



Economic viability and business models for V2X

D3.1.1 | PUBLIC OUTPUT SUMMARY

Scenario-based assessment | Source report: May 2026

Purpose and public contribution

Vehicle-to-everything (V2X) connects electric mobility with energy management. Bidirectional charging can enable a compatible vehicle to supply a home, a building or the electricity grid. Deliverable D3.1.1 examines the conditions under which these capabilities could create economic value in Hungary, Slovakia, Czechia and Poland, and how responsibilities and benefits could be shared among participants.

The report develops a business-model and investment framework. It connects technical availability, energy costs, service opportunities and contractual arrangements. Its economic findings are scenario-based projections, not measured commercial returns. The public contribution is a structured approach to assessing opportunities before investment, rather than a promise of profitability.

Three applications, different sources of value

Application	Economic purpose and key dependency
Vehicle to home (V2H)	Use more local solar generation and coordinate household energy use. Value depends on vehicle presence, household demand and applicable energy prices.
Vehicle to building (V2B)	Coordinate fleet charging and reduce costly demand peaks. Value depends on the building's load profile, tariff structure and operational needs.
Vehicle to grid (V2G)	Explore price-responsive energy exchange and aggregated flexibility services. Value depends on dependable availability, market access and service costs.

Choosing the right investment comparison

A standalone assessment includes the full cost of creating the charging and energy-management installation. An incremental assessment considers the additional cost and benefit of bidirectional capability where a charging investment is already justified. These answer different questions and should be reported separately.

The incremental approach is appropriate only when the underlying infrastructure would genuinely exist without V2X. Shared costs must be allocated consistently, and additional integration, operating and battery-use costs remain relevant. Neither perspective removes the need to establish whether the complete investment is affordable and technically suitable.



D3.1.1 | Assessment approach

How the economic assessment is structured

The source combines application-specific scenarios, cost and revenue categories, a stakeholder map and country-level comparisons. It distinguishes underlying information, modelling assumptions and commercial interpretation. A consistent assessment links expected vehicle connection patterns and usable energy to possible services, then deducts the costs of providing those services.

The reference case matters: benefits should be compared with operation without bidirectional charging, including suitable smart one-way charging where relevant. Changes in energy timing must be separated from benefits that specifically require energy export. This helps avoid attributing all charging optimisation gains to V2X.

From potential revenue to net value

Relevant costs extend beyond the charger. They include installation and connection works, metering, energy-management integration, maintenance, connectivity, purchased electricity, conversion losses, battery wear and the recovery of invested capital. Market-facing services may also involve intermediary fees and exposure to delivery or settlement costs.

Reduced electricity expenditure, payments for making capacity available and payments for delivered services are different forms of value. Gross revenue is not the amount available to an owner or driver. The analysis therefore needs a transparent path from each benefit through applicable costs to the remaining value and its allocation.

Roles and commercial relationships

Participant	Role in a potential service model
Vehicle or fleet owner	Provides agreed flexibility while retaining defined mobility requirements and visibility of participation terms.
Building or site operator	Coordinates site needs, infrastructure and local energy-management responsibilities.
Charging and control providers	Operate equipment, coordinate permitted energy exchange and support monitoring and settlement records.
Market intermediaries	Provide an appropriate route to trading or flexibility services, subject to local eligibility and contractual arrangements.

Agreements need to clarify availability, departure energy, equipment responsibilities, remuneration and the treatment of non-delivery. Participant compensation should reflect the agreed contribution and costs. A viable model must be understandable and acceptable to vehicle users as well as infrastructure and service providers.

Combining services without double counting

Revenue stacking means combining compatible uses of an asset over time. The same energy or capacity cannot be promised twice when commitments conflict. Mobility requirements, site needs, battery limits and service obligations restrict the remaining flexibility. Additional revenue should therefore be assessed with its additional costs and constraints, rather than simply added to separate best-case estimates.



D3.1.1 | Implications and next steps

Main implications of the scenarios

The source identifies commercial buildings and fleets as a promising early setting under its assumptions. Predictable parking patterns and building demand can support coordinated energy use. This is a direction for further assessment, not evidence that every building or fleet will produce a positive return.

For households, the economic case is closely linked to existing solar generation, energy-management capabilities and the timing of vehicle availability. For grid-facing services, aggregation may help combine resources and share service costs, but a larger fleet does not automatically provide dependable capacity. Actual connection behaviour and energy requirements determine what can be offered.

The four V4 markets should not be treated as a single financial setting. Tariff design, network conditions, market arrangements and contracts affect the opportunity. The transferable result is the assessment framework; local inputs and eligibility require confirmation before a commercial decision.

Uncertainty and evidence needs

Important uncertainties include investment and operating costs, electricity-price differences, service remuneration, intermediary fees, vehicle availability and usable battery energy. Battery ageing and compatibility also influence the practical offer. Testing less favourable assumptions is essential because attractive central scenarios can conceal exposure to several changes occurring together.

Operational evidence should connect charging behaviour, building demand and delivered flexibility with a consistent cost record. Pilot observations can support this validation, but a technical demonstration alone does not establish a sustainable business model. Modelled outcomes should remain clearly distinguished from observed performance and contracted income.

A staged path towards commercial evaluation

A practical sequence is to define the application and participant needs, establish a credible reference case, confirm technical and local commercial conditions, and test the assumptions against site evidence. The next step is to assess net value and responsibilities with prospective partners. Expansion should follow evidence of repeatable performance and acceptable economics, rather than expected future revenue alone.

The wider opportunity is to make better use of existing energy and mobility assets while supporting flexible electricity consumption. Realising that opportunity requires a balance between user confidence, dependable operation and economic discipline. The report provides a basis for that discussion across households, buildings, fleets and energy-service organisations.

How this public summary was prepared

This summary reorganises the supplied D3.1.1 report into its purpose, assessment approach and general implications. It retains the distinction between full-cost and incremental appraisal and between scenarios and evidence. Detailed financial values, pricing assumptions, proprietary formulas, remuneration mechanisms, named commercial targets and internal implementation plans have been omitted.

Source basis: V4Grid D3.1.1, Evaluation of economic viability and business models / V2X Business Model & Investment Framework, May 2026. Public summary; not the complete technical deliverable or a site-specific investment assessment.