

U.S. DEPARTMENT OF ENERGY Office of Inspector General

DOE-0IG-25-23

June 23, 2025

Regional Clean Hydrogen Hubs Program







Department of Energy Washington, DC 20585

June 23, 2025

MEMORANDUM FOR THE DIRECTOR, OFFICE OF CLEAN ENERGY DEMONSTRATIONS

SUBJECT: Audit Report: Regional Clean Hydrogen Hubs Program

The attached report discusses our audit of the Office of Clean Energy Demonstrations' Regional Clean Hydrogen Hubs Program. Because the Office of Clean Energy Demonstrations and the Regional Clean Hydrogen Hubs Program is in the early stages of its phased oversight approach, the Office of Inspector General is providing two recommendations addressing risk assessments and the development of a comprehensive workforce plan. If fully implemented, these recommendations should help ensure that the Regional Clean Hydrogen Hubs Program is meeting its goals and objectives. Management concurred with our recommendations.

We conducted this audit from May 2024 through May 2025 in accordance with generally accepted government auditing standards. We appreciated the cooperation and assistance received during this audit.

Jaran Jaron

Sarah Nelson Assistant Inspector General for Management *Performing the Duties of the Inspector General* Office of Inspector General

cc: Chief of Staff

DOE OIG HIGHLIGHTS

Regional Clean Hydrogen Hubs Program

June 23, 2025

Why We Performed This Audit

The Infrastructure Investment and Jobs Act provided the Department of Energy with \$8 billion to support the development of multiple, regional clean hydrogen hubs. These hubs are intended to be a network of clean hydrogen producers, consumers, and connective infrastructure. The Department's Office of Clean Energy Demonstrations (OCED) selected seven hubs to accelerate the large-scale production and end-use of clean hydrogen.

We initiated this audit to determine the extent to which the Department planned, resourced, and developed controls to help ensure the Regional Clean Hydrogen Hubs (H2Hubs) Program meets its goals and objectives.

What We Found

We found that the OCED did not adequately plan, resource, or develop controls to help ensure the H2Hubs Program met its goals and objectives. Specifically, we found that the OCED and the H2Hubs Program had not conducted any programmatic risk assessments of its internal or external control environments. Additionally, the OCED and the H2Hubs Program had not conducted an assessment on its human capital posture to determine whether adequate staffing resources with the requisite skills and knowledge were available to meet current and future mission goals and objectives.

The issues occurred, in part, because the OCED encountered numerous challenges as a newly created office within the Department. These challenges included a limited number of available staff as well as a prioritized focus on selecting and awarding projects without ensuring adequate internal controls were in place.

Without conducting programmatic risk assessments or developing a workforce plan, the OCED and the H2Hubs Program may be susceptible to unidentified internal or external vulnerabilities that could negatively impact its ability to meet current and future goals and objectives. For instance, weaknesses identified could result in project delays and increased opposition, hindering the successful implementation of the H2Hubs Program.

What We Recommend

To address the issues identified in this report, we made two recommendations related to developing and maintaining risk assessments and developing a comprehensive workforce plan that, if fully implemented, should help ensure that the H2Hubs Program meets its goals and objectives.

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Background and Objective

In November 2021, the Infrastructure Investment and Jobs Act (IIJA) authorized \$8 billion to the Department of Energy to establish a program to support the development of regional clean hydrogen hubs.¹ These hubs are intended to be a network of clean hydrogen producers, consumers, and connective infrastructure with regional facilities located within close proximity to each other that will help accelerate the large-scale production and use of clean hydrogen. Clean hydrogen is intended to be used for, but not limited to, heavy duty vehicles, power generation, ports, fertilizer, public transit, steel and glass production, and refineries.

To support this effort, the Department established the Office of Clean Energy Demonstrations (OCED) to help scale the emerging technologies needed to tackle the most pressing climate challenges and achieve net-zero emissions by 2050.² The OCED created the Regional Clean Hydrogen Hubs (H2Hubs) Program to oversee the administration and management of these regional clean hydrogen hubs. In September 2022, the OCED issued a funding opportunity announcement to seek applications for the planning, construction, and operation of 6 to 10 commercial-scale regional clean hydrogen hubs throughout the U.S. with a proposed minimum 50/50 Government-to-recipient cost share. After a multi-step merit review process, the OCED selected seven recipients in October 2023 to proceed into award negotiations with all seven hubs having been awarded as of January 2025. Figure 1 shows the geographical location of the seven selected H2Hubs. Appendix 3 includes additional details about each of the H2Hubs.



Figure 1: Geographical Location of the Seven H2Hubs

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¹ The OCED issued two funding opportunity announcements to award the \$8 billion authorized by the IIJA. One funding opportunity announcement set aside \$7 billion for the selection of regional hubs. The other allocated up to \$1 billion for a demand-side initiative to accelerate the clean hydrogen economy.

² In November 2021, the U.S. Government established a strategy for reaching net-zero emissions no later than 2050 to limit global temperature increases and prevent unacceptable climate change impacts and risks (*The Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050*, U.S Department of State and the U.S. Executive Office of the President, November 2021).

To oversee OCED-funded demonstration projects, the OCED applied a four-phased project management approach with multiple go/no-go decision points. Figure 2 provides an overview of the H2Hubs Program phased approach, including the estimated timeline and funding per phase.



Figure 2: H2Hubs Program Phased Approach to Project Management

- Phase 1 encompasses initial planning and analysis activities to ensure that the project is technologically, socially, and financially viable;
- Phase 2 finalizes engineering designs and business development, site access, workforce agreements, permitting, and offtake agreements;
- Phase 3, where most of the costs will occur, includes installation, integration, and construction activities; and
- Phase 4 ramps up the project to full operations, including data collection, to analyze the project's activities.

The selected financial assistance awards are expected to be executed over approximately 7 to 12 years depending on the size and complexity of the regional hub.

Given the significant amount of funding received by the OCED, a newly created office, we initiated this audit to determine the extent to which the Department planned, resourced, and developed controls to help ensure the H2Hubs Program meets its goals and objectives.

Results of Review

We found that the OCED did not adequately plan, resource, or develop controls to help ensure the H2Hubs Program meets its goals and objectives. Specifically, the H2Hubs Program did not fully assess risk to the program and projects, and it did not conduct an assessment of its human capital posture.

INADEQUATE RISK PLANNING

The OCED and the H2Hubs Program did not address overall programmatic risks prior to awarding IIJA funding to the regional hubs. Specifically, we found that the OCED and the H2Hubs Program did not conduct an initial programmatic risk assessment and subsequent reassessments of its internal or external control environments, as required.³

Initial Assessment of Risk

We found that the OCED and the H2Hubs Program did not conduct an overall initial programmatic risk assessment. As a new office within the Department, the OCED and its H2Hubs Program were required to take initial steps to identify, analyze, and mitigate risks and vulnerabilities at the program level. Instead, our review found that the H2Hubs Program only assessed risk at the selectee level, first during the merit review selection process and then again during award negotiations. OCED officials confirmed that these assessments were specific to each selectee, and an overall assessment at the program level was not conducted.

While performing assessments at the selectee level was a positive step, an assessment at the overall programmatic level may have identified additional risks that could impact the H2Hubs Program. For example, OCED officials expressed concerns with the Department of the Treasury's published draft rules for the hydrogen production tax credit in 26 United States Code 45V, known as the *Credit for Production of Clean Hydrogen*. The draft rules were published in December 2023, and at that time, the potential impacts of the tax credit were unknown. During our review, OCED officials indicated that the outcome of the final ruling could influence the success of the H2Hubs Program. Had an overall programmatic risk assessment been performed, this risk could have been identified and analyzed, and mitigation plans could have been developed before the final ruling was issued in January 2025. While we were unable to measure the impact of not conducting an overall programmatic risk assessment, it is important to recognize that not addressing these types of risks can lead to project delays and increased opposition, hindering the successful implementation of the H2Hubs Program.

Reassessments of Risk

The OCED and the H2Hubs Program also did not conduct any subsequent reassessments of programmatic risks, as required. Instead of reevaluating ongoing mitigation efforts, analyzing significant changes, or considering new possible vulnerabilities, officials indicated that they were

³ The Office of Management and Budget's Circular Number A-123 *Management's Responsibility for Enterprise Risk Management and Internal Control* and *Department of Energy FY 2024 Enterprise Risk Management Guidance* both require an initial effort to identify risk as well as to continuously monitoring risk and, when necessary, perform reassessments when changes occur.

developing an H2Hubs Program risk management register to track identified risks based on each of the selectees' pre-award risk assessments. However, tracking previously identified risks does not fully meet the requirements of the reassessment efforts because it does not identify emerging risks and challenges that may require further consideration. For example, OCED officials indicated the H2Hubs Program underwent a significant change during fiscal year 2024 following the selection of the seven hubs for award negotiations. As previously noted, when the OCED issued the funding opportunity announcement in 2022 seeking a minimum 50/50 Government-to-recipient cost share, the H2Hubs Program anticipated a portfolio with estimated total project costs around \$14 billion. However, during the award negotiation process, the total H2Hubs Program portfolio costs increased to approximately \$50 billion, and the Government-to-recipient cost share changed to 14/86. Such a significant change in project scope and cost should have triggered a reassessment of program risks, which would identify any new risks, or changes to existing risks, to the H2Hubs Program.

Lack of Staff

An overall programmatic risk assessment of the H2Hubs Program was not conducted, in part, because the OCED encountered numerous challenges related to the limited number of available staff. At the onset of the organization, the OCED did not have the staffing resources needed to complete all necessary actions associated with creating a new office. For example, with only 12 full-time equivalents on staff as of June 2022, the OCED made the decision to prioritize tasks such as developing an office mission and vision statement, developing organizational policies and procedures, planning for and establishing programs to oversee and administer IIJA funding, creating authority, and preparing funding opportunity announcements. However, over 2 years later, a programmatic risk assessment still had not been conducted although staffing levels increased to over 250 Federal employees and 165 support service contractors. Until a comprehensive assessment of programmatic risk is performed, the Department is not well positioned to respond to emergent changes in funding, scope, political or social dynamics, or other unforeseen issues related to the H2Hubs Program.

WORKFORCE PLANNING NEEDED FOR HUMAN CAPITAL MANAGEMENT

We found that the OCED and the H2Hubs Program did not conduct an assessment of its human capital posture to determine whether the OCED and the H2Hubs Program had adequate staffing resources with the requisite skills and knowledge to meet current and future mission goals and objectives. Best practices⁴ across the Federal Government state that workforce planning is critical to programmatic success. However, our review found that the OCED and the H2Hubs Program had not developed a formalized workforce plan. While the OCED developed some workforce documentation, it was unable to provide us with a formalized workforce analysis to justify its staffing levels at the time of our audit or its staffing plans for the future.

⁴ The Government Accountability Office's *Standards for Internal Control in the Federal Government*, GAO-14-704G, dated September 2014, states, "[E]ffective management of an entity's workforce, its human capital, is essential to achieving results and an important part of internal control." The Office of Personnel Management's *Workforce Planning Guide*, dated November 2022, states, "Workforce planning serves as the foundation for managing an organization's human capital. It enables organizations to strategically meet current and future workforce needs and prevents unnecessary disruptions in maintaining a steady-state and agile workforce."

Without detailed workforce plans in place, OCED officials told us that their strategy for future workforce needs was to contract out for any skillset or knowledge gaps, when necessary. OCED officials acknowledged that the expertise needed to manage the H2Hubs projects will change as they progress through the different phases of project management. As previously indicated in Figure 2, each phase differs in scope, duration, and cost; includes a "go/no-go" decision prior to advancing and receiving additional funding; and requires a different skillset and knowledge base for staff. For example, most project costs will occur in Phase 3 due to installation, integration, and construction activities, and therefore may require an increased number of subject matter experts to ensure that all costs are reasonable, allocable, and allowable. As a best practice, a formalized and comprehensive written workforce plan assessing the current and future workforce needs would benefit the OCED and the H2Hubs Program in identifying the required technical competencies and forecasting staffing resources for each of the phases.

The lack of a formalized and comprehensive workforce plan occurred, in part, because the OCED prioritized selecting and funding awards instead of analyzing current capabilities and future resourcing needs. Specifically, we found that for the H2Hubs Program the OCED prioritized issuing funding opportunity announcements, reviewing applications, making selections, and negotiating and issuing final awards for the seven regional hubs. Now that all seven regional hubs have been awarded, OCED officials informed us that the office will shift its focus towards managing the awards. In terms of the OCED's approach to staffing, OCED officials informed us that they use an organizational strategy that involves matrixing staff members from other divisions within the OCED as well as contracting out when necessary to support the various phases of project management. To the OCED's credit, in response to a recent Government Accountability Office report⁵ that identified a similar issue with workforce planning, the OCED stated that it will develop a robust and detailed strategic workforce plan. While the OCED and the H2Hubs Program are in the early stages of its phased oversight approach for each of the projects and have an informal staffing approach, the lack of a formalized workforce plan could negatively impact current and future project milestones as well as the success of meeting the goals and objectives of the H2Hubs Program.

⁵ Clean Energy: New DOE Office Should Take Steps to Improve Performance Management and Workforce Planning (GAO-25-106748, November 2024).

Recommendations

As the OCED moves forward with its management of the H2Hubs Program, current and future risks and resources will need to be adequately assessed to help ensure its goals and objectives are being met. Accordingly, we recommend that the Director, OCED:

- 1. Conduct an H2Hubs Program risk assessment and reassess the risks, as necessary, to identify and mitigate overall program risks; and
- 2. Develop a formal and comprehensive integrated workforce plan consistent with best practices that assesses the skills, competencies, and capabilities of the current workforce, as well as identifies the skills and roles that will be required in the future to achieve strategic goals.

Management Comments

Management concurred with our recommendations and identified responsive corrective actions to address the reported issues. Specifically, for Recommendation 1, management indicated that, in coordination with the Office of the Chief Financial Officer and other Departmental Elements, a cross-functional process to identify, document, and monitor key risks that could affect program execution will be established. Regarding Recommendation 2, management indicated that, in coordination with the Department, a workforce plan to ensure that the necessary, qualified staff perform project management oversight of the hydrogen hubs will be developed.

Management's comments are included in Appendix 4.

Office of Inspector General Response

Management's comments and proposed corrective actions were responsive to our recommendations.

Objective, Scope, and Methodology

Objective

We initiated this audit to determine the extent to which the Department of Energy planned, resourced, and developed controls to help ensure the Regional Clean Hydrogen Hubs (H2Hubs) Program meets its goals and objectives.

Scope

The audit was performed from May 2024 through May 2025 with the Office of Clean Energy Demonstrations (OCED) Headquarters in Washington, DC. The scope was limited to the OCED's implementation of the H2Hubs Program. The audit was conducted under Office of Inspector General project number A24PT003.

Methodology

To accomplish our audit objective, we:

- Reviewed requirements surrounding the H2Hubs included in the Infrastructure Investment and Jobs Act;
- Reviewed applicable Federal laws and regulations as well as policies, procedures, guidance, and standards issued by the Department, the Government Accountability Office, the Office of Personnel Management, the Office of Management and Budget, and the OCED;
- Reviewed prior, related audit reports issued by the Department's Office of Inspector General and the Government Accountability Office;
- Held discussions and interviews with Department officials from multiple OCED divisions and offices, including officials within the H2Hubs Program, Financial Assistance Office, Engagement Office, Budget Office, and Financial Oversight and Performance Office;
- Reviewed documentation supporting the application process and selection of the H2Hubs, including the funding opportunity announcement and the Merit Review Panel Chairperson's Report;
- Reviewed documentation for one of the awarded H2Hubs, which included, but was not limited to, the assistance agreement, project objectives, standard and award specific terms and conditions, statement of work, conflicts of interest certifications, and foreign entity participation waiver determinations; and
- Reviewed the OCED's internal risk documentation.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. We assessed internal controls and compliance with laws and regulations necessary to satisfy the audit objective. In particular, we assessed control environment, control activities, and risk assessment control components and underlying principles including: demonstrate commitment to integrity and ethical values; exercise oversight responsibility; establish structure, responsibility, and authority; demonstrate commitment to competence; define objectives and risk tolerances; identify, analyze, and respond to risks; assess fraud risks; identify, analyze, and respond to change; design control activities; implement control activities; and use quality information. However, because our review was limited to these internal control components and underlying principles, it may not have disclosed all internal control deficiencies that may have existed at the time of this audit. We did not request or receive any computer-processed data during our review. Therefore, we did not conduct a reliability assessment as a part of our audit.

Management officials waived an exit conference on June 9, 2025.

Related Reports

Office of Inspector General

• Special Report: *Prospective Considerations for Clean Energy Demonstration Projects* (DOE-OIG-22-39, August 2022). This capstone report summarizes historic reports that may serve to improve internal controls to help prevent fraud, waste, and abuse as the Department of Energy launches its clean energy demonstration projects funded under the Infrastructure Investment and Jobs Act and other appropriations. The report identifies five major risk areas that warrant immediate attention and consideration from Department leadership to prevent similar problems from recurring. These five areas include: insufficient Federal staffing, circumvention of project controls, insufficient oversight of projects, inadequate internal controls, and lack of recipient-level controls. The report also identifies several prospective considerations to help mitigate risk associated with clean energy demonstration projects funded through financial assistance awards: setting aside sufficient resources for Federal staffing, developing comprehensive policies and procedures, and building strong internal controls to ensure that the Government and taxpayers are adequately protected.

Government Accountability Office

Q&A Report to Congressional Committees: *Clean Energy: New DOE Office Should Take* Steps to Improve Performance Management and Workforce Planning (GAO-25-106748, November 2024). The Government Accountability Office (GAO) examined the Office of Clean Energy Demonstration's (OCED) establishment of its program development and proposal review process for issuing awards for projects. The GAO found that the OCED activities coordinating with other Department offices generally followed six of eight leading practices and partially followed the remaining two—defining common outcomes and ensuring accountability. The GAO also found that, regarding the OCED's performance management activities, they are partially aligned with two leading practices to include defining goals and collecting performance information to measure progress. However, the OCED's performance management activities did not align with the third leading practice of using performance management information to assess results and inform decisions. Lastly, the GAO found that the OCED had taken some actions to define its workforce needs but has not followed all leading practices for workforce planning. Specifically, the OCED has partially monitored and evaluated progress toward human capital goals but has not developed a strategic workforce plan to coordinate strategies and align them with agency goals.

Appendix 3

Selected Regional Clean Hydrogen Hubs

Awarded Hub	Proposed Locations	Federal Cost Share	Production Source	Hydrogen End-Use	Award Date
Hub A	Ohio, Pennsylvania, and West Virginia	Up to \$925 Million	Electrolysis, Biomass, Natural Gas, and Thermal Conversion	Fuel Cell Electric Mining Vehicles, Heavy Duty Vehicles, and Heavy Industry	July 2024
Hub B	California	Up to \$1.2 Billion	Renewables, Biomass, Electrolysis, and Thermal Conversion	Backup Power Generation, Heavy Duty Vehicles, Port Equipment, and Public Transit	July 2024
Hub C	Washington, Oregon, and Montana	Up to \$1 Billion	Electrolysis	Heavy Duty Vehicles, Ports, Peaking Plants, Generators, Data Centers, and Refineries	July 2024
Hub D	Texas	Up to \$1.2 Billion	Natural Gas, Electrolysis, and Thermal Conversion	Heavy Duty Vehicles, Power Generation, Ammonia, Refineries, and Marine Fuel	November 2024
Hub E	Colorado, Minnesota, Montana, North Dakota, South Dakota, and Wisconsin	Up to \$925 Million	Renewables, Electrolysis, and Thermal Conversion	Fertilizer Production Power Generation	January 2025
Hub F	Pennsylvania, Delaware, and New Jersey	Up to \$750 Million	Renewables, Nuclear Electricity, Electrolysis, and Thermal Conversion	Heavy Duty Vehicles, Refuse and Sweeper Trucks, Power Generation, and Combined Heat and Power	January 2025
Hub G	Illinois, Indiana, Iowa, and Michigan	Up to \$1 Billion	Renewables, Natural Gas, and Nuclear Energy	Steel and Glass Production, Power Generation, Refineries, Heavy Duty Vehicles, and Sustainable Aviation Fuel	November 2024

Appendix 4

Management Comments



Department of Energy Washington, DC 20585

June 5, 2025

MEMORANDUM FOR	SARAH NELSON ASSISTANT INSPECTOR GENERAL FOR MANAGEMENT
FROM:	CATHY TRIPODI DIRECTOR OFFICE OF CLEAN ENERGY DEMOSTRATIONS
SUBJECT:	Response Letter to OIG Report Draft report entitled: Regional Clean Hydrogen Hubs Program (A24PT003)

Thank you for the opportunity to review and comment on the subject draft report. The Office of Clean Energy Demonstrations (OCED) appreciates the auditors' audit work and provides the following comments below:

We concur with the auditors' findings. The attachment to this memorandum details actions planned to be taken by OCED.

If you have any questions regarding this response, please contact Howard Dickenson, Acting Deputy Director, Office of Clean Energy Demonstrations.

Enclosure

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Appendix 4

Enclosure

Management Response OIG Draft Report: Regional Clean Hydrogen Hubs Program (A24PT003)

Recommendation 1: Conduct an H2Hubs Program risk assessment and reassess the risks, as necessary, to identify and mitigate overall program risks

DOE Response: Concur

OCED, in coordination with the Office of the Chief Financial Officer (CFO) and other Departmental Elements, will establish a cross-functional process to identify, document, and monitor key risks that could affect program execution. This will include developing procedures for reassessing risk at major milestones or when significant changes occur and integrating emerging external factors into ongoing risk tracking.

Estimated Completion Date: December 3, 2025

Recommendation 2: Develop a formal and comprehensive integrated workforce plan consistent with best practices that assesses the skills, competencies, and capabilities of the current workforce, as well as identifies the skills and roles that will be required in the future to achieve strategic goals.

DOE Response: Concur

OCED, in coordination with the Department, will develop a workforce plan to ensure the necessary, qualified staff perform rigorous project management oversight of the hydrogen hubs.

Estimated Completion Date: September 30, 2025

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FEEDBACK

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