Connecting generators in the West Murray Zone

Consistent with the principles expressed in the National Electricity Rules (NER), the primary objective of connection assessments is to minimise the risk that new connections or commissioning activities will adversely affect power system security, quality of supply, power transfer capability or use by other network users.

Connection projects have traditionally been assessed by AEMO on an individual basis. The NER make an implicit assumption that every connection can be assessed on a linear timeframe because its impact on security, quality of supply and other committed users at any point in time will be ascertainable.

The NER do not recognise the possibility of parallel connection applications, registration applications, hold-point progressions, and model validation testing for a significant number of generation projects in electrical proximity, where the outcomes of each activity could have adverse impacts individually or in combination with each other.

This is now the reality in the WMZ.

1. Challenges of parallel assessment

The nature and complexity of potential interactions in the WMZ means that commissioning and committed projects cannot all be assessed in modelling studies in the same timeframes, if these adverse impacts are to be avoided or minimised. Specifically, sequential and timing challenges arise because:

- While the power system in the WMZ is only marginally stable, addition of any material number of inverters has the potential to interact with existing plant to create or exacerbate undesirable oscillatory response to a disturbance.
- Identification of these interactions requires advanced wide area PSCAD studies, requiring expanded server capability, extensive time to run each case, and modelling capability still in development. Some NSPs may have limited capability to undertake these studies, which must employ a consistent approach.
- Generator models for current solar farm and wind farm equipment are modified many times during the connection application, system strength assessment, construction and commissioning process. For example, the outcome of a full system strength impact assessment in the WMZ will inevitably require location-specific tuning of the model parameters, settings changes, or additional equipment as part of a system strength remediation scheme.
- In practice, this means that the assumptions in the NER about model availability for connection assessments no longer hold.

In current WMZ network conditions, AEMO and NSPs can only be satisfied that further grid-scale inverter-based generation can meet performance standards without adverse security or quality of supply consequences by studying the impact of each incremental connection (or increase in output) individually.

Once stability is confirmed, the model parameters and settings are finalised and integrated into the agreed wide area PSCAD model accessible by AEMO and all relevant NSPs. At that point the next project can be assessed.

If projects are not incrementally assessed against a model that incorporates finalised parameters for all considered generation, there is a material risk that:

- previous stability solutions will be invalidated by the integration of further generation; and
- assessments of proposed generation will result in inadequate or unachievable performance standards or remediation schemes,

in both cases potentially leading to further adverse security impacts or major disturbances, greater and deeper constraints, investment losses and stranded assets, and more costs to consumers.

2. Boundaries of the WMZ

AEMO is currently consulting with relevant network service providers (NSPs) to finalise a methodology that can be used to confirm the precise electrical boundaries of the WMZ as it currently stands. The map and descriptions published to date have been illustrative only. Once the NSP consultation is complete, AEMO will communicate the outcome to impacted participants.

3. Sequencing approach for commissioning and committed projects

Taking account of the feedback received to date, AEMO has refined its proposed sequencing approach and established a first draft of the proposed assessment sequence for projects in commissioning, pre-registration and alteration. The sequence was communicated to many of you last week via letter and is broken down by project stage and based on objectively ascertainable dates to ensure fairness and transparency.

The project stages and parameters used to define the position in the sequence are:

Group	Project stage	Parameters
Group A	In commissioning	The position in the sequence is determined by the registration date or the most recent submission date of a hold point assessment report of the commissioning project, whichever is the latest. This will allow projects to proceed as they finish hold point testing and prevent delays waiting for projects that may have encountered difficulties in completing their hold point tests.
Group B	Pre-registration	The position in the sequence is determined by the date when the application for registration has been received, including all required supporting information.
Group C	Alteration of committed projects (clause 5.3.9 process)	The position in the sequence is determined by: i. if unregistered, date of grid connection agreement, NER 5.3.4A letter, or NER 5.3.4B approval, whichever is the latest; or ii. if registered, date of registration.

Exceptions may occasionally be appropriate but will be minimised. Considerations may include the creation of broader system benefits or a need to remedy a non-compliance that impacts AEMO's ability to maintain power system security.

When AEMO is ready to assess a project, the project needs to meet the criteria to proceed, which include the preparation of complete and compliant supporting data to allow the assessment to proceed without delay. If material is missing or incomplete, the assessment will be paused and reconsidered for assessment after the next project in the sequence has been assessed.

4. Kick off meetings

Prior to commencing the assessment of a project, AEMO will arrange a kick-off meeting with the proponent and the relevant NSP to go through the technical information submitted and discuss the assessment approach in more detail.

5. Sequencing uncommitted projects

Uncommitted projects (those still in the connection application stage) are not included in the above sequencing proposal.

AEMO will not be in a position to assess proposed generator access standards or review system strength remediation proposals until all committed projects have been assessed to the commissioning stage and incorporated into the wide area model.

In the meantime, AEMO wishes to work with stakeholders on a way forward to allow the secure connection and operation of projects in the WMZ in advance of long-term network infrastructure solutions

AEMO expects these discussions to cover potential options that could facilitate connection, including formation of combined connection groups to share remediation costs, technical innovation and model development.