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Australian Energy Market Commission
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SUBMISSION — MINIMUM SYSTEM LOAD GOVERNANCE AND MARKET ARRANGEMENTS

ERC0417 — MSL reserve service | ERC0439 — MSL framework and floor price proposal

Submitted jointly by Nomadic Energy Pty Ltd and Frontier Data Infrastructure Pty Ltd

1 Introduction

Nomadic Energy and Frontier Data Infrastructure welcome the opportunity to comment on the Commission's consultation on minimum system load (MSL) governance and market arrangements. Nomadic Energy is primarily an electricity generation business. Frontier Data Infrastructure is a sister company focused on the ownership and operation of data centre infrastructure, including flexible computing loads. Across the two businesses we have practical experience with megawatt-scale flexible computing applications and are developing a pipeline for substantially greater capacity. Our interest is principally from the perspective of large, controllable electricity loads, and the role those resources may play in supporting operation of the market during periods of very low operational demand.

We have confined our comments to matters on which we have direct operating experience, and have not commented on the drafting of definitions, on dispatch or settlement mechanics, or on the appropriate level of administered prices. We agree with the four assessment criteria proposed in chapter 6, and our comments bear most directly on safety, security and reliability and on the principles of market efficiency. They are most relevant to Questions 4, 5, 7, 8 and 9.

2 Flexible computing as an MSL resource

The consultation paper appropriately identifies new large loads, including data centres, as a material uncertainty affecting the outlook for minimum operational demand. In our view it is important that system planning distinguishes between large loads that operate continuously and are largely insensitive to market conditions, and flexible large loads capable of materially changing consumption in response to prices, market signals or dispatch instructions. Treating all forecast large-load growth as a static addition to underlying demand may understate the load-side resources potentially available to the system.

The characteristic that matters for MSL purposes is not a facility's total consumption but its incremental controllable demand: the difference between the level at which it is operating and the level to which it can be instructed to move. A facility with installed capacity of 20 MW operating at 12 MW may, subject to its commercial and operational requirements, be able to make some or all of the remaining 8 MW available as incremental load during an MSL event.

That proportion is not a fixed characteristic of the technology. It is largely a design outcome, since the type of computing work placed at a site is chosen to suit the duty that site is intended to perform. A facility configured around latency-tolerant, interruptible workloads may have a substantial majority of its load available as controllable headroom, while one configured around workloads carrying strict availability commitments may have very little. It would therefore be unsafe to assume a fixed ratio between installed capacity and controllable load across this class of resource.

Unlike an energy storage system, a computing facility's ability to sustain additional demand is not necessarily constrained by a finite state of charge. This may make flexible computing particularly suitable for sustained "trough filling" requirements extending across several hours.

3 Operating characteristics relevant to MSL

Scale and granularity

Flexible computing infrastructure is typically modular. A facility may consist of numerous independently controllable blocks of load rather than a single indivisible load, and the increments can be as fine as the duty requires - in some configurations down to individual server level, which is a matter of kW rather than MW. Consumption can therefore be adjusted in fine steps rather than switched wholesale - a facility can follow an instructed level closely rather than moving between a small number of fixed operating states, and individual loads can be aggregated into a single controllable resource where appropriate.

Response speed

Where a facility is enabled and holding headroom, the change in consumption can be effected rapidly and automatically. Our facilities can move from an operating level to a target level in under 6 seconds for curtailment, and under 60 seconds for ramping to a designated load. This is distinct from the notice required to place a facility in a position to respond.

Notice period

MSL conditions are generally more forecastable than many other system security events, which is favourable for load-side participation. We would suggest that participants be permitted to specify their own notice or commitment requirements, rather than all resources conforming to a single response profile where that is unnecessary. Improved forecasting and earlier information on approaching MSL conditions would directly increase the volume of flexible computing load that can be made available, and does not depend on any new market mechanism.

Duration

Different forms of flexible demand can provide materially different response durations. Battery storage may have limited charging headroom depending on its state of charge, whereas flexible computing may be capable of maintaining additional consumption for substantially longer periods. Participants should therefore be capable of specifying both MW capability and duration, rather than a single MW figure being assumed to be deliverable across any event length.

Control, measurement and verification

Flexible computing load can be remotely controlled and monitored, and a facility of this kind can be configured so that consumption is separately metered at interval granularity at the connection point. Where possible, the Commission should favour clear measurement of actual dispatch performance over complex hypothetical baselines. For a large load that is separately metered, remotely monitored and instructed, it should be possible to demonstrate directly the movement from one operating level to another following an AEMO instruction, which is simpler and less contestable than estimating what the facility would otherwise have consumed.

4 Effective price signals — Questions 4 and 5

We agree with the Commission and the Reliability Panel that efficient price signals should remain an important mechanism for encouraging market participants to respond to periods of excess supply and very low operational demand. Flexible computing facilities can be highly responsive to electricity prices. That responsiveness is conditional, however, on the commercial arrangements through which the facility purchases electricity allowing the wholesale price signal to reach it. Where a facility is supplied under a fixed-price retail contract or a hedged structure, a negative spot price has limited or no effect on its operating decisions, irrespective of how negative that price becomes. This bears directly on how much response the Commission should expect a stronger price signal to produce.

We do not consider that the wholesale energy price alone will necessarily provide AEMO with sufficient certainty that the required amount of incremental demand will be available at the required location, time and duration. There is an important distinction between a market participant having an incentive to consume additional electricity, and AEMO knowing in advance that a defined quantity of controllable load will be available when required. A price signal delivers the first. It does not, by itself, deliver the second.

We therefore see merit in the Reliability Panel's proposal to strengthen price signals during genuine MSL conditions. We would suggest it addresses a different part of the problem from a mechanism that gives AEMO advance certainty about available load, and would encourage the Commission to consider the two together rather than as alternatives.

5 The need for load reserves — Question 7

We support the proposition that there is a need for more explicit arrangements supporting the provision of load reserves during MSL conditions. The existing wholesale market provides an incentive for additional consumption when prices are negative, but does not ensure that sufficient controllable demand will be available when AEMO requires it.

From the perspective of a large flexible load operator there is a real opportunity cost associated with reserving load capability for the electricity system. A facility may otherwise have a commercial incentive to operate near its full level continuously. To provide a defined quantity of reliable MSL reserve, the operator must instead preserve sufficient operating headroom so that consumption can increase when called upon. That headroom represents foregone revenue-earning activity, and the cost is incurred whether or not an MSL event ultimately occurs. An appropriately designed availability or enablement payment can compensate the facility for making that capability reliably available, which is the difference between capability that might be available and capability that can be relied upon.

Flexibility at scale is also not solely an operating decision. It requires investment in control and orchestration systems, in metering and telemetry, and in physical capacity provisioned beyond what the underlying computing business would otherwise require. That expenditure is incremental to the base facility and must be justified against incremental revenue. As a developer assessing projects for future connection, we find that difficult to justify against the prospect of negative prices alone, since neither their incidence nor their depth can be relied upon at the point the investment decision is made. The volume of flexible load available to the system in future is therefore not fixed. It will depend in part on whether the arrangements the Commission settles make investment in flexibility commercially rational at the time projects are designed.

6 Proposed MSL market ancillary service — Question 8

We support further development of the Clean Energy Council's proposed MSL market ancillary service, subject to one important principle: eligibility should be genuinely technology-neutral and based on measured performance.

The appropriate question is not whether a resource is a battery, pumped hydro facility, data centre or another type of industrial load. It is whether the resource can meet the required performance standard. That standard should address how much additional operational demand the resource can provide, how quickly it can respond and how much notice it requires. It should also address how long the response can be sustained, whether it can be remotely controlled, whether delivery can be measured and verified, and whether the resource can reliably follow AEMO instructions.

Where a flexible computing facility can satisfy that standard, it should be able to compete to provide MSL services on equivalent terms to other technologies.

This principle should extend through the design of registration, bidding, metering, telemetry and dispatch requirements, so that a nominally technology-neutral service is not in practice built around the characteristics of battery storage in a way that creates unnecessary barriers for other sources of flexible demand. Drawing on the characteristics described in section 3, we would ask in particular that the design allow participants to specify both MW capability and duration and their own notice requirements; recognise incremental controllable demand rather than total consumption; favour direct measurement of dispatch performance over hypothetical baselines;

provide for availability or enablement payments; permit the aggregation of modular loads into a single controllable resource; and accommodate loads co-located with generation, where eligibility should reflect the measurable benefit to the power system rather than whether the load sits in front of or behind a particular meter.

On implementation and operating costs, a service assuming unlimited availability, or specified without regard to how often providers can be called, will be priced accordingly by participants. Allowing providers to specify their own availability parameters is likely to reduce the cost of the service to consumers.

7 Alternative and complementary arrangements — Question 9

We do not consider that the Commission necessarily needs to choose between energy-market price signals and a dedicated MSL reserve mechanism, as the two serve different purposes. Wholesale prices provide a broad economic signal encouraging participants to reduce generation or increase consumption, while an MSL reserve mechanism can give AEMO greater certainty that a defined quantity of load will be available at a particular time and for a required duration.

A workable framework may therefore comprise improved forecasting and information regarding approaching MSL conditions; strong wholesale price signals encouraging voluntary market response; a transparent mechanism allowing AEMO to procure or enable defined quantities of flexible demand where greater certainty is required; and directions and emergency measures remaining available as a last resort. We offer no view on the relative merits of the other arrangements canvassed in the consultation paper, which fall outside our direct experience.

8 Conclusion and further engagement

We support the Commission's consideration of more transparent and market-based arrangements for managing minimum system load. On the two proposals, we would note that stronger price signals and a mechanism giving AEMO advance certainty address different parts of the problem, and we would encourage the Commission to consider them together. Whatever it concludes, we would ask that any future MSL framework be designed around the service delivered to the electricity system rather than the technology used to deliver it.

The consultation paper identifies the development of new large loads as one of the material uncertainties in the MSL outlook. Flexible computing is a relatively recent entrant to electricity markets, and we would be glad to assist with that question as this work develops. We would welcome the opportunity to discuss this submission with the project team, and to take part in any technical working groups or trials, where we can contribute operating detail on response speed, duration and verification. Please contact Alex Blott via ab@nomadic-energy.com in the first instance.

Yours sincerely,

Alex Blott

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