



---

2026 IERE-KEPCO Seoul Energy Equation Workshop  
Seoul, South Korea  
May 19–22, 2026

## **Harnessing Electric Vehicle Flexibility via AC V2G Systems: KEPCO's Pilot Results and Future Outlook**

**Kijun PARK**

**Head of AI Laboratory, KEPCO Research Institute, Korea Electric Power Corporation  
(KEPCO)**

**Keywords:** *Vehicle-to-Grid(V2G), Electric Vehicle, ESS, ISO15118*

### **Abstract**

As South Korea shifts toward renewable energy, its power grid faces a growing instability problem. This is best illustrated by the "Duck Curve". This imbalance often leads to "curtailment," where clean energy is intentionally wasted to prevent the grid from overloading. In 2023, this happened 133 times on Jeju Island alone. Traditionally, the solution to this problem involves building massive stationary batteries or expensive grid upgrades. However, a more efficient and cost-effective resource is already sitting in our parking lots. By 2030, South Korea is projected to have 4.2 million electric vehicles (EVs). Because these cars remain parked about 95% of the time, they represent a massive, under-utilized network of mobile batteries that can help balance the grid.

This presentation explores the evolution of EV charging, moving from "dumb" charging (simply plugging in) to managed charging (V1G) and, ultimately, bidirectional Vehicle-to-Grid (V2G) systems. V2G allows EVs to not only draw power from the grid but also feed it back during peak demand. Compared to traditional energy storage, V2G is significantly cheaper and faster to deploy. In particular, the study highlights that using AC V2G technology (utilizing the CCS Type 1 standard) can reduce infrastructure costs many times over compared to expensive DC alternatives.

The heart of this discussion is the KEPCO AC V2G Pilot Program. This 14-month study involved over 100 Hyundai IONIQ 5 vehicles and 100 specialized chargers. The results proved the technology is ready for the real world: the system demonstrated high precision in managing battery levels and responded to grid signals in less than 10 seconds. Furthermore, the study addressed a major concern for car owners - battery health - by providing data showing that V2G operations have a minimal impact on battery degradation.

To bring this technology to the mainstream, the presentation recommends new policies such as "discharge compensation" (paying drivers for their electricity) and flexible pricing. Looking ahead, KEPCO is launching an ambitious project to create a Megawatt-scale pilot program with 1,500 chargers. By treating EVs as a very flexible "Virtual Power Plant," South Korea can enhance its grid stability and significantly lower the cost of the green energy transition.