Victoria's EV Transition: Core Narrative, Key Themes, and Recommendations

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Introduction

Victoria's transition to electric vehicles (EVs) is now a clear demonstration of the core thesis: EVs represent the largest emerging flexible, price-responsive load in the state. When guided by effective policy, EVs can lower system costs, bolster renewable energy integration, and reduce the need for planned network augmentation.

Core Narrative

- EVs should not be seen as a "new problem load" but as a **key enabler** of a high-renewables, low-cost energy system. They provide flexible, schedulable demand at a significant scale, located precisely where Victorians live and work.
- Victoria has surpassed approximately 50% renewable generation over the past year, though wind and solar curtailment remains significant. EVs are the most obvious form of controllable demand to absorb this energy and improve asset utilisation.
- Since the initial submission, EV uptake has accelerated, validating projections: in 2025, Australian battery electric vehicle (BEV) sales exceeded 100,000 for the first time, and the national plug-in share reached the mid-teens in some months, with Victoria leading the way.
- The main constraint today is not technical but relates to governance and tariff design. Smart charging, vehicle-to-grid (V2G)/vehicle-to-home (V2H) capabilities, and distributed energy resource (DER)-centric planning can allow Victoria to defer or avoid major investments in transmission and peaking infrastructure, while also improving reliability.

Key Themes and Talking Points

1. Truth over Noise: EVs Strengthen the Grid

- Increased renewable penetration in the National Electricity Market (NEM) and Victoria has correlated with lower volume-weighted wholesale prices. Gas and other fuels remain the dominant drivers of price volatility, not EVs.
- When EVs are treated as flexible, off-peak loads, they flatten demand profiles, reduce dependence on costly peaking plants, and better utilise existing network and generation assets.
- A key policy message is: "Burning fuels is expensive; using electricity is comparatively cheap. Matching growing renewable supply with smart EV load delivers lower bills and reduced emissions for all, not just EV drivers."

2. EVs as the Largest Distributed Battery Fleet

- The EV fleet is already the world's largest single category of battery capacity, having surpassed utility-scale storage years ago - a trend set to continue through the 2030s.
- Each EV in Victoria adds tens of kilowatt-hours of controllable storage and flexible demand behind the meter, at no capital cost to the system operator.
- Around 10% of wind and solar energy was curtailed in October 2025, demonstrating that the system is already "spilling" low-cost clean energy that could be captured by smart-charged EVs.
- The critical talking point: "If we don't actively integrate EVs as DER, we are simultaneously curtailing renewables and planning new transmission and firming that we may not fully need."

3. Smart Charging and Tariffs: Getting Default Behaviour Right

- Most EV charging naturally occurs overnight or at workplaces. With time-of-use and dynamic tariffs, this charging can be encouraged further into periods of high renewable output, such as midday solar and off-peak wind.
- **Core recommendations:**
- Mandate network-connected smart chargers for new installations, defaulting to off-peak and high-renewable periods, while preserving user override.
- Introduce dynamic tariffs that provide low or even negative prices during renewable surpluses, and strong price signals to avoid evening peaks.
- Distribution Network Service Providers (DNSPs) should act as neutral platforms—enabling data exchange, visibility, and orchestration—while competitive charging services should be left to the market, except where clear market failures exist.

4. Bidirectional Charging (V2G/V2H) as Real System Capacity

- A typical EV (with a 50–100 kWh battery) can power an average home for a day or two, or provide valuable system-level services such as frequency support.
- Fast-track interoperability standards (such as ISO 15118), and move from endless pilot programs to funded operational deployments, especially for fleets and depots where aggregation and duty cycles are most manageable.
- Since the original submission, developments have reinforced this position:

- AGL's national V2G trial, commencing 1 January 2026 across NEM DNSPs (including Victoria), features BYD, Hyundai, Kia, and Zeekr vehicles, demonstrating commercial interest and technical feasibility for residential-scale V2G.
- Companies like Amber are reporting early lessons on V2G integration—such as charger certification, OEM warranty handling, and location-specific network constraints—highlighting the need for common standards and clear regulation.
- Victoria's kerbside EV charging trial, featuring at least 5% V2G chargers and ring-fencing waivers for DNSPs (CPU), shows that regulators already accept EVs as grid support tools, not just as loads.
- The main argument: "The question is no longer 'if' V2G works; it is how quickly Victoria embeds it in standards, tariffs and planning assumptions."

5. Public and Equitable Charging, Safety, and Urban Form

- Many Victorians lack off-street parking. Equitable deployment of charging infrastructure is essential, especially in older suburbs, regional towns, and multi-dwelling buildings.
- **Recommendations:**
- Provide targeted funding for public and kerbside charging, prioritising solar-and-storage co-location and local microgrids to relieve network constraints.
- Update building codes and rental laws to ensure all new developments are EV-ready (conduits, capacity, panel space) and ensure older wiring is upgraded to reduce fire risks when EV charging is installed.
- Urban design must integrate EV policy with public transport, active travel, and car-share schemes to avoid locking in car dependence and congestion while decarbonising.

6. Network Planning and Transmission: Properly Accounting for DER and EVs

- Planners, including AEMO and network operators, should explicitly test scenarios with high EV-as-DER utilisation (smart charging, V2G, second-life batteries) before making commitments to long-lived transmission investments.
- New documents from AEMO and DNSPs show they already assume steep EV growth:
- AusNet's 2025 EV strategy, using AEMO's forecasts, assumes EV penetration in Victoria will climb from single digits to 50% of sales by 2030, nearly 100% by 2040, and 100% fleet electrification by 2050.

- AEMO's Victorian Annual Planning highlights new minimum-demand records driven by rooftop PV and signals the need for more flexible demand and DER integration—precisely the role EVs can fulfil.
- The critical point: "If planners already assume millions of EVs, they must also assume those vehicles are actively orchestrated. The worst outcome is to assume the load but ignore the flexibility."

7. Second-Life Batteries and the Circular Economy

- Retired EV batteries retain 70–80% of their capacity and can underpin local storage for communities, especially at the grid's edge and in low-income areas.
- **Key recommendations:**
- Standardise grading, reuse certification and safety protocols for second-life battery packs.
- Provide incentives for community storage projects using second-life batteries, especially those linked to rooftop solar and local resilience initiatives.
- Implement statutory lifecycle traceability to support safe recycling and maximise recovery of critical minerals.
- This strategy aligns with Victoria's and the Commonwealth's critical minerals and battery industry strategies, positioning Victoria as a leader in pack assembly, refurbishment, and advanced recycling.

8. Regulatory, Data, Cyber and Workforce Architecture

- Require open APIs and robust cybersecurity standards for chargers and V2G to ensure orchestration across OEMs and aggregators, without compromising privacy or security.
- Invest early in workforce skills—training electricians for EV-ready wiring, software and control specialists, and technicians for EV and battery servicing.
- Ensure equity and planning reform are embedded: EV and DER policies should be assessed for their distributional impacts and ability to support a just transition.

Recent Developments Since Submission

Since we lodged our submission, three things have become clearer.

1. **EV uptake is tracking at or above the 'fast' scenario.**
    - BEV sales exceeded 100,000 nationally in 2025, with BEVs now representing over 8% of new vehicle sales. By the end of 2025, the monthly plug-in share reached approximately 16–17%.

- This underscores the need for Victoria to plan for rapid EV penetration this decade, rather than viewing it as a distant issue for 2040.

2. **System operators and DNSPs now formally assume high EV penetration in their planning.**
    - AusNet's published EV strategy relies on AEMO scenarios and treats EVs as a material future load component.
    - AEMO's latest ESOO and Victorian planning documents highlight the challenges of minimum demand caused by solar and stress the need for flexible demand and DER integration, roles ideally suited for EVs.
    - This strengthens the case for integrating EV flexibility into the Integrated System Plan (ISP), ESOO, and Victorian Annual Planning Report (VAPR), rather than treating it as an externality.
3. **Real-world V2G and kerbside trials in Victoria and nationally are underway.**
    - Victoria's CPU kerbside charging and V2G trial, with ring-fencing waivers, shows the regulator is already permitting DNSPs to deploy EV infrastructure to help manage network constraints.
    - AGL's national residential V2G trial and Amber's V2G work demonstrate growing commercial interest and identify remaining barriers—OEM warranties, standards, data access—which the above recommendations address directly.

Conclusion: Key Choices and Immediate Levers

The Committee's critical choice is whether to treat EVs as unmanaged load (which will be costly) or as orchestrated DER (which lowers costs and accelerates decarbonisation).

The three immediate levers are:

- Mandate smart, network-connected charging with dynamic pricing and pro-renewables defaults.
- Fast-track V2G/V2H standards and redirect funding from pilots to large-scale fleet and neighbourhood deployments.
- Require AEMO and DNSPs to publish planning scenarios where high EV-DER utilisation materially reduces the need for new transmission and firming, making the full value of harmonising EVs with supply and demand visible to policymakers.