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Mr Arek Gulbenkoglu
A/g Executive General Manager, Consumers and Markets
Australian Energy Regulator
GPO Box 520
Melbourne VIC 3001

By online submission:

Dear Mr Gulbenkoglu

AEMO submission – Essential Energy's Islandable Microgrids Trial Waiver Application (AER reference: 5143235)

AEMO welcomes the opportunity to comment on Essential Energy's application for regulatory sandbox trial waivers for islandable microgrids.

AEMO supports the objective of improving reliability and resilience for communities that may experience extended or difficult-to-restore network outages. A controlled trial may also provide useful practical evidence about the operation of islandable microgrids and assist the development of enduring regulatory arrangements for temporary islanding.

1. Scope of AEMO's response

AEMO's submission focuses on those consultation questions most relevant to AEMO's functions and responsibilities (questions 1-4, and 9), particularly:

- the market settlement implications of the proposed trial;
- impacts on AEMO and other market participants;
- the materiality of those impacts;
- safeguards and conditions that may be appropriate; and
- the potential use of existing regulated Stand-Alone Power System (SAPS) arrangements where temporary islanding has material market consequences.

2. Implementation under the proposed approach

A key feature of Essential Energy's proposal is that settlement, metering, and other market interface matters are not presently identified as requiring specific waiver relief. Rather, the application proposes that these matters be managed through trial design, protocols, stakeholder engagement, monitoring and reporting.

The application also proposed to examine whether retaining ordinary market treatment during periods of islanding may provide a simpler and more proportionate outcome than alternative approaches.

AEMO recognises the implementation simplicity of this approach. If affected connection points and resources continue to be represented within existing market systems in the same way during islanding as when they are interconnected, there may be little or no need for changes to existing market systems or settlement processes. However, that simplicity may give rise to other consequences.

Where a section of the distribution network becomes electrically separated from the interconnected power system and is instead supplied by local generation or storage, continuing to represent that section under ordinary interconnected market arrangements may create a mismatch between the physical operation of the network and its representation in market and settlement systems.

Depending on the characteristics of the particular deployment and islanding event, this could affect:

- Settlement of affected customer load;
- Financially Responsible Market Participant (FRMP) financial responsibility;
- Unaccounted for Energy (UFE) and loss allocation;
- Treatment of electricity supplied by local generation and storage;
- Recovery of the costs of revenues associated with that local supply;
- Metering and market-system information;
- Dispatch, forecasting and ancillary service participation for resources within the islanded section;
- Prudential exposure; and
- AEMO's visibility of the actual operating state of the relevant network section.

AEMO does not consider that these potential impacts necessarily mean that ordinary market treatment is inappropriate.

For short duration operational islanding, or where energy volumes and associated market consequences are immaterial, retaining existing arrangements may be the simpler and more proportionate outcome. DNSPs already undertake short-term continuity-of-supply and restoration activities for which formal changes to market treatment would not necessarily be warranted.

The relevant question is therefore not simply whether a network section becomes electrically islanded, but whether the scale, duration, and characteristics of the islanding event result in market or settlement impacts that are sufficiently material to require different treatment.

3. Materiality cannot presently be determined from the application

AEMO considers that the application does not presently provide sufficient information to determine the likely materiality of the market and settlement consequences described above.

The application identifies a range of potential microgrid configurations and operating models, including battery-only systems, grid-connected microgrids with local generation, and arrangements involving third-party ownership, operation or market participation.

However, the information necessary to assess the market and settlement implications of those arrangements on a deployment specific basis is not provided in sufficient detail.

Relevant information would include, for example:

- The expected frequency and duration of islanding events;
- The number and characteristics of affected NMIs;
- Expected customer load during islanding;
- The scale and expected output of local generation and storage;
- How locally supplied electricity would be treated financially;
- Expected impacts on FRMP settlement and UFE;
- Relevant metering arrangements;

- The presence of registered or otherwise market-facing resources within the proposed island boundary; and
- The treatment of those resources during islanding.

This information is important because the application proposes that the materiality of some settlement and market interface impacts be assessed through the trial.

AEMO considers that, where the relevant variables are known or can reasonably be estimated, the expected consequences should first be analysed before deployment. For example, expected settlement effects arising from local generation supplying islanded customer load should generally be capable of being modelled using assumptions regarding load, generation, islanding duration and prevailing settlement arrangements.

The trial can then be used to validate those assumptions, identify unforeseen effects and test whether the selected treatment operates effectively in practice. AEMO does not consider that the basic consequences of retaining ordinary market treatment should need to be discovered only through live trial operation where those consequences are reasonably capable of prior analysis.

4. Distinguishing operational islanding from materially significant islanding

AEMO considers that a useful way of assessing materiality is to distinguish between short-term operational islanding and islanding that becomes materially significant for market purposes.

The application describes islandable microgrids as systems capable of operating both while connected to the main electricity grid and independently during outage or planned isolation.

Not every such transition necessarily requires formal market treatment.

For example, a short-duration interruption where a local battery or generator maintains supply to customers while normal network conditions are restored may have limited market consequences. In these circumstances, leaving existing market and settlement arrangements unchanged may be proportionate.

By contrast, where islanding persists for a longer period, affects a substantial volume of load, includes material quantities of local generation or storage, affects resources participating in market or dispatch arrangements, the consequences of continuing to represent the affected section as interconnected may become more significant.

This distinction is particularly relevant to Essential Energy's Tibooburra example. The application states that the proposed microgrid is intended to maintain electricity supply during upstream outages and could provide supply through a substantial proportion of historically experienced outages.

The relevant market consideration is not simply whether the town becomes islanded during those events. It is whether a particular event remains a short-term measure with immaterial market consequences or becomes sufficiently significant that different market and settlement treatment is warranted.

AEMO considers that this distinction could form part of the assessment and design of individual trial deployments.

5. Temporary use of the existing SAPS framework where impacts are material

Where pre-deployment assessment indicates that retaining ordinary market arrangements would have material market or settlement consequences, AEMO considers that the existing regulated SAPS framework provides a useful model for mitigating those impacts.

The regulated SAPS framework establishes market, settlement, and metering arrangements for electricity supply to network areas that are electrically separated from the interconnected power system.

Importantly, the SAPS framework is not inherently limited to individual customer connections. The application states that SAPS solutions are well suited to discrete customer connections but do not address township-level resilience. AEMO considers that this understates the flexibility of the regulated SAPS framework.

SAPS arrangements can provide an established market architecture for an electrically separated section of network containing multiple customer connection points. This makes the framework relevant to the type of township scale resilience outcomes contemplated by Essential Energy.

Where islanding has material market consequences, applying relevant SAPS arrangements temporarily could provide a means of aligning market treatment with the physical operating state of the network.

This could address or mitigate the principle issues identified above by providing established treatment for settlement within the electrically separated area, market system representation, metering, local generation and storage, and resources that should no longer participate in ordinary dispatch or forecasting arrangements when islanded.

AEMO is not suggested that temporary islanding should result in permanent SAPS treatment, or that SAPS treatment should apply to every islanding event. Rather, relevant SAPS market and settlements arrangements could be applied temporarily where an event is sufficiently material, with ordinary interconnected arrangements restored following reconnection. For short-duration or immaterial events, retaining existing arrangements may remain the more proportionate approach.

6. Appropriate safeguards and conditions

AEMO considers that any trial waiver should include conditions ensuring that market-interface impacts are considered before relevant deployments commence. In particular, AEMO recommends that the AER consider requiring:

1. a deployment-specific assessment of settlement, metering, market-system, and dispatch impacts before commissioning;
2. identification of affected NMIs, FRMPs, metering participants and any registered or dispatch-related resources within the island boundary;
3. assess the likely materiality of the consequences of retaining ordinary market treatment;
4. engagement with AEMO before commissioning where the assessment identifies a material impact on AEMO-operated market, settlement, metering, dispatch, or forecasting arrangements;
5. an agreed treatment for material market-interface impacts before the relevant deployment proceeds; and
6. monitor actual outcomes against the assumptions used in that assessment during the trial.

This approach would allow the trial to generate genuine evidence while ensuring that reasonably foreseeable market consequences are understood and appropriately managed before live operation.

7. Relationship to the developing T-SAPS proposal

Essential Energy's application refers to the developing T-SAPS concept as a potential enduring framework for aspects of market recognition, settlement and operational treatment during temporary islanding.

AEMO is currently developing a proposal that seeks to provide an enduring framework for temporary islanding arrangements. Experience from Essential Energy's trial may provide useful evidence to inform that work, particularly in relation to the circumstances in which different market and settlement treatment is proportionate.

AEMO looks forward to working with the AER, Essential Energy, and other stakeholders as the consultation process progresses. Should you wish to discuss any of the matters raised in this submission, please contact Hannah Heath, Group Manager – Strategic Market Reform, at [redacted].

Yours sincerely,

[redacted]

Violette Mouchaileh
Executive General Manager, Policy and Corporate Affairs