GENERATOR TECHNICAL PERFORMANCE STANDARDS

WORKSHOP ON GENERATOR TECHNICAL PERFORMANCE STANDARDS

JUNE 2018

AEMC

Agenda

1. Negotiating process
2. System strength
3. Continuous uninterrupted operation
4. Reactive power capability
5. Reactive power control
6. Reactive current response
7. Frequency and active power control
8. Remote monitoring and control
9. Consequential amendments
10. Transitional arrangements

INTRODUCTION

APPROACH AND OVERVIEW

THE NEED FOR CHANGE

- The generation mix is changing - voltage and frequency are getting harder to manage
- The technical requirements are no longer adequate to address this challenge:
  - the negotiating process was not set up for this dynamic environment
  - some standards are not adequate to effectively manage voltage and frequency within acceptable limits
  - some standards are not adequate to address the risk of cascading failure due to increased risk and severity of voltage and frequency disturbances
  - some standards do not effectively define the needs of the power system

APPROACH TO ASSESSMENT

- NEO assessment – the long term interests of consumers – for this rule change we focused on price and security trade-off
- An **automatic access standard** is the level of performance that is going to be ok for system security and quality of supply no matter what equipment you put in, or where you put it
- A **minimum access standard** is the level of performance that is going to be ok for system security and quality of supply to put *some* equipment in *somewhere*
- The assessment considers the issues in the context of, and consistent with, the broader connections framework (shallow connection charges with no firm access to markets)

FOCUS FOR TODAY'S WORKSHOP

- Provide a forum for stakeholders to give their views and hear the views of others
- Enhance stakeholder understanding of the draft rule
- Identify issues with the draft rule
    - technical issues
    - drafting/legal issues
    - approach (philosophy) issues
    - implementation or operational issues
- Note this is the start of the process of addressing issues. So today is about identifying and defining issues. We will then start working to understand and address issues.
- Submissions, submissions, submissions

NEGOTIATING PROCESS

CLEARER ROLES AND RESPONSIBILITIES

NEGOTIATING PROCESS – new obligations for connection applicants

- Where a negotiated access standard is proposed:
  - it must be as close as practicable to the automatic access standard, having regard to the need to protect plant from damage, power system conditions at the proposed location of the connection, and, the commercial and technical feasibility of complying with the automatic access standard, and
  - the proposal must be supported with reasons and evidence as to why the proposed negotiated access standard is appropriate

NEGOTIATING PROCESS – new obligations for AEMO and NSPs

- AEMO and network service providers must provide to the connection applicant detailed reasons for either:
  - rejecting a proposed negotiated access standard, based on certain criteria, including an adverse effect on system security or the quality of supply to other network users, or
  - requiring connection applicants to provide additional evidence to support proposed negotiated access standards.

SYSTEM STRENGTH

NO CLEAR CASE FOR A NEW ACCESS STANDARD

SYSTEM STRENGTH – SYSTEM SECURITY

The draft rule does not include a system strength access standard.

System security assessment

- No additional system security issue needs to be addressed by a new access standard given the *Managing power system fault levels rule*.
- *Managing power system fault levels rule* allows for:
  - maintenance of fault levels at or above those required for a secure operating state following a credible contingency or protected event, including following the loss of a synchronous generating unit, and
  - capability from connecting generators to operate stably, and cause no harm, for the lowest expected system strength at the connection point.

SYSTEM STRENGTH - COSTS

Cost assessment

- A system strength access standard *could* reduce costs for TNSPs and future connecting generators if current connecting generators provide a minimum level of system strength capability. However:
  - insufficient certainty as to whether these avoided costs will be realised, and if so, how much, for whom, and when, and
  - imposing costs or regulatory requirements on connecting generators to help facilitate future connections is contrary to the principles behind the transmission framework in operation in the NER (shallow connection charges).
- Broader issues of coordinating connections are also being addressed in the *Coordination of generation and transmission investment review*.

CONTINUOUS OPERATION

NEW REQUIREMENTS TO SUPPORT SYSTEM SECURITY

Continuous uninterrupted operation (CUO)

- We have made a number of changes to access standards that require generating units and systems to maintain *continuous uninterrupted operation* for a range of power system disturbances, including to voltage and frequency

- These changes reflect the trend toward increased frequency and severity of disturbances as the generation mix changes

CUO – Definition – Chapter 10 of the NER

Definition of *continuous uninterrupted operation* in the draft rule (clean):

In respect of a *generating system* or *generating unit* operating immediately prior to a *power system* disturbance:

(a) not *disconnecting* from the *power system* except under its *performance standards* established under clauses S5.2.5.8 and S5.2.5.9;

(b) during the disturbance contributing active and reactive current as required by its *performance standards* established under clause S5.2.5.5;

(c) after clearance of any electrical fault that caused the disturbance, only substantially varying its *active power* and *reactive power* as required or permitted by its *performance standards* established under clauses S5.2.5.5, S5.2.5.11, S5.2.5.13 and S5.2.5.14; and

(d) so as to not exacerbate or prolong the disturbance or cause a subsequent disturbance for other *connected plant*, except as required or permitted by its *performance standards*,

with all essential auxiliary and *reactive plant* remaining in service.

CUO – Definition – Chapter 10 of the NER

Definition of *continuous uninterrupted operation* in the draft rule (markup):

In respect of a *generating system* or ~~operating~~ *generating unit* operating immediately prior to a *power system* disturbance:~~,~~

(a) not *disconnecting* from the *power system* except under its *performance standards* established under clauses S5.2.5.8 and S5.2.5.9; ~~and,~~

(b) during the disturbance contributing active and reactive current as required by its *performance standards* established under clause S5.2.5.5;

(c) after clearance of any electrical fault that caused the disturbance, only substantially varying its *active power* and *reactive power* as required or permitted by its *performance standards* established under clauses S5.2.5.5, S5.2.5.11, S5.2.5.13 and S5.2.5.14; and~~,~~

(d) so as to not exacerbate or prolong the disturbance or cause a subsequent disturbance for other *connected plant*, except as required or permitted by its *performance standards*,

with all essential auxiliary and *reactive plant* remaining in service.~~, and responding so as to not exacerbate or prolong the disturbance or cause a subsequent disturbance for other *connected plant*.~~

CUO – Voltage disturbance – S5.2.5.4

Automatic access standard:

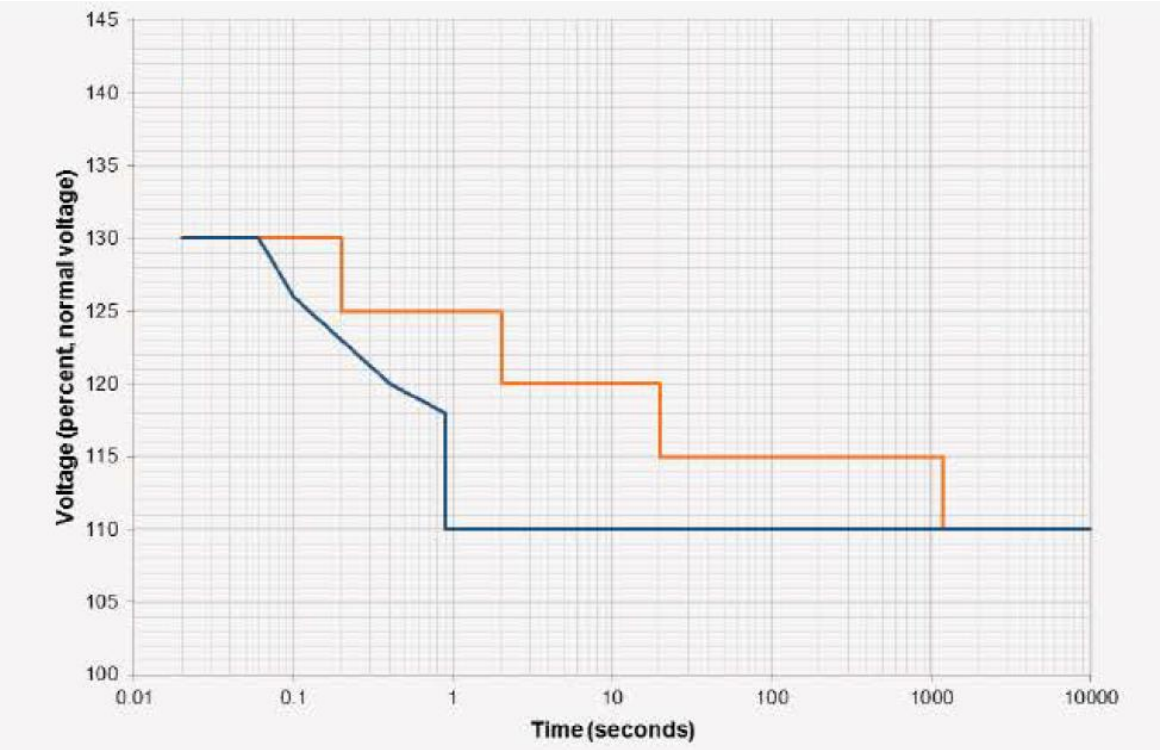
CUO required for the following ranges:

1) **over 130%** of *normal voltage* for a period of at least **0.02 seconds** after T(ov);
2) **125% to 130%** of *normal voltage* for a period of at least **0.2 seconds** after T(ov);
3) **120% to 125% of** *normal voltage* for a period of at least **2.0 seconds** after T(ov);
4) **115% to 120%** of *normal voltage* for a period of at least **20.0 seconds** after T(ov);
5) **110% to 115%** of *normal voltage* for a period of at least **20 minutes** after T(ov);
6) **90% to 110%** of *normal voltage* **continuously**;
7) **80% to 90%** of *normal voltage* for a period of at least **10 seconds** after T(uv); and
8) **70% to 80%** of *normal voltage* for a period of at least **2 seconds** after T(uv),

where T(ov) means the point in time when the *voltage* at the *connection point* first varied above 110% of *normal voltage* and T(uv) means the point in time when the *voltage* at the *connection point* first varied below 90% of *normal voltage*.

CUO – Voltage disturbance – S5.2.5.4

Over-voltage requirements in the automatic access standard (orange) compared to system standard in S5.1a.4 (blue)



Source: Rule change request, p. 33, modified

CUO – Voltage disturbance – S5.2.5.4

Minimum access standard:

CUO required for the following ranges:

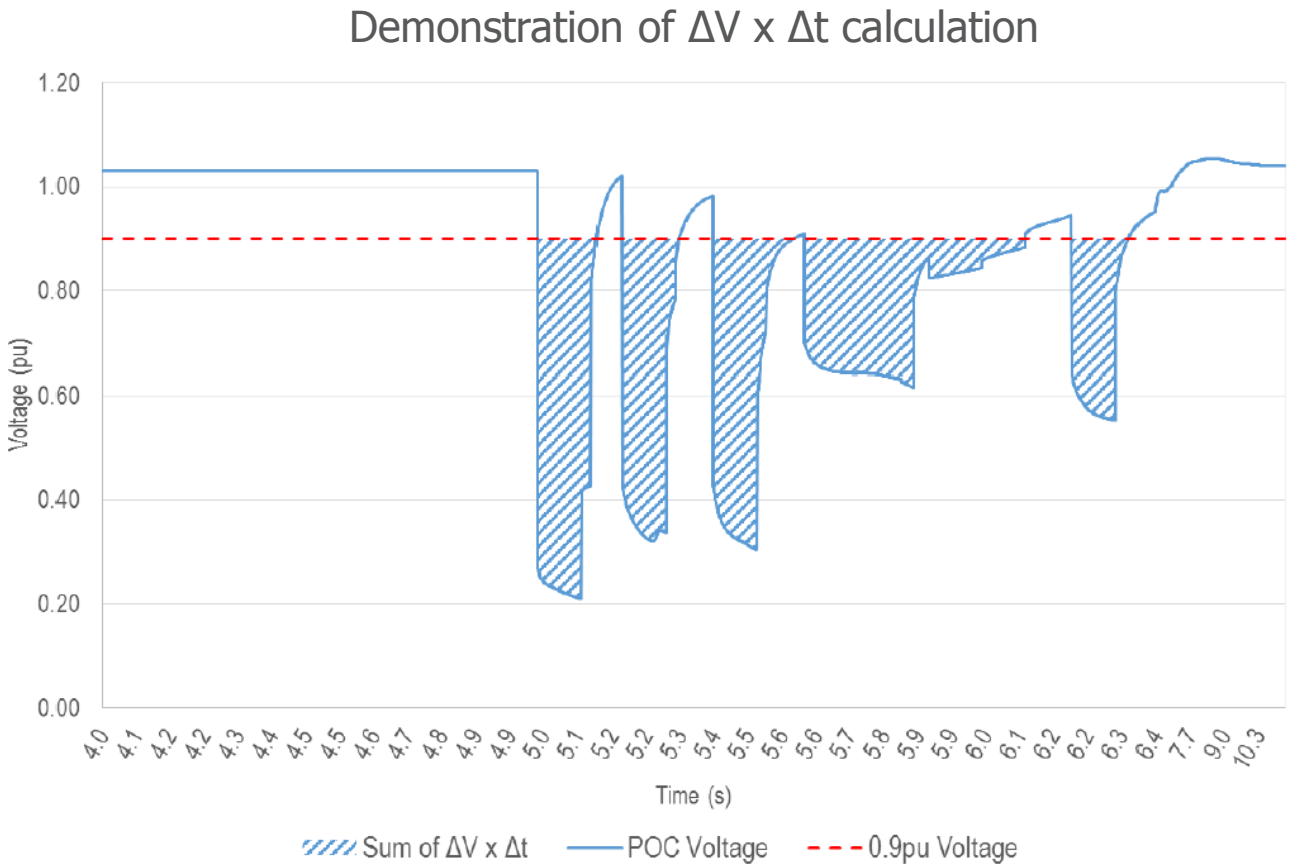
1) **115% to 120%** of *normal voltage* for a period of at least **0.1 seconds** after T(ov);
2) **110% to 115%** of *normal voltage* for a period of at least **0.9 seconds** after T(ov);
3) **90% to 110%** of *normal voltage* **continuously**, provided that the ratio of *voltage* to *frequency* (as measured at the *connection point* and expressed as a percentage of *normal voltage* and a percentage of 50 Hz) does not exceed:
   (A) a value of **1.15** for more than **two minutes**
   (B) a value of **1.10** for more than **10 minutes**
4) **80% to 90%** of *normal voltage* for a period of at least **5 seconds** after T(uv); and
5) **70% to 80%** of *normal voltage* for a period of at least **2 seconds** after T(uv),

where T(ov) means the point in time when the *voltage* at the *connection point* first varied above 110% of *normal voltage* and T(uv) means the point in time when the *voltage* at the *connection point* first varied below 90% of *normal voltage*.

CUO – Multiple voltage disturbances – S5.2.5.5(b)(1A) and (c)(1A)

Criteria	Automatic access standard	Minimum access standard
Total number of disturbances within five minutes	15	6
Sliding window reset time	5 minutes	30 minutes
Accumulated disturbance duration	1800 milliseconds	1000 milliseconds
Sum of $\Delta V \times \Delta t$	1.0 pu seconds	0.5 pu seconds
Number of deep disturbances	6	3
Minimum time difference between successive disturbances	No restriction	200 milliseconds
Type of disturbances to be considered	• One disturbance cleared by a breaker fail protection system • One long-duration shallow disturbance, e.g. 80% residual voltage for 2 seconds as per S5.2.5.4 of the NER • One deep three-phase disturbance (or two deep three-phase disturbances in parts of network where a three-phase auto-reclosing is permitted) • Remaining disturbances are unbalanced • An unsuccessful auto-reclosure event is counted as two disturbances	• One disturbance cleared by a breaker fail protection system • One long-duration shallow disturbance, e.g. 80% residual voltage for 2 seconds as per S5.2.5.4 of the NER • All disturbances are unbalanced • An unsuccessful auto-reclosure event is counted as two disturbances

CUO – Multiple voltage disturbances – S5.2.5.5(b)(1A) and (c)(1A)



Source: AEMO, *Multiple voltage disturbance ride through capability: Justification of AEMO's proposal*, p. 13.

CUO – Active power recovery – S5.2.5.5(b)(3)(ii) and (c)(3)(ii)

Automatic access standard

From **100 milliseconds** after clearance of the fault, active power of at least 95% of the level existing just prior to the fault.

Minimum access standard

Return to at least 95% of the pre-fault active power output, after clearance of the fault, **within a period of time agreed** by the Connection Applicant, AEMO and the Network Service Provider.

Note: "clearance of the fault" has replaced "disconnection of the faulted element".

CUO – Partial load rejection – S5.2.5.7

Draft rule removes exemption for asynchronous generating systems. Current requirements apply to all generating systems:

Automatic access standard

Generating ~~unit~~ system must be capable of continuous uninterrupted operation during and following a power system load reduction of **30%** from its pre-disturbance level or equivalent impact from separation of part of the power system in **less than 10 seconds**, provided that the loading level remains above minimum ~~load~~ generation.

Minimum access standard:

Generating ~~unit~~ system must be capable of continuous uninterrupted operation during and following a power system load reduction of **5%** from its pre-disturbance level or equivalent impact from separation of part of the power system in **less than 10 seconds**, provided that the loading level remains above minimum ~~load~~ generation.

CUO – Frequency disturbance – S5.2.5.3

Automatic access standard:

- Additional requirement to maintain CUO unless RoCoF is outside range of **±3 Hz for more than 1 s**, in addition to current requirement of ±4 Hz for more than 0.25 s.

Minimum access standard

- Additional requirement to maintain CUO unless RoCoF is outside range of **±2 Hz for more than 0.25 s**, in addition to current requirement of ±1 Hz for more than 1 s.

REACTIVE POWER CAPABILITY

REACTIVE CAPABILITY WHEN AND WHERE IT IS NEEDED

REACTIVE POWER CAPABILITY (S5.2.5.1)

The draft rule:

- retains existing **automatic access standard** arrangements
- amends the **minimum access standard** so that it remains a requirement to provide no reactive power capability, but is drafted in the same form as the automatic access standard
- specifies the access standards for reactive power capability (clause S5.2.5.1) as an AEMO advisory matter, and
- includes in the access standards for reactive power capability a requirement that a negotiated access standard be consistent with maintaining power system security, taking into account existing and considered projects

REACTIVE POWER CONTROL

MORE FLEXIBLE CONTROL FOR AN UNCERTAIN FUTURE

REACTIVE POWER CONTROL (S5.2.5.13) – changes in 3 areas

The draft rule includes changes relating to:

- the mode of reactive power control a generating system must be capable of operating in
- performance capabilities in the different reactive power control modes, and
- the rise and settling times associated with the generating system's response to a step change in voltage of 5%

REACTIVE POWER CONTROL (S5.2.5.13) – mode of reactive power control

The draft rule:

- amends the **automatic access standard** so that it requires the capability to operate in all reactive power control modes (voltage, reactive power and power factor), and the ability to switch between them in accordance with a procedure agreed with AEMO and the network service provider
- amends the **minimum access standard** so that it requires the capability to operate in either voltage control, or otherwise any other reactive power control mode with the agreement of AEMO and the network service provider, and
- allows for mode of reactive power control arrangements to apply irrespective of the connection point voltage and the capacity of the generating system

REACTIVE POWER CONTROL (S5.2.5.13) – performance requirements

The draft rule changes the **minimum access** standard for voltage control mode performance requirements to:

- require a generating system to regulate voltage at the connection point (or another agreed location on the power system or within the generating system) to within ±2% of the setpoint, and
- allow the voltage setpoint to be controllable in the range of at least 98% to 102% of normal voltage at the connection point (or the agreed location)

The **automatic access** standard remain unchanged

REACTIVE POWER CONTROL (S5.2.5.13) – performance requirements

The draft rule changes voltage control mode performance requirements to:

- clarify arrangements allowing droop control through a 'droop-adjusted setpoint', in both the **automatic and minimum access standards**, and
- clarify the relationship between S5.2.5.13 and S5.2.5.1 by including a new **general requirement** that the performance characteristics of any reactive power capability agreed under clause S5.2.5.13 are to be consistent with the capability determined in clause S5.2.5.1

REACTIVE POWER CONTROL (S5.2.5.13) – performance requirements

- The draft rule includes new performance requirements for operation in power factor and reactive control modes:
  - **automatic access standard** to regulate reactive power or power factor at the connection point, or at an agreed location:
    - to within 0.5% of its setpoint, and
  - **minimum access standard** to regulate reactive power or power factor at the connection point, or at an agreed location:
    - to within 2% of its setpoint
- Both the **automatic and minimum access standards** require the reactive power or power factor setpoint to be continuously controllable across the reactive power capability range established in clause S5.2.5.1

REACTIVE POWER CONTROL (S5.2.5.13) – response to a 5% voltage step

The draft rule aligns **minimum access standard** arrangements for asynchronous and synchronous generating systems operating in voltage control mode by:

  - increasing allowable settling time for synchronous generating systems to 7.5 seconds

- Existing **automatic access standard** arrangements are retained for generators operating in voltage control mode
- **Automatic access standard** rise and settling time requirements are also extended to generators operating in power factor and reactive power control modes

REACTIVE CURRENT RESPONSE

ALL TECHNOLOGIES MUST SUPPORT VOLTAGE DURING DISTURBANCES

REACTIVE CURRENT RESPONSE (S5.2.5.5) – synchronous generating systems

The draft rule:

- retains current arrangements under both the **automatic and minimum access standards** for synchronous generating systems for reactive current response during disturbances (subject to the introduction of a new response limit for synchronous generating systems), and
- introduces new arrangements under both the **automatic and minimum access standards** for asynchronous generating systems that define the characteristics of their reactive current response during disturbances

REACTIVE CURRENT RESPONSE (S5.2.5.5) – asynchronous generating systems

The draft rule includes new arrangements for asynchronous generators in the following areas:

- the magnitude of the desired response
- response speed and duration
- the voltage thresholds at which response is triggered
- limits on the maximum required response
- active and reactive current consumption limits
- arrangements relating to measurement, and
- maintaining total current during a fault

REACTIVE CURRENT RESPONSE (S5.2.5.5) - response magnitude

- The draft rule includes the following requirements for an asynchronous generating system to provide the capability to inject or absorb reactive current in response to a 1% rise or fall in voltage:

	Reactive injection	Reactive absorption
Automatic access standard	4%	6%
Minimum access standard	2%	2%

- Response requirements occur in respect of voltages above and below the generating unit terminal threshold ranges (discussed later)
- Both the negotiated capability and the specific reactive current response set within the negotiated capability are to be recorded in the generator performance standards

REACTIVE CURRENT RESPONSE (S5.2.5.5) – response magnitude – deep faults

The draft rule includes exceptions to the requirement to provide a reactive current response under deep fault conditions:

- under the **automatic access standard**, reactive current injection is not required for all generating unit terminal voltages lower than 5% of nominal voltage
- under the **minimum access standard**, reactive current injection is not required for all generating unit terminal voltages lower than 20% of nominal voltage.

REACTIVE CURRENT RESPONSE (S5.2.5.5) – response speed and duration

The draft rule includes an **automatic access standard** requirement for reactive current response to:

- be maintained until the connection point voltage recovers to between 90% and 110% of normal voltage

The draft rule includes an **automatic access standard** requirement for response to:

- have a rise time of no greater than 40 ms
- have a settling time of no greater than 70 ms, and
- be adequately damped

The **minimum access standard** also includes these requirements but with additional flexibility accounting for equipment limits.

REACTIVE CURRENT RESPONSE (S5.2.5.5) – response speed and duration

- The draft rule includes the following exceptions in the **minimum access standard** to the duration and speed of response requirements for asynchronous generating systems:
  - under-voltage - as an exception to the response duration requirement, allow a response duration limit of 2 seconds in respect of all voltages below the under-voltage response threshold, and
  - over-voltage - as an exception to the speed of response requirements, where a duration of greater than 2 seconds is required, the reactive current rise time must be as soon as practicable, and in any event, no longer than 180 milliseconds

REACTIVE CURRENT RESPONSE (S5.2.5.5) – response thresholds

The draft rule includes a **general requirement** specifying the ranges within which thresholds for activation of the reactive current response are set:

- under-voltage **-** reactive current injection to be set within the range of 85% to 90% of nominal voltage, and
- over-voltage **-** reactive current absorption to be set within 110% to 112% of nominal voltage

The draft rule also specifies that:

- the specific thresholds for activation of the reactive current contributions must be recorded in the performance standards, and
- the voltage thresholds triggering reactive current response are to be defined at the generating unit terminals (but may be measured at the connection point, which is discussed later)

REACTIVE CURRENT RESPONSE (S5.2.5.5) – current consumption

The draft rule includes requirements limiting any active and reactive current consumption on occurrence of a fault:

- an **automatic access standard** requirement, that any active current consumption immediately upon the occurrence of a fault must not exceed 5% of the maximum continuous current of the generating system, and is limited to 20 ms
- a **minimum access standard** requirement that any active current consumption on the occurrence of a fault must not exceed 10% of the maximum continuous current of the generating system, limited to a duration of 60 ms, and
- a **general requirement**, that any reactive current consumption immediately upon the occurrence of a fault must not exceed 5% of the maximum continuous current of the generating system, and is limited to the duration of rise time

REACTIVE CURRENT RESPONSE (S5.2.5.5) – limits on maximum response

The Commission's draft rule includes a **general requirement** that:

- an asynchronous generating system reactive current response may be limited to the maximum continuous current rating of the generating system (including all operating generating units), and
- a synchronous generating system reactive current response may be limited to 250% of the maximum continuous current rating of the generating system (including all operating generating units)

REACTIVE CURRENT RESPONSE (S5.2.5.5) – measurement

The Commission's draft rule includes **general requirements** that:

- allow the reactive current contribution and voltage deviation to be measured at the connection point (with the agreement of AEMO and the network service provider)
- allow the reactive current contribution required (under clause S5.2.5.5(b)(2) or clause S5.2.5.5(c)(2)) to be with reference to the phase-to–phase, phase-to-ground or sequence components of voltages, and
- require that the ratio of the negative sequence to positive sequence components of the reactive current contribution must be agreed with AEMO and the network service provider for the relevant faults listed in the automatic and minimum access standard of S5.2.5.5

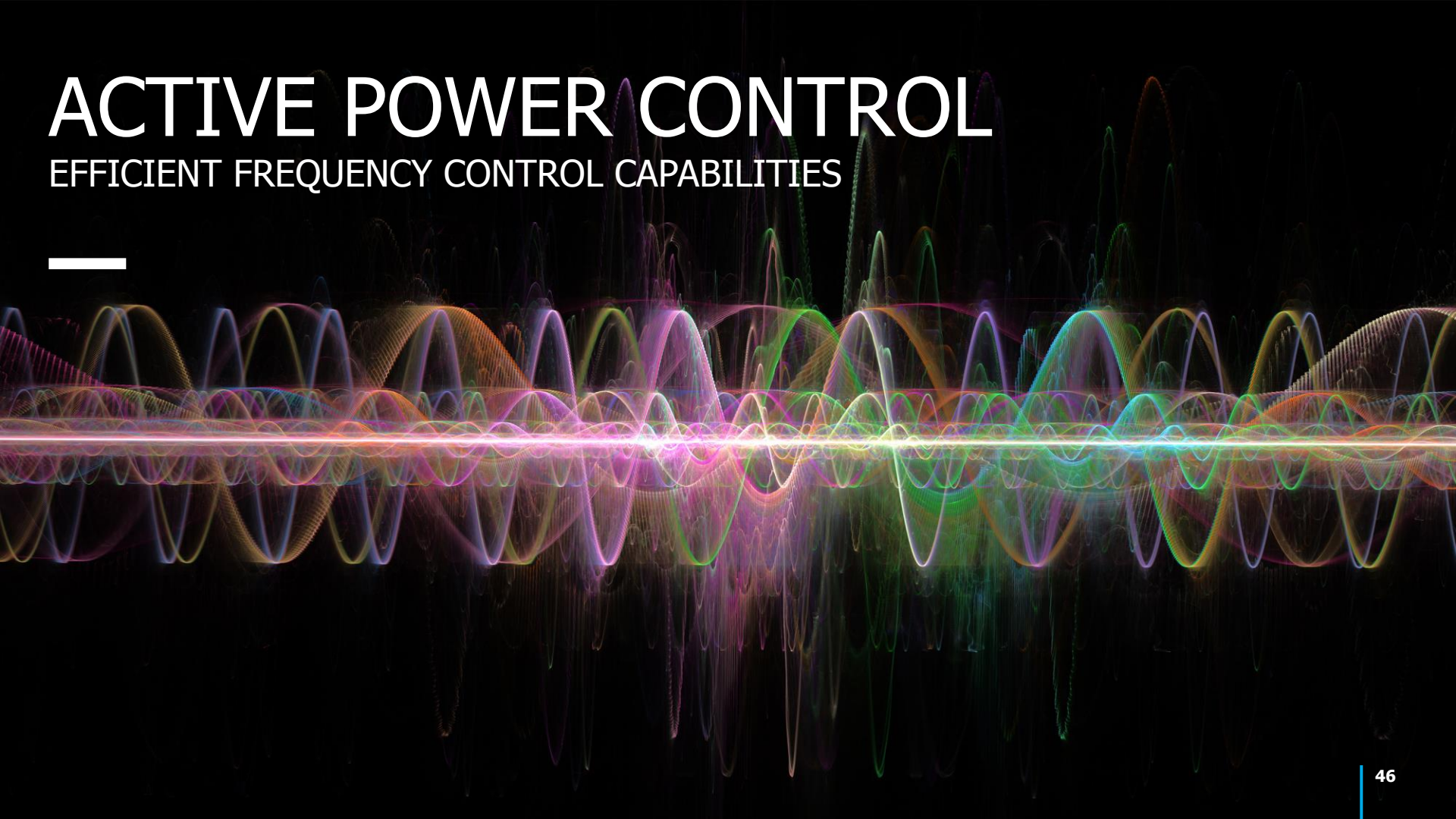
REACTIVE CURRENT RESPONSE (S5.2.5.5) – total current during a fault

The draft rule includes a **general requirement** for:

- an asynchronous generating system to have the capability to maintain total current (both active and reactive) during a disturbance at the maximum continuous current of the generating system including all operating generating units (in the absence of a disturbance) at all times, and
- includes additional guidance providing for AEMO and the network service provider to impose limits on active current injection where required to maintain system security and the quality of supply to other network users.

ACTIVE POWER CONTROL

EFFICIENT FREQUENCY CONTROL CAPABILITIES



ACTIVE POWER CONTROL (S5.2.5.11) – frequency response mode

- The draft rule:
  - requires all generating systems to have the capability to operate in frequency response mode (subject to energy source availability) so they have the capability to automatically provide an active power response to a change in frequency in the power system
  - changes a the way the automatic access standard is specified so it explicitly refers to the provision of market ancillary services for frequency control, and
  - includes general requirements that:
    - require the GPS to record the ancillary services the generating system will be capable of providing, and the related performance parameters and related requirements for each market ancillary service, and
    - require all generating systems to have and record certain technical capabilities, including the capability to set a deadband and droop response within defined ranges

ACTIVE POWER CONTROL (S5.2.5.14) – active power control and ramp rate

The draft rule:

- requires all semi-scheduled generating systems to have the capability to control active power output to a ramp limit, and
- requires all non-scheduled generating systems to have some active power control capability
- requires all scheduled and semi-scheduled generating systems to have AGC capabilities

MONITORING AND CONTROL

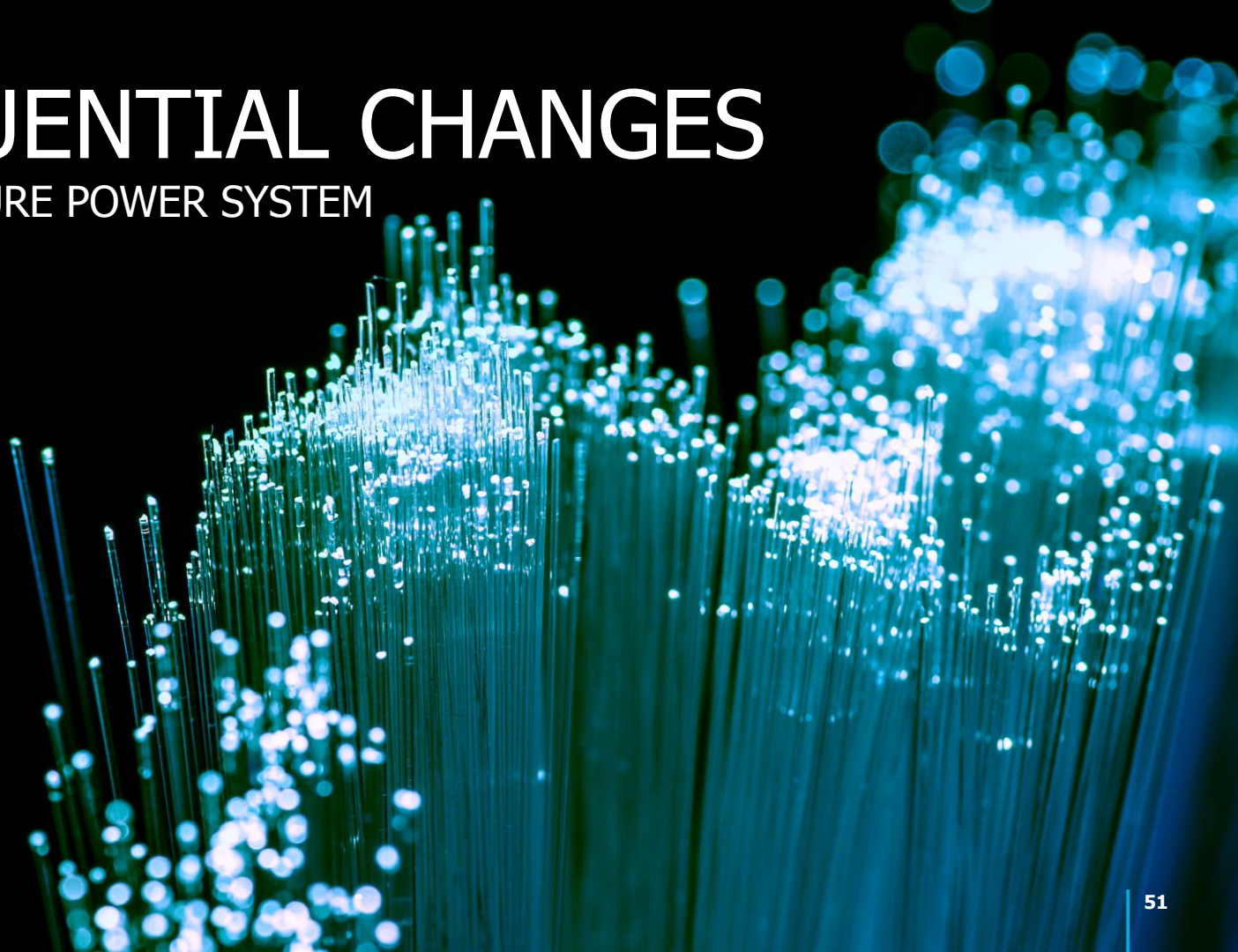
REMOTE CAPABILITIES WHERE THEY ARE NEEDED

REMOTE MONITORING AND CONTROL CAPABILITIES

- The draft rule amends the automatic access standard to:
  - increase the information that generating systems and units must provide, and
  - require generating systems to have remote control capability for voltage control, active power and AGC
- The draft rule also amends the minimum access standard to expand its application to include all non-scheduled generating systems

CONSEQUENTIAL CHANGES

SUPPORTING A SECURE POWER SYSTEM



CONSEQUENTIAL CHANGES - overview

- The draft rule includes a number of additional changes that are consequential to making the rule, including:
  - introducing a framework for the regular review of access standards
  - introducing clear obligations for AEMO to provide the AER with information on generator performance standards, and
  - clarifying the operation of existing arrangements for renegotiation of performance standards when equipment is altered
- Commission will also request the Reliability Panel to review the template for generator compliance with performance standards after a final rule is made

CONSEQUENTIAL CHANGES – cl. 5.3.9 alterations to plant

- The draft rule:
  - allows a generator altering its generating system to submit a negotiated access standard between the automatic access standard and the generator's existing performance standard, and
  - clarify that the types of equipment alterations set out in Column 1 of the table at clause 5.3.9(d) are deemed to trigger both the application of all of the requirements in clause 5.3.9 (unless AEMO and the network service provider otherwise agree)
  - changes clause references in the table in clause 5.3.9(d) as proposed by AEMO

CONSEQUENTIAL CHANGES – new proposal from AEMO

- NSPs to provide to AEMO within a specified period of time the enquiry forms related to a connection enquiry that are required under Schedule 5.4(a) of the NER
- AEMO considers information is needed to give AEMO greater visibility of new connections:
  - due to AEMO's role in broader network and integrated planning, and
  - because AEMO is aware some projects have commenced development during the connection enquiry stage

TRANSITIONAL ARRANGEMENTS

BALANCING SECURITY AND CERTAINTY

TRANSITIONAL ARRANGEMENTS – WHEN THE NEW RULE APPLIES

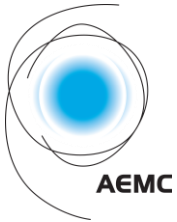
- The draft rule proposes applying any final rule from the date that is 8 weeks from the date of the final determination
- Old rules apply where a connection applicant has an offer to connect or a connection agreement on the date of commencement (i.e. 8 weeks after a final rule is made)
- Old rules also apply where a connection applicant has a *full set of access standards agreed* for a proposed connection on the date of commencement

WHEN IS A FULL SET OF ACCESS STANDARDS AGREED?

- Where, in the reasonable opinion of the NSP and AEMO, all access standards relevant to a plant are agreed as at the commencement date, the NSP must:
  - within 10 business days from a request by the connection applicant, provide written confirmation of this to the connection applicant, and
  - use its best endeavours to provide, within 10 business days from the commencement date, written confirmation to the relevant connection applicant that all access standards were agreed as at the commencement date
- If any conditions are subsequently unable to be satisfied, then the full set of access standards will be taken to have not been agreed, and the new arrangements will then apply to the negotiation

WHAT IF THE NEW RULES APPLY TO A CONNECTION?

- Aim is to minimize additional cost, while maintaining flexibility to account for the range of circumstances for connections
- From the commencement date the NSP must:
  - within 10 business days, use reasonable endeavours to notify the connection applicant that the existing connection enquiry or application to connect will be treated as a connection enquiry or application to connect under the new arrangements (as relevant), and
  - within a further 20 business days, in consultation with AEMO, provide the connection applicant with any further information relevant to the proposed plant (including details of the relevant access standards), and written notice of any further information to be provided by the connection applicant to the network service provider, to enable the network service provider to prepare a connection application or an offer to connect (as relevant) under the new arrangements



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