

The REVS project

The Realising Electric Vehicle-to-Grid Services (REVS) project brought together stakeholders from federal and territory governments, the transport and electricity industries, in a consortium to speed up the development of Vehicle-to-Grid (V2G) capable EVs, chargers and services throughout Australia. This project has shown that V2G technology can provide frequency services to the national energy market, and has resulted in a roadmap for a large-scale implementation of V2G services. The project results, insights and roadmap will lead to new V2G services available to fleets and residential customers.

Introduced the first bi-directional charger approved for use in Australia.

51 V2G EVs providing grid frequency services.

Demonstrated that providing FCAS services would generate ~\$400 per vehicle annually.

Simulated grid disturbances demonstrating bi-directional charging is robust technical solution.

12 knowledge sharing reports paving the way for other V2G deployments.

45 knowledge sharing events across transport, finance, energy and research industries.

V2G for Australia



V2G technology allows EVs to act as a distributed energy resource and can support energy ecosystem. This eliminates the need for extra investments in grid storage and helps reduce emissions.

Once technical barriers and input costs have been addressed, V2G value will be more attainable. Existing standards, rules and regulations can be adjusted to suit the technology's specific requirements in order to reduce technical limitations and lowering the cost of charging hardware can increase the profitability of users.

A key factor for the successful implementation of V2G is the co-development of a value proposition that is attractive to both the transport and energy sectors and acceptable sharing of risk.



Energy retailers (the likely key intermediary between the energy market and the end user) must also have the capability to clearly communicate the V2G concept to their customers and transparently share the benefits.

Integrating V2G into the wider energy ecosystem has the potential to offset more than \$6 billion investment in dispatchable storage by utilising the EV battery.

The path for V2G in Australia



2023

- REVS project
- 1 V2G charger OEM approved in Aust
- Cost of V2G hardware \$10k+
- kW of connected capacity



CCS (Combined Charging System) V2G capable



2030

- 1% (~150k) EVs in Australian fleet V2G capable
- Several V2G charger OEMs approved in Aust
- Some EV models V2G is 'built in'
- Cost of V2G hardware <\$6k
- Compelling value proposition for V2G EV owners



MWs connected capacity supporting V2G services



2035

- 5% (750k) EVs in Australian fleet V2G capable
- V2G provides a more encompassing set of services to diverse people such as energy market participation, emissions reduction, and resilience services.



GWs connected capacity supporting V2G services



2040

- 10% (1.5m) EVs in Australian passenger fleet V2G capable
- Reduce the need for investment in grid scale dispatchable storage.
- Scale addresses variability and help with intermittency of renewables.



ActewAGL was awarded \$2.73m as part of the Australian Renewable Energy Agency's (ARENA) Advancing Renewables Program. The REVS project is a whole of industry collaboration including the ACT Government (fleet owner), Australian National University (research), Evoenergy (electricity network distributor), JET Charge (charging infrastructure), Nissan (vehicle manufacturer) and SG Fleet (fleet manager), all who have collectively supported the project contributing a further \$3.86m.

All calculations based on the following assumptions

1. \$400 value per vehicle per year: based on vehicle availability data from the REVS project and 2022 contingency FCAS market prices for 4 FCAS services.
2. Australian Passenger fleet: 13.1m vehicles (in NEM regions) in 2021 based on ABS data. Assuming 1% growth annually by 2040 15.8m vehicles in the passenger fleet.
3. \$6b investment offset in dispatchable storage: 31GW by 2050 from dispatchable storage using V2G, VPPs and emerging technologies. Based on 2022 AEMO ISP modelling. Assuming 11GW contribution from V2G in 2040. \$609/kW for grid scale energy storage based on CSIRO GenCost 2021-22: Final report