

# Vehicle-to-Grid Charger Embodiment

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## What It Specifies

Vehicle and charging station each hold credentialed identities admitting energy-exchange participation. As the vehicle plugs in, the architecture initiates a pair-settlement session covering the energy exchange.

The settlement carries: party identities, energy-rate claim (price per unit, direction of flow, total quantity), session timing, and signatures binding the exchange. The session settlement composes with sub-settlements for time-varying rate.

## Why It Matters Structurally

Current charging architectures depend on charger-network operators as intermediary platforms. The intermediary fees, intermediary lock-in, and intermediary failure modes all impose structural costs.

Pair-settlement charging eliminates the intermediary structural cost. Vehicle and charger settle directly; charging-network operators become optional service providers rather than required infrastructure.

## How It Composes With Mesh Operation

The architecture defines the energy-exchange protocol on top of the general pair-settlement primitive. V2G classes, time-varying rate settlement, and grid-side aggregation services all compose with the pair-settlement architecture.

Implementation can integrate with existing charging hardware. The pair primitive becomes the settlement layer; physical charging hardware (connectors, meters, communication protocols) integrates through declared interfaces.

## **What This Enables**

EV owners gain settlement directness. Charging-station operators gain reduced platform dependency. Grid operators gain V2G architectural support that platform-mediated approaches cannot match.

The architecture also supports emerging energy patterns. Wholesale-rate V2G, peer-to-peer energy exchange, and dynamic-pricing charging all build on the pair-settlement primitive.