules by the ISO;
- monitoring compliance with the rules by other system participants (i.e. NSPs);
- investigating incidents;
- exercising disciplinary powers (discussed below in section 3.3.6); and
- proposing rule changes.

In the WEM, the ERA performs this surveillance role, monitoring rules compliance by all “rule participants”, including AEMO, generators and wholesale customers (largely, retailers). The ERA was given this function for the WEM Rules, rather than AEMO, because AEMO itself is a major rule participant, being directly involved in both market and system management operations. That is, in the WEM, AEMO is both market operator and system operator.

The Design Report considered two options for surveillance, being either the ERA or the ISO³⁵ itself, and expressed a preference for using the ERA.

Stakeholder feedback on the Design Report indicated a preference instead to have the ISO perform as much of the surveillance function as possible, with a view to simplifying the regime and reducing its cost.

As noted in the Design Report,³⁶ the advantages of having the ISO perform the surveillance role include the fact that the ISO could set its own priorities and resources for the surveillance. Also, the ISO already has the necessary information and background. The disadvantages of using the ISO include possible lack of independent scrutiny (because the ISO would be assessing its own compliance) and also the question of whether the ISO could secure the necessary competencies at reasonable cost.

As discussed in section 4.4 of this consultation paper, the Public Utilities Office is now proposing that the ISO initially be tasked under the Administrative ISO model. As such, the ISO will not be involved in day to day operational decisions, so there is less reason to be concerned about any loss of accountability from the ISO’s self-scrutiny.

The Public Utilities Office considered, and discussed with stakeholders, a model in which the surveillance role was split, such that the ISO monitored all system participants other than itself, and the ERA monitored the ISO. This received some support, but concerns were expressed that the boundaries between the two monitoring regimes might become blurred, with the risk of either gaps or inefficient overlaps.

As a general proposition, the Public Utilities Office considers the risk to be very small that AEMO would be influenced by a conflict of interest in any surveillance activity. That is, the Public Utilities Office considers that in most if not all circumstances, AEMO in its role as ISO can be relied upon to investigate its own behaviour, and report transparently on any breaches by it of the rules. As such, and especially in circumstances where the ISO’s role is a purely administrative one, the Public Utilities Office believes that the surveillance role can be left entirely to the ISO in the first instance. If a system participant is dissatisfied with the ISO’s self-investigation, it will then be able to raise the matter with the ERA.

This is likely to be the most efficient and hence lowest cost approach. However, because this pragmatic approach does create at least a theoretical conflict of interest for the ISO, the Public Utilities Office proposes that to ensure proper transparency and accountability, there should be a mechanism for system participants to refer alleged rule breaches by ISO to the ERA.

Finally, the Public Utilities Office suggests that it may be necessary to revisit this pragmatic approach if:

³⁵ Specifically, the Design Report contemplated that the role might be filled by a sub-committee of the ISO’s governing body.

³⁶ Design Report, p 72.

- it emerges that the ISO is not able to adequately manage either the surveillance role in general, or self-scrutiny in particular; or
- over time, the NSPs elect to move to an expanded role for the ISO.

Accordingly, the legislation will permit future rules or regulations to move some or all of the supervisory role to the ERA. However, this would not occur without appropriate consultation with all stakeholders, including importantly the NSPs who will be funding the regime.

3.3.6 Enforcement

Like any legislation creating a regulatory regime, the enabling Act for the Pilbara electricity reforms will permit the regulations and rules to establish an enforcement regime comprising civil penalties and other enforcement powers (declarations, injunctions, etc.)³⁷. This is both necessary and desirable – a statutory regime without any enforcement mechanisms is of limited practical benefit.

However, the Public Utilities Office is aware that the Pilbara is currently operating day to day on the basis of existing relationships between NSPs and some limited operational agreements. The Public Utilities Office does not wish to impose a heavy-handed compliance and enforcement regime unnecessarily. Feedback from stakeholders has generally been supportive of this view.

This is so despite the fact that even under the Administrative ISO model, certain non-compliant behaviour could have serious practical and economic consequences, for example if an NSP fails to act in accordance with agreed emergency operating protocols (see section 5.4.8), system security could be threatened, and in an extreme scenario there could be blackouts with resulting economic disruption.

Accordingly, the Public Utilities Office has determined for the moment that the initial Rules will contain no civil penalty enforcement regime. The Public Utilities Office will monitor this closely, and may recommend the development of such a regime in the future if it appears necessary and justified.

However, it is proposed to empower the ISO, and if necessary, the ERA, to ‘name and shame’ those who breach the rules.

It is also proposed to allow a court to impose both declaratory and injunctive relief. This is a relatively light-handed measure which allows system participants to ensure that the rules are obeyed, without imposing the heavy-handed sanction of fines or civil penalties.

³⁷ A declaration is an authoritative statement by a court or other tribunal as to the state of things – e.g. that a person is in breach of an obligation, or that a law has a certain effect. An injunction is a mandatory order by a court or other tribunal forcing a person to do, or not do, something – e.g. to cease certain conduct, or to release certain information.

3.3.7 Dispute resolution

Although the Administrative ISO model is intended to be a light-handed regulatory regime, which as far as possible preserves NSPs' existing freedom of action, the Rules will nonetheless impose rights and obligations on system participants, so it is reasonable to expect that from time to time disagreements may arise. For example, the Rules will impose obligations on relevant parties for the management of contingency and emergency events, the assessment of proposed outages and the coordination, transparent procurement and allocation of ancillary services.

Where there is a (non-commercial) disagreement between participants (including the Pilbara ISO) with respect to their obligations under the Rules relating to power system operation, or otherwise in relation to alleged non-compliance with the Rules, a dispute resolution mechanism will be required to facilitate and resolve disagreements.

It is proposed that this design follow the WEM Rules dispute resolution regime.³⁸

3.3.8 Review of decisions

An ability for system participants to challenge decisions of the ISO and ERA will be one of the most important checks and balances in the Pilbara regime.

Any appeal/review mechanism must be carefully designed, to balance the need to protect participants' important business interests, against the need to achieve certainty and avoid unnecessarily prolonging litigation or enabling adverse vested interests to delay or frustrate necessary actions.

This subject spans both the ISO work stream and the access work stream.

3.3.9 Participation and registration

There will need to be a simple registration regime for system participants. At present it is expected that this will be limited to the ISO and NSPs, it is not anticipated that generators or loads will need to register.

The WEM Rules regime will form a basis for the design.

3.4 Proposed arrangements

3.4.1 The Independent System Operator

The Public Utilities Office proposes that AEMO be appointed to be the ISO.

3.4.2 Making and changing the Rules

Governance

The rule change process will be overseen by the Rule Change Panel (RCP).

³⁸ See WEM Rules 2.19 and 2.20

To ensure the RCP has appropriate expertise to manage technical rules changes, the Public Utilities Office is considering expanding the size of the Panel to ensure that it has access to the necessary technical expertise. In doing so, the Public Utilities Office is considering revising the current 3-out-of-3 quorum requirement³⁹ to an n-1 requirement.

There will be a NWIS Advisory Committee (NAC), analogous to the WEM Rules' Market Advisory Committee (MAC).

The RCP will determine from time to time who chairs the NAC. To maximise industry engagement, the NAC may be chaired by AEMO rather than the RCP Executive Officer.

As in the WEM, select RCP decisions will be subject to Procedural Review. This is a very limited review simply to determine whether the correct procedural steps were followed. To maximise transparency, the RCP's annual reporting to the Minister will also be required to show all situations in which the RCP disregarded NAC recommendations or participant requests e.g. not to abridge or expedite the process.

Commencing the rule change process

The rules will provide flexible processes for the RCP to provide pre-lodgement and post-lodgement support, including NAC involvement. The intention is to formalise the existence of these processes, but to leave their detail un-prescribed and hence flexible.

Any person, including the RCP (see "Rules evolution" below), may lodge a proposed rule change.

As in the WEM, the RCP will still be able to reject proposals at the outset, but the NAC must be consulted first. The criteria for rejection will be tightened so that proposals can only be rejected if they are considered frivolous or vexatious, or are manifestly inconsistent with the Pilbara electricity objectives, or substantially duplicate an existing proposal (in which case consideration will be given to merging the new proposal into the existing proposal).

As in the WEM, the RCP will provide technical rule-drafting support to rule change proponents.

During stakeholder consultation, it was suggested that the RCP be permitted to delay the start of the formal rule change process after a proposal has been submitted (as the AEMC can do⁴⁰). The rationale is that this will allow the Panel to juggle priorities and resources for urgent proposals, and will avoid wasting stakeholder time by holding a submission period too long before the Panel will be able to actually review the proposal and the submissions. The Public Utilities Office has considered this proposal, but is concerned that it may have an unintended consequence of allowing a backlog of rule changes to develop.

Standard rule change process

The standard process will be very similar to the WEM Rules process, but NAC involvement will be made more explicit. The standard process, unless abridged or expedited, will be as follows. The stated timelines are from the WEM Rules:

³⁹ Energy Industry (Rule Change Panel) Regulations 2016, regulation 14.

⁴⁰ NEL, s 107

- the RCP must consult the NAC before deciding to reject (i.e. not progress) a rule change proposal;
- the RCP must consult the NAC during the pre-lodgement and post-lodgement processes;
- the RCP will publish each rule change proposal (max 7 business days⁴¹);
- any system participant or member of the public may make a submission on the proposal (min 30 business days⁴²);
- the RCP must consult the NAC at least once regarding the proposal before it publishes its draft determination, and the NAC chair will determine whether more NAC meetings are needed (subject to RCP overrule);
- the RCP will publish a draft determination (max 20 business days⁴³), and the administrative requirements for this will be streamlined, compared with the WEM Rules;
- any system participant or member of the public may make a submission on the draft determination (min 20 business days⁴⁴);
- the RCP must consult the NAC at least once after it publishes its draft determination and before it publishes its final determination, to discuss the draft determination and all submissions; and
- the RCP will publish a final determination (max 20 business days⁴⁵), with streamlined administrative requirements.

As with the WEM Rules, the RCP will be able to extend the above timelines.⁴⁶ However, it must publish a notice of its proposal to do so. The NAC, or any system participant, can object to the delay. The RCP will have a discretion whether to accept or reject the objection, but must report on any rejections in its annual report.

The Rules will specify timelines for the ISO to respond to requests for information, modelling or other assistance, and the consequences of those timelines being exceeded.

Expediting or abridging the process (fast track)

Unlike the WEM Rules, and the *Gas Services Information Rules*⁴⁷, the Rules will *not* provide a single one-size-fits-all “fast track” process for minor or urgent proposals.

Instead, the full consultation process (proposal, consultation, draft decision, consultation, and final decision) will apply by default to all proposals, but:

⁴¹ WEM Rules section 2.5.7

⁴² WEM Rules section 2.5.7(f)(iii).

⁴³ WEM Rules section 2.7.6

⁴⁴ WEM Rules section 2.7.6(b)

⁴⁵ WEM Rules section 2.7.7A

⁴⁶ WEM Rules section 2.5.10

⁴⁷ The *Gas Services Information Rules* (available [here](#)) contain in rule 133 a different fast track process, but it has the same limitation as the WEM Rules' model in that it allows consultation to occur on a by-invitation basis.

- for minor changes or when there is a broad consensus (e.g. after the pre-lodgement activity or after the first few NAC discussions) — the RCP, giving the NAC an opportunity to comment,⁴⁸ may abridge the consultation steps, for example by dropping the draft determination and second round of consultation as occurs in the WEM fast track process; and
- for urgent changes — the RCP, after giving the NAC an opportunity to comment⁴⁹, may expedite (i.e. accelerate) the consultation timetable.

The RCP will be able to do this abridgement or expedition at any time, provided participants are given notice and at least a short opportunity to object. Unless doing so is impracticable, the RCP should give the NAC an opportunity to comment⁵⁰ regarding this decision.

For urgent matters, unless the RCP separately abridges the steps on the ground that the change is only minor or because a broad consensus has emerged, there is to be full, but accelerated, consultation including a draft determination and a second round of submissions. That is, urgency alone is not a sufficient ground to deprive participants of a full voice.

In extremely urgent circumstances, each consultation window may be shortened to as little as two working days, theoretically allowing the full rule change process to be completed within approximately one week. But this level of haste would only be needed in extraordinary circumstances. The RCP will have discretion to determine an appropriate timeframe in each case.

The “urgent” rule change process will be disruptive and burdensome for both the RCP and stakeholders. Accordingly, the test for what constitutes an urgent change will be narrow: the problem to be addressed must involve material risk or cost, and must not be capable of being addressed by some alternative interim measure or subsequent adjustment. The RCP must consider the cost and disruption involved, before determining that a change is urgent, and (if it is urgent) in deciding by how much the timelines should be accelerated.

Unlike the WEM Rules fast track process, whenever the RCP chooses to abridge or expedite, all participants must be notified of the proposal, and all participants must be given at least a short opportunity to submit at least once on every rule change proposal.

It has been suggested to the Public Utilities Office that after urgent rule changes are completed, any person may trigger a retrospective full consultation process, to consider whether other changes might also be required, or even (in extreme circumstances) whether the urgent change needs to be unwound.⁵¹ The Public Utilities Office considers that this mechanism could be a valuable safeguard, but is aware that it could also involve unnecessary repetition and expense.

⁴⁸ The objective here is to increase industry’s voice, without bogging the rule change process down in greater time and cost. It’s envisaged that the opportunity to comment will be quick and informal. It will not be a full consultation process with prescribed material to be published and prescribed response times. It could be done by placing this item on the agenda at a scheduled NAC meeting, or by an email notification with a limited response time.

⁴⁹ See footnote **Error! Bookmark not defined.**

⁵⁰ See footnote **Error! Bookmark not defined.**

⁵¹ EI Act s109 already contains this mechanism for urgent ENAC amendments. If the Minister skips public consultation because an amendment is urgent, the Minister must call for public comment as soon as practicable after the event, and must consider whether to reverse the amendment or make other changes. The present proposal for the Pilbara is slightly more flexible, requiring reconsideration only if someone requests it.

The Public Utilities Office therefore proposes that the RCP be given the discretion to reject such a request if it considers the request to be vexatious, or if it considers that no re-consultation is necessary e.g. because the abridgement of time in the urgent process was not so extreme as to deprive affected stakeholders of a reasonable opportunity to consider and comment.

The RCP may at any time reverse a decision to abridge or expedite, i.e. it may slow the process back down again. The NAC or any participant may ask it to do so, at any time. The RCP must consider that request, but it will have a discretion as to how it responds. If the RCP rejects a request to slow the process, it must give reasons. As noted above, it has been suggested that the RCP should report on all such rejections in its annual report, with a counter-suggestion that this would be an unnecessary burden.

Technical and other subcommittees

As with the MAC, the NAC will have the ability to form working groups. For technical rule changes, it is envisaged that the NAC may form a specialist technical working group. The RCP secretariat may also want to call on engineering support from external sources, or from EnergySafety under the existing MOU between the ERA and EnergySafety.

Protected provisions

As with the WEM Rules, some of the Rules will be “protected provisions” which cannot be changed without Ministerial approval. The Public Utilities Office expects the list of such rules to be quite short, likely being confined to rules setting out the rule change process itself, and the RCP’s administration and funding.

Procedure change

The Public Utilities Office proposes that the above flexible procedure may be appropriate for procedure changes as well, avoiding the need for a separate regime as in the WEM Rules.

Rules evolution

The RCP will be given a function of considering and proposing broader, evolutionary rule changes for the Pilbara regime. To manage costs, the RCP will be required to consult with the NAC before committing substantial resources to a self-initiated rule change proposal.⁵² This is how the WEM Rules deal with rule change proposals by the ERA and AEMO.⁵³ It has been suggested that, because rules evolution involves elements of policy development and reform:

- the RCP should consult the Public Utilities Office before starting work on a proposal; and
- the RCP should only commence developing a proposal if the NAC reaches broad consensus and/or the Coordinator of Energy requests that it do so.

The RCP would be expected to also consult early with other directly-affected stakeholders such as the ISO, but this detail may be left to the RCP’s discretion.

⁵² See WEM Rules sections 2.5.1A and 2.5.1B.

⁵³, see WEM Rules sections 2.5.1A and 2.5.1B.

It is noted that the Public Utilities Office is considering whether the RCP having this function might jeopardise the independence of its decision-making, and if so what governance arrangements may be needed to protect that independence.

This raises the question of how a disagreement between the RCP and the NAC on this subject should be dealt with. Because rules evolution involves elements of policy development and reform, the Public Utilities Office is considering a mechanism in which such disputes are referred to the Coordinator for resolution.

3.4.3 Budget and fees

The ISO must seek ERA approval for its proposed allowable revenue and forecast capital expenditure, for each three year review period. The ERA will undertake public consultation on this proposal and determine the ISO's allowable revenue and forecast capital expenditure. Substantial departures (under or over) from the approved amounts will be brought back to the ERA, for example a new capital expenditure programme.

The ERA will be required to ensure that the ISO's planned expenditure is prudent and efficient, and designed to achieve the lowest sustainable cost of providing the services in accordance with the Pilbara electricity objective and Rules.

The ISO will publish an annual budget forecast for each of the services it plans to provide under the Rules, and an annual financial report showing actual expenditure. Market fee shortfalls and over-recovery will be balanced out by an adjustment to market fees in the next year.

The ISO will annually determine and publish its system fees, which will be designed to recover the budgeted amounts, see Section 8.

The ERA's costs of administering its functions under the Rules will also be recovered through system fees.

3.4.4 Surveillance

The primary system surveillance role will be performed by the ISO (AEMO). This will include:

- monitoring its own compliance with the rules;
- monitoring other system participants' (i.e. NSPs') compliance with the rules;
- reporting on the findings of any investigations into emergency situations, including any instances where network customers prevented a participant from complying with any pre-established emergency operating procedures;
- investigating incidents; and
- proposing consequential rule changes.⁵⁴

⁵⁴ As noted above, the ISO will be required to consult with the NAC before committing substantial resources to a rule change proposal, as AEMO is today under the WEM Rules, see WEM Rule 2.5.1A.

The ISO may, if necessary, develop a procedure for its surveillance function, but the rules will encourage the ISO to approach its surveillance functions with as little formality and as much expedition as is practicable, consistent with maintaining credible, robust governance arrangements.

The ERA will have a reserved role to investigate non-compliances by the ISO, if a system participant asks it to, following the primary investigation and report by the ISO.

The ISO will report annually, and publicly, to the Minister detailing all alleged non-compliances during the preceding year. The report must detail the outcome of each complaint. For each complaint where a non-compliance was found, the report must detail the non-compliance and (if they can be determined) its consequences, the steps taken by the non-compliant system participant to remediate the non-compliance and prevent its recurrence. The report may recommend rule changes. The report is to deal with complaints about, and non-compliances by, the ISO in the same way as for other participants. Where a complaint about the ISO's alleged non-compliance has been referred to the ERA, the ISO's report must append a copy of the ERA's determination.

The Act will give the ISO and ERA the appropriate powers to perform the above functions. The Act will also enable the Rules to task the ERA with undertaking a periodic review of the Pilbara regime.

3.4.5 Enforcement

The enabling Act will permit rules and regulations which create a civil penalty regime, but no such regime will be included in the initial rules. A regime may be created later, if it proves necessary and justified.

The ISO and ERA will both have powers to report publicly on non-compliant behaviour.

The dispute resolution procedures (below) will provide a mechanism to resolve disagreements about rules compliance. Also, anyone will be able to propose rule changes to address undesirable behaviour.

As a last resort, a system participant will be able to ask a court for a declaration (for example as to the effect of a rule, or as to whether certain behaviour does or does not comply with the rules) or an injunction (for example compelling a person to do something they are obliged to do, or to desist from a breach).

3.4.6 Dispute resolution

A system participant may give a dispute notice to another system participant including the ISO. If necessary, the ISO and the ERA can publish guidance on how the dispute mechanism and investigations for non-compliances are to interrelate.

A copy of each dispute notice must be given to the ISO, who must consider whether any other system participant should be invited to join the dispute.

System participants are to meet through their senior executives or authorised representatives to attempt to resolve the dispute.

If they cannot, they must endeavour to agree on a dispute resolution method, for example, mediation, expert determination or other alternative dispute resolution.

If they cannot agree on any other method, the parties may litigate the dispute.⁵⁵

During stakeholder consultation, it was suggested that the ISO's annual report to the Minister could include a summary of disputes raised during the year. The Public Utilities Office considers that this may be a helpful way to track stress points in the regime. The reports would need to be restricted to a summary, and to protect commercially sensitive information.

3.4.7 Review of decisions

The Public Utilities Office is continuing to work on this design consideration and will engage with stakeholders on any proposed mechanism as part of the stakeholder reference group meetings.

3.4.8 Participation and registration

The ISO will administer a simple, fit-for-purpose regime to deal with system participant registration.

3.4.9 Other matters

Audit

The audit provisions will be adapted from the corresponding WEM Rules.⁵⁶

Prudential arrangements

As discussed throughout the rest of this consultation paper, wherever possible the regime will be designed so that AEMO has no credit exposure and hence no need to carry prudential security. This item will be developed further during the implementation stage, with the policy objective of keeping any prudential requirements to a minimum.

Interaction with contracts

A core objective of the proposed reforms is, and will remain, to minimise or eliminate any conflict between these reforms and current contractual arrangements. Stakeholders are invited to keep the Public Utilities Office informed wherever they see any possible conflicts emerging.

⁵⁵ See WEM Rules 2.20.2.

⁵⁶ WEM Rules section 2.14.

4. The “Administrative ISO” model and the ISO’s functions

4.1 Introduction

This section describes the recommended Pilbara ISO model, and the ISO’s proposed primary and other functions. These arrangements will be set out in the proposed Rules.

4.2 Current arrangements

Power system planning and operation in the interconnected Pilbara system is currently undertaken by individual NSPs, with informal approaches to outage management and reserve capacity management. Horizon Power acts as de-facto system operator to facilitate ancillary services and emergency coordination.

A number of operational issues in the interconnected Pilbara system have emerged as a result of the lack of central planning in power system development, and the presence of multiple NSPs.

4.3 Design considerations

4.3.1 AEMO review of Pilbara ISO role

AEMO was asked to undertake a review of the Pilbara ISO role and to make a recommendation to the Public Utilities Office.⁵⁷ AEMO’s review included:⁵⁸

- reviewing and analysing the 35 design elements in the Design Report, including a minimum effective design for the Pilbara ISO role;
- identifying organisational risks (to the ISO) in addressing the design elements and how they could be mitigated;
- identifying and resolving participant concerns that may inhibit the Pilbara ISO establishment, implementation and operation;
- identifying and defining the Pilbara ISO primary and other functions and powers required to meet the design objectives;
- identifying practical options for Pilbara reform implementation; and
- determining indicative costs for the Pilbara ISO establishment, implementation and for the first three years of operation.

AEMO’s review activities were supported by a comprehensive stakeholder engagement strategy and associated activities involving all key stakeholders from industry, government and within AEMO.

⁵⁷ AEMO Final Report, cited in footnote 13 on page 9 on this consultation paper

⁵⁸ AEMO Final Report, p. 13

4.3.2 AEMO recommended the “Administrative ISO” model

AEMO considered three models for the Pilbara ISO, as summarised in the table below.

Table 4.1 ISO model options

Operating state	Definition
Administrative ISO model (recommended)	Undertakes primary function described in section 4.4.2 and the other functions described in section 4.4.3, with defined procedures determined to describe NSP actions during contingencies, and the AEMO having no general power to direct system participants except in some emergency states.
Operating ISO model	Undertakes the functions contemplated by the Administrative ISO model, with the addition of 24/7 visibility and monitoring, the ability to issue real-time dispatch instructions to manage contingencies, and real time compliance monitoring of ancillary services.
Full Market Operator model	Similar to Wholesale Electricity Market/National Energy Market, i.e. real time system operations in conjunction with an energy and capacity market.

AEMO recommended the Administrative ISO model.⁵⁹

At the heart of the Administrative ISO model is a division of responsibilities between the ISO and the NSPs. In order to keep both system and staffing costs down, and in order to keep system operation as close as possible to current practices, the Administrative ISO will have no real-time power system visibility and no real-time dispatch instruction capability. Rather, individual NSPs must continue to monitor and manage their own networks within technical and commercial envelopes. The model is described more fully under “*Proposed arrangements*” below.

A comparison of the three models is provided in the figure below.

⁵⁹ AEMO Final Report section 4.3, p 28, and see Chapter 4 generally.

Figure 4.1 ISO models option responsibilities and management⁶⁰

Regulatory Regime Implementation – Model Option Responsibilities and Management			
Responsibility	1. Administrative ISO model	2. Operating ISO model	3. Full Market Operator model ⁶¹
ISO function (high level)	Interconnected Pilbara system, power system security	Interconnected Pilbara system, power system security	Interconnected Pilbara system, power system security and reliability ⁶²
ISO presence	Post-incident	24/7 monitoring desk	24/7 active desk
Energy contracts	Bilaterals	Bilaterals	Market mechanism (including Bilaterals)
Ancillary services	Contract	Contract	Market, contract, dispatch
Response (events)	<ul style="list-style-type: none"> Network Operator: Event Mitigation Protocols ISO: Post-incident investigation 	ISO Directions	Co-optimised dispatch via dispatch instruction from ISO
Action trigger	Emergency conditions – delegation under protocols	Operating State triggers / contingency events	Real-time operation
Settlement	Reconciliation of costs	Reconciliation of costs	Settlement agent
Capacity	No capacity mechanism (i.e Bilaterals plus Ancillary Services (AS))	No capacity mechanism (i.e Bilaterals, AS plus Ready Reserve requirement)	Full Reserve Capacity Mechanism
Outages	ISO co-ordinated (i.e deemed approved unless directed by ISO to cancel)	Availability framework	Availability framework
Compliance / enforcement	Reporting	Reporting and monitoring	Reporting and monitoring
Planning	ISP (Integrated System Plan) + MT PASA	ISP + MT/ST PASA	ISP + LT/MT/ST PASA + Pre-dispatch

AEMO concluded that the Administrative ISO model has the lowest implementation costs, because it leverages and formalises existing operating practices and requires minimal industry cost and resource allocation. AEMO concluded that:

... the Administrative ISO model is the optimal ISO model for the NWIS in its current operating environment. It meets the core objectives for Pilbara electricity reform in a ‘least cost’ and ‘least intervention’ manner, improves transparency in the operation of the NWIS, confers obligations and functions on the parties that are best-placed to manage them, and was widely accepted by participants during the stakeholder engagement process.⁶³

⁶⁰ Adapted from AEMO Final Report, Figure 2, p 28.

⁶¹ There are many possible permutations for the “full market” model. For example it’s possible to have a market with or without a reserve capacity mechanism. The model summarised here is just one possible variant, for illustration purposes. The current reforms have not proposed a market model, and so have not considered it in any detail.

⁶² Assuming the Full Market model equips the ISO with suitable mechanisms, eg. a reserve capacity mechanism.

⁶³ AEMO Final Report, section 4.3, p 28.

Because each of the other models considered would also encompass the systems and resources involved in the Administrative ISO model, AEMO felt that the Administrative ISO model could be adopted as a first step, without hindering later development of the ISO role if that proved desirable. As a result, it felt that:

... this model provides the essential platform for the strategic and structured future evolution of the NWIS and would support economic development in the Pilbara region and prosperity for Western Australia as a whole.⁶⁴

The Public Utilities Office accepts AEMO's recommendation, and proposes to use the Administrative ISO model. This model is consistent with Design Element 33, which requires minimal interference in the day-to-day operation of the interconnected Pilbara system.

4.3.3 ISO's primary function

Adopting the Administrative ISO model will require a revision to the ISO's primary function, and also delegation of much of what remains.

ISO to be responsible for security, but not reliability

Design Element 20 proposed that the ISO's primary function be "ensuring the reliability and stability of the system".⁶⁵

Reliability and security⁶⁶ are different things. Reliability refers to the ability of a power system to meet consumer demand. It comprises a mix of supply adequacy (i.e. making sure there is sufficient generation or demand management to meet load) and network reliability. Security is a measure of a power system's ability to tolerate disturbances and, as a result, to maintain electricity supply to consumers.

A system operator tasked with managing reliability will need tools and powers to enable it to ensure that adequate generation capacity is built. In the WEM, AEMO has this responsibility, and manages it using the Reserve Capacity Mechanism. In the Pilbara, at present, each NSP or consumer manages this through bilateral contracts with generators. If the ISO were to take on responsibility for system reliability, it would need a considerably more expensive and intrusive model than the Administrative ISO model. AEMO indicated that before an ISO could take on a reliability function, it would need to move to a variant of the Full Market Model at exponentially greater cost and complexity.⁶⁷

For this this reason, and following extensive stakeholder feedback on this point, AEMO concluded:

To the extent that reliability in the NWIS is the responsibility of the NSPs under bilateral contracts, AEMO considers that it would be appropriate for the NWIS ISO's core function to be limited to ensuring the security of the power system.⁶⁸

⁶⁴ AEMO Final Report, section 4.3, p 28.

⁶⁵ Refer to Appendix A for full list of Design Elements

⁶⁶ Although Design Element 20 refers to "stability", the broader and more important concept is power system **security**. Security and stability are not the same thing. Stability refers to a power system's return to equilibrium after a physical disturbance. Security, as noted above, is a more general concept encompassing the power system's ability to withstand disturbance of all sorts.

⁶⁷ AEMO Final Report, section 4.1.3. pp 26-27. AEMO estimated setup costs to be in the order of \$50m, and annual operating costs to be in the order of \$8m p.a. (p 27), compared with setup of \$1.1m setup and operation of \$1.2m p.a. for the Administrative ISO model (pp 23-24)

⁶⁸ AEMO Final Report, section 6.1, p 34.

The Public Utilities Office accepts this recommendation, and proposes that Design Element 20 be modified accordingly. With other minor wording changes to improve clarity,⁶⁹ the first limb of Design Element 20 will now state:

“1. The ISO’s primary function is to maintain and improve system security.”

ISO’s primary function (maintaining and improving system security) will largely be delegated to NSPs

The other implication of the Administrative ISO model for the ISO’s primary function is that even when it is expressed in these narrower terms, in all but the most unusual circumstances,⁷⁰ the ISO will be delegating the actual performance of this function to NSPs. This is discussed in section 4.3.5.

4.3.4 ISO’s other functions

AEMO’s analysis recommended a number of functions to address the identified shortfalls in the Pilbara.⁷¹ They are described below in section 4.4.3.

4.3.5 Delegation and authorisation by the ISO, and immunity of delegates

A necessary consequence of the Administrative ISO model is a greater role and responsibility for NSPs. This includes some direct responsibilities, but it also involves a substantial delegation of the ISO’s primary system security function.

This proposal too emerges from the AEMO Final Report, and was strongly supported by stakeholders.⁷² AEMO summarised its benefits as follows:

The benefits of a limited-scope NWIS ISO ... [primary] function are two-fold First, the breadth of the NWIS ISO intervention is minimal and restricted to emergency situations only, so its ability to interfere does not affect the normal day-to-day commercial operations of NSPs. Second, the role responsibilities of the NWIS ISO and NSPs are transparent in that they can be easily identified and prescribed in the regulatory instruments, resulting in substantially reduced operational, commercial and compliance risk as the obligations on relevant parties and operational processes are clear.⁷³

One important question arising from this delegation is how far the ISO’s immunity should extend to its delegate. Subject to stakeholder feedback, the Public Utilities Office proposes that delegates should enjoy the same immunity as the ISO, see “Immunity of delegates” in section 4.4.2.

⁶⁹ In addition to removing the objective of managing reliability, the Public Utilities Office proposes to reword this objective as follows:

- rename this function from “core” to “primary”, to better reflect its primacy and avoid confusion with other lists of “core functions” e.g. in the AEMO Final Report;
- replace “ensure” with “maintain and improve” to better fit with the largely hands-off Administrative ISO model; and
- to replace “stability” with the more usual industry expression of “security”.

⁷⁰ See discussion of emergency response in section 5.4.8.

⁷¹ AEMO Final Report, the other functions are listed in section 3.1 and discussed in the rest of Chapter 3.

⁷² AEMO Final Report, section 6.1, p 35.

⁷³ AEMO Final Report, section 6.1, p 35.

4.4 Proposed arrangements

4.4.1 The “Administrative ISO” model

The Public Utilities Office proposes to adopt the Administrative ISO model, as being optimum for the Pilbara's current operating environment.

Main elements of the model

The main elements of the Administrative ISO model are as follows:⁷⁴

Table 4.2 Key aspects of Administrative ISO model

Aspect	Proposed arrangement
ISO	AEMO
ISO Governing body	AEMO Board supported by an industry consultative committee (see discussion of NAC, at section 3.3.32). During the implementation period, the regime may be governed by the Public Utilities Office, guided by an industry consultative committee comprising AEMO and industry stakeholders. During this interim period, many of the ISO's other functions may be performed by a delegate, likely Horizon Power
ISO primary function	Maintain and improve system security
ISO other functions	See section 4.4.3.
Statutory protection	The same statutory immunity as is provided to AEMO under the <i>Electricity Industry Act 2004</i> as the system management participant for the SWIS. ⁷⁵
Management of system reliability	Reliability will be the NSP's responsibility, not the ISO's. See also “Delegation” in section 4.4.2.
Cost recovery	A transparent cost allocation methodology will be provided to allow the costs associated with the ISO to be recovered from participants (see sections 3.3.4 and 8)
Real-time operations and management, including dispatch	The ISO will not have real-time visibility of the power system, which precludes real-time intervention to manage contingency or emergency events. The ISO will not dispatch ancillary services.
Operational framework and protocols	An operational framework is required to be established to identify when and how the ISO will intervene in operations of the interconnected Pilbara system. This is discussed briefly in “Emergencies” in section 4.4.2 below, and more fully in section 5.4.8.

⁷⁴ The Administrative ISO model is described more fully in AEMO Final Report, section 4.1.1, pp 20-24.

⁷⁵ Section 126 of the *Electricity Industry Act 2004* provides statutory immunity for specified persons, including AEMO, in respect of good faith acts or omissions in the performance or purported performance of its functions. The immunity is not absolute for negligent acts or omissions, but rather is capped at a limit prescribed in the *Electricity Industry (Wholesale Electricity Market) Regulations 2004*.

Delegation / authorisation structure	<p>Many of the ISO’s responsibilities will be delegated to NSPs. See “Delegation” in section 4.4.2 below.</p> <p>The ISO will also have a general power to delegate to a suitable and relevant party to perform some of its functions, where it is necessary or appropriate, such as in an emergency situation.</p>
Relationship with participants/registration	The ISO will have a direct relationship with NSPs through a registration process. The ISO will not have a direct relationship with generators or loads. See section 3.3.9.
Post-incident review	The ISO will analyse and review, including as part of post-incident review and review of performance of ancillary services and settlement, to assist with continuous improvement with a view to maximising the effectiveness of power system operations. A review may suggest that a new or modified operating protocol is required, or changes to the Rules. These will be developed by the ISO in consultation with participants. See section 5.2.6.

Systems implications

Most of AEMO’s costs in implementing the Administrative ISO model will be for personnel, as there are no real-time systems to build, operate and maintain. Any (non-real-time) systems it may require must be simple, fit-for-purpose, and where possible and appropriate, should leverage existing systems within the WEM or NEM.

The type of systems that are likely to be required include, but are not limited to:

- participant Interface: registration tool, outage logging tool, and outage coordination tool;
- Power System Model; and
- Ancillary Service Tool: FCAS allocation and settlement, and balancing settlement.

4.4.2 ISO’s primary function

Modified primary function

For the reasons discussed in section 4.3.3, the Public Utilities Office proposes that the first limb of Design Element 20 be modified to read:

“1. The ISO’s primary function is to maintain and improve system security.”

Delegation to NSPs

The Administrative ISO model will ensure system security through a three-fold approach:

- as now, NSPs will bear primary responsibility for system security within their own networks;
- the ISO will have a coordinating role, working with NSPs:
 - to develop pre-established contingency response plans to accommodate all reasonably foreseeable network contingencies; and

- to manage any system emergencies brought on by unforeseen contingencies, and in most or all circumstances, NSPs will be responsible for implementing these plans or agreed actions as the ISO’s delegate; and
- perhaps, in extraordinary circumstances, issuing directions to system participants as a last resort to maintain system security, as discussed in section 5.4.8 below.

As to the first of these, each NSP will be required to ensure it has adequate capacity to meet forecast consumer requirements and performance standards, cognisant of planning criteria that account for planned and unplanned contingencies (outages) and generation configurations.⁷⁶

The Rules will include a framework for the ISO to both delegate its functions, and to authorise persons to undertake actions consistent with the ISO’s functions when necessary or appropriate.

Immunity of delegates

Subject to stakeholder feedback, the Public Utilities Office proposes that when an NSP or other person is exercising delegated or authorised ISO functions, it should have the benefit of the same immunity as the ISO does (see “Statutory protection” in section 4.4.1 above).

The Public Utilities Office seeks stakeholder feedback on the possible implications of this arrangement for existing and new contractual arrangements.

Emergencies

The ISO’s primary function will be to maintain and improve system security. As noted above in most or all circumstances, the ISO’s role will be limited to an administrative, coordinating one, and the NSPs will determine and take whatever action is necessary to respond to system emergencies. However, because the primary responsibility for system security will continue to rest with the ISO, it will be able in extraordinary circumstances to issue directions, as discussed in section 5.4.8 below.

4.4.3 ISO’s other functions

The Pilbara ISO will be given the following functions:

- Maintain and manage the whole of system model.
- Operate the Rules (within the bounds of the Administrative ISO model).
- Determine the types and quantities of FCAS and SRAS ancillary services needed in the interconnected Pilbara system, and procure those services (see section 6).
- Administer EBAS ancillary services (see section 0)
- Perform operational planning and outage coordination.
- Develop and apply an agreed operational framework as to when and how the ISO is to intervene in emergencies/contingencies (see section 5.4.8).
- Perform post-incident reviews and analysis (see section 5.4.9).

⁷⁶ Design Report, p 52; Design Consultation Paper, p 37.

- Undertake whole of system long term planning (see section 5.4.3).
- Manage participant (NSP) registration (see section 3.3.98).
- Recover Pilbara ISO function costs (see sections 3.3.4 and 8).
- Undertake compliance monitoring and reporting (see section 3.3.54).
- Facilitate dispute resolution in accordance with the Rules (see section 3.3.76)
- Reconcile of ancillary services cost allocations (see section 6).

5. Planning, scheduling and dispatch

5.1 Introduction

As discussed in Section 4, the Public Utilities Office proposes to adopt the Administrative ISO model, with the ISO's primary function being to maintain and improve system security. Responsibility for system reliability will be allocated to the NSPs.

Design Element 21⁷⁷ lists several other ISO responsibilities and activities:

- undertaking planning and outage scheduling;
- developing and managing a full interconnected Pilbara system simulation model;
- issuing dispatch instructions (i) for Ancillary Services and, (ii) to preserve or restore system security [and reliability]⁷⁸; and
- taking lead accountability for managing emergency response and post-incident investigations.

This Section describes how these aspects are proposed to be managed.

5.2 Current arrangements

5.2.1 Planning

In the context of system operation, the term 'planning' summarises the studies and related activities that power system operators typically undertake to:

- understand threats to the security of the power system; and
- identify proactive responses or 'contingency plans' to manage the threats.

The threats to system security are identified through contingency analyses which consider the capacity of the system to withstand scheduled and unplanned credible events given forecast operating conditions. Steady state and dynamic stability studies are carried out with the objective of understanding the network's response to various loading and network configuration scenarios, including the impact of various types of system faults. Dynamic and steady state power system simulation models are required to perform the studies, with the key input data being:

- facility⁷⁹ characteristics, load and energy forecasts, and outage⁸⁰ plans; and

⁷⁷ Refer to Appendix A for full list of Design Elements

⁷⁸ Design Element 21 also identifies a potential role for the ISO in providing a dispatch service, where a generator contracts with the ISO to dispatch its generators, rather than have its own operators

⁷⁹ Facilities include: distribution systems, transmission systems, generation systems, and connection points at which electricity is delivered out of a distribution system or transmission system ("load").

⁸⁰ i.e. planned outages for corrective or preventative asset management – typically for generators and network elements

- the applicable operating standards,⁸¹ technical envelope,⁸² equipment limits,⁸³ and security limits⁸⁴ or their equivalents, which together define ‘a secure system’.

The results of the system security or ‘planning’ studies are interpreted in the context of the limits which define a secure system, and which are set out in the technical rules. These primarily relate to voltage and frequency. Excursions beyond the limits require corrective action. The results of system planning can therefore be used to inform:

- scheduling, dispatch, emergency response, and post-incident investigations;
- under-frequency load shedding settings and other technical matters;⁸⁵ and
- assessment of the impact on system security of new or expanded connections of loads and generators and the network access process, including reserve capacity requirements and commissioning tests.

From an operational perspective the planning studies are typically performed with a two to three year horizon to allow time for threats to system security to be identified and risk mitigation measures to be identified and implemented proactively.

Planning in the Pilbara

In this context, system security planning as it currently occurs in the Pilbara is characterised by the following:

- planning undertaken by individual NSPs, with informal coordination of proactive contingency planning across network boundaries, based on collaboration rather than agreed, common rules;
- operating standards, technical envelopes, equipment limits, and security limits, or their equivalents, developed independently for each sub-system by the relevant NSPs;
- demand control is enacted through automatic under-frequency load shedding - the settings are determined by NSPs in accordance with the relevant frequency operating standards in the technical rules applicable to the network. NSPs are responsible for (i) proactively deciding what loads will be shed and when, and (ii) ensuring that sufficient load is ‘shed’ to achieve the required frequency response;
- development and application of system models:
 - there is no unified, whole of system model; and
 - although each NSP’s individual model is based on the best information available, this must include approximations where other Pilbara parties do not provide the necessary detailed information;

⁸¹ Frequency, time and voltage standards as defined in the technical rules

⁸² The limits for the operation of the system in each operating state

⁸³ Any limit on the operation of a facility’s equipment that is recorded in the standing data for the facility

⁸⁴ Any technical limit on the operation of the system as a whole, or a region within the system, necessary to maintain Power System Security, including both dynamic and static limits

⁸⁵ Such as protection settings

- with the exception of some long-term planning, including scenario analysis, for the coastal parts of the network by Horizon Power, network and generation development across the interconnected Pilbara system is typically not coordinated across the whole interconnected Pilbara system, and follows the specific requirements of competitive organisations;
- informal approaches to outage management and reserve capacity management;⁸⁶ and
- ancillary services management led by Horizon Power on behalf of the system as a whole, including procurement, dispatch, and settlement services.

5.2.2 Reserve capacity

Reserve capacity is the rated capacity of a generator. In aggregate, the reserve capacity in the interconnected Pilbara system is a measure of the installed generation capacity on the system. Sufficient installed generation capacity is required to deal with credible unplanned generation outages. Insufficient reserve capacity puts system security at risk and, if risks manifest, extensive load shedding and possibly system blackouts may occur for extended periods. 'Sufficiency' is defined in terms of a 'reserve capacity margin' or 'reserve capacity standard' which in turn is set by balancing the cost of reserve capacity versus the risk of not having enough.

The reserve capacity 'margin' is the difference between the aggregate installed capacity and the forecast maximum load at any time. In the interconnected Pilbara system this is an outcome of the individual bilateral supply arrangements in the interconnected Pilbara system. The amount of reserve capacity provided for in any supply arrangement is determined by the relevant generator or NSP.

5.2.3 Scheduling

Scheduling refers to planning functions in the 'two weeks ahead' window in which outages and ancillary services are scheduled. Scheduling accounts for changes to demand and energy forecasts, revised planned outages, and unplanned outages in identifying proactively any threats to system security and necessary responses.

Scheduling activities involve refinement of activities in the short-term planning horizon, which is typically from a few days to a few hours in advance. This includes progressive refinement of outage plans, including opportunistic maintenance to proactively manage foreseeable threats to the security of respective sub-systems. This may involve cancelling/deferring planned outages.

Foreseeable threats include, by way of example:

- coincident planned outages; and
- a planned outage of significant duration and limited recall capacity at a time when there is an elevated risk of unplanned contingency events.

⁸⁶ Based on feedback from current Pilbara NSPs, there is currently 'sufficient' reserve capacity across the system and in sub-systems

Previously ‘approved’ scheduled outages may need to be cancelled within the scheduling phase.

Scheduling in the Pilbara

In the Pilbara, at present:

- there are no formal arrangements for sharing outage plans between NSPs and, even if plans are shared, NSPs are not empowered to approve or reject planned outages if there is a perceived risk to system security. However, NSPs can and do collaborate to agree mitigation measures;
- Horizon Power undertakes a coordination role for the whole of the interconnected Pilbara system, ensuring that any known or likely changes to load forecasts, generation availability, or transmission network element availability are accounted for, leading to progressive refinement of ancillary services requirements and arrangements; and
- each NSP uses its own system simulation models for daily constraint analysis and management.

5.2.4 Dispatch

Dispatch refers to the issuing of instructions to generators and loads, to balance electricity supply and demand in real time.

Dispatch in the Pilbara

The Pilbara does not have a wholesale electricity market - each generator self-dispatches in real time to meet its contractual obligations, or it contracts with another operator to do so on its behalf. The real-time responsibilities of NSPs in the interconnected Pilbara system, managing their own sub-systems, include:

- generation dispatch, which could be one or more of:
 - dispatch of its own generators;⁸⁷
 - directed dispatch where a NSP is contracted to control certain generators owned by others, responding to the requirements of bilateral supply agreements with the respective load(s); and
 - directed dispatch in the case of emergencies, where the NSP will instruct generators connected to its network to change their output with the objective of restoring or maintaining system security;
- ancillary services dispatch:
 - Horizon Power takes a whole-of-system perspective, contracting for frequency control ancillary services; and

⁸⁷ For example, a mining company that owns and operates network and generator facilities will operate the assets to supply power as required to meet its organisation’s requirements, taking into account security, reliability, and performance standards in the process

- individual generators manage their own resources to provide spinning reserve, energy balancing, and reserve capacity to the extent they determine appropriate for their supply obligations;
- contingency management – either independently of other NSPs, when the impact is localised, or if the impact is wider, it will involve other NSPs as required; and
- logging and reporting.

5.2.5 Emergency response

There is no common set of security standards in the Pilbara to establish a single definition of “emergency”, so the expression has a somewhat subjective meaning.

In practice, Pilbara operators currently defer to Horizon Power to coordinate emergencies that threaten whole-of-interconnected-Pilbara-system security. The operators have established informal communications protocols for emergency situations and work cooperatively to restore the system to a secure operating state, following Horizon Power’s dispatch instructions.⁸⁸

5.2.6 Post-incident investigation

The key purpose of post-incident analysis is to understand the sequence of events and decisions that led to a system incident to provide the basis for improvement to systems, procedures, training, etc. System incidents worthy of such analysis typically have a material commercial impact on one or more participants and there can be a reluctance on the part of some parties to the incident to fully disclose information due to legal- and/or insurance-related risk concerns.

For the Pilbara, in the absence of governing Rules, there are no obligations to participate in reviews or to provide data logs and other relevant information other than through legal discovery. Consequently, Pilbara post-incident investigations are undertaken informally, and the assessments and outcomes are somewhat constrained by the extent to which information is shared.

5.3 Design considerations

5.3.1 Defining operating states

Three approaches to defining operating states were considered. The advantages and disadvantages of each approach are identified in the table below.

Table 5.1 Analysis of operating state framework

Framework option	Advantages	Disadvantages
1. WEM Rules Normal Operating State High Risk Operating State Emergency Operating State	Established framework used in the SWIS since 2004 Familiar to AEMO	Some ambiguities (e.g. what is ‘significant’) Not aligned with the ‘national’ framework

⁸⁸ Unless there is a threat to safety or the risk of material damage to plant in doing so.

	Familiar to some Pilbara participants Many clauses can be adopted or adapted (mostly via deletion of non-applicable elements)	
2. National Electricity Rules Satisfactory Operating State Reliable Operating State	Established framework used in the NEM Less ambiguity in the definitions than the WEM framework Consistency with the rest of Australia Familiar to AEMO and at least some Pilbara participants	The National Electricity Rules are tightly interwoven with the wholesale NEM. Unravelling them from this origin would be more complex than adapting the WEM Rules
3. Bespoke	Opportunity to develop a tailored approach for the Pilbara	Would not have been subject to many years of experience by any operators or other participants in the Pilbara, so some implementation and operational risk Higher training impost Possibly higher system development costs

The Rules will define operating states in accordance with Option1.

5.3.2 Responsibility for Short Term Projected Assessment of System Adequacy (Short Term PASA or ST PASA)

Two approaches were considered for assigning responsibility for scheduling activities, which the WEM Rules call ‘Short Term PASA’:⁸⁹

- Option 1: the ISO undertakes all the fine tuning of ancillary services provisions, outage management, and other proactive measures to keep the system in the Normal Operating State in accordance with the Short Term PASA clause; or
- Option 2: NSPs have the responsibility for their own ‘sub-systems’, as they do currently.

Only Option 2 is compatible with the Administrative ISO model, proposed under Section 4, because Option 1 would require near-real time and real-time activities. There is no halfway house – either the ISO is established with all the resources, including personnel, SCADA data, and systems that it requires to operate in near real time, or it is not.

The downside to Option 2 is that there will be no whole-of-system management by the ISO of the planning/scheduling a week in advance. This is manageable with the appropriate power system operating procedures (or their equivalent) in place – which the ISO will take a lead role in developing (see section 5.4.8 below).

⁸⁹ WEM Rules section 3.17

5.3.3 Reserve capacity

One of the opportunities for improving the overall operating cost to existing and prospective participants in the Pilbara identified in previous reports on the Pilbara interconnected system was to reduce the level of reserve capacity in the interconnected Pilbara system. Provision of a reserve capacity ancillary service by the ISO has been identified as a means to achieve more efficient levels of reserve capacity.

Three options for the ISO’s role in managing reserve capacity in the interconnected Pilbara system have been considered, with the pros and cons of each approach identified in the table below.

Table 5.2 Analysis of reserve capacity options

Option	Advantages	Disadvantages
1. Reserve Capacity Mechanism	Established framework in the WEM	Complex and expensive to administer Relatively high reserve capacity payments (for capacity credits)
2. Reserve Capacity Ancillary Service	ISO managed service provides independence and assurance Opportunity to reduce overall reserve capacity in the interconnected Pilbara system over time	Requires some form of reserve capacity mechanism including (ideally) a competitive procurement process
3. ISO governance of reserve capacity	Low cost ISO oversight role Relatively simple access rule requiring load curtailment in the event of inadequate reserve capacity in new load connections	Limited opportunity for reducing the amount and the effective cost of providing reserve capacity in the interconnected Pilbara system

The Public Utilities Office prefers the third option because it represents the lowest cost approach on establishment of the ISO given the context of sufficient reserve capacity in the interconnected Pilbara system for the foreseeable future.

Therefore, a reserve capacity ancillary service is not proposed for the Pilbara. Nonetheless, sufficient reserve capacity is necessary for managing system security. Three factors will help ensure there is sufficient reserve capacity in the interconnected Pilbara system:

- the aggregate effect of the requirements of the electricity supply arrangements in the interconnected Pilbara system between generators and loads – these arrangements are expected to require a certain amount of reserve capacity to provide the necessary supply reliability;

- NSPs having oversight to ensure that generators have adequate reserve capacity to fulfil their supply obligations;⁹⁰ and
- the ISO monitoring and reporting on interconnected Pilbara system reserve capacity.

In Design Element 22, reserve capacity management was proposed as an ancillary service to be managed by the ISO. Subsequent consultation with key stakeholders has resulted in a decision to not provide a reserve capacity ancillary service. The collective view of NSPs is that there is currently ‘sufficient’ reserve capacity allowing for credible contingencies (such as the unplanned outage of the largest generating unit). However, there is no formalised, agreed reserve capacity margin or ‘standard’ by which sufficiency is measured. Instead, of an ancillary service, reserve capacity monitoring and reporting has been included as an aspect of network development coordination, as discussed in Section 7.

5.3.4 Emergency response

As noted in section 4.3.3, NSPs will largely (as now) be responsible for managing the stability of their own networks. However, the ISO’s primary function is to maintain and improve system security and, in light of this role, it cannot be expected to adopt a wholly ‘hands off’ approach in all circumstances.

That said, in addition to the policy position that the existing operational status quo be preserved so far as possible, the ISO’s ability to intervene will be limited by the practical reality that the ISO will not have real-time visibility of the system operating state.

In this respect, adopting the Administrative ISO model requires a departure from the position described in Design Element 21 in the Design Report, which proposed that the ISO “have lead accountability for managing emergency response”.

As AEMO observed, under the Administrative ISO model:

Network operators will remain responsible for maintaining their generation and load balance and will retain responsibility for their own operations. As there are multiple interconnected networks in the NWIS, an issue within one network can potentially affect another. The NWIS ISO will therefore need to intervene to direct a participant to act in a specified way where power system security is threatened e.g. as a consequence of a contingency event or an emergency.

An operational framework is necessary to codify when and how the NWIS ISO may intervene in participants’ day-to-day operations to carry out its responsibilities under its key function to maintain power system security. The framework will also prescribe how and when the NWIS ISO may authorise another relevant party (such as a network operator) to fulfil some of its responsibilities, where necessary or appropriate.⁹¹

The Public Utilities Office proposes in section 5.4.8 that the ISO have power to issue directions to NSPs to deal with emergency situations, especially situations not covered by an established protocol, the fine details of which remain to be established.

⁹⁰ The Generator’s installed capacity may be supplemented by other provisions that the Generator has made for reserve capacity, for example by contracting with another generator for back-up capacity

⁹¹ AEMO Final Report, section 3.1.6, p 16.

5.4 Proposed arrangements

5.4.1 Operating Standards and Security Limits

In WEM Rules Chapter 3, Operating Standards and the Technical Envelope, Security and Equipment Limits collectively define a secure system (i.e. if the system is operated within these limits/standards, the system is assumed to be secure).

The Rules will refer to the frequency, time limits, and voltage standards currently defined in the various versions of the technical rules used in the Pilbara to define the equivalent of the Operating Standards. With manageable exceptions, the standards are aligned across the various versions and they will be harmonised as necessary and embedded in the Rules. Equipment Limits will be defined for each facility in the interconnected Pilbara system and managed by the ISO as standing data for the purpose of system modelling and planning. A Security Limit and a Technical Envelope will be established for the interconnected Pilbara system and will be managed by the ISO.

The ISO will be required to develop a power system operating procedure (or its equivalent)⁹² which documents the process it will follow to determine, maintain, and modify the Equipment Limit, Security Limit, and Technical Envelope. NSPs will be required to ensure that the system is operated in accordance with this *power system operating procedure* (PSOP) and, therefore, within the Technical Envelope.

5.4.2 Operating States

The operating states provide a framework for the planning, scheduling, and dispatch responsibilities of the ISO and NSPs. The Rules will define three ‘operating states’, drawing on the WEM Rules,⁹³ as described in the table below.

Table 5.3 Operating state definitions

Operating state	Definition
Normal Operating State	There are no violations of Security Limits, Equipment Limits, Operating Standards, or the Technical Envelope, and there are adequate Ancillary Services
High Risk Operating State	There are or are likely to be minor violations of the Security Limits, Equipment Limits, Operating Standards, or the Technical Envelope, and a range of other risks to system security ⁹⁴
Emergency Operating State	When there are or are likely to be significant violations of the Security Limits, Equipment Limits, Operating Standards, or the Technical Envelope, and a range of other risks to system security. ⁹⁵

⁹² The intention is for power system operating procedures or their equivalent to be subject to a formal change process which will include consultation with key stakeholders

⁹³ WEM Rules clauses 3.3 (Normal Operating State), 3.4 (High Risk Operating State), and 3.5 (Emergency Operating State).

⁹⁴ Including, for example, fuel shortages, SCADA system degradation, inadequate Ancillary Services

⁹⁵ Including, for example, significant generation shortfall, significant involuntary load shedding, significant SCADA system failure

5.4.3 Planning

The ISO will have the overarching responsibility to proactively identify scenarios which may cause the network to be in a High Risk or Emergency Operating State. It must communicate these scenarios to NSPs.

Medium Term PASA (Projected Assessment of System Adequacy)

The ISO will be responsible for long term planning, which is an input to the proposed Integrated System Plan,⁹⁶ and for medium term planning. For the latter, the Rules will be based on the requirements of WEM Rules clause 3.16, which describes the Medium-Term Projected Assessment of System Adequacy (MT PASA). The key aspects of MT PASA that will be adopted for the Rules include:

- The ISO will establish and develop a whole-of-system model.
- The ISO will be empowered to obtain certain information/data from NSPs relevant to its system modelling and system studies;
- The results of the system studies will help the ISO to plan for the secure operation of the system, with reference to the Operating Standards and the other technical limits that collectively help define the three operating states. The key activities involve:
 - setting Ancillary Services Requirements over the three-year time horizon, progressively refining the requirement through to two weeks in advance, and negotiating appropriate Ancillary Services contracts;
 - assist with outage planning – discussed below; and
 - monitoring the level of Reserve Capacity in the system and in sub-systems. – which is discussed further in section 5.4.4;
- NSPs will be required to provide the information the ISO requests and any other relevant data;
- The ISO will be required to publish information developed from the MT PASA studies for each period in the planning horizon;⁹⁷and
- The ISO will be required to document the procedure it follows in conducting MT PASA studies in a power system operating procedure (or its equivalent).

⁹⁶ Discussed in Section 7

⁹⁷ The published information is likely to include aggregate peak load forecasts, forecast available generation capacity, any weeks in which there is expected to be a shortfall of capacity, planned transmission outages, fuel related constraints, and approved Commissioning Tests

In accordance with Design Elements 10 and 13, when evaluating access applications (see separate consultation paper concerning the light handed access regime), the ISO will need to take into account constraints to new or expanded generators in its system modelling and analysis and in its MT PASA procedures. The MT PASA process will identify scenarios in which credible contingency events will jeopardise the capacity of the system to remain in the Normal Operating State. Depending on the nature of the constraints and the access arrangements for individual generators, one or more generators may need to be constrained-off proactively for a period of time.⁹⁸ As discussed below, the ISO will delegate the dispatch function, including managing constrained dispatch, to NSPs.

Confidential information

The Rules will deal with the confidentiality of Participants' information. The implementation stage will include further consultation and fine tuning of the rules around confidential and commercially sensitive information, to balance the need on one hand to protect this information against disclosure (either explicitly or by enabling de-compilation of aggregated or anonymised data), and on the other hand to build and share effective and accurate models.

Outage management

Outage management provisions in the WEM Rules clauses 3.18-3.21 will be adapted for the interconnected Pilbara system. The ISO will:

- compile, publish and maintain a list of all the equipment on the interconnected Pilbara system that is required to be subject to outage scheduling;
- consider Outage Plans⁹⁹ identifying any potential impact of a proposed Outage Plan(s)¹⁰⁰ on other networks, and on whole-of-system security, using a risk assessment process;¹⁰¹
- if necessary, request the relevant NSP(s) to coordinate the timing of the Scheduled Outage(s) to minimise the impact, and to revise the Outage Plan(s) - the ISO will provide sufficient information to allow the NSP(s) to undertake informed negotiations, including the basis of its risk assessment;
- following submission of the revised Outage Plan(s), formally notify the relevant NSP(s) that the revised Outage Plan(s) is either:
 - satisfactorily modified and is authorised to proceed; or
 - not authorised to proceed if there is failure to reach agreement on actions to satisfactorily mitigate the risk arising from the Outage Plan(s) - the ISO will be required to give the reasons for its decision; and
- compile and maintain an Outage Schedule containing information of all Scheduled Outages, where the Scheduled Outages are the ISO-approved outages.

⁹⁸ That is, as an alternative to allowing the system to enter a High Risk Operating State, and/or increasing ancillary services provisions which entails additional operating costs

⁹⁹ An Outage Plan is a formally submitted outage request by a NSP and which may be for a network element, a generator or a load within its network

¹⁰⁰ Noting that a two or more NSPs may submit outage plans that, when considered together, may pose a risk to system security

¹⁰¹ Criteria re provided in WEM Rules cl3.18.11, which may be adapted for the Pilbara.

NSPs will have recourse to a dispute resolution mechanism. NSPs will be required to submit Outage Plans to the ISO for facilities in their networks, including planned outages of network elements, generators or loads greater than a certain limit.¹⁰²

Specifically, NSPs will be required to:

- register their Outage Plans with the ISO one to three years in advance of the proposed outage to give time for the ISO to identify issues. Outage Plans may be submitted up to two weeks in advance of the proposed outage time, however:
 - this may not provide sufficient time for due diligence and negotiation with any other relevant NSPs and/or the ISO; and
 - unless the Pilbara electricity objective or power system security require different prioritisation, priority will be given to Outage Plans that were submitted one to three years in advance in the order in which they were received if there is a conflict;
- provide the information required by the ISO;
- negotiate in good faith to mitigate risk, if required; and
- advise the ISO of its revised Outage Plans, if any.¹⁰³

The benefit of the proposed approach is that the ISO will be responsible for providing independent governance of outage management which should help ensure that the risk of unacceptable impacts of proposed planned outages to other networks or the system as a whole are adequately mitigated.

NSPs will be authorised to proceed with Opportunistic Maintenance¹⁰⁴ within their networks at their own discretion and risk on the understanding that the outage is to allow minor maintenance to occur.¹⁰⁵

5.4.4 Reserve capacity

The following will be included in the Rules:

- an obligation on the ISO to develop Reserve Capacity Standards¹⁰⁶ for the interconnected Pilbara system – these will determine the amount of reserve capacity required for system security;
- an obligation on the ISO to publish its assessment of the adequacy of system reserve capacity – this is proposed to be an aspect of the proposed Integrated System Plan, discussed below; and
- an obligation on NSPs to provide the necessary information about prospective new or expanded electricity supply arrangements to the ISO.

¹⁰² Which is yet to be determined, but as a guide, is 10MW in the WEM Rules

¹⁰³ Outage Plans may be revised by the relevant NSP due to its own circumstances or as a result of ISO-initiated negotiations to mitigate the risk of intolerable impacts should the outage(s) proceed as planned

¹⁰⁴ Minor maintenance – which may include generator maintenance

¹⁰⁵ The WEM Rules provide for a formal process for requesting an outage of a facility that is not subject to a Scheduled Outage for the purposes of Opportunistic Maintenance, but feedback from stakeholders is that the relevant NSPs should be empowered to decide when it is prudent to proceed (i.e. without referral to the NSP; this is also consistent with the Administrative Model proposed for the ISO and Design Element 33

¹⁰⁶ Horizon Power, as the de facto system manager has developed a reserve capacity standard which can be the starting point for the ISO's determination

5.4.5 Demand control

Two design options were considered for the processes governing demand control in the interconnected Pilbara system:

- Option 1: adopt the requirements of WEM Rules clause 3.6, which would require:
 - the ISO to determine under-frequency load shedding (UFLS) requirements for the whole system, develop operational plans to implement them (taking into account sensitive loads, rotational load shedding, and manual load shedding) and assure that the NSPs implement its requirements; and
 - NSPs to implement the ISO's plans with the 'freedom' to select which loads in each frequency bands will be shed to comply with the load shedding targets.
- Option 2: as for option 1, but with the role of managing for sensitive loads and rotational load shedding delegated to the NSPs, and no manual load shedding.

Option 2 was selected because it assigns the responsibility for the various activities with the entity best able to manage them. The ISO will have overall accountability to ensure that the NSPs have acceptable UFLS arrangements from a system perspective.

5.4.6 Scheduling

Design Element 21 envisioned that the ISO would be responsible for planning and scheduling and issuing limited dispatch instructions, to preserve or restore system security or as otherwise contracted to do so by a NSP or generator.

As noted in section 5.3.2, in the context of the proposed Administrative ISO model, the Public Utilities Office proposes that NSPs continue to undertake scheduling activities for their respective sub-systems.

The added complexity with the proposed Pilbara networks access regime is that NSPs will need to account for the effect of generators that have network access on a constrained basis. NSPs will need to schedule in accordance with any constraint arrangements determined by the ISO, who in turn will need to take into account constrained access provisions for such connections. The mechanisms for managing constrained access have yet to be developed.

By the time NSPs begin ST PASA forecasting, the ISO will have (i) largely completed its outage management duties, and (ii) set the Ancillary Services requirements based on the information provided by Participants and its own system studies as part of the MT PASA activities.

Each NSP will decide what the nature of the scheduling/planning activities (if any) it requires to undertake during the 2-week scheduling period. The NSP will:

- manage planned outages:
 - accounting for any new foreseeable threats to the security of their individual sub-systems by monitoring and, if necessary, cancelling/deferring planned outages on their sub-systems; and
 - advising the ISO of any changes to its Scheduled Outage(s);

- undertake daily constraint analysis and management, advising the ISO of any matters which may have a material impact on system security; and
- be required to advise the ISO of any changes to their Scheduled Outage and any other matters that arise in the scheduling phase that may impact system security or other networks.

If, based on the information provided, a NSP determines that the system or its sub-system is at risk of being in a High Risk or Emergency Operating State, it will be required to act according to the agreed procedures and protocols established by the ISO to preserve system security. This will include managing constrained dispatch. The power system operating procedure (or its equivalent) will be developed before the Rules commence.

Through the power system operating procedure, the ISO will be delegating to each NSP its responsibility for managing power system security during the scheduling horizon. The NSPs will be empowered under the Rules to undertake actions during the scheduling horizon to preserve system security in accordance with the operating procedures.

5.4.7 Dispatch

The ISO will not be involved in real-time activities, including dispatch, other than to undertake system simulation studies at the request of a NSP.¹⁰⁷

NSPs will be responsible for managing dispatch, with the authority to issue dispatch instructions, or their equivalent, to prevent the system from entering the High Risk Operating State or Emergency Operating State or to restore the system to the Normal Operating State. NSPs will need to manage any changes to scheduling and dispatch resulting from constraints to new or expanded generators, in accordance with the Rules, managing constrained dispatch as required. The mechanisms for managing constrained access have yet to be developed.

Otherwise, unless they have other arrangements in place (e.g. a contract with the NSP) generators will self-dispatch as they see fit to comply with their supply obligations, including any Ancillary Service Contracts they may have with the ISO.

5.4.8 Emergency response

Under the Administrative Model, the ISO will not have access to real-time information¹⁰⁸ and will not be directly involved in real-time emergency response. However, the ISO remains responsible for ensuring that procedures are in place for emergencies to be effectively managed. It will do this by:

- delegating its powers to the NSP which is responsible for the sub-system in which the emergency is initiated;

¹⁰⁷ The proposed Administrative ISO Model includes access to power system planning resources during the week

¹⁰⁸ For example, it will not receive SCADA data from participants

- working with NSPs to develop detailed contingency/emergency operating protocols (power system operating procedures) to apply during system emergencies. The procedures will be based on contingency analysis undertaken as part of the ISO's planning function – the intention is that all credible foreseeable contingencies will be covered by pre-established emergency protocols;
- developing power system operating procedures that will guide the emergency response activities of the 'lead' NSP and the others, in order to avoid any need for the ISO to act directly. The procedures are likely to be largely based on the informal protocols currently used in the Pilbara, which include cooperation and coordination between NSPs; and
- working with NSPs to provide a coordinated response to system emergencies, including any which are not covered by a pre-established protocol, or if the Minister exercises emergency powers under the *Energy Operators (Powers) Act 1979* or any emergency provisions in other legislation.

Operating framework and protocols in action

The proposed Administrative ISO model requires an operating framework to determine when and how the ISO may intervene to manage contingencies and emergencies to ensure power system security is maintained, and when (which will be almost always) this task is left to the NSPs. Because under this model the ISO will not have real-time visibility, more detailed operating protocols will be required.

The contingency and emergency events for which protocols will be developed are those events that have occurred historically or are otherwise readily identifiable. For many of these events, NSPs will already have operating protocols in place to manage that event. The ISO will leverage existing operating protocols and input from all NSPs to ensure new fit-for-purpose Pilbara operating protocols are developed with full technical and operational understanding of an event. The outcome will be a set of formalised and enforceable Pilbara operating protocols that will prescribe role responsibilities and impose obligations onto all relevant parties i.e. usually NSPs, under the Administrative ISO model.

Where a Pilbara operational protocol exists for an event and the event manifests, the post-incident review will assess the use and effectiveness of the Pilbara operating protocol to enable continuous improvement.

Where an event occurs and there is no formal operating protocol for the event, then the Rules will provide guidance to manage the event and maintain or restore power system security. The post-incident review process (section 5.4.9), will determine whether a new or modified Pilbara operating protocol for such an event is required, and if required, the Rules will require the ISO to develop one in collaboration with NSPs.

In the event of a large system event, such as a cyclone or system black, the ISO would perform a coordination role. This will provide centralised oversight to ensure the system is managed/recovered in a coordinated manner.

ISO directions in extraordinary circumstances

The Public Utilities Office proposes that the ISO has power to issue directions to NSPs to deal with emergency situations, especially situations not covered by an established protocol. This is expected to be used only in extraordinary circumstances, when the interconnected Pilbara system is facing a low probability high consequence event which was not adequately anticipated by pre-established protocols. The exact scope of this power, the limited circumstances in which it may be used, and protocols around its use, will be developed in consultation with stakeholders during the implementation phase.

The Rules will also enable the ISO to delegate its functions, and to authorise selected persons to take certain actions, when necessary, including in emergencies.

5.4.9 Post-incident investigations

The ISO will have the responsibility for coordinating post-incident investigations. This process will be based on the provisions in WEM Rules clause 3.8. Consistent with the Administrative ISO model, most of the actual technical investigation will be undertaken by the NSPs, with modelling support from the ISO if required.

The ISO will investigate and report on any incidents in the operation of the equipment comprising the interconnected Pilbara system that it considers either (i) endangered power system security to a significant extent, or (ii) had the potential to have a significant impact on power system security. This will include any situation in which the interconnected Pilbara system entered an emergency operating state, and any incident in which a contingency arose which was not covered by a pre-established operating protocol.

The objective of the incident investigations is to identify root cause issues and recommend corrective action, which may include changes to the Rules, changes to its own procedures or the pre-established contingency operating protocols, or improvements within sub-system operations. The ISO will be responsible for progressing the recommendations through the designated rule change processes.

The investigation will also identify any situations in which an NSP's other contractual obligations prevented the NSP from complying with any pre-established protocol or (if the circumstances ever arise for a direction to be given) any direction issued by the ISO. Investigation reports will be published, and will also be provided to the Minister in the ISO's annual report (section 3.3.54).¹⁰⁹

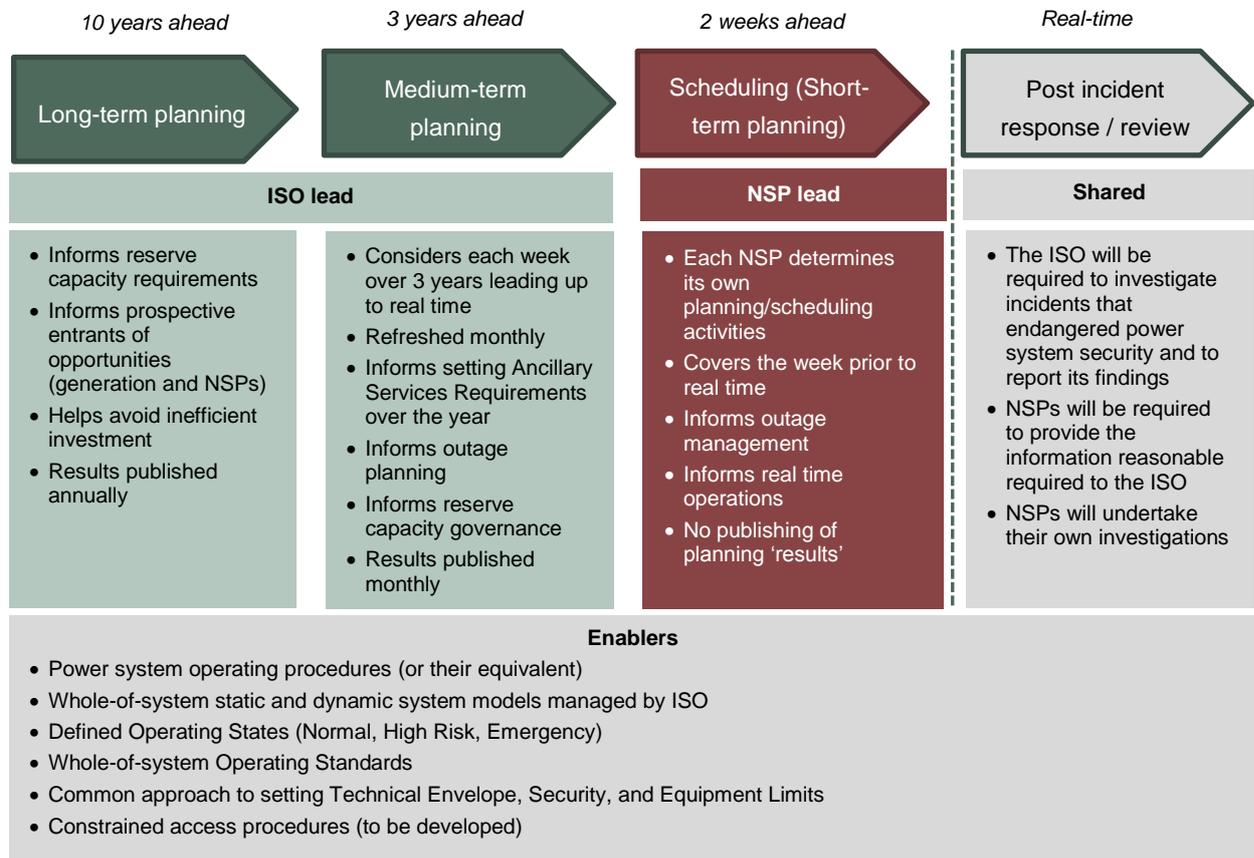
The ISO will need to be empowered to require NSPs to provide data and information to assist it with its investigations. NSPs will be able to identify confidential and commercially sensitive information. As noted above, during the implementation phase the rules around confidential and commercially sensitive information will be fine-tuned, to balance system participants' interests against the need to adequately learn from incidents and to develop new rules, procedures and protocols.

¹⁰⁹ AEMO Final Report, s5.3, p 31.

5.4.10 Summary

Figure 5.1 summarises the proposed responsibilities in the planning, scheduling, and dispatch horizons and for post-incident investigations. Long-term planning is discussed in section 7.

Figure 5.1 Planning, scheduling and post-incident responsibilities



The diagram shows that in addition to the single whole-of-system static and dynamic model of the interconnected Pilbara system, the Rules will provide a harmonised approach to managing system security. Real time system management, including emergency response in almost all circumstances, will be provided by NSPs. Where the ISO delegates its authority to NSPs, it will do so through power system procedures and/or protocols which will be developed in advance of the new regulatory regime commencement. The ISO will also develop and manage power system operating procedures (or their equivalent) for the long-term and medium-term planning activities and for post-incident investigations.

6. Ancillary Services

6.1 Introduction

As discussed in Section 4, the Public Utilities Office proposes to adopt the Administrative ISO model, with the ISO's primary function being to maintain and improve system security.

Design Element 22 confers the role of procuring and allocating the costs of ancillary services to the ISO.

This section outlines each of the elements of the ancillary services framework that will form part of the Rules, namely (i) types of ancillary services, (ii) the ancillary service procedures document, (iii) ancillary service standards, (iv) procurement, and (v) cost recovery. Additional support services to be provided for in the Rules are also discussed.

6.2 Current arrangements

Horizon Power, as the de facto system operator, currently manages ancillary services in the interconnected Pilbara system on behalf of all loads, generators, and NSPs to help ensure power system security under the various NSPs' technical rules. Horizon Power does this collaboratively with other Pilbara users, and has entered into several ancillary services contracts for that purpose.

6.3 Design considerations

6.3.1 Pilbara electricity objective should apply

The Public Utilities Office considers that the Pilbara electricity objective¹¹⁰ can guide the ISO to procure optimal types and volumes of ancillary services at efficient prices, and to allocate the cost of doing so in an equitable manner.

6.3.2 Ancillary services standards should be flexible

The ancillary services requirement amounts will be calculated based on the ancillary service standards to be developed by the ISO.

Stakeholders suggested that Horizon Power's current ancillary services standards should be reviewed against the system model before the ISO implements them for the Pilbara. As a result, the Rules will only provide for the ISO to develop the ancillary service standards; they will not be hard-coded into the Rules.

6.3.3 Definition: Electricity Supply Arrangements

The term *Electricity Supply Arrangement (ESA)* means:

An arrangement (contractual arrangement or otherwise) by which a generator connected to a network supplies electricity to a load connected to a network.

¹¹⁰ Design Element 19 in the Design Report states this as: 'To promote efficient investment in, and efficient operation and use of, electricity services for the long-term interests of consumers of electricity with respect to price, quality, safety, reliability, and security of supply of electricity; and the reliability, safety and security of the Pilbara.'

Relevantly, the ESAs concerned are those in the *interconnected Pilbara system*.

The term ESA applies to a range of supply arrangements – including bilateral contracts and self-supply arrangements.

6.3.4 Assumption: ESAs aim for zero imbalances

Current practice in the Pilbara is for the parties to each ESA to aim to keep their imbalances as close to zero as possible. The proposed treatment of ancillary services adopts this principle.

6.3.5 Role of ancillary services

Ancillary services are procured to meet the interconnected Pilbara system’s requirements for *power system security*; i.e. the power system’s ability to withstand sudden disturbances, including the failure of generation, transmission and distribution equipment and secondary equipment.¹¹¹

6.3.6 Frequency Control Ancillary Service (FCAS)

Frequency Control Ancillary Service (FCAS) is:

an online reserve of electrical generation capable of responding immediately to small changes in system frequency in real time.

In a relatively small system like the interconnected Pilbara system, the interaction of multiple FCAS providers may lead to system instability. Therefore, there can be only one FCAS provider at a time – except during an islanding/network congestion event, when each island/separated sub-network should have its own FCAS provider.

The FCAS provider will provide automatic frequency response to keep the frequency within the frequency tolerance band.

Table 6.1 Design requirements of FCAS

Ancillary service	Description
Components	FCAS consists of: <ul style="list-style-type: none"> • <i>FCAS Up</i> – a service involving rapid increase in generation of electricity when the frequency drops below 50 Hz; and • <i>FCAS Down</i> - a service involving rapid withdrawal of electricity generation when the frequency increases above 50 Hz.
<i>Ancillary service standard</i>	The ancillary service standard for FCAS will be defined by the ISO in its ancillary service procedure document.
Procurement arrangements	Arrangements to procure to meet the <i>FCAS ancillary services requirement</i> .
Cost recovery	Specific requirements for cost recovery of FCAS include:

¹¹¹ This is different from *power system reliability* which relates to the *power system* having adequate generation and transmission capacities to meet the electricity demand.

	<ul style="list-style-type: none"> • The FCAS monthly payment for a settlement month will be recoverable from all loads whose maximum load swing has exceeded 10 MW¹¹² during the relevant allocation calculation period. • Where an FCAS monthly payment is only applicable for a sub-network, only the loads in that sub-network are liable to pay for the FCAS monthly payments. • An FCAS monthly payment is recovered from a load based on its load swing within the allocation calculation period relative to the sum of all load swings within the same allocation calculation period for the loads that are liable to pay for the FCAS monthly payment under the relevant FCAS agreements.
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6.3.7 Spinning Reserve Ancillary Service

Spinning Reserve Ancillary Service (SRAS) is:

an online reserve of electrical generation capacity capable of responding when frequency drops below the lower bound of the frequency tolerance band due to a credible contingency event in the interconnected Pilbara system power system.

Table 6.2 Design requirements of SRAS

Ancillary service	Description
Components	SRAS is provided as a single component
Ancillary service standard	The ancillary service standard for SRAS will be defined by the ISO in its ancillary service procedure document.
Procurement arrangements	<p>The ISO should procure sufficient capacity to meet the ancillary services requirement for SRAS net of the following:</p> <ul style="list-style-type: none"> • generators' FCAS Up capacity (because the FCAS Up capacity can be used for providing a 'first tranche' of SRAS); and • Any spare online capacity available¹¹³ that can be used for providing SRAS.
Cost recovery	<p>Specific requirements for cost recovery of FCAS include:</p> <ul style="list-style-type: none"> • The cost is to be recovered from the causer of the need for SRAS using the following formula: Cost recovery from the causer = Proportion x SRAS Monthly Payment • Proportion is to be set using the airport runway principle, under which: <ul style="list-style-type: none"> ○ Each of the generators in the interconnected Pilbara system will be grouped into Entities based on the common responsible person for the generators (for example, Rio Tinto is the Entity responsible for its generators); ○ The contingency exposures for all Entities for a settlement month will be determined. ○ The Entities' net contingency exposures will be determined. • Proportion for an Entity will be set on the following basis:

¹¹² The WEM Rules generally use 10 MW as a threshold for exemption. The Public Utilities Office uses this as a guide for setting the threshold for FCAS cost recovery.

¹¹³ This spare online capacity may be available due to lumpiness of generation capacities in the interconnected Pilbara system.

- Based on an Entity's share of its net contingency exposure, relative to the largest net contingency exposure during the allocation calculation period;
- To the extent there is any shared net contingency exposure, the extent of the shared exposure will be divided equally between the Entities.

It is proposed that the SRAS design operates as follows:

- there can be multiple providers of SRAS at a time (even within an island/separated subnetwork);
- under the Administrative ISO model, NSPs will instruct an SRAS provider to start a generator to provide SRAS where required;
- in deciding whether to issue this instruction, the NSP must take into account any online capacities already available (i.e. the FCAS and any spare online capacities). The NSP must also take into account the credible islanding/network congestion scenarios; and
- frequency response for a contingency event is automatic (the generated electricity is an EBAS).

6.3.8 Energy Balancing Ancillary Service

Energy Balancing Ancillary Service (EBAS) is:

an ancillary service that provides for any energy imbalance shortfalls between parties according to their ESAs. The associated balancing energy is provided from the online FCAS and SRAS capacities

ESA imbalances will naturally vary the electricity generation outputs from the online FCAS and SRAS capacities (to provide frequency response). The frequency response will be automatic using a variety of control mechanisms including droop setting or automatic generation control.

Although the EBAS is not designed to provide balancing energy as a commercial service (i.e. other than for the purpose of responding to a temporary ESA imbalance) it is inevitable that balancing energy will need to be provided by EBAS (for example, due to operational errors or measurement and control discrepancies by participants of an ESA). The EBAS payment arrangement (including the ESA Imbalance Penalty Rate) is designed to disincentivise any unnecessary ESA imbalances.

As EBAS is a by-product of FCAS and SRAS and there is no need to procure it as a specifically-dispatched service. Thus, there is no need to specifically determine the EBAS amount that the ISO needs to procure. There is however a need to reimburse the cost of any net imbalance energy.

Payments for balancing energy under the EBAS

The proposed payments for balancing under the EBAS are summarised in the table below. The settlement amounts for EBAS are to be calculated for each 15 minutes period¹¹⁴ referred to as the EBAS settlement interval.

Table 6.3 Payments for the *balancing energy* under the EBAS

Balancing energy	Provider	Payment to provider	Who pays and how much?
Generating (from the online capacity) to restore frequency back up to the frequency tolerance band	<ul style="list-style-type: none"> FCAS Up providers SRAS Providers 	Generated electricity times the administered price	Party with an ESA negative imbalance energy Payment = ESA negative imbalance energy (MWh) x [administered price + ESA imbalance penalty rate] (\$/MWh)
Withdrawing electricity (from the online capacity) to restore frequency back down to the frequency tolerance band	FCAS Down provider	No payment required to or from the provider	No charge required

Due to diversity of ESA imbalances at a point of time¹¹⁵ and the ESA imbalance penalty rate, it is likely that the ISO will over-recover the combined EBAS payments from the multiple ESAs. The over-recovered amount will be offset against the system management charge (as discussed in section 8).

The Public Utilities Office proposes that no payment is required under the circumstance of ESA positive imbalance (and provision of FCAS Down by the provider). This is because the non-payment itself is already a disincentive for an ESA positive imbalance¹¹⁶.

As part of its ancillary services procedure document, it is proposed that the ISO develops procedures to:

- maintain registration of each of the ESAs in the interconnected Pilbara system;
- describe the frequency response process;

¹¹⁴ Both 15 minute and 30 minute options were considered. During the Ancillary Services Workshop on 17 September 2018, stakeholders advised that both options are technically feasible. The 15 minutes option is recommended. This is because a shorter *EBAS settlement interval* is likely to reduce *ESA imbalances* by reducing the opportunity for inter-period balancing (i.e. using an *ESA positive imbalance* from one period to offset the *ESA negative imbalance* of another period).

¹¹⁵ For example, one ESA may be in an *ESA positive imbalance* while another ESA may be in an *ESA negative imbalance* at the same time. This may result in the net *balancing energy* generation by the *EBAS* provider, which is the net of the two *ESA imbalances*, being less than the *ESA negative imbalance* - assuming that the *ESA negative imbalance* is larger than the *ESA positive imbalance* (in absolute value term). The *EBAS* is paid based on the net *balancing energy* provided while the ESA is charged based on its *ESA negative imbalance*. Hence, the ISO over-recovers the *balancing energy* payment under this circumstance

¹¹⁶ That is, the *generator* of the *ESA* is burning more fuel than it needs to or otherwise generating the imbalance amount with no resulting revenue.

- set out the detailed settlement calculations; and
- set out the methodology for setting the administered price and ESA imbalance penalty rate. The methodology should disincentivise ESA imbalances to the maximum extent practicable.

Alternative EBAS payments arrangement

An alternative EBAS payment arrangement was also considered to make provision for ‘make-up’ or ‘carry forward’ (that is, allowing an ESA positive imbalance of an ESA settlement interval to offset a negative imbalance for another interval). In consultation with the stakeholders, the Public Utilities Office finds this to be unnecessary and less effective compared to the proposed arrangement. Without the ‘make-up’ or ‘carry forward’ provision, participants will be further incentivised to keep their ESA imbalances small.

6.3.9 FCAS and SRAS costs allocation calculation period

The Public Utilities Office considered an arrangement whereby the FCAS and SRAS cost recoveries are to be calculated every thirty minutes based on parameters occurring over that time. This arrangement is likely to require substantially more investment in developing and managing the calculation ‘engine’. The stakeholders consider the costs are likely to outweigh the benefits.

Rather than performing the FCAS and SRAS cost recovery calculations every 30 minutes, the proposed arrangement requires an annual calculation for the purposes of cost allocation. This is likely to require a substantially lower computational cost to the ISO.

To strike a balance between cost and efficient economic signals in the interconnected Pilbara system, the cost allocation for FCAS and SRAS will be determined annually, based on the average annual proportions of FCAS and SRAS incurred over the allocation calculation period. The allocation calculation period for a particular financial year is defined as the previous three financial years.

The Public Utilities Office considers the three-year sampling duration is adequate to give a representative ‘typical’ behaviour of a Pilbara user for the purpose of allocating ancillary services cost.

6.3.10 Ancillary services settlement function

Two options were considered for the ISO’s Ancillary Services settlement role:

- Option 1: the ISO’s role is limited to coordinating ancillary services settlements only – it does not undertake the settlement itself (i.e. participants to settle among themselves based on settlement calculations provided by the ISO); or
- Option 2: the ISO acts as a settlement agent.

Given that the ISO will be required to enter into the FCAS agreements and SRAS agreements with the respective providers, and pay the providers under these agreements, the Public Utilities Office considers that the ISO will need to undertake the role of a settlement agent. The Public Utilities Office therefore recommends Option 2 above.

6.3.11 Other capabilities

Additional capabilities for maintaining power system security in the interconnected Pilbara system may also be required, but through work undertaken as part of detailed design and consultation it is considered that these need not at this stage be established as comprehensively-applied Ancillary Services, to be provided by the ISO.¹¹⁷ They are as described in the table below.

Table 6.4 Additional capabilities for maintaining power system security

Ancillary service	Description
<i>System restart capability</i>	<p>In the event of a shutdown or <i>islanding</i> of the power system, there will be a need to ensure there is sufficient capability in the interconnected Pilbara system to be able to start <i>generators</i> (i.e. which are shut down) when auxiliary power is not available from the <i>power system</i>.</p> <p>The re-started <i>generator</i> will provide the required power to progressively re-start and synchronise the other <i>generators</i> in the interconnected Pilbara system. Note that all networks in the interconnected Pilbara system currently have <i>system restart capability</i>.</p> <p>If this service were to be added to the Rules at a later date, the ISO would likely be required to assess requirements for <i>system restart capability</i> and procure it if it is deemed required. The ISO would likely recover the cost from the parties that require the service. Adding system restart capability would be a rule change, implemented through the process described in section 3.3.32.</p>
Dispatch support capability	<p>The purpose of dispatch support is to give the ISO the flexibility to procure any additional types of <i>ancillary services</i> needed for maintaining <i>power system security</i> that arise over time (to the extent this is not provided for under the proposed <i>ancillary services</i>).</p> <p>Dispatch support may include, but is not limited to, voltage control, system inertia control, <i>load rejection service</i> and reactive power control, where the required service is not already provided under any <i>ancillary service</i>.</p> <p>If this service were to be added to the Rules at a later date, the ISO would likely be permitted to procure dispatch support if and when the need arises. The ISO would likely recover the cost for dispatch support in an equitable manner (to be determined at the time). Adding dispatch support capability would be a rule change, implemented through the process described in section 3.3.32.</p>

¹¹⁷ The Design Report referred to introduction of system restart services and inertia services, which have now been replaced

6.4 Proposed arrangements

6.4.1 Ancillary services procedures document

The ISO must develop an ancillary services procedures document that will contain within it, the detailed provisions to enable the ISO to manage ancillary services and, in particular under the administrative ISO model, to provide clear procedures for each of the NSPs to follow in real time. The ancillary services procedures document must:

- allow the ISO to use dynamic system studies to the maximum extent possible in a timely manner (discussed later in this document); and
- promote operational flexibility to meet the potential changing needs of the Pilbara ancillary services requirements; and
- develop the detailed procedures for setting and applying the ancillary services standards.

6.4.2 Ancillary service standard

The ISO must use the ancillary services procedures document to:

- set the ancillary services standards for FCAS and SRAS;
- apply these ancillary services standards to determine the ancillary services requirements amounts for a specific period of time. The period of time is to be set by the ISO, to balance between certainty of service provision and better responding to ancillary services requirements variations (e.g. seasonal variation).

No ancillary services standard is required for EBAS because it is a by-product of the FCAS and SRAS. However, metering and commercial arrangements for EBAS will be required.

6.4.3 Ancillary service types

In order to enable power system security to be maintained, three types of ancillary service are proposed for the Pilbara as described in the table below.

Table 6.5 Ancillary Service types

Ancillary service	Description
Frequency Control Ancillary Service (FCAS)	<p>Due to fluctuations in generation and <i>load</i> consumption, the <i>frequency</i> naturally deviates from the target level of 50 Hz. The <i>frequency</i> and time error standards for the Pilbara are defined in the Technical Rules.</p> <p>The provider of FCAS responds to keep the <i>frequency</i> within the <i>frequency tolerance band</i> by rapidly varying its generation output. The FCAS provider reserves a quantity of generation capacity online ready to provide these responses. The energy generated into, or withdrawn from, the interconnected Pilbara system under FCAS forms part of the <i>Energy Balancing Ancillary Service (EBAS)</i>.</p>

<p><i>Spinning Reserve Ancillary Service (SRAS)</i></p>	<p>System <i>frequency</i> can drop suddenly due to an instantaneous excess of <i>load</i> compared to generation as a result of certain <i>contingency events</i> (e.g. such as loss of supply from a large <i>generator</i>). This may result in the <i>frequency</i> falling below the lower bound of the <i>single contingency band</i> of the <i>frequency operating standard</i>. Under this circumstance, <i>generators</i> providing the SRAS will be required to rapidly inject electricity into the interconnected Pilbara system to arrest the <i>frequency</i> excursion and restore the <i>frequency</i> within the <i>frequency tolerance band</i> within a defined period of time. Similar to the case for FCAS, the energy generated into the interconnected Pilbara system under SRAS forms part of the EBAS.</p>
<p><i>Energy Balancing Ancillary Service (EBAS)</i></p>	<p><i>Generators</i> supply electricity to <i>loads</i> through their ESAs. An <i>ESA imbalance</i> is created to the extent that the total electricity supply ‘sent out’ from the <i>generators</i> of an <i>ESA</i> does not always equal the total <i>load</i> consumption (loss adjusted) for that <i>ESA</i>. In the absence of an energy market, <i>energy balancing</i> is required from one or more <i>generators</i> to ‘fill’ the <i>ESA imbalance</i>.</p> <p>Under the proposed EBAS arrangement, the <i>balancing energy</i> is provided by the providers of FCAS and SRAS.</p>

Under the proposed arrangement, the FCAS, SRAS and EBAS work hand-in-hand to maintain the power system security in the interconnected Pilbara system.

6.4.4 Procurement arrangements for FCAS and SRAS

The proposed arrangements for procurement of ancillary services include:

- The ancillary services procedure document will set out the processes for competitive procurement of ancillary services;
- The ISO will procure ancillary services based on the procedure;
- The ISO will enter into an ancillary services agreement to procure FCAS and SRAS from generators to meet the ancillary services requirements for a specific period of time. The requirements are set by:
 - (a) the ancillary services standards, and
 - (b) credible islanding/network congestion scenarios;
- The ancillary services agreement will specify a monthly (or other periodic) fixed payment from the ISO to each FCAS and SRAS provider.

Cost recovery mechanisms

The ancillary services procedures document will detail a cost recovery procedure for ancillary services as follows:

- The ISO will recover the cost and pay it to the ancillary services providers;
- The procedure will set out formulas for determining and allocating costs and payments on a periodic basis; and
- Cost recovery for FCAS and SRAS will be calculated using the allocation calculation period (to be discussed in later in this consultation paper).

Cost recovery provisions specific to each of the ancillary services are detailed in section 6.3.

6.4.5 Supporting provisions

Other aspects that may be required to support power system security are discussed in the sections below.

Dynamic system studies

In order to allow the Pilbara ancillary services to be effective in delivering power system security, it is important for the ISO to conduct dynamic system studies. From these system studies, the ISO will acquire a better understanding of the operating characteristics and constraints in the interconnected Pilbara system power system.

The Public Utilities Office proposes that provisions be made in the Rules to require the ISO to develop a procedure (as part of the ancillary services procedure document) for information requests, handling of the information (including confidentiality protocols) and reporting of the study results.

Review of ancillary services provisions in the Rules

The Public Utilities Office proposes the ancillary services provisions in the Rules be reviewed every five years by the ERA. Market governance arrangements will also allow modifications to be considered as part of Rule change processes, where the need becomes evident within this timeframe. This is to ensure that the ancillary services arrangement in the Pilbara remains fit for purpose.

7. Network Services

7.1 Introduction

Design Element 23 identifies three 'network services' roles for the ISO:

- (i) network development coordination;
- (ii) publication of statements of transmission development and generation opportunities;
and
- (iii) technical oversight of connection and access.

The first two of these are inter-related in that they both seek more efficient capital investment resulting from better planning and coordination. They are referred to collectively in this section as 'network development coordination'.

In this section, we describe how the 'network services' roles will be captured in the Rules.

7.2 Current arrangements

7.2.1 Network development coordination

At present NSPs act unilaterally in developing their networks to meet their or their customers' needs. This development will typically be driven by:

- a paramount reliance on power system security and reliability to support its own production and transport needs; and
- competition between stakeholders operating in similar industries (e.g. resource mining).

There have been advocates for more coordinated network development in the Pilbara, taking into account prospective major new or expanded loads, but this has had limited success due to the two factors listed above. NSPs assessments of load growth and the required network and generator requirements are typically not publicly available. Coordination is therefore very limited.

7.2.2 Network connection governance

At present each NSP controls connection to its own network applying its own technical rules. Different NSPs apply different technical rules. There is no independent governance over the rules or their application. Recently this has resulted in a generator being connected in circumstances which gave rise to a dispute regarding the potential negative impact on contiguous networks.

7.3 Proposed arrangements

The Public Utilities Office proposes that the ISO's role in network development will relate to the publication of information to assist in more effective development. The proposed ISO role regarding network connection and access will be to assure that the technical rules (within the Rules) are consistently and appropriately applied to each proposed new connection of a generator, load or network, to ensure that it will not compromise power system security.

The detailed design of the constrained access framework and the role of the ISO in it has not yet been developed.

7.3.1 Network development coordination

Design Element 23 proposes that the ISO publish '*statements of transmission development and generation opportunities (whilst protecting commercially sensitive information)*.' The intention of the Design Element is to publish information that may lead to more effective network and generation development in response to load growth or other drivers.

The options considered for network coordination were to:

- adopt relevant aspects of the Long-Term Projected Assessment of System Adequacy (LT PASA) requirements of WEM Rules clause 4.5;
- produce a transmission development plan and a generation statement of opportunity per the approach designated in Design Element 23;
- produce an Integrated System Plan (ISP), produced biennially with a ten-year horizon, that incorporates both the transmission development and generation opportunities information, among other things; and
- not produce any such publications nor undertake LT PASA because of the concern that the information may be so compromised by confidentiality constraints placed on input data that the publication could be of no value.

The LT PASA in the WEM has a 10-year planning horizon and is required to be updated annually. These LT PASA requirements are very prescriptive and are designed to, among other things, underpin the procurement of sufficient reserve capacity through the Reserve Capacity Mechanism. It bases the assessment of reserve capacity provisions on a Planning Criterion.¹¹⁸ The WEM LT PASA incorporates a number of provisions specific to the SWIS that are not relevant to the Pilbara.¹¹⁹ It was considered to be of limited value in the context of the Pilbara, even for adaption to meet the objectives behind Design Element 23.

¹¹⁸ In WEM Rules clause 4.5.9

¹¹⁹ Such as Intermittent Loads and Demand Side Management Programs, in addition to a reserve capacity market

Rather than produce separate, annual transmission development and generation statement of opportunities documents, the proposed approach is to produce a single biennial ISP that provides both an assessment of current system capacity and risk and load and supply projections for the next decade in the Pilbara. The geographical scope is therefore wider than the current interconnected Pilbara system boundaries with the aim of identifying all prospective and existing loads that may be supplied from the interconnected Pilbara system. The intent of the ISP is to provide a 10-year outlook for potential developers (load, network, and generators), with the aim of providing a basis for (i) new entrants, and (ii) more coordinated investment in the Pilbara.

The ISO will be required to provide system development scenarios (opportunities) based on a long term¹²⁰ load growth forecast. It will also consider any other matters pertinent to the development of the Pilbara including new fuel sources, renewable and intermittent energy developments (such as large-scale solar farms). As discussed above, the ISP will also identify reserve capacity projections and, possibly, ancillary services projections. Strategic consideration of this information may help with efficient development of the Pilbara.

The proposed process is to include the requirement for the ISO to first publish an ‘inputs’ report, seeking feedback on assumptions prior to developing and publishing the ISP.

The fourth alternative was not to require the ISO to publish any form of long-term planning report, primarily because of concerns regarding the constraints placed by confidentiality requirements will have on the usefulness on any form of network coordination document.

Respecting confidentiality of information is certainly one of the challenging aspects of this initiative. However, this is not dissimilar to the challenge faced in other jurisdictions for similar publications. Publicly available or non-confidential information, data aggregation, and scenario analysis are common approaches to providing hopefully useful information for developers and others. More work and consultation will be done on information confidentiality during the implementation stage.

7.3.2 Network connection governance

The Rules are proposed to contain (or provide for) a harmonised, single set of technical rules which will be apply across the interconnected Pilbara system, as discussed in section 8 (Harmonised Technical Rules). This reduces the risk that the connection process will result in connections that threaten system security.

However, the rules will also need a governance arrangement for network connection, for the following reasons:

- because NSPs in the Pilbara tend to be vertically integrated (i.e. to be under common ownership with generators and, in some cases, loads on the network) – independent oversight is required to reassure other stakeholders that new or upgraded connections will be treated fairly and will not compromise their operations or threaten system security; and
- to resolve commercial/technical disputes between NSPs and between the ISO and NSPs.

¹²⁰ For example, 10 years

Accordingly, the Design Report identified the ISO's role in the connection process as to: assure itself (on behalf of all other customers) that the Rules are consistently and appropriately applied such that the connection of the new or replacement generator, load or network will not compromise system security. The ISO will ultimately certify that the connection may proceed.¹²¹

Under the proposed approach NSPs will continue to be responsible for network investment decisions within their networks. Accordingly, NSPs will remain responsible for the connection process, in accordance with the requirements of the proposed 'harmonised' technical rules to be incorporated in the Rules and the proposed access regime.¹²²

To enact the ISO's role in the connection process, the Rules will provide that:

- before providing access to its network, an NSP must submit evidence to the ISO that it has diligently followed the Rules;
- the ISO will assess the potential impact of the proposed new or upgraded connection on system security, certifying that the connection may proceed if it is satisfied;
- if the ISO determines that proceeding the new or upgraded facility poses an unacceptable system risk, the ISO must work collaboratively with the NSP to resolve the ISO's concerns;
- require a suitable load curtailment scheme as a condition of connecting a new or expanded load, if the NSP reasonably deems that there is insufficient capacity in the relevant generator;
- require a suitable constrained dispatch regime as a condition of connecting a new or expanded generator, where required;¹²³ and
- if the NSP addresses the ISO's concerns to the ISO's satisfaction, the ISO must certify that the connection may proceed.

A dispute resolution process will be available to NSPs who cannot reach agreement with the ISO on a matter described above.

¹²¹ Design Report, page 62 and Design Element 13

¹²² NSPs may elect to delegate network development decisions to another party such as the ISO, in which case the ISO may enter into a separate contract to undertake such a role. However, no such role for the ISO has been contemplated in the design.

¹²³ In accordance with Design Elements 9 and 10 which are discussed in the Regulatory framework for the Pilbara electricity networks: Light-handed Regulatory Regime - Detailed Design Consultation Paper.

8. Cost recovery

8.1 Introduction

As per Design Element 29, a mechanism is needed to recover AEMO's administrative costs for its Pilbara ISO functions.

8.2 Current arrangements

Horizon Power currently acts as the de facto system operator and absorbs the costs of doing so. Horizon Power's costs for providing this service to the Pilbara are in effect paid by Western Power's customers in the SWIS through the Tariff Equalisation Contribution.

8.3 Design considerations

8.3.1 Efficiency and fairness

ISO services are not easily attributable to 'causation' and there is no dynamic, operational or allocative efficiency gain to be achieved through differentially signalling the ISO's cost of administration.

The Public Utilities Office wishes to minimise the risk of distorting otherwise efficient decisions by participants. Ramsay Pricing principles would suggest a simple levy applying to all participants, as proposed in the Design Report.¹²⁴ The Public Utilities Office is not aware of any compelling arguments to exclude any of the interconnected participants in the Pilbara from responsibility for contributing to the ISO costs and to do so would increase the share of costs that would need to be covered by other participants.

8.3.2 Allocation options for the System Management Fee

The Public Utilities Office considered the options of requiring AEMO to charge the System Management Fee as:

1. An equal per-kWh rate based on all generator output in the interconnected Pilbara system, or
2. An equal per-kW rate to all generator capacity in the interconnected Pilbara system, or
3. An equal dollar amount to each of the 'networks', being initially defined as the Alinta, Horizon and Rio Tinto networks.

The Public Utilities Office does not favour charging on a capacity basis, since this would lead to a higher component falling on parties with higher amounts of reserve capacity to meet contingency events.

The Public Utilities Office has considered the options of a generator output basis and equal dollar amounts to each network. Based on AEMO's current preliminary estimate of \$1.2 million per annum for its operating costs, the Public Utilities Office has estimated in broad terms that:

¹²⁴ Design Report section 3.5.4

- charging based on all generator output would result in a fee of just under \$0.50/MWh; or
- charging an equal dollar amount would result in an annual fee of \$400,000 to each of the three networks, which equates to around \$0.25/MWh for Rio Tinto generation and around \$0.90 to \$1.00/MWh for generators on Horizon and Alinta's networks.

On balance, Public Utilities Office favours charging equal dollar amounts to each network, with a requirement that they on-charge as part of open access on a non-discriminatory basis. Specifically, it would be a requirement that these networks would not favour their own generation relative to generation from other parties connected to their networks.

8.3.3 Application Fees

As is the case in the NEM and the WEM, AEMO will be required to undertake some studies and analysis to assist with new connections¹²⁵. These studies will be 'bespoke' and are likely to be required only for larger generator or load connections to the interconnected Pilbara system.

The Public Utilities Office considers that it is not equitable for the costs of such studies and analysis to be included in allowable revenues for the *System Management Fee* charged to existing parties. Because of the bespoke nature of the studies, The Public Utilities Office proposes to ensure a mandate in the Rules for AEMO to charge *Application Fees* to the parties who request or require such studies to support their intended connections. The Public Utilities Office would expect AEMO to develop an application process for the Pilbara¹²⁶ and which will include the basis for estimating and charging for such costs as are incurred.

8.4 Proposed arrangements

The Design Report proposed that the costs for administering AEMO's Pilbara administrative functions should be recovered through a simple levy, such as applies in the WEM, and that this will apply to all parties connected to the interconnected Pilbara system. The Public Utilities Office proposes that this System Management Fee will comprise equal lump-sum charges to each of the 'NSPs', being Alinta Energy, Horizon Power and Rio Tinto. The covered networks (i.e. initially Horizon Power and Alinta) will be required to recover this cost on an equitable basis consistent with the Pilbara electricity objective, for example through a levy on generated output that is determined based on their total generation volumes.

As with the WEM (and the NEM), it is envisaged that the AEMO Pilbara 'allowable revenue' will be annually determined by the ERA (section 3.3.43). This will be determined as the sum of an approved budget for the forthcoming year, together with any true-up of costs over- or under-recovered in the previous year¹²⁷. The approved System Management Fee will be determined by dividing the allowable revenue by the number of networks.

¹²⁵ See Section 7: Network Services

¹²⁶ Public Utilities Office expects that AEMO would rely on similar processes that AEMO has already established for the NEM and for the WEM.

¹²⁷ As is noted in the discussion of Energy Balancing Ancillary Service in Section 6.4, it is likely that EBAS will over-recover the cost, due to the effects of imbalance diversity and imbalance penalties. Any of these will be included with other such over-recoveries (or offset against under-recoveries) in the revenue determination for the following year.

AEMO will also be empowered to charge intending new generators or loads Application Fees for any connection-related costs, such as for system studies or to be able to provide advice to those parties on potential constraints. Such costs will therefore not be included in the System Management Fee referred to above.

9. Technical Rules

9.1 Introduction

Technical Rules typically contain the performance standards and technical requirements for all assets connecting to an electricity network. They provide the standards, procedures and planning criteria governing the construction and operation of an electricity network, and the performance and technical specifications for User equipment connected to the network.

An important design element for the new regulatory framework is to establish uniform, agreed Rules to apply to covered and uncovered networks (and incorporating requirements similar to the Horizon Power Technical Rules), to be implemented and managed by the ISO.

9.2 Current arrangements

Various versions of the Technical Rules currently apply in the Pilbara. Whilst the initial Technical Rules were based on a previous version of Western Power's Technical Rules applicable to the SWIS, NSPs have subsequently amended the Technical Rules applicable to their own networks. Under current arrangements:

- because NSPs manage their own technical rule changes and exemptions, technical requirements are not aligned between networks, or between Users on the same network;
- NSPs require Users to comply with technical rules, but this is not overseen by an independent body. There is some grandfathering for older facilities; and
- Technical rules substantially focus on generation assets, which can significantly influence the behaviour of the electricity system and quality of the electricity supply.

The recent connection of a new generation asset in the interconnected Pilbara system has brought into focus the variation in technical performance standards, acceptance and compliance processes across NSPs. A harmonised set of Technical Rules, and independent oversight by a system operator, may have avoided those issues.

The key issues drawn from previous works, and that were included in the detailed design, are reproduced in the table below.

Table 9.1 List of key design issues for Harmonised Technical Rules

Key issue	Elaboration
Lack of a common standard	There is no single, final and agreed set of technical rules or exemptions that apply consistently across the interconnected Pilbara system.
Simplification of network requirements	Requirements have evolved to be specific to network owners, and characteristics of individual network characteristics, i.e. max fault level requirements, network redundancy.
No independent, integrated oversight	Currently each NSP manages its own connection requirements, with no oversight or monitoring by a central or independent body. The technical rules give Horizon Power, as de-facto ISO, a very limited role in this regard.

Potential barriers to entry

There appear to be unnecessary barriers to entry for small renewable generators due to the relevant NSP being able to change the rules at its discretion.¹²⁸

9.3 Design considerations

9.3.1 Scope and coverage of Technical Rules

At present, the Public Utilities Office's development of this detailed design regarding the technical rules has focussed on the system operations arrangements. However, as the light-handed access framework evolves, the role of technical rules in access will continue to be developed.

Under the Administrative ISO model and consistent with Design Element 26,¹²⁹ daily operational control of network infrastructure and connected User facilities will remain with the NSP. As such, only a subset of the SWIS Technical Rules and WEM Market Rules apply to the interconnected Pilbara system.

For example, the ISO will need powers to act reasonably in the interests of managing its functions – primarily to maintain power system security and safety, but predominantly the ISO will act (or provide direction) through the NSP. The ISO will not undertake any direct control of Users' equipment.

Thus, the role of granting approvals under the technical rules will need to be split. The ISO will have certain defined roles as part of coordinating testing and commissioning of plant, and access applications and new connections. Otherwise, each NSP will remain the approving authority in respect of its own network.

9.3.2 Management of existing facilities and standards

In the stakeholder consultation, participants raised concerns regarding the current level of Technical Rules compliance in the interconnected Pilbara system, and the informal exemptions and testing/compliance processes.

Importantly, stakeholders generally agreed that existing 'latent' conditions which pose a threat to power system security and reliability and/or to existing facilities/operations should not be grandfathered indefinitely, although non-compliances should be considered on a case by case basis to determine whether they do or do not threaten a material adverse impact.

Stakeholders also observed that facilities' actual operating behaviour can be more important than whether it meets particular set-points during compliance testing.

Care is needed that the Rules' technical requirements do not create a significant financial barrier to the rules' commencement, (e.g. a requirement for evidence of compliance or compliance tests for all connected facilities), or alternatively create dis-incentives to upgrade plant/facilities due to the threat of compliance-related upgrade costs.

¹²⁸ The lack of a coordinated approach to ancillary services is another barrier, see chapter 6

¹²⁹ *The ISO will have sufficient powers to effectively enact and enforce its obligations and undertake its functions. The powers of the ISO will not extend to daily operational control of interconnected networks in the Pilbara unless such control is transferred to the ISO by agreement.*

The Public Utilities Office proposes that the Rules will recognise existing arrangements in place for existing connected facilities for a period of time, suggested to be five years, after which new or materially upgraded facilities must demonstrate compliance with the Rules. This option is considered to provide the optimal balance between compliance and risk to power system security, noting that the risk of non-compliance is primarily borne by the NSP.

After five years, the facility's compliance with the harmonised Technical Rules can be assessed. Any non-compliances will need to be resolved on a case-by-case basis, with exemption (where practicable) as an option. These provisions would not replace any operating restrictions that may currently exist, and which should continue until such time as evidence is provided to release the restriction.

Before selecting the above, the Public Utilities Office also considered the following other options:

- grandfathering all existing facilities, thereby deemed to comply at commencement of new rules; or
- recognising existing arrangements, and provide for maintaining those provisions for existing facilities and plant; or
- requiring all facilities to demonstrate compliance to new rules at commencement date.

9.3.3 Variation between performance standards

In cases where the current technical standards differ across the interconnected Pilbara system¹³⁰ and a means to adopt an alternate standard is not available, the recommendation is to preserve both standards in the interconnected Pilbara system as reflective of current arrangements.

The National Electricity Rules provides a framework for accepting alternative performance standards, and it is proposed to apply this framework to the interconnected Pilbara system to reflect the minimum and desired performance standards, to apply to future connections. For example, the NER provides:

- *access performance standards to define the range of the technical requirements for the operation of equipment when negotiating the connection of generators, market NSPs and certain end use customers. These access standards include a range from the minimum to the automatic access standard.*
- *for each technical requirement defined by the access standards a connection applicant must either:*
 - *meet the automatic access standard, in which case the equipment will not be denied access because of that technical requirement, or*
 - *negotiate a standard of performance with the local NSP (and AEMO for access standards that are AEMO advisory matters) that is at or above the minimum access standard and below the automatic access standard, and*

¹³⁰ Primarily in regards to a difference between the Horizon Power Technical Rules and Rio Tinto Technical Rules

- *equipment that does not at least meet the minimum access standard will be denied access because of that technical requirement.*

During stakeholder consultation, participants considered that system studies would be required to determine whether some performance standards could be amended. On further review, it was determined that minimum standards and automatic standards could be applied that reflect current practice and which provide a pathway for application of the automatic standard (or alternate negotiated standard). In doing so, this option mitigates any potential cost impact to NSPs and Users associated with a change to the performance standard.

Alternative options considered and rejected were:

- adopt a single performance standard and incur costs prior to adoption (or at a future date) to undertake investigations to confirm that the system can meet the modified standard and, potential costs for corrective action to the equipment; or
- write both standards into the Technical Rules, but this adds further complexity as to how these will be applied in the future.

9.3.4 Requirements for further studies

For the determination of some parameters, the ISO will need to develop and maintain a common system model for the interconnected Pilbara system, to simulate the response of the power system to alternate scenarios and events. It has been difficult to develop such a model in the past given the sensitivities of commercial information associated with connected facilities of privately-owned networks.

A common interconnected Pilbara system power system model will assist in determining common settings in the Technical Rules, including Under Frequency Load Shedding (UFLS) settings and Critical Fault Clearance Times (CFCTs). Whilst an independent study was commissioned in 2013 by some stakeholders, the findings were not adopted into the prevailing Technical Rules at that time. Whilst this provides some guidance with respect to the adequacy of current settings, and areas for improvement, the study is not reflective of currently connected facilities or transmission network and importantly is not endorsed by all participants.

It is therefore proposed that small changes be made to these settings based on the current Technical Rules, and any further amendments be subject to a system study to be undertaken by AEMO once the power system model is developed.

9.3.5 Transmission and Distribution System Planning Criteria

The Public Utilities Office proposes to remove the current Horizon system planning criteria¹³¹, thereby reinforcing NSPs' responsibility to comply with the system performance standards in the Technical Rules, without nominating planning criteria as a means to achieve this compliance.

The alternate options considered, and rejected, include:

- retaining system planning criteria in Technical Rules.

¹³¹ Comprising requirements for (i) Transmission system (including N-0 criterion and N-1 criterion); (ii) Medium Voltage distribution system (including N-0 criterion); (iii) Low Voltage Distribution System (including Pole to Pillar Connection Points Mandatory); (iv) Fault limits; and (v) Maximum fault currents

- consistent with the Technical Rules in the SWIS and the Horizon Power Technical Rules this would provide consistent and transparent planning and design criteria for interconnected networks.
- However, these criteria may not represent how other network owners elect to manage their systems and may require additional investment above that which is economically efficient.
- amending the Technical Rules to provide requirements for NSPs to separately develop / publish system planning criteria for their networks.
 - This would align with the approach adopted in the NER, for the NEM. It would allow the NSP to reflect specific conditions and requirements for its network, as to how it will meet system performance standards.
 - However, the requirement is not currently adhered to by all networks and would present a significant burden on network owners.

9.3.6 Schedules and information sharing

The Public Utilities Office proposes to retain the information schedules contained in the current Horizon Power Attachments, which provide a standard form to capture information that is required as part of the assessment steps described in the preceding provisions.

The alternate options considered, and rejected, include:

- removing the Schedules from the Technical Rules and require all NSPs to develop their own information schedules.
 - However, this option does not align with the design principles, specifically simplicity and standardisation of information requirements.
- developing an alternative set of requirements.
 - However, no issues were identified with the current schedules to present a compelling reason to progress this option and this would be inconsistent with the design principles.

9.4 Proposed arrangements

It is important that Technical Rules – relied upon for the provision of access to the electricity network and maintenance of a secure power system – promote development of the Pilbara, are technology neutral, and apply equally to all participants.

A new harmonised set of Technical Rules will be established for managing and operating the system. These agreed rules and protocols will be implemented and amended through formal process with strengthened accountability (see section 3.3.32).

In the Design Report, stakeholders suggested that the Technical Rules should be largely based on the existing Horizon Power and Rio Tinto Technical Rules, because these networks represent the majority of the interconnected Pilbara system. The Detailed Design approached the development of the Technical Rules in this way and benefited from a high degree of alignment between the various versions of the Rules,¹³² and in many cases, a clear rationale for adoption of one set of requirements over another.¹³³

9.4.1 Governance and administration

The Technical Rules will apply to all interconnected networks that form part of the interconnected Pilbara system.

The existing Horizon Power Technical Rules include a number of governance and administrative provisions pertaining to authorisation, application, commencement and interpretation. As the harmonised Technical Rules are proposed to form part of the Rules, these provisions will be replaced by the Rules governance provisions.

The rule change process for the Technical Rules is proposed to be common with the Rules, see section 3.3.32.

There will be a central transparent process for the recording and management of exceptions, derogations and amendments. Specifically, it is proposed that NSPs may continue to grant exemptions to Users, but the NSP must first consult with the ISO to ensure that doing so will cause no adverse impact to power system security and is consistent with the constrained dispatch regime that is to be developed. This is a consultation role for the ISO, not an approval one: except in specified circumstances listed below, the ultimate responsibility for compliance with the technical rules resides with the NSP.

9.4.2 Transmission and distribution system performance and planning criteria

The Technical Rules will describe the technical performance requirements of the power system and the NSP's obligations to provide transmission and distribution systems that will allow these performance requirements to be achieved. It is proposed that references to non-interconnected systems (or Microgrids) are to be removed as these are not relevant to the operation of the interconnected Pilbara system, or to NSPs other than Horizon Power.

The ISO must be consulted on matters pertaining to management of power system security, consistent with its primary function. These additions have been based on similar provisions in the SWIS.

In many cases, the existing Technical Rules' provisions relating to power system performance standards were already aligned, and therefore can be adopted into the harmonised Technical Rules. In a small number of cases, the provisions differ, whereby the provisions will reflect either:

¹³² Primarily based on a comparison of Technical Rules developed by Horizon Power and Rio Tinto

¹³³ Although the design process benefitted greatly from a high degree of stakeholder engagement, it is not suggested that stakeholders have had a full opportunity to consider and comment on all details of the proposed harmonised technical rules. Consultation will continue during the implementation phase.

- simplified version of mutually agreed standards that is considered fit for purpose. For example, Availability of Protection Systems;
- updated standards based on independent studies. For example, the need to update UFLS settings following development of a single system model;
- adoption of Horizon Power requirements, where these are considered superior to other examples. For example, Load to be Available for Disconnection; and
- combination of requirements, by adoption of a performance standard framework, similar to that adopted in the National Electricity Rules¹³⁴ for those provisions where there is a need to preserve a difference in standards. For example, temporary over-voltage standards.

The Technical Rules require NSPs to meet technical performance standards and performance envelopes. The methods to be employed, whether by provision of transmission network, distribution network or generation facility, remains within the NSP's control. The NSP would be expected to balance the risk and costs associated with meeting its obligations to Users connected to its network.

The prevailing view during stakeholder consultation was that third parties should not determine, through Technical Rules, the planning requirements for private NSPs' transmission and distribution networks. Further, it was viewed that private NSPs may make non-network investments (e.g. generation options) to ensure adequate power system security and reliability.

Instead, the Technical Rules should provide, and ensure, an over-arching requirement for NSPs to follow good practice in planning their networks to:

- maintain power system security and reliability – that the ISO will need to confirm via system modelling, given it is responsible for the system model;
- manage network safety; and
- not exceed equipment limits.

Currently, only Horizon Power has published system planning criteria. Codifying system planning criteria is not considered to provide a more efficient solution for the interconnected Pilbara system, and therefore has been removed from the harmonised Technical Rules. NSPs that may be required to develop and publish system planning criteria, can do so separately to the Rules.

9.4.3 Technical Requirements for User facilities

Technical requirements that Users must satisfy as a condition of connection of any equipment to the network, are included to ensure that the power system performance standards are achieved, and that other Users are not adversely affected, or safety put at risk.

¹³⁴ Adoption of automatic, minimum and negotiated performance standards

The harmonised Technical Rules will include additional requirements to ensure that obligations apply to the ISO in addition to NSPs and Users, consistent with the ISO's role and functions under the ISO Administrative model. In many cases, the existing Technical Rules provisions are aligned, and can be adopted into the harmonised Technical Rules.

In a small number of cases, the provisions differ, whereby the provisions will reflect either:

- a simplified version of mutually agreed standards that is considered fit for purpose. For example, Metering standards and connection processes to be nominated by the NSP, rather than described within the Technical Rules;
- Horizon Power requirements, where these are considered superior to other examples. For example, Requirements for connection of inverters to LV networks;
- combinations of requirements, by adoption of a performance standard framework, similar to that adopted in the National Electricity Rules¹³⁵ for those provisions where there is a need to preserve a difference in standards. For example, immunity to frequency excursions.

9.4.4 Inspection, testing, commissioning, disconnection and reconnection

The existing Technical Rules assume a single relationship between the NSP and the facility. In circumstances where the NSP and the User facility are the same entity, issues of transparency and compliance with a harmonised set of Technical Rules may arise.

Additional requirements are proposed for the harmonised Technical Rules, in the context of managing power system security, to provide a role (in certain circumstances, and while remaining within the Administrative ISO model which wherever possible will leave primary operational responsibility with the NSP) for:

- ISO to inspect, and in an emergency to access, facilities, as required (subject to reasonable notice, OSH, induction etc. requirements)
- ISO to have an oversight role over the nature of testing to be conducted, including test procedures and special tests;
- In some circumstances, an obligation on a Generator to cooperate with certain ISO requests e.g. when power system security is threatened;
- added obligation on NSPs to inform and coordinate with ISO (as relevant) with respect to any testing and commissioning of facilities, to the extent necessary for the ISO to perform its oversight functions;
- ISO may in certain circumstances request additional tests, where necessary in connection with its function of managing power system security; and
- ISO may, in consultation with the NSP and within the framework of the Administrative ISO model, in extreme circumstances give directions to a generator who is non-compliant, where that non-compliance impacts power system security or safety

¹³⁵ Adoption of automatic, minimum and negotiated performance standards

9.4.5 System operation and coordination

It is proposed that the harmonised Technical Rules clarify roles of system operation and coordination to reflect the Administrative ISO model in which these requirements apply to the NSPs' operation and coordination its and Users' facilities.

Additional requirements are proposed to be included in the harmonised Technical Rules, in the context of managing power system security, to provide obligations on NSPs and Users, as follows:

- NSPs to consult with ISO on the boundaries between relevant responsibilities, where the ISO has lead responsibility for maintaining the power system security and the NSP in most circumstances has responsibility for operating the network (including the reporting and management of operating states);
- Users to co-operate with NSPs and the ISO, to the extent necessary to allow the ISO to effectively perform its functions;
- NSPs must inform the ISO of an equipment outage, if that outage may present a risk to power system security; and
- NSPs to consult with the ISO, as the owner and manager of the power system model, to undertake modelling of the power system (as relevant) as part of its assessment of connections of facilities.

9.4.6 Information schedules

The information schedules currently contained in the Attachments to Horizon Power's Technical Rules and used as the basis for development of the proposed harmonised Rules, provide a useful standard template for the capture of information required to assess facilities' performance, as discussed in the preceding provisions. These schedules also gather essential information used for the assessment of applications for access and connection to the network.

These schedules are proposed to be retained in the harmonised Rules. However, NSPs should not be obliged to follow the attachments in lieu of requesting other information to meet their obligations under the Rules.

10. Transitional measures and implementation

10.1 Introduction

This section identifies the proposed processes to establish the ISO and transition stakeholders to the new regime.

10.2 Establishing the ISO

A Bill is proposed to be introduced into Parliament in the first half of 2019. The Public Utilities Office will manage the preparation, publication and commencement of each piece of delegated legislation necessary to enable the new framework to start on the intended go-live date of 1 January 2020. This delegated legislation will likely include the Rules discussed above, a Pilbara Networks Access Code (discussed in the separate access framework consultation paper), supporting regulations, and likely other instruments.

Once the Bill has passed Parliament and taken effect as an Act, the Minister for Energy will seek to formally appoint AEMO to be the ISO. If appointed, AEMO will commence the following establishment activities:

- amend its constitution and/or other governance documents as required;
- establish the required ISO capacities, including ISO resourcing, systems and processes to undertake the ISO role;
- develop an agreed operational framework and detailed operating protocols as to when and how the ISO is to intervene in emergencies/contingencies;
- commence work on a common system model for the interconnected Pilbara system; and
- assist the Public Utilities Office to develop a plan for transitioning Pilbara participants to the new regulatory environment.

Transition Plan

A plan will be developed to ensure that all participants are ready to transition to the new regulatory environment at the intended go-live date of 1 January 2020.

This will involve:

- an outline of what ongoing transitional processes will be required to achieve full functional operation after the go-live date;
- extensive modelling to validate operating protocols and ancillary services requirements;
- engaging with all participants to jointly prepare for planning, trials and go-live transition;
- ensuring all participants are aware of the new requirements and have implemented the systems and processes necessary to comply with them; and
- ensuring that necessary changes to commercial agreements between participants are concluded before the go live date.

Appendix A Reconciliation of design elements to detailed design

In this Appendix, a reconciliation of the structure of design elements presented in the Design Report is provided against the sections contained in this consultation paper.

Table A.1 Reconciliation of design elements to detailed design

Design Element	Elaboration	Response
1	<p>The following interconnected networks in the Coastal Region of the NWIS will be covered at commencement of the light handed third-party access regime in the NWIS:</p> <ul style="list-style-type: none"> the Horizon Power interconnected network; and the Alinta DEWAP interconnected network. 	<p>Not in this paper.</p> <p>For Design Elements 1-12, and 14-18, see separate Detailed Design Consultation paper for the light handed access regime</p>
2	<p>Uncovered NWIS Interconnected Networks can 'opt-in' to the third-party access regime at any time. Networks that 'opt-in' will be immune from subsequent more onerous coverage applications that could otherwise lead to imposition of a different regime. A network that has opted in to the pilbara networks third party access regime can also opt out of the regime if their circumstances change.</p>	<p>Not in this paper</p>
3	<p>Coverage will be extended in the future to networks not covered at commencement by application of the existing Access Code coverage test.</p> <p>An assessment for coverage is triggered by a coverage application that must be assessed by the Minister for Energy in accordance with current coverage criteria.</p> <p>If a network is found to meet the coverage criteria, then the Minister will be required to make an additional decision as to whether the network should be subject to the light handed or full regulation, using principles similar to those in the National Gas Law.</p> <p>Provision will be made for a Minister's decision to be revoked if a networks circumstances change such that the coverage criteria is no longer satisfied.</p>	<p>Not in this paper</p>
4	<p>Pricing principles will be developed to guide price setting and dispute arbitration.</p>	<p>Not in this paper</p>

5	The onus will be on networks to develop, negotiate and defend their pricing methodologies in accordance with the Pricing Principles.	Not in this paper
6	In setting Reference Tariffs, the covered network businesses will be required to demonstrate that they meet the Pricing Principles, and either: (a) describe how they have applied the pricing guidelines; or (b) describe the alternate methodology and key assumptions they have used in developing their Reference Tariffs.	Not in this paper
7	By mutual agreement, an access applicant and the relevant network could agree on a Non Reference Tariff.	Not in this paper
8	Network access in the NWIS will be designed as a 'market carriage' regime.	Not in this paper
9	Generators connected to the NWIS networks at the commencement of the new regime will continue to receive access that is unconstrained, or not constrained to a greater extent than at regime commencement. These grandfathered requirements will be codified in a set of 'Rules' relating to scheduling and dispatch and relating to any new connections and expansions of existing generators and loads.	Not in this paper
10	New generators or expanded capacity of existing generators will be allowed network access on a constrained basis, with such generators being appraised (without guarantee) of the likely extent of constraints and the options for relieving those constraints. Generators would be liable for the cost of any options they choose to relieve constraints.	Not in this paper
11	Loads will be provided with access at default security levels to be defined, but with provision for specific loads to request bespoke access and connection point security criteria to apply to them.	Default security levels will be defined by the combination of the Security Limit and Technical Envelope as described in Section 5.3 (Planning, Scheduling, and Dispatch). Provisions for bespoke access and connection criteria are addressed in the network access paper.
12	The networks will be responsible for managing the connection process, including specifying connection asset requirements and commercial terms for the provision of such assets.	Not in this paper

13	<p>The ISO will be responsible for dealing with the ‘electricity transfer and access’ aspects of new connections and applications for expanded capacity, including the matters described in Design Element 10. The ISO will also design any changes to scheduling and dispatch resulting from constraints to new or expanded generators, in accordance with the Rules, and will accordingly manage constrained dispatch where required.</p>	<p>Addressed. The ISO’s role in managing constrained dispatch is described in Section 5.3 (Planning, Scheduling, and Dispatch).</p> <p>The ISO’s role in new and expanded generator access is described in Section 7 (Network Services).</p>
14	<p>Information disclosure requirements will be developed as part of the Pilbara networks access framework. These will be developed in consultation with stakeholders and will specify the information that must be published by covered networks and the timetable for publication.</p>	Not in this paper
15	<p>A negotiation framework will be developed as part of the Pilbara Regime, setting out requirements for each covered network to produce and publish:</p> <ul style="list-style-type: none"> • a user access guideline; • the process for making an access request; • the process for making access offers; and • the process for negotiating access, pricing, and access terms and conditions. 	Not in this paper
16	<p>A dispute resolution framework will be developed, that is clear and binding, based on the non-scheme pipeline arbitration mechanism in the National Gas Rules modified as outlined in this consultation paper for the specific circumstances of the NWIS. It will be administered by the ERA.</p>	Not in this paper
17	<p>Covered networks’ regulated activities and functions will be required to be structurally or functionally separated from their non-regulated activities and functions. Business-specific requirements will be defined, following competition analysis.</p>	Not in this paper
18	<p>A transition plan for the new Pilbara networks third party access regime will allow timelines that permit service providers to efficiently meet new obligations, and also to ensure that existing contractual positions and operating positions are suitably protected.</p>	Addressed. Transition measures and implementation are discussed in Section 10.

19	<p>The interim objective of the NWIS ISO should be consistent with the National Electricity Objective, namely:</p> <p><i>‘To promote efficient investment in, and efficient operation and use of, electricity services for the long-term interests of consumers of electricity with respect to price, quality, safety, reliability, and security of supply of electricity; and the reliability, safety and security of the NWIS.’</i></p>	<p>This will be set out in the enabling Act</p> <p>The current proposal in s 120A of Draft 5 of the Bill is:</p> <p><i>‘To promote efficient investment in, and efficient operation and use of, services for the long-term interests of consumers of electricity in the Pilbara region in relation to – (a) price, quality, safety, reliability, and security of supply of electricity; and (b) the reliability, safety and security of the interconnected Pilbara system.’</i></p>
20	<p>The design principles for the ISO are:</p> <ol style="list-style-type: none"> 1. the ISO’s core function is to ensure the reliability and stability of the system; 2. the ISO should act with impartiality and transparency; 3. the ISO should act to maximise overall system efficiency; 4. the cost of establishing and operating the ISO should be kept to a practical minimum; 5. proposed arrangements should consider the commercial interests and priorities of privately-owned electricity network assets in the Pilbara; 6. technical standards should not present a physical constraint to potential future interconnection of the interconnected Pilbara system, or a barrier to any technology type; and 7. the effectiveness of the ISO should be reviewed periodically. 	<p>Addressed with variation.</p> <p>Design principle 20.1 has been modified as discussed in section 4.3.3 to give the ISO a security function only, and otherwise has been reflected in the ISO’s responsibilities in Sections 4-7.</p> <p>Design principle 20.2 is reflected in the ISO’s governance and overarching administrative arrangements in Section 3.</p> <p>Design principle 20.3 will be reflected in the Pilbara electricity objective in the Act, and is embodied in the adoption of the Administrative ISO model</p> <p>Design principle 20.4 is reflected in simplification of the ISO’s functions reflected in the adoption of the Administrative ISO model and throughout Section 5.</p> <p>Design principle 20.5 has been reflected in the recognition of the need for day-to-day operations to remain with the NSPs and in recognising commercial priorities in Sections 5-7.</p> <p>Design principle 20.6 has been reflected in the approach to a harmonised set of technical rules as described in Section 9.</p> <p>Design principle 20.7 has been reflected by the post-implementation review in section 2.2, the provisions for periodic ERA review of the regime in section 3.3.54, and the proposed rules evolution role of the rule change panel (see “Rules evolution” in two places in section 3.3.32).</p>

21	<p>The ISO will:</p> <ul style="list-style-type: none"> • undertake planning and outage scheduling; • develop and manage a full Pilbara simulation model; • have lead accountability for managing emergency response and undertaking post-incident investigations; and • issue dispatch instructions in limited circumstances including: <ul style="list-style-type: none"> - where contractual arrangements with the ISO require it – for example: <ul style="list-style-type: none"> ○ for ancillary service provision; and ○ for providing a dispatch service;¹³⁶ and - to step in to preserve or restore system security and reliability – for example: <ul style="list-style-type: none"> ○ following equipment failure; and ○ to manage a network or system constraint (consistent with the Rules). 	<p>Addressed with variation. The role of the ISO has been discussed in detail in Sections 4 and 5, noting that with the proposed adoption of the Administrative ISO model, the ISO will not be responsible for scheduling or issuing dispatch instructions. As discussed in Section 5, the ISO will remain responsible for system security but delegate its authority to NSPs to issue dispatch instructions to preserve or restore system security, in all but very unusual circumstances. This includes emergency response, see section 5.4.8.</p> <p>The Administrative ISO will not be responsible for reliability, see section 4.3.3 and Design Element 20.1.</p> <p>The ISO will coordinate post incident investigations: section 5.4.9.</p>
22	<p>The ISO will take over the role of procuring and allocating the costs associated with the following Ancillary Services: frequency control, spinning reserve, balancing & settlements, reserve capacity, and black start capability.</p>	<p>Addressed with variation. The ISO's role in managing Ancillary Services is discussed in Section 6, noting that the ISO will not provide a reserve capacity ancillary service or, initially a system restart service (black start service).</p> <p>The ISO will however be involved with aspects of reserve capacity management, as discussed in Section 7.</p>
23	<p>The ISO will provide the following Network Services for the Pilbara in conjunction with Network Owners, Generators, and End Customers: network coordination, technical oversight of connections and access, and publication of statements of transmission development and generation opportunities (whilst protecting commercially sensitive information)</p> <p>The Horizon Power ISO+ model, including the proposed system operator's role in providing network transport services will be reviewed once the proposed ISO functions have been implemented and tested in practice.</p>	<p>Addressed. See the proposed network functions of the ISO in Section 7.</p>

¹³⁶ i.e. where a generator contracts with the ISO to dispatch its generators (i.e. rather than have its own operators)

24	The ISO will at initiation provide limited Market Services, with economic dispatch of generation unlikely to be justified in the Pilbara for the foreseeable future. The ISO needs to be provided with an ability to cover its Pilbara-related administrative costs and the costs of any Market Services that it provides.	Addressed with variation. The Administrative ISO model certainly does not include a market, except to the extent that EBAS (section 0) involves a small amount of energy settlements. The cost recovery aspect of Design Element 24 is discussed in Section 8.
25	With the recommended functions of the ISO in this document, the ISO will need to be regarded in the <i>Electricity Industry (Metering) Code 2012</i> as the equivalent of the Independent Market Operator/AEMO for the Pilbara with similar rights, obligations and responsibilities. The ISO is <u>not</u> initially positioned as a Metering Services provider.	Addressed with variation. The Administrative ISO model will likely have a very small metering role (see section 2.4, footnote 16)
26	The ISO will have sufficient powers to effectively enact its obligations and undertake its functions. The powers of the ISO will not extend to daily operational control of interconnected networks in Pilbara unless such control is transferred to the ISO by agreement.	Addressed. The ISO's primary function will be set out in the enabling Act. Most of the ISO's functions and powers will be set out in the Rules (see section 4.4).
27	The ISO will be a stand-alone entity, with the proposed functions undertaken by AEMO as an extension of its current Western Australian operations, noting that it may choose to contract with other NSPs for provision of some services.	Addressed. See Section 3.
28	The ISO's annual revenue and capital expenditure forecast will be independently approved by the ERA.	Addressed. See section 3.3.43
29	The ISO capital and operating costs will be recovered from market participants.	Addressed. See Section 8
30	The ISO will be governed by the AEMO Board on the basis that AEMO undertakes the ISO role for the Pilbara. Its charter will be established with the involvement of key stakeholders.	Addressed. See section 3.3.21
31	The ISO surveillance functions will be provided to the ISO governing body by the ERA.	Addressed with variation. To minimise costs the ISO will generally monitor itself (section 3.3.54).
32	Changes to the Rules will be a service provided to the ISO governing body by the ERA.	Addressed with variation. The rules custodian will be the Rule Change Panel, not the ERA (section 3.3.32).

33	<p>The ISO will have coverage of the entire Pilbara Interconnected System, with powers limited to those necessary to undertake its assigned functions consistent with the design objective.</p> <p>For the avoidance of doubt, the ISO will not have powers to interfere with the efficient operations of networks, other than to protect the security and reliability of the interconnected Pilbara system and these powers do not necessarily require direct control of all network elements.</p> <p>Any changes to the powers of the ISO will be subject to rigorous analysis with stakeholder input to ensure that there is a material net benefit of any proposed changes.</p>	<p>The ambit of the Pilbara Regime will be dealt with in the enabling Act, with detailed decisions of which rules need to apply to which networks to be resolved, with consultation, during the implementation stage.</p> <p>The recommended Administrative ISO model described in Section 4 is consistent with this Design Element, although the ISO's functions is limited to system security, and not reliability, as discussed in section 4.3.3.</p>
34	<p>The ISO will have the same immunity from damages claims as AEMO has for its operations in the SWIS.</p>	<p>Addressed. See section 4.3.5 and "Immunity of delegates" in section 4.4.2.</p>
35	<p>Transitioning to the new ISO will allow timelines that permit the ISO and participants to efficiently meet new obligations and functions and for stakeholder participation in the development of the various design elements.</p>	<p>Transitional arrangements are discussed in Section 10.</p>

Appendix B Reconciliation of WEM Rules to detailed design

In this Appendix, a reconciliation of the structure of the Wholesale Electricity Market Rules (WEM Rules) is provided against the sections contained in this consultation paper.

Table B.1 Reconciliation of WEM Rules to detailed design

Section	Elaboration	Response
1	INTRODUCTION <ul style="list-style-type: none"> • Authority of Market Rules • Objectives • Conventions • Staging 	Not in scope for detailed design of system operations arrangements
2	ADMINISTRATION <ul style="list-style-type: none"> • Functions and Governance • Market Documents • Monitoring, Enforcement and Audit • Reviewable Decisions and Disputes • Market Consultation • Budgets and Fees • Maximum and Minimum Prices and Loss Factors • Participation and Registration • Communications and Systems Requirements • Prudential Requirements • Emergency Powers 	Elements (as relevant) are discussed in the governance and administrative arrangements proposed in Section 3
3	POWER SYSTEM SECURITY AND RELIABILITY <ul style="list-style-type: none"> • Security and Reliability • Ancillary Services • Medium and Short Term Planning • Commissioning Tests • Decommitment and Reserve Capacity Obligations • Settlement Data 	Discussed in Sections 5 and 6. The ISO is responsible for system security but not reliability, see section 4.3.3
4	RESERVE CAPACITY RULES	Not considered relevant to the Rules
5	NETWORK CONTROL SERVICES	Not considered relevant to the Rules
6	THE ENERGY MARKET	Not considered relevant to the Rules

7	DISPATCH	Discussed in Section 5
8	WHOLESALE MARKET METERING	Not considered relevant to the Rules
9	SETTLEMENT	Discussed in Section 6 (in relation to Ancillary Services)
10	MARKET INFORMATION	Not considered relevant to the Rules
11	GLOSSARY	A glossary is included in the Paper
A1	APPENDIX 1: STANDING DATA	Not considered relevant to the Rules
A2	APPENDIX 2: SPINNING RESERVE COST ALLOCATION	Discussed in Section 6
A3	APPENDIX 3: RESERVE CAPACITY AUCTION AND TRADE METHODOLOGY	Not considered relevant to the Rules
A4	APPENDIX 4: [BLANK]	n/a
A4	APPENDIX 4A: INTERMITTENT LOAD INDIVIDUAL RESERVE CAPACITY REQUIREMENTS	Not considered relevant to the Rules
A5	APPENDIX 5: INDIVIDUAL RESERVE CAPACITY REQUIREMENTS	Not considered relevant to the Rules
A5A	APPENDIX 5A: NON-TEMPERATURE DEPENDENT LOAD REQUIREMENTS	Not considered relevant to the Rules
A6	APPENDIX 6: STEM PRICE CURVE DETERMINATION	Not considered relevant to the Rules
A7	APPENDIX 7: [BLANK]	n/a
A8	APPENDIX 8: [BLANK]	n/a
A9	APPENDIX 9: RELEVANT LEVEL DETERMINATION	Not considered relevant to the Rules
A10	APPENDIX 10: RELEVANT DEMAND DETERMINATION	Not considered relevant to the Rules
A11	APPENDIX 11: DETERMINATION OF CONSTRAINED ACCESS ENTITLEMENT	Not in scope for detailed design of system operations arrangements

Appendix C Ancillary service illustrative worked examples

In this appendix, we provide illustrative worked examples for FCAS and SRAS cost allocations, for the purpose of charging these Ancillary Services to Participants.

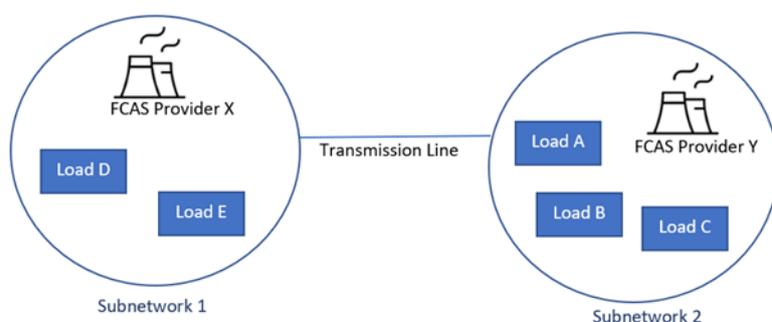
Providers will be paid for provision of these services, at terms to be negotiated by the ISO and based on standards and requirements which the ISO will determine.

Illustrative example - cost recovery of FCAS

Assume the *power system* comprises two sub-networks, and these sub-networks are connected by a single transmission line. The cost recovery is to be determined for *settlement month* of September 2020, hence the *allocation calculation period* for the *settlement month* is the period covering the *financial years* 2017/18 to 2019/20.

The power system is illustrated in the figure below.

Figure C.1 Diagram to illustrate FCAS cost recovery



Also, the *load swings* during the *allocation calculation period* occur as indicated in the table below.

Table C.1 Assumed load swings within the allocation calculation period

Load	Assumed		Calculated
	Positive Load Swing (MW)	Negative Load Swing (MW)	Load Swing (MW)
A	5 MW	-10 MW	15 MW
B	20 MW	- 15 MW	35 MW
C	1 MW	-2 MW	3 MW
D	12 MW	20 MW	32 MW
E	15 MW	-21 MW	36 MW

We also assume that:

- *FCAS provider Y provides FCAS for the entire power system and receives an FCAS monthly payment of \$200K per month under FCAS agreement Y.*
- *The ISO considers the loss of or network congestion of the transmission line connecting the two sub-networks, resulting in separation of the network to be a credible scenario. Therefore, the ISO also enters FCAS agreement X with FCAS provider X to provide FCAS when the transmission line is unavailable. The FCAS monthly payment under this agreement is \$20K a month.*

The cost recovery for the *FCAS monthly payments* for the *settlement month* can be calculated as shown in the table below.

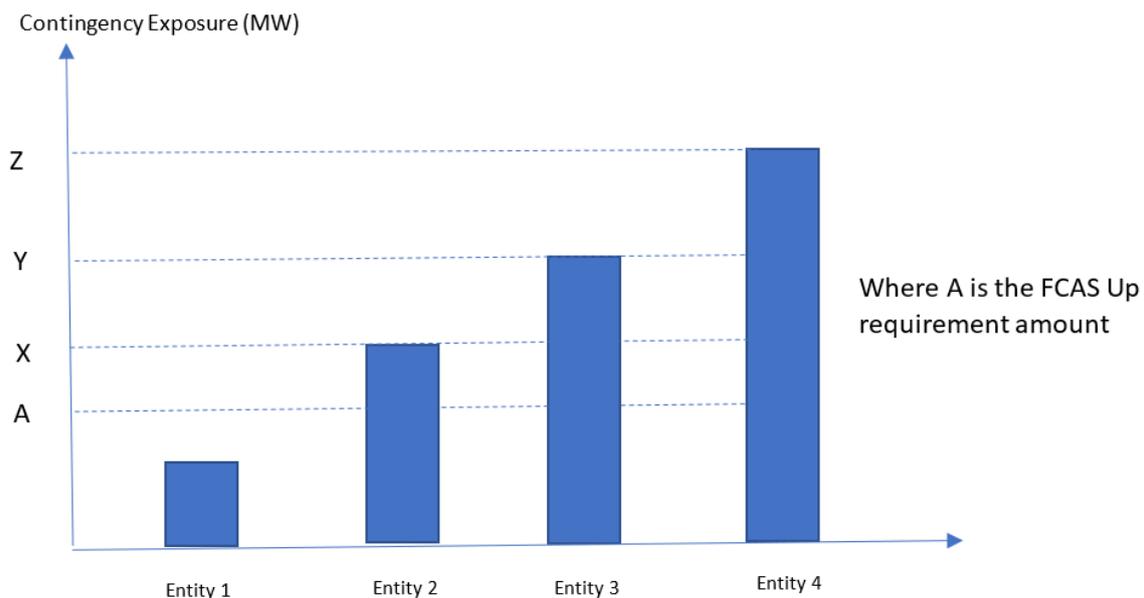
Table C.2 Example – cost recovery of FCAS monthly payment

Load	Contribution to <i>FCAS monthly payment</i> for <i>FCAS agreement Y</i>	Contribution to <i>FCAS monthly payment</i> for <i>FCAS agreement X</i>
A	$\frac{15}{15 + 35 + 32 + 36} \times \$200K$	0 (not in Subnetwork 1)
B	$\frac{35}{15 + 35 + 32 + 36} \times \$200K$	0 (not in Subnetwork 1)
C	0 (<i>load swing</i> less than 10 MW)	0 (not in Subnetwork 1)
D	$\frac{32}{15 + 35 + 32 + 36} \times \$200K$	$\frac{32}{32 + 36} \times \$20K$
E	$\frac{36}{15 + 35 + 32 + 36} \times \$200K$	$\frac{36}{32 + 36} \times \$20K$

Illustration of the airport runway model for allocating SRAS

To illustrate contingency exposure to SRAS using the 'airport runway model' we consider the largest unit of generation for each Entity during the *allocation calculation period*. In the figure below, we have plotted the generation of Entities 1 to 4, against their contingency exposures, noting on the graph the amount that is effectively covered by the *FCAS Up* requirement shown as 'A' in the figure below.

Figure C.2 Illustration of the airport runway model



The loss of any of these identified electricity generators represents credible *contingency events* which drive the spinning reserve ancillary service requirement amount. The generation quantities therefore represent the *contingency exposure* caused by the respective *Entities*.

It is proposed that the cost of *spinning reserve* for a *settlement month* is recovered from an Entity based on its *net contingency exposure* relative to the largest *net contingency exposure* during the *allocation calculation period*. To the extent that there is any shared *net contingency exposure* by the *Entities*, the extent of the shared exposure should be divided equally between the *Entities*.

The selection of *net contingency exposure* (rather than the gross *contingency exposure*) is due to the fact that any generation below the *FCAS Up* requirement threshold (A) does not need to contribute towards the SRAS cost. This is because the loss of this generation does not result in a *frequency excursion*.

From the figure above, the *net contingency exposures* of *Entities* 2, 3 and 4 can be calculated as X minus A, Y minus A and Z minus A respectively. *Entity* 1 has no *net contingency exposure* because its *contingency exposure* is less than the threshold A.

However,

- *Entities 2, 3 and 4 share the net contingency exposure of X minus A (MW). Therefore, the cost is shared equally between the three Entities for this net contingency exposure.*
- *Entities 3 and 4 share the net contingency exposure between X and Y (MW). Therefore, the cost is shared equally between Entities 3 and 4 for the exposure Y minus X.*
- *Entity 4 is the sole Entity exposed to the net contingency exposure between Z and Y (MW). Therefore, Entity 4 will pay 100% of the cost for the net contingency exposure Z minus Y.*

The proportion of costs allocated to each *Entity* can therefore be calculated as shown in the table below.

Table C.3 Proportional calculations for SRAS example by Entity

Entity	Proportion calculation for SRAS
<i>Entity 1</i>	Not required to contribute to SRAS because its <i>contingency exposure</i> is less than A
<i>Entity 2</i>	$Proportion_2 = \frac{\frac{1}{3} \times (X - A)}{(Z - A)}$
<i>Entity 3</i>	$Proportion_3 = \frac{\frac{1}{3} \times (X - A) + \frac{1}{2} \times (Y - X)}{(Z - A)}$
<i>Entity 4</i>	$Proportion_4 = \frac{\frac{1}{3} \times (X - A) + \frac{1}{2} \times (Y - X) + (Z - Y)}{(Z - A)}$