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Bidirectional Charging: An Auto Industry Perspective

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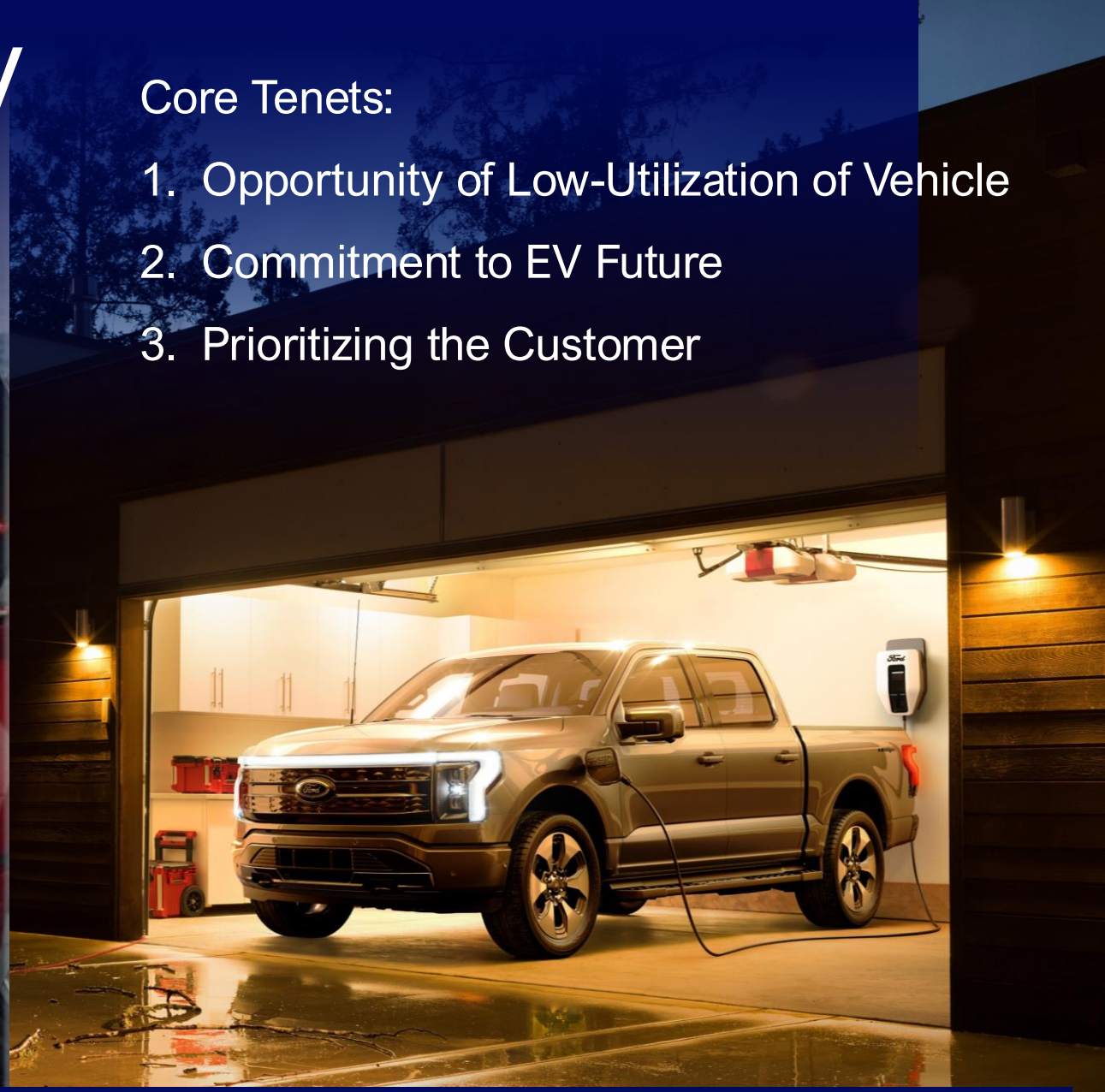


Value Beyond Mobility

Core Tenets:

1. Opportunity of Low-Utilization of Vehicle
2. Commitment to EV Future
3. Prioritizing the Customer





At Ford, we believe EVs should be part of the grid solution.

Ford's Universal Electric Vehicle (UEV) Platform

One platform | Many vehicle types





The Ford Fathom™ | 2027 | <$30,000 | Mid-Size Pickup

Ford's New Universal EV Platform will use an AC Bidirectional Architecture

DC VS AC Bidirectional Power

DC Bidirectional Systems

Requires a separate, wall-mounted inverter
Power conversion happens in equipment outside the vehicle. That additional hardware can add significant cost.

Ford Fathom™ and Universal EV Platform

Inverter capability is integrated into the vehicle. The team that developed the Fathom engineered the inverter capability into an existing part on the vehicle, reducing the need for separate hardware.







Ford's Home Power Station

Ford's Home Backup Power Panel

What's the Difference?



Home Power Management



Home Backup Power

	Home Power Management	Home Backup Power
What does it do?	Automatically manages when Fathom charges and when its stored energy is used to power a customer's home.	Automatically powers a customer's home when the power goes out.
What hardware is required?	Ford's next generation home charger, the Home Power Station.	Home Power Station and the Home Backup Power Panel.
What can it power?	A customer's home, using energy from the vehicle's battery to deliver more than 10 kW of power for everyday use.	A customer's home, using energy from the vehicle's battery to deliver more than 10 kW of power during an outage.
What are the unique benefits?	Fathom can charge when electricity is less expensive and automatically power the home when electricity is pricier, which may help lower electricity bills.	Provides clean, quiet backup power as an alternative to traditional gas or diesel generators.

California: Bidirectional Charging Barriers to Scale

Lessons Learned

Early Pilots

- Ford has participated in several early bidirectional charging pilots across the country with F-150 Lightning customers, including **PG&E's Residential V2X Pilot Program since 2024.**
  - PG&E's pilot program offers large incentives and benefits to participating customers.
  - Biggest lesson learned is around enrollment.

PG&E and Ford Accelerating Vehicle-to-Home Technology in California | PG&E

Barriers to Scale

- Biggest barriers to widespread use and adoption are affordability, cost, & interconnection.
  - California IOUs have the **highest** interconnection application fee in the country for small-size, residential systems.
  - California IOUs also require separate metering for customers with NEM solar, **adding to the total cost**.

Ford launched a Utility Working Group with North American utilities to help define scalable interconnection processes well before Fathom™ hits the road. If you're a utility or regulator and interested in getting involved, email vhome@ford.com.

The primary barriers to scaling bidirectional charging include: cost and interconnection.

Working with Utilities and Regulators

Why it's important for OEMs to be collaborative partners?



OEMS REGULATORS UTILITIES

Purpose and Goals

- Be a proactive partner
- Work collaboratively with regulators and utilities
- Support knowledge transfer on new technologies
- Increase transparency
- Help ease and improve the customer installation process
- Achieve greater penetration of bidirectional charging systems
- Support revenue opportunities for customers and cost-savings for the grid


Ford