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System Operator

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Submission to the System Operator Strategy Phase 2 Consultation Paper: Draft Strategic Priorities

Vector welcomes the opportunity to respond to the System Operator's Phase 2 consultation on its draft Strategic Priorities (the consultation paper). As New Zealand's largest electricity distribution business, Vector has a direct and material interest in how the System Operator's role evolves over the next decade, particularly as it relates to the integration of distributed energy resources (DER) and consumer energy resources (CER) at the transmission–distribution interface.

This submission draws on Vector's established public positions on distribution system operation (DSO) and demand flexibility, set out across a number of recent submissions and pieces of analysis, including:

- Vector's response to the Authority's consultation on future system operation in the evolving power system (August 2025);
- Vector's response to the Authority's update to scarcity pricing settings (November 2024);
- Electricity Networks Aotearoa's report, prepared by Baringa Partners, on potential DSO models for New Zealand (the Baringa Report);
- Vector's response to the joint industry open letter on non-network solutions (February 2026); and
- Vector's ongoing multi-retailer, low-voltage demand flexibility pilot in Auckland, developed in partnership with EECA and several retailers, which is generating live evidence on price-led, envelope-mediated coordination of CER.

Read together, these documents set out a consistent and increasingly well-evidenced position: that the most efficient, scalable and durable model for coordinating flexibility at the distribution level is one in which distributors publish credible signals - dynamic operating envelopes and locational, time-varying prices - and retailers and aggregators translate those signals into customer products and device-level action. This submission applies that position to the System Operator's five proposed strategic priorities, with particular focus on Priority 4 (Leveraging data and distributed resource integration), which is of greatest relevance to Vector's role as a distributor.

Vector's submission is structured in three parts:

- Part A responds at a high level to each of the five proposed strategic priorities;
- Part B sets out Vector's detailed position on the TSO–DSO model and the role of price-and-envelope-mediated coordination, responding specifically to Priority 4 and the “Issues for others to consider” section; and

- Part C identifies the specific regulatory gaps that Vector considers must be resolved - by the Authority, in collaboration with the System Operator and EDBs - before flexibility can be relied upon at scale.

Part A: Response to the five strategic priorities

Vector supports the overall direction of the draft Strategy and the System Operator's recognition that the power system of 2036 will require a coordinated, hybrid TSO–DSO model. The table below summarises Vector's position on each of the five priorities, with detailed commentary on Priority 4 provided in Part B.

SO priority	Vector's overall position	Key submission points
1. Operating a secure, highly variable power system	Supportive, with a request for clarity on the LV interface.	System security depends on the System Operator having credible visibility of DER/CER behaviour at the grid edge, but this should come from EDB-published data and signals - not from direct System Operator visibility into, or control of, individual devices.
2. Efficient market operations and information provision	Strongly supportive, particularly of the market sandpit and asset integration initiatives.	Markets, not control rooms, should be the primary coordination mechanism for flexibility. P2.6 (market sandpit) and P2.5 (integrating new operating models) should explicitly reference EDB-led LV pilots already under way.
3. Evolving operational capability	Supportive of CRoF and AI investment; limited direct relevance to Vector's submission.	No major comments; Vector notes that System Operator capability uplift should be matched by commensurate, approved funding for equivalent DSO capability investment.
4. Leveraging data and distributed resource integration	The most important priority for Vector. Strongly supportive of the hybrid TSO–DSO	The Hybrid model, price-and-envelope-mediated coordination, and explicit role

	direction, subject to the points below.	separation (data and signals, not direct device control) are central to Vector's position. See Part B below.
5. Strengthening industry resilience	Supportive, with specific comment on P5.4 (emergency demand management).	Vector supports a clear, tested Common Load Management Protocol. This should be built and exercised collaboratively with EDBs, recognising EDBs' primary role in coordinating local restoration sequencing.

The Strategy would be enhanced if it included a clear commitment to report periodically on progress against the strategic priorities, initiatives and any KPIs developed with the Electricity Authority. Vector considers this would improve transparency and accountability for delivery, particularly given the scale of the work programme proposed and the number of initiatives that depend on coordinated action across the System Operator, the Authority and other market participants. Regular progress reporting would also help stakeholders understand whether the Strategy is delivering the intended outcomes and where further industry engagement or regulatory support may be required.

Priority 1: Operating a secure, highly variable power system

Vector supports this priority and the associated initiatives, particularly the shift toward probabilistic forecasting (P1.2) and the evolution of Special Protection Scheme management (P1.3). As the consultation paper itself notes, stakeholders “cautioned against the System Operator directly controlling distribution-connected assets.” Vector agrees and considers this principle should be stated explicitly as a design constraint on every initiative under this priority, not only those grouped under Priority 4.

Priority 2: Efficient market operations and information provision

Vector strongly supports this priority, in particular the proposed market sandpit (P2.6) and the work to integrate new operating models, including DSOs and aggregators, into the market (P2.5). Vector's Auckland LV Network Lab flexibility pilot - a live, multi-retailer test of price-led coordination on a single HV feeder - is precisely the kind of initiative a market sandpit should be designed to learn from and scale. Vector would welcome early engagement with the System Operator on how findings from this pilot, and equivalent pilots being run by other EDBs, can inform P2.5 and P2.6.

Priority 3: Evolving operational capability

Vector has no major comments on this priority, which is substantially internal to Transpower's own operations. Vector notes, for context, that the scale of investment proposed in Control Room of the

Future capability (P3.1) should be matched by commensurate, approved funding for distribution-level visibility and capability - a point developed further in Part C.

Priority 4: Leveraging data and distributed resource integration

This is the priority of greatest relevance to Vector and is addressed in detail in Part B.

Priority 5: Strengthening industry resilience

Vector supports this priority, and in particular the development of a national Common Load Management Protocol under P5.4. Vector has advocated for several years for clearer rules requiring all parties managing distributed load and generation - retailers, aggregators and non-retailer DER Managers alike - to coordinate with their host distributor during system emergencies, recognising that EDBs retain primary responsibility for local restoration sequencing once a national event has been addressed. This is discussed further in Part C.

Part B: The TSO–DSO model and price-led coordination

Vector supports the Hybrid model as the basis for Priority 4

The consultation paper describes a 2036 power system underpinned by "a practical hybrid TSO–DSO model," in which "distribution networks actively manage local conditions, while the System Operator orchestrates system-wide balancing and security management." Vector strongly supports this characterisation. It is consistent with the Hybrid model Vector identified as its preferred option, of the three models assessed in the Baringa Report, in its own submission on future system operation: a model in which the DSO operates local flexibility coordination and optimises constraints within its own network, while the System Operator optimises the wholesale market and manages system-wide security.

Vector's preference for the Hybrid model over a Total TSO or Total DSO approach reflects three considerations that remain valid today:

- Local knowledge cannot be centralised efficiently. Distribution networks' assets number in the hundreds of thousands of substations, each with different physical characteristics, customer profiles and constraint patterns. A Total TSO model would require Transpower to absorb this complexity directly, which neither the consultation paper nor Vector considers practical.
- EDBs already hold the customer- and network-facing relationships required to contract and price local flexibility, through flexible connections, network pricing and, where justified, contracted non-network solutions. A Total DSO model that required all flexibility to clear a single local market would duplicate this capability unnecessarily.
- The Hybrid model supports incremental evolution. It does not require all DSO functions to be resolved or standardised before progress can be made, which matters given the current state of market and capability development across New Zealand's 29 EDBs.

The coordination mechanism should be price-and-envelope-led, with the System Operator at arm's length from devices

Priority 4 states a clear ambition: to "enable secure whole of system operation… so that DER/CER can integrate anywhere without undue operational risk." Vector's strong preference is that this is achieved through distributors publishing two complementary signals to retailers and aggregators, who in turn translate them into customer products and device-level action:

- Dynamic operating envelopes, reflecting the physical headroom available for import and export at a given location and time; and
- Locational, time-varying network prices, reflecting the economic cost of network use at that location and time.

Vector's Auckland LV Network Lab is testing precisely this architecture: a single HV feeder, multiple competing retailers, and a price-and-envelope interface in which Vector's role is to publish credible, machine-readable signals – that retailers or aggregators use to manage consumer devices. Early evidence from comparable trials in Australia, such as Ausgrid's Project Edith, supports the consultation paper's own vision that "intervention is a last resort" and that "market-based products and fit-for-purpose tools… enable more proactive event management."

Vector's recommendation: Priority 4 and its supporting initiatives (P4.3, P4.4) should explicitly state that whole-of-system visibility and coordination are to be achieved through shared data and published signals - envelopes and prices - rather than through direct System Operator visibility into, or instruction of, individual distribution-connected devices. This is consistent with stakeholder feedback already recorded in the consultation paper, which cautioned against direct System Operator control of distribution-connected assets, and should be reflected as an explicit design principle, not left implicit.

Roles should mirror the existing Grid Owner / System Operator precedent

Vector's submission on future system operation argued that New Zealand already has a clear and workable precedent for allocating responsibilities between a national coordinator and asset-owning operators: the existing division of roles between the System Operator and Transpower's Grid Owner function. Vector considers the same logic should apply, by extension, to the System Operator–EDB interface. The table below summarises Vector's view of the appropriate allocation of roles consistent with this precedent and with the architecture being tested in Vector's LV pilot.

Entity	Vector's view of the appropriate role
System Operator	Operate the wholesale market and grid in real time; publish trusted, system-wide information; coordinate national emergencies; implement market design set by the Authority.

	Should not seek visibility of, or influence over, individual LV-connected devices.
Distributors (EDBs/DSOs)	Publish local operating envelopes and locational price/scarcity signals; coordinate local emergencies and restoration sequencing; contract flexibility where price signals alone are insufficient; retain primacy over locally contracted and emergency-activated resources.
Retailers and aggregators (ESPs)	Translate published signals into customer products; own device-level control logic and customer relationships; respond to EDB envelopes and System Operator/EDB emergency instructions.
Electricity Authority	Set the TSO–DSO functional model, market design and DER/CER performance obligations; resolve the regulatory gaps identified in Part C.

Comments on specific Priority 4 initiatives

P4.1: Development of a standard operational data set for industry use

Vector supports this initiative and the explicit statement that data sharing should be considered "at the interface between DSO and TSO," rather than reaching through to individual devices. Vector recommends the System Operator work directly with EDBs already running LV demand flexibility pilots - including Vector's Auckland pilot - to ensure the standard data set reflects the operational reality of envelope- and price-based coordination, rather than being designed in the abstract.

P4.3: Data access and use

Vector supports establishing initial data access and sharing arrangements with EDBs for controllable load visibility. Vector notes that the appropriate scope of this data sharing is operational visibility for event management purposes - consistent with the role allocation set out above - and should not be read as a step toward System Operator dispatch of distribution-connected resources.

P4.4: Future System Operator interoperability

Vector strongly supports the System Operator's commitment to "actively contribute to the Authority's development of an effective hybrid TSO-DSO functional model." Given the materiality of this work to EDBs, Vector recommends the System Operator commit to a joint workplan with the Authority and the EDB sector (through the ENA Future Networks Forum) to define this model. This would build on the Baringa DSO Report's analysis, rather than progressing this primarily as an Authority–System Operator bilateral process. Vector also notes that incorporating "distribution constraints (operating envelopes) and DER states into overall constraint/security management" (as proposed under Future Investment Priorities) should be designed around EDB-published envelope

data, consistent with the role allocation above, rather than requiring EDBs to expose granular, device-level data to the System Operator.

P2.6: Market sandpit

Vector welcomes this initiative and notes that EDBs, including Vector, are already running exactly this kind of tests at meaningful scale. Vector recommends the System Operator engage directly with these existing pilots when scoping the sandpit, to avoid duplicating work already under way and to ensure regulatory learnings are captured collaboratively rather than sequentially.

Part C: Regulatory gaps that need to be resolved

Vector has raised the following issues consistently across its submissions on future system operation and scarcity pricing settings. They remain unresolved and, in Vector's view, represent the most significant barriers to the System Operator and EDBs being able to rely on price-and-envelope-led coordination at the scale envisaged in the consultation paper's 2036 vision. Vector raises them here because the consultation paper's own “Issues for others to consider” section identifies TSO–DSO roles, foundational data requirements and DER/CER performance obligations as matters requiring action beyond the System Operator alone, and Vector agrees with that framing.

A national Code-based protocol for emergency coordination of distributed resources

Priority 5's proposed initiative P5.4 (coordinating emergency demand management) is, in Vector's view, one of the most important in the entire Strategy. Vector supports the System Operator and the ENA's continued work to refine and ultimately operationalise a Common Load Management Protocol. Vector's LV Network Lab plans to include emergency “shed now” and “cap export” signalling as a tested capability from its earliest phases, precisely because robust, well-understood emergency coordination is a precondition for confidence in the broader price-led model - not a separate workstream.

Vector recommends the System Operator and the Authority prioritise giving this protocol the force of Code, rather than relying solely on bilateral negotiation between EDBs and individual retailers or aggregators. A protocol that depends on voluntary, bilateral agreement leaves EDBs exposed where a market participant is not currently captured by the Code (for example, certain non-retailer aggregators).

Clarity on the boundary between EDB-published signals and System Operator visibility

As set out in Part B, Vector's strong preference is for whole-of-system visibility under Priority 4 to be achieved through EDB-published envelopes and prices, not through direct System Operator access to device-level data or control. Vector recommends this be stated explicitly in the final Strategy, both to give the market confidence in the durability of the price-led model and to avoid duplicated investment in monitoring infrastructure between EDBs and the System Operator.

Faster resolution of the TSO–DSO functional model

Vector notes the consultation paper's own observation that “stakeholders highlighted that market design, price signals and operational models are not keeping pace with decentralisation, with unclear roles, weak coordination, and a need for improved… TSO–DSO integration.” Vector agrees, and has made this point consistently since 2023. Initiative P4.4 commits the System Operator to “actively contribute” to the Authority's development of this model, but does not commit to a timeframe. Given the materiality of this uncertainty to EDB investment decisions - each year of delay requires EDBs to continue planning and investing as though flexibility cannot be relied upon - Vector recommends the final Strategy commit to a definite timeframe for this work, aligned with the Authority's existing Future System Operation programme.

Performance obligations for all parties managing distributed resources, not only retailers

Vector has previously raised, including in its November 2024 submission on scarcity pricing settings, that non-retailer aggregators currently sit outside the Code's good electricity industry practice obligations. This gap is directly relevant to Priority 4's ambition that “DER/CER can integrate anywhere without undue operational risk,” and to Priority 1's concern with compliance and performance obligations for new asset types (P2.5). Vector recommends the Strategy explicitly note this gap and signal the System Operator's support for the Authority addressing it as a priority Code amendment.

Matching investment in distribution-level capability to the System Operator's own capability uplift

The Strategy proposes substantial investment in System Operator capability under Priority 3, including the Control Room of the Future programme. Vector supports this investment and notes it should be matched by commensurate approved funding for the corresponding capability uplift required at the distribution level such as LV visibility, envelope calculation, and price publication infrastructure. Vector encourages the System Operator to use its position, in dialogue with the Commerce Commission and the Authority, to support the case for distribution-level capability funding that is commensurate with the whole-of-system ambition set out in this Strategy.

Conclusion

Vector supports the overall direction of the draft System Operator Strategy, and in particular its recognition that the power system of the future requires a coordinated hybrid TSO–DSO model built on shared visibility, common standards and aligned market signals. Vector's central recommendation is that this coordination be achieved primarily through EDB-published operating envelopes and locational, time-varying prices, translated into customer action by retailers and aggregators - with the System Operator's role focused on system-wide balancing, security and market operation, at arm's length from individual distribution-connected devices.

Vector is already testing this architecture in practice, through its Auckland LV Network Lab with a multi-retailer demand flexibility pilot, and would welcome the opportunity to share emerging findings with the System Operator as the Strategy is finalised. Vector also encourages the System Operator to use this Strategy to help create urgency around the regulatory gaps identified in Part C, several of which have been raised by Vector consistently since 2023 and remain unresolved.

Vector thanks the System Operator for the opportunity to contribute to this consultation and looks forward to continued engagement as the Strategy is finalised later in 2026.

Kind regards

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