Energy Transformation Implementation Unit

Transformation Design and Operation Working Group Meeting 13

Tuesday 9 June 2020

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- Please keep questions relevant to the agenda item being discussed.
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- Please state your name and organisation when you ask a question to assist with meeting minutes.
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Agenda

- Operational planning and PASA
- GPS compliance and monitoring – transitional rules for existing generators
- Network Access Quantities

Forecasting and PASA Process

TDOWG Meeting 13

9 June 2020

Introduction

- The purpose of these slides is to share the thinking we have done around the applicability of the current Forecasting and PASA framework for a move to SCED.
- MT/ST PASA process need to be matched to the future requirements of the SWIS, including:
  - A move to Constrained Access and Security Constrained Economic Dispatch
  - Technology mix characterised by high levels of Variable Renewable Energy (VRE)
  - High levels of penetration of Battery Energy Storage Systems (BESS)
  - Increased levels of Distributed Energy Resources (DER)
  - Higher penetration of end use appliances that are responsive to prices and demand (DR)
  - Be designed to accommodate a wider range of credible threats to power system operations

The purpose of PASA

The primary purpose of the PASA processes is to make an assessment of "adequacy". It is fundamentally about identifying risks to maintaining power system security and reliability, allowing for the market to respond, and if necessary, for AEMO intervene in a timely manner.

Primarily - is there sufficient available capacity to meet the anticipated demand and maintain operating standards, allowing for future uncertainty such as:

- changes in weather patterns and statistical weather events
- planned and unplanned outage events
- availability and variability of intermittent generation
- availability of synchronous generation
- availability of service providers
- the impact and variability of embedded generation
- the impact of network constraints

Key PASA issues

AEMO has identified the following key issues in relation to a move to SCED:

Power System Reliability Assessment

- No direct linkage to reliability principles
- The move to SCED means that we can no longer use a "simple" reserve calculation, due to the impact of network constraints and to the increasing level of variable renewable energy sources.
- Lack of clarity on treatment of generation undergoing "commissioning" (e.g. new generation or following significant maintenance)
- Inflexibility for AEMO to determine the most appropriate forecasts to use when making PASA assessment, e.g.
    - (assessment of demand three years in advance in the MT PASA horizon will have different assumptions to an assessment three weeks in advance in the ST PASA horizon).
    - assessment of available demand side management capacity over different time domains
    - assessment of non-scheduled generation output
    - assessment of battery storage capacity over different time domains

Power System Security

- Publication period is infrequent and granularity of information is low
- Does not contain detailed information on binding network constraints and ESS
- Use statistical estimation of NSG quantities for determining reserve, which does not allow for the range of potential outputs that may occur

Notification and Intervention Criteria

- Lack of guidance around risk notification for participants, the capability for AEMO to intervene, and obligations on participants

Current MT PASA Objectives

- MT PASA provides a view of the adequacy of available supply to meet expected demand on a weekly basis for a three year ahead planning horizon.
- AEMO must use the assembled data to assist it with respect to:
  - setting Ancillary Service Requirements over the year; and
  - outage planning for Registered Facilities; and
  - assessing the availability of Facilities providing Capacity Credits, and the availability of other capacity.
- The formal output is published monthly on the AEMO website and is used by market participants to assist in their outage planning.

Current ST PASA Objectives

- The ST PASA provides a view of the adequacy of available supply to meet expected demand in the upcoming three-week window in 6 hourly intervals and it is published weekly.
- The adequacy assessment is an ongoing activity as generator planned outages are assessed. It also considers forecast demand changes to confirm if there are any abnormal situations that may require changes to the ESS requirements.
- In addition planned transmission outages are also considered particularly where they impact the availability of generation. Any security problems or planned commissioning tests are also highlighted.

Future PASA Objectives

- Both MT and ST PASA should provide sufficient and timely information about system security and reliability issues to AEMO and the industry such that
    - market participants can respond to the likely market need and thus reduce the need for AEMO to intervene in the market
    - AEMO can use different operational levers to maintain system reliability and security e.g. rescheduling a network outage, intervening via directions, or activating any SESSM in cases where market participants do not respond to the situation

Demand Forecasts – Current Separate Uses

- Dispatch and Pre-Dispatch Load Forecast
  - Used to feed dispatch engine, 5-minute resolution
  - Defined based on "dispatchable" quantities
  - Has an expanding window of uncertainty as pre-dispatch time window extends
- PASA
  - Statistical forecast model, taking into account historical weather variability
  - Six hour resolution for three week horizon – ST PASA
  - Weekly resolution for a three year horizon – MT PASA
  - Focus is on "reasonably likely" potential demand
  - Leverages ESOO for growth factors
  - Used for both ST PASA and MT PASA
    - Note currently first week of published ST PASA forecast uses 'high case' Trading Interval Load Forecast
- ESOO
  - Econometric determination of single yearly peak value over 10 year horizon
  - Based on sent-out data
  - Uses economic forecasts to determine underlying growth factors
  - Includes assessment of embedded generation impact

Different forecast quantities used in a PASA assessment

- AEMO/Market Participants/Network Operator:
  - Forecast of System Load is used for AEMO dispatch activities, modified to account for behind the fence loads. [Dispatch]
  - Market Load forecasts - This forecast is published and used to produce the balancing price forecast. [Pre- Dispatch]
  - PASA forecasts (as generated and sent-out) used by AEMO to determine reliability margins and to support generator outage assessments [PASA]
  - System Load forecasts (as generated) are used by operational planners for network outage planning and assessment. [Outage Assessment]
- Examples of NEM Demand Definitions in the table below:

Demand Type	Definition	Description
Underlying	Customer consumption	Consumption on premises (behind the meter) including demand supplied by rooftop PV and battery storage
Delivered	Underlying- PV-battery	The energy the consumer (either residential or business) withdraws from the electricity grid
System Load	Delivered + (network losses)	Total generation fed into the electricity grid. May be specified by as "sent out" (auxiliary load excluded) or "as generated" (auxiliary load included)
Operational "sent-out"	System Load – small non-scheduled	Demand met by generation "as sent out" by scheduled and large non-scheduled generators
Operational " as generated"	Operational " as sent out" + Auxilliary loads	Demand met by generation " as generated" by scheduled and large non-scheduled generators including demand on generator premises (auxiliary load)
Non-scheduled	Large + Small Non-Scheduled	Demand met by large and small non-scheduled generators.

Intermittent Generation Forecasts

- Current market rules require a market participant to ensure offers into the real-time market accurately reflect its 'reasonable expectation' of the capability of its Balancing Facilities to be dispatched.
  - For intermittent facilities this means that participant offers should reflect their generation forecast.
- This forecast may be useful in shorter term periods within the PASA (e.g. within the first week of the ST PASA) but it is would potentially be difficult/unreasonable to produce an ongoing, up to date, "expected" forecast for the full 3 year horizon.
- Therefore the PASA assessments need to allow flexibility for AEMO to use a range of "potential" or "likely" intermittent generation outputs in order to assess adequacy.

Design Principles

Key principles for PASA Rules

Design Proposal;

The overall key principle is that the rules should not prescribe the type of forecast quantities to be used in PASA, but link to an overarching PASA objective and to the power system security and reliability principles.

In addition to this:

- The rules should allow for flexibility to use the most appropriate forecast quantities in order to assess adequacy over the various PASA timeframes, including:
  - Demand quantities
  - Non-scheduled generation quantities
  - Demand side program quantities
  - Energy storage quantities

  [Similar to current PASA rules for NSG and DSP, but new requirement for demand. Remove hard coded requirements in the current rules]

- AEMO required to document in the Market Procedure the assessment methodology it uses to determine risks to Power System Security and Power System Reliability, including key criteria such as:
  - Events being catered (e.g. planned/forced outages)
  - Treatment of different situations (e.g. commissioning)
  - The different types of forecasts used
  - Contingencies

  [New requirement to aid transparency]

Design Principles

Key principles for PASA Rules

Design Proposal (continued);

- Information required by AEMO to support the PASA assessment, and timeframes for provision, to be documented in the Market Procedure.

  [Allowed for under current PASA rules but with new requirement for detail to be specified for transparency]

- Increase the granularity and publication frequency of the PASA reports to provide better, more useful information, however avoid hard coding to allow these to change as the needs of industry evolve. AEMO to document publication requirements in the Market Procedure, initial suggestion:
  - ST PASA: 30-minute granularity, spanning up to 1 week out (aligning with available bidding data), published daily. This aligns to the Week – Ahead Pre-dispatch schedule.
  - MT PASA: 30-minute granularity (daily peak for reporting), spanning from 1 week out to 3 years, published every week

  [New requirement to improve usability and provide flexibility, remove hard-coded requirements in current rules]

- All quantities used in the assessment are to be published, along with requirements to publish a more consumable summary report (with the report requirements being documented in the above Market Procedure).

  [New requirement to aid transparency and improve usability, remove hard-coded report requirements in current rules]

- Develop notification and intervention criteria specifying how key shortages (e.g. Energy, ESS) are identified, what AEMO can do to intervene, and the obligations of participants to respond, to be contained in the WEM Rules.

  [New requirement – discussed in later slides in this presentation]

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Power System Security and Reliability Assessment

MT/ST PASA – Future Assessment Options

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Current factors used in the Reserve margin calculation

+	Total scheduled generation capacity, weather adjusted
+	Total non-scheduled generation capacity, time of year adjusted
-	Planned & forced generator outages
-	Unusable capacity (e.g. NCS generators, behind the fence generators, transmission constraints)
+	Total DSM capacity
-	Planned & forced DSM outages
-	70% of largest generator that will be available at that time [Ancillary services – Spinning Reserve]
-	30% of largest generator that will be available at that time [Ready reserve – 15 mins]
-	70% of second largest generator that will be available at that time [Ready reserve – 4 hours]
+	System interruptible load (SIL) [that is not a DSM]
-	Planned or forced SIL outages
-	2nd standard deviation load forecast
	Reserve margin

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Current Issues for Reserve Margin

- Reserve Margin is the capacity remaining after all impacts are considered
  - If the Reserve Margin is zero, or not sufficiently positive, the Power System may not be secure
  - In general, AEMO approves outages by ensuring a positive Reserve Margin
- This static methodology is not suitable going forward as it does not cater for:
  - The impact of network constraints on available capacity
  - The variance of the demand forecast error over an expanding time horizon
  - The variability of intermittent generation sources
- A methodology is required that assesses reliability over a range of possible outcomes.

Type of capacity adequacy measures going forward

- Under the new Operating States framework, AEMO is required to develop and publish the Reliability Standard Implementation Procedure that includes key criteria for how AEMO will assess reliability in MT and ST PASA.
- Below are some common type of capacity adequacy measures used:
  - Capacity margin: a measure of the difference between total supply capacity and a measure of peak demand. In effect, this shows the expected 'safety margin' above expected demand.
  - Unserved energy (USE): the volume of demand that is 'lost' due to power supply interruption. For example, an average USE of 0.002% means that 99.998% of demand would be served without incident. USE reflects both the depth and duration of any power interruption;
  - Loss of load expectation (LOLE): the expected number of hours of power interruption. For example, some systems have a standard of no more than one day in 10 years (equivalent to 2.4 hours per year on average). LOLE does not reflect the severity of any power outage;
  - Loss of load probability (LOLP): the LOLE expressed as a fraction of hours per annum;

WEM Implementation - MT PASA Probabilistic Approach

Design

- The new MT PASA is intending to use a probabilistic modelling approach and could be made up of three different analyses.
  - A reliability run, to forecast unserved energy
  - A constraints run, to identify which constraints are likely to bind
  - A Loss of Load Probability run, to identify which intervals are at greater risk of unserved energy
- This would involve using time-sequential, security-constrained optimal dispatch simulations, incorporating Monte Carlo simulations.
- Monte Carlo simulations will be used to model key uncertainties such as generator outage patterns and the sensitivity of demand and intermittent generation to weather.
- Monte Carlo simulations could involve running many iterations which provides a range of possible outcomes.
  - Each iteration would vary based on demand and intermittent generation and/or the timing and extent of generation outages.
- MT PASA provides results that show the expectation and distribution of key results such as the level of USE, ESS availability and constraints.
- These results are then used by AEMO to determine whether market notifications are required, and whether intervention is required.

MT PASA Key Inputs

From participants:

- Facility capacity: available via Standing Data
- Unit energy modelling data and limits – Scheduled Generating units, wind turbine and large-scale solar availability (local limit information): as described in the market procedure
- Network and generator outages: available via outage submissions
- Expected commissioning/de-commissioning dates for new/upgraded or retiring plant: available from existing sources

From AEMO:

- Transmission constraint equations (incorporating network outages)
- Demand forecasts (e.g. 10% and 50% POE, to provide a potential range)
- Demand side management (DSM) forecasts
- Intermittent generation forecasts
- ESS forecast requirements to drive constraints, e.g.
    - MWs of RoCoF Control Service, system Inertia, or adequate levels of ramping capability
    - MW of Contingency Reserve and Regulation
    - at least 2 black start units

Methodology – Reliability Run

Key Objective: Forecast Unserved Energy (USE) over the three-year horizon;

- Uses multiple demand POE levels (e.g.10% and 50%)
- Monte Carlo iterations are run. USE is the weighted expectation across all simulations.
- If the expected annual USE, averaged across the simulations, exceeds the maximum level specified, a potential issue is identified.
- AEMO would issue a notice to the market identifying the timing, size and likelihood of the issue
- If not addressed by timely market response, AEMO's response to projected issues identified in MT PASA may be to utilise existing powers (e.g. cancel/reject outages), or to initiate supplementary reserve capacity for projected energy shortages.

Methodology – Assessment of likelihood of binding constraints

Key Objective: Forecast likelihood of constraints binding or violating over the three-year horizon;

- Uses multiple demand POE levels (e.g 10% and 50%)
- Monte Carlo iterations are run. Likelihood is the weighted expectation across all simulations.
- Constraints may bind at different times during simulations, depending on the demand and intermittent generation forecast used, planned & forced outages and generation dispatch.
- Used to identify potential shortfalls of Essential System Services, identify when and where network constraints may become binding on generators/load and identify any projected violations of power system security.
- AEMO's response to projected issues identified in MT PASA may be to utilise existing powers (e.g. reject or cancel outages), or to potentially initiate Supplementary ESS Mechanism (SESSM) to procure firm Essential System Services, or to direct participants with reserve capacity obligations and available capacity not on outage.

- AEMO will develop a "simple English" report on constraints that provides further details on generators impacted by binding constraints, shortfalls of ESS and will also provide key graphical outputs after each MT PASA run.
- AEMO will develop a report to provide stakeholders with information on constraints and resulting network congestion that are updated regularly.
    - Congestion Information Resource
        - Analysis of the constraint equations that bound during a trading interval
        - Annual WEM Constraint Report

Methodology – Loss of Load Probability (LOLP) run

Key objective: To assist participants in timing planned outages to reduce the risk of unserved energy (by determining which days have higher risk of loss of load).

- Similar modelling approach to Reliability run but with a single set of "abstract" traces extracted from the set of reference years.
- Determine the maximum half-hourly demand net of total intermittent generation across the 10% POE inputs for each reference year. Record which reference year this demand occurred in.
- Construct a trace that uses all data (demand, wind, solar), repeated so that each day within a month (e.g. every Tuesday in December) is the same.
- The construction of abstract demand traces means that each day is modelled as a "worst case" for that day of the week and in each month.
- Monte Carlo simulations are performed.
- Results would show the likelihood of load shedding across the three-year horizon.
    - that is, days when load is most at risk, (note - this is not a measure of the actual chance of load shedding on a given day).

ST PASA Model Detail

As a general principle, the more the ST PASA model reflects physical reality, the better the outcome. Moving to a shorter horizon (i.e. 1-week horizon) allows the assessment to reflect:

- Demand forecasts based on dispatch, allowing for uncertainty effects of forecasting as the time horizon expands
- Actual participant bidding information, including ESS capability
- Actual information from the pre-dispatch process, indicating likely dispatch outcomes
- Consideration of network constraints based on projected outage conditions
- Consideration of probabilistic approaches for linked events such as high wind speeds leading to wind turbines disconnecting, bushfires affecting multiple transmission lines etc.
- AEMO's response to projected issues identified in ST PASA may be to utilise existing powers (e.g. cancel/reject outages), or to initiate more directive measures such as directions to offer ESS where accredited, or directions to commit of capacity where there are Reserve Capacity Obligations to manage energy shortfalls.

Intervention Criteria, Notification and Obligations

For maintaining Power System Security and Reliability

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Current WEM Intervention Process

- From an energy perspective, the primary intervention mechanism in the planning horizon for AEMO currently is the outage mechanism.
- PASA assessments are used to aid in outage approvals, and identify where the reserve margin is low requiring cancellation/re-scheduling of outages.
- This includes assessment of the current Ready Reserve Criteria, which is a broad factor intended to cater for scarcity of Ancillary Services.
- These are supplemented by manual power system studies, investigating the impact of network outages on security and reliability.
- Where an issue is identified, an outage can be either cancelled/re-scheduled or recalled. However often this decision is deferred until closer to real-time to allow for the most up to date information.
- From a real-time perspective, shortages in Ancillary Service quantities are generally managed through short term re-dispatch of the Synergy Portfolio, or in more severe cases through constraining participants via dispatch and activation of Backup Load Following Services.
- This results in a general lack of transparency to the market in general that a risk exists, with insufficient time for the market respond naturally.

New Intervention Process

- There will be new requirements added to the WEM Rules for AEMO to identify Low Reserve conditions and details will be described in the market procedure.
  - A Low Reserve condition may signify where the risk of having insufficient capacity to meet the expected demand has become unacceptable (as detailed in the Reliability Standard Implementation Procedure).
  - Also a Low Reserve condition may identify where the probability of not being able to maintain Power System Security or Power System Reliability without load shedding has become high.
- There may be multiple Low Reserve condition levels specified to help identify how likely the issue is to occur (i.e. increasing in probability).
- AEMO will notify the market as soon as practicable when a Low Reserve condition is identified.

New Intervention Process

- Following a Low Reserve condition being identified and notified to the market, AEMO may subsequently intervene in different ways to resolve the issue (depending on the circumstance and the identified probability).
- The WEM Rules will specify the general principles for intervention, but it may not always be possible to follow these exactly depending on the actual situation. If AEMO is unable to follow the general principles, AEMO will have the discretion to operate outside these general principles where it considers reasonably necessary in order to maintain Power System Security or Power System Reliability (e.g. where there is insufficient time).
- The intervention general principles will be to use the following order of priority:
    1. Where a risk has been identified but the probability assessed as low or AEMO intervention to resolve the risk could reasonably be made at a later time, allow the market to react naturally.
    2. Re-schedule outages where possible ahead of time, to avoid late cancellation of outages
    3. Where a lack of available capacity for dispatch is identified, but there is still available capacity not on outage – direct participants with Reserve Capacity Obligations and available capacity not on outage to offer
    4. Recall outages
    5. Where a lack of ESS capacity is identified, but there is still available capacity not on outage;
        - Direct any facility holding a SESSM award for the relevant shortfall to offer first
        - Then any facility accredited for the relevant ESS to offer
    6. Direct participants with available capacity to operate at a particular level or in a particular way based on registered capability
    7. Procure Supplementary Reserve Capacity or trigger the Supplementary ESS Mechanism.

Example interventions

Examples of possible interventions are below:

Condition	Potential intervention
Forecast low reserve level, but low probability event	No intervention, allow market to respond. AEMO identify "at risk" Outages as a result
Forecast ESS capacity shortage in MT PASA timeframes, but with low probability event	No intervention, allow market to respond. AEMO identify "at risk" Outages as a result (where ESS providers are on outage over the risk period)
Forecast ESS capacity shortage in MT PASA timeframes, with high probability	If outside [12] months: no intervention , allow market to respond If within [6-12] months and can be resolved by adjusting outages: Reject/Cancel/Re-Schedule Outages If within [6-12] months and cannot be resolved by adjusting outages: Procure Supplementary Essential System Services
Forecast energy shortage in MT PASA timeframes, with available DSP capacity forecast to be utilised	Reject/Cancel/Re-schedule outages
Forecast energy shortage in MT PASA timeframes, with no available capacity remaining not on outage	Procure Supplementary Reserve Capacity
Forecast energy shortage in ST PASA timeframes, capacity available with RCOQ but not offering in service	Direct participants with Reserve Capacity Obligations to offer
Forecast energy shortage in ST PASA timeframes, with no available RCOQ capacity not on outage	Recall outages

Reserve Levels and Intervention

Design principles

Design:

- New requirement in the WEM Rules for AEMO to identify Low Reserve conditions.
- AEMO must as soon practicable publish any low reserve conditions.
- AEMO must immediately publish a notice of any foreseeable circumstances that may require AEMO to implement a AEMO intervention event.
- AEMO will intervene only after notification, except where the condition is identified with very short notice, in which case the declaration will be notified as soon as practicable.
- New requirement in the WEM Rules for an Intervention guideline for the intervention general principles explained in the previous slide.
- Specific intervention powers will be linked to reserve level declarations in the scheduling and dispatch rules.
- AEMO will be required to develop a methodology in a Market Procedure that describes the following:
  - how AEMO will determine declaration of low reserve conditions (reserve level declaration), including any levels.
  - Notification processes and timeframes.
  - Intervention process for AEMO to intervene and adhering to the general intervention principles.

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PASA: Next Steps

- Draft the ETF paper
  - Sets out the current arrangements and the key principles to be retained, modified, removed and added in the market design
  - Design issues to be addressed
- Draft WEM Rules changes
- Consult on draft Rules


Questions

Energy Transformation Implementation Unit

GPS Compliance and Monitoring – Transitional Arrangements

TDOWG

9 June 2020

Framework - recap

Record	Lack of visibility about contracted standards	Register of generator performance standards under the WEM Rules
Monitoring	Low uptake of self-monitoring programs	Institute a requirement for self monitoring under the WEM Rules
	No role for central monitoring for compliance purposes	Give AEMO and Western Power central monitoring functions
Enforcement	Lack of proportionate compliance responses	Introduce civil penalty provisions for GPS non-compliance

Applying the framework to existing generators

The new compliance and monitoring framework for generator performance standards is expected to be finalised in the WEM Rules late 2020.

It will commence on 1 February 2021 for generators that finalise a network access offer from that date.

Generators who are connected to the network or have a finalised network access offer before this date will be ‘existing generators.’

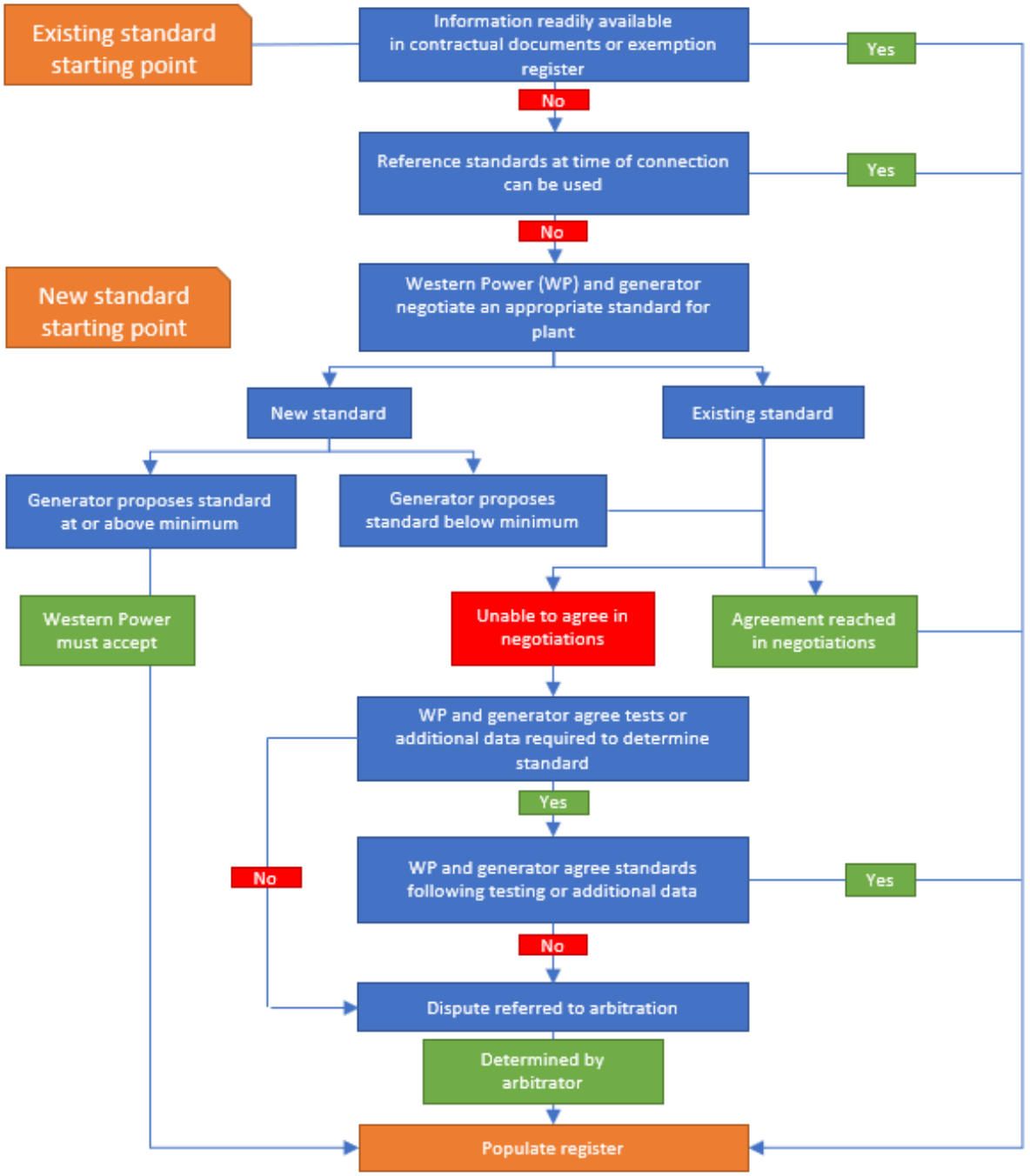
An existing generator will not be subject to the framework until it has a full set of generator performance standards populated in the register and a monitoring plan approved by AEMO.

Register - content

Proposed standard	New/revised/unchanged
Reactive power capability	Revised
Voltage and reactive power control	Revised
Active power control	Revised
System strength	New
Inertia and frequency control	Revised
Disturbance ride-through (frequency)	Revised
Disturbance ride-through (voltage)	Revised
Disturbance ride-through (multiple contingencies)	New
Disturbance ride-through (partial load rejection)	Revised
Disturbance ride-through (quality of supply)	New
Generator protection systems	Unchanged
Quality of electricity generated	Revised, with new elements
Impact on network transfer capability	Revised
Model provision	Revised

Register - process

- Generators negotiate with Western Power
- Western Power required to consult with AEMO – cannot accept a negotiated standard unless AEMO also does
- Bespoke dispute resolution process – to be discussed



Register - timing

Western Power and existing generators can begin process to populate register immediately after WEM Rules are made (late 2020)

Deadline of February 2022 to finalise standards, unless extension is agreed by both parties

After February 2022, if there is no agreement to extend determination will be referred to dispute resolution

Parties can refer to dispute resolution before this date

Self monitoring plans - content

Details about how each generator will monitor its compliance with the standards in the register

Must be approved by AEMO and as a general rule must be consistent with the template published by AEMO

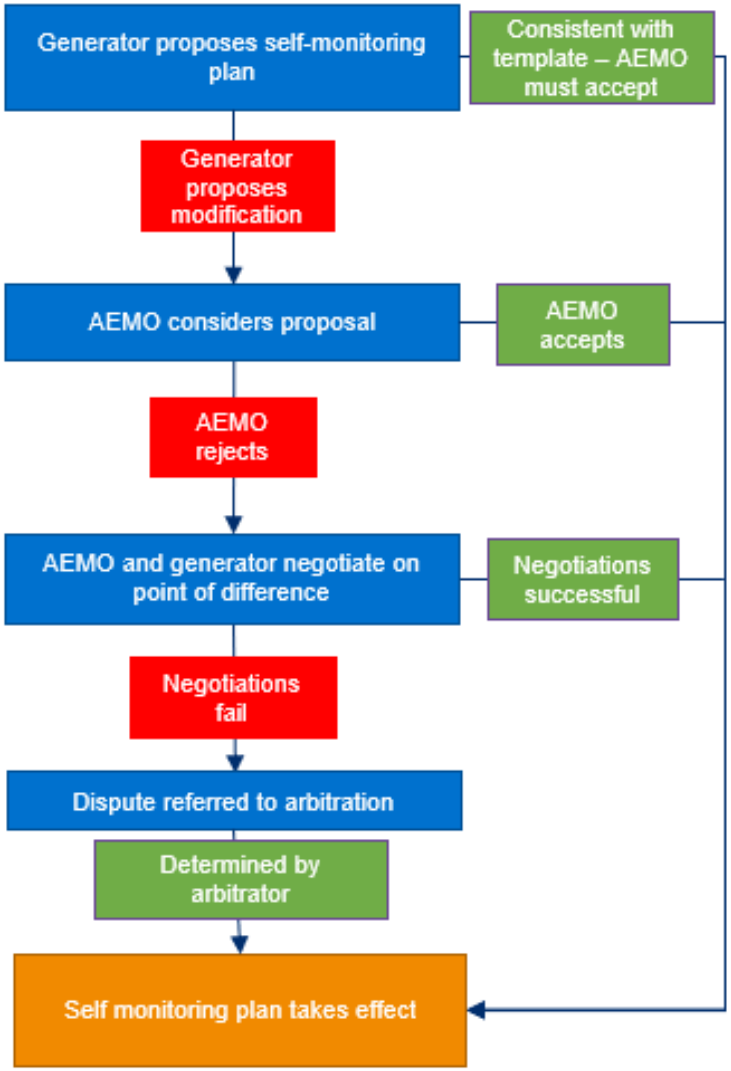
However, some existing generators may not be able to comply with the template without incurring significant costs

Some generators already have self-monitoring plans agreed with Western Power under the Technical Rules

Designing a framework to guide modifications for existing generators

Self-monitoring plans – process

- Generators negotiate with AEMO
- AEMO permitted to consult with Western Power – but no formal approval requirements
- Bespoke dispute resolution process – to be discussed



Self-monitoring plan – factors for consideration

When assessing a proposal for a modification AEMO must consider:

- Technical/physical inability to comply
- Consistency of alternative with electricity industry best practice
- Age of generator
- Risk
- Efficacy of alternative proposed testing method
- Advice from manufacturers and industry experts
- The technology of the plant
- Testing method or data source used to establish standard

Generators with self-monitoring plan approved by Western Power

If a generator already has a self-monitoring plan that it has agreed with Western Power and is currently operational, then AEMO will be obliged to accept that monitoring plan unless they can demonstrate that the method of testing proposed demonstrates an unacceptable risk to power system security and reliability.

However, if existing monitoring plans do not cater for self-monitoring of new standards, then the generator will be required to make a proposal to AEMO with regard to monitoring these standards, which will be considered in line with the factors in the previous slide above.

Self monitoring plan - timing

Generators required to submit proposed self monitoring plan by 1 August 2021

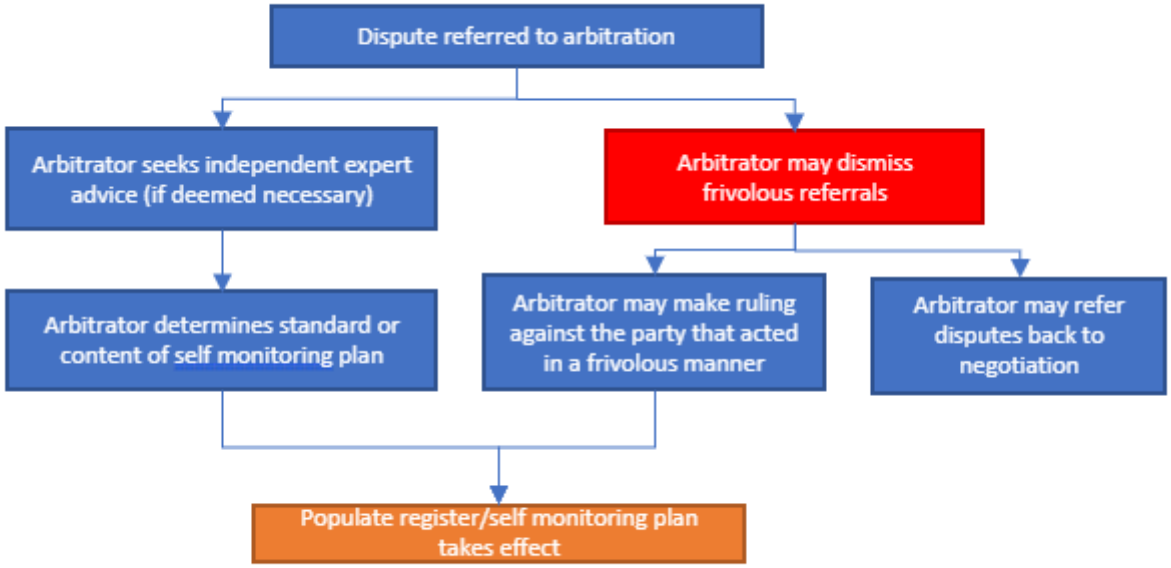
Failure to do so will be considered breach of the WEM Rules

12 months allowed for AEMO and generator to agree self monitoring plan, unless an extension is agreed

If no plan or extension agreed by 1 August 2022, automatically referred to dispute resolution

Parties may refer to dispute resolution prior to this date

Dispute resolution - process



Dispute resolution – cost recovery

The arbitrator will be permitted to assign costs associated with a specific dispute to parties involved in the dispute as they consider appropriate

In allocating costs, the arbitrator will be required to consider the following factors

- the final decision;
- the conduct of the parties before the arbitrator;
- any settlement or positions from the parties prior the hearing;
- any public interest considerations or wider ramifications

Parties will bear their own legal costs unless the arbitrator considers there is a compelling reason to assign one parties costs to another.

Civil penalties - application

The Taskforce has agreed to measures to address early non-compliance through rectification plans to ensure civil penalties are not unfairly or unnecessarily imposed.

The civil penalty framework will apply to all generators on an ongoing basis.

It will apply as at February 2020 to generators that finalise a network access offer and connect to Western Power's network after this date.

It will apply to existing generators once they have a set of standards populated in the register and a self-monitoring plan approved by AEMO.

Civil penalties - scope

Civil penalties will be associated with the requirements for generators to

- Comply with the relevant performance standards
- Comply with requirements of any trigger events in the register
- Address any non-compliance with performance standards whilst operating under an interim approval to generate
- Only dispatch electricity into the market for the purposes of a commissioning test prior to being issued an interim approval to generate or approval to generate
- Submit a self-monitoring plan to AEMO within the required timeframes (this includes both new and existing generators)
- Comply with, an approved self-monitoring plan
- Report any non-compliance with the relevant performance standards
- Notify Western Power prior to undertaking a generator modification

Civil penalties - quantum

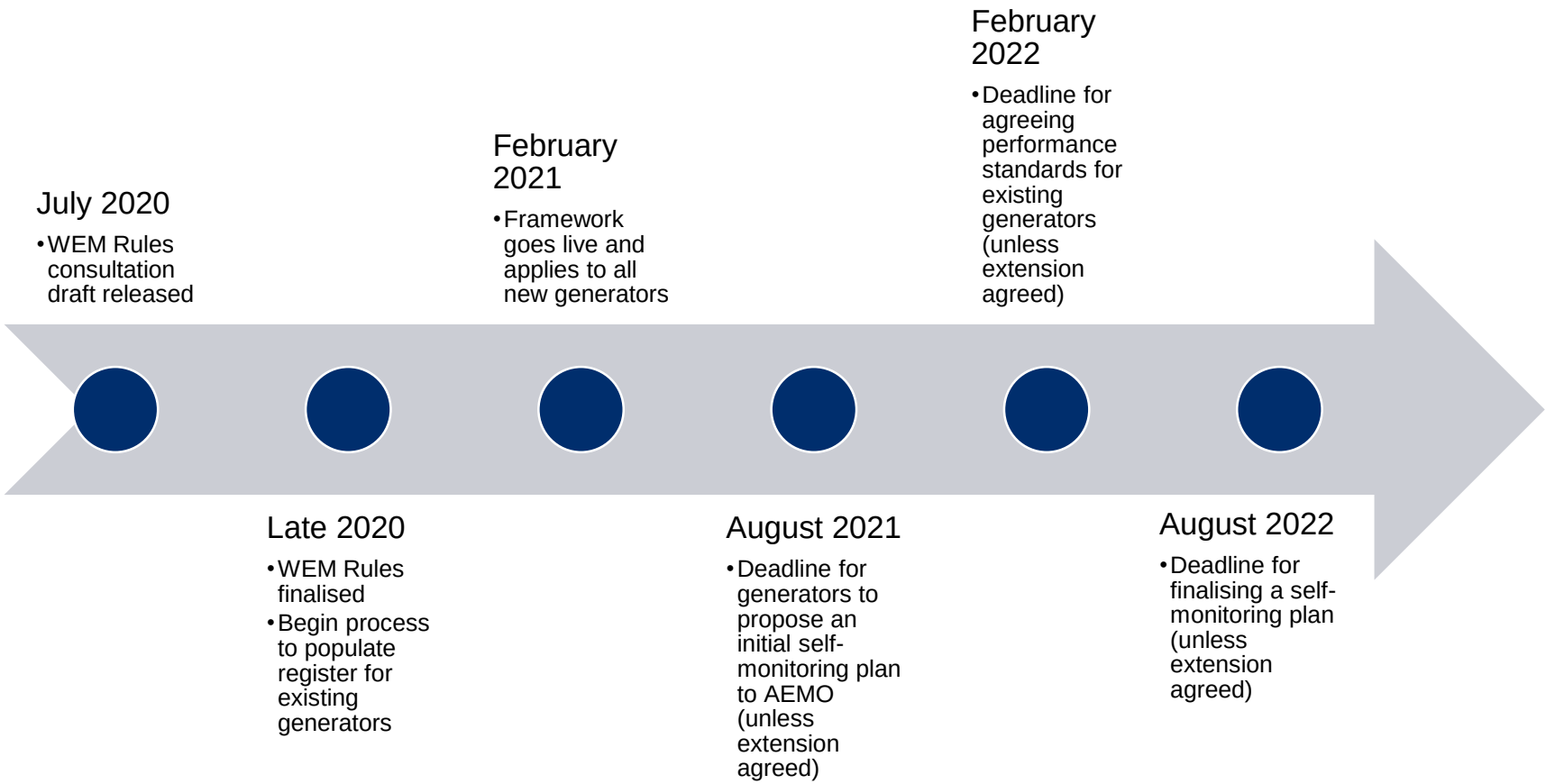
Ongoing

- Category C penalty
- Maximum penalty of $100,000 for first and subsequent contraventions
- Daily penalty of $20,000

Transitional (until new market start)

- Category A penalty
- Maximum penalty of $10,000 for first contravention
- $20,000 for subsequent contravention

Next steps


July 2020
•WEM Rules consultation draft released
Late 2020
•WEM Rules finalised
•Begin process to populate register for existing generators
February 2021
•Framework goes live and applies to all new generators
August 2021
•Deadline for generators to propose an initial self-monitoring plan to AEMO (unless extension agreed)
February 2022
•Deadline for agreeing performance standards for existing generators (unless extension agreed)
August 2022
•Deadline for finalising a self-monitoring plan (unless extension agreed)

Energy Transformation Implementation Unit

TDOWG 13

9 June 2020

NAQ policy issues
Connection and access

Agenda

1. NAQ framework – Recap

2. Key design parameters remaining for Taskforce endorsement

3. Connection and access

NAQ framework

Recap and next steps

NAQ framework

Recap and next steps

To date

February 2020 – Key design parameters endorsed by Taskforce

March 2020 – Transition to the new framework

Next steps

June 2020 – Key design parameters remaining to be endorsed by Taskforce

June and July 2020 – Resolve remaining issues for NAQ framework design

August and September 2020 – Finalise draft amending rules

October 2020 – Commence formal consultation on draft rules

November 2020 – Submit amending rules to Minister for approval

NAQ framework

Key design parameters remaining

Variability in RLM

Intermittent facilities

Accounting for changes in Relevant Level

Issue

- NAQ framework requires NAQ to be reduced where CRC < NAQ.
- Intermittent facilities' CRC is set by the relevant level.
- Relevant level is variable and depends on weather conditions.
- The fluctuation in relevant level may result in a facility losing NAQ and then being required to compete for a subsequent increase with new facilities.

Taskforce decision (February 2020)

- Intermittent facilities should receive a limited exception to the general rule that facility performance must support NAQ.
- The exception is intended to preserve the facility's NAQ from being reduced for a limited period of time due to performance issues outside its control.
- The duration of the exception would be consulted on with industry but the Taskforce considered a one-year protection to be acceptable.

Intermittent facilities

Accounting for changes in Relevant Level

Discussion

- The NAQ assignment process prioritises existing facilities ahead of new facilities when assigning NAQ.
- The NAQ for any existing facility can be affected by factors beyond their control, such as changes in demand, changes in the configuration of the network, and for intermittent facilities, variability in the renewable resource.
- In these circumstances, the existing facility's performance has been demonstrated. It would be unreasonable then, in the event that demand, network, and weather conditions improve, to require the existing facility to compete with new facilities for any NAQ that could be supported by the facility's performance.
- Consistent with this design, existing intermittent facilities will be assessed ahead of new facilities for NAQ associated with a subsequent increase in their relevant level.
  - Note that where an existing facility has applied for an upgrade for its facility (e.g. an intermittent facility adds more turbines resulting in an increase in its nameplate capacity), the increase will need to be competed for with new facilities.

Intermittent facilities

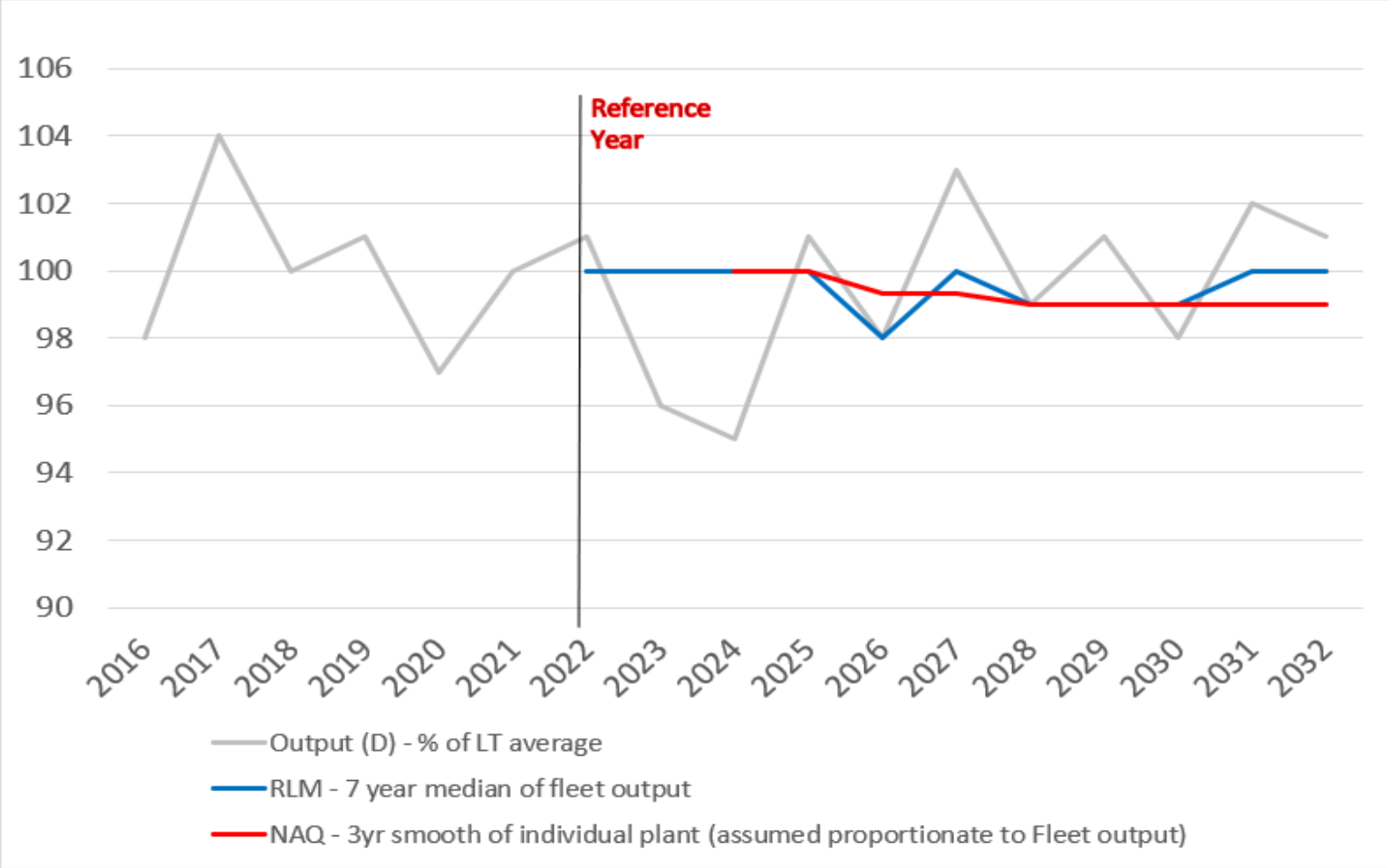
Accounting for changes in Relevant Level

Discussion

- Under the current RLM, a facility's relevant level is calculated based on the average of 5 years of output across specific trading intervals.
- While this averaging provides a degree of 'smoothing', it still results in a level of volatility for intermittent facilities.
- The ERA's proposed changes to the RLM (outlined in its Rule Change Proposal to the MAC on 29 July 2019) outlines several additional measures to further address and dampen this volatility, including:
  - Use a larger sample of 7 years for the calculation.
  - Use the median of capacity value results determined for each year in the 7 year period. Use of median ensures that results will not be biased towards extremely large or small values in the 7 year sample. The median is also capped by the capacity value of the fleet of intermittent generators based on the full 7 year period sample result.
  - The use of a 3 year moving average also ensures that results will not vary drastically between years and in the medium to long term trend.

Intermittent facilities

Accounting for changes in Relevant Level



This graph has been derived by Oakley Greenwood from CSIRO data in Coppin PA et al, Wind Resource Assessment in Australia – A Planners Guide, 2003, Wind Energy Research Unit CSIRO Land and Water, Figure 6

Intermittent facilities

Accounting for changes in Relevant Level

ETIU recommendation

The ETIU does not recommend any protection be provided for intermittent facilities' NAQ against volatility in the relevant level for the following reasons:

1. Existing facilities (including intermittent facilities) will be assessed ahead of new facilities for any NAQ associated with a subsequent increase in relevant level.
2. The additional measures to smooth the variability of the relevant level of facilities under the proposed RLM should dampen the volatility for intermittent facilities.

Replacement of capacity

Replacement of capacity
Changes in technology

Issue

- NAQ is performance based and will be retained so long as facility performance is maintained to the assigned level of NAQ. This incentivises investment in maintaining plant performance.
- This investment could result in the replacement of the original capacity resource with a new, and in some cases different, capacity resource. Allowing a facility to retain its NAQ could provide a level of protection that goes beyond the original purpose of the NAQ.
- The Taskforce was concerned that protecting incumbents from competition indefinitely may not deliver the efficiencies that can eventuate from the NAQ becoming contestable at some point.

Taskforce decision

- ETIU to consult with industry on the threshold at which investments in replacement of a capacity resource should be treated as a ‘new’ facility, triggering the need for its NAQ to become contestable.

Replacement of capacity
Changes in technology

Discussion

- Balance between competing objectives:
  - Providing investment certainty by rewarding capacity when it contributes to reliability and ensuring investment in appropriate capacity resources.
  - Promoting competition and allowing new entrants opportunities to invest in the SWIS.
- Difficult to identify the threshold where an investment in a facility should be treated as a ‘new’ facility. ETIU looked at:
  - Brownfield developments
  - Routine maintenance
  - Upgrades
- Examples are provided.

NAQ variations

Change in technology – Examples (1)

Type of change	Description	Type of change	Comments
Open cycle gas turbine (OCGT) is converted to a combined cycle gas plant (CCGT).	Gas turbine adds a waste heat recovery boiler and modifies gas turbine settings. New control system is required.	Brownfield development.	The conversion of the OCGT to a CCGT is a change in generation technology. ETIU considers this creates a 'new and different' facility that requires the Market Participant to relinquish its NAQ.
Windfarm upgrades turbines with larger turbines	Existing 3MW turbines are progressively replaced with 5MW units. The larger turbines require new towers, changed locations, new collection wiring and new control system. New connection assets are required.	Brownfield development.	No change the underlying generation However, the modification requires wholesale changes to the facility and so it could be considered as a 'new' facility that would require the Market Participant to relinquish its NAQ.
Plant replaced with similar plant. No increased output.	Gas turbine plant is replaced similar sized but new gas turbine unit(s). New equipment and control systems may or may not be required. it may also be necessary for new connection assets to be installed.	Brownfield development and/or maintenance.	Gas generation plants typically have several gas turbines. It may be more to replace a single gas turbine with a unit of equivalent performance and characteristics rather than undertake repairs to the turbine. However, not a 'different' facility that would require the Market Participant to relinquish its NAQ.

NAQ variations

Change in technology – Examples (2)

Type of change	Description	Type of change	Comments
Gas turbine adds steam or water injection	Gas turbine adds water injection facilities and upgrades control system.	Output increase without technical change. Routine upgrade / maintenance activities.	Summer output is increased, requiring modelling but no change to underlying technology. Also improves environmental performance as emissions (SOx and NOx) reduced. Investment in a plant that is efficient as it improves performance & reduces emissions.
Large Thermal plant does a major overhaul.	Full unit shutdown with replacement of all worn parts, minor upgrades and replacements.	Maintenance activities.	Major turbine/boiler checks are typically done every seven years or so. These investments are required to ensure that the technical and economic life of the original facility is optimised, as opposed to extending the life of the facility beyond its original investment planned life.
Gas turbine realigns blades for increased performance	Blades realigned to improve exhaust flow and therefore power output.	Routine upgrade.	A facility's performance (i.e. its CRC) can degrade over time without proper maintenance. This type of investment would ensure that the facility's CRC is maintained to a level that is equal to its assigned level of NAQ.
Additional Wind turbines installed	An existing wind farm gains additional land and adds turbines as part of an existing facility	Greenfield development.	Any increase in the facility's nameplate capacity will require the facility to compete with new facilities for any increased NAQ to support the higher nameplate capacity.

Replacement of capacity

Changes in technology

ETIU recommendation

- More work is required to develop an appropriate threshold.
- Defer the development of a threshold to a future work program.
- Threshold is not required for the start of constrained access for the RCM.
- Continue consulting with stakeholders.

Treatment of DSM

DSM
Impact on network availability

Issue

- Capacity Credits assigned to DSM providers can also be impacted by the entry of new generation capacity or other DSM providers.
- In principle, DSM providers should receive the same level of certainty that other capacity resources will receive under the NAQ framework.

Taskforce decision

- DSM providers, once accredited for Capacity Credits should, in-principle, receive the same level of certainty that other capacity resources will have under the NAQ framework.
- The accreditation of DSM should be subject to a locational aspect.

Demand Side Management

Impact on network availability

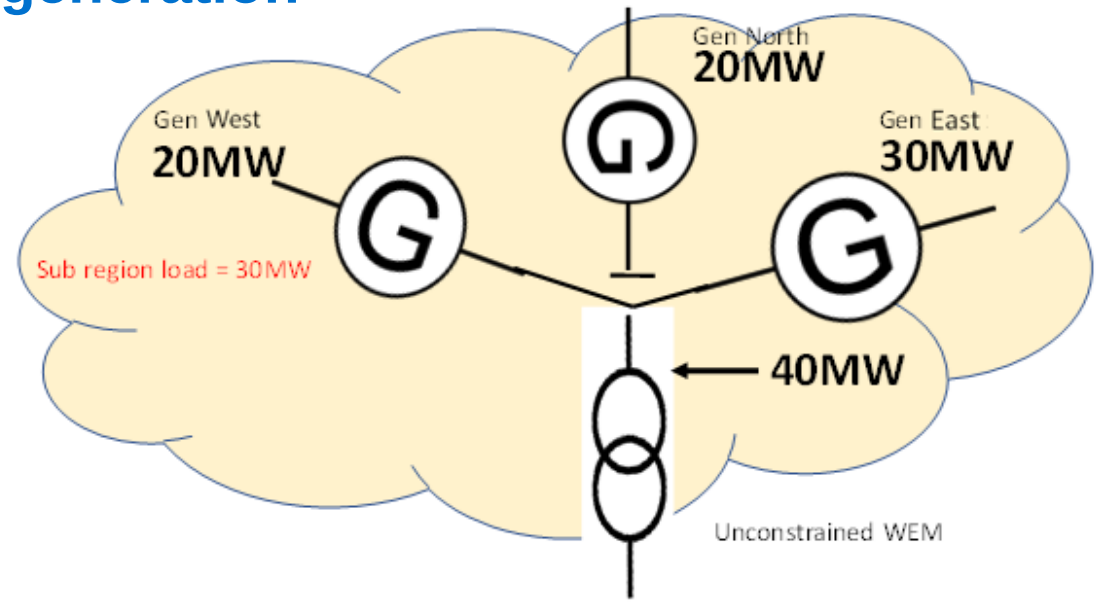
DSM is independent of network access in the normal sense as it is the reduction of a load.

However, in the presence of network constraints, the reduction in a local load will reduce the level of local generation required and therefore:

- While DSM does not require the use of network to provide its service
- Operation of DSM impacts on the network availability to others
- Therefore the presence of DSM must be assessed when NAQ is considered:
  - For new generators and
  - New DSM options

DSM Network impact

A region with DSM and generation

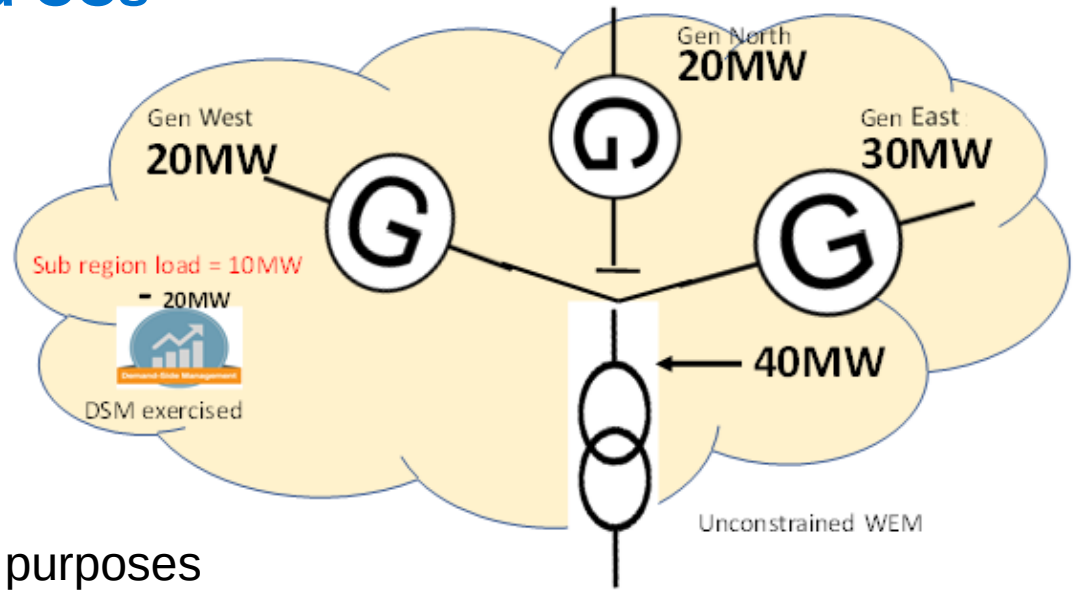


Available DSM but not exercised

- Region has a load of 30MW
- Generation of 50MW
- Network connection capable of transferring 40MW
- Unconstrained (20 MW clear)
- 20MW of DSM can be operated
- Potential new entrant, Gen North, would provide 20MW

DSM Network impact

DSM has been assigned CCs



- Same region but for RCM purposes
  - Generation of 50MW is operating
  - DSM of 20MW is operating
- Effective load is reduced to 10MW
- Network connection is now constrained
- Potential new entrant, Gen North, cannot be allocated NAQ or CCs
- Note that the example is symmetrical, if Gen North was already connected, the DSM could not be allocated NAQ or CCs

DSM integration

Needs to be equivalent to generation

If Gen North were already connected and had CCs:

- It would have been allocated NAQ
- Its investment would be protected

Therefore, for symmetry, when the DSM is already connected and has CCs:

- DSM needs an instrument to protect its investment
- The existence of the DSM will impact network availability to others
  - Option 1 – allocate NAQ equivalent to DSM
  - Option 2 – always check for DSM before allocating NAQ to others
- **Option 1 is simpler to implement and is recommended**

Connection and access

Connection and access

Key dates

Changes to Western Power's access instruments:

- **Applications and Queuing Policy**
- **ETAC (the standard access contract)**
- **Capital Contributions Policy**

July	Aug/Sep	Nov/Dec
Informal consultation through one-on-one with interested stakeholders	Release draft amendments and commence formal consultation	Changes to Western Power's access instruments are made

Meeting close

- Questions or feedback can be emailed to TDOWG@energy.wa.gov.au

- Next meeting on 19 June to work through draft rules for Ch -3A, related to GPS.