# Notice of Intent No. DE-FOA-0002892

## Notice of Intent to Issue
## Funding Opportunity Announcement No. DE-FOA-0002893

The Office of Energy Efficiency and Renewable Energy (EERE) intends to issue, on behalf of the Vehicle Technologies Office, a Funding Opportunity Announcement (FOA) entitled "Fiscal Year 2023 Vehicle Technologies Office (VTO) Program Wide Funding Opportunity Announcement".

Building a clean and equitable energy economy and addressing the climate crisis is a top priority of the Biden Administration. This anticipated FOA will advance the Biden Administration's goals to achieve carbon pollution-free electricity by 2035 and to "deliver an equitable, clean energy future, and put the United States on a path to achieve net-zero emissions, economy-wide, by no later than 2050 to the benefit of all Americans." The Department of Energy is committed to pushing the frontiers of science and engineering, catalyzing clean energy jobs through research, development, demonstration, and deployment (RDD&D), and ensuring environmental justice and inclusion of underserved communities.

The RDD&D activities to be funded under this FOA will support the government-wide approach to the climate crisis by driving the innovation that can lead to the deployment of clean energy technologies, which are critical for climate protection. Specifically, this FOA will advance RDD&D in several areas critical to achieving net-zero greenhouse gas (GHG) emissions by 2050, including: reduction of weight and cost of batteries, reduction in life cycle emissions of advanced lightweight materials, reduced costs and advanced technologies for both on- and off-road vehicle charging and infrastructure, innovative public transit solutions, and training to increase deployment of these technologies among diverse communities.

As part of the whole-of-government approach to advance equity across the Federal Government, it is the policy of the Biden Administration that:

> [T]he Federal Government should pursue a comprehensive approach to advancing equity for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. Affirmatively advancing equity, civil rights, racial justice, and equal opportunity is the responsibility of the whole of our government. Because advancing equity requires a systematic approach to embedding fairness in decision-making processes, executive departments and agencies (agencies) must recognize and work to redress inequities in their policies and programs that serve as barriers to equal opportunity.

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By advancing equity across the Federal Government, we can create opportunities for the improvement of communities that have been historically underserved, which benefits everyone.

As part of this approach, this anticipated FOA will encourage the participation of underserved communities and underrepresented groups. Applicants are highly encouraged to include individuals from groups historically underrepresented in STEM on their project teams.

It is anticipated that the FOA may include the following Areas of Interest:

**Area of Interest 1: High-Capacity, Long Cycle Life Lithium-Sulfur (Li-S) Batteries**
This area of interest targets the development of high-energy density, long-cycle life Li-S batteries to rival state-of-the-art Li-ion battery performance. Sulfur (S) is an earth-abundant and potentially high energy density cathode material, but significant optimization of the S cathode is needed to make long-lifetime Li-S batteries. This area of interest is focused on S cathode development to improve S loading, utilization, and capacity retention and is open to liquid or solid electrolytes; however, electrolyte development and the Li anode should not be the primary focus of proposed work. Consideration for issues limiting Li-S battery performance, for example, polysulfide shuttle mitigation, improved $Li_2S$ conversion, and for improved ionic and electronic conductivity in the cathode should be demonstrated. The final deliverable should be Li-S cells of at least 1 Ah capacity meeting the targets of ≥250 Wh/kg and 1,000 cycle life with 80% capacity retention.

**Area of Interest 2: Advanced Integrated Charging System**
Electric vehicles (EVs) have the potential to provide power to homes or buildings but the currently available hardware is costly and requires additional packaging space. The objective of this area of interest is to research, develop, and demonstrate innovative, integrated charging systems that co-optimize power electronics for both charging and propulsion functions on the vehicle with reduced cost and improved charging capability, including bi-directional vehicle-to-home (V2H) and vehicle-to-building (VTB). This area of interest focuses on integration of on-board charger/inverter and advanced materials to improve performance and reduce overall cost, mass, and volume, and minimize wear on automotive batteries and charging systems. Vehicle demonstration and validation in real world environments is required, with technologies applicable to light-, medium-, and heavy-duty EVs. Teams must include vehicle manufacturers as well as power electronics and charging equipment manufacturers or suppliers.

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**Area of Interest 3: Charging Concepts for Off-Road**

Providing charging to remote work sites (e.g., farms or constructions sites) is one of the biggest barriers to electrifying off-road equipment. Existing low power charging systems are not adequate for charging larger pieces of equipment. Furthermore, many sites with off-road equipment do not have 480V 3-phase or medium voltage connections for charging. The objective of this area of interest is to develop unique charging solutions which do not have 480V or medium voltage connection (i.e., weak grids and limited grid capacity) and would spur innovation to realize a high-power charging system that enables the use of plug-in construction and agricultural equipment.

**Area of Interest 4: Circularity and Sustainability of Polymer Composites for Vehicle Lightweighting and Decarbonization**

The objective of this area of interest is to reduce the embodied energy and greenhouse gas emissions of polymer composites during manufacturing. This could be accomplished through novel recycling methods for existing polymer composites, development of new polymer composite materials to enable recyclability, or improvements to manufacturing processes to reduce emissions. Proposed materials should be applicable for structural automotive components considering strength, stiffness, durability, manufacturing cycle time, and cost. New recycling or production processes should target high volume manufacturing and broad applicability to the current automotive manufacturing environment. Awarded projects will produce a structural vehicle component from polymer composites demonstrating significant reduction in carbon footprint from baseline. Applicant teams are encouraged to include members from all parts of the materials development, manufacturing, scale-up, production, and/or recycling aspects of the supply chain.

**Area of Interest 5: Low Cost, Low Carbon Magnesium Production**

The objective of this area of interest is to develop low cost, low carbon footprint methods of domestic magnesium production for lightweight vehicle components. VTO is targeting expanding the current landscape to include additional primary and secondary methods to produce magnesium including reducing cost and greenhouse gas emissions of electrolysis and pidgeon methods. Proposals will identify the targeted domestic source of magnesium as either primary or secondary, as well as the proposed production methods being developed for extraction/recovery/concentration, refining, and alloying to structural automotive grades. Awarded projects will produce at least 20 kg of automotive casting grade magnesium from a domestic source demonstrating significant cost and greenhouse gas emissions reduction as compared to the baseline.

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**Area of Interest 6: Novel Lightweight Materials**
The objective of this area of interest is to explore promising new lightweight materials beyond current Program focuses (advanced high-strength stainless steel, aluminum, magnesium, and polymer composites) and assess applicability to automotive structural components. Proposed materials should strive to match incumbent properties such as strength, ductility, corrosion resistance, fatigue life, appearance, and manufacturability, and significantly improve upon incumbent properties such as density, cost, and carbon footprint. Awarded projects will produce a minimum of 20 kg of the novel lightweight material for materials property testing as well as conduct a techno-economic analysis and a life cycle assessment.

**Area of Interest 7: Modeling, Analyzing, and Addressing Knowledge Gaps in the Workforce Supporting Electric Vehicles and the Related Supply Chain**
The objective of this area of interest is to model, analyze, and address knowledge gaps in the workforce supporting EVs and the related supply chain. The domestic EV and EV-supporting supply chain is relatively nascent and expected to grow quite rapidly over the coming decade. VTO is not currently aware of any existing, comprehensive analysis of the workforce changes, both primary and potentially also secondary, that are likely to accompany this growth. Proposals submitted to this FOA topic should indicate an ability to map out plausible differing supply chain paths characteristic of the EV manufacturing and supply chain, including characterizing workforce impacts related to EVSE and EV charging. Since the equipment and methods related to current EV charging can vary significantly, awarded projects will be expected to map out multiple scenarios that seem plausible. Awarded projects under this FOA topic should result in a) modeling/assessment tools that can answer EV workforce-related questions, acknowledging uncertainty in both ultimate technology paths as well as transition timelines, and/or b) in-depth research analyses indicating some realistic bounds to the likely workforce impacts, describing the key uncertainties relevant to understanding the EV and EV-supporting supply chain workforce, e.g., what kinds of data not currently collected needs to be collected in order to fill in existing gaps, how technological changes to EV charging methods and/or changes in travel/mobility patterns will impact otherwise plausible workforce development scenarios, etc.

**Area of Interest 8: Mobility System Approaches Supporting Public Transportation**
The objective of this area of interest is to explore and demonstrate potential mobility system approaches to improving the efficiency and convenience of public transportation, acknowledging transit's role in both low-carbon people movement and ensuring equitable mobility access. Proposed projects should take a "mobility system" approach that combines a conventional transit mode with novel automation, connectivity, and/or sharing technologies to demonstrate an increase in transit ridership along with at least a 25% greenhouse gas emissions

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reduction compared to a baseline case. Applicant teams must include a public transportation authority.

**Area of Interest 9: Reducing Soft Costs of Electric Vehicle Infrastructure to Enable Widespread Deployment**

Soft costs refer to administrative and planning costs, as opposed to the hard costs of manufactured components, construction, and labor. Soft costs for EVSE installations include costs related to codes and permitting, siting/drawing, financing, future-proofing, the utility interconnection process, and numerous other costs that vary and are poorly understood. While the magnitude of these costs varies, it is and has always been a significant component to the overall cost of most EVSE installations. Major breakthroughs would lead to critical and substantive reductions of the overall cost of installation and operation. The objective of this area of interest is to develop strategies, resources, and tools to reduce these soft costs that present barriers to widespread deployment of both high-power DC fast charging and Level 2 AC electric vehicle charging. Approaches that target both residential and non-residential EVSE installations are of interest. Teams are encouraged to include state and/or local governments, codes and standards organizations, utilities, and/or EVSE operators.

**Area of Interest 10: Addressing Critical Workforce Training Needs for Transportation Electrification**

The objective of this area of interest is to collaborate with communities across the United States who are transitioning from an automotive/powertrain or energy jobs local economy to equip this local workforce with skills necessary for participating in the transportation electrification workforce. Projects should work with community-based organizations, community colleges, or other local stakeholders to identify regional needs for training this workforce for transportation electrification jobs, develop or modify curricula to address skills gaps, and deliver the required training to the local workforce.

**Area of Interest 11: Consumer Education for Electric Vehicle Charging**

EV charging can be a confusing topic for the general public since there are various electric vehicle supply equipment (EVSE) standards, charging levels, charging networks, payment interfaces, pricing structures, etc. This confusion both causes barriers to consumers adopting EVs and to entities installing EV chargers in settings such as mobility hubs, residential communities, retail centers, workplaces, public-garages, and multi-family housing developments. The objective of this area of interest is to develop projects that educate consumers about the growing availability of EV chargers through unbiased information. Projects will use innovative approaches to reach targeted audiences with brand-neutral educational campaigns, dispel EV charger myths, and increase consumer comfort level with EV charging technology and availability. Project approaches may include proven social marketing and social

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science approaches, experiential events, partnerships that reach underserved communities, collaboration with Clean Cities coalitions, and other strategic initiatives.

**Area of Interest 12: Demonstration and Deployment – Open Topic**
The objective of this area of interest is to explore novel solutions to transportation and energy challenges through demonstration and deployment projects not otherwise addressed in the planned FOA. This would include projects to address challenges unique to their geographic areas and solutions with potential for replication in other areas across the country.

EERE envisions awarding multiple financial assistance awards in the form of cooperative agreements. The estimated period of performance for each award will be approximately 24-36 months

**Additional Information:**

This Notice is issued so that interested parties are aware of the EERE's intention to issue this FOA in the near term. All the information contained in this Notice is subject to change. EERE will not respond to questions concerning this Notice. Once the FOA has been released, EERE will provide an avenue for potential Applicants to submit questions.

EERE plans to issue the FOA on or about February 2023 via the EERE eXCHANGE website https://eere-eXCHANGE.energy.gov/. If Applicants wish to receive official notifications and information from EERE regarding this FOA, they should register in EERE eXCHANGE. If or when the FOA is released, applications will be accepted only through EERE eXCHANGE.

TEAMING PARTNER LIST: DOE is compiling a Teaming Partner List to facilitate the formation of new project teams for this potential FOA. The Teaming Partner List allows organizations who may wish to participate on an application to express their interest to other applicants and to explore potential partnerships.

- SUBMISSION INSTRUCTIONS: Any organization that would like to be included on this list should access EERE eXCHANGE and choose the menu item labelled Teaming Partners. From the pulldown menu, select this NOI, DE-FOA-0002891. Enter your organization and contact information and press Register. All information submitted for this NOI will be transferred to the FOA list when the potential FOA is published. For further information regarding teaming partner lists, see https://eere-exchange.energy.gov/Manuals.aspx.

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In anticipation of the FOA being released, Applicants are strongly advised to complete the following prior to application submission:

- Register and create an account in EERE eXCHANGE at https://eere-eXCHANGE.energy.gov. This account will allow the user to apply to any open EERE FOAs that are currently in EERE eXCHANGE.

  As of September 29, 2022, potential applicants will be required to have a Login.gov account to access EERE eXCHANGE. As part of the eXCHANGE registration process, new users will be directed to create an account in Login.gov. Please note that the email address associated with Login.gov must match the email address associated with the eXCHANGE account. For more information, refer to the Exchange Multi-Factor Authentication (MFA) Quick Guide in the Manuals section of eXCHANGE.

  It is recommended that each organization or business unit, whether acting as a team or a single entity, use only one account as the contact point for each submission. Questions related to the registration process and use of the EERE Exchange website should be submitted to: EERE-eXCHANGESupport@hq.doe.gov
- Register with the System for Award Management (SAM) at https://www.sam.gov. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in SAM registration. Please update your SAM registration annually. Upon registration, SAM will automatically assign a Unique Entity ID (UEI).
- Register in FedConnect at https://www.fedconnect.net/. To create an organization account, your organization's SAM MPIN is required. For more information about the SAM MPIN or other registration requirements, review the FedConnect Ready, Set, Go! Guide at https://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf
- Register in Grants.gov to receive automatic updates when Amendments to a FOA are posted. However, please note that applications will not be accepted through Grants.gov. http://www.grants.gov/. All applications must be submitted through EERE eXCHANGE.

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