



Power System Operations Working Group –
Meeting 4:

PSSR Regulatory Framework, Technical Rules Changes, Constraints Governance and Pre-Dispatch

June 27th 2019

Quick note

We are planning to record this session to assist in notes and minute taking, if anyone has any concerns about this please let us know and we will disable the recording.

Thank you

Agenda

1. Reform Update
2. Previous Meeting Minutes Acceptance
3. PSSR Regulatory Framework (ETIU)
4. Technical Rules Change Management (ETIU)
5. Short break
6. Pre-Dispatch Overview (AEMO)
7. Constraints Governance (ETIU)
8. Update on ESS Modelling (AEMO)

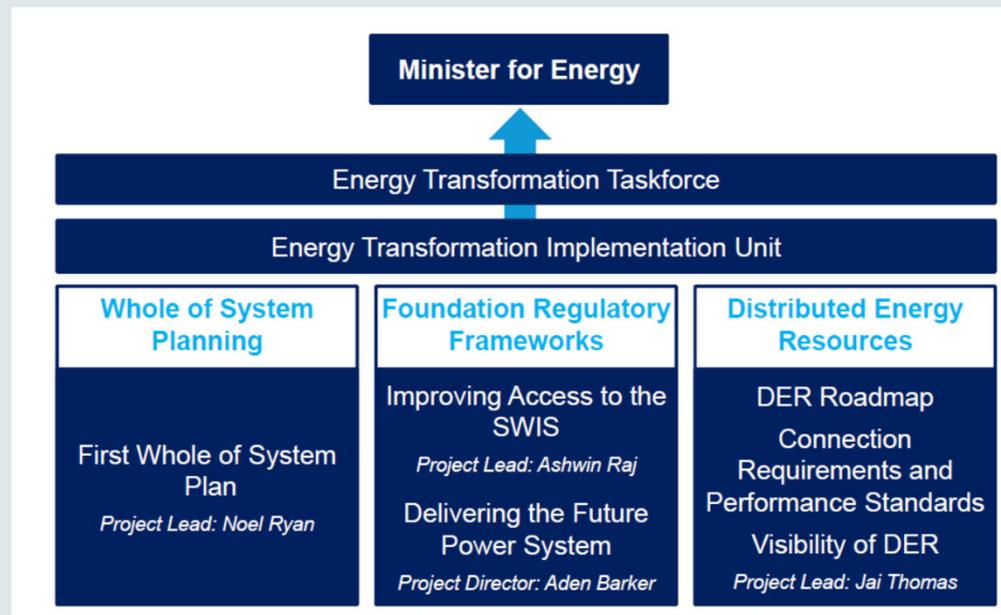
Ground Rules

A few ground rules to get us started

- There is a large amount of material to work through in the workshop today, and the session chair will try to keep us on time in order to have sufficient time for discussion
- Should it not be possible to get through all the material within the available workshop time, a second session may be scheduled depending on the amount of material remaining and availability of attendees, or alternatively feedback may be provided out-of-session
- Questions and issues raised should be relevant to the discussion at hand, although questions/issues affecting other areas of the reform (or outside of the reform) will still be captured
- We will attempt to capture all questions/answers discussed during the session today, for circulation after the workshop along with these slides and any revisions to the papers as a result of the workshop discussions
- All feedback/discussion is relevant, if attendees do not have a chance to ask a question or raise an issue, please feel free to make use of the PSOWG mailbox: WARPSO@aemo.com.au

Reform Update

- At the 11th of June 2019 MAC, the newly formed Energy Taskforce Implementation Unit (ETIU) gave a presentation to MAC members on the Government's Energy Transformation Strategy (ETS) and the Energy Transformation Taskforce (ETF)



Reform Update

- In that presentation, ETIU also provided an update on the forms of stakeholder engagement that would be used to progress the market design elements.
- ETIU reiterated that stakeholder engagement is critical to the successful delivery of the Government's Energy Transformation Strategy, and confirmed that both the Power System Operation Working Group (PSOWG) and Market Design and Operation Working Group (MDOWG) would continue to be used to present design recommendations and seek considered feedback from working group members.
- This is a recognition of the valuable contribution that both the PSOWG and MDOWG have given to the reform process so far.
- We have recently revised the Terms of Reference for the working groups to reflect the changes in the structure of reform, these will be updated on the RCP website shortly.
- AEMO will continue to chair the PSOWG and will continue to work closely with ETIU and other industry bodies to develop content for the working group.

Previous minutes

Confirmation of previous minutes

PSSR Regulatory Framework

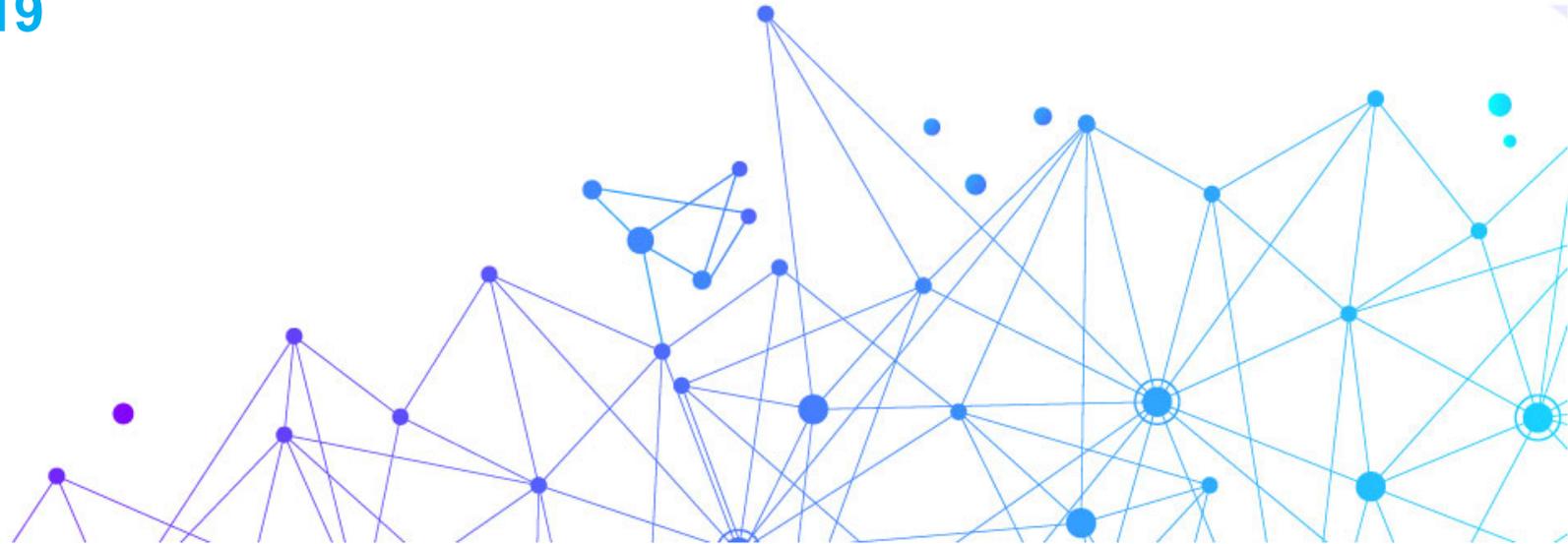
PSSR Regulatory Framework (ETIU)



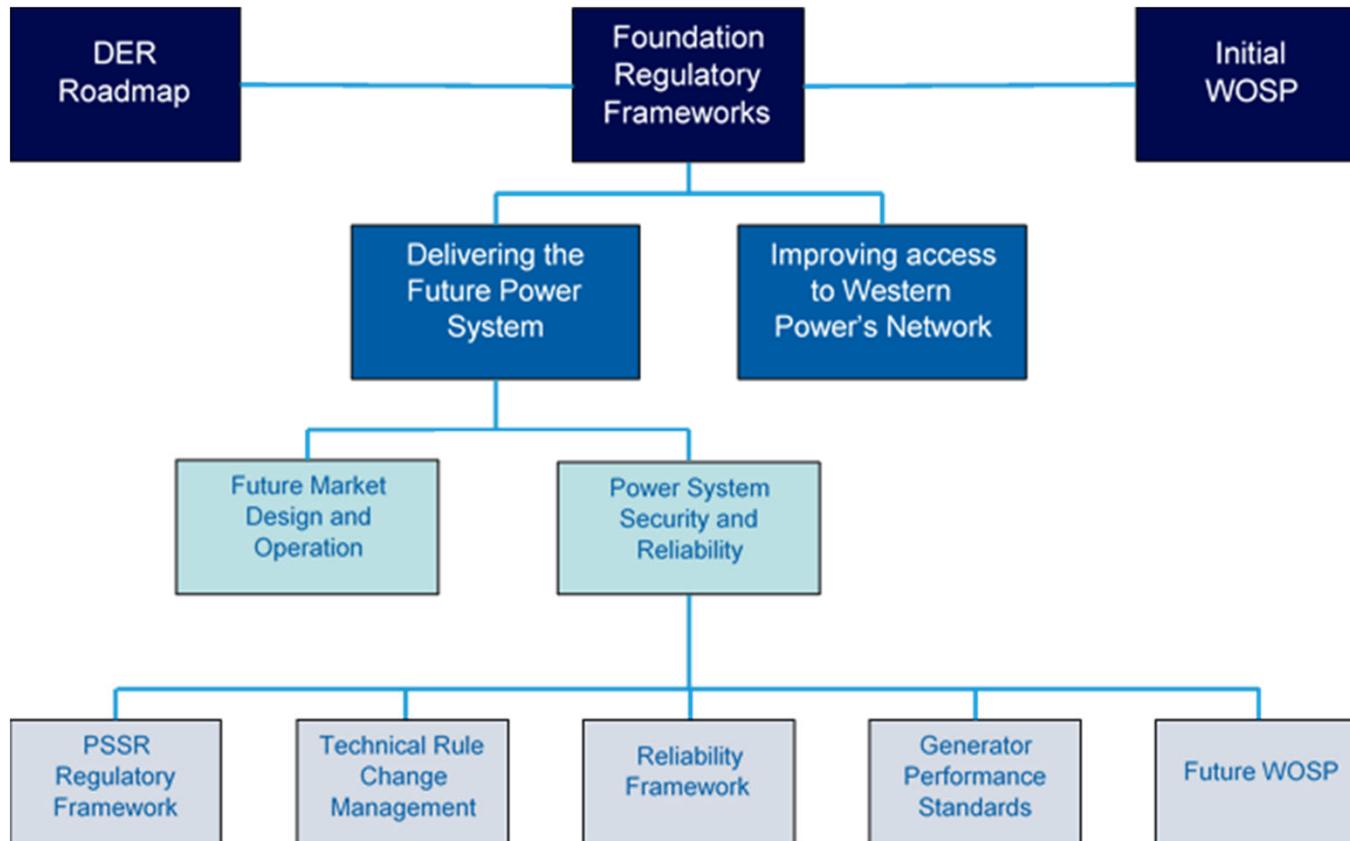
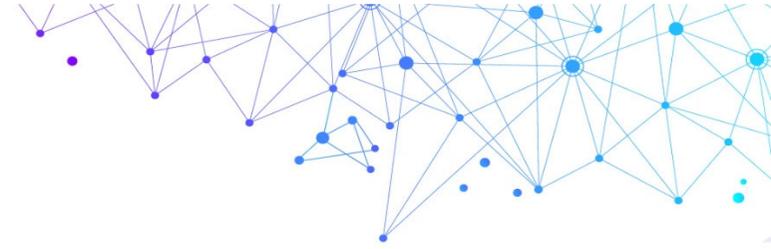
**Energy Transformation
Implementation Unit**

Regulatory Framework for Power System Security and Reliability

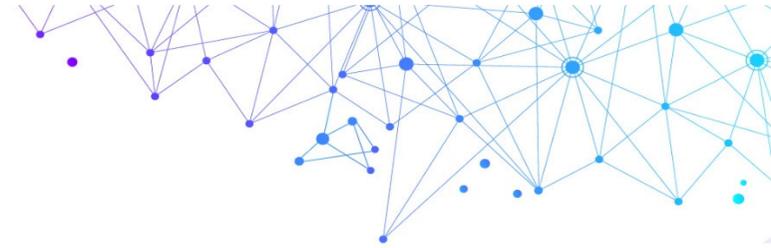
PSOWG 27 June 2019



STRUCTURE



PURPOSE AND SCOPE



The project aims to make improvements to the PSSR regulatory framework to support the safe and reliable operation of the SWIS into the future, acknowledging the changing generation mix and system load profile, as well as the Government's intention to move to a constrained network access model.

Instruments within scope include:

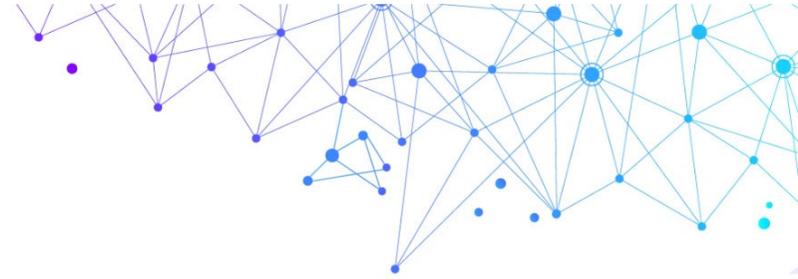
- The Electricity Networks Access Code 2004;
- The Electricity Industry (Access Code Enforcement) Regulations 2005;
- Western Power's Technical Rules;
- The Electricity Industry (Wholesale Electricity Market) Regulations 2004;
- Wholesale Electricity Market Rules;
- Energy Industry (Rule Change Panel) Regulations 2016; and
- The Electricity Industry (Network Quality and Reliability of Supply) Code 2005.

OUT-OF-SCOPE

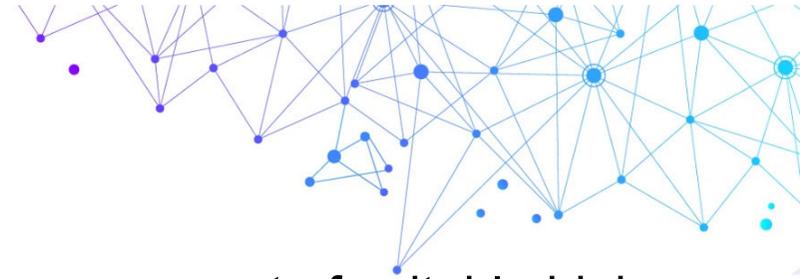
Changes to primary legislation are out-of-scope.

The following are being addressed through related work streams or projects:

- Review of PSSR standards [AEMO and WPC]
- Technical Rules governance [ETIU]
- Compliance options [ETIU]
- Gaps with respect to DER, batteries, and microgrids [As required: Western Power; ETIU; AEMO; PUO]

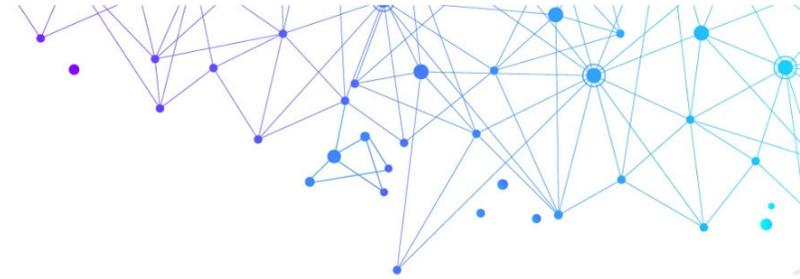


PROJECT PLAN



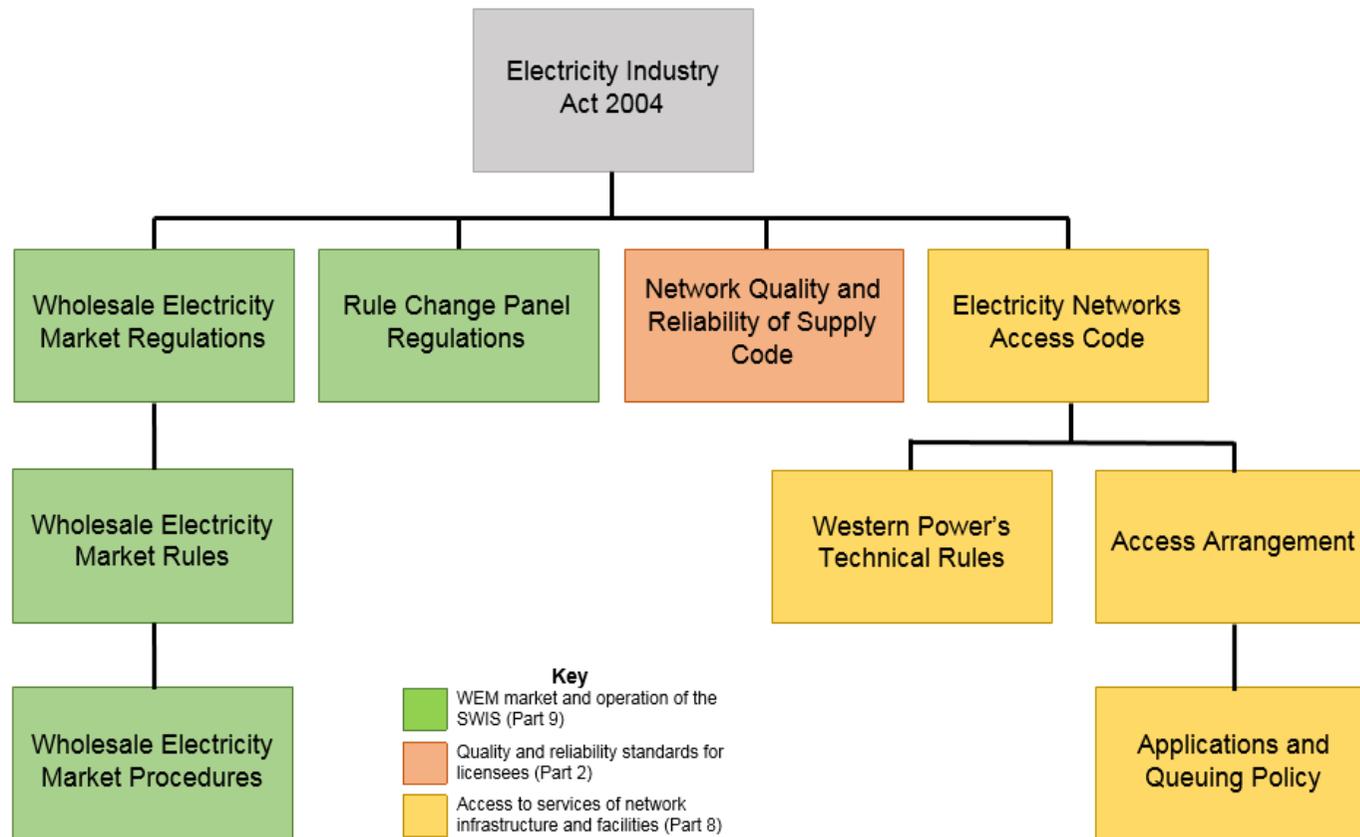
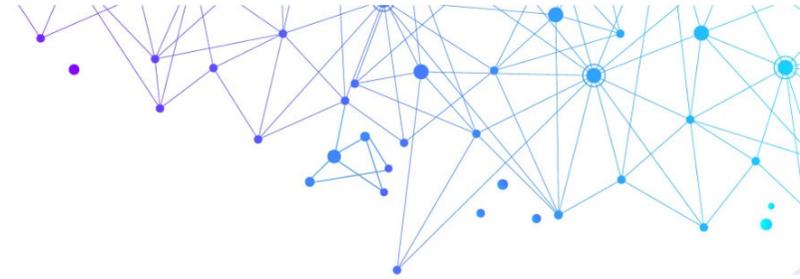
- **Phase 1 (this stage):** includes problem identification and assessment of suitable high-level framework options to address such problems. This phase concludes with agreement on a high level framework for further development under Phase 2. Phase 1 will be presented to the Energy Transformation Taskforce in July 2019.
- **Phase 2:** focuses on further developing the preferred option, including a detailed assessment of regulatory and rule changes required. This stage concludes with agreement on detailed drafting instructions for all relevant instruments within the framework. Phase 2 will be presented to the Energy Transformation Taskforce by the end of 2019.
- **Phase 3:** implements the changes identified in Phase 2. As the changes required will likely affect a range of instruments that have dependencies with other projects, scheduling of amendments are expected to occur over time, rather than a 'big bang' approach to implementation. Phase 3 will occur throughout 2020.

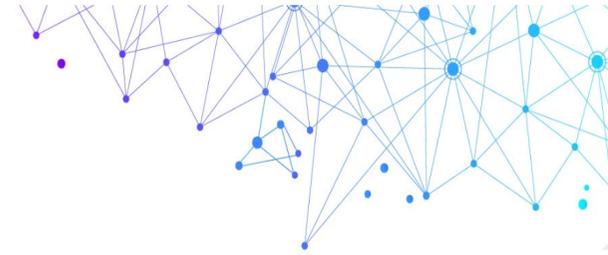
THE PROBLEM



- The existing generator performance standards are out-dated and do not well reflect the changing nature of the power system.
- Western Power and AEMO have proposed a revised generator performance guideline to better reflect the needs of the power system and the types of connections that it has now and into the future
- The proposed generator performance guideline allows for a range of different connection options depending on the specific connection scenario, and allows AEMO (as the System Manager) and Western Power to negotiate with the connecting entity around their generator performance standards.
- However, the current framework does not permit the System Manager to have a formal role in the negotiation of generator performance standards prior to the connection of new generators.
 - This is partially a result of the incomplete implementation of EMR reforms
 - If persisting long-term the inadequacies of the current framework will propagate, increasing risk to the management of the system
- The current monitoring and compliance regime for large generators is lacking, leading to a lack of known, consistent connection standards, ultimately increasing risk to the management of the system; and
- Duplication and gaps exist within the current framework, resulting in inefficiency and risk.

CURRENT FRAMEWORK



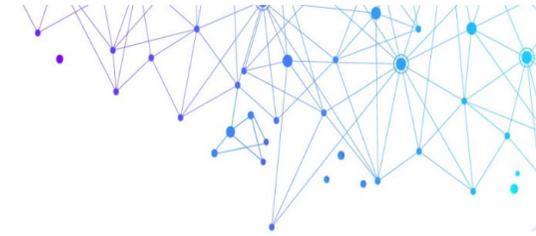


PROPOSAL 1: GPS AND FOS

Move frequency operating standards and select generator performance standards from Western Power's Technical Rules to the Market Rules to better align with roles and responsibilities and improve compliance options.

- Transmission connected, registered generators
- Standards to encompass those consulted as part of the Generator Performance Guidelines as well as certain other standards under the Technical Rules that relate to system security (detail to be confirmed under Phase 2)

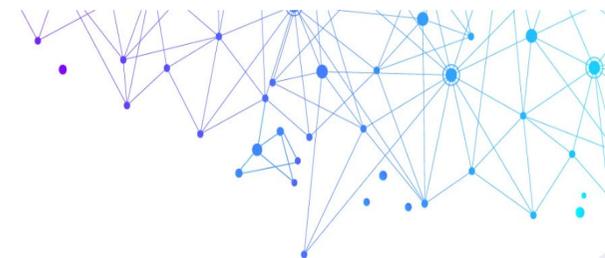
PROPOSAL 2: RULE CHANGE PANEL



Bolster the Rule Change Panel to accommodate a wider range of potential rule change requests- partially to support the movement of generator performance standards.

- Increase number of panelists from 3 to a range between 4 and 5
- Relax eligibility provisions
- Increase conflict of interest provisions

PROPOSAL 3: REGULATORY 'TIDY-UP'

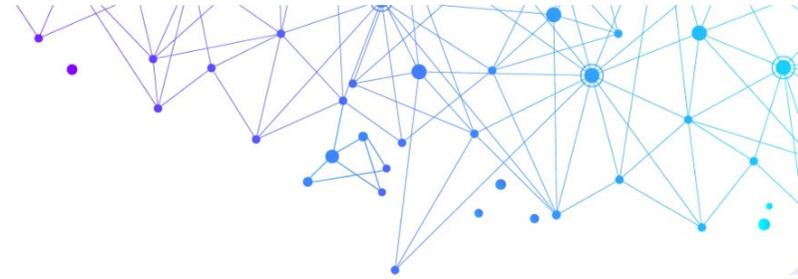


This is intended to capture a collection of more minor changes to address gaps, clarify roles and responsibilities, remove duplication and improve coordination between instruments, with the goal of improving efficiency and managing emerging risks.

- Examples include aligning definitions (where appropriate) and removing duplicated reporting between the NQRS and Access Arrangement.

The full range of changes will be scoped as part of Phase 2 of the project.

NEXT STEPS



- Papers to the Energy Transformation taskforce in August 2019 covering:
 - Proposed changes to the location of generator performance and frequency operating standards
 - Proposed changes to the Rule Change Panel
 - Publish resulting papers where applicable
- Develop appropriate amendments to the reliability standards to accommodate constrained access
- Proceed to Phase 2, expected to be complete by end 2019.
 - Detailed design of proposals, including assessment of how facility registered generators will comply with GPS and regulatory ‘tidy-up’
 - Publish resulting papers where applicable
 - Drafting (Access Code; WEM Rules; NQRS)

Technical Rules Change Management

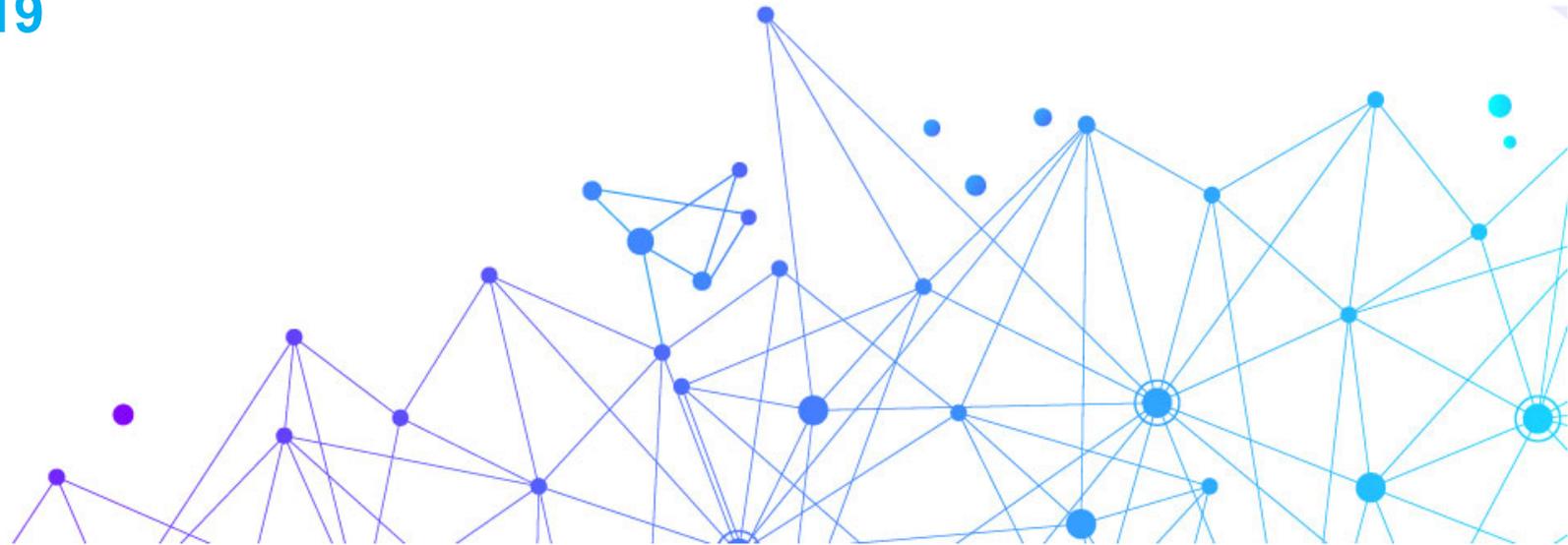
Technical Rules Change Management (ETIU)



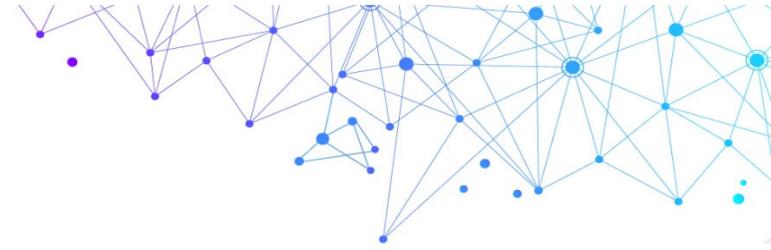
**Energy Transformation
Implementation Unit**

Western Power's Technical Rules – Proposed Change Management Process

PSOWG 27 June 2019



PURPOSE & SCOPE



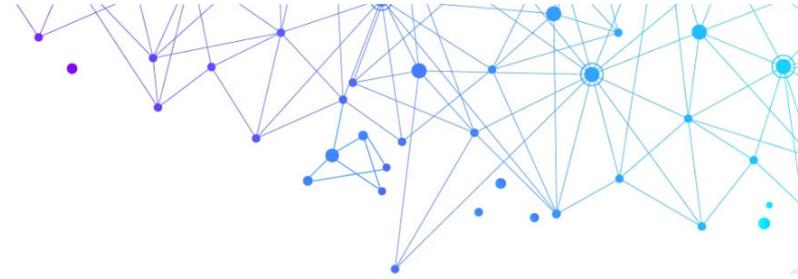
- To improve the change management process for amending the technical rules, which govern covered electricity networks.
- The technical rules provide the standards, procedures and planning criteria governing the design, construction and operation of a covered electricity network. They also set the technical standards for the facilities, loads and generators that connect to the network in order to meet reliability, power quality and safety standards.
- Focus on Western Power's Technical Rules, acknowledging that changes may affect other parties into the future.

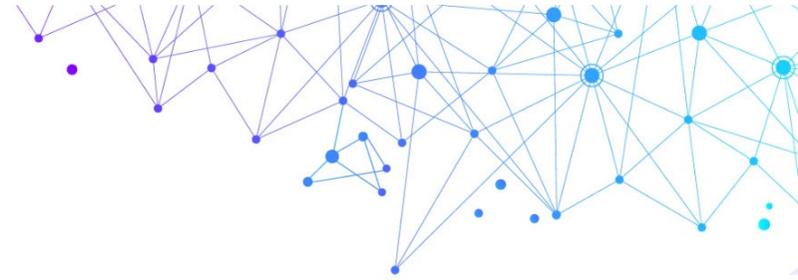
OUT-OF-SCOPE

Changes to primary legislation are out-of-scope.

The following are being addressed through related work streams:

- Review, update and amendment of Technical Rules [Western Power & ERA]
- Technical Rules Compliance [ETIU]
- Gaps with respect to DER, batteries, and microgrids [As required: Western Power; ETIU; AEMO; PUO]



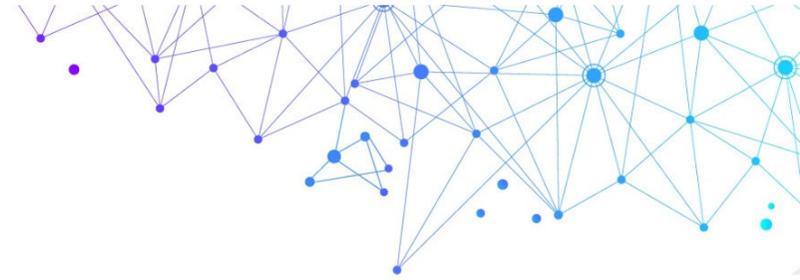


THE PROBLEM

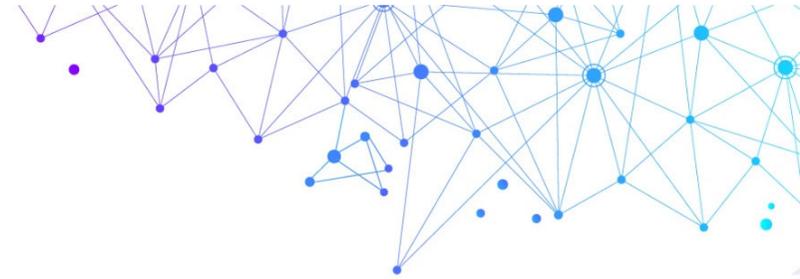
- Effectively, only Western Power can submit to the ERA a proposal to amend its Technical Rules. Industry is unable to submit a rule change request and currently has limited ability to effect long-term change.
- The existing rule change process has not resulted in a dynamic instrument that is able to keep pace with the changing power system.
- The Technical Rules Committee (TRC), is formed to consider and advise the ERA on approval of proposed Technical Rules. As it currently stands, the TRC is used as an ad hoc body that is only formed to address particular rule change requests, and then disbanded or left dormant.
- In designing a new change management process, consideration must be given to process and the ability of the ERA to manage potentially large volumes of change requests.

PROPOSAL - CONTINUING KEY ARRANGEMENTS:

- ERA continues as decision maker.
- Technical Rule change requests are submitted to the ERA.
- The Chair of the TRC is appointed by the Coordinator of Energy.
- The TRC continues to report to the ERA as an advisory committee.
- The ERA must consider any advice from the TRC.
- The ERA must consult the public on substantial changes.
- The ERA recovers its costs of administering and approving the Technical Rules through Western Power's access charges.

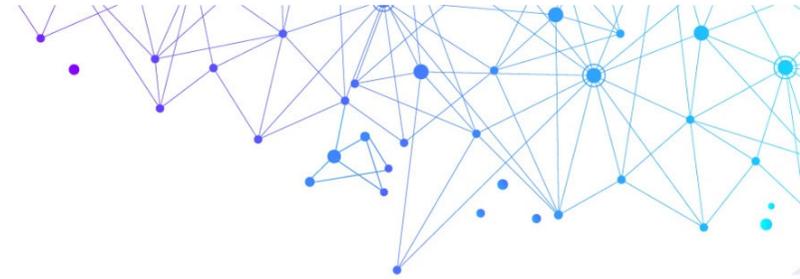


PROPOSAL - MODIFIED ARRANGEMENTS:



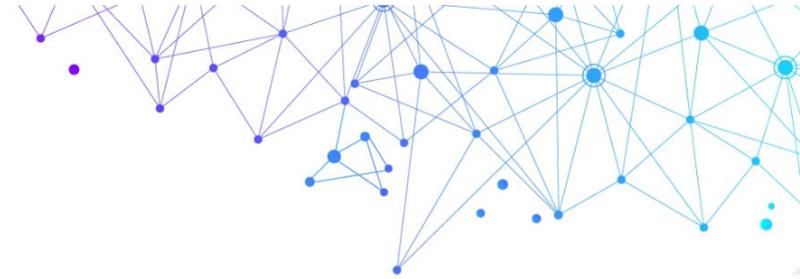
- The TRC becomes a standing committee and may also consider and advise on emerging issues. Membership to include AEMO with appropriate cost recovery in the WEM rules for AEMO.
- The TRC may establish sub-committees to deal with specific areas; e.g. transmission/distribution, energy storage and inverters.
- The ERA must seek the advice of the TRC for any rule change request that it does not reject.
- The ERA can reject rule change requests that are trivial, vexatious, misconceived or lacking in substance, but this is to be expanded to allow the ERA to reject overlapping or redundant rule change applications.
- The ERA approves (or rejects) proposals based on its view as to whether it meets the objectives of the Technical Rules, the objectives of the Access Code and its view as to whether the proposal will have a material adverse affect on the service provider or a User. These criteria do not consider whether the proposal increases the costs of electricity to consumers, decreases reliability or security or the overall benefits. It is recommended the Access Code is amended to allow the ERA to consider a wider range of benefits of a proposed rule change.

PROPOSAL – NEW ARRANGEMENTS



- Rule change requests may be submitted to the ERA by **any** interested party
 - Changes are required to ensure that AEMO can cost-recover for change proposals it may make.
- The ERA may manage the flow of rule change requests through establishing priorities, conditions and formats for proposals, etc.
- The TRC may request the ERA provide the services of technical consultants to advise the TRC.
- The ERA is to establish and fund a Secretariat (Executive Officer) to support the TRC. The Secretariat is to report to and be responsible to the Chair of the TRC.
- Serving on a standing TRC may be onerous for persons who are not paid to undertake this role. The ERA is provided with flexibility, but not the obligation, to pay some TRC members (i.e. Consumer representatives) for their participation.

NEXT STEPS



Phase 1 – Completion by August 2019

- Present to PSOWG for comment – meeting of 27 June 2019.
- Prepare advice for Energy Transformation Taskforce (ETTF) – July 2019.
- Publish resulting papers where applicable

Phase 2 – Completion by end of 2019

- Finalise design elements (e.g. priority consultation approach, guidelines for TRC member payment)
- Prepare detailed drafting of changes to the Access Code.
- Obtain ETTF and Ministerial approval to proceed to implementation.
- Publish resulting papers where applicable

Phase 3 – Completion by February 2020.

- Access Code amendment process, which includes public consultation on drafted amendments.
- WEM Rule changes to allow the AEMO to cost recover for submitting Technical Rules change proposals and participating on the TRC.

Break

Short break

Pre-Dispatch Overview

Pre-Dispatch Overview (AEMO)



WEM Reform: Pre-Dispatch Development

PSO-WG Meeting 4
27 June 2019

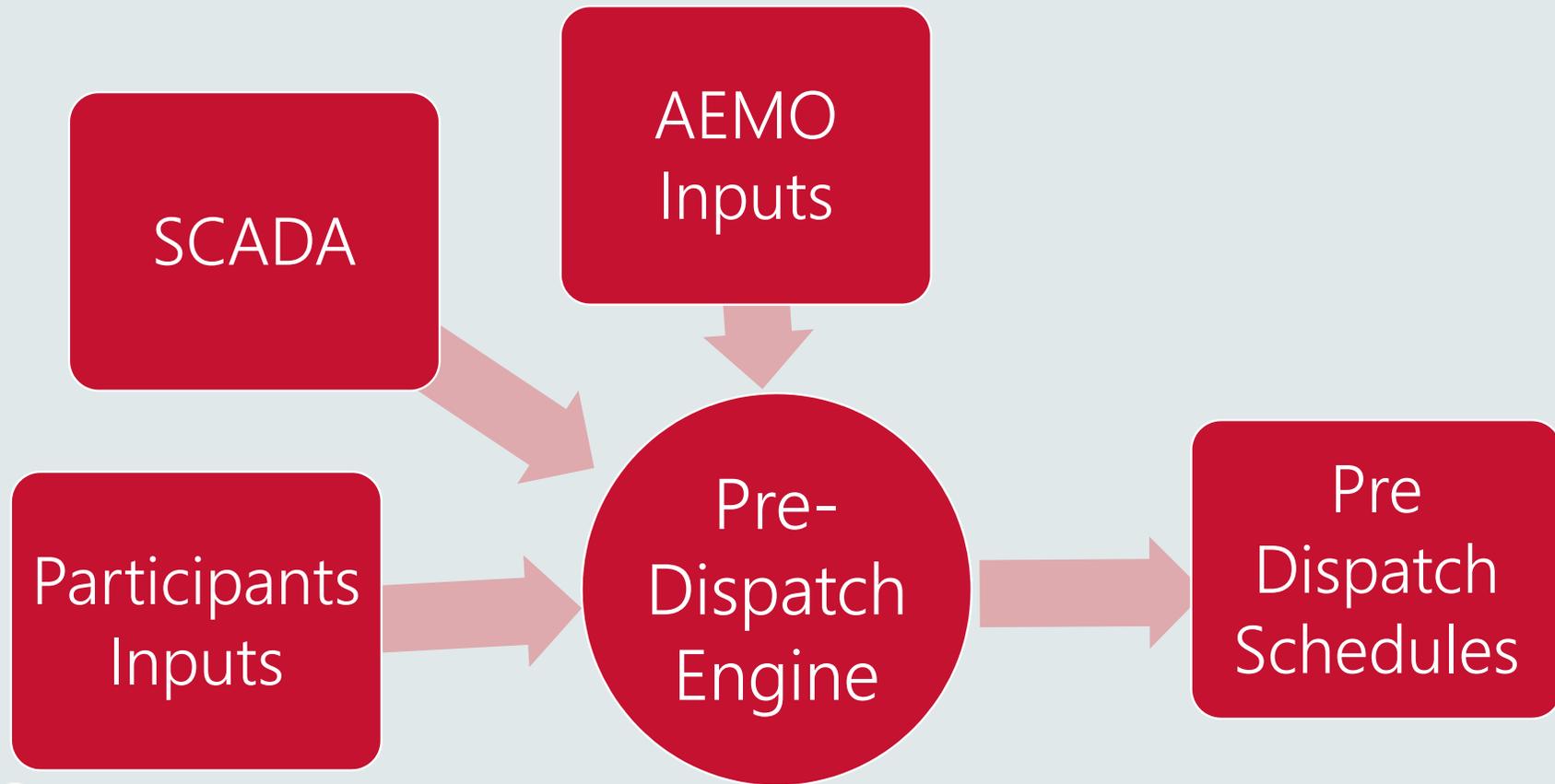
Introduction

- This presentation is intended to introduce the concepts of pre-dispatch to the working group, and discuss some of the types of data that can be made available, and associated timeframes.
- This presentation will also discuss some of the differences between dispatch and pre-dispatch and demonstrate some of the sources of variance between the two.
- The design of the Pre-dispatch processes should be described in the market rules, its related operating procedures and support the operation of the energy market. Currently, the WEMR do not have any requirements prescribed for a pre-dispatch process.
- The following slides describe a how a potential pre-dispatch process for the WEM could work with a single node, hub-and-spoke design, utilising constraint equations.

Introduction – What is Pre-Dispatch

- Pre-dispatch is to be considered as a forecast of dispatch outcomes.
- To provide market participants with sufficient unit loading, unit ancillary service response and pricing information to allow them to make informed business decisions.
- To provide AEMO with sufficient information to allow it to fulfil its duties, in relation to system reliability and security.
- If required, it is used as a back up system if the market system fails
- The above information would be calculated by pre-dispatch engine and published to the market in the form of trading interval (e.g. Half-hourly) schedules of forecast unit loading, forecast unit ancillary service response and forecast regional prices.

Pre-Dispatch Process Inputs



Participants Inputs

- Registration Data
 - Standing data submitted by market participant
- Energy and AS dispatch offers/bids
 - Unit energy dispatch offer/bid data is price band and MW loading constraint information
 - AS dispatch offer/bid data is AS quantity, pricing and boundaries of operation
 - Unit availability of each generating unit

AEMO Inputs

- Demand Forecast(s)
- AS requirements
- Constraint Equations
- Wind and Solar Forecast(s)
- SCADA

For pre-dispatch schedules, the market clearing engine is always run from the best current estimates of data.

Possible Pre-Dispatch Schedule Timeframes

The 30th of March MDOWG proposed some possible timeframes:

- Short-term schedule
 - 2-hours ahead, 5 minute resolution, updated every 5 minutes
- Mid-term schedule
 - 2-days ahead, 30 minute resolution, updated every half hour
- Market Outlook Schedule
 - Week ahead, 30 minute resolution, updated daily

What do working group members think of these timeframes?

Pre-Dispatch Output Results

The 30th of March MDOWG also proposed the following in terms of content

- Pre-dispatch information could be released to the market in two stages:
 - Output results calculated from each run of the Pre-dispatch process are released after that Pre-dispatch run. Pre-dispatch data is published to the whole market, however only quantities shown initially (no prices) with price data relating to a specific market participant only published to that participant; and
 - All Pre-dispatch data (both input and output) is published to the whole market after the end of the trading day to which that data applies.

Typical Pre-Dispatch Output Results

- Pricing Data (where available)
 - Spot Prices for energy and Ancillary Services, generation and load
- Constraint Data
 - LHS and RHS data
- Unit Specific Data
 - Total cleared MW
- The above are just some simplified examples of output results for each trading interval within the pre-dispatch period.
- Results output format will need to be determined within WEM.

Factors contributing to differences between Dispatch and Pre-Dispatch outcomes

- A number of factors could contribute to differences between Pre-dispatch and Dispatch outcomes
- This would affect the ability of pre-dispatch to be considered as a forecast of dispatch outcomes
- Externalities and market/technical design could contribute to differences between dispatch and pre-dispatch outcomes

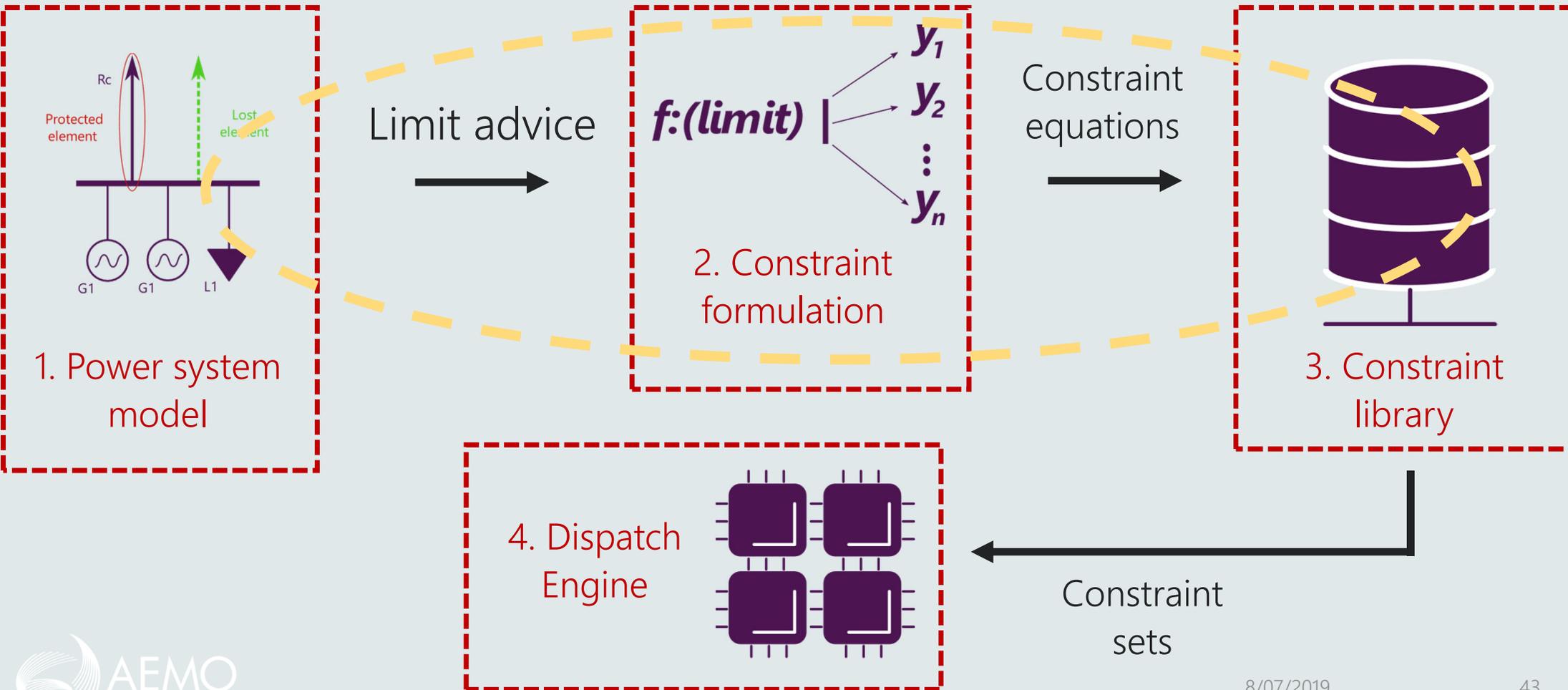
Externalities

- Unforeseen power system events can occur any time and can contribute to differences between Dispatch and pre-dispatch outcomes.
- Unplanned generation or network Outages
 - May cause constraint equations to bind in Dispatch but are yet to affect pre-dispatch.
 - May affect up to six Dispatch runs before being included in a pre-dispatch run.
- Short-Notice changes to planned outages for a trading interval
 - Early return - May cause constraint equations to bind in the initial pre-dispatch but not in the latest dispatch
 - Extension - May cause constraint equations bind in dispatch that were initially scheduled as not binding in pre-dispatch.
- Inaccurate demand and non-scheduled Forecast
 - May cause constraint equations to bind in dispatch but not in the latest pre-dispatch (or vice versa)

Market Design

- 5 minute dispatch versus 30 minute pre-dispatch – Resolution and Frequency
 - 30 min Pre-dispatch is unable to capture transient situations, such as rebidding, that occur in Dispatch during a particular trading interval.
 - The different resolution and frequency of dispatch and pre-dispatch may thereover result in differences in their outcomes (.)
- Re-bidding of Unit offers for the current trading interval
 - No gate closure for re-bidding to actual dispatch, hence late rebidding for the current trading interval is often not captured until the next 30-min pre-dispatch interval
 - This could create differences between Dispatch and the latest pre-dispatch outcome
- Unscheduled changes handled by dispatch
 - Variations from dispatch targets and how these are handled in dispatch
 - Unplanned failures
 - Dispatch non-compliance
 - Manual adjustments to constraint equations

Technical Design – Constraint technical framework



Dispatch Constraint Equations

- Real-time system data (SCADA) is available and used on RHS
- Actual generator outputs, line flows, reactive dispatch, region demands, area loads, etc
- Actual network configuration & switching status
- Equipment ratings for the real-time conditions used
 - static (fixed)
 - dynamic line ratings
 - day or night, summer or winter
 - continuous or short-time
- $G1 + G2 + G3 \leq \text{Rating} - \text{Current Line Flow} + \text{Initial Value } (G1 + G2 + G3)$



Pre-Dispatch Constraint Equations

- Open loop (flow equation) constraint equations used in pre-dispatch – (Flow is less than or equal to limit)
- Future element flows are not available to pre-dispatch – (real-time SCADA values cannot be used as indicators of line flows in the future)
- **Demand forecast values** used for regions, areas and zones
- **Forecast values** used for generator outputs, (from previous pre-dispatch results)
- Time dependent line ratings correctly included (day/night, summer/winter)
- **Estimated values** used for all other terms

Pre-Dispatch Constraint Equations

- Estimates used include
 - region (area) loads estimated by a fixed percentage of the forecast region demand (where area/zone forecast is not available)
 - dynamic ratings estimated by static (fixed) ratings
 - average or the current dispatch value
 - typical values
- $G1 + G2 + G3 \leq \text{Rating} - \text{sum of Load (L1 + L2)}$

Hence PD equations often tricky to build & understand

A good case for AEMO to include details in a market documentation

Key Differences between Pre-Dispatch and Dispatch in the NEM

Inputs	Pre-Dispatch	Dispatch
Resolution	30-min – 12 to 36 hours 5 min – 60 mins	5-min
Demand Forecast	Historical profiles of average actual demand	Instantaneous Forecast
Wind & Solar Forecast	Historical forecast	Persistent forecast
SCADA	PI Database	Largely real time information
Constraints Equations	Pre-defined or set/static profiles	Pre-defined and Dynamic profiles
Models	2 Specific models	4 Specific models

Current Market forecast schedules in Australia, New Zealand and Singapore

Market	Schedule	Horizon	Resolution	Publication
WEM	Forecast BMO	14 to 38 hours	30 mins	Every 30 mins
NEM	Pre-Dispatch	12 to 36 hours	30 mins	Every 30 mins
	5- min Pre-Dispatch	60 mins	5 mins	Every 5 mins
New Zealand	PRSS/NRSS	4 hours	30 mins	Every 30 mins
	PRSL/NRSL	36 hours	30 mins	Every 2 hours
	Weekly Dispatch	6 days	30 mins	Daily
Singapore	Short term	6 hours	30 mins	Every 30 mins
	Pre-Dispatch	12 to 36 Hours	30 mins	Every 2 hours
	Market Outlook	6 days	30 mins	Daily

Pre-dispatch: Possible sensitivities

- To help participants manage uncertainty between Pre-dispatch timeframes and dispatch timeframes, it may be possible to run multiple versions of Pre-dispatch to show sensitivities. Some potential sensitivities could include:
 - Different demand forecasts (e.g. High/Low forecasts)
 - Different non-scheduled generation forecasts (e.g. allowance for error)
 - Inclusion of key contingencies (constraints)
 - Synchronisation status

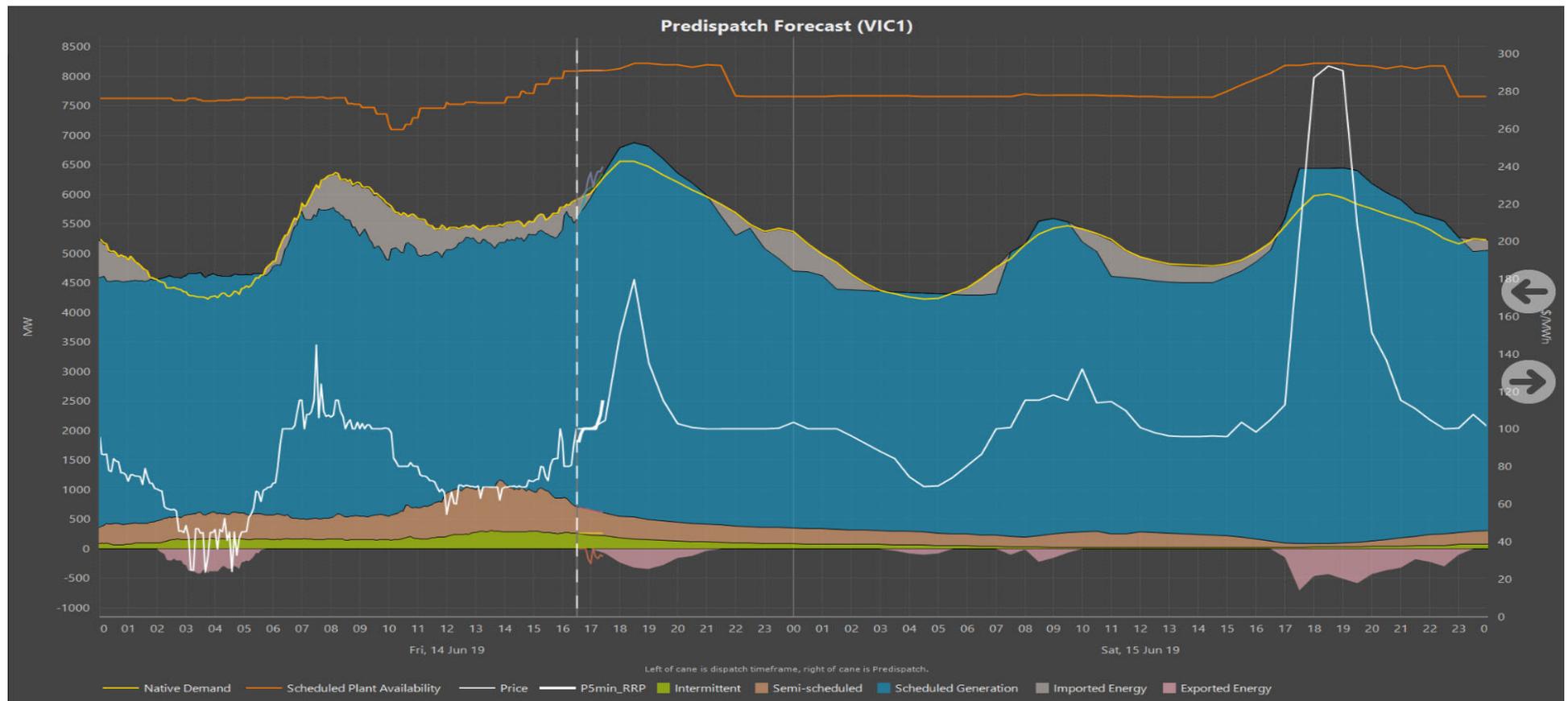
What other things would the working group like to consider?

Pre-dispatch: Example NEM screenshots

C	NEMP.WORLD	NEXT_DAY_PREDISPATCH	AEMO	PUBLIC	10/04/20	4:40	3065430	3065430				
I	PREDISPATCH	CONSTRAINT_SOLUTION	5	PREDISPATCHSEQNO	RUNNO	CONSTRAINTID	PERIODID	RHS	MARGINALVALUE	VIOLATIONDEGREE	DUID	LHS
D	PREDISPATCH	CONSTRAINT_SOLUTION	5	2019040818	1	#BANN1_E	2019040901	32	0	0	BANN1	0
D	PREDISPATCH	CONSTRAINT_SOLUTION	5	2019040818	1	#BANN1_E	2019040902	32	0	0	BANN1	0
D	PREDISPATCH	CONSTRAINT_SOLUTION	5	2019040818	1	#BANN1_E	2019040903	32	0	0	BANN1	0
D	PREDISPATCH	CONSTRAINT_SOLUTION	5	2019040818	1	#BANN1_E	2019040904	32	0	0	BANN1	0
D	PREDISPATCH	CONSTRAINT_SOLUTION	5	2019040818	1	#BANN1_E	2019040905	32	0	0	BANN1	0
D	PREDISPATCH	CONSTRAINT_SOLUTION	5	2019040818	1	#BANN1_E	2019040906	32	0	0	BANN1	0.018
D	PREDISPATCH	CONSTRAINT_SOLUTION	5	2019040818	1	#BANN1_E	2019040907	32	0	0	BANN1	5.807
D	PREDISPATCH	CONSTRAINT_SOLUTION	5	2019040818	1	#BANN1_E	2019040908	32	0	0	BANN1	19.907
D	PREDISPATCH	CONSTRAINT_SOLUTION	5	2019040818	1	#BANN1_E	2019040909	32	0	0	BANN1	23.735
D	PREDISPATCH	CONSTRAINT_SOLUTION	5	2019040818	1	#BANN1_E	2019040910	32	0	0	BANN1	28.416

C	NEMP.WORLD	NEXT_DAY_PREDISPATCH	AEMO	10/04/20	4:40										
I	PREDISPATCH	UNIT_SOLUTION	2	RUNNO	DUID	CONNECTIONPOINTID	AGCSTATUS	TOTALCleared	LOWER6SEC	RAISE5MIN	RAISE60SEC	RAISE6SEC	RAMPDOWNRATE	RAMPUPRATE	
D	PREDISPATCH	UNIT_SOLUTION	2	1	BW01	NBAY1		1	350	5	15	15	10	180	240
D	PREDISPATCH	UNIT_SOLUTION	2	1	BW01	NBAY1		1	350	5	15	15	10	180	240
D	PREDISPATCH	UNIT_SOLUTION	2	1	BW01	NBAY1		1	430.40739	5	15	15	10	180	240
D	PREDISPATCH	UNIT_SOLUTION	2	1	BW01	NBAY1		1	550.40739	5	15	15	10	180	240
D	PREDISPATCH	UNIT_SOLUTION	2	1	BW01	NBAY1		1	615	5	15	15	10	240	300
D	PREDISPATCH	UNIT_SOLUTION	2	1	BW01	NBAY1		1	641.23721	5	8.0303	5	5	240	300
D	PREDISPATCH	UNIT_SOLUTION	2	1	BW01	NBAY1		1	610	5	15	15	10	240	300
D	PREDISPATCH	UNIT_SOLUTION	2	1	BW01	NBAY1		1	620.90909	5	15	15	10	240	300

Pre-dispatch: Example NEM screenshot



Pre-Dispatch: Next Steps

- Pre-Dispatch Framework/rules
- Comparison with NEM and other jurisdictions
- Development of Pre-Dispatch constraint equations
- Pre-Dispatch Engine solver
- Transitional Arrangements



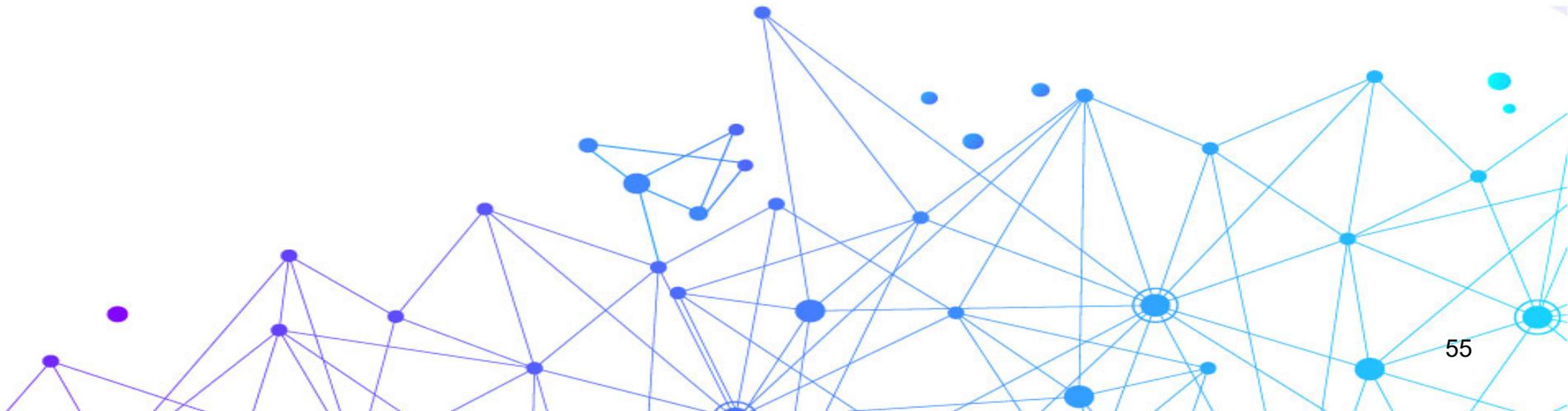
Questions

Constraints Governance

Constraints Governance (ETIU)

A governance framework to enable the development, use and regulation of constraint equations

Presentation for PSOWG meeting 4 – 27 June 2019



PROJECT OBJECTIVE AND DELIVERABLES

Objective

To develop a framework to govern the development, use and regulation of constraint equations, and associated processes and information, that will enable a security-constrained dispatch and market system.

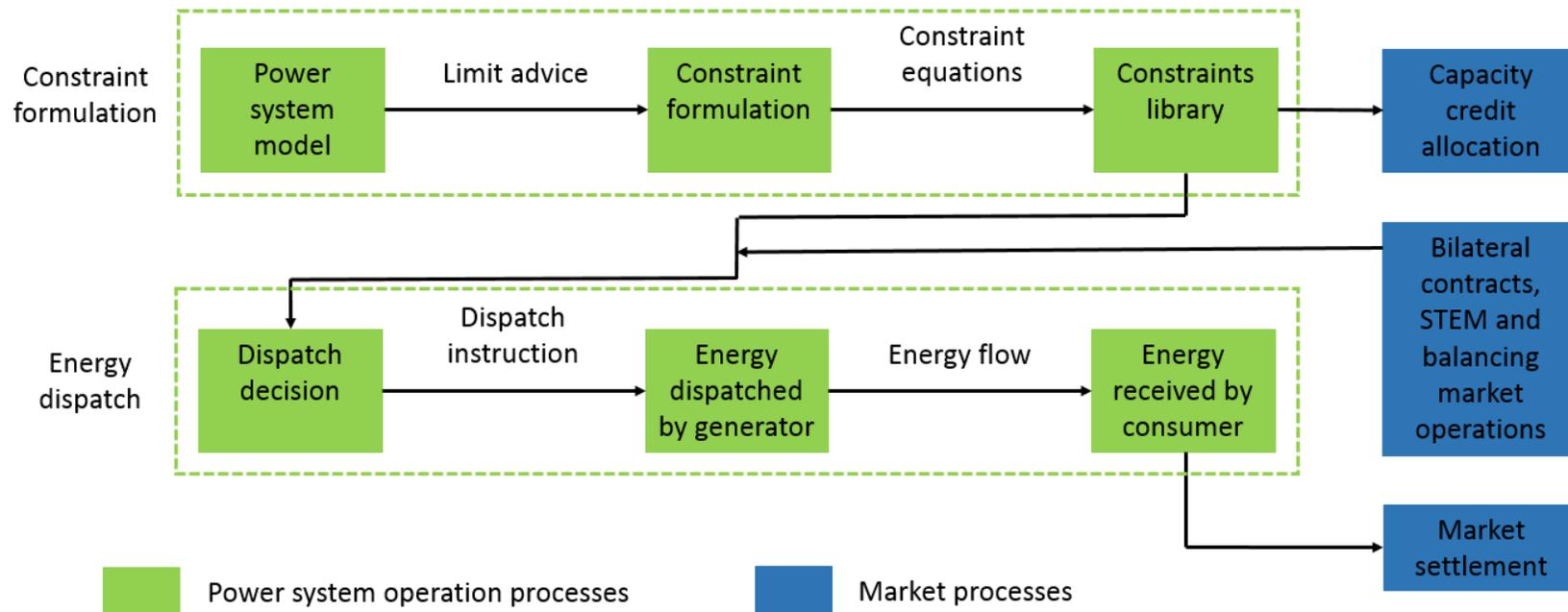
Deliverables

- Governance framework
- Technical framework
- Initial constraints library
- Regulatory changes

PROJECT TIMELINE

November 2018	AEMO presentation to PSOWG - technical matters
February 2019	AEMO and Western Power presentation to PSOWG – technical matters
June 2019	ETIU presentation to PSOWG – governance framework recommendations
July 2019	Taskforce signs off recommendations paper, ETIU publishes the paper
August 2019	ETIU, in consultation with AEMO and Western Power, commences work on drafting instructions for rule and regulatory changes. AEMO and Western Power commence work on initial set of constraint equations, IT infrastructure/processes and the technical framework.
Early 2020	Changes to implementation instruments (e.g. WEM rules) in place.
October 2022	Go live

PROCESS TO FORMULATE AND USE CONSTRAINTS



RESPONSIBILITY FOR LIMIT ADVICE AND CONSTRAINT FORMULATION

RECOMMENDED OPTION

Western Power is responsible for providing to AEMO thermal and non-thermal limit advice, and AEMO is responsible for formulating all constraint equations.

- consistent with core functions and expertise
- developed by the party with the best access to information
- likely the most efficient, effective and cheapest option
- is consistent with other jurisdictions
- clear delineation of responsibilities

REGULATORY REGIME

RECOMMENDED OPTION

The ERA's existing audit guidelines for monitoring, audit and compliance review functions be extended where necessary to cover:

- *development of limit advice*
 - *constraint equations; and*
 - *use of, and compliance with, constraint equations.*
-
- provides compliance incentives
 - consistent compliance responses
 - consistent with ERA functions
 - likely most cost-efficient option

REVIEW AND APPEAL

RECOMMENDED OPTION

Market participants will have the right to seek review on matters that will relate to constraints (e.g. limit advice, confidentiality of constraint information), and that the existing dispute mechanism is available for constraint related matters.

- extension of the existing legal framework
- consistency
- practical

TECHNICAL FRAMEWORK

RECOMMENDED OPTION

AEMO develops procedures that outline operational processes, including (but not limited to):

- *Information transfer between Western Power and AEMO, including limit advice*
 - *The process for reviewing and finalising limit advice*
 - *The method for formulating constraints*
 - *Constraint relaxation procedure*
 - *Emergency operation procedure*
-
- consistent, robust and transparent decision making
 - balances certainty and flexibility
 - consistent with existing functions

PUBLICATION OF CONSTRAINTS INFORMATION

RECOMMENDED OPTION

AEMO regularly publishes on its website:

- **A library of constraint equations;**
- **information on which constraints are binding and when; and**
- **supporting information related to constraints.**

AEMO should also publish on its website congestion information and related documents.

- promotes transparency
- timely information
- accessible format

COST RECOVERY FOR NEW RESPONSIBILITIES

RECOMMENDED OPTION

All work associated with constraints (both initial and ongoing) is funded:

- **For AEMO and the ERA through market and regulator fees; and**
- **Western Power through charges to access its infrastructure**

- efficiency and equity considerations
- consistent with existing approach

LEGISLATIVE CHANGES REQUIRED

CHANGES TO THE WEM RULES

- Constraints governance framework

CHANGES TO THE ACCESS CODE

- To enable Western Power to recover costs of the initial constraints work undertaken through retrospective application; and for constraints work on an ongoing basis.

NEXT STEPS

- Please provide any further feedback by close of business **Friday 5 July 2019** to WARPOS@aemo.com.au
- July 2019 – Taskforce signs off on the recommendations
- August 2019 – ETIU progresses legislative changes;
Work commences on technical aspects
- Early 2020 – Rule changes in effect.
- October 2022 – Go live.

Update on ESS Modelling (AEMO)



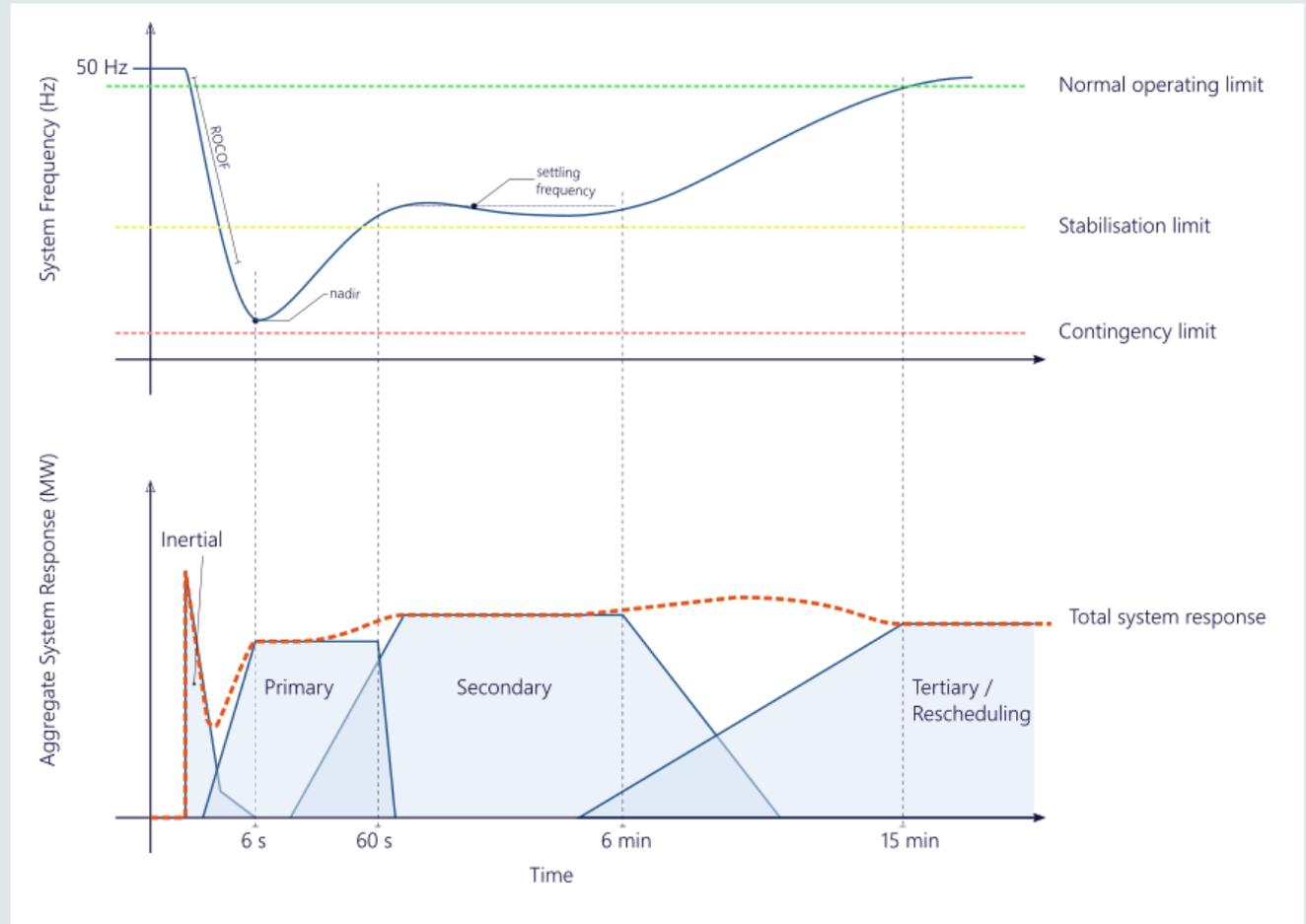
ESS Update

Essential System Services

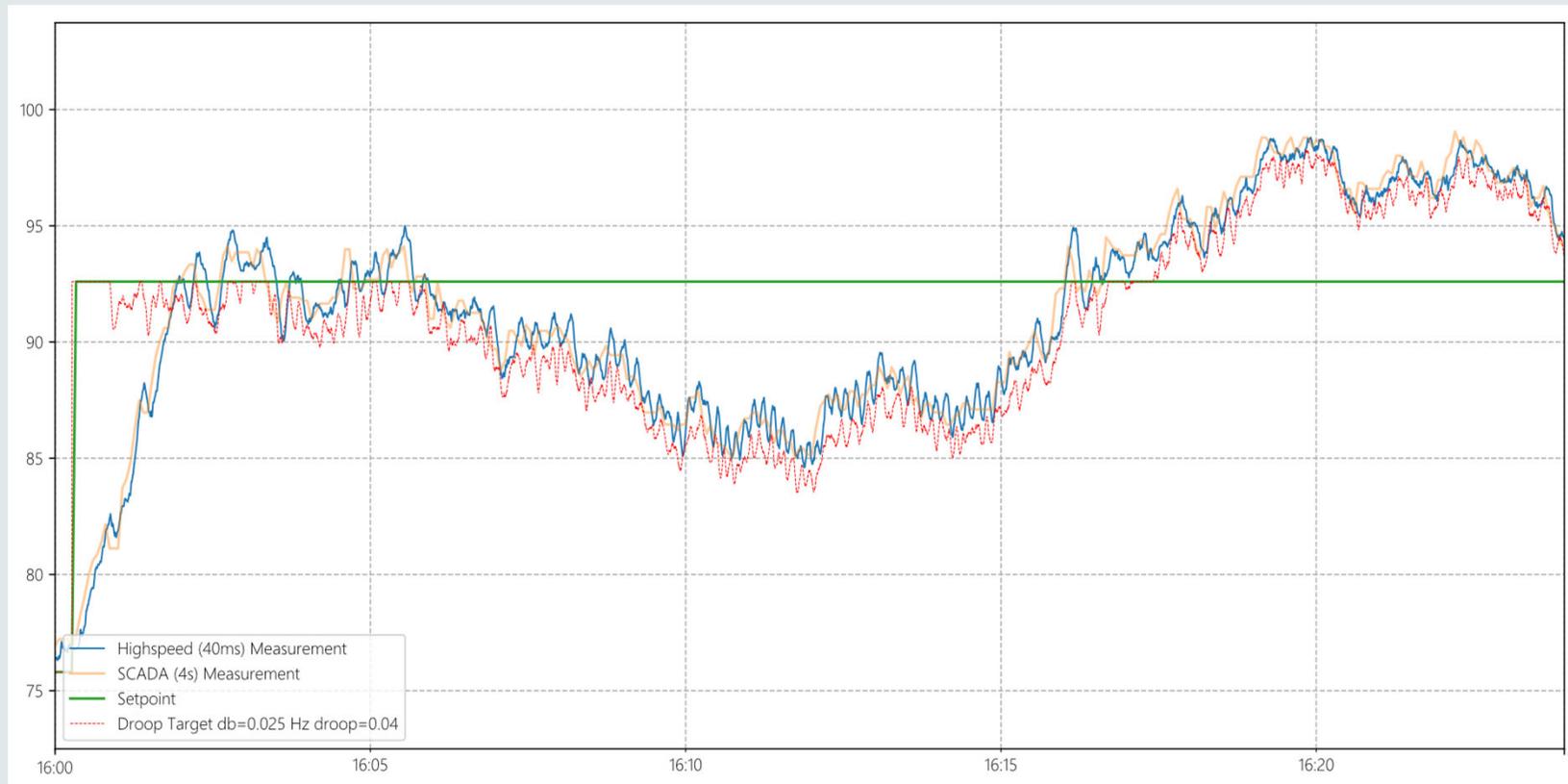
Ancillary Services Project

New Essential System Services Framework

Contingency Response Framework



Regulation Response Framework



Questions or general business

Any other questions or general business?

Thank you

Thank you very much for your attendance and thoughtful contribution

- We will endeavour to send a copy of these slides, along with notes from today's workshop out to attendees and interested parties within the next 5 business days
- Please feel free to send any other questions or thoughts to the PSOWG email inbox:

WARPSO@aemo.com.au