

MEMORANDUM OF UNDERSTANDING
TO ESTABLISH
THE VEHICLE-TO-EVERYTHING COLLABORATION

This Memorandum of Understanding (this “MOU”) is made between the undersigned parties (collectively referred to herein as “Parties”, and individually as a “Party”) with the intent to explore establishing the Vehicle-to-Everything Collaboration (hereinafter referred to as “Collaboration”), a collaboration for accelerating development and commercialization of vehicle-to-everything (i.e. “V2X”) technologies, which include vehicle-to-grid, vehicle-to-building, and vehicle-to-load capabilities, by validating the technologies and demonstrating the commercial viability of such technologies. Other potential goals include identifying and resolving barriers, accelerating commercialization and customer adoption, and improving coordination between electric and automotive sectors. Parties agree that by signing this MOU, they intend to pursue collaborative projects as described below based upon terms and conditions acceptable to the Parties under each specific project. The initial Parties to this MOU are: National Electrical Contractors Association (“NECA”) – Los Angeles, International Brotherhood of Electrical Workers (“IBEW”) – Chapter 11, Fermata Energy (“FERMATA”), The Waste Management Company-Lancaster, Los Angeles Department of Water and Power (“LADWP”), Rhombus, BYD Motors, Inc. (“BYD North America”), The City of Lancaster and City of Lancaster Community Choice Aggregator (“CCA”), Southern California Edison (“SCE”), Zeem Solutions, The California Energy Commission, Pacific Gas and Electric Company (“PG&E”), General Motors LLC, Ford Motor Company, San Diego Gas & Electric, Sacramento Municipal Utility District, Lucid Group, Inc., and the Department of Energy (“DOE”). The effective date of this MOU is April 20, 2022, or the date on which at least two (2) Parties have executed this MOU, whichever is later (the “Effective Date”). Other entities may become Parties after the Effective Date by signing on to this MOU and providing notice to all other signatories.

Bidirectional plug-in electric vehicles (“PEVs”) present the potential for increasing the country's energy security, economic vitality, and quality of life. Bidirectional PEVs, including plug-in hybrid electric and all-electric vehicles, could play a key role in the country's transportation future and present an opportunity to support the electrical grid as part of a broader approach to vehicle-to-grid integration. The intent of this MOU is to collaboratively explore opportunities for research, engineering, and infrastructure investments that will accelerate and enable bidirectional PEV integration into the electrical grid, potentially by establishing demonstration bidirectional charging stations, collecting and analyzing demonstration data, and preparing technoeconomic analyses to evaluate the business case for V2X. The Collaboration will aim to bring together cutting-edge resources from DOE, DOE National Labs, state and local governments, utilities, and private entities to evaluate the technical and economic feasibility of integrating bidirectional charging into energy infrastructure. Installation of bidirectional PEV charging infrastructure also requires a skilled and qualified workforce. IBEW and NECA Los Angeles are willing to train and provide the Parties with a list of and access to qualified contractors, including Electric Vehicle Infrastructure Trained Program

(“EVITP”) Certified Electricians and EVITP approved contractors trained in the electric vehicle supply equipment and charging infrastructure to support deployment of V2X technologies.

WHEREAS, the Parties seek to leverage the experience, technical capabilities, infrastructure, resources, and/or know-how of each Party to provide technical and economic validation of certain V2X technologies;

WHEREAS, the Parties seek to integrate DOE’s unique capabilities of high-performance computing and novel approaches to characterizing large data sets to provide rapid data analytics to provide technical and economic validation of the Technologies;

WHEREAS, the Parties seek to create a customer-friendly, to the extent possible, automated means to advance V2X capabilities; and

WHEREAS, the Parties seek to advance the national goals outlined in Executive Order 14037, Strengthening American Leadership in Clean Cars and Trucks, August 5, 2021, to bolster the domestic market for zero-emission vehicles, including battery electric, plug-in hybrid electric, and fuel cell electric vehicles and supports the priority of expanding key infrastructure, springing critical innovation and investing in the American autoworker, thereby boosting job growth across the United States along the full supply chain for the automotive sector.

NOW, THEREFORE, the Parties agree as follows:

1. GOALS

The Parties seek to launch an effort to bring together public and private experts in electric vehicle-grid integration and energy infrastructure to investigate and promote the commercial viability of V2X capabilities.

The Parties further seek to provide technical assistance to accelerate the development and deployment of certain V2X technologies. The Parties seek to leverage their experience and best practices with the goal of demonstrating the commercial viability of V2X capabilities.

The Parties also seek to:

- A. Promote and support the understanding and dissemination of knowledge about the technological and economic opportunities and resilience afforded by bidirectional electric vehicles.
- B. Promote and support customer education and a focus on customer-friendly applications of V2X technologies to promote adoption. Automation and “set it and forget it” strategies and solutions will be considered.
- C. Provide access to specific DOE core competencies in transportation and energy infrastructure integration for supporting research, development, demonstration, and deployment purposes.

2. OBJECTIVES

The Parties intend to meet as soon as practicable following execution of this MOU to pursue development of a roadmap aimed at achieving the following objectives:

- A. Cooperate in planning to identify scenarios, specific activities, and barriers to deployment of V2X functionality for the Collaboration;
 - a. A first anticipated activity of the Collaboration is to establish and operate test locations for the technologies to demonstrate them in real-world settings.
 - b. The Collaboration intends to establish use cases for the demonstration test locations. More specifically, the Collaboration intends to determine scenarios based on the Technologies and anticipated uses at the demonstration test locations for data collection and evaluation.
 - c. The test locations are expected to supply data to DOE and its National Laboratories for technoeconomic analysis for the established use cases. More specifically, the Collaboration intends to collect and analyze data from bidirectional charging demonstrations to evaluate performance, duty cycles (where relevant), monetization attributes, and to perform balance-of-systems analysis and future system modeling and simulation for the use cases, business model opportunities, cybersecurity, and safety;
- B. Execute additional agreements among the Parties and relevant DOE National Laboratories, as needed to further the goals and achieve the objectives of the Collaboration; and
- C. Cooperate in planning and conducting joint outreach of the outcomes and other technology transfer activities (as applicable) that contribute to the combined effectiveness of the Parties as related to this MOU.
- D. Prepare and release information to the public.

3. PARTY PARTICIPATION

Each Party intends to offer appropriate and relevant contributions to the Collaboration that can be envisioned to further its goals that will be set forth in later agreements developed to implement the goals of this MOU.

- A. DOE: DOE, through its elements potentially including its National Laboratories, Vehicle Technologies Office (VTO), Office of Cybersecurity, Energy Security, and Emergency Response (CESER), Office of Electricity, and Office of Technology Transitions, intends to support the Collaboration effort by:
 - 1. Providing access to the resources of the DOE National Laboratories, particularly data analytics resources and vehicle and grid technical resources;

2. Supplying technical assistance upon request to the Parties under appropriate agreements developed to implement the goals of this MOU; and
 3. Preparing publicly available reports, to be reviewed and approved by the Parties in advance of publication, regarding the efficacy and commercial viability of the V2X technologies as well as any barriers to widespread adoption.
- B. Other Collaboration Participants: All remaining Parties intend to support the Collaboration effort by providing resources according to their interests and capabilities, potentially including:
1. Providing access to certain technologies and maximizing the use of American-made products;
 2. Hosting sites for generating technical and economic data;
 3. Sharing certain technical and economic data with DOE and, potentially, other Parties for validation and analysis;
 4. Lending expertise for the analysis of the technical and economic data;
 5. Promoting V2X technologies by supplying information about them to the public, including customer bases;
 6. Lending expertise for the development of training and potentially providing access to certain qualified contractors for the installation of electric vehicle supply equipment and charging infrastructure to support V2X deployment; and
 7. Conducting analysis, data collection, or customer feedback to evaluate customer experience.

4. TIMELINE

- A. The Parties intend to formally begin discussions in support of the Collaboration effort as soon as possible.
- B. This MOU expires two (2) years from the effective date of the MOU. The MOU may be renewed by written consent of the Parties wishing to continue the Collaboration effort.
- C. Any Party may terminate its participation in this MOU at any time but should endeavor to provide thirty (30) days' advance written notice to the other Parties.

5. INTELLECTUAL PROPERTY, DATA-SHARING, AND DATA PROTECTION

This MOU establishes the intent of the Parties to establish the Collaboration, with additional development and implementation details to be further specified in later definitive agreements, as may be appropriate, including but not limited to engagement agreements, joint development agreements, Intellectual Property Management Plans, and/or Data Use Agreements. Any proprietary data and information provided to DOE are expected to be governed by the provisions of the Freedom of Information Act (5 U.S.C. §552), the Trade Secrets Act (18 U.S.C. §1905) and other applicable laws and regulations, subject to any additional obligations that may be established in any later definitive agreements.

6. CONTACTS

The Parties will coordinate their activities through identified points of contact for their respective organizations. The designated points of contact, which either Party may change by written notice to the other Party, shall be listed in or added to Appendix A.

7. AUTHORITIES

DOE enters into this MOU under the authority of Sections 31a, 32, 33, and 161 of the Atomic Energy Act of 1954, as amended (42 U.S.C. §§ 2051, 2052, 2053, 2201), and Section 646 of the Department of Energy Organization Act Public Law 95-91, as amended; 42 U.S.C. § 7256).

8. GENERAL PROVISIONS

- A. This MOU is a statement of intent of the Parties to explore participation in the Collaboration. This MOU is not a binding document, and any activities hereunder are subject to the availability of funds, resources, and personnel. It is not legally enforceable and shall not be construed to create any legal obligation on the part of any Party. This MOU shall not be construed to provide a private right or cause of action for or by any person or entity. No Party shall have any obligation or liability until the Parties have executed a definitive agreement relating to the Collaboration.
- B. This MOU is neither a fiscal nor a funds obligation document. Nothing in this MOU authorizes or is intended to obligate the Parties to expend, exchange, or reimburse funds, services, or supplies, or transfer or receive anything of value.
- C. Each Party shall be responsible for its own costs and expenses incurred in connection with this MOU, including attorney's fees.
- D. Nothing in this MOU restricts any of the Parties from participating in any activity with other public or private agencies, organizations or individuals nor is it an endorsement of any of the Parties' products or services.

- E. All activities and agreements contemplated herein are subject to, and will be carried out in compliance with, all applicable laws, regulations, agency policies, and other legal requirements, and due governance and processes of all Parties.
- F. No amendments to this MOU shall be effective unless executed in writing, and by mutual consent of the parties.
- G. This MOU may be signed in counterparts, each of which may be considered an original but all of which taken together constitute one and the same agreement after the Effective Date regardless of the date on which any Party signs in counterpart.

IN WITNESS WHEREOF,

For DOE Vehicle Technologies Office

By: David Howell

Printed
Name: David Howell

Title: Director, Vehicle Technologies Office

Date: April 19, 2022

For DOE Office of Electricity

By: Michael Pesin

Printed

Name: Michael Pesin

Title: Deputy Assistant Secretary

Date: April 18th, 2022

For DOE Office of Cybersecurity, Energy Security, and
Emergency Response

By: **PUESH KUMAR** Digitally signed by PUESH KUMAR
Date: 2022.04.19 16:57:03 -04'00'

Printed
Name: **Puesh Kumar**

Title: **Director, Office of Cybersecurity, Energy Security, Emergency Response (CESER)**

Date: **4/19/2022**

For DOE Office of Technology Transitions

By: Marcos R. Gonzales Harsha  Digitally signed by Marcos R. Gonzales Harsha
Date: 2022.04.19 07:30:36 -04'00'

Printed
Name: Marcos Gonzales Harsha

Title: Principal Deputy Director, Office of Technology Transitions

Date: 4/19/2022

For International Brotherhood of Electrical Workers
(IBEW) – Chapter 11

By: Joël Barton
Printed Name: Joël Barton
Title: Business Manager
Date: 4/19/22

For National Electrical Contractors Association
(NECA) – Los Angeles

By:

James Willson

Printed
Name:

James Willson

Title:

Executive Director

Date:

April 19, 2022

For Fermata Energy (FERMATA)

By: 

Printed
Name: David Sutzky

Title: CEO

Date: 11 April 2022

For Los Angeles Department of Water and Power
(LADWP)

By: _____

Printed
Name: Brian J. Wilbur

Title: Senior Assistant General Manager-Power System
Construction, Maintenance, and Operations

Date: April 15, 2022

For Rhombus

By: 

Printed
Name: RICK SANDER

Title: CEO

Date: 4/15/22

For The City of Lancaster and City of Lancaster
Community Choice Aggregator (CCA)

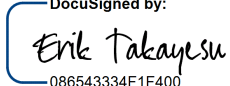
By: 

Printed
Name: R. Rex Parris

Title: Mayor, City of Lancaster

Date: Monday, April 4, 2022

For Southern California Edison (SCE)

By:  086543334F1F400...

Printed Name: Erik Takayesu

Title: VP, Asset Strategy and Planning

Date: 4/7/2022

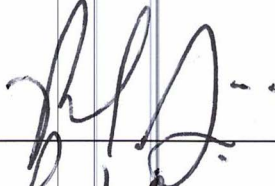
For Zeem Solutions

By: _____

Printed
Name: _____

Title: _____

Date: _____


Paul Giropis

CTO

9/7/22

For Pacific Gas and Electric Company (PG&E)

By: Aaron August

Printed

Name: Aaron August

Title: Vice President, Business Development & Customer Engagement

Date: 4/13/2022

For The California Energy Commission

By: PAM

Printed
Name: Patty Monahan

Title: Commissioner

Date: April 13, 2022

For General Motors LLC

GENERAL MOTORS



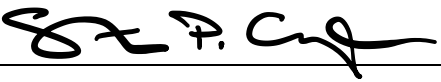
By: _____

Printed Name: Travis Hester

Title: VP - EV Growth Operations

Date: April 7, 2022

For Ford Motor Company

By: 

Printed Name: Steve Croley

Title: Chief Policy Officer and General Counsel

Date: April 7, 2022

For San Diego Gas and Electric



By: _____

Printed

Name: Miguel Romero

Title: Vice President, Energy Innovation

Date: April 15, 2022

For Sacramento Municipal Utility District

By: Paul Lau

Printed
Name: Paul Lau

Title: Chief Executive Officer & General Manager

Date: April 8, 2022

For Lucid Group, Inc.

By:

A handwritten signature in black ink, appearing to be 'Eric Bach', written over a horizontal line.

Printed
Name:

Eric Bach

Title: SVP, Product and Chief Engineer

Date: April 11th, 2022

For California Public Utilities Commission

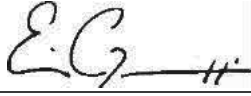
By: 

Printed
Name: Clifford Rechtschaffen

Title: Commissioner

Date: 4/14/2022

For City of Los Angeles

By: _____

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Name: Mayor Eric Garcetti

Title: Mayor of Los Angeles

Date: April 15, 2022

For Nuvve Holding Corporation

By: DocuSigned by:

94D74E28812040C...

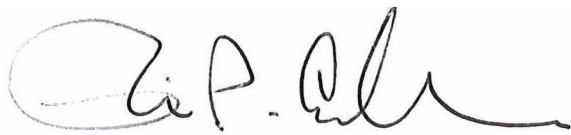
Printed Name: Gregory Poilasne

Title: Chairman and CEO

Date: /14/2022

For Nissan Group of The Americas

By:



Printed
Name:

Michael P. Collier

Title:

SVP Nissan North America

Date:

4/18/22

For First Student, Inc.

By: K. L. Matthews

Printed
Name: Kevin L. Matthews

Title: Head of Electrification

Date: 4/15/2022

For The Lion Electric Co.

By:  _____

Printed

Name: Nate Baguio

Title: Senior Vice President of Commercial Development

Date: 4-15-2022



Appendix A: Points of Contact for V2X Participants

For DOE:

Name: _____
Title: _____
Email: _____
Phone: _____

For National Electrical Contractors Association (NECA) – Los Angeles:

Name: _____
Title: _____
Email: _____
Phone: _____

For Fermata Energy (FERMATA):

Name: _____
Title: _____
Email: _____
Phone: _____

For Los Angeles Department of Water and Power (LADWP):

Name: _____
Title: _____
Email: _____
Phone: _____

For International Brotherhood of Electrical Workers (IBEW) – Chapter 11:

Name: _____

Title: _____

Email: _____

Phone: _____

For Rhombus:

Name: _____

Title: _____

Email: _____

Phone: _____

For The City of Lancaster and City of Lancaster Community Choice Aggregator (CCA):

Name: _____

Title: _____

Email: _____

Phone: _____

For Southern California Edison (SCE):

Name: _____

Title: _____

Email: _____

Phone: _____

For Zeem Solutions:

Name: _____

Title: _____

Email: _____

Phone: _____

For The California Energy Commission:

Name: _____

Title: _____

Email: _____

Phone: _____

For Pacific Gas and Electric Company (PG&E):

Name: _____

Title: _____

Email: _____

Phone: _____

For General Motors LLC:

Name: _____

Title: _____

Email: _____

Phone: _____

For Ford Motor Company:

Name: _____
Title: _____
Email: _____
Phone: _____

For San Diego Gas & Electric:

Name: _____
Title: _____
Email: _____
Phone: _____

For Sacramento Municipal Utility District

Name: _____
Title: _____
Email: _____
Phone: _____

For Lucid Group, Inc.:

Name: _____
Title: _____
Email: _____
Phone: _____

For California Public Utilities Commission:

Name: _____
Title: _____
Email: _____
Phone: _____

For City of Los Angeles:

Name: _____
Title: _____
Email: _____
Phone: _____

For Nuvve Holding Corporation:

Name: _____
Title: _____
Email: _____
Phone: _____

For Nissan Group of The Americas:

Name: _____
Title: _____
Email: _____
Phone: _____

For First Student, Inc.:

Name: _____

Title: _____

Email: _____

Phone: _____

For The Lion Electric Co.:

Name: _____

Title: _____

Email: _____

Phone: _____