



The Keys To Unlocking Value Streams From Battery Electric Vehicles

*Fermata Energy's Vehicle-to-Everything (V2X)
Bidirectional Charging Technology; Resilience
And Disaster Response*



Nissan LEAF connected to Fermata Energy's FE-15 15kW bidirectional charger as part of a V2X project at the EIT manufacturing facility in Danville, VA, the FE-15's production site.

V2X Technology Overview



V2X bidirectional charging leverages energy from a parked EV to power off-board loads.

Vehicle-to-Grid (V2G)

- *Demand Response (DR)* helps utilities manage grid demand and stability while generating revenue for the EV owner.
- Promotes energy resilience

Vehicle-to-Building (V2B)

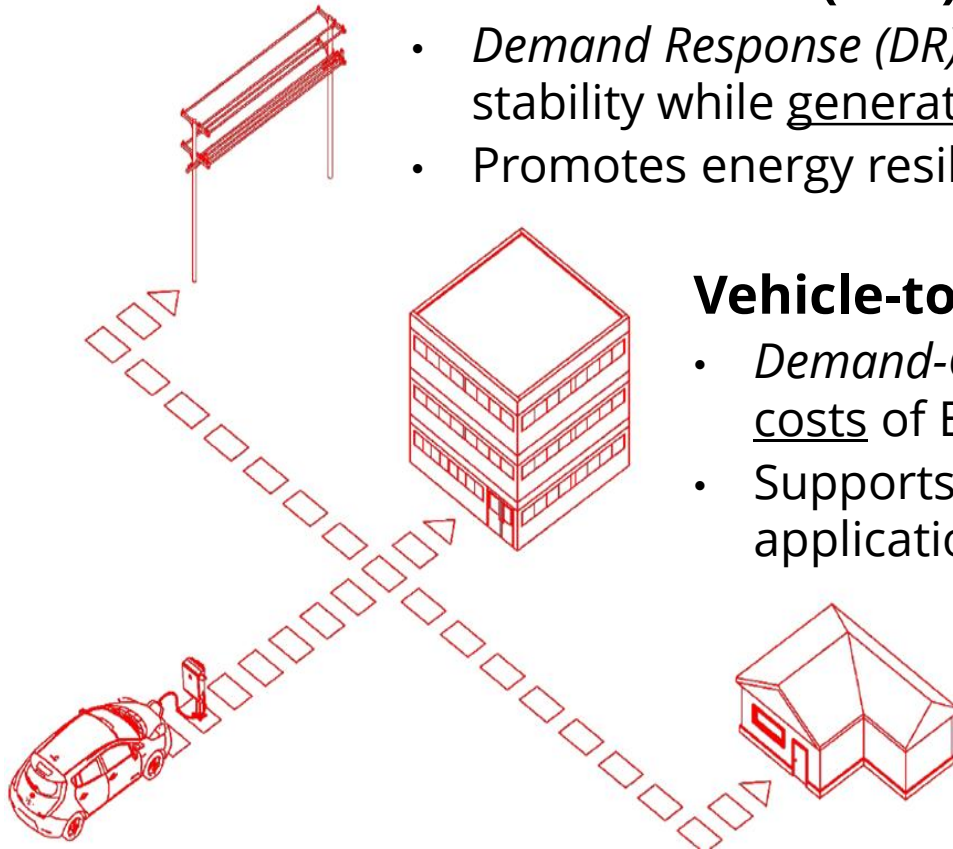
- *Demand-Charge Management (DCM)* reduces electricity costs of EV fleet/building during peak-load periods.
- Supports grid stability even as a “behind-the-meter” application.

Vehicle-to-Home (V2H)

- Residential emergency backup power
- Complements solar/renewable integration
- Supports grid demand and stability

Fermata Energy is operating commercial V2B and V2G at multiple customer sites across the U.S.

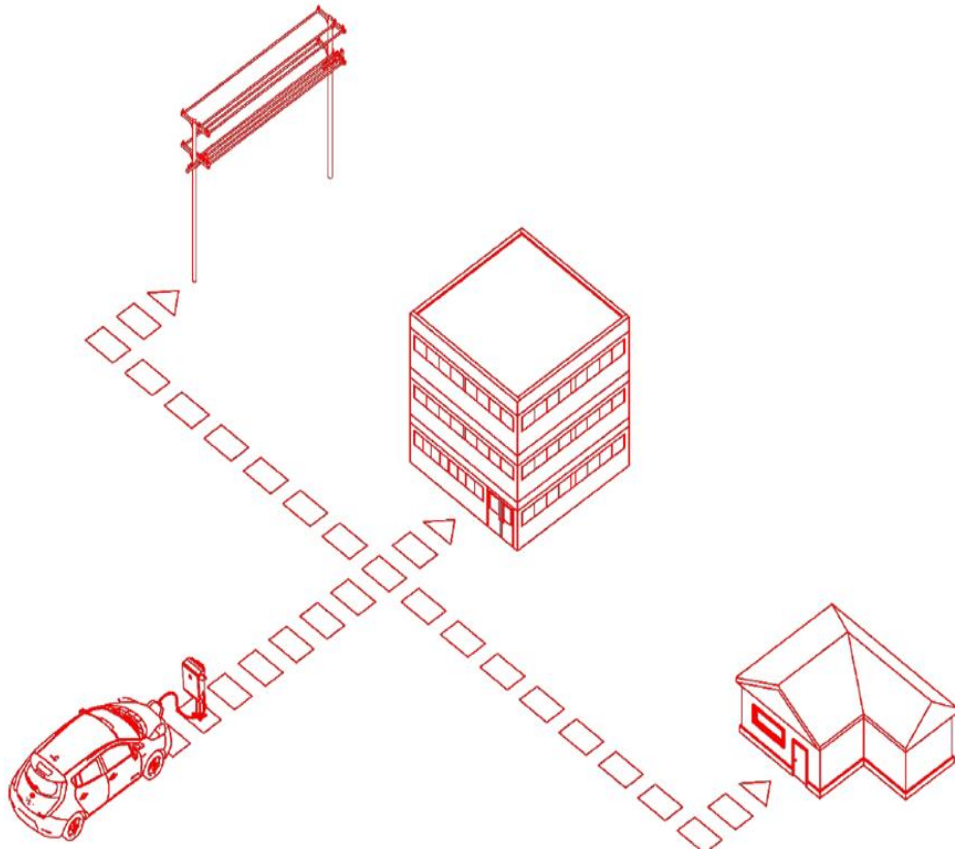
- Ford and GM EV trucks will have non-grid-tied V2H for Emergency Backup Power.
- Fermata Energy is developing a grid-tied V2H solution.



V2X Technology Overview



V2X directly supports EV market development.
EVs = Distributed Energy Resources ("Energy on Wheels")



V2X Key Impacts

- Reduces EV Total Cost of Ownership (TCO) by unlocking value streams from parked EVs
- Provides energy resilience and backup power
- Complements renewables integration (e.g., solar)
- Helps manage and stabilize grid demand
- Improves competitiveness of EV portfolio

Fermata Energy V2X Commercial Deployments



Overview

- Fermata Energy provides V2X services commercially today in the U.S. with light-duty EVs.
 - Operating at multiple commercial sites around the country successfully, generating average monthly savings in many cases beyond what it costs to lease the EVs being used.
 - Integrating with multiple utilities (e.g., National Grid, Eversource, Green Mountain Power, etc.) to support demand-response programs, system-wide peak shaving, and other use cases.
- Expanding into medium- and heavy-duty EV applications.

Working with Critical Stakeholders

- OEMs + Utilities
- Commercial + Government Fleets
- Carshare + Energy Equity
- Project Developers

Developing Applications

- Building Load Integration
- Demand Response
- Microgrid Latency
- Grid Ancillary Services



Fermata Energy V2X Deployment Sites Across U.S.

V2B/V2G Revenue Examples

Key Fermata Energy Deployments With One 15 kW Charger (Representative)



Customer	V2X Site Location	Operation Start Date	Revenue / Savings (\$) (per 15 kW Bidirectional Charger + EV)	Use Case(s)*
<i>Burrillville Wastewater Treatment Facility</i>	Burrillville, RI	Jun. '21	\$4,547 actual over 4-month period [DR: \$4,325 + DCM: \$222]	"ConnectedSolutions" Utility V2G DR Program + V2B DCM
<i>The Alliance Center</i>	Denver, CO	Jun. '21	~\$2,500 actual over 11-month period	V2B DCM, Car Share
<i>The City of Boulder</i>	Boulder, CO	Dec. '20	\$4,462 actual over 17-month period	V2B DCM
Electric Cooperative	North Carolina	Nov. '20	\$3,500+ est. annual	System-wide peak shaving + V2B DCM
Utility	Vermont	Nov. '20	\$2,000 projected	System-wide peak shaving

*Use Cases: DCM: Demand-Charge Management, DR: Demand Response

V2X – What's Next?



Expanding Use Cases for Resilience and Disaster Response; Coordinating Across Industries & Applications

- OEM V2X Development
- Utility Interconnection
- Charging Standards
- Bidirectional Charger Hardware

OEM V2X Development



Ford launches its bidirectional home charging station at a surprisingly good price

[electrek](#), Mar. 1, 2022



CHEVROLET

The Future Is Bright With General Motors Using EVs During Power Outages

[hotcars.com](#), Mar. 8, 2022



PORSCHE

Porsche proves the benefits of V2G technology by pooling its EVs together to help stabilize electrical grids

[electrek](#), Apr. 8, 2022



VW ID.4 Getting Plug & Charge, Bidirectional Charging This Summer

[InsideEVs](#), Apr. 7, 2021



V O L V O

*Starting with the successor to the XC90, we'll offer **bidirectional charging**, allowing customers to offload surplus electricity in their car battery to the power grid. This means **electric Volvo drivers can provide energy to the grid.***

[volvocars.com](#), Sep. 9, 2021

Others: [GMC Hummer EV](#), [Lucid](#), [Hyundai](#), [Kia](#), [Rivian](#), [BMW](#), [Mercedes](#), [Stellantis \(FCA\)](#)



Expanding Use Cases for Resilience and Disaster Response; Coordinating Across Industries & Applications

- Utility Interconnection
 - Process varies by utility
 - Certification requirements changing and can vary by state
- Charging Standards
 - CHAdeMO vs. CCS
 - CHAdeMO: available and successful now
 - CCS: development and testing ongoing, 2025 roadmap
- Bidirectional Charger Hardware
 - V2X for backup power
 - Grid-forming
 - Black Start

Thank you.

For more information, please visit

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