



Energy optimisation for V2X applications

D2.4.1 | PUBLIC OUTPUT SUMMARY

Methodological scope based on the May 2026 report

Purpose and contribution

V4Grid explores how electric vehicles can support flexible energy use while remaining available for transport. Deliverable D2.4.1 addresses optimisation at the electricity connection point of a home, building or fleet site. Such a point may also include solar generation and stationary storage, creating opportunities to coordinate energy use across several resources.

The central challenge is to balance energy objectives with practical requirements. An action that appears attractive for electricity purchasing may be unsuitable for a vehicle that must leave soon. Useful optimisation therefore considers the site, its users and equipment together. The source establishes a methodological basis for development and evaluation, rather than final operational or commercial results.

Applications and intended benefits

Application	Intended benefit	Essential consideration
Vehicle to home	Use more locally generated solar electricity.	Household needs and vehicle readiness.
Vehicle to building	Coordinate energy costs and high-demand periods.	Fleet departures and site capacity.
Price responsive V2G	Explore value from the timing of energy exchange.	Applicable costs and permitted import and export.
Aggregated V2G	Coordinate flexibility for external requests.	Available resources and agreed service conditions.

These applications have different purposes. Price-responsive operation concerns when energy is purchased or returned. Aggregation concerns coordinated delivery of flexibility beyond an individual site. Describing both in a methodological report does not establish equal maturity, commercial availability or eligibility for paid services.

Local energy and mobility

For homes, solar production and electricity demand may occur at different times. A compatible connected vehicle can potentially help align them. For buildings, coordinated charging may help manage concentrated demand while vehicles continue to serve business needs. In both cases, actual connection times and required departure energy shape the available flexibility.



D2.4.1 | *Methods and interpretation*

Requirements for responsible operation

The driver's expected departure and required energy must remain central to a proposed service. Equipment capabilities, battery operating boundaries and the electricity connection also constrain what can be done. Maintaining a battery reserve does not, by itself, demonstrate that a home can operate during a grid outage; this summary makes no backup-power capability claim.

Site conditions differ. A household with solar panels, a commercial building and a fleet depot may have different demand patterns, tariffs and opportunities to connect vehicles. An approach suitable for one location cannot be assumed to deliver the same outcome elsewhere. Demand, renewable generation and vehicle availability can also change after a plan is made.

Battery use needs consideration alongside the energy objective. Exchanging more energy is not automatically preferable if it increases unnecessary cycling or conflicts with mobility needs. The work recognises that economic objectives, dependable operation and acceptable user experience must be assessed together.

Grid services and evidence boundaries

Technical bidirectionality is only one condition for a grid-facing service. Connection arrangements, permitted energy exchange and the relevant operational and commercial agreements must also be established. Price-responsive operation depends on actual costs and constraints; aggregation depends on the flexibility that participating resources can deliver.

The public brief describes intended value and the scope of the development work. It does not publish price series, revenue forecasts, savings percentages, reliability rates or algorithm rankings. Illustrative material in a technical report should not be treated as a final project-wide result, and outcomes from one tested setting would not establish universal suitability.

Contribution to future assessment

The methodological contribution is a common way to consider energy objectives together with mobility and site requirements across the four applications. It helps explain what future evaluation must address: whether an energy benefit is supported by evidence, whether user needs are retained and whether the operating context permits the intended service. Actual performance requires separate validation.

How this public summary was prepared

This document condenses the supplied D2.4.1 public brief into an account of purpose, applications and limitations. It is newly written public text. Mathematical formulations, algorithm selections, internal workflows, training or configuration logic, parameters, thresholds, numerical examples, time-series plots and implementation references are not reproduced. No technical datasets or source attachments are embedded.

Source basis: V4Grid D2.4.1 Public Brief, based on Documented set of algorithms for offtake point optimization in V2X concepts, May 2026. This summary describes methodological scope and potential value, not validated operational results.