Los Alamos National Laboratory

LA-UR-24-31944

Call for Commercialization Partners

Modification 3 (September 4, 2025)

On behalf of the Department of Energy's Hydrogen and Fuel Cell Technologies Office

L'INNOVATOR 2.0 PROGRAM

Through this Call for Commercialization Partners, Los Alamos National Laboratory (LANL) seeks experienced commercialization partners to bring advanced hydrogen and fuel cell technologies developed with support from the U.S. Department of Energy's (DOE) Hydrogen and Fuel Cell Technologies Office (HFTO) from the lab to the marketplace, with the potential to drive significant impact in the energy sector. In pursuit of this objective, LANL, in collaboration with HFTO, is identifying one or more commercialization partners with the necessary expertise, manufacturing capacity, commitment, and investment potential essential for successful commercialization and broad deployment of these transformative technologies.

BACKGROUND

Overview of L'Innovator Program and Call for Commercialization Partners

L'Innovator (Lab Innovator) is an initiative by HFTO to accelerate the commercialization of cutting-edge hydrogen and fuel cell innovations developed at national labs. These technologies have the potential to reduce costs and improve durability, creating a strong competitive edge for developers in an emerging, high-growth industry. With an estimated $2.5 trillion[1] global market across sectors—including stationary power, transportation, industrial, and portable power—and applications such as energy storage, backup power/ resiliency, material handling equipment, military use, and vehicles, the hydrogen and fuel cell industry is positioned for substantial growth in the coming years.

This Call for Commercialization Partners directly supports the U.S. National Hydrogen Strategy and Roadmap[2], which explores opportunities for hydrogen to contribute to national goals across multiple sectors of the economy. It also advances DOE's goal to unleash American energy innovation with technologies that advance basic science, grow America's scientific leadership, and lower costs for American consumers. The U.S. is poised to significantly advance the commercialization and deployment of hydrogen and fuel cell technologies. While this initiative spans multiple applications, this Call is especially relevant to heavy and medium-duty transportation—including trucks, buses, rail, and off-road equipment—as well as stationary fuel cell applications critical to data centers and other essential infrastructure.

In addition, HFTO is supporting companies in the development and manufacturing of 14 gigawatts (GW) per year of fuel cell stacks, a capacity sufficient to support approximately 50,000 fuel cell trucks, or about 15% of the market. This substantial investment from both public and private sectors highlights the commitment to advancing hydrogen and fuel cell technology and underscores the unique opportunity this Call presents to commercialize LANL's recent innovations on a large scale.

[1] https://hydrogencouncil.com/en/study-hydrogen-scaling-up/

[2] U.S. National Clean Hydrogen Strategy and Roadmap (energy.gov)

Introducing L'Innovator 2.0 Program

Following the success of HFTO's 2017 L'Innovator pilot, the current L'Innovator 2.0 program offers access to an intellectual property (IP) portfolio encompassing catalyst and electrode structure technology developed at LANL, with a focus on facilitating commercial scaling and private-sector adoption.

A critical feature of L'Innovator 2.0—successfully implemented in the original pilot—is HFTO's cost-sharing arrangement with LANL, designed to attract private investment for IP licensing in the portfolio and enable collaboration through a Cooperative Research and Development Agreement (CRADA) with one or more commercialization partners. This approach aims to accelerate the advancement of catalyst and electrode structure technologies, leading to the demonstration of a Minimum Viable Product (MVP) to validate performance, commercial viability, and potential for scale-up and commercial use.

This Call invites interest from potential commercialization partners, particularly those with proven experience in developing and scaling similar technologies. Note that this Call for Commercialization Partners is not a procurement.

Purpose and Objectives of This Call

The specific purpose of this Call is to inform and engage potential commercialization partners regarding the L'Innovator 2.0 IP portfolio opportunity and outline the process for partnership with LANL. This Call is expected to result in one or more licensing agreements or options to license, as well as one or more collaboration agreements—such as a CRADA—to support the transition of LANL's catalyst and electrode structure technology to the commercial marketplace. More information on the DOE CRADA template is available online.

Selected commercialization partners will be expected to co-invest in the development, manufacture, and commercialization of innovative hydrogen and fuel cell technologies, with an emphasis on domestically produced catalysts and membrane electrode assemblies (MEAs) that enhance U.S. industry and economic competitiveness.

About Triad National Security, LLC (Triad)

Triad National Security, LLC (Triad), as the manager and operator of Los Alamos National Laboratory (LANL) for the U.S. Department of Energy's (DOE's) National Nuclear Security Administration under contract No. 89233218CNA000001, is a mission-driven Federally Funded Research and Development Center (FFRDC). Triad is dedicated to addressing critical national security challenges through science and engineering on behalf of both government and private sector clients. Acting on behalf of its federal sponsor, HFTO, Triad will oversee the issuance of this Call for Commercialization Partners and manage the selection process to identify the most qualified industry partners to assist in deploying the L'Innovator 2.0 IP portfolio described herein.

L'INNOVATOR 2.0 PROGRAM OVERVIEW

Addressing Commercialization Challenges

L'Innovator 2.0 is designed to address specific challenges that investors and companies face in the development, manufacturing, and deployment of hydrogen and fuel cell technologies. One key challenge is the lack of mechanisms to support manufacturers in developing a Minimum Viable Product (MVP) that demonstrates the commercial feasibility of laboratory IP before requiring substantial commitments.

This collaborative initiative aims to advance lab-generated innovations from a low technology readiness level (TRL) and low manufacturing readiness level (MRL) to a higher TRL and MRL—an essential progression for commercial readiness. Rather than LANL working independently to develop and demonstrate an MVP, this Call seeks to engage private-sector companies through the L'Innovator framework and on agreed terms, enabling collaborative commercialization efforts. ***A primary objective of this program is to attract private investment and create new and expanded U.S. manufacturing opportunities for the specific technologies featured in this Call.***

Unique Framework and Opportunities in L'Innovator 2.0

The framework of L'Innovator 2.0 offers a unique opportunity for interested manufacturing companies and investors to:

- Access a portfolio of high-potential hydrogen and fuel cell IP through an efficient, streamlined engagement process, including the necessary contractual mechanisms.
- Receive support from LANL in developing and demonstrating an MVP, with co-funding provided by HFTO.

TECHNOLOGY DESCRIPTION

The L'Innovator 2.0 IP portfolio consists of ***highly innovative technology*** that could significantly reduce the cost and improve the durability of fuel cell systems, surpassing the current state-of-the-art and providing a competitive edge to future developers and end-users. Each of these technologies is described in further detail below.

Catalysts. Researchers at LANL have developed novel catalysts and catalyst supports that provide enhanced oxygen reduction reaction (ORR) performance and durability in polymer electrolyte membrane fuel cells. LANL's catalyst technology can provide higher efficiency, higher power density, and higher durability, while using lower amounts of platinum group metals. Novel catalysts include Pt and Pt alloy nanoparticles, including ordered intermetallic nanoparticles in which Pt is combined with one or more additional metals (e.g., Co, Ni, Zn, etc.). Novel supports include doped carbon materials that provide highly tunable pore structures and surface chemistries. LANL's ordered intermetallic nanoparticle technology has demonstrated enhanced ORR performance under real-world operating conditions in fuel cell membrane electrode assembly (MEA) testing, while simultaneously providing enhanced durability by reducing base metal leaching rates.

LANL's catalyst support technology, which includes porous carbons with tunable pore size distribution based on zeolitic imidazolate framework (ZIF) precursors, has been demonstrated to facilitate effective transport of reactants and products to Pt-based active sites, while also protecting these active sites and suppressing degradation and poisoning processes.

Electrode Structures. Novel electrode structures developed at LANL have been demonstrated to enable enhanced performance and durability in fuel cell MEAs. These structures, which include array electrodes, grooved electrodes, and coaxial nanowire electrodes (CANE), provide enhanced transport of oxygen, protons, and water, thereby reducing transport limitations and increasing power density and efficiency. Furthermore, by providing enhanced transport, the resulting electrodes are less sensitive to degradation-induced transport limitations and thereby exhibit enhanced durability. The array electrode technology uses vertically aligned arrays of ionomer channels to facilitate proton transport through the fuel cell electrode while also facilitating oxygen transport by enabling reduced ionomer-to-carbon ratios. Similarly, the grooved electrode technology uses vertically aligned grooves to facilitate oxygen transport while also facilitating proton transport by enabling increased ionomer-to-carbon ratios. The CANE technology exhibits similar advantages, while also reducing catalyst degradation rates by replacing conventional Pt/C with unsupported Pt films.

Advanced LANL catalyst and electrode technology can be used in all types of polymer electrolyte fuel cell applications. This technology is particularly useful for applications that require high power density, high efficiency (with low heat rejection), and high durability, including medium- and heavy-duty trucking, aviation, materials handling, off-highway equipment, and marine. An example demonstrating the success of LANL innovations is shown in Figure 1. The Hydrogen and Fuel Cell Technologies Office (HFTO) has been funding the Million Mile Fuel Cell Truck Consortium (M2FCT) since 2020 and has been tracking the development of various catalysts and MEAs since its inception. As shown in the figure, the most recent MEAs and catalysts significantly exceed the original DOE targets. With some of the best results recorded to date, this presents an unprecedented opportunity for commercial partners to work with LANL to further develop the technology and accelerate time to market.

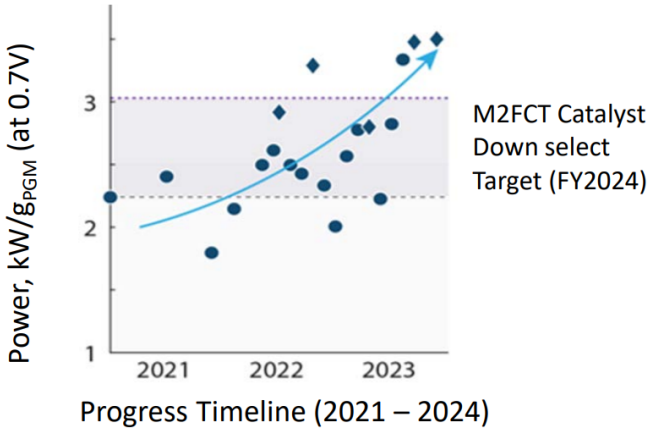

Figure 1. Progress in fuel cell performance and durability driven by novel catalyst and electrode development in the M2FCT consortium. Dashed lines show the original M2FCT target (2.5 kW/g_PGM) and the FY2024 downselect target (3.04 kW/g_PGM), with recent LANL catalysts and electrodes exceeding the downselect target. Circles represent conventional electrode structures, and diamonds represent advanced electrode structures.

Below you will find (1) a listing of the relevant IP available for licensing, (2) details regarding the information requested in the form of a letter of interest, and (3) information regarding the next steps in this commercialization call process.

INITIAL PORTFOLIO OF L'INNOVATOR INTELLECTUAL PROPERTY

Los Alamos National Laboratory Patents

- S133679 (pending) "Ionomer Membranes For Fuel Cells And Related Devices." Mukundan, Rangachary (Mukund), Borup, Rodney L (Rod), Spendelow, Jacob Schatz, Komini Babu, Siddharth.
- S133689, US Patent 12009525B2, "Coaxial Nanowire Electrode." Siddharth Komini Babu, Jacob Schatz Spendelow, Rangachary Mukundan.
- S167564 (pending) "Groovy Fuel Cell Electrodes for Enhanced Performance." Mukundan, Rangachary (Mukund), Borup, Rodney L (Rod), Spendelow, Jacob Schatz, Lee, Chung Hyuk, Komini Babu, Siddharth.
- S167605 (pending) "Electrodes Based on Catalytic Nanofilms." Spendelow, Jacob Schatz, Liyanage, Wipula Priya Rasika, Yang, Gaoqiang, Komini Babu, Siddharth.
- S167606 (pending) "Robust Structured Electrolyte-Electrode Interface for Electrochemical Devices." Yang, Gaoqiang, Martinez, Ulises, Lee, Chung Hyuk, Spendelow, Jacob Schatz, Komini Babu, Siddharth.
- S167614 (pending) "Intermetallic Catalysts With High Performance and Durability." Wang, Chenyu, Spendelow, Jacob Schatz, Pan, Yung-Tin.
- S167690 (pending) "Porous Catalyst Supports with Differentiated Transport Channels." Spendelow, Jacob Schatz, Wang, Xiaojing, Chen, Kate, Li, Kui.

Please note that the U.S. Government retains a worldwide, royalty-free, nonexclusive right to practice or have practiced any Triad-owned patents and/or copyrighted software in the performance of work on behalf of the U.S. Government. Accordingly, all government contractors will have open access to any Triad patents and copyrights in performance of a federal government contract. These retained rights are not applicable to any commercial application of the technology and are strictly limited to applications for or on behalf of the U.S. Government.

COMMERCIAL LICENSING

To provide selected partner(s) with the necessary freedom to operate, Triad will offer nonexclusive license rights to all or parts of the portfolio of IP under reasonable terms and conditions. By virtue of the statutory rights included in any resultant L'Innovator CRADA(s), the selected partner(s) will have an option to exclusively license new IP developed under the CRADA during its term and for a period of six (6) months following the termination or expiration of the CRADA.

Thus, Triad intends to provide a comprehensive suite of license rights to the selected partner(s) for both members of the existing portfolio of L'Innovator IP and future IP developed under the L'Innovator 2.0 program. As the licensing agent responsible for administering the L'Innovator 2.0 IP portfolio, Triad is authorized to grant licenses.

CALL FOR COMMERCIALIZATION PARTNER(S)

Triad is opening this formal Call to commercial entities to achieve commercialization and deployment of the L'Innovator 2.0 IP portfolio. This offering is made without prejudice to any form of agreement, collaborative arrangement, alliance, number of entities, or partnering mechanism.

Companies interested in pursuing this commercialization opportunity should submit a letter of interest (LOI), as well as any questions or comments, to the undersigned on or before 11:59 p.m. MST on July 15, 2025.

Commercial Call Timeline

Issue - Call for Commercialization Partner(s)	November 15, 2024
Letter of Interest (LOI) Submission Deadline	**July 15, 2025**
Execution of Non-Disclosure Agreements (NDAs)	August 29, 2025
Full Proposals / Business Plans Due to LANL	October 18, 2025
Selection and Announcement of Partner(s)	October 31, 2025
Fully Executed CRADA Between Triad and Partner(s)	April 1, 2026*

*Execution of CRADA is subject to DOE review and subject to change depending on the information provided by partner(s).

Letter of Interest

The L'Innovator 2.0 review panel will select one or more qualified commercial partners to assist with the development and deployment of the MVP, targeting eventual market penetration through a competitive call for proposals—the LOI being the first step in that process.

A LOI must include the following information:

1. A description of your company and its mission
2. An explanation of the company's interest in the technology and its relevance to the company's goals and existing product offerings
3. Demonstrated experience in developing, manufacturing, and marketing a technology in one or more technology areas relevant to the IP portfolio
4. Demonstrated significant financial backing and investment interest
5. A brief description of the company's financial and human resources available for commercializing this technology
6. A brief description of the company's relevant facilities/capabilities or access to facilities and equipment required for manufacturing and scale up of the technology
7. An outline of how the company will provide cost match (described below) for the development, manufacturing, and demonstration of an MVP
8. Anticipated project lead (product champion within your organization) and a brief description of the company's commercialization strategy
9. A concise description of your company's proposed customer set and end users, including the strategy for developing a supply base to support the emerging hydrogen and fuel cell market; and
10. A list of any questions that you may have that you would like to have answered prior to the deadline for submitting a full proposal/business plan. Note: answers to these questions will be provided to all interested parties to ensure the fair and equitable sharing of information regarding this opportunity

PREFERRED PARTNER ATTRIBUTES

- Demonstrated experience in commercializing related technologies.
- This call requires at least a 1:1 cost match with the HFTO investment, which is anticipated to be approximately $2 million directed at MVP development (i.e., if HFTO provides $2 million, the company would also provide at least $2 million). Cost match can include cash, in-kind contribution, or a combination of cash and in-kind contribution.
- U.S. manufacturing presence with relevant manufacturing capabilities, along with an explicit commitment from the company to substantially manufacture in the U.S.
- A concise description of your company's proposed customer base and end users, including the strategy for developing a supply chain to support the emerging hydrogen and fuel cell market.

FIRST DEADLINE AND POINT OF CONTACT

To be considered responsive, an LOI must be received by 11:59 p.m. MST on July 15, 2025.

Letters may be mailed to the LANL business development contact listed below or submitted as an attachment via email. The LOI should include, at a minimum, the information listed above; however, you are welcome to include any additional information regarding your company (e.g., brochures, product information) that may assist in the evaluation of your interest and suitability as a commercialization partner.

Please do not include information that your company considers proprietary or business-sensitive. Triad will supply a non-disclosure agreement (NDA) if it becomes evident that one is required to proceed with the next steps in this process. Note that NDAs with non-U.S. companies will require additional time to process due to export control requirements and other necessary reviews.

Following your submission, you will be contacted by LANL with additional information regarding the next steps in the process. We look forward to reviewing your ideas on how we can work together to rapidly advance this technology toward the commercial marketplace and accelerate deployment to benefit the U.S. economy.

LANL Business Development Contact – Richard P. Feynman Center for Innovation

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Questions about this call may also be directed to Marc Witkowski.