Department of Energy (DOE)
Office of Clean Energy Demonstrations (OCED)

Bipartisan Infrastructure Law: Additional Clean Hydrogen Programs (Section 40314): Regional Clean Hydrogen Hubs Funding Opportunity Announcement

Funding Opportunity Announcement (FOA) Number: DE-FOA-0002779
FOA Type: Mod 000002
CFDA Number: 81.255

FOA Issue Date:	9/22/2022
Submission Deadline for Concept Papers:	11/7/2022 5:00pm ET
Concept Paper Encourage/Discourage Notifications:	December 2022
Submission Deadline for Full Applications:	4/7/2023 5:00pm ET
Expected Submission Deadline for Replies to Reviewer Comments:	5/31/2023 5:00pm ET
Pre-Selection Interviews:	Summer 2023
Expected Date for DOE Selection Notifications:	Fall 2023
Expected Timeframe for Award Negotiations:	Winter 2023-2024

- Applicants must submit a Concept Paper by 5:00pm ET on the due date listed above to be eligible to submit a Full Application.
- To apply to this FOA, applicants must register with and submit application materials through OCED Exchange at https://oced-Exchange.energy.gov, OCED's online application portal.
- Applicants must designate primary and backup points-of-contact in OCED Exchange with whom DOE will communicate to conduct award negotiations. If an application is selected for award negotiations, it is not a commitment to issue an award. It is imperative that the applicant/selectee be responsive during award negotiations and meet negotiation deadlines. Failure to do so may result in cancelation of further award negotiations and rescission of the selection.
- Unique Entity Identifier (UEI) and System for Award Management (SAM) - Each applicant must be registered in SAM and provide a valid UEI number in its application. See Section IV.G for more information.

Modifications

Modifications to the Funding Opportunity Announcement (FOA) are HIGHLIGHTED in the body of the FOA.

Mod. No.	Date	Description of Modification
000001	11/16/2022	• In Section IV.D.i and Section IV.D.viii of the FOA, the total page limit for Community Partnership Documentation was eliminated and the page limit for each letter/submission from community partners was increased from 1 page to 3 pages. • Section IV.D.xiv (DOE Work Proposal for DOE/NNSA FFRDC) was removed and replaced with "Not Applicable". The funding for the FFRDC sub-recipients will flow through the prime recipient; therefore, a DOE work proposal is not required (not applicable).
000002	1/18/2023	• The cover page of the Technical Volume (Section IV.D.ii and Appendix I) was updated to require that the applicant certify the domestic entity status of the proposed prime recipient and all subrecipient(s) in accordance with definitions in Section III.A.i of the FOA, and identify any entities that will require a foreign entity waiver. • Section IV.A (Application Process) was updated to allow the Technical Volume cover page to be a font size of 10 point or larger. • The "Example Cover Page for H2Hub Applications" template, available under the "Application Forms and Templates" section on the OCED Exchange website, was updated to collect the information described above. • Section IV.D.v (Environmental Considerations Summary) was updated to allow the maps requested with the Environmental Considerations Summary to be submitted as separate files and be in larger engineering formats. • Appendix G (Environmental Considerations Summary) was updated to remove the reference to GIS Shapefiles. While the maps may be created as a GIS Shapefile or other engineering formats, the maps must be saved and submitted as a PDF file.

Table of Contents

Table of Contents ..... **iii**

I. Funding Opportunity Description **7**

A. Background and Context 7
i. Technology Space and Program Purpose 9
ii. Community Benefits Plan: Job Quality and Equity 11
iii. Teaming Partner List – H2 Matchmaker 12
B. Topic Area Description 12
i. H2Hub Definition 12
Hydrogen Production 14
Connective Infrastructure (Hydrogen Delivery and Storage) 15
Hydrogen End-Uses 16
ii. H2Hub Project Overview 17
Anticipated Funding and Award Details 17
Phase 1 – Detailed Project Planning 20
Phase 2 – Project Development, Permitting, and Financing 20
Phase 3 – Installation, Integration, and Construction 21
Phase 4 – Ramp-Up and Sustained Operations 22
Transitions between Phases 22
iii. H2Hub Application Requirements 23
Business Development and Management 24
Engineering, Procurement, Construction, and Operations 29
Safety, Security, and Regulatory Requirements 34
Risk Analysis and Mitigation 39
Technical Data and Analysis 39
Community Benefits Plan: Job Quality and Equity 47
C. Applications Specifically Not of Interest 54
D. Authorizing Statutes 55
E. Notice of Bipartisan Infrastructure Law-Specific Requirements 55

II. Award Information **56**

A. Award Overview 56
i. Estimated Funding 56
ii. Period of Performance 57
iii. New Applications Only 57
B. DOE Funding Agreements 57
i. Cooperative Agreements 57

III. Eligibility Information **58**

A. Eligible Applicants 58
i. Domestic Entities 58
ii. Foreign Entities 59
iii. Incorporated Consortia 59
iv. Unincorporated Consortia 59
B. Cost Sharing 60
i. Legal Responsibility 61
ii. Cost Share Allocation 61
iii. Cost Share Types and Allowability 61

iv. Cost Share Contributions by FFRDCs 62
v. Cost Share Verification 62
vi. Cost Share Payment 63
C. Compliance Criteria 63
i. Compliance Criteria 63
D. Responsiveness Criteria 64
E. Other Eligibility Requirements 64
i. Requirements for DOE/NNSA and non-DOE/NNSA FFRDCs Included as a Subrecipient 64
F. Limitation on Number of Concept Papers and Full Applications Eligible for Review 65
G. Questions Regarding Eligibility 65

IV. Application and Submission Information 66

A. Application Process 66
i. Additional Information on OCED Exchange 67
B. Application Forms 67
C. Content and Form of the Concept Paper 68
i. Concept Paper Content Requirements 68
D. Content and Form of the Full Application 69
i. Full Application Content Requirements 70
ii. Technical Volume 71
iii. H2Hub TEA and LCA Projections 74
iv. Community Benefits Plan 74
v. Environment Considerations Summary 76
vi. Resumes 76
vii. Letters of Commitment 76
viii. Community Partnership Documentation 76
ix. SF-424: Application for Federal Assistance 77
x. Budget Justification Workbook 77
xi. Summary for Public Release 77
xii. Summary Slides 78
xiii. Subrecipient Budget Justification 78
xiv. Not Applicable 78
xv. Authorization for non-DOE/NNSA or DOE/NNSA FFRDCs (if applicable) 78
xvi. SF-LLL: Disclosure of Lobbying Activities (required) 78
xvii. Waiver Requests (if applicable) 79
xviii. Requirement to Report Potentially Duplicative Funding 79
xix. Locations of Work 80
E. Content and Form of Replies to Reviewer Comments (Optional Submission) 80
F. Post Selection Information Requests 80
G. Unique Entity Identifier (UEI) and System for Award Management (SAM) 81
H. Submission Dates and Times 82
I. Intergovernmental Review 82
J. Funding Restrictions 82
i. Allowable Costs 82
ii. Pre-Award Costs 82
iii. Performance of Work in the United States (Foreign Work Waiver) 83
iv. Construction 84
v. Foreign Travel 84
vi. Buy America Requirements for Infrastructure Projects 84
vii. Davis-Bacon Act Requirements 85
viii. Lobbying 87
ix. Risk Assessment 87
x. Invoice Review and Approval 88

xi. Prohibition related to Foreign Government-Sponsored Talent Recruitment Programs 88
xii. Affirmative Action and Pay Transparency Requirements 89

V. Application Review Information 91

A. Technical Review Criteria 91
i. Concept Papers 91
ii. Full Applications 91
iii. Criteria for Replies to Reviewer Comments 95
B. Standards for Application Evaluation 95
C. Other Selection Factors 95
i. Program Policy Factors 95
D. Evaluation and Selection Process 97
i. Overview 97
ii. Pre-Selection Interviews 97
iii. Pre-Selection Clarification 97
iv. Recipient Integrity and Performance Matters 98
v. Selection 98
E. Anticipated Notice of Selection and Award Negotiation Dates 98

VI. Award Administration Information 99

A. Award Notices 99
i. Ineligible Submissions 99
ii. Concept Paper Notifications 99
iii. Full Application Notifications 99
iv. Successful Applicants 99
v. Alternate Selection Determinations 100
vi. Unsuccessful Applicants 100
B. Administrative and National Policy Requirements 100
i. Registration Requirements 100
ii. Award Administrative Requirements 102
iii. Foreign National Access 102
iv. Subaward and Executive Reporting 102
v. National Policy Requirements 102
vi. Environmental Review in Accordance with National Environmental Policy Act (NEPA) 102
vii. Flood Resilience 103
viii. Applicant Representations and Certifications 103
ix. Statement of Federal Stewardship 105
x. Statement of Substantial Involvement 105
xi. Intellectual Property Management Plan (IPMP) 108
xii. Subject Invention Utilization Reporting 109
xiii. Intellectual Property Provisions 109
xiv. Reporting 109
xv. Go/No-Go Review 110
xvi. Conference Spending 111
xvii. Uniform Commercial Code (UCC) Financing Statements 111
xviii. Implementation of Executive Order 13798, Promoting Free Speech and Religious Liberty 111
xix. Participants and Collaborating Organizations 112
xx. Requirement to Report Potentially Duplicative Funding 112
xxi. U.S. Manufacturing Commitments 112
xxii. Interim Conflict of Interest Policy for Financial Assistance 113
xxiii. Data Management Plan (DMP) 114
xxiv. Fraud, Waste, and Abuse 114
xxv. Human Subjects Research 115

xxvi. Cybersecurity Plan 115

VII. Questions/Agency Contacts 117

VIII. Other Information 118

A. FOA Modifications 118
B. Government Right to Reject or Negotiate 118
C. Commitment of Public Funds 118
D. Treatment of Application Information 118
E. Evaluation and Administration by Non-Federal Personnel 119
F. Notice Regarding Eligible/Ineligible Activities 119
G. Notice of Right to Conduct a Review of Financial Capability 119
H. Real Property and Equipment 120
I. Requirement for Full and Complete Disclosure 121
J. Retention of Submissions 121
K. Title to Subject Inventions 121
L. Government Rights in Subject Inventions 122
M. Rights in Technical Data 123
N. Copyright 124
O. Export Control 124
P. Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment 125
Q. Personally Identifiable Information (PII) 125
R. Annual Independent Audits 126

Appendix A – List of Acronyms 127

Appendix B – DOE Technology Readiness Level Scale 130

Appendix C – Integrated Project Schedules 131

Appendix D – Cost Share Information 132

Appendix E – Waiver Requests 136

A. Foreign Entity Participation 136
B. Foreign Work 137

Appendix F – Required Use of American Iron, Steel, Manufactured Products, and Construction Materials 139

Appendix G – Environmental Considerations Summary 143

Appendix H - Preparation of Environmental Information Volume 146

Appendix I – Example Cover Page for H2Hub Applications 151

Appendix J – Congressional Authorization 152

Executive Summary

The U.S. Department of Energy (DOE) is releasing this Funding Opportunity Announcement (FOA) to solicit regional clean hydrogen hubs (H2Hubs) in accordance with the Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law (BIL). This $8 billion effort will catalyze investment in the development of H2Hubs that demonstrate the production, processing, delivery, storage, and end-use of clean hydrogen, in support of the Biden Administration's goal to achieve a carbon-free electric grid by 2035 and a net zero emissions economy by 2050.

The H2Hubs will form the foundation of a national clean hydrogen network that will contribute substantially to decarbonizing multiple sectors of the economy. Matching the scale-up of clean hydrogen production to a growing regional demand is a key pathway to achieving large-scale, commercially viable hydrogen ecosystems. H2Hubs will enable this pathway by demonstrating low-carbon intensity and economically viable hydrogen-based energy ecosystems that can replace existing carbon-intensive processes. This will accelerate the deployment of these technologies and enabling infrastructure, attract greater investments from the private sector, and promote substantial U.S. manufacturing of numerous hydrogen related technologies.

Each H2Hub will include multiple partners that will bring together diverse hydrogen technologies to produce and utilize large amounts of hydrogen in different ways. These clean hydrogen demonstrations will balance hydrogen supply and demand, connective infrastructure, and a plan for long-term financial viability. The H2Hubs will also include substantial engagement of local and regional stakeholders, as well as Tribes, to ensure that they generate local, regional, and national benefits. H2Hubs will be expected to carry out meaningful community and labor engagement; invest in America's workforce by creating good-paying jobs with the free and fair choice to join a union; advance diversity, equity, inclusion, and accessibility; and contribute to the President's Justice40 Initiative goal that 40% of the overall benefits of certain federal investments flow to disadvantaged communities.

DOE has defined a four-phase structure for the H2Hubs. Phase 1 will encompass initial planning and analysis activities to ensure that the overall H2Hub concept is technologically and financially viable, with input from relevant local stakeholders. Phase 2 will finalize engineering designs and business development, site access, labor agreements, permitting, offtake agreements, and community engagement activities necessary to begin installation, integration, and construction activities in Phase 3. Phase 4 will ramp-up the H2Hub to full operations including data collection to analyze the H2Hub's operations, performance, and financial viability. This FOA will solicit plans for all four phases of proposed H2Hub activities; however, DOE will only initially authorize funding for Phase 1. DOE's review and evaluation of deliverables reflecting activities in each phase will inform Go/No-Go decisions that occur between or within Phases.

For this initial FOA launch, DOE envisions selecting six (6) to ten (10) H2Hubs for a combined total of up to $6-7 billion in federal funding. DOE **may** issue a second launch of this FOA to solicit additional H2Hubs beyond those selected in the initial launch. Other FOA launches or use of Other Transaction Authorities **may** also be used to solicit new technologies, capabilities, end-uses, or partners.

I. Funding Opportunity Description

A. Background and Context

DOE's Office of Clean Energy Demonstrations (OCED) is issuing this FOA in collaboration with the Office of Energy Efficiency and Renewable Energy's (EERE) Hydrogen and Fuel Cell Technologies Office (HFTO) and the DOE Hydrogen Program.[1] Awards made under this FOA will be funded through BIL appropriations.[2]

OCED's mission is to deliver clean energy technology demonstration projects at scale in partnership with the private sector to accelerate deployment, market adoption, and the equitable transition to a decarbonized energy system. OCED was established in December 2021 and was first authorized and funded through the BIL. The founding of OCED builds on DOE's expertise in clean energy research and development and expands DOE's scope to fill a critical gap on the path to net-zero emissions by 2050.

The BIL is a once-in-a-generation investment in infrastructure, designed to modernize and upgrade American infrastructure to enhance United States competitiveness, drive the creation of good-paying union jobs, tackle the climate crisis, and ensure stronger access to economic, environmental, and other benefits for disadvantaged communities.[3] The BIL appropriates more than $62 billion to DOE[4] to invest in American manufacturing and workers; expand access to energy efficiency; deliver reliable, clean and affordable power to more Americans; and deploy the technologies of tomorrow through clean energy demonstrations. As part of and in addition to upgrading and modernizing infrastructure, DOE's BIL investments will address the climate crisis, support efforts to build a clean and equitable energy economy that achieves zero carbon electricity by 2035 and put the United States on a path to achieve net-zero emissions economy-wide by no later than 2050[5] to benefit all Americans.

The BIL authorizes and appropriates $8 billion over the five-year period encompassing fiscal years (FYs) 2022 through 2026 to establish a program to support the development of at least

[1] https://www.hydrogen.energy.gov/pdfs/hydrogen-program-plan-2020.pdf
[2] Infrastructure Investment and Jobs Act, Public Law 117-58 (November 15, 2021). https://www.congress.gov/bill/117th-congress/house-bill/3684. This FOA uses the more common name "Bipartisan Infrastructure Law."
[3] Pursuant to E.O. 14008 and the Office of Management and Budget's Interim Justice40 Implementation Guidance M-21-28, DOE has developed a definition and tools to locate and identify disadvantaged communities. These resources can be located at https://energyjustice.egs.anl.gov/. DOE will also recognize disadvantaged communities as defined and identified by the White House Council on Environmental Quality's Climate and Economic Justice Screening Tool (CEJST), which can be located at https://screeningtool.geoplatform.gov/.
[4] U.S. Department of Energy. November 2021. "DOE Fact Sheet: The Bipartisan Infrastructure Deal Will Deliver For American Workers, Families and Usher in the Clean Energy Future." https://www.energy.gov/articles/doe-fact-sheet-bipartisan-infrastructure-deal-will-deliver-american-workers-families-and-0
[5] Executive Order (EO) 14008, "Tackling the Climate Crisis at Home and Abroad," January 27, 2021.

four regional clean hydrogen hubs (referred to as "H2Hubs" throughout this document). The specific provisions for H2Hubs are set forth in Section 40314 of the BIL (see Appendix J for the complete language), which amends Title VIII of EPAct 2005 by adding a new "Section 813 – Regional Clean Hydrogen Hubs." Section 813(a) defines the term "regional clean hydrogen hub" as "a network of clean hydrogen producers, potential clean hydrogen consumers, and connective infrastructure located in close proximity" that:

- Demonstrably aid the achievement of the clean hydrogen production standard developed under section 822(a) of the Energy Policy Act of 2005 (EPAct 2005), as amended by Section 40315 of BIL;[6]
- Demonstrate the production, processing, delivery, storage, and end-use of clean hydrogen; and
- Can be developed into a national clean hydrogen network to facilitate a clean hydrogen economy. [7]

This FOA seeks applications for the planning, construction, and operation of commercial-scale H2Hubs. The BIL H2Hubs statutory provisions[8] require that to the maximum extent practicable, DOE select proposals that cover the following characteristics:

- **Feedstock diversity** – at least one H2Hub shall demonstrate the production of clean hydrogen from fossil fuels, one H2Hub from renewable energy, and one H2Hub from nuclear energy.
- **End-use diversity** – at least one H2Hub shall demonstrate the end-use of clean hydrogen in the electric power generation sector, one in the industrial sector, one in the residential and commercial heating sector, and one in the transportation sector.
- **Geographic diversity** – each H2Hub shall be located in a different region of the United States and shall use energy resources that are abundant in that region, including at least two H2Hubs in regions with abundant natural gas resources.

The BIL H2Hubs statutory provisions also direct that:

- **Employment** – DOE shall give priority to regional clean hydrogen hubs that are likely to create opportunities for skilled training and long-term employment to the greatest number of residents in the region.
- **Additional criteria** – DOE may take into consideration other criteria that are necessary or appropriate to carry out the H2Hubs.[9]

The H2Hubs will also incorporate a range of activities to maximize the benefits of the clean energy transition as the nation works to curb the climate crisis, empower workers, and advance

[6] 42 U.S.C. § 16166
[7] 42 U.S.C. § 16161a
[8] Infrastructure Investment and Jobs Act, Public Law 117-58 (November 15, 2021), Subtitle B – Hydrogen Research and Development, Section 40314 – Additional clean hydrogen programs. https://www.congress.gov/bill/117th-congress/house-bill/3684
[9] 42 U.S.C. § 16161a

environmental justice, as outlined in the Community Benefits Plan, which applicants must submit with their application (see Section I.B.iii).

i. Technology Space and Program Purpose

Hydrogen is one part of a comprehensive portfolio of energy technologies that can support the nation's transition to net-zero emissions economy-wide, while leveraging regional resources and creating equitable and sustainable growth. The strategic development and use of hydrogen will take into consideration technologies across a variety of sectors for the most efficient, affordable, and sustainable pathways enabled by market adoption. Sectors that are difficult to decarbonize are expected to become priority markets for clean hydrogen, such as steel and chemicals manufacturing,[10] heavy-duty transportation, and production of liquid fuels. Hydrogen is also seen as an enabling technology – supporting increased integration of renewable energy into the electric power grid, heating, and other applications through long duration energy storage and offering flexibility and multiple revenue streams to clean power generation.

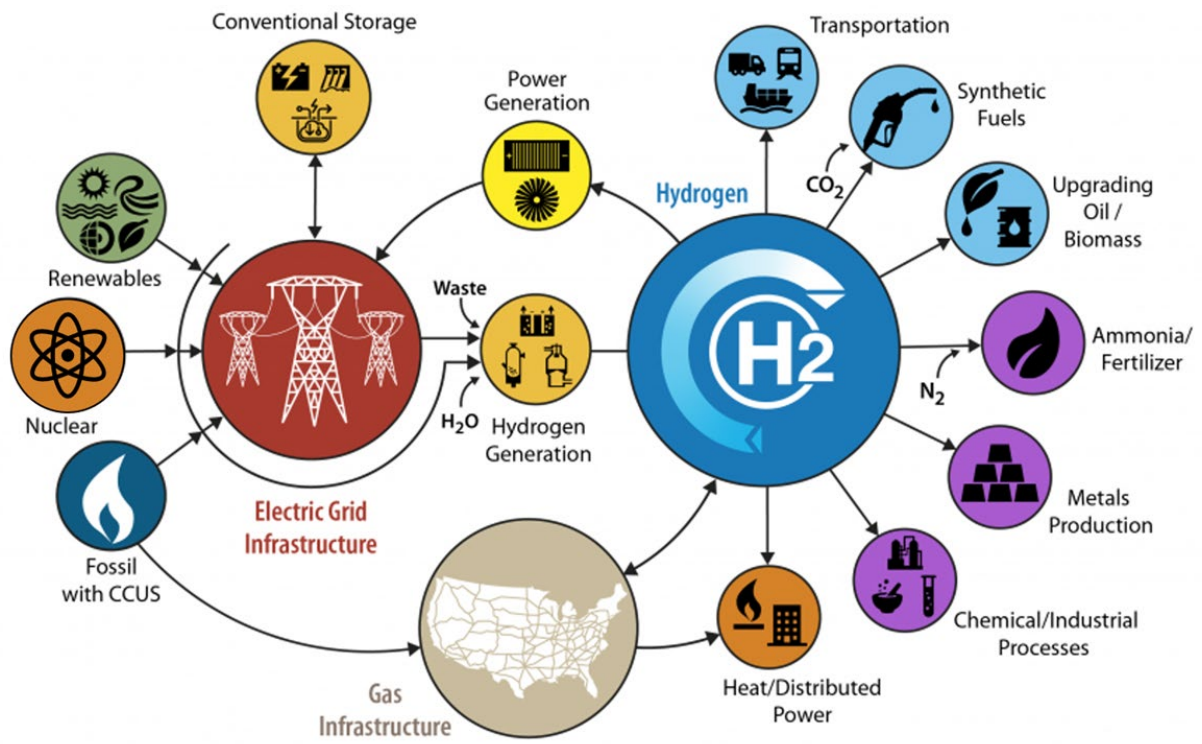

Figure 1. DOE's H2@Scale® initiative will enable decarbonization across sectors using clean hydrogen.[11]

As shown in Figure 1, clean hydrogen can be produced from diverse domestic resources and used across sectors. Production can be centralized or decentralized, grid-connected or off-grid, offering scalability, versatility, and regionality. Hydrogen provides multiple options across sectors and can complement today's conventional grid and natural gas infrastructure. Hydrogen

[10] https://www.energy.gov/eere/industrial-decarbonization
[11] https://www.energy.gov/eere/fuelcells/h2scale

can be stored and used where electrification may be challenging, such as certain market segments within industry and long duration energy storage.

Several technologies for clean hydrogen production can be utilized, including electrolyzers powered by the nation's growing share of clean energy, methane reformation with carbon capture and storage (CCS), gasification or thermal conversion of waste, and many other emerging technologies. To unlock the market potential for clean hydrogen, DOE launched the Hydrogen Energy Earthshot (Hydrogen Shot)[12] in June 2021 to reduce the cost of clean hydrogen by 80% to $1 per 1 kilogram in 1 decade ("1 1 1"). The Hydrogen Shot is the first of DOE's Energy Earthshots, which aim to accelerate breakthroughs of more abundant, affordable, and reliable clean energy solutions within the decade while creating good-paying jobs and growing the economy. The H2Hubs program will complement and contribute to the Hydrogen Shot by demonstrating the production of clean hydrogen at scale.

In addition, Section 40314 of the BIL amends EPAct 2005 to add "Section 814 – National Clean Hydrogen Strategy and Roadmap." Under this section, DOE developed a technologically and economically feasible national strategy and roadmap[13] to facilitate widescale production, processing, delivery, storage, and use of clean hydrogen. The roadmap for clean hydrogen identified a strategic opportunity to produce 10 million metric tons (MMT) of clean hydrogen in the U.S. annually by 2030, 20 MMT by 2040, and 50 MMT by 2050. This strategy targets high-impact applications for clean hydrogen that will decarbonize end-uses across the economy – especially those where there are fewer alternatives, such as direct electrification or the use of biofuels. The clean hydrogen demand opportunity is based on achieving cost competitiveness through the Hydrogen Shot goal to enable demand in each respective sector. The H2Hubs to be selected under this FOA are a key part of this strategy.

This FOA supports DOE's hydrogen priorities described above by soliciting applications for H2Hubs which will form the foundation of a national clean hydrogen network that will contribute substantially to decarbonizing multiple sectors of the economy while also enabling regional and community benefits. Matching the scale-up of clean hydrogen production to a growing regional demand will be key to achieving large-scale, commercially viable hydrogen ecosystems and avoiding stranded assets. H2Hubs can enable clean hydrogen ecosystems by locating supply and demand in close proximity. At the same time, the H2Hubs will provide specific examples of economically viable and community-supported hydrogen-based energy solutions that can replace existing carbon-intensive processes. The H2Hubs are intended to accelerate the deployment of these technologies, attract greater investments from the private sector, and promote substantial U.S. manufacturing of hydrogen related technologies with low greenhouse gas (GHG) intensity.

[12] https://www.energy.gov/eere/fuelcells/hydrogen-shot
[13] https://www.hydrogen.energy.gov/pdfs/clean-hydrogen-strategy-roadmap.pdf

As part of the whole-of-government approach to advance equity and encourage worker organizing and collective bargaining,[14,15,16] and in alignment with BIL section 40314 (Additional Clean Hydrogen Programs), H2Hubs funded through this FOA and any related activities will seek to encourage meaningful engagement and participation of workforce organizations, including labor unions, as well as underserved communities and underrepresented groups, including consultation with Tribal nations.[17,18] Consistent with Executive Order 14008,[19] this FOA is designed to help meet the goal that 40% of the overall benefits of certain federal investments in clean energy and climate solutions flow to disadvantaged communities, as defined by the Department pursuant to the Executive Order, and to drive the creation of good-paying jobs with the free and fair chance for workers to join a union.

ii. Community Benefits Plan: Job Quality and Equity

To support the goals of building a clean and equitable energy economy (including maximizing benefits and minimizing negative impacts), projects funded under this FOA are expected to include a Community Benefits Plan to:

- Support meaningful community and labor engagement;
- Invest in America's workforce;
- Advance diversity, equity, inclusion, and accessibility; and
- Contribute to the President's goal that 40% of the overall benefits of certain federal investments flow to disadvantaged communities (the Justice40 Initiative).[20]

Applicants are encouraged to submit letters of support from established labor unions and community-based organizations that demonstrate the applicant's ability to achieve the above goals as outlined in the Community Benefits Plan. Within the Community Benefits Plan, applicants are encouraged to provide specific detail on how to ensure the delivery of measurable community and jobs benefits, e.g., through milestones and the use of tools such as good neighbor agreements, local hire agreements, project labor agreements, other collective bargaining agreements, or similar agreements (collectively referred to throughout this FOA as "Workforce and Community Agreements"). See Section I.B.iii. for the Community Benefits Plan content requirements.

[14] EO 13985, "Advancing Racial Equity and Support for Underserved Communities Through the Federal Government," January 20, 2021.
[15] EO 14025, "Worker Organizing and Empowerment," April 26, 2021.
[16] EO14052, "Implementation of the Infrastructure Investment and Jobs Act," November 18, 2021.
[17] EO 13175, November 6, 2000 "Consultation and Coordination With Indian Tribal Governments", charges all executive departments and agencies with engaging in regular, meaningful, and robust consultation with Tribal officials in the development of federal policies that have Tribal implications.
[18] https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/26/memorandum-on-tribal-consultation-and-strengthening-nation-to-nation-relationships/
[19] EO 14008, "Tackling the Climate Crisis at Home and Abroad," January 27, 2021.
[20] https://www.energy.gov/diversity/justice40-initiative

iii. Teaming Partner List – H2 Matchmaker

DOE encourages the creation of diverse, committed, and capable teams to collaborate on H2Hub projects. To facilitate H2Hub team formation, DOE launched H2 Matchmaker,[21] a **voluntary** online tool created to aid in fostering partnerships among key stakeholders by allowing potential partners to identify each other. H2 Matchmaker is an online information resource intended to help foster partnerships by increasing awareness and aligning potential needs in specific regions of the U.S.

H2 Matchmaker includes an interactive map containing self-reported clean hydrogen producers, hydrogen consumers, infrastructure provider/operators, and other key stakeholders (e.g., government, Tribal, labor, workforce development, safety codes and standards, financier/investor, environmental justice organizations), as well as contact information and core H2Hub related capabilities of DOE's National Laboratories. Participation by underrepresented groups and workforce organizations, including labor unions, is highly encouraged. H2 Matchmaker includes a Justice40 status designation to indicate participants that may be relevant to the Justice40 Initiative's intent to increase benefits and reduce harm.

H2 Matchmaker will be regularly updated to reflect new teaming partners who provide their organization's information. Any organization that would like to be included in H2 Matchmaker is encouraged to fill out the H2 Matchmaker Self-Identification form available at https://www.energy.gov/eere/fuelcells/h2-matchmaker.

A similar tool is available for carbon abatement infrastructure. CO2 Matchmaker[22] is a voluntary online self-identification tool with an online map showing existing and planned carbon capture, utilization, removal, transport, and storage infrastructure.

B. Topic Area Description

i. H2Hub Definition

DOE is soliciting applications for H2Hubs that will form the foundation of a national clean hydrogen network that will contribute substantially to decarbonizing multiple sectors of the economy while also enabling regional and community benefits. As mentioned above, matching the scale-up of clean hydrogen production to a growing regional demand is a key pathway to achieving large-scale, commercially viable hydrogen ecosystems. H2Hubs will enable this pathway by demonstrating low-carbon intensity and economically viable hydrogen-based energy ecosystems that can replace existing carbon-intensive processes. This will accelerate the deployment of these technologies, attract greater investments from the private sector, and promote substantial U.S. manufacturing of hydrogen related technologies.

[21] https://www.energy.gov/eere/fuelcells/h2-matchmaker
[22] https://www.energy.gov/fecm/carbon-matchmaker

DOE requires that each H2Hub will be led by a single entity (prime applicant) and envisions that each H2Hub will likely include multiple partners that will bring together diverse technologies producing, transporting, and utilizing large amounts of hydrogen in different ways. See Section III.A for information about eligible applicants. Each H2Hub should focus on commercial-scale demonstrations of clean hydrogen that include production, delivery, storage, and end-uses in a specific geographic region (e.g., metropolitan area, state, or several states in close proximity) within the U.S. Each H2Hub should demonstrate balanced hydrogen supply and demand, connective infrastructure, and achieve continuous financial and operational viability during the award and sustained viability beyond DOE funding. In addition, each H2Hub will quantitively estimate and measure societal impacts including community benefits as well as life cycle environmental impacts of the H2Hub technologies on the region. H2Hubs should include substantial engagement of local and regional stakeholders to ensure that they generate local, regional, and national benefits.

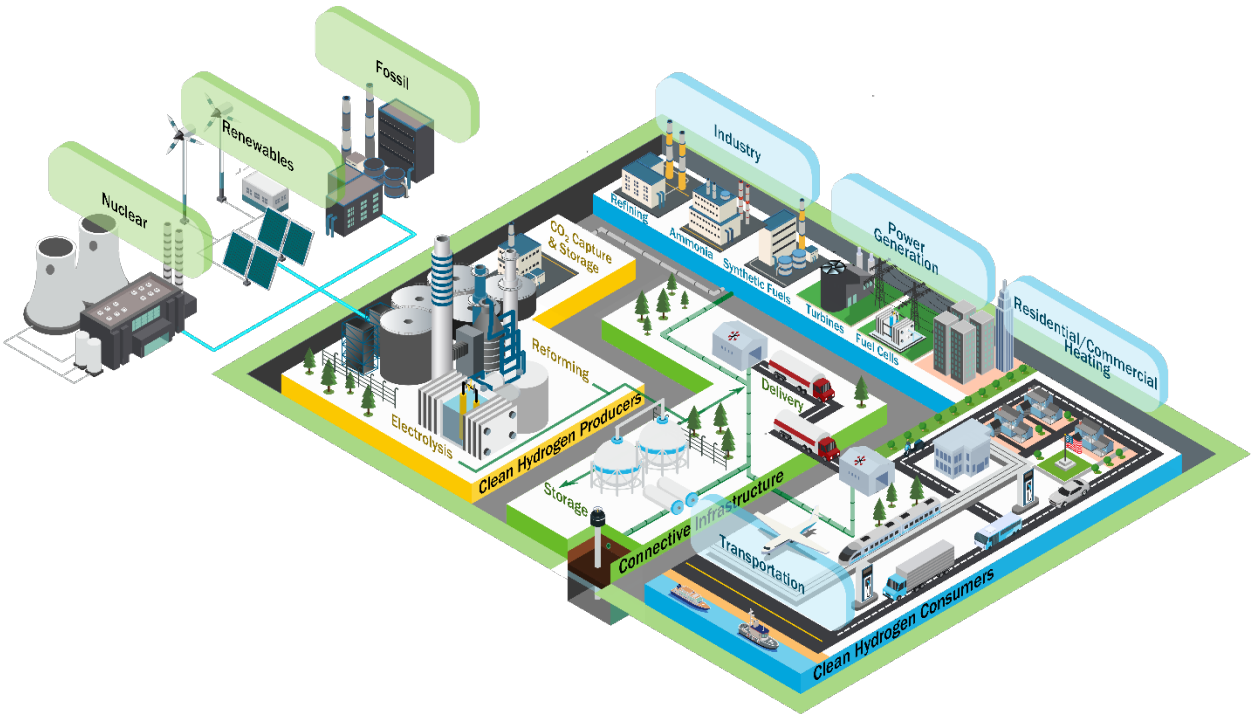

Figure 2. H2Hubs vision, showing the potential for different clean hydrogen production methods (using renewables, nuclear energy, fossil fuels with CCS), end-uses (industry, power generation, residential/commercial heating, and transportation), and necessary connective infrastructure all in close proximity.

Figure 2 illustrates a conceptual vision of potential H2Hub components, where the H2Hub is defined as a network of clean hydrogen producers, balanced with clean hydrogen consumers, and connective infrastructure located in a specific region. The schematic depicts multiple resources and end-uses across sectors for illustrative purposes; it is recognized that not all components may be present within a given H2Hub. These hydrogen ecosystems will rely on one or more clean energy resources (e.g., solar, wind, and/or other renewables; nuclear; fossil

sources with CCS) to produce clean hydrogen that is stored and delivered to one or more clean hydrogen consumers in sectors such as transportation, industry, power generation, or residential/commercial heating. Delivery and storage infrastructure will be critical to ensure connectivity between H2Hub production and end-use technologies. To maximize the impact of available funding, each H2Hub, to the extent possible, should utilize energy resources prevalent in its region and leverage existing facilities and infrastructure for hydrogen production, storage, delivery, and end-uses.[23] In addition, H2Hubs that source domestic resources and components will be considered favorably. The H2Hub scope and funding should be focused on technologies within the three areas outlined in Figure 2: clean hydrogen producers, connective infrastructure, and clean hydrogen consumers. The allocation of funds for activities outside of these areas, such as the construction of renewable, nuclear, or fossil facilities needed to power H2Hub technologies is generally not allowable but may be considered in limited scenarios if strong justification is provided and the proposed funding amounts for these activities represent a minor component of the overall H2Hub funding.

The sections below outline the various potential technologies that H2Hubs may include in more detail.

Hydrogen Production

To ensure regional impact and scale, DOE expects that hydrogen production technologies integrated into H2Hubs will be capable of producing impactful, commercial-scale quantities of clean hydrogen at a rate of **at least 50-100 metric tons (MT) per day,**[24] and in-line with each applicant's proposed project budget. H2Hubs that request higher funding levels are expected to include higher hydrogen production rates. While feedstock sources or hardware may affect the upper limit of how much hydrogen can realistically be produced as part of a H2Hub, H2Hubs that produce larger quantities of clean hydrogen (exceeding this minimum requirement) will be considered favorably by DOE. In rare circumstances, DOE will consider smaller H2Hubs that may have hydrogen demand, geographic, or other size limitations preventing them from reaching the minimum production rate, but applications must provide significant justification. Each H2Hub should leverage regional resources as appropriate, including water, renewable energy (e.g., solar, wind, biomass), nuclear energy, and fossil fuels with CCS. H2Hubs may feature hydrogen produced using more than one energy resource.

Consistent with statutory direction, H2Hubs must ***demonstrably aid achievement*** of, but do not necessarily need to meet, the clean hydrogen production standard.[25] Various provisions in the

[23] Applicants should consider the current and potential harmful/negative impacts associated with existing infrastructure. Retrofits/upgrades to existing infrastructure that may reduce harmful impacts of existing/legacy infrastructure should also be considered along with community input.
[24] Designed nameplate capacity
[25] The clean hydrogen production standard (CHPS) is currently under development, per 42 U.S.C. § 16166(a). Applicants will be evaluated on the degree to which they reduce emissions across the full life cycle, and not necessarily based on whether they achieve the CHPS target.

Hydrogen title of EPAct 2005, as amended by the BIL, describe the standard as one to orient towards but not necessarily achieve in the near term. However, DOE expects H2Hubs to employ state-of-the-art technologies and best practices to mitigate emissions (GHG and criteria pollutants[26]) throughout the H2Hub. The proposed H2Hubs will be ***evaluated by the degree to which they reduce emissions*** across the full life cycle. To quantify emission reductions, H2Hubs will be required to conduct a detailed life cycle analysis (LCA) to determine the carbon intensity of all elements over the lifetime of the H2Hub (see emissions and resource consumption LCA portion of Section I.B.iii). This and other FOA requirements, including merit review criteria and program policy factors (see Section V – Application Review Information), have been developed to ensure that any H2Hub selected by DOE for award will demonstrably aid achievement of the clean hydrogen production standard.

As stated above, the BIL requires that, to the maximum extent practicable, at least one H2Hub demonstrate the production of clean hydrogen from fossil fuels, one H2Hub from renewable energy, and one H2Hub from nuclear energy.[27] Hydrogen production technologies of particular interest include proven technologies that are commercially and economically viable at scale. Some examples include, but are not limited to:

- Electrolysis with clean energy (e.g., renewables, nuclear)
- Thermal conversion processes[28] (e.g., fossil fuel, waste, and/or biomass,[29] reforming, or gasification with integrated CCS technologies; methane pyrolysis to produce a value-add carbon co-product)
- Technologies that produce hydrogen as a by-product, such as from industrial processes or polygeneration (e.g., using high-temperature fuel cells that can co-produce hydrogen, heat, and power; electrolysis of alkanes; co-electrolysis)
- Other advanced pathways that are commercially, technically, and economically viable at scale

Connective Infrastructure (Hydrogen Delivery and Storage)

H2Hubs must include all connective infrastructure for hydrogen delivery and storage with sufficient capacity to reliably bridge any supply gaps between hydrogen production and consumption. If applicable, H2Hubs must also include infrastructure for carbon capture, storage, and distribution with thermal conversion processes that are used for the production of

[26] https://www.epa.gov/criteria-air-pollutants
[27] 42 U.S.C. § 16161a(c)(3)
[28] Applications that propose building new traditional thermal conversion plants will not be funded. However, proposals for building thermal conversion plants utilizing novel technologies are acceptable.
[29] For the definition of biomass, see EPAct 2005, § 932, codified at 42 U.S.C. § 16232.

clean hydrogen.[30] Leveraging existing or repurposed infrastructure, such as CO_2 pipelines, sequestration facilities, and hydrogen infrastructure to the greatest extent possible is highly encouraged. These infrastructure elements may include, but are not limited to:

- Development of new pipelines or the utilization (including upgrading) of existing pipeline networks and/or right of ways for hydrogen distribution, and/or if applicable, carbon dioxide distribution
- Construction of new hydrogen refueling stations or integrated networks of stations, with supporting delivery and dispensing infrastructure
- Hydrogen compression and/or liquefaction technologies at scales relevant to the end-uses of interest
- Hydrogen storage systems, including bulk liquid, gaseous, materials-based technologies, or subsurface options (e.g., salt caverns, depleted oil and gas fields, engineered formations)
- Carbon dioxide capture and storage, if applicable

It will be imperative for H2Hubs to mitigate any hydrogen losses from an economical, safety, and environmental impact perspective. Delivery and storage infrastructure should be designed to minimize releases, leaks, and fugitive emissions. Any emissions or criteria pollutants associated with transport, delivery, and distribution will factor into the LCA of the H2Hub.

DOE is actively developing sensor technologies to detect and quantify hydrogen leaks at a parts per billion level. As these sensors become commercially available in the coming years, DOE may require H2Hubs to install both indoor and outdoor sensors to ensure monitoring, data collection, and risk mitigation related to hydrogen losses.

Hydrogen End-Uses

DOE envisions H2Hubs will include various end-uses for hydrogen in multiple sectors that align with existing or anticipated regional demand; however, one end-use may be dominant and DOE is placing no minimum or maximum on the number or scale of end-users that must be part of an application. Existing end-users of hydrogen are eligible to participate in H2Hubs, especially where utilizing clean hydrogen has significant decarbonization potential. Domestic end-users of hydrogen are strongly preferred and in general, H2Hubs should include sufficient end-users to consume the hydrogen produced (i.e., balanced supply and demand).

[30] Federal funding is available for carbon capture (42 U.S.C. § 16292), carbon storage (42 U.S.C § 16293), and carbon dioxide pipelines (42 U.S.C. § 16293(e) and 42 U.S.C. chapter 149 subchapter IX part J). Applicants may apply for multiple sources of federal funding; however, federal financing cannot be leveraged by applicants to provide the required H2Hub cost share or to otherwise support the same scope that is proposed for a H2Hub project.

End-use applications for hydrogen may include, but are not limited to, those in the following sectors (as stated above, the BIL requires, to the maximum extent practicable, at least one H2Hub demonstrate end-uses in each of these sectors):

- Electric power generation (e.g., grid energy storage, backup power, distributed generation, combined heat and power, hydrogen blending)
- Industrial (e.g., iron refining/steelmaking, ammonia production, synthetic fuel production, chemical processes, fuel refining,[31] biorefining, process heat, hydrogen blending)
- Residential and commercial heating (e.g., district heating, hydrogen blending)
- Transportation (e.g., on-road and off-road fuel cell vehicles, marine, rail, aviation, cargo handling)

Utilization of all hydrogen within the H2Hub region is strongly preferred; however, to ensure balanced hydrogen supply and demand, applicants may propose exporting a portion of the hydrogen to end-users outside of the H2Hub, both domestic and international. Any emissions or criteria pollutants associated with hydrogen consumption or export will factor into the LCA of the H2Hub. In addition, any costs associated with the export of hydrogen must be factored into the overall economic viability of the H2Hub.

ii. H2Hub Project Overview

Anticipated Funding and Award Details

Under this FOA, DOE envisions selecting six (6) to ten (10) H2Hubs for a combined total of up to $6-7 billion in federal funding, subject to the number, quality, and funding needs of applications received. The remaining $1-2 billion may be reserved for future H2Hub launches or other supporting activities competed through future FOAs or using Other Transaction Authorities.

While DOE prefers a funding range from $500 million to $1 billion for each H2Hub, applications that propose a DOE share as low as $400 million or as high as $1.25 billion will be considered responsive to this FOA. H2Hubs that propose a DOE share between $400 and $500 million should provide significant justification to explain why the project is smaller than the preferred size. These applicants must demonstrate that the proposed H2Hub meets the full vision described above, connecting large-scale clean hydrogen production to end-users in the targeted geographic region. Similarly, H2Hubs that propose a DOE share between $1 and $1.25 billion should provide additional justification to explain why the extra funding over the preferred maximum is critical to realize the goals of the overall effort. See Section II.A.i for more details on estimated funding.

[31] While clean hydrogen used for oil refining will be considered in scope for this FOA, DOE will not provide funding to expand oil refining capacity.

Each H2Hub is required to provide a minimum of 50% non-federal cost share (50% of the total project cost including both DOE share and recipient cost share, for a total project cost of at least $800 million to $2.5 billion), to be executed over approximately 8-12 years (or faster) depending on the size and complexity of the H2Hub. The award period will include the planning, development, and construction of the H2Hub as well as 2-4 years of operations. Cost share may be provided in the form of cash or cash equivalents, or in-kind contributions. Cost share must come from non-federal sources (unless otherwise allowed by law) such as project participants, state or local governments, or other third-party financing. Federal financing, such as DOE Loan Guarantees, cannot be leveraged by applicants to provide the required H2Hub cost share or to otherwise support the same scope that is proposed under a H2Hub. See Section III.B for more information on Cost Sharing. A contingency reserve[32] will also be required for all Phase 3 and 4 activities. More guidance on contingency funding can be found in Section II.A.i.

H2Hubs will adhere to a four-phased structure for managing scope, schedule, deliverables, and budget. Figure 3 below shows an example of the requirements and deliverables for each phase. The items listed under the "Application" phase in Figure 3 are indicative of the type and scope of materials DOE will require applicants to submit for consideration of Phase 1 funding (see Section I.B.iii "H2Hub Application Requirements" below for a thorough discussion of these details). Items listed under Phases 1-4 are indicative of the type and scope of activities applicants should plan to execute in each phase if continued into that phase of funding. These activities will also be further defined during award negotiations and subsequent negotiations between phases. DOE review and evaluation of deliverables reflecting activities in each phase will inform Go/No-Go decisions that occur between and within phases.

[32] See 2 CFR 200.433 Contingency provisions

☆ Initial Application

◇ Go/No-Go Decisions

Application → ☆ Phase 1: Detailed Plan → ◇ Phase 2: Develop, Permit, Finance → ◇ Phase 3: Install, Integrate, Construct → ◇ Phase 4: Ramp-Up & Operate

← $0.4B - $1.25B Total DOE Funding; Non-Federal Cost Share ≥ 50% →

	Pre - DOE funding	Up to $20M DOE Funding, ~12-18 Months	Up to 15% of Total DOE Funding, ~2-3 Years	DOE Funding To Be Negotiated, ~2-4 Years	DOE Funding To Be Negotiated, 2-4 Years
Business Development & Management	Technical Volume • H2Hub Summary • Business Plan (BP), including preliminary site selection • Management Plan (MP) • Financial Plan (FP)	• Market, feedstock, & offtake letters of commitment • Final site selection • Financial model • Updated BP, MP, FP	• Teaming, offtake, & feedstock agreements • Site access secured • Confirmed project financing • Updated BP, MP, FP • Labor agreements	• Regular progress/status reporting for all agreements • Regular financial status reports • Other reporting per terms & conditions (T/Cs) • Updated BP, MP, FP covering Phases 3-4	• Financial model updated with offtake & production data • Revised growth plan & projections • Updated BP, MP, FP covering ramp-up & steady state operations
Engineering, Procurement, Construction, & Operations	• Engineering concept (~5%) • Technology Readiness Level (TRL) descriptions • Integrated Project Schedule (IPS): Full Project - L1; Phase 1 - L2 • Class 4 Total Project Cost (TPC) estimate • Operating & disposition concepts	• Engineering & Design (~30%) & related documents • Performance model • TRL analysis & uncertainties • IPS: Full Project - L2; Phase 2 - L3 • Class 3 TPC estimate	• Engineering & Design (~90%) & related documents • TRL updates • IPS: Full Project - L3 • Class 1 TPC estimate • Standard project management tool in use • Updated Operating Plan • Updated Disposition & Decommissioning (D&D) Plan	• Progress execution reporting • Integrated project completion testing	• Regular operations status reporting • Performance ramp verification & validation (V&V) • Validated performance model • Final TPC accounting
Safety, Security, & Regulatory Requirements	• Safety history/culture description • Permitting workflow overview • Environmental Considerations Summary	• Initial Safety Plans (hydrogen & site; 30% design) • Cybersecurity Plan • Environmental Information Volume	• Execution-ready Safety Plans (hydrogen & site ; 90% design) • Final Cybersecurity Plan • Permits in place for construction • Complete environmental reviews/assessments	• Status reporting on required permits & environmental • Safety & security incident reporting & audits • Permits for operations	• Ongoing permit, safety, & security reporting
Risk Analysis & Mitigation	• Risk Management Plan (RMP) • Risk Register	• RMP, Risk Register updates	• Quantitative risk analysis • RMP, Risk Register updates	• RMP, Risk Register updates • Periodic quantitative updates	• Tech risk updated for operations • Ongoing risk reporting
Technical Data & Analysis	• Preliminary Techno-economic Analysis (TEA) • Preliminary Life Cycle Analysis (LCA)	• Updated TEA • Updated LCA	• Mature LCA • Mature TEA w/ risk analysis • Technical Verification & Validation (V&V) Plan	• Periodic TEA & LCA updates • V&V data collection & analysis	• LCA & TEA incorporating operational data • Ongoing data collection & dissemination
Community Benefits: Job Quality & Equity	Community Benefits Plan (CBP) Initial plan, including: • Community & Labor Engagement • Investing in the American Workforce • Justice40 Initiative • Diversity, Equity, Inclusion, & Accessibility (DEIA)	• Implement Phase 1 scope of CBP • Update CBP for future phases based on activities & lessons learned, including documentation of stakeholder engagement status, workforce development, Justice40 implementation, & documentation of extent of community consent	• Implement Phase 2 scope of CBP • Measure & report on all CBP metrics • Update CBP for future phases based on activities & lessons learned	• Implement Phase 3 scope of CBP • Measure & report on all CBP metrics • Update CBP for future phases based on activities & lessons learned	• Implement Phase 4 scope of CBP • Measure & report on all CBP metrics • Final report including accomplishments, findings, & plans for steady state operations

Figure 3. Summary of activities and outcomes in each phase of H2Hub projects.

Phase 1 – Detailed Project Planning

Phase 1 activities will focus on completing specific details about the overall H2Hub project plan and analysis to refine projections submitted as part of the proposal. These activities should provide assurance to DOE that the overall H2Hub plan is technologically, financially, and legally viable, with buy-in from relevant local and community stakeholders. This could include any plans to develop a skilled labor pool through Workforce and Community Agreements. Teams will complete preliminary engineering, construction, and commercial-scale designs. This will include finalization of a Project Management Plan (PMP), a Risk Management Plan (RMP), an Intellectual Property Management Plan (IPMP), an initial financial model for the entire 4-phase effort, and final site selection for the various technologies to be included in the H2Hub.

The development of the initial H2Hub safety plan should be completed in Phase 1. Teams should be fully engaged with the DOE's National Environmental Policy Act (NEPA) team as they develop environmental and regulatory plans to prepare for permitting and approval processes in Phase 2. Outreach and stakeholder engagement, which should be active prior to the application process, should continue in Phase 1 as the H2Hub site(s) are finalized and community economic and development impacts become clearer. Phase 1 should also include a continuation of analysis activities to refine and update LCA and techno-economic analysis (TEA) data provided in the application.

DOE funding of up to $20 million will be available for Phase 1 for each selected H2Hub project, with a 50% minimum cost share requirement. Applicants should plan approximately 12-18 months for Phase 1, depending on the extent of advanced planning and analysis each team has already completed, and how quickly the awardee can move through the negotiated Go/No-Go requirements to move into Phase 2. DOE anticipates that some H2Hub teams will have already performed extensive analysis, planning, design, and community engagement as required in Phase 1, and therefore some H2Hub projects may advance to Phase 2 in under 12 months.

Phase 2 – Project Development, Permitting, and Financing

Phase 2 encompasses advanced planning activities. H2Hubs will finalize their project development plans, commercial agreements, financial structure, and complete the necessary permitting and approval activities required to begin construction of the H2Hub. By the end of Phase 2, engineering designs should be sufficiently mature to support completion and execution of relevant procurement or construction contracts and overall commencement of major project execution tasks. Long-lead procurement activities may be started in Phase 2 with prior DOE approval. Third-party financing agreements should be completed and relevant hydrogen offtake or feedstock agreements in place. Risk management plans should be revised and updated to reflect progress made and risks mitigated as well as new or emerging risks and corresponding management plans.

By the completion of Phase 2, safety and security plans should be finalized and execution ready. All necessary permits and approvals should be in place to prepare for construction, including completion of required NEPA reviews. Final pre-implementation LCA and TEA activities should be completed to DOE expectations and corresponding verification and validation (V&V) plans should be in place. Community and labor engagement should have progressed towards a comprehensive Community Benefits Plan that reflects community input and implementation experience to date and sets the stage for ongoing engagement. Community impact targets should be finalized and tracking plans should be in place to monitor economic and social impacts of the H2Hubs as they progress to implementation.

Up to 15% of the total DOE funding for the H2Hub will be available for Phase 2 activities, with a 50% minimum cost share requirement. DOE expects that Phase 2 activities will take up to 2 to 3 years but could be shorter depending on how advanced the H2Hub's analysis, planning, design, and community engagement activities are to this point and if the H2Hub is able to complete all the required deliverables.

Evidence of a contingency reserve is required prior to beginning Phase 3 activities. More guidance on contingency funding can be found in Section II.A.i.

Phase 3 – Installation, Integration, and Construction

Phase 3 activities will focus on implementation. DOE expects this phase to be the longest in duration and the most cost intensive. H2Hubs will employ industry standard project management tools and will be required to provide regular status updates and reports. Plans developed in the preceding phases will be revised and updated as appropriate to reflect actual performance. Previously and newly developed risks will be tracked, actively managed, and regularly reported to DOE. Reporting frequencies and content requirements will be unique to each H2Hub and negotiated prior to Phase 3 commencement.

While H2Hub teams will manage implementation, DOE will closely monitor progress and evaluate it against the plans developed through Phase 2. DOE and/or its third-party representatives will visit the site(s) regularly to verify progress and collect data, consistent with the established reporting requirements and substantial involvement (see Section VI.B.x "Statement of Substantial Involvement").

Phase 3 may look significantly different for each H2Hub as there will be varying amounts of construction and retrofitting within each H2Hub. As a result, DOE has not defined a funding range for Phase 3 activities but will require at least a 50% cost share contribution as well as a contingency reserve. Applicants should propose a funding level that is appropriate for the scale of the H2Hub technologies and infrastructure being installed and constructed. DOE expects that Phase 3 activities may take approximately 2 to 4 years, but applicants may propose shorter or longer lengths as long as the overall H2Hub project length is no longer than 12 years.

Phase 4 – Ramp-Up and Sustained Operations

In Phase 4, H2Hubs will transition to operations. Phase 4 will commence with completion of H2Hub-specific criteria, such as mechanical completion or production capacity demonstration, which will be negotiated in prior phases. Phase 4 activities will then focus on integrated system performance and ramp-up. By the end of Phase 4, each H2Hub will have demonstrated full commercial-scale design operations over an extended period. DOE expects that Phase 4 activities may take approximately 2 to 4 years but may extend longer depending on H2Hub-specific characteristics, including factors such as the rate of production ramp-up.

To meet a key OCED objective that DOE-funded commercial demonstration projects catalyze follow-on private sector investments as well as Justice40 goals, Phase 4 will also include substantial financial, socio-economic, environmental, and operational data collection and reporting to DOE. To the extent practicable while protecting sensitive and proprietary information, DOE will synthesize, anonymize, or otherwise incorporate site and operations data for the H2Hubs into quantitative and qualitative analyses that can be promulgated to external stakeholders for the purpose of informing future private sector investment decisions.

As with Phase 3, DOE will not define a funding range for Phase 4 activities, but at least 50% cost share will be required. Applicants should propose a funding level that is appropriate for the scale of the H2Hub ramp-up and initial operation using DOE funding. Similar to Phase 3, contingency funding will also be required for Phase 4. Applicants are also encouraged to review the regulations regarding Program Income and be aware of the ways in which Program Income can be treated during the award. For more information regarding Program Income, please see Section III.B.

Transitions between Phases

While this FOA is soliciting plans for all 4 phases of H2Hub projects, DOE will only initially commit to funding Phase 1 activities. Additional funding for subsequent phases will require successful completion of a Go/No-Go review at the end of each phase. Specific Go/No-Go criteria will be negotiated with each selected H2Hub project for transitions between each phase. This may include a requirement to submit a standardized set of data to provide quantitative and qualitative insight on metrics spanning the technological, economic, market, workforce, Justice40 goals, and other components of the H2Hub's analysis activities. DOE may also require the negotiation of additional Go/No-Go decision points within phases (i.e., phases may include one or more budget periods with Go/No-Go points at the end of each budget period). Applicants should propose quantitative Go/No-Go criteria for each budget period as part of the Workplan.

If DOE determines that a H2Hub is making insufficient progress, additional scrutiny and oversight by DOE or its representatives may be employed, and corrective measures negotiated. **H2Hubs (or portions of a H2Hub) may be discontinued at any of the Go/No-Go decision points**

if the Go/No-Go criteria, project, and/or program requirements are not met. See Section VI.B.xv for more information about Go/No-Go reviews.

Specific project structure details for each awardee will be negotiated on a project-by-project basis to produce the best possible balance between project outcomes and DOE risk exposure. Examples of factors that may be considered as part of such negotiations include project and risk management processes, team capabilities, cost share amounts, financial contingencies, and engagement of independent monitors such as an Independent Engineers and/or Community Benefits Plan consultants representing DOE interests. DOE will require unfettered access to project performance and financial data necessary to track progress against a project baseline (or similar). As these projects are new commercial deployments, to the greatest extent possible, project progress and information will be shared with interested stakeholders.

If funded through all four phases, DOE expects that the H2Hubs will reach technical and commercial viability under this FOA and will continue to operate beyond the financial assistance project period (well beyond DOE funding). Achieving DOE's broad end goals will necessitate review and evaluation of proposed project characteristics that include cost, schedule, and scope; technology; business; market; financial; management; community support or other factors throughout the project to validate assumptions made for determining commercial viability. The phased approach is designed to guide projects through the project development process incrementally. Each subsequent phase is structured to ensure that each H2Hub meets a standard level of maturity, employs a robust execution approach, and that technical and non-technical project risks are adequately and appropriately managed throughout DOE's award.

As the H2Hubs are expected to continue as self-sustaining entities operating fully independent of federal funds, DOE may also request financial sustainability plans or long-term disposition and decommissioning plans as part of future decision points. This may include proposed sources of funding/revenue and the business model which will support the H2Hub beyond the DOE award. This may also include an estimate of profit and loss demonstrating how the H2Hub will maintain financial self-sufficiency and strategies to grow beyond the initial H2Hub and/or to coordinate or connect with other regional H2Hubs to develop a national clean hydrogen network.

iii. H2Hub Application Requirements

Applications should describe the overall long-term vision and strategy for the H2Hub, detailed plans for Phase 1 activities, and higher-level plans for Phase 2 through 4 activities along with planned partnerships and financing strategies/commitments. Applicants should thoroughly describe the rationale for the preliminary H2Hub site locations, system designs, market potential, and commercial viability for hydrogen and other products. DOE understands that some applicants will be unable to initially provide a complete, detailed plan for all activities beyond Phase 1 and that certain partnering agreements and financing details will emerge

during the early phases. The following sections contain thorough details of application requirements and deliverables. The application process will include two phases: a Concept Paper phase and a Full Application phase. **Only applicants who have submitted an eligible Concept Paper will be eligible to submit a Full Application.** See FOA Section IV.C.i (Concept Paper Content Requirements) and IV.D (Content and Form and of the Full Application) for more information.

The information, data, and project cost (financial plan, technoeconomic analysis, and budget justification) presented in each section of the application should be consistent with the overall Workplan,[33] as well as with information provided in response to requirements described in other sections of the FOA.

Business Development and Management

All applications should include a summary of the H2Hub and three plans as part of the Business Development and Management technical volume:

- H2Hub Summary
- Business Plan
- Management Plan
- Financial Plan

Necessary elements that should be included in the H2Hub summary and each plan are detailed below. As described in the H2Hub Project Overview section above, the H2Hub's level of development and level of detail within these plans will evolve over the four phases as detailed in Figure 3.

H2Hub Summary
This summary should describe the overall team, scope, and objectives of the H2Hub. The applicant should explain the impact of DOE funding and how the DOE funding, relative to prior, current, or anticipated funding from other public and private sources, is necessary to achieve the H2Hub objectives. The applicant should also discuss how, if successful, the H2Hub will unlock follow-on funding from the private sector to build out a national clean hydrogen network.

Additionally, the applicant should explain the geographic region and preliminary site(s) selected, feedstocks used, hydrogen production pathways, connective infrastructure, hydrogen end-uses, and the balance of hydrogen supply and demand. The summary should include the rationale for the hydrogen end-uses and how they will complement other decarbonization

[33] A detailed Workplan should be submitted as part of the Technical Volume of the application. This will include a summary of the project objectives, scope, and schedule, as well as proposed milestones and Go/No-Go decision points. Refer to Section IV.D.ii for more information.

solutions. This section should also include a high-level schedule for executing on the H2Hub (Phases 1-4).

Applicants are encouraged to include a summary schematic (e.g., Process Flow Diagram) that depicts the H2Hub and a high-level Gantt Chart for the schedule. Note that the Gantt Chart should be consistent with the Integrated Project Schedule discussed in the Engineering, Procurement, Construction & Operations section below.

Business Plan

The business plan should include key success metrics and high-level milestones to be completed during each phase (Figure 3), such as signing key contracts and agreements, securing permits, completing NEPA reviews, executing financial close, commencing site preparation and construction, achieving commercial operations (i.e., near or full design capacity), and evaluating/analyzing markets for hydrogen and other products. It should also address the items listed below and any other pertinent information to understand the H2Hub business plans. The information presented in the Business Plan should be consistent with the overall Workplan.

Commercial Feasibility: The plan should describe the commercial feasibility of the proposed technologies and related infrastructure and how the applicant intends to employ such technologies and related infrastructure in the H2Hub. The applicant should describe how the proposed H2Hub would advance a national clean hydrogen network by replicating or further commercializing technologies and related infrastructure in the United States.

Key Contracts, Permits, and Agreements: The plan should provide a top-level description, schedule, and status, of all critical path contracts and agreements relevant to the H2Hub, encompassing permits, NEPA, design, engineering, technology licensing, financing, construction, startup, commissioning, shakedown, operation, and maintenance of the H2Hub.

Preliminary Site Selection: The plan should describe the rationale for selection of the H2Hub site(s) and contain evidence of control over the H2Hub site(s) or the plan to establish control over the H2Hub site(s). As stated above, H2Hubs are encouraged to leverage and repurpose/retrofit existing facilities and infrastructure to the greatest extent possible to minimize environmental impacts. In addition, site selection should consider regional specific resources, supply chains, as well as climate and physical risks (e.g., fire, flood) to ensure resilience/sustainability of the H2Hub.

Market Analysis: The plan should include an analysis of the current and projected markets for 1) the H2Hub's feedstock(s) (e.g., biomass, natural gas, nuclear energy, renewable energy, water); 2) hydrogen and other products; and 3) sales. The analysis should discuss the prevailing economic and demographic trends in the target market(s), both on a macroeconomic basis and for the H2Hub's feedstock(s) and product(s). It should identify the market dependencies on tax benefits or other government policies and incentives. The analysis should also describe the H2Hub's projected customer base and feedstock suppliers (availability and capacity) including

storage and transportation related requirements. The applicant should provide a justification for revenue and cost projections (price and volume) and include a plan for marketing the H2Hub's products. The application should also include current and potential competitors for the H2Hub's products and provide a detailed description of any competitive advantages.

Feedstock, Supplies, and Offtake Arrangements: The plan should provide a detailed description of plans for ensuring an adequate supply of feedstock and other major raw materials or supplies, as needed for successful operation of the H2Hub. If available, the applicant should provide letters of commitment or term sheets (including power purchase agreements) for prospective feedstocks and other suppliers. The applicant should also provide letters of commitment or term sheets from prospective customers and/or offtakers, if available. The letters of commitment should be submitted in a separate attachment in OCED Exchange (see Section IV.D.vii "Letters of Commitment" for more information).

Growth Plan: The plan should describe the potential for expanding the proposed H2Hub beyond the award performance period. The plan should also discuss how the proposed H2Hub will achieve market liftoff and contribute to building out a national clean hydrogen network, including the ability to attract follow-on private sector investments beyond the award performance period.

Management Plan

This plan should describe 1) the prime applicant's and project partners' organizational structure, capabilities, and operations plan; 2) the financial strength of the prime recipient and any major project partners in the H2Hub; and 3) prior experience of the senior/key personnel in similar or related undertakings to the proposed H2Hub. Senior/key personnel includes the H2Hub leadership/management team and other project personnel who contribute in a substantive, meaningful way to the successful execution of the H2Hub (e.g., H2Hub Program/Project Manager).

Organizational Structure: As part of the management plan, the applicant should provide an organizational chart of key entities and senior/key personnel for the H2Hub. The organizational chart and related description should show the prime recipient and any major project partners, subsidiaries, affiliates, parent organizations, or joint ventures associated with the H2Hub as well as an explanation of the legal structure (e.g., corporation, partnership, LLC). The application should describe the prime recipient and any major project partners' business relationship(s) and the various roles and responsibilities held by each organization. The applicant should also identify any foreign owned entities involved in the H2Hub and how the applicant will request a waiver, if needed, per Section III.A.ii. Applicants must also certify the domestic entity status of the proposed prime recipient and all subrecipient(s) in accordance with definitions in Section III.A.i of the FOA on the cover page of the Technical Volume (see Section IV.D.ii and Appendix I).

Management: The applicant should provide a description of the management and operations strategies to be employed in executing on the H2Hub activities. The application should list the

names of senior/key personnel as well as their positions or titles and the percentage of their time dedicated to executing on the H2Hub. If any key management and staff are not expected to spend 100 percent of their time executing on the H2Hub, the plan should provide a brief description of their other responsibilities or other activities outside of the H2Hub.

Experience: The plan should describe in detail the unique capabilities and expertise of the prime recipient and any major project partners or subrecipients, debt or equity sponsors, contractors/vendors (if known), and every other counterparty that the prime recipient believes will enable the H2Hub to be successful. In addition, the plan should summarize the prior experience of the prime recipient and any major project partners in similar undertakings to the proposed H2Hub (in both technical scope and financial size) and current or previous energy infrastructure projects. The plan should describe the following:

- Examples of at least two projects in the energy infrastructure sector similar in nature and scope to the H2Hub being proposed that have been completed (developed, financed, and managed construction) by the applicant or project partners.
- Examples of at least two projects in the energy infrastructure sector for which the applicant or project partners were responsible for managing the operations and maintenance of a similar project for a minimum of two years. Note, each project example must be a project for which construction has been completed. Applicants that are not able to include examples of two projects in their description of current and previous experience in the energy infrastructure sector should provide a detailed description of the facts that they believe are sufficient to demonstrate to DOE that they have the expertise that would be evidenced in current or previous experience in the energy infrastructure sector by including examples of two projects.
- Examples of at least two energy infrastructure projects where the applicant or project partners engaged and collaborated with a disadvantaged community to develop, finance, and manage construction (if available).

Pending Investigations: The plan should provide a summary of any pending or threatened (in writing) action, suit, proceeding, or investigation, including any action or proceeding by or before any governmental authority, that relates to the H2Hub senior/key personnel, and the status of any appeals.

Financial Plan

The plan should provide a description of the following elements for the proposed H2Hub:

- The preliminary funding plan including the total amount for:
  - Funding for project development in Phases 1 and 2,
  - Funding for Phase 3 including medium-term financing for machinery and equipment, and longer-term financing for the site and facility including sources and uses, and
  - Any required funding beyond internal cash flow including working capital financing in Phase 4;

- Plan and schedule to achieving long-term financial viability, beyond DOE and other federal funding;
- The amount of expected traditional equity investments (identify participants and level of participation, if applicable);
- The timing of expected equity contributions and/or debt funding;
- The timing of repayment of expected debt funding;
- If debt is contemplated, provide a plan for managing potential interest rate risk and default risk;
- If tax equity or other non-traditional equity investments are contemplated, highlight any structural requirements that might arise from such investments; and
- As described in Section II.A.i., contingency funding including the source should also be detailed in the financial plan.

Prime Applicant and Project Partners: In line with the Organization Structure in the Management Plan section, the application should describe the financial relationship of the prime recipient to major project partners, including any Foreign Owned Entities,[34] who are contributing cost share and/or performing work. It should include a table that identifies the name of the organization or entity that are expected to contribute debt or equity financing and any person, organization, or entity who owns or will own five percent (5%) or more of the H2Hub. The plan should indicate the prime recipient, project partners, and other debt or equity contributors by listing the organization or entity name, website address, mailing address, city and state, and postal code.

Financial Strength: The plan should describe the prime recipient's and major project partner's financial strengths, as well as the H2Hub's strategic significance to the prime recipient and major project partner involved.

Other Federal Support: Federal financing, such as grants or loan guarantees from federal agencies, cannot be leveraged by applicants to provide the required H2Hub cost share or to otherwise support the same scope of the H2Hub. However, other federal support may be used for activities that fall outside of the H2Hub scope/budget. The financial plan should identify whether the H2Hub will benefit directly or indirectly from other forms of federal support, such as grants, loan guarantees, tax credits, having federal agencies or entities as a customer or offtaker of the H2Hub's products or services, or other federal contracts, including acquisitions, leases, and other arrangements, that may indirectly support the H2Hub.

Non-Federal Support: The plan should identify other non-federal governmental (including state or local) incentives or other assistance on which the proposed H2Hub relies, including grants, tax credits and loan guarantees to support the financing, construction, and operation of the

[34] Foreign investment in projects may be subject to Committee on Foreign Investment in the United States (CFIUS) review: https://home.treasury.gov/policy-issues/international/the-committee-on-foreign-investment-in-the-united-states-cfius

H2Hub. It should indicate the terms of such support which could result in termination or reduction of anticipated/actual non-Federal support, and whether any such incentives or assistance are subject to clawback and the circumstances under which a clawback could occur.

Engineering, Procurement, Construction, and Operations

Applications should include initial versions of Engineering, Procurement, Construction and Operations (EPC&O) project documents described in the subsections below. These documents should meet a minimum level of maturity, as described below, but may be more advanced. During each phase, selected projects will further develop this set of documents. Within phases, H2Hubs will report on execution status and progress to DOE and its third-party representatives.

Applicants will be required to provide estimated values of key parameters that influence project performance and financial viability, including but not limited to capital costs, tax credits, operating costs, and revenue streams. The H2Hubs will provide revised data of increasing fidelity based on the best information available at the time. In Phase 4, DOE will require the H2Hubs to provide detailed operational, environmental, and financial data for technology and business case validation, along with other data such as socio-economic data for Justice40 goals. DOE will specify additional details for H2Hub performance validation upon successful completion of Phase 3.

The EPC&O category of requirements focuses on the project development process. Data, information, and related documents will cover (1) technology, (2) performance projections, (3) engineering, design, and procurement (4) cost estimates, (5) execution schedules, and (6) operating and disposition plans.

Technology

As part of the application and throughout the award, the H2Hub will assess and evaluate the project's technology maturity or readiness, including level of system integration and infrastructure, which DOE will in turn verify and validate. This assessment will form DOE's technical risk analysis basis. DOE expects the H2Hubs to actively manage outstanding technology risks, including those driven by technology maturation, level of system integration, and infrastructure needs.

H2Hub applications must include a conceptual engineering design that is reasonably achievable and a technology development and integration plan that reaches a technology readiness level (TRL) 8 or higher by the completion of Phase 4. Definitions of TRLs can be found in Appendix B. Through the course of the four phases, H2Hubs will be expected to develop their concept and strategy into full-fledged and executable designs and execution plans. As such, applicants are encouraged to focus on integrated system technologies that have completed TRL 6 or higher. While DOE may consider individual components with lower TRLs, they will be considered higher risk deployments and will require corresponding mitigations which may require development

activities outside of the H2Hub scope and funding. H2Hub award funding may not be used for pilot-scale or earlier activities, such as research and development.

Each application will be required to contain a technology plan that includes the following:

- Description of all non-commercial technologies and any key commercial technologies to be employed in the project, including existing equipment, facilities, and infrastructure;
- Description of and path to secure required intellectual property rights;
- Assessment of the integrated system and component level TRLs;
- Detailed analysis used to justify TRLs and commercial status if relevant;
- Description of all technology maturation needs and corresponding maturation plans, described by phase; and
- Description of technology-based risks and how they will be managed.

While DOE is not requiring its use, applicants are encouraged to review DOE's Technology Readiness Assessment Guide.[35] Applicants should ensure technology descriptions, TRL assessments, maturation needs, technical risks, and supporting analyses described in this section correspond to the proposed H2Hub's conceptual design plans, project schedules, and analyses required under the Technical Data and Analysis section below.

H2Hubs selected for award will be expected to execute the technology maturation and technical risk management plans described in the application. Analyses and documents included in the Technology section of the application will be updated and revised as needed through each phase. Quantitative and qualitative analysis of remaining risks will inform subsequent phase negotiations including for contingency, budget, and cost share. DOE will assess progress made as part of the Go/No-Go decision points. Adequate progress made in technology maturation and risk management activities, as well as an overall acceptable technology risk exposure will be required for projects to advance through phases.

Performance Projections

Understanding performance assumptions, risks, uncertainties, and variabilities is critical for individual H2Hub viability as well as the broader clean hydrogen market. Proposals should include detailed information about performance projections and supporting information. These projections should correspond to data, information, and assumptions provided in response to requirements described in the Business Development and Management as well as the Technical Data and Analysis sections of this FOA. If not already available, applicants must develop a detailed performance model in Phase 1.

H2Hubs will be required to demonstrate at least 50-100 MT per day[24] of clean hydrogen production. Applications should also include metrics and milestones necessary to deliver clean

[35] *Technology Readiness Assessment Guide,* DOE G 413.3-4A: https://www.directives.doe.gov/directives-documents/400-series/0413.3-EGuide-04-admchg1

hydrogen at the proposed amounts and demonstrate the H2Hub's targeted use-cases. The application should also discuss the potential to scale-up or expand the H2Hub in the future beyond what is proposed under the DOE award. The overarching performance goal of all H2Hubs is to ultimately demonstrate long-term financial viability by the time the DOE funding has ended, thereby spurring market uptake.

Engineering, Design, and Procurement

Engineering, design, and procurement information should be provided as part of the H2Hubs application. DOE expects applications will reflect a spectrum of project maturities. At a minimum, the applications should include a comprehensive conceptual design that reflects initial engineering studies such as pre-FEED or FEED (Front End Engineering Design) studies. It is expected that engineering and design should be at least ~5% complete at the application stage. Conceptual designs should be consistent with information provided in response to requirements described in other sections of the application.

Engineering information submitted with the application should provide a conceptual description of the type of technology, system integration, and connective infrastructure needed in each step along the pathway from feedstocks through production of clean hydrogen and end-use. Key facilities, systems, and technically complex components should be described in detail. Where applicable, proposals should also cite prior successful utilization of the proposed technologies, systems, and infrastructure in like environments at the pilot scale as a minimum.

To the extent information is available, applications should include a detailed description of the H2Hub infrastructure in terms of major subsystems and their interconnection(s) and a description of how the H2Hub is intended to operate. If available, high-level schematic, technical specifications, equipment supplier and vendor information for all technologies, systems, and connective infrastructure should be included in the application. The applicant should also describe the mass and energy balance of any major supply chain elements or unit operations, relevant system capacities, and projected availabilities.

If available, equipment descriptions should include consideration of how equipment would be used dynamically within the system. The applicant should describe how the system design will address relevant needs for energy buffering, storage of or buffering for hydrogen and any intermediary, input, or waste products. Needs for and plans to balance variable supply and demand signals, as well as resiliency aspects necessary to handle maintenance outages and external system shocks should also be described.

Applications should include the following:

- High-level schematic of interconnection of major equipment including storage and connective infrastructure.[36]

[36] This schematic may build off the high-level schematic, if provided in response to the Business Development & Management section requirements but should be expanded to include technical information.

- Nameplate capacities (e.g., MW [power generators], MWh [storage], kg [storage], metric ton/day [production])
- Major equipment efficiency or energy use rate specifications

Engineering designs will evolve and be revised in the early phases of the project and will be monitored and reviewed as part of Go/No-Go decisions between phases.

Applications should include a description of the proposed procurement plan in accordance with 2 CFR 200.317-327 as available including, but not limited to, the following:

- Long lead items and critical process equipment, storage, and connective infrastructure;
- Potential or planned major equipment providers;
- Procurement timelines and/or critical path procurements; and
- Third-party contracting plans.

The application should also describe the H2Hub's strategy to leverage existing U.S. manufacturing and supply chains and support the growth of these domestic capabilities in keeping with U.S. job creation and the Buy America goals of the BIL and related executive orders. In particular, applications should clearly identify any known supply chain risks and plans for timely procurement of supplies from underdeveloped supply chains. See Section IV.J.vi and Appendix F for information on Buy America requirements.

Cost Estimates

Applicants will be expected to develop detailed cost estimates that meet industry standards for the size and complexity of the proposed H2Hub. Cost estimates should be consistent with other financial data and analysis provided as part of the application, such as those elements described in the Business Development and Management and Technical Data and Analysis sections of the FOA. DOE expects that H2Hubs will employ industry standard cost estimating methodologies and tools. Cost estimates should correspond to the H2Hub design maturity and reflect appropriate uncertainties. While DOE is not requiring its use, applicants are encouraged to review DOE's Cost Estimating Guide.[37] Table 1 below is included in that guide and highlights examples of industry standard cost estimating approaches and use cases.

[37] DOE G 413.3-21A *Cost Estimating Guide*: https://www.directives.doe.gov/directives-documents/400-series/0413.3-EGuide-21A

Table 1: Cost Estimate Classification for Process Industries

	Primary Characteristic	*Secondary Characteristic*		
ESTIMATE CLASS	**MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES** Expressed as % of complete definition	**END USAGE** Typical purpose of estimate	**METHODOLOGY** Typical estimating method	**EXPECTED ACCURACY RANGE** Typical variation in low and high ranges
Class 5	0% to 2%	Concept screening	Capacity factored, parametric models, judgment, or analogy	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Study or feasibility	Equipment factored or parametric models	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget authorization or control	Semi-detailed unit costs with assembly level line items	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	Control or bid/tender	Detailed unit cost with forced detailed take-off	L: -5% to -15% H: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender	Detailed unit cost with detailed take-off	L: -3% to -10% H: +3% to +15%

Applications should include a current total project cost (TPC) estimate that covers the entirety of the H2Hub, including construction and 2-4 years of operations. All project costs falling within the H2Hub should be included, including capital, labor, finance, and other cost categories as appropriate for individual H2Hub plans. Any costs associated with Community Benefits Plan activities should also be included in the TPC estimate. Narratives accompanying cost estimates should include an explanation of the estimate class and/or maturity, a description of the methodology employed, and the uncertainty or accuracy range. While DOE is not requiring specific escalation assumptions be used for the application TPC, cost estimate narratives should explain what assumptions were used and why they were deemed appropriate. The expected estimate class for the application is Class 4 or better. Subsequent phases will require more refined estimates: Class 3 by end of Phase 1 and Class 1 by end of Phase 2. DOE may require use of standard cost estimating assumptions, including escalation assumptions in future phases.

Cost estimates should include itemized breakdowns that reflect at a minimum capital, labor, and financing costs. An overview of the H2Hub's current TPC estimate should be included in the application and supporting itemized data can be provided as part of the "H2Hub TEA and LCA Projections" Excel spreadsheet (see Technical Data and Analysis section below) as well as the "Budget Justification" Excel spreadsheets (see Sections IV.D.x and IV.D.xiii). Note, during award negotiations DOE will conduct a third-party review of the H2Hub TPC.

Execution Schedules

An Integrated Project Schedule (IPS) that reflects all elements of the overall project should be included in the application (as part of the Workplan, see Section IV.D.ii). The initial IPS should include all major project activities and milestones (consistent with the overall Workplan), including technology maturation, engineering, design, procurement construction, and

Community Benefits Plan activities. A minimum Level 1 IPS for the full project and a minimum Level 2 IPS for proposed Phase 1 activities should be provided with the application.[38] The IPS should be provided as part of the Workplan when submitting applications.

This IPS will be revised, expanded, and updated in future H2Hub phases. By the end of Phase 2 it is expected that the IPS will be execution ready and reflect comprehensive schedule risk and uncertainty analyses. During each phase, H2Hubs will report actual progress against their execution schedule or schedules as part of regular project management reporting requirements.

Operating & Disposition Plans

A high-level description of Operating & Disposition plans should be included with the application. The Operating plan should describe the H2Hub's concept of operations throughout the four phases. It is expected that this conceptual plan will be developed into a fully implementable Operations & Maintenance (O&M) plan prior to completion of Phase 3.

Despite full intention that H2Hubs will continue operating well beyond the award period, DOE acknowledges that unforeseen circumstances may arise that result in H2Hubs operations ending. H2Hubs must therefore develop and appropriately fund a disposition and decommissioning (D&D) plan. The application should include a high-level description of the proposed D&D approach. It is expected that this approach will be fully developed, including cost estimates, prior to completion of Phase 2 and with appropriate funding plans in place prior to completion of Phase 3. DOE expects the applicant to seek and maintain community input of the eventual site end-state.

Safety, Security, and Regulatory Requirements

Safety

Safety is critical to enabling the successful commercialization of clean hydrogen technologies. While hydrogen and fuel cell technologies have a history of safe use, it is important to maintain a continued focus on a safety culture across all aspects of demonstration, deployment, and commercialization. Fostering a strong safety culture must be a priority for the entire scope of a H2Hub – for every component, piece of equipment, integrated system, and all connective infrastructure, both hydrogen and non-hydrogen. Each H2Hub must develop a comprehensive Safety Program that encompasses all sites, technologies, and end-uses. The H2Hub must identify a lead (individual or team) for their Safety Program through which all safety plans are coordinated and submitted.

Applications should include a detailed description of safety culture that includes both the hydrogen and non-hydrogen aspects of safety, including a five-year construction/operations safety performance history (such as an OSHA 300A form or Experience Modification Rating) of

[38] For a description of IPS Levels, see Appendix C

the entities and management involved in the H2Hub. For those H2Hub teams who may not have an extensive history in the hydrogen sector, applicants should include a detailed description of their intended hydrogen safety culture for the H2Hub.

The Safety Program Lead will coordinate the development of comprehensive safety plans for all relevant sites,[39] to be reviewed by DOE or third-party consultants representing DOE interests. These plans should address appropriate hydrogen safety, OSHA, and local safety requirements for each relevant site and should be updated regularly through the life of the project. The initial safety plans should be submitted in Phase 1, in conjunction with the 30% design phase of each site. As it is possible that each site within a given H2Hub may not reach the 30% design phase at the same time, these plans may be submitted separately. Revised safety plans must be submitted by the end of Phase 2, in conjunction with the 90% design phase.

H2Hubs must perform a hazard and operability analysis (HAZOP) for each site and include the results in their safety plans that will be developed and refined during the project. H2Hubs should document their operational safety procedures for each site and are encouraged to obtain an audit of those procedures by an appropriately credentialed body. This documentation should include plans for staff safety, maintenance, and operation training.

H2Hubs are encouraged to provide or direct local first responders and authorities having jurisdiction (AHJs) to relevant training materials, including those for the safe handling of hydrogen and other industrial activities at each site in a H2Hub. H2Hubs are encouraged to provide relevant training to local first responders, which should take place prior to the end of Phase 3.

Hydrogen-Specific Safety: The Hydrogen Safety Panel (HSP)[40] will receive direct DOE funding to perform reviews of all hydrogen-related activities within the Safety Program at the direction of DOE. In addition, the selected H2Hubs may solicit independent safety reviews and consultation by other parties as needed.

The HSP will conduct a webinar for the selected H2Hubs during the award negotiation phase to provide an overview of hydrogen-related safety planning requirements. Following the webinar, individual H2Hubs may meet with the HSP directly to discuss safety considerations unique to their project.

H2Hubs will be required to collect and submit safety related data (e.g., component failure) during the period of DOE project funding. In addition, recipients will be encouraged to voluntarily provide safety-related data for a period of five (5) years from the end date of the

[39] For safety planning purposes, a "Site" may contain one or more different hydrogen technologies that may be covered under a single safety plan. For example, all components of a refueling station where on-site production and storage are co-located can be considered as part of a single site. Safety plans may be subdivided across several sites at the discretion of the H2Hub, but all elements of the H2Hub must be included in a safety plan.
[40] https://h2tools.org/hsp

DOE award. This data requirement contributes to a future safety culture by encouraging open communication about safety and lessons learned. It will also enable advancements in risk assessment and codes and standards development. H2Hubs will be required to notify DOE of any safety event (e.g., leak events, fires) within 14 days and submit a report which includes a root cause analysis and steps taken to prevent future events within 60 days of the event. Hydrogen-specific safety events must also be submitted to the public Lessons Learned database at H2Tools.org.

Cybersecurity

While a cybersecurity plan is not required as part of the application submission for this FOA, applications should include an assessment of potential cybersecurity threats or vulnerabilities and address cybersecurity challenges in their work scope.

If selected for award negotiations, recipients must submit an initial cybersecurity plan during the award negotiations phase (prior to the issuance of an award). H2Hubs should develop tailored cybersecurity plans outlining the specific plan to secure the H2Hub according to the unique needs of the proposed H2Hub and its associated technologies as applicable.

Further development/refinement of the cybersecurity plan will be a required component of Phase 1 activities. H2Hubs must deliver a final plan to DOE by the end of Phase 2 for review as part of the advancement to Phase 3. See Section VI.B.xxvi of the FOA for more information about cybersecurity plan requirements.

In addition, H2Hub teams will need to address physical and information security of the H2Hubs.

Permitting

DOE recognizes that there are regional differences in permitting processes and that permitting is often seen as a barrier to commercialization. The following requirements are intended to alleviate some of those barriers where possible.

H2Hub applications should include a permitting workflow overview that should identify the relevant and applicable federal, state, and local codes, regulations, and permitting requirements anticipated to site, construct, implement, and operate the H2Hub. As H2Hubs will likely span multiple site locations, the overview should be organized by site location and should identify the AHJs and relevant regulatory bodies that may have approval authority during the course of the project (e.g., U.S. Nuclear Regulatory Commission for H2Hubs involving commercial nuclear power plants). DOE recognizes that the material in this overview document will likely change during the award and, as such, will require that it be revised and updated during each of the first 3 phases. The IPS should clearly identify and incorporate timelines for application and expected completion or receipt of all required federal, state or local permits, approvals, or reviews. DOE encourages H2Hubs to conduct outreach to AHJs and submit any written confirmation from AHJs regarding the project, if received, as part of the application.

Frequent communication with AHJs through the life of the project is encouraged as a means of mitigating permitting delays.

During Phase 1, H2Hubs must perform an assessment to identify specific gaps in the regulations, codes, and standards (RCS) which may be relevant. The assessment should describe plans to engage with the RCS community to address those gaps. For example, this may include participation on committees or providing relevant data to enable the development or revision of certain RCS.

NEPA

All federally funded projects are subject to review in accordance with the National Environmental Policy Act (NEPA; 42 U.S.C. 4321, *et seq.*), which requires federal agencies to integrate environmental values into their decision-making processes by considering the potential environmental impacts of their proposed actions. For additional background on NEPA, please see Section VI.B.vi of this FOA and DOE's NEPA website.[41]

While NEPA compliance is a federal agency responsibility and the ultimate decisions remain with the federal agency, all recipients selected for an award will be required to assist in the timely and effective completion of the NEPA process in the manner most pertinent to their proposed project. If DOE determines certain records must be prepared to complete the NEPA review process (e.g., biological evaluations or environmental assessments), the recipient may be required to prepare the records; costs required to prepare the necessary records may be included as part of the project costs. It should be noted that new construction or significant modification of existing facilities and/or infrastructure (e.g., pipelines) will likely trigger an Environmental Assessment (EA) or Environmental Impact Statement (EIS). These will need to be accounted for in H2Hub project scope, schedule, and budget.

Applications must include an Environmental Considerations Summary attachment that provides the information requested in Appendix G "Environmental Considerations Summary." Responses to the Environmental Considerations Summary questions will be used to: (1) ensure that the environmental factors are considered in the decision-making process; (2) assess the applicant's awareness of project-related requirements, including requirements for mitigating any project-related adverse environmental risks and impacts; and (3) contribute to the evaluation and selection decision.

Engagement with the DOE NEPA team to develop environmental plans and analyses will be a significant component of the first two phases of the H2Hubs. If selected for award negotiation, the H2Hub team will complete an Environmental Information Volume (EIV) during Phase 1 that will support the NEPA reviews and determination for Phase 2. The EIV will also gather information to help inform the completion of federal agency NEPA process(es), including any required EAs or EISs that will be conducted during Phase 2 before advancement to Phase 3

[41] https://www.energy.gov/nepa

construction activities. Completion of all NEPA-related activities will be a required component of Phase 2 to 3 Go/No-Go metrics. See Appendix H for guidance to prepare the Environmental Information Volume.

Other Considerations

DOE recognizes that siting, permitting, and approval processes pose a schedule risk. Applicants are encouraged to consider the following items to help consultation and permitting processes run as efficiently as possible:

- H2Hubs should identify all primary site(s), along with a prioritized set of alternate sites, recognizing that even some well-vetted sites may become unviable due to obstacles unforeseen at the application stage.
- To minimize environmental impacts, H2Hubs are encouraged to leverage existing facilities, infrastructure, and rights-of-way to the maximum extent practical. Where possible, teams are also encouraged to coordinate and collocate H2Hub development with other existing or planned energy/infrastructure development projects to help minimize potential environmental and community impacts (i.e., "Dig once" concept).
- DOE strongly encourages early and frequent communication with all applicable Federal, Tribal, State, and Local AHJs. DOE further encourages applicants to seek out and propose improvements to advance the project review process, in coordination with other efforts such as Federal-State partnerships that may already be underway.
- Applicants should undertake a thorough review of all relevant Federal, State, and Local statutory and regulatory authorities. Knowledge of these authorities and associated processes will aid applicants in developing their proposed projects both in the application and award phases. Relevant federal statutes and authorities could include, but are not limited to: Clean Air Act, Clean Water Act, Endangered Species Act (ESA), and National Historical Preservation Act (NHPA).
- DOE also strongly encourages applicants to include in their proposals frequent and extensive consultation with local community stakeholders with a potential interest in the proposed site(s), aligned with activities in the Community Benefits Plan. Such consultation could provide multiple benefits. First, it may aid NEPA-mandated public processes by broaching potential issues early and often. Additionally, pre-consultation will help establish if multiple use conflicts exist and how to best resolve or mitigate conflicts at the earliest stage possible. Where possible, applicants and awardees are encouraged to seek solutions that benefit multiple interests. Finally, such consultation may help the industry advance in the future by gaining a better understanding of what these conflicts are and how they are best resolved.
- Several publicly available sources of data related to multiple use, environmental, and permitting considerations exist that will be of benefit to applicants as they evaluate potential sites. Where possible, applicants are encouraged to work with relevant agencies to explore access to information that has already been collected. Such sources include Federal, State, and regional data resources.

- There is a substantial opportunity to use data from projects awarded under this FOA to capture environmental data of benefit to regulatory agencies, as part of Justice40 goals, and the industry as a whole. Proposals should include plans for monitoring their sites and the environmental effects of their projects from site assessment through commissioning and throughout the entire life of the H2Hub.

Risk Analysis and Mitigation

DOE expects H2Hub recipients to understand and actively manage risks. The applicant should provide a comprehensive Risk Management Plan (RMP) that is accompanied by a corresponding risk register that can be used for ongoing risk management. The RMP should provide a narrative that analyzes the commercial, technical, construction, schedule, regulatory, permitting, safety, scale-up, infrastructure, financial, management, organizational, and market related risks. Each identified risk in the RMP should be clearly described, including its probability of realization, potential impacts, and proposed mitigations. As appropriate, identified risks should be incorporated into other project documentation, such as execution schedules, cost estimate maturity, and contingency. The risk management plan and risk register will be revised and updated as needed throughout the project life cycle. At a minimum, they will be reviewed and assessed for accuracy and adequacy as part of each transition between phases. Where and when appropriate, quantitative risk analyses may be required and subsequently incorporated into relevant risk management plans and contingency evaluations and will be used to inform negotiations with DOE. See Section II.A.i for more information about contingency reserve requirements.

Technical Data and Analysis

Each H2Hub must perform techno-economic analysis (TEA) and life cycle analysis (LCA) at an integrated systems level when the design is sufficiently advanced and then collect data to further refine and validate those analyses. The key TEA and LCA components are defined below in Figure 4.

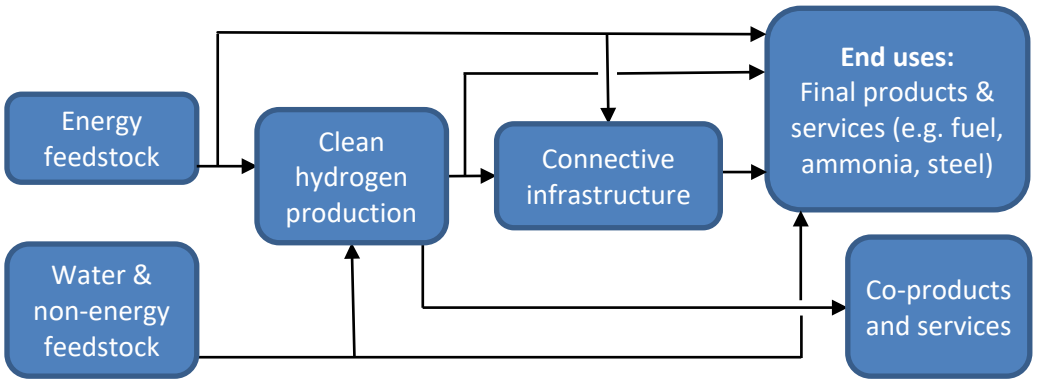

Figure 4. Key H2Hub TEA and LCA components

As part of the Technical Volume (see Section IV.D.ii), applicants should describe their assumptions, rationale, and specific system design / boundaries as part of their preliminary TEA and LCA. In addition, applicants are strongly encouraged to provide their preliminary proposed TEA and LCA assumptions and projections within the "H2Hub TEA and LCA Projections" Excel attachment (see Section IV.D.iii) as part of the application package, which itemizes key parameters that DOE is requesting to verify each analysis. This Excel file contains three worksheets (or tabs) including (1) "Description", (2) "General", and (3) "H2Hub TEA & LCA." The "Description" worksheet contains introductory information, including preferred units. The "General" worksheet collects overall information for each H2Hub's clean hydrogen production, use, and connective infrastructure processes. This includes hydrogen production amount, cost, and GHG emissions, as well as key financial metrics. The "H2Hub TEA & LCA inputs" worksheet collects more in-depth information about equipment and infrastructure specifications, product and co-products, fixed operating expenses, and financing specifications. Specific details regarding the TEA and LCA analyses are described below.

Preliminary TEA

A TEA is necessary to assess the long-term financial viability of each proposed H2Hub. Applicants should conduct their own TEA to estimate the TPC and the levelized cost of hydrogen that informs and is consistent with the values in the Financial and Business Plans. TEA should be conducted with the best available information from prior successful utilization of the proposed technologies, systems, and infrastructure in like environments at the pilot scale as a minimum at the time the application is submitted. Updates to the TEA will be repeated in future phases as more refined performance data and cost estimates become available. TEA within Phase 1 may leverage proprietary and published data, existing DOE tools, estimates or quotes from industry representatives, or any other sources as needed. Preferably, applicants will use an Excel multi-year Generally Accepted Accounting Principles (GAAP) financial articulation for the TEA, using nominal dollars for financial inputs. For consistency, DOE strongly encourages the use of the H2FAST model[42] to conduct GAAP analyses.[43] Additionally, applicants should provide key outputs from their TEA, and the information described in the following subsections in the H2Hub TEA and LCA Projections spreadsheet for DOE to verify the TEA and consistently evaluate H2Hub applications.

Applicants should also provide a narrative description of their TEA and LCA analysis as part of the Technical Volume (see Section IV.D.ii) which provides clarifications of key assumptions, sources of energy and feedstock assumptions and financial arrangements. DOE will assume a 30-year operational analysis period, though applicants may recommend a different analysis

[42] https://www.nrel.gov/hydrogen/h2fast.html

[43] DOE has additionally funded the development of other technoeconomic analysis tools that applicants may find helpful in H2Hub design. Examples include the Hydrogen Energy Storage Evaluation Tool (https://eset.pnnl.gov/) and to support optimization of hydrogen energy storage systems, StoreFAST to evaluate the cost of hydrogen energy storage systems (https://www.nrel.gov/storage/storefast.html), the Hydrogen Delivery Scenario Analysis Model (https://hdsam.es.anl.gov/index.php?content=hdsam) to evaluate the cost hydrogen infrastructure, and H2A Lite to evaluate the cost of hydrogen production (https://www.nrel.gov/hydrogen/h2a-lite.html)

period for DOE to additionally consider if justification is provided. Applicants should also articulate expected values of key parameters that influence financial viability, including capital costs, tax credits, operating costs, and revenue streams, that are consistent with the Business Development and Management and Engineering, Procurement, Construction, and Operations sections above.

In each subsequent phase, H2Hubs will be expected to provide higher fidelity data based on the best information available at the time (e.g., projected H2Hub performance after engineering design, capital cost estimates based on recent industry quotes). During Phase 4, DOE will require H2Hubs to provide detailed operational and financial data for technology and business case validation. DOE will provide additional details for performance validation and data reporting requirements as part of the Phase 3 to 4 transition.

Primary Product Value Stream: Depending on the targeted commodity or service of the H2Hub, one or more value streams may result from operation. For example, a H2Hub may result in production and distribution of hydrogen, ammonia, and process heat. While all products and services should be accounted for, one would likely emerge as a primary H2Hub revenue source and thus would be the focus for optimal performance. All other value streams would be considered co-products. When evaluating the H2Hub TEA, DOE will use the primary H2Hub product to normalize all other input and output streams of the process. To satisfy this information requirement, applicants should:

- Identify the H2Hub's primary product or service (e.g., hydrogen, ammonia, steel, freight transport).
- Identify the retail unit of the primary product (e.g., kg hydrogen, metric ton ammonia, metric ton steel, ton-miles of freight).[44]
- Provide nameplate capacity of the primary H2Hub product. This is defined as the theoretically maximum quantity the H2Hub can produce if it operates 100% of the time at maximum throughput rate. This should be expressed in retail units per unit time (e.g., kg hydrogen/day or thousand metric tons ammonia/year).[45]
- Project the output per year (retail units per year throughout the operating life of the H2Hub). This can also be specified as an annual-average utilization factor relative to the nameplate capacity of the H2Hub.
- Project the cost of hydrogen per kg and the value of the primary output (nominal $/retail unit) throughout the H2Hub's operating window.

[44] Please clearly define units of measure – for example, specify if tons are short tons, long tons, metric tons. If the applicant chooses thermal streams, please specify their basis as lower or higher heating value. If the H2Hub opts for volumetric gas units, please provide assumed BTU content per unit volume and its basis of higher or lower heating value (HHV, LHV).

[45] Nameplate capacity should exclude allowances for real-world operating constraints such as maintenance outages, renewable capacity factor, etc. These constraints will be accounted for through annual production forecasts.

Co-Products and Waste Streams: Besides the main service or commodity produced by a H2Hub, there may be substantial co-products and waste streams (e.g., oxygen, carbon dioxide). To evaluate the economic impact of those streams, applicants should quantify the co-product or waste stream amounts normalized per unit of primary product or service. For example, if a H2Hub deems it viable, oxygen produced through electrolysis may be captured and sold. Other examples of co-products include provision of ancillary services to a grid, exports of steam, and sales of power. Annual revenue from such services should be estimated. Where possible, existing offtake agreements or letters of support should be provided. This data should be consistent with the information presented in the market analysis and other sections of the FOA.

While co-products may add to a H2Hub's revenue stream, they may also result in increased expenses. Such expenses may be due to waste streams that require treatment or disposal. Applicants should:

- List and quantify all revenue yielding co-products on a normalized basis (e.g., kg oxygen co-production/kg H_2, mmBTU usable waste heat/metric ton ammonia, mmBTU usable waste heat/kgH_2, kWh power/kgH_2). The amount of co-products should be reported on per unit of primary product of the H2Hub.[46]
- Provide valuation of revenue-yielding co-products throughout the performance period of the H2Hub (e.g., nominal $/kg oxygen or $/mmBTU of waste heat). Report projected value change over the life of the H2Hub.
- List and quantify all expense-incurring co-products on a normalized basis (e.g., wastewater gal/kg hydrogen). Also report any substantial change of this value on an annual average basis.
- Provide an estimate of expenses associated with co-product streams throughout the operating life of the H2Hub (e.g., $/gal of wastewater, $/ton of solid waste treatment).

Up-Front Capital Investment: Capital investment may reflect a new purpose-built installation or a repurpose, reuse, or retrofit of an existing plant (e.g., electrolyzer). An example of a retrofit may be augmentation of a power generation turbine's burners and safety systems to allow acceptance of hydrogen as fuel. In either case, the applicant should provide a description of process equipment as well as its related installation timeframe and expenses. Capital expenditures and key parameters to list in the application include, but are not limited to:

- Itemized equipment capital expenses including equipment cost for all major components (e.g., H_2 production, batteries, hydrogen storage, compressors, liquefaction, truck terminals, tractors, trailers, pipelines)
- Construction expenses for labor, materials, management, and site improvements. Please assure no reported costs are double counted (e.g., material expenses as part of equipment capital and construction expenses)
- Non-depreciable asset acquisition (e.g., land, salt caverns)

[46] If the ratio changes materially over time, please report the annual average value and how it may change over the operating years.

- Non-depreciable asset estimated end of life value (e.g., proceeds from sale of land, salt caverns)
- Permitting and other expenses
- Other startup materials and expenses
- Construction period (years)
- Depreciation type allowable for different assets (e.g., accelerated depreciation may apply to some unit operations but not others)

Variable Operating Expenses for Energy and Feedstock: Production of hydrogen requires energy and material inputs. Those typically consist of water, electricity, natural gas, coal, heat, transportation fuel, biomass, etc. It is also possible for H2Hubs to use a mix of generation assets and balance their availability with the electric grid. TEA requires a forecast of the amount and cost associated with all energy and feedstock required for the H2Hub. For energy inputs, applicants are encouraged to use regionalized energy feedstock projections from the Annual Energy Outlook 2022 reference case.[47] If departure from such cost projections is deemed appropriate, justification should be provided. If the H2Hub will use power purchase agreements (PPAs), applicants should provide documentation or letters of agreement.

Applicants should provide the following:

- A list of all energy feedstocks, hydrogen production feedstocks, and other significant consumables expected to be used by the H2Hub (e.g., mmBTU HHV natural gas/kg hydrogen, gallon water/kg hydrogen, or kWh electricity/metric ton ammonia). Applicants should report inputs on an annual average basis and any substantial changes over time can be specified on annual basis. [Note: if the H2Hub uses energy from the grid at some times and at other times pushes power back to the grid, please specify the energy sold to the grid as a co-product (e.g., kWh/ton ammonia)].
- Cost projection for each energy feedstock, if the applicant recommends use of costs different from the Energy Information Administration's (EIA) Annual Energy Outlook (AEO) (e.g., $/mmBTU, $/kWh). If time of use grid rate structure is used, please include any demand charges impact as part of the total annual cost of grid electricity as a total $/kWh.
- Estimated current (2022) cost of non-energy feedstock. DOE will apply standard escalation factors to all non-energy feedstock (e.g., water) to reflect inflation. If the applicant has an outlook for future costs of non-energy feedstock that they would prefer DOE to use, this outlook may be provided in the spreadsheet and the applicant should provide supporting rationale in the narrative.

Refurbishments, Capital Replacements, and Overhauls: Supply chain elements may need periodic refurbishment or replacements requiring financial planning and capital reinvestment. Such events may include replacement of electrolyzer stacks, refurbishments of compressors,

[47] https://www.eia.gov/outlooks/aeo/

and major catalyst replacements. To account for such events, applicants should provide the estimated frequency (years) and cost of overhauls and replacements.

Fixed and Other Variable Operating Expenses: H2Hub operation will incur operating expenses such as O&M labor, land rental, property taxes, and insurance. Applicants should estimate these annual expenses with the highest fidelity possible (e.g., % of total CapEx/year). Note that expenses associated with the cost of financing should be kept separate from operating expense projections.

Financing Procurement and Structure: DOE understands that financing of nascent hydrogen technology and connective infrastructure may be considered a higher technological and market risk. As such, financing instruments may require interest or rates of return in excess of that used for business-as-usual projects. Applicants should include as much of the following information as possible, including justification for any assumptions and should be consistent with information provided in other sections of the application:

- Debt to equity ratio of financing
- Debt type (loan or constant outstanding debt)
- Interest rate on debt
- Commensurate return on equity
- Projected tax rates (combined state and federal income tax rate, capital gains tax rate)
- Liquidity/working capital (i.e., cash on hand reserved for H2Hub operations; applicant may want to express as a number of months of operating expenses)
- Depreciation type and period [Note: depreciation may vary among different supply chain elements]

Other Incentives Availability: If applicants are pursuing federal or state incentives in addition to this FOA, they should clearly show the projected proceeds from these incentives (e.g., Section 45V "Credit for Production of Clean Hydrogen" in the Inflation Reduction Act, 45Q "Credit for Carbon Oxide Sequestration," California Low Carbon Fuel Standard) on an annual basis for the performance period of the H2Hub and provide supporting documentation where possible. If applicants are pursuing the 45V Credit, they should clearly state the credit value that they are targeting.

Emissions and Resource Consumption LCA

Applicants are required to conduct a LCA according to the key components shown in Figure 4 which includes energy (e.g., electricity generation) and non-energy feedstock (e.g., natural gas for steam methane reforming), including all associated drilling and transmission; and hydrogen production, storage and distribution to end-uses, including all emissions associated with sequestration of CO_2 generated from hydrogen production. Emissions associated with equipment manufacturing are not included in the system boundary. Applicants should clearly state the estimated well-to-gate emissions from hydrogen production within each H2Hub, and the assumptions made to derive these estimates. These values should be reported in the

"H2Hub TEA and LCA Projections" spreadsheet under the "General" tab. Applicants are strongly encouraged to use the Greenhouse gases, Regulated Emissions, and Energy use in Technologies (GREET) model[48] for their LCA. Applicants are also encouraged to describe goals or strategies on how emissions can be further reduced into the future.

DOE will use GREET to consistently evaluate the well-to-gate carbon intensity and criteria air pollutant emissions estimated by the applicant for hydrogen production within each H2Hub.[49] DOE will additionally utilize LCA to evaluate the decarbonization potential of each H2Hub relative to incumbent technologies, given existing defaults within GREET regarding the emissions intensity of end-use technologies using incumbent fuels (e.g., use of diesel in trucks, fossil fuels in industry). Applicants should provide as much information as possible regarding key aspects of their system design, such as the rate of CCS, expected emissions (GHG and criteria pollutants), and the source of energy supply, into the "H2Hub TEA and LCA Projections" spreadsheet. Where data is not provided, DOE will use defaults within GREET to evaluate the carbon intensity and criteria pollutants of the proposed H2Hub.

Upstream emission sources, such as the generation mix for electricity supply and fugitive emissions for natural gas, can be highly influential on LCA, but often have high uncertainty. If proposed H2Hubs include direct integration with a power generator (e.g., direct connection to renewables) or a PPA, applicants should list the generator type(s) and respective estimated energy consumption by year. If proposed H2Hubs include integration with the electricity grid, applicants should identify the corresponding Regional Transmission Organization/Independent System Operator, if one exists. DOE will use GREET defaults to estimate the carbon intensity of that region's electricity grid.

Applicants are additionally encouraged to exercise best practices that mitigate fugitive emissions associated with fossil fuel extraction and delivery to their H2Hubs to the extent feasible. Feasible best practices will vary across H2Hubs, but examples include: siting the H2Hubs (hydrogen production sites) near the point of natural gas recovery to mitigate gas transmission; sourcing natural gas from regions of the country with low fugitive emissions; and designing high efficiency systems that minimize the use of natural gas. Applicants should provide fugitive emission rate estimates specific to the H2Hub, along with a justification, if applicable. If project-specific estimates are not provided, DOE will use national average default

[48] The GREET 1 Series (fuel cycle) model is available at https://greet.es.anl.gov/. The model is updated annually, primarily to reflect the latest default assumptions associated with technology cost and performance. Users may change these defaults to reflect scenario-specific assumptions (such as CCS rate, electricity mix, etc.), and are recommended to use the latest version of GREET online at the time that they conduct their analysis.

[49] In this solicitation, the term "well-to-gate" emissions refers to those associated with feedstock extraction (e.g., natural gas drilling), generation of electricity (used in numerous steps associated with hydrogen production), feedstock delivery (e.g., natural gas compression, natural gas leakage), hydrogen production (e.g., reforming, electrolysis, gasification, pyrolysis), and delivery and sequestration of CO_2 (e.g., fuel combustion for compression, leakage). The definition of this term is consistent with the term "well-to-gate" and "lifecycle" in Section 45V "Credit for Production of Clean Hydrogen" in the Inflation Reduction Act.

assumptions within GREET. DOE will also use GREET default estimates for the carbon intensity of biomass feedstock associated with hydrogen production, such as emissions associated with biomass growth and biomass delivery. Standard biomass feedstock within GREET will be assumed to have neutral biogenic emissions. If applicants are proposing use of a feedstock not in GREET, they are requested to provide an estimate of the emissions associated with biomass growth and use as well as a justification.

DOE will evaluate the information provided by the applicants on how each H2Hub plans to avoid, reduce, or sequester GHGs or criteria pollutant emissions, and compare results against emissions of incumbent technologies. DOE will utilize the information provided to estimate GHGs avoided by the H2Hubs. During each subsequent phase, DOE will require updated estimates of process level energy, mass flow diagrams and information for each key H2Hub component (e.g., production technologies and end-uses) based on the best information available at that stage of the project. These estimates will be used to generate updated estimates of H2Hub lifecycle emissions. For H2Hubs with end-uses that involve the combustion of clean hydrogen, applicants should also provide NO_x emissions estimates.

DOE acknowledges that water consumption for H2Hubs could place additional stress on regional water resources. Applicants should estimate freshwater consumption for hydrogen production and the full lifecycle using the GREET model. DOE encourages applicants to provide water consumption reduction strategies for the H2Hub. Applicants should describe the impact of H2Hub water consumption, including upstream water consumption, on regional water resources. As H2Hubs progress through the four phases, they will be expected to provide higher fidelity data based on the best information available at the time.

Data Collection and Reporting

To inform market adoption and evaluate progress towards H2Hub FOA goals, DOE will require project, environmental, technical, financial, operational, and socio-economic data collection and reporting for the H2Hubs. For example, during operation, mass and energy flows into, out of, and between major subsystems (e.g., electrolyzer, storage, compressor, terminal) and operating performance (e.g., maintenance and reliability metrics) for all subsystems of the H2Hub will be reported to DOE. H2Hubs must also report financial information (e.g., operating and financial cash flows). In Phases 2-4, DOE will be engaged in the verification and validation of data collection and reporting related to TEA, LCA, and the performance model, consistent with the established reporting requirements (see Section VI.B.xiv). In addition to the required data collection and reporting during the period of DOE project funding, recipients will be encouraged to voluntarily provide operating performance data beyond the period of performance for the award. DOE will provide more specifics regarding data collection and the reporting format as H2Hubs progress through Phases 2-4.

In addition to the items mentioned above, H2Hubs will be required to track and report on several outcomes and outputs related to the Community Benefits Plan, including those related

to the Justice40 Initiative; community and labor engagement; diversity, equity, inclusion, and accessibility; and job quality, as indicated below.

Community Benefits Plan: Job Quality and Equity

Applicants must submit an initial Community Benefits Plan: Job Quality and Equity (Community Benefits Plan or Plan) as a separate part of their application package (see Section IV.D.iv). The Community Benefits Plan must set forth the applicant's approach to ensuring that Federal investments advance the following four goals: 1) community and labor engagement; 2) investing in the American workforce; 3) advancing diversity, equity, inclusion, and accessibility (DEIA); and 4) contributing to the Justice40 Initiative. The sections below set forth the Plan requirements for each of the foregoing goals. The Community Benefits Plan elements should also be incorporated into the overall H2Hub scope, schedule, and budget.

DOE recognizes that each project and applicant is unique and requires a range of approaches to ensure community benefits and minimization of harms, and that some of these approaches may be new to applicants. Applicants should complete each portion of the initial Community Benefits Plan to the greatest extent possible. In cases where information is incomplete, applicants should clearly explain the reason for missing information and provide plans to address those gaps during the project. If the applicant has prior or ongoing efforts to advance energy and environmental justice, DEIA, community and labor engagement, or quality jobs, the application should discuss how they are incorporating lessons learned and building on these prior/ongoing efforts. At this stage of the application process, the Community Benefits Plan should indicate the applicant's intention to engage meaningfully with community and labor stakeholders on these goals, including the potential of entering into a formal Workforce and Community Agreement. DOE expects the information contained in the Community Benefits Plan to deepen and evolve during each phase.

For each Community Benefits Plan section, applicants should propose metrics to measure the success of the Community Benefits Plan. Major milestones and work descriptions relevant to the plan should be included within the IPS and Workplan. Applicants are encouraged to use SMART (Specific, Measurable, Achievable, Relevant and Timely) milestones whenever possible. Each of the four sections should also include information about the resources intended to implement the Community Benefits Plan, including staff time and budget to convene public meetings to engage and negotiate agreements with relevant labor unions, communities and other stakeholders. The initial Community Benefits Plan should provide the most details regarding actions the applicant would take during Phase 1, but should also describe in a higher level summary what goals, deliverables, outcomes, and implementation strategies the applicant would pursue in Phases 2 – 4. The Community Benefits Plan will be part of Go/No-Go decision criteria.

The Community Benefits Plan must be implemented and updated during each project phase. For example, in each phase, awardees would 1) implement the Community Benefits Plan

activities corresponding to that phase and 2) create an end-of-phase report that includes status summary, lessons learned, and an updated Community Benefits Plan for future phases/activities. DOE will provide feedback to awardees and require that they update their initial Community Benefits Plan during award negotiations. During Phases 1-4, DOE will also provide additional guidance to awardees on requirements for updating the Community Benefits Plan for future phases which may include new impacts, metrics, ways of measuring the information, or reporting guidance for a specific subset of metrics related to community and workforce benefits. In addition to providing guidance, DOE or its representative(s) expect to independently verify plan implementation status and effectiveness. Independent findings may be incorporated into H2Hub Go/No-Go reviews. DOE will also require accomplishments and findings related to the Community Benefits Plan to be included as part of the H2Hub final report.

Applicants may also provide letters of support from representative organizations and labor unions reflecting substantive engagement and feedback on applicant's approach to community benefits including investments in the American workforce; diversity, equity, inclusion, and accessibility; and the Justice40 Initiative detailed below. These letters of support should be submitted under the Community Partnership Documentation (see Section IV.D.viii) and do not count toward the Community Benefits Plan page limit.

Detailed guidance and examples on creating each section of the Community Benefits Plan will be provided under the application documents section on the OCED Exchange website at https://oced-Exchange.energy.gov. Applicants are encouraged to read these resources prior to writing their initial Community Benefits Plan. Applicants are also encouraged to leverage information generated in other portions of this FOA to support Community Benefits Plan development, including the Environmental Considerations Summary, the TEA (e.g., Co-Products and Waste Streams section), and LCA.

The initial Community Benefits Plan must not exceed 25 pages and must be uploaded to Exchange as a separate file (see Section IV.D.iv for more information).

Community and Labor Engagement

The Community and Labor Engagement section should describe the applicant's plans and actions to engage with community stakeholders such as community-based organizations representing local residents and businesses, labor unions and other worker organizations, workforce development organizations, local government, emergency responders, communities with environmental justice concerns, disadvantaged communities, and community-based organizations that support or work with disadvantaged communities. By facilitating labor and community input, social buy-in, and accountability, such engagement can substantially reduce or eliminate stalls or slowdowns, litigation, and other risks associated with project implementation.

If awarded and in conjunction with DOE, awardees will also identify to DOE any federally recognized Indian Tribes, including Alaska native village or regional or village corporations (who are not project partners) for whom the proposed project may have implications. The awardee will provide information to support DOE's development of a Tribal engagement plan that acknowledges each Tribe's consultation policies, traditions, and expectations, and adheres to DOE Order 144.1 on Tribal consultation, with the hope that appropriate mitigation will be identified through government-to-government consultation to off-set any such potentially adverse implications. DOE is and remains responsible for government-to-government consultation with any federally recognized Indian Tribes, including Alaska native village or regional or village corporations about the proposed project.

This section should include the following elements:

- **Background.** A description of prior and ongoing efforts by the applicant and its project partners to engage communities, Tribes, and labor stakeholders relevant to the H2Hub.
- **Social Characterization Assessment.** A brief writeup of a social characterization assessment of the community (which describes community dynamics, decision-making processes, etc.).
- **Initial Stakeholder Analysis Summary.** A description of how the H2Hub identified stakeholders; what sectors, labor unions, communities, organizations, etc. the stakeholders and H2Hub represents; and current or anticipated level of engagement (e.g., advisory committee, working group member, active public participant). Provide an assessment of existing labor and community support for and/or concerns with the H2Hub, including a description of steps taken to gather this information.
- **Engagement Methods and Timeline.** Applicants should develop an engagement schedule which includes when and how they will engage stakeholders, workforce organizations including labor unions, and communities, as well as the objectives for the engagement. This should include a description of specific engagement methods (e.g., listening sessions, town halls, open houses, mediated discussions) which should be matched to H2Hub phases. Methods should also be matched to goals, which may include learning about community and labor concerns and interests, seeking input, addressing input and concerns, and providing information, depending on project phase. DOE strongly encourages H2Hubs to describe efforts that will be taken to address public safety perceptions. Applicants should describe how they will extend these methods to include traditionally excluded stakeholders. If awarded, awardees will work in conjunction with the Department of Energy to develop a Tribal engagement plan as appropriate.
- **Two-way Engagement Statement.** The application should include a statement discussing how the H2Hub incorporates community input for the project and the extent to which the host community or communities have already indicated support for the H2Hub. The statement should list the points in the phases of the H2Hub where engagement can impact H2Hub decisions or characteristics, including a discussion of whether there is a pathway for the H2Hub to consider changing target site(s) based on

social considerations. A discussion of how community engagement results will impact H2Hub decisions and characteristics should be incorporated into the Technical Volume including the IPS and Project Management Plan. This section should also include a discussion of community participation in and access to monitoring data.

- **Workforce and Community Agreements Statement.** The application should include a statement describing any plans to negotiate a Community Benefits Agreement, Good Neighbor Agreement, Project Labor Agreement, Community Workforce Agreement, and/or other collective bargaining agreements. Such agreements facilitate community and labor input and social buy-in, identify how concerns will be mitigated, and specify the distribution of community and economic benefits, including job quality, access to jobs and business opportunities for local residents, and mitigating community harms, thus reducing or eliminating these types of risks.
- **Engagement Evaluation Strategy.** The application should include a description of plans for activities to evaluate the success of stakeholder engagement, including evaluating community and labor stakeholder perceptions of the progress.
- **Resource Summary.** The application should describe the H2Hub resources dedicated to implementing the plan including staff, facilities, capabilities, and budget that will support implementing the plan.

Investing in the American Workforce

Quality jobs are the key to attracting and retaining the appropriately skilled, trained, or credentialed workforce required to meet the H2Hubs FOA goals. These new jobs should be supported by workforce development activities to build a stable skilled and trained workforce that will meet project labor needs. This section should describe the applicant's comprehensive plan for the creation and retention of high-paying quality jobs and development of a skilled workforce. Meaningful engagement with labor unions is a key component of job quality and workforce development and is covered in detail in the community and labor engagement section. This section of the Community Benefits Plan should build on the description of prior and ongoing efforts by the applicant and its project partners to engage labor unions, community colleges, and other workforce organizations described above in the Community and Labor Engagement statement and the efforts to increase participation and leadership of people in underrepresented or excluded groups as described in the Diversity, Equity, Inclusion, and Accessibility section.

This section should include the following elements:

- **Background.** Summarize the applicants' and its project partners' previous and planned efforts to provide above average pay and benefits to properly classified employees in both the construction and ongoing operations phases; support the rights of workers to a free and fair chance to join a union; and invest in workforce development efforts.
- **Quality Jobs.** Describe plans to attract, train, and retain a skilled, qualified, local, and diverse workforce for both construction and ongoing

operations/production/maintenance activities, including the anticipated quality of jobs the H2Hubs will create (i.e., wages– beyond compliance with Davis-Bacon prevailing wages and benefits, opportunities for wage progression, classification as employees, jobs for in-state workers, etc.). Describe how these jobs will be sufficiently attractive to skilled and trained workers under competitive labor market conditions.

- **Workforce Development.** A description of plans for:
    - Investing in workforce education and training (e.g., labor-management training programs, registered apprenticeships, partnerships with community colleges, sector-based approaches to workforce development);
    - Supporting workers' skill acquisition and opportunities for advancement; and
    - Utilization of an appropriately credentialed workforce (e.g., requirements for appropriate and relevant professional and safety training, certification, and licensure, including where appropriate utilization of graduates from registered apprenticeship programs).
    - Other plan elements deemed appropriate by the Applicant.
- **Worker Rights.** Employees' ability to organize, bargain collectively, and participate, through labor organizations of their choosing, in decisions that affect them contributes to the effective conduct of business and facilitates amicable settlements of any potential disputes between employees and employers, providing assurances of project efficiency, continuity, and multiple public benefits. Provide information describing:
    - How the applicant will support and protect workers' free and fair chance to form or join unions of their choosing and exercising collective voice in the workplace, in both construction and ongoing operations;
    - Plans to ensure project success and continuity by mitigating labor disputes or strikes (e.g., neutrality with respect to union organizing; good faith negotiations, etc.);
    - Activities and policies that ensure worker engagement in the design and execution of workplace safety and health plans;
    - How to ensure workplace health and safety and worksites free from harassment and discrimination;
    - How Project Labor Agreements[50] or Community Workforce Agreements will be utilized in construction activity (e.g., collective bargaining agreements between unions and contractors that govern terms and conditions of employment for all workers on a construction project);
    - Plans to track retention rates and address areas of worker or workplace concern.
- **Strategies, Milestones and Timelines**. A description of targeted outcomes and implementation strategies, including milestones as well as a schedule for execution.
- **Resource Summary**. A description of project resources dedicated to implementing activities including staff, facilities, capabilities, and budget—including those for relevant partner organizations/training providers.

[50] https://www.whitehouse.gov/briefing-room/presidential-actions/2022/02/04/executive-order-on-use-of-project-labor-agreements-for-federal-construction-projects/

Diversity, Equity, Inclusion, and Accessibility (DEIA)
Applicants should submit a DEIA section within the Community Benefits Plan that describes the actions the applicant will take, if selected for award, to foster a welcoming and inclusive environment, support people from groups underrepresented in Science, Technology, Engineering, and Mathematics (STEM) and/or applicable workforces, advance equity, and encourage the inclusion of individuals from these groups in all phases of the project. The section should detail how the applicant will partner with underrepresented businesses, educational institutions, and training organizations that serve workers who face barriers to accessing quality jobs, and/or other project partners to help address DEIA.

Minority Serving Institutions, Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Veteran Owned Businesses, Tribal Colleges and Universities, community-based groups, faith-based organizations, or entities located in an underserved community that meet the eligibility requirements (See Section III) are encouraged to participate on the application team. The Selection Official may consider the inclusion of these types of entities as part of the selection decision (See Section V.C.i. Program Policy Factors).

Elements of the DEIA plan should include the following:

- **Background**. Describe prior and ongoing efforts by the H2Hub team relevant to DEIA, based on findings from an initial assessment that examines the context of DEIA in organizations related to the project team.
- **Strategies, Milestones, and Timelines**. Describe targeted DEIA outcomes and implementation strategies, including milestones, and include a DEIA schedule for execution.
- **Resource Summary**. Describe project resources dedicated to implementing DEIA activities including staff, facilities, capabilities, and budget including project partners.

Justice40 Initiative
Applicants should submit Justice40 Initiative section within the Community Benefits Plan that describes plans to address energy and environmental justice (EEJ) concerns, which will maximize the likelihood of successful H2Hubs. The Justice40 Initiative section has two subsections: Subsection 1 is an Assessment, which assesses project impacts and where they flow, and Subsection 2 is the Implementation Strategy, which explains what actions the applicants will take to maximize benefits and minimize negative impacts and measure, track, and report project impacts. Meaningful engagement with impacted communities is a key component of environmental justice and is covered in detail as part of the Community and Labor Engagement section.

Subsection 1: The Assessment subsection should include:

- **An assessment of impacted communities and groups**. Applicants should describe all applicable communities or groups which could experience impacts from the proposed

H2Hub. Applicants should identify which of these are considered disadvantaged communities [51] and characterize the existing burdens they are facing using EJSCREEN,[52] disadvantaged community definition tools**,** or other analytic tools. Applicants should include which tool was used in their analysis. Impacts to communities and Tribes/ANCs should be considered for all inputs and outputs along all four phases of the H2Hub, in addition to impacts at the H2Hub site(s) or work location(s).

- **An assessment of H2Hub benefits and where they flow**. Applicants should describe in detail all anticipated H2Hub benefits. This description should clearly enumerate: a) specific H2Hub benefits including to the greatest extent possible metrics that will be used to track these benefits; b) where/to whom H2Hub benefits are expected to flow with the greatest amount of specificity possible (e.g., census block group or census-tract level), and the extent to which these benefits flow to disadvantaged communities; and c) describe how well the anticipated project benefits and impacts align with community priorities ascertained through community engagement. Benefits could include measurable direct or indirect investments or positive project outcomes that contribute to the eight DOE Justice40 policy priorities in disadvantaged communities: (1) a decrease in energy burden; (2) a decrease in environmental exposure and burdens; (3) an increase in access to low-cost capital; (4) an increase in job creation, the clean energy job pipeline, and job training for individuals; (5) increases in clean energy enterprise creation and contracting (e.g., minority-owned or disadvantaged business enterprises); (6) increases in energy democracy, including community ownership; (7) increased parity in clean energy technology access and adoption; and (8) an increase in energy resilience.
- **An assessment of H2Hub negative impacts and where they flow.** Applicants should describe all anticipated H2Hub negative impacts. This description should clearly enumerate: a) specific H2Hub negative impacts including, to the greatest extent possible, metrics that will be used to track these impacts; b) where/to whom impacts are expected to flow with the greatest amount of specificity possible, and whether disadvantaged communities will experience negative impacts disproportionately; and c) how additional project negative impacts will interact with existing cumulative burdens. Negative impacts could include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health impacts**.** Consider direct impacts, indirect impacts, and cumulative impacts. The Community Benefits Plan may refer to the impacts identified in the NEPA Environmental Considerations Summary which will also be submitted with the application rather than replicating the information/analysis.

[51] Pursuant to E.O. 14008 and the Office of Management and Budget's Interim Justice40 Implementation Guidance M-21-28, DOE has developed a definition and tools to locate and identify disadvantaged communities. These resources can be located at https://energyjustice.egs.anl.gov/. DOE will also recognize disadvantaged communities as defined and identified by the White House Council on Environmental Quality's Climate and Economic Justice Screening Tool (CEJST), which can be located at https://screeningtool.geoplatform.gov/

[52] https://www.epa.gov/ejscreen

- **Assessment of information gaps:** For elements of the Assessment where additional work is needed to fully assess or measure potential H2Hub impacts or impacted communities, applicants can outline research and analytical goals to clarify the unknowns.

H2Hub impacts and community assessments should be quantifiable, measurable, and trackable to the greatest extent possible; DOE expects applicants to include both qualitative and quantitative metrics. If no H2Hub sites or related activities are located within or near a community and/or disadvantaged communities, applicants should provide a detailed explanation to support this conclusion.

Subsection 2: The Implementation Strategy subsection will outline concrete steps the applicant will take to maximize benefits; minimize negative impacts; and measure, track, and report project impacts. The Implementation Strategy subsection should include the following elements:

- **Background**: A brief narrative summary of the opportunities and risks related to EEJ in the proposed project.
- **Milestones and Timelines:** An Implementation Strategy schedule which includes when and how EEJ work will be conducted. This includes H2Hub milestones for maximizing benefits and minimizing negative impacts; milestones to measure, track, and report H2Hub impacts; updates to the EEJ assessment; and future work. The schedule should define its timeline on the same schedule as the IPS, and if selected for award, these should also be reflected in the Workplan and Project Management Plan.
- **Assessment of barriers to realizing benefits and minimizing negative impacts:** For items outlined in the Assessment, discuss potential barriers to realizing H2Hub benefits, minimizing negative impacts, and plans for mitigating those barriers.
- **Resource Summary**: Describe project resources dedicated to implementing the plan including staff, facilities, capabilities, and budget that will support implementing the plan.

C. Applications Specifically Not of Interest

The following types of applications will be deemed nonresponsive and will not be reviewed or considered (See Section III.D of the FOA):

- Applications that fall outside the technical parameters specified in Section I.A. and I.B. of the FOA.
- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).
- Applications including research, development, and pilot-scale activities.
- Applications that propose building new traditional thermal conversion plants will not be considered. However, proposals for building thermal conversion plants utilizing novel technologies to reduce emissions will be considered.

- Applications that propose to expand fossil fuel oil refining capacity. The end-use of clean hydrogen in refining/chemical processes is acceptable; however, H2Hub funding may not be used to expand, upgrade, or repair existing refining units.

D. Authorizing Statutes

The programmatic authorizing statute is Section 813 of the Energy Policy Act of 2005, Public Law 109-58, as amended by Section 40314 of the Infrastructure Investment and Jobs Act of 2021, Public Law 117-58, codified at 42 U.S.C. § 16161a.

Awards made under this announcement will fall under the purview of 2 Code of Federal Regulation (CFR) Part 200 as amended by 2 CFR Part 910.

E. Notice of Bipartisan Infrastructure Law-Specific Requirements

Be advised that special terms and conditions apply to projects funded by the BIL relating to:

- Reporting, tracking and segregation of incurred costs;
- Reporting on job creation and preservation;
- Publication of information on the Internet;
- Access to records by Inspectors General and the Government Accountability Office;
- Requiring all of the iron, steel, manufactured goods, and construction materials used in the infrastructure activities of applicable projects are produced in the U.S.;[53]
- Ensuring laborers and mechanics employed by contractors or subcontractors on BIL-funded projects are paid wages equivalent to prevailing wages on similar projects in the area;
- Protecting whistleblowers and requiring prompt referral of evidence of a false claim to an appropriate inspector general; and
- Certification and Registration.

Recipients of funding appropriated by the BIL must comply with requirements of all applicable Federal, State, and local laws, regulations, DOE policy and guidance, and instructions in this FOA. Recipients must flow down the requirements to subrecipients to ensure the recipient's compliance with the requirements.

Be advised that BIL funds can be used in conjunction with other funding, as necessary to complete projects, but tracking and reporting must be separate to meet the reporting requirements of the BIL and related Office of Management and Budget (OMB) Guidance. Applicants for projects funded by sources other than the BIL should plan to keep separate records for BIL funds and to ensure those records comply with the requirements of the BIL.

[53] See Section IV.J.vi and Appendix F for more information.

II. Award Information

A. Award Overview

i. Estimated Funding

DOE expects to make a total of approximately $6-7 Billion of federal funding available for new awards under this FOA, subject to the availability of appropriated funds. DOE anticipates making approximately 6-10 awards under this FOA. DOE may issue one, multiple, or no awards under this FOA.

For information on the funding range for each H2Hub, see "Anticipated Funding and Award Details" under Section I.B.ii "H2Hub Project Overview" above.

Title	Anticipated # of Awards	Anticipated Minimum Award Size for Any One Individual Award (Fed Share)	Anticipated Maximum Award Size for Any One Individual Award (Fed Share)	Approximate Total Federal Funding Available for All Awards	Anticipated Period of Performance (years)	Required non-federal cost share level (minimum)
Regional Clean Hydrogen Hubs	6-10	$400 Million	$1.25 Billion	$6-7 Billion	8-12	50%

DOE may establish more than one budget period for each award and fund only the initial budget period(s). Funding for all budget periods, including the initial budget period, is not guaranteed.

A contingency reserve is required for all Phase 3 and 4 activities. The amount of contingency will be determined based on the quantitative risk analysis. The required contingency may be adjusted based on the level of remaining project risks and other considerations as the project progresses in Phase 3 and 4. Recipients must demonstrate that they can meet unexpected financial needs of the project. The full design package needed to advance to Phase 3 must also include documentation showing that the recipient has access to the required contingency. Typically, DOE expects contingency funds must be: (a) liquid, (b) immediately available, and (c) unrestricted funds dedicated exclusively to the project for the purpose of mitigating project performance baseline risk. The contingency reserve is in addition to total project costs and does not count toward the minimum 50% cost share requirement. If expended, the contingency will not result in reimbursement by DOE above the total federal share approved in the award. DOE discourages recipients from reducing scope to comply with the contingency reserve requirement.

ii. Period of Performance

DOE anticipates making awards that will run from 8 years up to 12 years in length, comprised of one or more budget periods. However, projects may propose a shorter period of performance based on their level of readiness to proceed into each phase. Project continuation will be contingent upon several elements, including satisfactory performance and DOE's Go/No-Go decision. For a complete list and more information on the Go/No-Go review, see Section VI.B.xv.

iii. New Applications Only

DOE will accept only new applications under this FOA. DOE will not consider applications for renewals of existing DOE-funded awards through this FOA.

B. DOE Funding Agreements

Through cooperative agreements and other similar agreements, DOE provides financial and other support to projects that have the potential to realize the FOA objectives. DOE does not use such agreements to acquire property or services for the direct benefit or use of the United States government.

i. Cooperative Agreements

DOE generally uses cooperative agreements to provide financial and other support to prime recipients.

Through cooperative agreements, DOE provides financial or other support to accomplish a public purpose of support or stimulation authorized by federal statute. Under cooperative agreements, the government and prime recipients share responsibility for the direction of projects.

DOE has substantial involvement in all projects funded via cooperative agreement. See Section VI.B.x of the FOA for more information on what substantial involvement may involve.

III. Eligibility Information

To be considered for substantive evaluation, an applicant's submission must meet the criteria set forth below. If the application does not meet these eligibility requirements, it will be considered ineligible and removed from further evaluation.

A. Eligible Applicants

i. Domestic Entities

The proposed prime recipient and subrecipient(s) must be domestic entities. The following types of domestic entities are eligible to participate as a prime recipient or subrecipient of this FOA:

1. Institutions of higher education;
2. For-profit entities;
3. Non-profit entities; and
4. State and local governmental entities, and Tribal nations.

To qualify as a domestic entity, the entity must be organized, chartered, or incorporated (or otherwise formed) under the laws of a particular state or territory of the United States; have majority domestic ownership and control; and have a physical place of business in the United States.

DOE/NNSA FFRDCs are eligible to apply for funding as a subrecipient, but are not eligible to apply as a prime recipient. The funding for the FFRDC will flow through the prime recipient.

Non-DOE/NNSA FFRDCs are eligible to participate as a subrecipient, but are not eligible to apply as a prime recipient.

Notwithstanding the above, federal agencies, instrumentalities, and corporations (other than DOE) are eligible to participate as a subrecipient, but are not eligible to apply as a prime recipient.

Entities banned from doing business with the U.S. government such as entities debarred, suspended, or otherwise excluded from or ineligible for participating in Federal programs are not eligible.

Entities identified on a Department of Homeland Security, Binding Operational Directives as an entity publicly banned from doing business with the Unites States government are not eligible. See https://cyber.dhs.gov/directives/.

Non-profit organizations described in Section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995 are **not** eligible to apply for funding. Non-profit organizations described in Section 501(c)5 of the Internal Revenue Code are eligible to apply for funding.

ii. Foreign Entities

In limited circumstances, DOE may approve a waiver to allow a foreign entity to participate as a prime recipient or subrecipient. A foreign entity may submit a full application to this FOA but the full application must be accompanied by an explicit written waiver request. Likewise, if the applicant seeks to include a foreign entity as a subrecipient, the applicant must submit a separate explicit written waiver request in the full application for each proposed foreign subrecipient.

Appendix E lists the information that must be included in a foreign entity waiver request. The applicant does not have the right to appeal DOE's decision concerning a waiver request.

iii. Incorporated Consortia

Domestic incorporated consortia are eligible to participate as a prime recipient or subrecipient. For consortia incorporated (or otherwise formed) under the laws of a state or territory of the United States, please refer to "Domestic Entities" above. For consortia incorporated (or otherwise formed) in a foreign country, please refer to the requirements in "Foreign Entities" above.

Each consortium must have an internal governance structure and a written set of internal rules. Upon request, the consortium must provide a written description of its internal governance structure and its internal rules to the DOE Contracting Officer.

If the consortium includes foreign members, the applicant must submit a separate explicit written waiver request in the full application for each foreign member. See Appendix E.

iv. Unincorporated Consortia

Unincorporated Consortia must designate one member of the consortium to serve as the prime recipient/consortium representative. The prime recipient/consortium representative must be incorporated (or otherwise formed) under the laws of a state or territory of the United States. The eligibility of the consortium will be determined by the eligibility of the prime recipient/consortium representative under Section III.A of the FOA.

Upon request, unincorporated consortia must provide the DOE Contracting Officer with a collaboration agreement, commonly referred to as the articles of collaboration, which sets out

the rights and responsibilities of each consortium member. This agreement binds the individual consortium members together and should include the consortium's:

- Management structure;
- Method of making payments to consortium members;
- Means of ensuring and overseeing members' efforts on the project;
- Provisions for members' cost sharing contributions; and
- Provisions for ownership and rights in intellectual property developed previously or under the agreement.

If the consortium includes foreign members, the applicant must submit a separate explicit written waiver request in the full application for each foreign member. See Appendix E.

B. Cost Sharing

The cost share must be at least 50% of the total project costs[54] for demonstration projects or a commercial application activity. [55] Each phase of projects selected under this FOA must also meet the 50% cost share requirement unless a different basis is sufficiently justified and negotiated. The cost share must come from non-federal sources unless otherwise allowed by law. DOE funding is limited to the award amounts listed in Section II.A.i; therefore, any cost increases to the negotiated total project cost must be covered by additional non-federal cost share.

Cost share may come from project participants, state or local governments or other third-party financing. Federal financing, such as DOE Loan Guarantees, cannot be leveraged by applicants to provide the required H2Hub cost share or to otherwise support the same scope that is proposed under the H2Hub. Also, in general deferred or avoided costs such as tax credits may not be used as cost share. However, non-federal cost share can include Tennessee Valley Authority power sales revenue, which is specifically allowed under the Energy Policy Act of 2005. See 42 U.S.C § 16352(c) (Section 988 of Energy Policy Act of 2005) and 2 CFR 910.130(d)(2)(v).

To assist applicants in calculating proper cost share amounts, DOE has included a cost share information sheet and sample cost share calculation as Appendix D to this FOA.

Further, applicants are encouraged to review the regulations regarding Program Income and be aware of the ways in which Program Income can be treated during the award. For awards made under this FOA, the default use of program income is Addition.[56] Any other treatment of

[54] Total project costs is the sum of the government share, including FFRDC costs if applicable, and the recipient share of project costs.
[55] Energy Policy Act of 2005, Pub.L. 109-58, sec. 988. Also see 2 CFR 200.306 and 2 CFR 910.130 for additional cost sharing requirements.
[56] See 2 CFR 200.307(e)(2).

Program Income must be negotiated and approved by DOE. Program Income should not be included as cost share in the applicant's budget.

i. Legal Responsibility

Although the cost share requirement applies to the project as a whole, including work performed by members of the project team other than the prime recipient, the prime recipient is legally responsible for paying the entire cost share. If the funding agreement is terminated prior to the end of the project period, the prime recipient is required to contribute at least the cost share percentage of total expenditures incurred through the date of termination.

The prime recipient is solely responsible for managing cost share contributions by the project team and enforcing cost share obligations assumed by project team members in subawards or related agreements.

ii. Cost Share Allocation

Each project team is free to determine how best to allocate the cost share requirement among the team members. The amount contributed by individual project team members may vary, as long as the cost share requirement for the project as a whole is met.

iii. Cost Share Types and Allowability

Every cost share contribution must be allowable under the applicable federal cost principles, as described in Section IV.J.i. of the FOA. In addition, cost share must be verifiable from the recipient's records.

Project teams may provide cost share in the form of cash or in-kind contributions. Cost share may be provided by the prime recipient, subrecipients, or third parties (entities that do not have a role in performing the scope of work). Vendors/contractors may not provide cost share. Any partial donation of goods or services is considered a discount and is not allowable.

Cash contributions include, but are not limited to: personnel costs, fringe costs, supply and equipment costs, indirect costs and other direct costs.

In-kind contributions are those where a value of the contribution can be readily determined, verified and justified but where no actual cash is transacted in securing the good or service comprising the contribution. Allowable in-kind contributions include, but are not limited to: the donation of space or use of equipment.

Project teams may use funding or property received from state or local governments to meet the cost share requirement, so long as the funding was not provided to the state or local government by the federal government.

The prime recipient may not use the following sources to meet its cost share obligations including, but not limited to:

- Revenues or royalties from the prospective operation of an activity beyond the project period;
- Proceeds from the prospective sale of an asset of an activity;
- Federal funding or property (e.g., federal grants, equipment owned by the federal government); or
- Expenditures that were reimbursed under a separate federal program.

Project teams may not use the same cash or in-kind contributions to meet cost share requirements for more than one project or program.

Cost share contributions must be specified in the project budget, verifiable from the prime recipient's records, and necessary and reasonable for proper and efficient accomplishment of the project. As all sources of cost share are considered part of total project cost, the cost share dollars will be scrutinized under the same federal regulations as federal dollars to the project. Every cost share contribution must be reviewed and approved in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred.

Applicants are encouraged to refer to 2 CFR 200.306 and 2 CFR 910.130 for additional cost sharing requirements.

iv. Cost Share Contributions by FFRDCs

Because FFRDCs are funded by the federal government, costs incurred by FFRDCs generally may not be used to meet the cost share requirement. FFRDCs may contribute cost share only if the contributions are paid directly from the contractor's Management Fee or another non-federal source.

v. Cost Share Verification

Applicants are required to provide written assurance of their proposed cost share contributions in their full applications.

Upon selection for award negotiations, applicants are required to provide additional information and documentation regarding their cost share contributions. Please refer to Appendix D of the FOA.

Phase 1 cost share must be verifiable upon submission of the full application. For Phases 2-4, cost share verification will be included as part of the Go/No-Go decision for each phase. Inability by a recipient to verify that it has resources to meet the cost share requirement for

each subsequent Phase (or contingency requirement for Phases 3 and 4) may result in a No-Go decision by DOE.

vi. Cost Share Payment

DOE requires prime recipients to contribute the cost share amount incrementally over the life of the award. The frequency will be determined by the DOE Contracting Officer during award negotiations. At a minimum, the prime recipient must meet the cost share requirement on a Budget Period basis unless a different basis is negotiated and approved by DOE. If an FFRDC is part of the project team, the prime recipient will be required to provide funding directly to the FFRDC and include project cost share at a percentage commensurate with the FFRDC costs.

C. Compliance Criteria

Concept Papers, Full Applications, and Replies to Reviewer Comments must meet all compliance criteria listed below or they will be considered noncompliant. DOE will not review or consider noncompliant submissions, including Concept Papers, Full Applications, and Replies to Reviewer Comments that were: submitted through means other than OCED Exchange; submitted after the applicable deadline; and/or submitted incomplete. DOE will not extend the submission deadline for applicants that fail to submit required information by the applicable deadline due to server/connection congestion.

i. Compliance Criteria

Concept Papers
Concept Papers are deemed compliant if:
- The Concept Paper complies with the content and form requirements in Section IV.C. of the FOA; and
- The applicant successfully uploaded all required documents and clicked the "Submit" button in OCED Exchange by the deadline stated in this FOA.

Full Applications
Full Applications are deemed compliant if:
- The applicant submitted a compliant Concept Paper;
- The Full Application complies with the content and form requirements in Section IV.D. of the FOA; and
- The applicant successfully uploaded all required documents and clicked the "Submit" button in OCED Exchange by the deadline stated in the FOA.

Replies to Reviewer Comments
Replies to Reviewer Comments are deemed compliant if:
- The Reply to Reviewer Comments complies with the content and form requirements in Section IV.E. of the FOA; and

- The applicant successfully uploaded all required documents to OCED Exchange by the deadline stated in the FOA.

D. Responsiveness Criteria

All "Applications Specifically Not of Interest," as described in Section I.C. of the FOA, are deemed nonresponsive and are not reviewed or considered.

E. Other Eligibility Requirements

i. Requirements for DOE/NNSA and non-DOE/NNSA FFRDCs Included as a Subrecipient

DOE/NNSA and non-DOE/NNSA FFRDCs may be proposed as a subrecipient on another entity's application subject to the following guidelines:

Authorization for non-DOE/NNSA FFRDCs
The federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with its authority under its award.

Authorization for DOE/NNSA FFRDCs
The cognizant Contracting Officer for the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The following wording is acceptable for this authorization:

Authorization is granted for the Laboratory to participate in the proposed project. The work proposed for the Laboratory is consistent with or complementary to the missions of the Laboratory and will not adversely impact execution of the DOE assigned programs at the Laboratory.

Cost Share
The applicant's cost share requirement will be based on the total cost of the project, including the applicant's, the subrecipient's, and the FFRDC's portions of the project.

Responsibility
The prime recipient will be the responsible authority regarding the settlement and satisfaction of all contractual and administrative issues including, but not limited to disputes and claims arising out of any agreement between the prime recipient and the FFRDC.

Limit on FFRDC Effort
The FFRDC effort, in aggregate, shall not exceed 10% of the total estimated cost of the project, including the applicant's and the FFRDC's portions of the effort.

F. Limitation on Number of Concept Papers and Full Applications Eligible for Review

An entity may submit more than one Concept Paper and Full Application to this FOA, provided that each application describes a unique, distinct project and provided that an eligible Concept Paper was submitted for each Full Application.

G. Questions Regarding Eligibility

DOE will not make eligibility determinations for potential applicants prior to the date on which applications to this FOA must be submitted. The decision whether to submit an application in response to this FOA lies solely with the applicant.

IV. Application and Submission Information

A. Application Process

The application process will include two phases: a Concept Paper phase and a Full Application phase. **Only applicants who have submitted an eligible Concept Paper will be eligible to submit a Full Application.**

At each phase, DOE performs an initial eligibility review of the applicant submissions to determine whether they meet the eligibility requirements of Section III of the FOA. DOE will not review or consider submissions that do not meet the eligibility requirements of Section III. All submissions must conform to the following form and content requirements, including maximum page lengths (described below) and must be submitted via OCED Exchange at https://oced-Exchange.energy.gov, unless specifically stated otherwise. **DOE will not review or consider submissions submitted through means other than OCED Exchange, submissions submitted after the applicable deadline, or incomplete submissions**. DOE will not extend deadlines for applicants who fail to submit required information and documents due to server/connection congestion.

A **Control Number** will be issued when an applicant begins the OCED Exchange application process. This control number must be included with all application documents, as described below.

The Concept Paper, Full Application, and Reply to Reviewer Comments must conform to the following requirements:

- Each must be submitted in Adobe PDF format unless stated otherwise;
- Each must be written in English;
- Unless stated otherwise, all pages must be formatted to fit on 8.5 x 11 inch paper with margins not less than one inch on every side. Use Calibri typeface, a black font color, and a font size of 12 point or larger (except on the cover page and in figures or tables, which may be 10 point font). A symbol font may be used to insert Greek letters or special characters, but the font size requirement still applies. References must be included as footnotes or endnotes in a font size of 10 or larger. Footnotes and endnotes are counted toward the maximum page requirement;
- The Control Number must be prominently displayed on the upper right corner of the header of every page. Page numbers must be included in the footer of every page; and
- Each submission must not exceed the specified maximum page limit, including cover page, charts, graphs, maps, and photographs when printed using the formatting requirements set forth above and single spaced. If applicants exceed the maximum page lengths indicated below, DOE will review only the authorized number of pages and disregard any additional pages.

Applicants are responsible for meeting each submission deadline. **Applicants are strongly encouraged to submit their Concept Papers, Full Applications, and Replies to Reviewer Comments at least 48 hours in advance of the submission deadline.** Under normal conditions (i.e., at least 48 hours in advance of the submission deadline), applicants should allow at least 1 hour to submit a Concept Paper, Full Application, or Reply to Reviewer Comments. Once the Concept Paper, Full Application, or Reply to Reviewer Comments is submitted in OCED Exchange, applicants may revise or update that submission until the expiration of the applicable deadline. If changes are made to any of these documents, the applicant must resubmit the Concept Paper, Full Application, or Reply to Reviewer Comments before the applicable deadline.

DOE urges applicants to carefully review their Concept Papers, Full Applications, and Replies to Reviewer Comments to allow sufficient time for the submission of required information and documents. Full Applications that pass the initial eligibility review will undergo comprehensive technical merit review according to the criteria identified in Section V.A.ii of the FOA.

i. Additional Information on OCED Exchange

OCED Exchange is designed to enforce the deadlines specified in this FOA. The "Apply" and "Submit" buttons will automatically disable at the defined submission deadlines. Should applicants experience problems with OCED Exchange, the following information may be helpful.

Applicants that experience issues with submission PRIOR to the FOA deadline: In the event that an applicant experiences technical difficulties with a submission, the applicant should contact the OCED Exchange helpdesk for assistance (OCED-ExchangeSupport@hq.doe.gov). The OCED Exchange helpdesk and/or the OCED Exchange system administrators will assist applicants in resolving issues.

B. Application Forms

The application forms and instructions are available on OCED Exchange. To access these materials, go to https://oced-Exchange.energy.gov and select the appropriate funding opportunity number.

Note: The maximum file size that can be uploaded to the OCED Exchange website is 50MB. Files in excess of 50MB cannot be uploaded, and hence cannot be submitted for review. If a file exceeds 50MB but is still within the maximum page limit specified in the FOA, it must be broken into parts and denoted to that effect. For example:

TechnicalVolume_Part_1
TechnicalVolume_Part_2

C. Content and Form of the Concept Paper

To be eligible to submit a Full Application, applicants must submit a Concept Paper by the specified due date and time.

i. Concept Paper Content Requirements

Each Concept Paper must be limited to a single H2Hub concept. Do not consolidate unrelated concepts into a single Concept Paper.

The Concept Paper must conform to the following content and form requirements and must not exceed the stated page limits. If applicants exceed the maximum page length of 20 pages, DOE will review only the authorized number of pages and disregard any additional pages:

Section	Page Limit	Description
Cover Page	1 page maximum	See an example cover page in Appendix I (also provided under the application documents section on the OCED Exchange website). Applicants should provide all of the information requested on the example cover page including any statements regarding confidentiality, if applicable.
H2Hub Description & Project Team Description	19 pages maximum	Applicants should succinctly describe: • The proposed integrated H2Hub; including the key production to connective infrastructure to hydrogen end-use technologies and systems to be deployed, and how the H2Hub will advance the infrastructure for hydrogen production and consumption in the U.S. • A preliminary development plan and timeline, including any key risks and challenges, showing the impact that the proposed project would have on the hydrogen production and consumption infrastructure in the U.S. • The impact that DOE funding would have on the proposed project. • How the proposed work, if successful, would meet the FOA objectives, including how the H2Hub will achieve long term financial and operational viability, market liftoff, and follow-on funding from the private sector to build out a national clean hydrogen network. Applicants are required to describe succinctly the approach to be taken with the Community Benefits Plan, addressing the four core elements: • Carrying out meaningful community and labor engagement; • Investing in the American workforce; • Advancing diversity, equity, inclusion, and accessibility; and • Contributing to the Justice40 Initiative goal that 40% of the overall climate and clean energy investments flow to disadvantaged communities. Applicants should succinctly describe the qualifications, experience, and capabilities of the proposed Project Team, including:

		• Whether the Project Team and senior/key personnel have the skill and expertise needed to successfully design, develop, and operate the proposed H2Hub. • Whether the applicant has prior experience which demonstrates an ability to perform tasks of similar risk and complexity. • Whether the applicant has worked together with its teaming partners on prior projects or programs. • Whether the applicant has adequate access to equipment and facilities necessary to accomplish the effort and/or clearly explain how it intends to obtain access to the necessary equipment and facilities. • A summary organization chart of the team should be provided. • Applicants may provide other graphs, charts, or data to supplement their H2Hub and Project Team Descriptions.

DOE makes an independent assessment of each Concept Paper based on the criteria in Section V.A.i of the FOA. DOE will encourage a subset of applicants to submit Full Applications. Other applicants will be discouraged from submitting a Full Application. An applicant who receives a "discouraged" notification may still submit a Full Application. DOE will review all eligible Full Applications. However, by discouraging the submission of a Full Application, DOE intends to convey its lack of programmatic interest in the proposed project in an effort to save the applicant the time and expense of preparing an application that is unlikely to be selected for award negotiations.

DOE may include general comments provided from reviewers on an applicant's Concept Paper in the encourage/discourage notification posted on OCED Exchange at the close of the review.

D. Content and Form of the Full Application

Applicants must submit a Full Application by the specified due date and time to be considered for funding under this FOA. Applicants must complete the following application forms found on the OCED Exchange website at https://oced-exchange.energy.gov/, in accordance with the instructions.

Applicants will have at least 100 days from receipt of the Concept Paper Encourage/Discourage notification on OCED Exchange to prepare and submit a Full Application.

All Full Application documents must be marked with the Control Number issued to the applicant. Applicants will receive a control number upon clicking the "Create Concept Paper" button in OCED Exchange and should include that control number in the file name of their Full Application submission.

i. Full Application Content Requirements

Each Full Application must be limited to a single concept. Do not consolidate unrelated concepts in a single Full Application. Full Applications must conform to the following content and form requirements and must not exceed the stated page limits. If applicants exceed the maximum page lengths indicated below, DOE will review only the authorized number of pages and disregard any additional pages.

Component	File Format	Page Limit	File Name
Technical Volume	PDF	100	ControlNumber_LeadOrganization_TechnicalVolume
H2Hub TEA and LCA Projections	MS Excel	n/a	ControlNumber_LeadOrganization_TEA_LCA
Community Benefits Plan	PDF	25	ControlNumber_LeadOrganization_CBP
Environmental Considerations Summary	PDF	n/a	ControlNumber_LeadOrganization_EnvInfo
Resumes	PDF	2 pages each	ControlNumber_LeadOrganization_Resumes
Letters of Commitment	PDF	2 pages each	ControlNumber_LeadOrganization_LOCs
Community Partnership Documentation	PDF	3 pages each	ControlNumber_LeadOrganization_PartnerDocs
SF-424	PDF	n/a	ControlNumber_LeadOrganization_App424
Budget Justification Workbook	MS Excel	n/a	ControlNumber_LeadOrganization_Budget_Justification
Summary for Public Release	PDF	3	ControlNumber_LeadOrganization_Summary
Summary Slides	MS PowerPoint	6	ControlNumber_LeadOrganization_Slides
Subrecipient Budget Justification(s)	MS Excel	n/a	ControlNumber_LeadOrganization_Subrecipient_Budget_Justification
Authorization from cognizant Contracting Officer for FFRDC, if applicable	PDF	n/a	ControlNumber_LeadOrganization_FFRDCAuth
SF-LLL Disclosure of Lobbying Activities	PDF	n/a	ControlNumber_LeadOrganization_SF-LLL
Foreign Entity Waiver Requests and Foreign Work Waiver Requests, if applicable	PDF	n/a	ControlNumber_LeadOrganization_Waiver
Potentially Duplicative Funding Notice (if applicable)	PDF	n/a	ControlNumber_LeadOrganization_PDFN
Locations of Work	MS Excel	n/a	Control Number_LeadOrganization_LOW

Note: The maximum file size that can be uploaded to the OCED Exchange website is 50MB. Files in excess of 50MB cannot be uploaded, and hence cannot be submitted for review. If a file exceeds 50MB but is still within the maximum page limit specified in the FOA it must be broken into parts and denoted to that effect. For example:
TechnicalVolume_Part_1

TechnicalVolume_Part_2

DOE will not accept late submissions that resulted from technical difficulties due to uploading files that exceed 50MB.

Detailed guidance on the content and form of each application component is provided below.

ii. Technical Volume

The Technical Volume must be submitted in PDF format and must conform to the following content and form requirements, including maximum page lengths. This volume must address the requirements described in Section I.B.iii "H2Hub Application Requirements" and the technical review criteria as discussed in Section V.A of the FOA. Save the Technical Volume in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_TechnicalVolume."

Applicants must provide sufficient citations and references to justify the claims and approaches made in the Technical Volume. However, DOE and reviewers are under no obligation to review cited sources.

The Technical Volume to the Full Application may not be more than 100 pages, including the cover page, table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all of the information in the table below. The applicant should consider the weighting of each of the technical review criterion (see Section V.A of the FOA) when preparing the Technical Volume.

The Technical Volume should clearly describe and expand upon information provided in the Concept Paper. The Technical Volume must conform to the following content requirements:

Technical Volume Content Requirements	
SECTION/PAGE LIMIT	**DESCRIPTION**
Cover Page (One page)	See an example cover page in Appendix I (also provided under the application documents section on the OCED Exchange website). Applicants should provide all of the information requested on the example cover page including any statements regarding confidentiality, if applicable. Applicants must also certify the domestic entity status of the proposed prime recipient and all subrecipient(s) in accordance with definitions in Section III.A.i of the FOA.
Business Development and Management	The Business Development and Management section should include four plans, as discussed in detail Section I.B.iii. ☐ H2Hub Summary

	Business Plan: ☐ Commercial Feasibility ☐ Key Contracts and Agreements ☐ Preliminary Site Selection ☐ Market Analysis ☐ Feedstock, Supplies, and Offtake Arrangements ☐ Growth Plan Management Plan: ☐ Organizational Structure ☐ Management ☐ Experience ☐ Pending Investigations Financial Plan: ☐ Prime Applicant and Project Partners ☐ Financial Strength ☐ Other Federal Support ☐ Non-Federal Support
Engineering, Procurement, Construction, and Operations	The Engineering, Procurement, Construction and Operations section should include the following, as discussed in detail in Section I.B.iii. ☐ Technology ☐ Performance Projections ☐ Engineering, Design, and Procurement ☐ Cost Estimates (at least Class 4) ☐ Operating & Disposition Plans
Safety, Security, and Regulatory Requirements	The Safety, Security, and Regulatory Requirements section should include the following, as discussed in detail in Section I.B.iii. ☐ Safety ☐ Cybersecurity ☐ Permitting ☐ NEPA
Risk Analysis and Mitigation	The Risk Analysis and Mitigation section should include the following, as discussed in detail in Section I.B.iii. ☐ Risk Management Plan ☐ Risk Register
Technical Data and Analysis	The Technical Data & Analysis section should include the following, as discussed in detail in Section I.B.iii. ☐ Preliminary Techno-Economic Analysis Narrative (GAAP analyses) ☐ Life Cycle Analysis Narrative ☐ TEA & LCA Excel Sheet (H2Hub TEA and LCA Projections spreadsheet submitted separately - see Section IV.D.iii)

Workplan	The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure (WBS), Go/No-Go decision points, and Project Schedule. The Workplan will form the basis of the Cooperative Agreement that will be negotiated if selected for award. The Workplan should contain the following information: - Project Objectives: The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes. - Technical Scope Summary: The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete decision points (see below for more information on Go/No-Go decision points). The applicant should describe the specific expected end result of each performance period, including milestones detailed in the Community Benefits Plan. - WBS and Task Description Summary: The Workplan should describe the work to be accomplished and how the applicant will achieve the project schedule, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period, task and subtasks, which is typical of a standard WBS for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project (including project construction and operations). The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as "we will then complete a proprietary process" is unacceptable). It is the applicant's responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this FOA. If selected for award negotiations, the summary will be incorporated into the SOPO, which will contain a more detailed description of the WBS and tasks. - Go/No-Go Decision Points (See Section VI.B.xv for more information on the Go/No-Go Review): Provide a summary of project-wide Go/No-Go decision points at appropriate points in the project schedule. At a minimum, each project must have at least one project-wide Go/No-Go decision point for each budget period (12 to 18-month period) of the project. The applicant should also provide the specific technical criteria to be used to evaluate the project at the Go/No-Go decision point. - End of Project Goal: The applicant should provide a summary of the H2Hub's end of project goal(s), including: successfully demonstrating commercial operations and financial viability, contributing to the decarbonization of multiple sectors, providing positive community benefits, and the ability to achieve market liftoff and catalyze follow-on investments to continue to build out a national clean hydrogen network beyond the award.

	☐ Integrated Project Schedule: As described in Section I.B.iii under the "Engineering, Procurement, Construction, and Operations" subsection, the applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and Go/No-Go decision points.

iii. H2Hub TEA and LCA Projections

Applicants must provide their preliminary TEA and LCA projections and are strongly encouraged to use the provided "H2Hub TEA and LCA Projections" Excel spreadsheet, which is available under the application documents section on the OCED Exchange website. This spreadsheet itemizes key parameters that DOE is requesting to verify each analysis. This Excel file contains three worksheets (or tabs) including (1) "Description", (2) "General", and (3) "H2Hub TEA & LCA." More information can be found above in Section I.B.iii under the Technical Data and Analysis subsection.

Save the H2Hub TEA and LCA Projections in an Excel file using the following convention for the title "ControlNumber_LeadOrganization_TEA_LCA."

iv. Community Benefits Plan

The Community Benefits Plan must be submitted in PDF format and must conform to the following content and form requirements, including maximum page lengths. This document must address the requirements described under the Community Benefits Plan header in Section I.B.iii "H2Hub Application Requirements" and the associated technical review criteria as discussed in Section V.A of the FOA. Save the Community Benefits Plan in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_CBP."

Applicants should provide sufficient data and references to justify the claims and approaches made in the Community Benefits Plan. However, DOE and reviewers are under no obligation to review cited sources.

The Community Benefits Plan for the Full Application may not be more than 25 pages, including table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all of the information in the table below. The applicant should consider the weighting of each of the technical review criterion (see Section V.A) when preparing the Community Benefits Plan.

The Community Benefits Plan should clearly describe and expand upon information provided in the Concept Paper. The Community Benefits Plan must conform to the following content requirements:

Community Benefits Plan Content Requirements	
SECTION/PAGE LIMIT	**DESCRIPTION**
Community and Labor Engagement (~30% of Plan length)	The Community and Labor Engagement section should contain the following information: ☐ Background ☐ Social Characterization Assessment ☐ Initial Stakeholder Analysis Summary ☐ Engagement Methods and Timeline ☐ Two-way Engagement Statement ☐ Workforce and Community Agreements Statement ☐ Engagement Evaluation Strategy ☐ Resource Summary
Investing in the American Workforce (~20% of Plan length)	The Investing in the American Workforce section should contain the following information: ☐ Background ☐ Quality Jobs ☐ Workforce Development ☐ Worker Rights ☐ Strategies, Milestones and Timelines ☐ Resource Summary
DEIA (~20% of Plan length)	The DEIA section should contain the following information: ☐ Background ☐ Strategies, Milestones, and Timelines ☐ Resource Summary
Justice40 Initiative (~30% of Plan length)	The Justice40 Initiative section should include two parts, as described in Section I.B.iii. Assessment: ☐ An assessment of impacted communities and groups ☐ An assessment of H2Hub benefits and where they flow ☐ An assessment of H2Hub negative impacts and where they flow ☐ Assessment of information gaps Implementation Plan: ☐ Background ☐ Milestones and Timelines ☐ Assessment of barriers to realizing benefits and minimizing negative impacts ☐ Resource Summary

v. Environment Considerations Summary

See Appendix G for information to include in the Environmental Considerations Summary.

Save the Environmental Considerations Summary in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_EnvInfo."

The map showing the location(s) of the proposed project and site layout map requested with the Environmental Considerations Summary may be submitted as separate files and may be in larger engineering formats. While the maps may be created as a GIS Shapefile or other engineering formats, the maps must be saved and submitted as a PDF file.

vi. Resumes

A resume provides information that can be used by reviewers to evaluate an individual's relevant skills and experience. Submission of a 2-page resume is required for each senior/key personnel that includes the following:

- Contact Information;
- Education: Provide institution, major/area, degree, and year of graduation; and
- Professional Experience: Describe the individual's experience leading large construction projects, including hydrogen systems.

Save all resumes in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_Resumes."

vii. Letters of Commitment

Submit letters of commitment from all subrecipient and third-party cost share providers. If applicable, also include any letters of commitment from suppliers/partners/end-users/future customers/labor unions/community-based organizations (two-page maximum per letter). Save the letters of commitment in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_LOCs."

viii. Community Partnership Documentation

In support of the Community Benefits Plan, applicants may submit documentation to demonstrate existing or planned partnerships with community entities, such as organizations that work with local stakeholders such as residents and businesses; organizations that carry out workforce development programs, trade associations, worker organizations including labor unions; and community-based organizations that work with disadvantaged communities. The Partnership Documentation could be in the form of letters on the partner's letterhead outlining the planned partnership signed by an officer of the entity, a Memorandum of Understanding, or other similar agreement. Such letters must state the specific nature of the partnership and

must not be general letters of support. If the applicant intends to enter into a Workforce and Community Agreement as part of the Community Benefits Plan, please include letters from proposed partners as appropriate. Each letter must not exceed 3 pages. Save the partnership documentation in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_PartnerDocs".

ix. SF-424: Application for Federal Assistance

Complete all required fields in accordance with the instructions on the form. The list of certifications and assurances in Field 21 can be found at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms, under Certifications and Assurances. Note: The dates and dollar amounts on the SF-424 are for the complete project period and not just the first project year, first phase or other subset of the project period. Save the SF-424 in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_424."

x. Budget Justification Workbook

Applicants are required to complete the Budget Justification Workbook. This form is available on OCED Exchange at https://oced-Exchange.energy.gov/. Prime recipients must complete each tab of the Budget Justification Workbook for the project as a whole, including all work to be performed by the prime recipient and its subrecipients and contractors as well as resources required to implement the Community Benefits Plan. Applicants should include costs associated with required annual audits and incurred cost proposals in their proposed budget documents. The "Instructions and Summary" included with the Budget Justification Workbook will auto-populate as the applicant enters information into the Workbook. Applicants should carefully read the "Instructions and Summary" tab provided within the Budget Justification Workbook. Save the Budget Justification Workbook in a single Microsoft Excel file using the following convention for the title "ControlNumber_LeadOrganization_Budget_Justification."

xi. Summary for Public Release

Applicants are required to submit a summary of their project. The project summary must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the program/project manager, the project title, the objectives of the project, a description of the project, the potential impact of the project (e.g., benefits, outcomes), and major participants. This document must not include any proprietary or sensitive business information as DOE may make it available to the public after selections are made. The project summary must not exceed 3 pages when printed using standard 8.5 x 11 paper with 1" margins (top, bottom, left, and right) with font not smaller than 12 point. Save the Summary for Public Release in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_Summary."

xii. Summary Slides

Applicants are required to provide up to six (6) slides summarizing the proposed H2Hub project. Applicants are encouraged to use the Summary Slide template provided under the application documents section on OCED Exchange website. These slides are used during the evaluation process.

The Summary Slides should include the following information:

- Overview
- Organizational Chart
- Project Schedule
- Business Model
- Life Cycle Assessment Impacts
- Community Benefits Plan

Save the Summary Slides in a single Microsoft PowerPoint file using the following convention for the title "ControlNumber_LeadOrganization_Slides."

xiii. Subrecipient Budget Justification

Applicants must provide a separate budget justification for each subrecipient (including FFRDCs) that is expected to perform work estimated to be more than $10,000,000 or 25 percent of the total work effort (whichever is less). The budget justification must include the same justification information described in the "Budget Justification" section above. Save each subrecipient budget justification in a Microsoft Excel file using the following convention for the title "ControlNumber_LeadOrganization_Subrecipient_Budget_Justification."

xiv. Not Applicable

xv. Authorization for non-DOE/NNSA or DOE/NNSA FFRDCs (if applicable)

The federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with the contractor's authority under its award. Save the Authorization in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_FFRDCAuth."

xvi. SF-LLL: Disclosure of Lobbying Activities (required)

Prime recipients and subrecipients may not use any federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Prime recipients and subrecipients are required to complete and submit SF-LLL, "Disclosure of Lobbying Activities" (https://www.grants.gov/web/grants/forms/sf-424-individual-family.html) to ensure that non-federal funds have not been paid and will not be paid to any person for influencing or attempting to influence any of the following in connection with the application:

- An officer or employee of any federal agency;
- A Member of Congress;
- An officer or employee of Congress; or
- An employee of a Member of Congress.

Save the SF-LLL in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_SF-LLL."

xvii. Waiver Requests (if applicable)

Foreign Entity Participation
For projects selected under this FOA, as set forth in Section III.A.ii., all prime recipients and subrecipients must be organized, chartered, or incorporated (or otherwise formed) under the laws of a particular state or territory of the United States; have majority domestic ownership and control; and have a physical place of business in the United States. To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application. Appendix E lists the information that must be included in a waiver request.

Performance of Work in the United States (Foreign Work Waiver)
As set forth in Section IV.J.iii., all work for projects selected under this FOA must be performed in the United States. To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application. Appendix E lists the information that must be included in a foreign work waiver request.

Save the Waivers in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_Waiver."

xviii. Requirement to Report Potentially Duplicative Funding

If the applicant or project team member has other active awards of federal funds, the applicant must determine whether the activities of those awards potentially overlap with the activities set forth in its application to this FOA. If there is a potential overlap, the applicant must notify DOE in writing of the potential overlap and state how it will ensure any project funds (i.e., recipient cost share and federal funds) will not be used for identical cost items under multiple awards. Likewise, for projects that receive funding under this FOA, if a recipient or project team member receives any other award of federal funds for activities that potentially overlap with the activities funded under the DOE award, the recipient must promptly notify DOE in writing of the potential overlap and state whether project funds from any of those other federal awards

have been, are being, or are to be used (in whole or in part) for one or more of the identical cost items under the DOE award. If there are identical cost items, the recipient must promptly notify the DOE Contracting Officer in writing of the potential duplication and eliminate any inappropriate duplication of funding.

Save the Potential Duplicative Funding Notice in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_PDFN."

xix. Locations of Work

The applicant must complete the supplied template by listing the city, state, and zip code + 4 for each location where project work will be performed by the prime recipient or subrecipient(s). Save the completed template as a MS Excel file using the following convention for the title "Control Number_LeadOrganization_LOW."

E. Content and Form of Replies to Reviewer Comments (Optional Submission)

DOE will provide applicants with reviewer comments following the evaluation of all eligible Full Applications. Applicants have a brief opportunity to prepare a short Reply to Reviewer Comments (Reply). The Reply must not exceed ten (10) pages. If a Reply is more than ten (10) pages in length, DOE will review only the first ten (10) pages and disregard any additional pages. Applicants may use the Reply to respond to one or more comments or to supplement their Full Application. The Reply may include text, graphs, charts, or data.

DOE will post the reviewer comments in OCED Exchange. The expected submission deadline is on the cover page of the FOA; however, it is the applicant's responsibility to monitor OCED Exchange in the event that the expected date changes. The deadline will not be extended for applicants who are unable to timely submit their Reply due to failure to check OCED Exchange or relying on the expected date alone. Applicants should anticipate having approximately three (5) business days to submit a Reply.

DOE will not review or consider ineligible Replies to Reviewer Comments (see Section III.C.i "Compliance Criteria" of the FOA). Applicants are not required to submit a Reply to Reviewer Comments. DOE will review and consider each eligible Full Application, even if no Reply is submitted or if the Reply is found to be ineligible.

F. Post Selection Information Requests

If selected for award, DOE reserves the right to request additional or clarifying information regarding the following (non-exhaustive list):

- Senior/key personnel proposed to work on the project and collaborating organizations (See Section VI.B.xix. Participants and Collaborating Organizations);

- An Intellectual Property Management Plan (if applicable) describing how the project team/consortia members will handle intellectual property rights and issues between themselves while ensuring compliance with federal intellectual property laws, regulations, and policies in accordance with Section VI.B.xi Intellectual Property Management Plan;
- A Data Management Plan (if applicable) describing how all research data displayed in publications resulting from the proposed work will be digitally accessible at the time of publications, in accordance with Section VI.B.xxiii.;
- Indirect cost information;
- Other budget information and cost analysis;
- Commitment Letters from Third Parties Contributing to Cost Share, if applicable;
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5);
- Representation of Limited Rights Data and Restricted Software, if applicable;
- Information related to Davis-Bacon Act requirements;
- Information related to any Workforce and Community Benefits Agreement, Good Neighbor Agreements, or other agreements applicants may have made with the relevant community;
- Statement of Project Objectives (SOPO); and
- Environmental Questionnaire.

G. Unique Entity Identifier (UEI) and System for Award Management (SAM)

Each applicant (unless the applicant is an individual or federal awarding agency that is excepted from those requirements under 2 CFR 25.110(b) or (c), or has an exception approved by the federal awarding agency under 2 CFR 25.110(d)) is required to: (1) Be registered in the SAM at https://www.sam.gov before submitting its application; (2) provide a valid UEI number in its application; and (3) continue to maintain an active SAM registration with current information at all times during which it has an active federal award or an application or plan under consideration by a federal awarding agency. DOE may not make a federal award to an applicant until the applicant has complied with all applicable UEI and SAM requirements and, if an applicant has not fully complied with the requirements by the time DOE is ready to make a federal award, the DOE will determine that the applicant is not qualified to receive a federal award and use that determination as a basis for making a federal award to another applicant.

NOTE: Due to the high demand of UEI requests and SAM registrations, entity legal business name and address validations are taking longer than expected to process. Applicants should start the UEI and SAM registration process as soon as possible. If applicants have technical difficulties with the SAM registration or UEI validation process they should contact Customer Service on SAM.gov. SAM.gov Customer Service will work service tickets in the order in which they are received and asks that applicants not create multiple service tickets for the same request or technical issue.

H. Submission Dates and Times

All required submissions must be submitted in OCED Exchange no later than 5 p.m. Eastern Time on the dates provided on the cover page of this FOA.

I. Intergovernmental Review

This FOA is not subject to Executive Order 12372 – Intergovernmental Review of Federal Programs.

J. Funding Restrictions

i. Allowable Costs

All expenditures must be allowable, allocable, and reasonable in accordance with the applicable federal cost principles. Pursuant to 2 CFR 910.352, the cost principles in the Federal Acquisition Regulations (48 CFR Part 31.2) apply to for-profit entities. The cost principles contained in 2 CFR Part 200, Subpart E apply to all entities other than for-profits.

Costs to support or oppose union organizing, whether directly or as an offset for other funds, are unallowable.

ii. Pre-Award Costs

Applicants selected for award negotiations (selectee) must request prior written approval to charge pre-award costs. Pre-award costs are those incurred prior to the effective date of the federal award directly pursuant to the negotiation and in anticipation of the federal award where such costs are necessary for efficient and timely performance of the scope of work. Such costs are allowable only to the extent that they would have been allowable if incurred after the date of the federal award and **only** with the written approval of the federal awarding agency through the DOE Contracting Officer.

Pre-award costs cannot be incurred prior to the Selection Official signing the Selection Statement and Analysis.

Pre-award expenditures are made at the selectee's risk. DOE is not obligated to reimburse costs: (1) in the absence of appropriations; (2) if an award is not made; or (3) if an award is made for a lesser amount than the selectee anticipated.

1. **National Environmental Policy Act (NEPA) Requirements Related to Pre-Award Costs**
   DOE's decision whether and how to distribute federal funds under this FOA is subject to NEPA. Applicants should carefully consider and should seek legal counsel

or other expert advice before taking any action related to the proposed project that would have an adverse effect on the environment or limit the choice of reasonable alternatives prior to DOE completing the NEPA review process.

DOE does not guarantee or assume any obligation to reimburse pre-award costs incurred prior to receiving written authorization from the Contracting Officer. If the applicant elects to undertake activities that DOE determines may have an adverse effect on the environment or limit the choice of reasonable alternatives prior to receiving such written authorization from the Contracting Officer, the applicant is doing so at risk of not receiving federal funding for their project and such costs may not be recognized as allowable cost share. Nothing contained in the pre-award cost reimbursement regulations or any pre-award costs approval letter from the Contracting Officer override the requirement to obtain the written authorization from the Contracting Officer prior to taking any action that may have an adverse effect on the environment or limit the choice of reasonable alternatives. Likewise, if an application is selected for negotiation of award, and the prime recipient elects to undertake activities that are not authorized for federal funding by the Contracting Officer in advance of DOE completing a NEPA review, the prime recipient is doing so at risk of not receiving federal funding and such costs may not be recognized as allowable cost share.

iii. Performance of Work in the United States (Foreign Work Waiver)

1. **Requirement**
   All work performed under awards issued under this FOA must be performed in the United States. The prime recipient must flow down this requirement to its subrecipients.

2. **Failure to Comply**
   If the prime recipient fails to comply with the Performance of Work in the United States requirement, DOE may deny reimbursement for the work conducted outside the United States and such costs may not be recognized as allowable recipient cost share. The prime recipient is responsible should any work under this award be performed outside the United States, absent a waiver, regardless of whether the work is performed by the prime recipient, subrecipients, contractors or other project partners.

3. **Waiver**
   There may be limited circumstances where it is in the interest of the project to perform a portion of the work outside the United States. To seek a foreign work waiver, the applicant must submit a written waiver request to DOE. Appendix E lists the information that must be included in a request for a foreign work waiver.

Save the waiver request(s) in a single PDF file. The applicant does not have the right to appeal DOE's decision concerning a waiver request.

iv. Construction

Recipients are required to obtain written authorization from the Contracting Officer before incurring any major construction costs.

v. Foreign Travel

Foreign travel costs are not allowable under this FOA, except with explicit DOE approval.

If international travel is proposed for your project, please note that your organization must comply with the International Air Transportation Fair Competitive Practices Act of 1974 (49 U.S.C. 40118), commonly referred to as the "Fly America Act," and implementing regulations at 41 CFR 301-10.131 through 301-10.143. The law and regulations require air transport of people or property to, from, between, or within a country other than the United States, the cost of which is supported under this award, to be performed by or under a cost-sharing arrangement with a U.S. flag carrier, if service is available. Foreign travel costs are allowable only with the written prior approval of the Contracting Officer assigned to the award.

vi. Buy America Requirements for Infrastructure Projects

Pursuant to the Build America Buy America Act, subtitle IX of BIL (Buy America), federally assisted projects that involve infrastructure work, undertaken by applicable recipient types, require that:

- All iron, steel, and manufactured products used in the infrastructure work are produced in the United States; and
- All construction materials used in the infrastructure work are manufactured in the United States.

In general, whether a given project must apply this requirement is dependent on several factors, such as the recipient's entity type, whether the work involves "infrastructure," as that term is defined in Section 70914 of the BIL (discussed in more detail below), and whether the infrastructure in question is publicly owned or serves a public function.

For this FOA specifically, all projects subject to this FOA are considered "infrastructure" within the Buy America provision of BIL, based on implementation guidance[57] from the Office of Management and Budget (OMB) issued on April 18, 2022. Moreover, based also on the OMB guidance, the Buy America requirements of the BIL do not apply to DOE projects in which the

[57] https://www.whitehouse.gov/wp-content/uploads/2022/04/M-22-11.pdf

prime recipient is a for-profit entity; the requirements only apply to projects whose prime recipient is a "non-Federal entity," e.g., a State, local government, Indian Tribe, Institution of Higher Education, or nonprofit organization. Subawards should conform to the terms of the prime award from which they flow; in other words, for-profit prime recipients are not required to flow down these Buy America requirements to subrecipients, even if those subrecipients are non-Federal entities as defined above. Conversely, prime recipients which are non-Federal entities must flow the Buy America requirements down to all subrecipients, even if those subrecipients are for-profit entities. Finally, for all applicants—both non-Federal entities and for-profit entities—DOE is including a Program Policy Factor that the Selection Official may consider in determining which Full Applications to select for award negotiations that considers whether the applicant has made a commitment to procure U.S. iron, steel, manufactured products, and construction materials in its project.

The Cooperative Agreement between DOE and the awardee will require each recipient: (1) to fulfill the commitments made in its application regarding the procurement of U.S.-produced products, subject to a waiver process by DOE assessing the availability and cost (increasing the cost of the overall project by >25%) and (2) to fulfill the commitments made in its application regarding the procurement of other key component metals and manufactured products domestically that are deemed available in sufficient and reasonably available quantities or of a satisfactory quality at the time of award negotiation, again subject to a DOE waiver process. Applicants may also seek a DOE waiver of domestic procurement requirements based on applicable public interest factors, such as relating to minor components, international trade obligations, or other considerations.

Applicants are strongly encouraged to consult Appendix F for more information.

vii. Davis-Bacon Act Requirements

Projects awarded under this FOA will be funded under Division D of the BIL. Accordingly, per Section 41101 of that law, all laborers and mechanics employed by the applicant, subrecipients, contractors or subcontractors in the performance of construction, alteration, or repair work funded in whole or in part under this FOA shall be paid wages at rates not less than those prevailing on similar projects in the locality, as determined by the Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, United States Code commonly referred to as the "Davis-Bacon Act" (DBA).

Applicants shall provide written assurance acknowledging the DBA requirements above, and confirming that the laborers and mechanics performing construction, alteration, or repair work on projects funded in whole or in part by awards made as a result of this FOA are paid or will be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by subchapter IV of Chapter 31 of Title 40, United States Code (Davis-Bacon Act).

Applicants acknowledge that they will comply with all of the Davis-Bacon Act requirements, including but not limited to:

(1) ensuring that the wage determination(s) and appropriate Davis-Bacon clauses and requirements are flowed down to and incorporated into any applicable subcontracts or subrecipient awards.

(2) ensuring that if wage determination(s) and appropriate Davis-Bacon clauses and requirements are improperly omitted from contracts and subrecipient awards, the applicable wage determination(s) and clauses are retroactively incorporated to the start of performance.

(3) being responsible for compliance by any subcontractor or subrecipient with the Davis-Bacon labor standards.

(4) receiving and reviewing certified weekly payrolls submitted by all subcontractors and subrecipients for accuracy and to identify potential compliance issues.

(5) maintaining original certified weekly payrolls for 3 years after the completion of the project and must make those payrolls available to the DOE or the Department of Labor upon request, as required by 29 CFR 5.6(a)(2).

(6) conducting payroll and job-site reviews for construction work, including interviews with employees, with such frequency as may be necessary to assure compliance by its subcontractors and subrecipients and as requested or directed by the DOE.

(7) cooperating with any authorized representative of the Department of Labor in their inspection of records, interviews with employees, and other actions undertaken as part of a Department of Labor investigation.

(8) posting in a prominent and accessible place the wage determination(s) and Department of Labor Publication: WH-1321, Notice to Employees Working on Federal or Federally Assisted Construction Projects.

(9) notifying the Contracting Officer of all labor standards issues, including all complaints regarding incorrect payment of prevailing wages and/or fringe benefits, received from the recipient, subrecipient, contractor, or subcontractor employees; significant labor standards violations, as defined in 29 CFR 5.7; disputes concerning labor standards pursuant to 29 CFR parts 4, 6, and 8 and as defined in FAR 52.222-14; disputed labor standards determinations; Department of Labor investigations; or legal or judicial proceedings related to the labor standards under this Contract, a subcontract, or subrecipient award.

(10) preparing and submitting to the Contracting Officer, the Office of Management and Budget Control Number 1910-5165, Davis Bacon Semi-Annual Labor Compliance Report, by April 21 and October 21 of each year. Form submittal will be administered through the iBenefits system (https://doeibenefits2.energy.gov) or its successor system.

Recipients of funding under this FOA will also be required to undergo Davis-Bacon Act compliance training and to maintain competency in Davis-Bacon Act compliance. The Contracting Officer will notify the recipient of any DOE sponsored Davis-Bacon Act compliance trainings. The U.S. Department of Labor ("DOL") offers free Prevailing Wage Seminars several times a year that meet this requirement, at https://www.dol.gov/agencies/whd/government-contracts/construction/seminars/events.

For additional guidance on how to comply with the Davis-Bacon provisions and clauses, see https://www.dol.gov/agencies/whd/government-contracts/construction and https://www.dol.gov/agencies/whd/government-contracts/protections-for-workers-in-construction.

viii. Lobbying

Recipients and subrecipients may not use any federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Recipients and subrecipients are required to complete and submit SF-LLL, "Disclosure of Lobbying Activities" (https://www.grants.gov/web/grants/forms/sf-424-individual-family.html) to ensure that non-federal funds have not been paid and will not be paid to any person for influencing or attempting to influence any of the following in connection with the application:

- An officer or employee of any federal agency;
- A Member of Congress;
- An officer or employee of Congress; or
- An employee of a Member of Congress.

ix. Risk Assessment

Prior to making a federal award, the DOE is required by 31 U.S.C. 3321 and 41 U.S.C. 2313 to review information available through any Office of Management and Budget (OMB)-designated repositories of government-wide eligibility qualification or financial integrity information, such as SAM Exclusions and "Do Not Pay."

In addition, DOE evaluates the risk(s) posed by applicants before they receive federal awards. This evaluation may consider: results of the evaluation of the applicant's eligibility; the quality of the application; mitigation of labor and community disputes; financial stability; quality of

management systems and ability to meet the management standards prescribed in this part; history of performance; reports and findings from audits; and the applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-federal entities.

In addition to this review, DOE must comply with the guidelines on government-wide suspension and debarment in 2 CFR 180 and must require non-federal entities to comply with these provisions. These provisions restrict federal awards, subawards and contracts with certain parties that are debarred, suspended, or otherwise excluded from or ineligible for participation in federal programs or activities.

Further, as DOE funds investments in the nation's critical infrastructure, DOE also considers possible vectors of undue foreign influence in evaluating risk. If high risks of undue foreign influence are identified and cannot be sufficiently mitigated, DOE may elect to not fund the applicant.

x. Invoice Review and Approval

DOE employs a risk-based approach to determine the level of supporting documentation required for approving invoice payments. Recipients may be required to provide some or all of the following items with their requests for reimbursement:

- Summary of costs by cost categories;
- Timesheets or personnel hours report;
- Proof of compliance with Davis-Bacon and electronic submittals of certified payroll reports;
- Disclosure of any citations related to NLRA, FLSA, OSHA, SCA, or DBA, or Title VII;
- Invoices/receipts for all travel, equipment, supplies, contractual, and other costs;
- UCC filing proof for equipment acquired with project funds by for-profit recipients and subrecipients;
- Explanation of cost share for invoicing period;
- Analogous information for some subrecipients; and
- Other items as required by DOE.

xi. Prohibition related to Foreign Government-Sponsored Talent Recruitment Programs

Persons participating in a Foreign Government-Sponsored Talent Recruitment Program of a Foreign Country of Risk are prohibited from participating in projects selected for federal funding under this FOA. Should an award result from this FOA, the recipient must exercise continuing due diligence to reasonably ensure that no individuals participating on the DOE-funded project are participating in a Foreign Government-Sponsored Talent Recruitment Program of a Foreign Country of Risk. Consequences for violations of this prohibition will be

determined according to applicable law, regulations, and policy. Further, the recipient must notify DOE within five (5) business days upon learning that an individual on the project team is or is believed to be participating in a foreign government talent recruitment program of a foreign country of risk. DOE may modify and add requirements related to this prohibition to the extent required by law.

Definitions:

1. **Foreign Government-Sponsored Talent Recruitment Program.** An effort directly or indirectly organized, managed, or funded by a foreign government, or a foreign government instrumentality or entity, to recruit science and technology professionals or students (regardless of citizenship or national origin, or whether having a full-time or part-time position). Some foreign government-sponsored talent recruitment programs operate with the intent to import or otherwise acquire from abroad, sometimes through illicit means, proprietary technology or software, unpublished data and methods, and intellectual property to further the military modernization goals and/or economic goals of a foreign government. Many, but not all, programs aim to incentivize the targeted individual to relocate physically to the foreign state for the above purpose. Some programs allow for or encourage continued employment at U.S. research facilities or receipt of Federal research funds while concurrently working at and/or receiving compensation from a foreign institution, and some direct participants not to disclose their participation to U.S. entities. Compensation could take many forms including cash, research funding, complimentary foreign travel, honorific titles, career advancement opportunities, promised future compensation, or other types of remuneration or consideration, including in-kind compensation.
2. **Foreign Country of Risk.** DOE has designated the following countries as foreign countries of risk: Iran, North Korea, Russia, and China. This list is subject to change.

xii. Affirmative Action and Pay Transparency Requirements

All federally assisted construction contracts exceeding $10,000 annually will be subject to the requirements of Executive Order 11246:

(1) Recipients, subrecipients, contractors and subcontractors are prohibited from discriminating in employment decisions on the basis of race, color, religion, sex, sexual orientation, gender identity or national origin.

(2) Recipients and Contractors are required to take affirmative action to ensure that equal opportunity is provided in all aspects of their employment. This includes flowing down the appropriate language to all subrecipients, contractors and subcontractors.

(3) Recipients, subrecipients, contractors and subcontractors are prohibited from taking adverse employment actions against applicants and employees for asking about, discussing, or sharing information about their pay or, under certain circumstances, the pay of their co-workers.

The Department of Labor's Office of Federal Contractor Compliance Programs (OFCCP) uses a neutral process to schedule contractors for compliance evaluations. OFCCP's Technical Assistance Guide[58] should be consulted to gain an understanding of the requirements and possible actions the recipients, subrecipients, contractors and subcontractors must take.

Additionally, for construction projects valued at $35 million or more and lasting more than one year, the recipients, subrecipients, contractors and subcontractors may be assigned by OFCCP as a mega construction project and may be neutrally selected for a compliance evaluation by OFCCP.[59]

[58] See OFCCP's Technical Assistance Guide at: https://www.dol.gov/sites/dolgov/files/ofccp/Construction/files/ConstructionTAG.pdf?msclkid=9e397d68c4b111ec9d8e6fecb6c710ec. Also see the National Policy Assurances http://www.nsf.gov/awards/managing/rtc.jsp

[59] For more information regarding this program, see https://www.dol.gov/agencies/ofccp/construction/mega-program.

V. Application Review Information

A. Technical Review Criteria

i. Concept Papers

Concept Papers are evaluated based on consideration the following criterion. All sub-criteria are of equal weight and will be considered in evaluating the criterion but will not be individually scored.

Concept Paper Criterion: Overall FOA Responsiveness and Viability of the Project (Weight: 100%)

This criterion involves consideration of the following factors:

- The applicant clearly describes the proposed scope of the integrated H2Hub including the key clean hydrogen production through end-use technologies and systems, total cost of the project, and how the proposed H2Hub would ultimately facilitate a national clean hydrogen network in the U.S.
- The applicant has identified a preliminary project development plan and timeline, including a finance plan, any key risks, challenges, and possible mitigation strategies, and has shown the impact that DOE funding and the proposed project would have on developing a national clean hydrogen network and supporting decarbonization goals.
- The applicant and proposed team have the qualifications, experience, capabilities, and other resources necessary to design, develop, build, and operate the proposed H2Hub.
- A description of strategies to ensure meaningful community and labor engagement; quality jobs and workforce development; EEJ and the Justice40 Initiative; and diversity, inclusion, accessibility—including methods to ensure accountability.
- The proposed work, if successfully accomplished, would meet the objectives as stated in the FOA, including achieving market liftoff and attracting follow-on investments from the private sector to build out a national clean hydrogen network.

ii. Full Applications

DOE will evaluate applications against the technical review criteria shown below. All sub-criteria are of equal weight and will be considered in evaluating the criteria but will not be individually scored.

Criterion 1: Technical Merit and Impact (25%):

- Extent to which the application specifically and convincingly demonstrates how the proposed H2Hub will deploy regional hydrogen infrastructure capable of meeting the technical objectives outlined in the FOA.
- The degree to which the proposed H2Hub reduces emissions (GHG and criteria pollutants) across the full life cycle compared to current/conventional technologies and processes as evaluated by the GREET model.
- The ability of the proposed H2Hub to produce at least 50-100MT of clean hydrogen per day (in-line with the proposed H2Hub budget) and also ensure a balance between clean hydrogen production and utilization. H2Hubs that will produce larger quantities of clean hydrogen (exceeding this minimum requirement) will be considered favorably by DOE.
- The degree to which the proposed technologies and integrated systems are clearly described in the application. This includes the sufficiency of technical detail provided in the application addressing whether the proposed technologies and systems are commercially viable (i.e., able to deploy at scale in support of the clean hydrogen production and utilization requirements outlined in the FOA).
- Adequacy and clarity of the risk assessment and risk management discussion. A demonstrated understanding of the key technical, construction, regulatory, permitting, safety, scale-up and infrastructure integration risks involved in the proposed work, and the quality of the mitigation strategies to address them. This includes adequate and accurate assessment of project readiness.

Criterion 2: Financial and Market Viability (20%):

- The degree to which the application justifies the proposed H2Hub's economic viability, sustainability, and potential growth beyond DOE funding, including achieving market liftoff and follow-on investments to build out a national clean hydrogen network.
- The degree to which the applicant assesses the proposed H2Hub's markets and competition to ensure the proposed H2Hub will be competitive and sustainable including data to substantiate any claims such as average selling prices and both historical and forward-looking market trends.
- The degree to which the proposed H2Hub utilizes and leverages available regional resources to meet the FOA objectives.
- The adequacy and justification of the proposed H2Hub budget and spend plan covering both DOE funding and non-federal cost share. This includes applicant's ability to provide contingency to meet unknown project cost overruns often seen with large demonstration projects.
- The availability, credibility, and risk/terms of non-federal cost share sources and funds necessary to meet ongoing cost share needs. This includes the ability to leverage DOE financial assistance funding from this FOA with state and local incentives and private financing.

- The degree to which the applicant addresses each key participating organization's financial commitment to the proposed H2Hub including overall financial strength and financial capability to implement the proposed H2Hub.
- The adequacy of the business plan for developing key project agreements such as financing, acquisition strategies, power purchase agreements, feedstock supply, offtake (sales) agreements, and other relevant project documents.
- The extent to which the proposed H2Hub captures growing markets for hydrogen end-uses and enables new and expanding hydrogen market segments.
- The adequacy and clarity of the financial risk management discussion and a demonstrated understanding of financial and market risks involved in the proposed work, as well as the quality of the mitigation strategies to address them.

Criterion 3: H2Hub Workplan (15%)

- The speed at which the H2Hub can achieve its proposed production rate and build out the related infrastructure to expand end use markets for clean hydrogen.
- The overall reasonableness of the IPS based on the associated complexity of the H2Hub proposal.
- The degree to which the proposed H2Hub Workplan and critical path have been clearly and thoroughly described and thoughtfully considered.
- The degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan will succeed in meeting the project goals.
- The strength and level of clarity in the definition of the project phases, metrics, IPS, and Go/No-Go criteria.
- The strength of the deliverables as defined in the application, such that DOE and independent experts will be able to review key technical, financial, regulatory, permitting, and community benefit milestones at appropriate project Go/No Go decision points to mitigate project risk and enable the successful design, procurement, construction, and operation of the proposed H2Hub.
- The extent to which the Community Benefits Plan is integrated into the project management schedule and provides mechanisms with measurable actions that enable impacts to project direction in a timely manner.

Criterion 4: Management Team and Project Partners (20%)

- The capability of the prime recipient, the proposed team, and key personnel to manage and address all aspects of the proposed work with a high probability of success.
- The qualifications and relevant experience, including number of years, demonstrated safety performance history, and specific project experience, of the

key project participants in performing similar projects and the allocation of responsibility commensurate with this experience.

- The reasonableness of time commitment from key personnel to successfully manage a project of this size and complexity.
- The level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan.
- The degree to which existing facilities and/or infrastructure provided by the applicant team are leveraged to support the H2Hub.
- The strength of the project management discussion in the project Workplan to give confidence in a high likelihood of H2Hub success.
- The degree to which the applicant has defined and described a project management structure that addresses interfaces with DOE and key H2Hub team members.
- The clarity and appropriateness of the roles of the team members.
- Adequacy and clarity of the risk management discussion as it pertains to the project team and project management aspects of the proposed H2Hub.
- A demonstrated understanding of key team and project management risks involved in the proposed work; as well as the quality of the mitigation strategies to address them.

Criterion 5: Community Benefits Plan (20%)

- The extent to which the plan specifically and convincingly demonstrates how the proposed H2Hub will provide societal benefits and mitigate/minimize negative impacts.
- The extent to which the actions outlined in the Community Benefits Plan are supported by existing Workforce and Community Agreements (e.g., good neighbor agreements, workforce agreements, project labor agreements, collective bargaining agreements, and similar agreements).
- The extent to which the team and resources--including staff, facilities, capabilities, and budget--are capable of adequately implementing plans outlined in the Community Benefits Plan.
- The extent to which the Community Benefits Plan identifies specific and measurable benefits, how the benefits will flow, and how negative impacts would be mitigated—and specifically describes these impacts on disadvantaged communities.
- The extent to which the project illustrates the ability to support the overall goal of the Justice40 Initiative that 40% of the benefits of the overall investments flow to disadvantaged communities.
- The extent to which the project demonstrates a clear and appropriately robust plan to meaningfully engage local stakeholders, including labor unions and community-based organizations that support or work with disadvantaged communities, and/or Tribes, in a manner that can impact project decisions.

- The extent to which impacted communities and workforce organizations, including labor unions, are appropriately included as core partners in the project and/or affirm support.
- The extent to which the Community Benefits Plan demonstrates that the jobs supported by the proposed project will be quality jobs and provides robust and credible plan to attract, train, and retain skilled workers (e.g., through a Workforce and Community Agreement or commitment to workers' free and fair choice to join a union or labor organization of their choosing; and/or commitments to wages above prevailing wage requirements, benefits, or other worker support, including education, training, and worker engagement in workplace safety and health plans).
- The extent to which the Community Benefits Plan includes specific and high-quality actions to meet DEIA goals, which may include DEIA recruitment procedures; partnerships with workforce training or support organizations serving workers facing systematic barriers to employment; and other DEIA commitments.
- The extent to which the project includes plans for analysis, workforce, and/or engagement efforts that address community, labor, and workforce desires and/or concerns which go beyond the requirements for technical, analytical, performance, or regulatory compliance.

iii. Criteria for Replies to Reviewer Comments

DOE has not established separate criteria to evaluate Replies to Reviewer Comments. Instead, Replies to Reviewer Comments are combined with the original applications and evaluated as an extension of the Full Application.

B. Standards for Application Evaluation

Applications that are determined to be eligible will be evaluated in accordance with this FOA, taking into consideration the guidance provided in the "DOE Merit Review Guide for Financial Assistance," effective September 2020, which is available at: https://energy.gov/management/downloads/merit-review-guide-financial-assistance-and-unsolicited-proposals-current.

C. Other Selection Factors

i. Program Policy Factors

In addition to the above criteria, the Selection Official may consider the following program policy factors in determining which Full Applications to select for award negotiations:

- The degree to which the proposed project exhibits technological diversity when compared to the existing DOE project portfolio and other projects selected from the subject FOA.
- The degree to which the proposed project, including proposed cost share, optimizes the use of available DOE funding to achieve programmatic objectives.
- The degree to which the proposed project avoids duplication/overlap with other publicly, or privately, funded work.
- The level of industry involvement, as well as demonstrated ability to accelerate commercialization and overcome key market barriers.
- The degree to which the proposed project will accelerate transformational commercial deployments in areas that industry by itself is not likely to undertake because of technical and financial uncertainty.
- The degree to which the proposed project will employ procurement of U.S. iron, steel, manufactured products, and construction materials.
- The degree to which the proposed project incorporates applicant or team members from MSIs (e.g., Historically Black Colleges and Universities (HBCUs)/Other Minority Serving Institutions); and partnerships with Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Veteran Owned Businesses, or Tribal nations.
- The degree to which the proposed project, when compared to the existing DOE project portfolio and other projects to be selected from the subject FOA, contributes to the total portfolio meeting Justice40 goals.
- The degree to which the proposed project has broad public support from the communities most directly impacted by the project.
- The degree to which the proposed project collectively represents diverse types and sizes of applicant organizations.
- The degree to which the proposed project minimizes environmental risks. Environmental risk includes, but is not limited to, an adverse impact to air, soil, water, or increase in overall life cycle greenhouse gas footprint.
- The degree to which the H2Hub will maximize deployment and could be further developed, scaled-up, expanded, and/or replicated in the future as a part of a national clean hydrogen network.
- The degree to which the proposed project meets the feedstock diversity requirements as defined in in BIL Section 813(c)(3) when considered among other H2Hub projects selected from the subject FOA.
- The degree to which the proposed project meets the end-use diversity requirements as defined in in BIL Section 813(c)(3) when considered among other H2Hub projects selected from the subject FOA.
- The degree to which the proposed project meets the geographical diversity requirements as defined in in BIL Section 813(c)(3) when considered among other H2Hub projects selected from the subject FOA.

- The degree to which the proposed project meets the requirement to have H2Hubs located in regions of the U.S. with the greatest natural gas resources as defined in BIL Section 813(c)(3) when considered among other H2Hub projects selected from the subject FOA.

D. Evaluation and Selection Process

i. Overview

The evaluation process consists of multiple steps; each includes an initial eligibility review and a thorough technical review. Rigorous technical reviews of eligible submissions are conducted by reviewers that are experts in the subject matter of the FOA. Ultimately, the Selection Official(s) considers the recommendations of the reviewers, along with other considerations such as program policy factors, in determining which applications to select.

ii. Pre-Selection Interviews

As part of the evaluation and selection process, DOE may invite one or more applicants to participate in Pre-Selection Interviews. Pre-Selection Interviews are distinct from and more formal than pre-selection clarifications (See Section V.D.iii. of the FOA). The invited applicant(s) will meet with DOE representatives to provide clarification on the contents of the Full Applications and to provide DOE an opportunity to ask questions regarding the proposed project. The information provided by applicants to DOE through Pre-Selection Interviews contributes to DOE's selection decisions.

DOE will arrange to meet with the invited applicants in person at DOE's offices or a mutually agreed upon location. DOE may also arrange site visits to certain applicants' facilities. Alternatively, DOE may invite certain applicants to participate in a one-on-one conference with DOE via webinar, videoconference, or conference call.

DOE will not reimburse applicants for travel and other expenses relating to the Pre-Selection Interviews, nor will these costs be eligible for reimbursement as pre-award costs.

DOE may obtain additional information through Pre-Selection Interviews that will be used to make a final selection determination. DOE may select applications for funding and make awards without Pre-Selection Interviews. Participation in Pre-Selection Interviews with DOE does not signify that an applicant has been selected for award negotiations.

iii. Pre-Selection Clarification

DOE may determine that pre-selection clarifications are necessary from one or more applicants. Pre-selection clarifications are distinct from and less formal than pre-selection interviews. These pre-selection clarifications will solely be for the purposes of clarifying the application.

The pre-selection clarifications may occur before, during or after the merit review evaluation process. Information provided by an applicant that is not necessary to address the pre-selection clarification question will not be reviewed or considered. Typically, a pre-selection clarification will be carried out through either written responses to DOE's written clarification questions or video or conference calls with DOE representatives.

The information provided by applicants to DOE through pre-selection clarifications is incorporated in their applications and contributes to the merit review evaluation and DOE's selection decisions. If DOE contacts an applicant for pre-selection clarification purposes, it does not signify that the applicant has been selected for negotiation of award or that the applicant is among the top ranked applications.

DOE will not reimburse applicants for expenses relating to the pre-selection clarifications, nor will these costs be eligible for reimbursement as pre-award costs.

iv. Recipient Integrity and Performance Matters

DOE, prior to making a federal award with a total amount of federal share greater than the simplified acquisition threshold, is required to review and consider any information about the applicant that is in the designated integrity and performance system accessible through SAM (currently FAPIIS) (see 41 U.S.C. 2313).

The applicant, at its option, may review information in the designated integrity and performance systems accessible through SAM and comment on any information about itself that a federal awarding agency previously entered and is currently in the designated integrity and performance system accessible through SAM.

DOE will consider any written comments by the applicant, in addition to the other information in the designated integrity and performance system, in making a judgment about the applicant's integrity, business ethics, and record of performance under federal awards when completing the review of risk posed by applicants as described in 2 CFR 200.206.

v. Selection

The Selection Official may consider the technical merit, the Federal Merit Review Panel's recommendations, program policy factors, and the amount of funds available in arriving at selections for this FOA.

E. Anticipated Notice of Selection and Award Negotiation Dates

DOE anticipates notifying applicants selected for negotiation of award and negotiating awards by the dates provided on the cover page of this FOA.

VI. Award Administration Information

A. Award Notices

i. Ineligible Submissions

Ineligible Concept Papers and Full Applications will not be further reviewed or considered for award. The Contracting Officer will send a notification letter by email to the technical and administrative points of contact designated by the applicant in OCED Exchange. The notification letter will state the basis upon which the Concept Paper or the Full Application is ineligible and not considered for further review.

ii. Concept Paper Notifications

DOE will notify applicants of its determination to encourage or discourage the submission of a Full Application. DOE will post these notifications to OCED Exchange.

Applicants may submit a Full Application even if they receive a notification discouraging them from doing so. By discouraging the submission of a Full Application, DOE intends to convey its lack of programmatic interest in the proposed project. Such assessments do not necessarily reflect judgments on the merits of the proposed project. The purpose of the Concept Paper phase is to save applicants the considerable time and expense of preparing a Full Application that is unlikely to be selected for award negotiations.

A notification encouraging the submission of a Full Application does not authorize the applicant to commence performance of the project. Please refer to Section IV.J.ii. of the FOA for guidance on pre-award costs.

iii. Full Application Notifications

DOE will notify applicants of its determination via a notification letter by email to the technical and administrative points of contact designated by the applicant in OCED Exchange. The notification letter will inform the applicant whether or not its Full Application was selected for award negotiations. Alternatively, DOE may notify one or more applicants that a final selection determination on particular Full Applications will be made at a later date, subject to the availability of funds or other factors.

iv. Successful Applicants

Receipt of a notification letter selecting a Full Application for award negotiations does not authorize the applicant to commence performance of the project. If an application is selected for award negotiations, it is not a commitment by DOE to issue an award. Applicants do not

receive an award until award negotiations are complete and the Contracting Officer executes the funding agreement, accessible by the prime recipient in FedConnect.

The award negotiation process will take several months. Applicants must designate a primary and a backup point-of-contact in OCED Exchange with whom DOE will communicate to conduct award negotiations. The applicant must be responsive during award negotiations (i.e., provide requested documentation) and meet the negotiation deadlines. If the applicant fails to do so or if award negotiations are otherwise unsuccessful, DOE will cancel the award negotiations and rescind the Selection. DOE reserves the right to terminate award negotiations at any time for any reason.

Please refer to Section IV.J.ii. of the FOA for guidance on pre-award costs.

v. Alternate Selection Determinations

In some instances, an applicant may receive a notification that its application was not selected for award and DOE designated the application to be an alternate. As an alternate, DOE may consider the Full Application for federal funding in the future. A notification letter stating the Full Application is designated as an alternate does not authorize the applicant to commence performance of the project. DOE may ultimately determine to select or not select the Full Application for award negotiations.

vi. Unsuccessful Applicants

DOE shall promptly notify in writing each applicant whose application has not been selected for award or whose application cannot be funded because of the unavailability of appropriated funds.

B. Administrative and National Policy Requirements

i. Registration Requirements

There are several one-time actions before submitting an application in response to this FOA, and it is vital that applicants address these items as soon as possible. Some may take several weeks, and failure to complete them could interfere with an applicant's ability to apply to this FOA, or to meet the negotiation deadlines and receive an award if the application is selected. These requirements are as follows:

1. **OCED Exchange**
   Register and create an account on OCED Exchange at https://oced-Exchange.energy.gov. This account will then allow the user to register for any open OCED FOAs that are currently in OCED Exchange.

Beginning on July 29, 2022,[*] Exchange will be updated to integrate with Login.gov. As of September 30, 2022[*], potential applicants will be required to have a Login.gov account to access OCED 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 OCED Exchange Login Guide in the Manuals section of Exchange at https://oced-exchange.energy.gov/Manuals.aspx.

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. Applicants should also designate backup points of contact so they may be easily contacted if deemed necessary. **This step is required to apply to this FOA.** The Exchange registration does not have a delay; however, **the remaining registration requirements below could take several weeks to process and are necessary for a potential applicant to receive an award under this FOA.**

2. **System for Award Management**
   Register with the SAM at https://www.sam.gov. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called a Marketing Partner ID Number (MPIN) are important steps in SAM registration. Please update your SAM registration annually.

3. **FedConnect**
   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.

4. **Grants.gov**
   Register in Grants.gov (http://www.grants.gov) to receive automatic updates when Amendments to this FOA are posted. However, please note that Concept Papers, and Full Applications will not be accepted through Grants.gov.

5. **Electronic Authorization of Applications and Award Documents**
   Submission of an application and supplemental information under this FOA through electronic systems used by the DOE, including OCED Exchange and FedConnect.net, constitutes the authorized representative's approval and electronic signature.

[*] Please note that these dates are tentative and subject to change.

ii. Award Administrative Requirements

The administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR Part 200 as amended by 2 CFR Part 910.

iii. Foreign National Access

All applicants selected for an award under this FOA may be required to provide information to DOE in order to satisfy requirements for foreign nationals' access to DOE sites, information, technologies, equipment, programs, or personnel. A foreign national is defined as any person who is not a U.S. citizen by birth or naturalization. If a selected applicant (including any of its subrecipients, contractors, or vendors) anticipates involving foreign nationals in the performance of its award, the selected applicant may be required to provide DOE with specific information about each foreign national to ensure compliance with the requirements for access approval. National laboratory personnel already cleared for site access may be excluded.

iv. Subaward and Executive Reporting

Additional administrative requirements necessary for DOE grants and cooperative agreements to comply with the Federal Funding and Transparency Act of 2006 (FFATA) are contained in 2 CFR Part 170. Prime recipients must register with the new FFATA Subaward Reporting System database and report the required data on their first tier subrecipients. Prime recipients must report the executive compensation for their own executives as part of their registration profile in SAM.

v. National Policy Requirements

The National Policy Assurances that are incorporated as a term and condition of award are located at: http://www.nsf.gov/awards/managing/rtc.jsp.

vi. Environmental Review in Accordance with National Environmental Policy Act (NEPA)

DOE's decision whether and how to distribute federal funds under this FOA is subject to NEPA (42 U.S.C. 4321, *et seq.*). NEPA requires federal agencies to integrate environmental values into their decision-making processes by considering the potential environmental and societal impacts of their proposed actions. For additional background on NEPA, please see DOE's NEPA website at https://www.energy.gov/nepa.

While NEPA compliance is a federal agency responsibility and the ultimate decisions remain with the federal agency, all recipients selected for an award will be required to assist in the

timely and effective completion of the NEPA process in the manner most pertinent to their proposed project. If DOE determines certain records must be prepared to complete the NEPA review process (e.g., biological evaluations), the recipient may be required to prepare the records and the costs to prepare the necessary records may be included as part of the project costs.

vii. Flood Resilience

Applications should indicate whether the proposed project location(s) is within a floodplain, how the floodplain was defined, and how future flooding will factor into the project's design. The base floodplain long used for planning has been the 100-year floodplain, that is, a floodplain with a 1.0 percent chance of flooding in any given year. As directed by Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input (2015), Federal agencies, including DOE, continue to avoid development in a floodplain to the extent possible. When doing so is not possible, Federal agencies are directed to "expand management from the current base flood level to a higher vertical elevation and corresponding horizontal floodplain to address current and future flood risk and ensure that projects funded with taxpayer dollars last as long as intended." The higher flood elevation is based on one of three approaches: climate-informed science (preferred), freeboard value, or 0.2 percent annual flood change (500-year floodplain). EO 13690 and related information is available at https://www.energy.gov/nepa/articles/eo-13690-establishing-federal-flood-risk-management-standard-and-process-further.

viii. Applicant Representations and Certifications

1. **Lobbying Restrictions**

   By accepting funds under this award, the prime recipient and subrecipients agree that none of the funds obligated on the award shall be expended, directly or indirectly, to influence Congressional action on any legislation or appropriation matters pending before Congress, other than to communicate to Members of Congress as described in 18 U.S.C. § 1913. This restriction is in addition to those prescribed elsewhere in statute and regulation.

2. **Corporate Felony Conviction and Federal Tax Liability Representations**

   In submitting an application in response to this FOA, the applicant represents that:

   a. It is **not** a corporation that has been convicted of a felony criminal violation under any federal law within the preceding 24 months; and

   b. It is **not** a corporation that has any unpaid federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

For purposes of these representations the following definitions apply:

A Corporation includes any entity that has filed articles of incorporation in any of the 50 states, the District of Columbia, or the various territories of the United States [but not foreign corporations]. It includes both for-profit and non-profit organizations.

3. **Nondisclosure and Confidentiality Agreements Representations**

In submitting an application in response to this FOA the applicant represents that:

a. It or its subrecipients **does not and will not** require its employees or contractors to sign internal nondisclosure or confidentiality agreements or statements prohibiting or otherwise restricting its employees or contactors from lawfully reporting waste, fraud, or abuse to a designated investigative or law enforcement representative of a federal department or agency authorized to receive such information.

b. It or its subrecipients **does not and will not** use any federal funds to implement or enforce any nondisclosure and/or confidentiality policy, form, or agreement it uses unless it contains the following provisions:

(1) *''These provisions are consistent with and do not supersede, conflict with, or otherwise alter the employee obligations, rights, or liabilities created by existing statute or Executive Order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive Orders and statutory provisions are incorporated into this agreement and are controlling.''*

(2) The limitation above shall not contravene requirements applicable to Standard Form 312 Classified Information Nondisclosure Agreement (https://fas.org/sgp/othergov/sf312.pdf), Form 4414 Sensitive Compartmented Information Disclosure Agreement (https://fas.org/sgp/othergov/intel/sf4414.pdf), or any other form issued by a federal department or agency governing the nondisclosure of classified information.

(3) Notwithstanding the provision listed in paragraph (a), a nondisclosure or confidentiality policy form or agreement that is to be executed by a person

connected with the conduct of an intelligence or intelligence-related activity, other than an employee or officer of the United States government, may contain provisions appropriate to the particular activity for which such document is to be used. Such form or agreement shall, at a minimum, require that the person will not disclose any classified information received in the course of such activity unless specifically authorized to do so by the United States government. Such nondisclosure or confidentiality forms shall also make it clear that they do not bar disclosures to Congress, or to an authorized official of an executive agency or the Department of Justice, that are essential to reporting a substantial violation of law.

ix. Statement of Federal Stewardship

DOE will exercise normal federal stewardship in overseeing the project activities performed under DOE awards. Stewardship Activities include, but are not limited to, conducting site visits; reviewing performance and financial reports; providing assistance and/or temporary intervention in unusual circumstances to correct deficiencies that develop during the project; assuring compliance with terms and conditions; and reviewing technical performance after project completion to ensure that the project objectives have been accomplished.

x. Statement of Substantial Involvement

DOE has substantial involvement in work performed under awards made as a result of this FOA. DOE does not limit its involvement to the administrative requirements of the award. Instead, DOE has substantial involvement in the direction and redirection of the technical aspects of the project as a whole. Substantial involvement includes, but is not limited to, the following:

1. DOE shares responsibility with the recipient for the management, control, direction, and performance of the project.

2. DOE may intervene in the conduct or performance of work under this award for programmatic reasons. Intervention includes the interruption or modification of the conduct or performance of project activities.

3. DOE may redirect or discontinue funding the project based on the outcome of DOE's evaluation of the H2Hub at project-wide Go/No-Go decision point(s).

4. DOE may redirect or discontinue funding for individual H2Hub activities based on the outcome of DOE's evaluation of those activities at the individual H2Hub activity Go/No-Go decision points.

5. DOE participates in major project decision-making processes (e.g., changes to scope and budget).

6. As part of its substantial involvement, DOE may engage a private, independent engineering (IE) firm, or other third-party consultants, to assist with project monitoring and oversight. In order to adequately monitor project progress and provide technical direction and/or redirection to the recipient, DOE must be provided an adequate level of insight into various recipient activities. Government insight activities by DOE include attendance at recipient meetings, reviews and tests, as well as adequate and timely access for DOE or its IE's or consultants to perform independent evaluations of recipient's plans and processes. Recipient shall notify the DOE Project Officer of meetings, reviews, and tests in sufficient time to permit DOE participation, and will ensure that DOE, the IE, or consultant has access to the site and any and all relevant documentation sufficient to allow the IE or consultant to provide independent evaluations to DOE on the progress of the project. DOE, and its IE's or consultants, may also require access to and delivery of data generated outside of the project in order to complete the review and validation tasks. Failure to provide sufficient access to data to assess project readiness may result in a No-Go decision or termination.

   Specific activities to be conducted by DOE include, but are not limited to, the following:

   - Risk Evaluation – DOE will review the recipient's initial Risk Mitigation Plan (RMP) for quality and completeness. DOE will also monitor updates to the RMP and actions taken by the recipient during the performance of its award to mitigate risks and improve the probability of successful execution of the H2Hub. At DOE's discretion, additional independent risk analyses of the project by DOE consultants may be requested.
   - Independent Engineering Assessments – DOE may engage a private, independent engineering firm to assist in assessing the progress of the project and provide timely and accurate reports to DOE. The recipient will ensure that the IE has access to any and all relevant documentation sufficient to allow the IE to provide independent evaluations to DOE on the progress of the project. Such documentation includes, but is not limited to, the following:
     - Equipment and system commercial readiness documentation
     - Quarterly reports
     - Go/No-Go and continuation application documentation
     - Financial, marketing, management, and business plans
     - Community Benefits Plan
     - Project execution and operating plans
     - Risk management plans
     - Procurement strategies
     - Engineering drawings and specifications
     - Construction plans
     - Integrated project schedules
     - Key contracts and agreements

- Final design review documents
- Value management and engineering studies and/or plans
- Project controls and management tools, including earned value management systems
- Qualifications of the integrated project team
- Invoices submitted to DOE
- Operating plans
- Disposition plans
- Safety plans

DOE will evaluate the quality and completeness of information and documentation provided by the recipient to DOE and its consultants in order to allow DOE to provide technical direction and/or redirection to the recipient about how best to achieve the purposes of the award. The recipient and/or DOE may require the IE or consultant to sign a nondisclosure agreement (NDA) which shall be negotiated in good faith and in a timely manner. Consultants to DOE may not provide technical direction and/or redirection to the recipient.

7. DOE may appoint Federal Government representatives to participate in any H2Hub governance or advisory boards that may be established.

8. To adequately monitor project progress and provide direction to the H2Hub, the recipient must provide DOE the opportunity to participate in the H2Hub's activities including H2Hub meetings, key reviews, workshops, and community engagement activities. The recipient must notify DOE a minimum of ten business days before the H2Hub activity and provide all appropriate documentation for DOE review.

9. The recipient may be required to participate and present at annual peer/program reviews.

10. The recipient will require a positive compliance recommendation from DOE prior to adopting any H2Hub-related documents and subsequent substantial changes to such documents. The recipient will provide DOE with a minimum of ten business days to review for compliance with the award. This includes, but is not limited to, business plan; project management plan; risk management plan; operations plan; intellectual property management plan, data management plan, cybersecurity plan, safety plan, Community Benefits Plan, planning documents listed in the SOPO, and other key documents for the H2Hub.

11. The recipient will provide DOE with timely notice of H2Hub related publicity information regarding the recipient's organization and the H2Hub (e.g., press releases, public announcements, marketing/promotional materials). The recipient will provide DOE a minimum of five business days to review and offer input. Related

publicity information includes materials developed by the recipient, subrecipients, or other participants.

12. The recipient will provide DOE a minimum of ten business days to review any risk mitigation and corrective action plans.

13. DOE will review all new subrecipients to assess whether the potential project partner would further the objectives of the award.

DOE reserves the right to make modifications and/or additions to this list based on future risk assessments and/or the specific H2Hub management approach enlisted by the recipient.

xi. Intellectual Property Management Plan (IPMP)

By the end of Phase 1, applicants must submit an executed IPMP between the members of the consortia or team.

The award will set forth the treatment of and obligations related to intellectual property rights between DOE and the individual members. The IPMP should describe how the members will handle intellectual property rights and issues between themselves while ensuring compliance with federal intellectual property laws, regulations, and policies (see Sections VIII.J.-VIII.N. of this FOA for more details on applicable federal intellectual property laws and regulations). Guidance regarding the contents of IPMP is available from DOE upon request.

The following is a non-exhaustive list of examples of items that the IPMP may cover:

- The treatment of confidential information between members (e.g., the use of NDAs);
- The treatment of background intellectual property (e.g., any requirements for identifying it or making it available);
- The treatment of inventions made under the award (e.g., any requirements for disclosing to the other members on an application, filing patent applications, paying for patent prosecution, and cross-licensing or other licensing arrangements between the members);
- The treatment of data produced, including software, under the award (e.g., any publication process or other dissemination strategies, copyrighting strategy or arrangement between members);
- Any technology transfer and commercialization requirements or arrangements between the members;
- The treatment of any intellectual property issues that may arise due to a change in membership of the consortia or team; and
- The handling of disputes related to intellectual property between the members.

xii. Subject Invention Utilization Reporting

To ensure that prime recipients and subrecipients holding title to subject inventions are taking the appropriate steps to commercialize subject inventions, DOE may require that each prime recipient holding title to a subject invention submit annual reports for ten (10) years from the date the subject invention was disclosed to DOE on the utilization of the subject invention and efforts made by prime recipient or their licensees or assignees to stimulate such utilization. The reports must include information regarding the status of development, date of first commercial sale or use, gross royalties received by the prime recipient, and such other data and information as DOE may specify.

xiii. Intellectual Property Provisions

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at http://energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards.

xiv. Reporting

Reporting requirements are identified on the Federal Assistance Reporting Checklist, attached to the award agreement. This checklist can be accessed at https://www.energy.gov/eere/funding/downloads/model-cooperative-agreement. Within this link, see Attachment 2 Federal Assistance Reporting Checklist, after clicking on "Model Cooperative Agreement".

Additional reporting requirements apply to projects funded by BIL. As part of tracking progress toward key departmental goals – ensuring justice and equity, creating jobs, boosting domestic manufacturing, reducing greenhouse gas emissions, and advancing a pathway to private sector – DOE may require specific data collection. Examples of data that may be collected include:

- New manufacturing production or recycling capacity
- Number and types of trainings provided; certificates and training credentials received by employees; trainees placed in full-time employment; ratio of apprentice-to-journey level works employed; and workforce partnerships involving employees, community-based organizations, or labor unions.
- Justice and Equity data including:
    - Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses and Veteran Owned Businesses acting as vendors and sub-contractors for bids on supplies, services, and equipment
    - Value, number, and type of partnerships with Minority-Serving Institutions (MSIs)
    - Stakeholder engagement events, consent-based siting activities
    - Other relevant indicators from Community Benefits Plan

- Funding leveraged, follow-on-funding, Intellectual Property (IP) Generation and IP Utilization

xv. Go/No-Go Review

Each project selected under this FOA will be subject to a periodic project evaluation referred to as a Go/No-Go Review. A Go/No-Go Review is a risk management tool and a project management best practice to ensure that, for the current phase or period of performance, project success is definitively achieved and potential for success in future phases or periods of performance is evaluated, prior to actually beginning the execution of future phases. At the Go/No-Go decision points, DOE will evaluate project performance, project schedule adherence, the extent milestone objectives are met, compliance with reporting requirements, continued financial strength including ability to meet both cost sharing and contingency requirements, adequacy of Community Benefits Plan implementation, and overall contribution to the program goals and objectives. Federal funding beyond the Go/No-Go decision point (continuation funding) is contingent upon (1) availability of federal funds appropriated by Congress for the purpose of this program; (2) the availability of future-year budget authority; (3) recipient's project progress compared to the Integrated Project Schedule; (4) recipient's submittal of required reports; (5) recipient's compliance with the terms and conditions of the award; (6) DOE's Go/No-Go decision; (7) the recipient's submission of a continuation application;[60] and (8) written approval of the continuation application by the Contracting Officer.

As a result of the Go/No-Go Review, DOE may, at its discretion, authorize the following actions: (1) continue to fund the project, contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority; (2) recommend redirection of work under the project; (3) place a hold on federal funding for the project, pending further supporting data or funding; or (4) discontinue funding the project because of insufficient progress, change in strategic or programmatic direction, or lack of funding.

[60] A continuation application is a non-competitive application for an additional budget period within a previously approved project period. At least ninety (90) days before the end of each budget period, the recipient must submit its continuation application, which includes the following information:

i. A progress report on the project objectives, including significant findings, conclusions, or developments, and an estimate of any unobligated balances remaining at the end of the budget period. If the remaining unobligated balance is estimated to exceed 20 percent of the funds available for the budget period, explain why the excess funds have not been obligated and how they will be used in the next budget period.
ii. A detailed budget and supporting justification if there are changes to the negotiated budget, or a budget for the upcoming budget period was not approved at the time of award.
iii. A description of any planned changes from the SOPO and/or Milestone Summary Table.

The Go/No-Go decision is distinct from a non-compliance determination. In the event a recipient fails to comply with the requirements of an award, DOE may take appropriate action, including but not limited to, redirecting, suspending, or terminating the award.

xvi. Conference Spending

The recipient shall not expend any funds on a conference not directly and programmatically related to the purpose for which the cooperative agreement was awarded that would defray the cost to the United States government of a conference held by any Executive branch department, agency, board, commission, or office for which the cost to the United States government would otherwise exceed $20,000, thereby circumventing the required notification by the head of any such Executive Branch department, agency, board, commission, or office to the Inspector General (or senior ethics official for any entity without an Inspector General), of the date, location, and number of employees attending such conference.

xvii. Uniform Commercial Code (UCC) Financing Statements

Per 2 CFR 910.360 (Real Property and Equipment) when a piece of equipment is purchased by a for-profit recipient or subrecipient with federal funds, and when the federal share of the financial assistance agreement is more than $1,000,000, the recipient or subrecipient must:

Properly record, and consent to the Department's ability to properly record if the recipient fails to do so, UCC financing statement(s) for all equipment in excess of $5,000 purchased with project funds. These financing statement(s) must be approved in writing by the Contracting Officer prior to the recording, and they shall provide notice that the recipient's title to all equipment (not real property) purchased with federal funds under the financial assistance agreement is conditional pursuant to the terms of this section, and that the government retains an undivided reversionary interest in the equipment. The UCC financing statement(s) must be filed before the Contracting Officer may reimburse the recipient for the federal share of the equipment unless otherwise provided for in the relevant financial assistance agreement. The recipient shall further make any amendments to the financing statements or additional recordings, including appropriate continuation statements, as necessary or as the Contracting Officer may direct.

xviii. Implementation of Executive Order 13798, Promoting Free Speech and Religious Liberty

States, local governments, or other public entities may not condition sub-awards in a manner that would discriminate or disadvantage sub-recipients based on their religious character.

xix. Participants and Collaborating Organizations

If selected for award negotiations, the selected applicant must submit a list of senior/key personnel who are proposed to work on the project, both at the recipient and subrecipient level and a list of collaborating organizations within 30 days after the applicant is notified of the selection. Recipients will have an ongoing responsibility to notify DOE of changes to the senior/key personnel and collaborating organizations, and submit updated information during the life of the award.

xx. Requirement to Report Potentially Duplicative Funding

If a recipient or project team member receives any other award of federal funds for activities that potentially overlap with the activities funded under the DOE award, the recipient must promptly notify DOE in writing of the potential overlap and state whether project funds from any of those other federal awards have been, are being, or are to be used (in whole or in part) for one or more of the identical cost items under the DOE award. If there are identical cost items, the recipient must promptly notify the DOE Contracting Officer in writing of the potential duplication and eliminate any inappropriate duplication of funding.

xxi. U.S. Manufacturing Commitments

A primary objective of DOE's multi-billion dollar research, development, and demonstration investments is to cultivate new research and development ecosystems, manufacturing capabilities, and supply chains for and by U.S. industry and labor. Therefore, in exchange for receiving taxpayer dollars to support an applicant's project, the applicant must agree to a U.S. Competitiveness provision requiring any products embodying any subject invention or produced through the use of any subject invention will be manufactured substantially in the U.S. unless the recipient can show to the satisfaction of DOE that it is not commercially feasible. Award terms, including the specific U.S. Competitiveness Provision applicable to the various types of recipients and projects, are available at https://www.energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards.

Please note that a subject invention is any invention conceived or first actually reduced to practice in performance of work under an award. An invention is any invention or discovery which is or may be patentable. The recipient includes any awardee, recipient, sub-awardee, or sub-recipient.

As noted in the U.S. Competitiveness Provision, at any time in which an entity cannot meet the requirements of the U.S. Competitiveness Provision, the entity may request a modification or waiver of the U.S. Competitiveness Provision. For example, the entity may propose modifying the language of the U.S. Competitiveness Provision in order to change the scope of the requirements or to provide more specifics on the application of the requirements for a particular technology. As another example, the entity may request that the U.S.

Competitiveness Provision be waived in lieu of a net benefits statement or U.S. manufacturing plan. The statement or plan would contain specific and enforceable commitments that would be beneficial to the U.S. economy and competitiveness. Examples of such commitments could include manufacturing specific products in the U.S., making a specific investment in a new or existing U.S. manufacturing facility, keeping certain activities based in the U.S., or supporting a certain number of jobs in the U.S. related to the technology. If DOE, in its sole discretion, determines that the proposed modification or waiver promotes commercialization and provides substantial U.S. economic benefits, DOE may grant the request and, if granted, modify the award terms and conditions for the requesting entity accordingly.

More information and guidance on the waiver and modification request process can be found in the DOE Financial Assistance Letter on this topic, available at https://www.energy.gov/management/pf-2022-09-fal-2022-01-implementation-doe-determination-exceptional-circumstances-under. Additional information on DOE's Commitment to Domestic Manufacturing for DOE-funded research and development (R&D) is available at https://www.energy.gov/gc/us-manufacturing.

The U.S. Competitiveness Provision is implemented by DOE pursuant to a Determination of Exceptional Circumstances (DEC) under the Bayh-Dole Act and DOE Patent Waivers. See Section VIII.K. Title to Subject Inventions of this FOA for more information on the DEC and DOE Patent Waivers.

xxii. Interim Conflict of Interest Policy for Financial Assistance

The DOE interim Conflict of Interest Policy for Financial Assistance (COI Policy)[61] is applicable to all non-Federal entities applying for, or that receive, DOE funding by means of a financial assistance award (e.g., a grant, cooperative agreement, or technology investment agreement) and, through the implementation of this policy by the entity, to each Investigator who is planning to participate in, or is participating in, the project funded wholly or in part under the DOE financial assistance award. The term "Investigator" means the Principal Investigator and any other person, regardless of title or position, who is responsible for the purpose, design, conduct, or reporting of a project funded by DOE or proposed for funding by DOE. Recipients must flow down the requirements of the interim COI Policy to any subrecipient non-Federal entities. Further, for DOE funded projects, the recipient must include all financial conflicts of interest (FCOI) (i.e., managed and unmanaged/unmanageable) in their initial and ongoing FCOI reports.

It is understood that non-Federal entities and individuals receiving DOE financial assistance awards will need sufficient time to come into full compliance with DOE's interim COI Policy. To provide some flexibility, DOE allows for a staggered implementation. **Specifically, prior to**

[61] DOE's interim COI Policy can be found at PF 2022-17 FAL 2022-02 Department of Energy Interim Conflict of Interest Policy Requirements for Financial Assistance.

award, applicants selected for award negotiations must: ensure all Investigators complete their significant financial disclosures; review the disclosures; determine whether a FCOI exists; develop and implement a management plan for FCOIs; and provide DOE with an initial FCOI report that includes all FCOIs (i.e., managed and unmanaged/unmanageable). Recipients will have 180 days from the date of the award to come into full compliance with the other requirements set forth in DOE's interim COI Policy. **Prior to award, the applicant must certify that it is, or will be within 180 days of the award, compliant with all requirements in the COI Policy.**

xxiii. Data Management Plan (DMP)

Each applicant whose Full Application is selected for award negotiations will be required to submit a DMP during the award negotiations phase. A DMP explains how, when appropriate, data generated in the course of the work performed under a DOE award will be shared and preserved in order to validate the results of the proposed work or how the results could be validated if the data is not shared or preserved. The DMP must provide a plan for making all research data displayed in publications resulting from the proposed work digitally accessible at the time of publications.

xxiv. Fraud, Waste, and Abuse

The mission of the DOE Office of Inspector General (OIG) is to strengthen the integrity, economy and efficiency of the Department's programs and operations including deterring and detecting fraud, waste, abuse, and mismanagement. The OIG accomplishes this mission primarily through investigations, audits, and inspections of DOE activities to include grants, cooperative agreements, loans, and contracts.

The OIG maintains a Hotline for reporting allegations of fraud, waste, abuse, or mismanagement. To report such allegations, please visit https://www.energy.gov/ig/ig-hotline.

Additionally, recipients of DOE awards must be cognizant of the requirements of 2 CFR 200.113 Mandatory disclosures, which states:

> The non-Federal entity or applicant for a Federal award must disclose, in a timely manner, in writing to the Federal awarding agency or pass-through entity all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award. Non-Federal entities that have received a Federal award including the term and condition outlined in appendix XII of 2 CFR Part 200 are required to report certain civil, criminal, or administrative proceedings to SAM (currently FAPIIS). Failure to make required disclosures can result in any of the remedies described in 2 CFR 200.339. (See also 2 CFR part 180, 31 U.S.C. 3321, and 41 U.S.C. 2313.) [85 FR 49539, Aug. 13, 2020]

xxv. Human Subjects Research

Research involving human subjects, biospecimens, or identifiable private information conducted with DOE funding is subject to the requirements of DOE Order 443.1C, Protection of Human Research Subjects, 45 CFR Part 46, Protection of Human Subjects (subpart A which is referred to as the "Common Rule"), and 10 CFR Part 745, Protection of Human Subjects. Additional information on the DOE Human Subjects Research Program can be found at: https://science.osti.gov/ber/human-subjects

xxvi. Cybersecurity Plan

In accordance with IIJA Section 40126, DOE is proposing to require awardees to submit a cybersecurity plan prior to receiving funding.[62] These plans are intended to foster a cybersecurity-by-design approach for IIJA efforts. The Department will also use these plans to ensure effective integration and coordination across its research, development, and demonstration programs. A cybersecurity plan is NOT required as part of the application submission for this FOA, but all projects selected under this FOA will be required to submit an initial cybersecurity plan during the award negotiation phase.

The Department recommends using open guidance and standards such as the National Institute of Standards and Technology's (NIST) Cybersecurity Framework (CSF) and the DOE Cybersecurity Capability Maturity Model (C2M2).[63] The cybersecurity plan created pursuant to Section 40126 should document any deviation from open standards, as well as the utilization of proprietary standards where the awardee determines that such deviation is necessary.

- Cybersecurity plans should be commensurate to the threats and vulnerabilities associated with the proposed efforts and demonstrate the cybersecurity maturity of the project.
- Cybersecurity plans may cover a range of topics relevant to the proposed project, e.g., software development lifecycle, third-party risks, and incident reporting.

[62] 42 USC §18725

[63] NERC critical infrastructure protection (CIP) standards for entities responsible for the availability and reliability of the bulk electric system. NIST IR 7628: 2 Smart grid cyber security strategy and requirements. NIST SP800-53, Recommended Security Controls for Federal Information Systems and Organizations: Catalog of security controls in 18 categories, along with profiles for low-, moderate-, and high-impact systems. NIST SP800-82, Guide to Industrial Control Systems (ICS) Security. NIST SP800-39, Integrated Enterprise-Wide Risk Management: Organization, mission, and information system view. AMI System Security Requirements: Security requirements for advanced metering infrastructure. ISO (International Organization for Standardization) 27001, Information Security Management Systems: Guidance on establishing governance and control over security activities (this document must be purchased). IEEE (Institute of Electrical and Electronics Engineers) 1686-2007, Standard for Substation Intelligent Electronic Devices (IEDs) Cyber Security Capabilities (this document must be purchased). DOE Cybersecurity Capability Maturity Model (C2M2).

- At a minimum, the Cybersecurity Plan should address questions noted in IIJA section 40126 (b) 'Contents of Cybersecurity Plan'.[64]

A draft version of supplementary guidance on the Cybersecurity Plan requirement will be available at https://www.energy.gov/ceser/bipartisan-infrastructure-law-implementation

[64] 42 USC §18725

VII. Questions/Agency Contacts

Upon the issuance of a FOA, DOE personnel are prohibited from communicating (in writing or otherwise) with applicants regarding the FOA except through the established question and answer process as described below. Specifically, questions regarding this FOA must be submitted to: H2Hubs@hq.doe.gov. Questions must be submitted not later than 3 business days prior to the application due date and time. Please note, feedback on individual projects will not be provided through Q&A.

All questions and answers related to this FOA will be posted on OCED Exchange at: https://oced-exchange.energy.gov. **You must first select this specific FOA Number to view the questions and answers specific to this FOA**. DOE will attempt to respond to a question within 3 business days, unless a similar question and answer has already been posted on the website.

Questions related to the registration process and use of the OCED Exchange website should be submitted to: OCED-ExchangeSupport@hq.doe.gov.

VIII. Other Information

A. FOA Modifications

Amendments to this FOA will be posted on the OCED Exchange website and the Grants.gov system. However, you will only receive an email when an amendment or a FOA is posted on these sites if you register for email notifications for this FOA in Grants.gov. DOE recommends that you register as soon after the release of the FOA as possible to ensure you receive timely notice of any amendments or other FOAs.

B. Government Right to Reject or Negotiate

DOE reserves the right, without qualification, to reject any or all applications received in response to this FOA and to select any application, in whole or in part, as a basis for negotiation and/or award.

C. Commitment of Public Funds

The Contracting Officer is the only individual who can make awards or commit the government to the expenditure of public funds. A commitment by anyone other than the Contracting Officer, either express or implied, is invalid.

D. Treatment of Application Information

Applicants should not include business sensitive information (e.g., commercial or financial information that is privilege or confidential), trade secrets, proprietary, or otherwise confidential information in their application unless such information is necessary to convey an understanding of the proposed project or to comply with a requirement in the FOA. Applicants are advised to not include any critically sensitive proprietary detail.

If an application includes trade secrets or information that is commercial or financial, or information that is confidential or privileged, it is furnished to the Government in confidence with the understanding that the information shall be used or disclosed only for evaluation of the application. Such information will be withheld from public disclosure to the extent permitted by law, including the Freedom of Information Act. Without assuming any liability for inadvertent disclosure, DOE will seek to limit disclosure of such information to its employees and to outside reviewers when necessary for merit review of the application or as otherwise authorized by law. This restriction does not limit the Government's right to use the information if it is obtained from another source.

Full Applications, and other submissions containing confidential, proprietary, or privileged information must be marked as described below. Failure to comply with these marking

requirements may result in the disclosure of the unmarked information under the Freedom of Information Act or otherwise. The U.S. Government is not liable for the disclosure or use of unmarked information and may use or disclose such information for any purpose.

The cover sheet of the Full Application, and other submission must be marked as follows and identify the specific pages containing trade secrets, confidential, proprietary, or privileged information:

> **Notice of Restriction on Disclosure and Use of Data:**
> Pages [list applicable pages] of this document may contain trade secrets, confidential, proprietary, or privileged information that is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial assistance or loan agreement between the submitter and the Government. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source. [End of Notice]

The header and footer of every page that contains confidential, proprietary, or privileged information must be marked as follows: "Contains Trade Secrets, Confidential, Proprietary, or Privileged Information Exempt from Public Disclosure." In addition, each line or paragraph containing proprietary, privileged, or trade secret information must be clearly marked with double brackets or highlighting.

E. Evaluation and Administration by Non-Federal Personnel

In conducting the merit review evaluation, the Go/No-Go Reviews and Peer Reviews, the government may seek the advice of qualified non-federal personnel as reviewers. The government may also use non-federal personnel to conduct routine, nondiscretionary administrative activities, including DOE contractors. The applicant, by submitting its application, consents to the use of non-federal reviewers/administrators. Non-federal reviewers must sign conflict of interest (COI) and non-disclosure acknowledgements (NDA) prior to reviewing an application. Non-federal personnel conducting administrative activities must sign an NDA.

F. Notice Regarding Eligible/Ineligible Activities

Eligible activities under this FOA include those which promote industry adoption of hydrogen, but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned, or pending legislation.

G. Notice of Right to Conduct a Review of Financial Capability

DOE reserves the right to conduct an independent third-party review of financial capability for applicants that are selected for negotiation of award (including personal credit information of

principal(s) of a small business if there is insufficient information to determine financial capability of the organization).

H. Real Property and Equipment

Real property and equipment purchased with project funds (federal share and recipient cost share) are subject to the requirements at 2 CFR 200.310, 200.311, 200.313, and 200.316 (non-Federal entities, except for-profit entities) and 2 CFR 910.360 (for-profit entities). For projects selected for award under this FOA, the recipient may take disposition action on the real property and equipment or continue to use the real property and equipment after the conclusion of the award period of performance. Recipients may continue to use the real property and equipment so long as the recipient:

a. Continues to use the property for the authorized project purposes;
b. Complies with the applicable reporting requirements and regulatory property standards; and
c. Requests continued use of the property with its final SF-428 Tangible Personal Property Report and/or SF-429 Real Property Status Report submission during award closeout.

The recipient's written Request for Continued Use must identify the property and include: a summary of how the property will be used (must align with the authorized project purposes); a proposed use period, (e.g., perpetuity, until fully depreciated, or a calendar date where the recipient expects to submit disposition instructions); acknowledgement that the recipient shall not sell or encumber the property or permit any encumbrance without prior written DOE approval; current fair market value of the property; and an Estimated Useful Life or depreciation schedule for equipment.

When the property is no longer needed for authorized project purposes, the recipient must request disposition instructions. For-profit entity disposition requirements are set forth at 2 CFR 910.360. Property disposition requirements for other non-federal entities are set forth in 2 CFR 200.310 – 200.316.

During the award period of performance, recipients may request Contracting Officer approval to encumber real property and/or equipment acquired in whole or in part with project funds. DOE may, in its discretion, approve an encumbrance of such property and/or equipment if DOE has a first priority *pari passu* position with senior lenders to the recipient including in the event of a bankruptcy, reorganization, insolvency proceeding, or liquidation of project assets.

During any period of continued use, property disposition, or liquidation proceedings, project assets including real property and equipment shall not be sold to any entity, whether public or

private, that is owned or controlled by a foreign entity[65] of a foreign country of risk. DOE has designated the following countries as foreign countries of risk: Iran, North Korea, Russia, and China. This list is subject to change.

I. Requirement for Full and Complete Disclosure

Applicants are required to make a full and complete disclosure of all information requested. Any failure to make a full and complete disclosure of the requested information may result in:

- The termination of award negotiations;
- The modification, suspension, and/or termination of a funding agreement;
- The initiation of debarment proceedings, debarment, and/or a declaration of ineligibility for receipt of federal contracts, subcontracts, and financial assistance and benefits; and
- Civil and/or criminal penalties.

J. Retention of Submissions

DOE expects to retain copies of all Full Applications and other submissions. No submissions will be returned. By applying to DOE for funding, applicants consent to DOE's retention of their submissions.

K. Title to Subject Inventions

Ownership of subject inventions is governed pursuant to the authorities listed below:

- Domestic Small Businesses, Educational Institutions, and Non-profits: Under the Bayh-Dole Act (35 U.S.C. § 200 et seq.), domestic small businesses, educational institutions, and non-profits may elect to retain title to their subject inventions.

- All other parties: The federal Non-Nuclear Energy Act of 1974, 42. U.S.C. 5908, provides that the government obtains title to new inventions unless a waiver is granted (see below).

[65] For purposes of this FOA, "foreign entities" include: (1) any foreign government or foreign government agency or instrumentality thereof; (2) any international organization; (3) any form of business enterprise or legal entity organized, chartered or incorporated under the laws of any country other than the United States or its territories; (4) any form of business enterprise organized or incorporated under the laws of the United States or a State or other jurisdiction within the United States which is owned or controlled by a foreign government, agency, firm, corporation, or a person who is not a citizen or national of the United States; and (5) any person who is not a citizen or national of the U.S.

- Class Patent Waiver: DOE may issue "class patent waivers" under which domestic large businesses that meet certain stated requirements may elect to retain title to their subject inventions.

- Advance and Identified Waivers: For an applicant not covered by a Class Patent Waiver or the Bayh-Dole Act, the applicant may request a patent waiver that will cover subject inventions that may be invented under the award, in advance of or within 30 days after the effective date of the award. Even if an advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver for identified inventions, i.e., individual subject inventions that are disclosed to DOE within the timeframes set forth in the award's intellectual property data terms and conditions. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.

- DEC: On June 07, 2021, DOE approved a DETERMINATION OF EXCEPTIONAL CIRCUMSTANCES (DEC) UNDER THE BAYH-DOLE ACT TO FURTHER PROMOTE DOMESTIC MANUFACTURE OF DOE SCIENCE AND ENERGY TECHNOLOGIES. In accordance with this DEC, all awards, including sub-awards, under this FOA shall include the U.S. Competitiveness Provision in accordance with Section VI.B.xxi. U.S. Manufacturing Commitments of this FOA. A copy of the DEC can be found at https://www.energy.gov/gc/determination-exceptional-circumstances-decs. Pursuant to 37 CFR § 401.4, any non-profit organization or small business firm as defined by 35 U.S.C. 201 affected by any DEC has the right to appeal it by providing written notice to DOE within 30 working days from the time it receives a copy of the determination.

- DOE may issue and publish on the website above further DECs prior to the issuance of awards under this FOA. DOE may require additional submissions or requirements as authorized by any applicable DEC.

L. Government Rights in Subject Inventions

Where prime recipients and subrecipients retain title to subject inventions, the U.S. government retains certain rights.

Government Use License

The U.S. government retains a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States any subject invention throughout the world. This license extends to contractors doing work on behalf of the government.

March-In Rights

The U.S. government retains march-in rights with respect to all subject inventions. Through "march-in rights," the government may require a prime recipient or subrecipient who has

elected to retain title to a subject invention (or their assignees or exclusive licensees), to grant a license for use of the invention to a third-party. In addition, the government may grant licenses for use of the subject invention when a prime recipient, subrecipient, or their assignees and exclusive licensees refuse to do so.

DOE may exercise its march-in rights only if it determines that such action is necessary under any of the four following conditions:

- The owner or licensee has not taken or is not expected to take effective steps to achieve practical application of the invention within a reasonable time;
- The owner or licensee has not taken action to alleviate health or safety needs in a reasonably satisfied manner;
- The owner has not met public use requirements specified by federal statutes in a reasonably satisfied manner; or
- The U.S. manufacturing requirement has not been met.

Any determination that march-in rights are warranted must follow a fact-finding process in which the recipient has certain rights to present evidence and witnesses, confront witnesses and appear with counsel and appeal any adverse decision. To date, DOE has never exercised its march-in rights to any subject inventions.

M. Rights in Technical Data

Data rights differ based on whether data is first produced under an award or instead was developed at private expense outside the award.

"Limited Rights Data": The U.S. government will not normally require delivery of confidential or trade secret-type technical data developed solely at private expense prior to issuance of an award, except as necessary to monitor technical progress and evaluate the potential of proposed technologies to reach specific technical and cost metrics.

Government Rights in Technical Data Produced Under Awards: The U.S. government normally retains unlimited rights in technical data produced under government financial assistance awards, including the right to distribute to the public. However, pursuant to special statutory authority, certain categories of data generated under DOE awards may be protected from public disclosure for up to five years after the data is generated ("Protected Data"). For awards permitting Protected Data, the protected data must be marked as set forth in the award's intellectual property terms and conditions and a listing of unlimited rights data (i.e., non-protected data) must be inserted into the data clause in the award. In addition, invention disclosures may be protected from public disclosure for a reasonable time in order to allow for filing a patent application. DOE shall have the right to aggregate data produced under the award so that the data's source is anonymous and may publish such aggregated data at its discretion.

For this FOA, selectees and recipients may request an extended period of protection (more than five years and not to exceed thirty years) if reasonably required for commercialization for specific categories of data first produced under the resulting awards in accordance with 15 U.S.C. § 3710a(c)(7)(B)(ii) and the Energy Policy Acts of 1992 and 2005. Further direction will be provided during the negotiation process upon request.

N. Copyright

The prime recipient and subrecipients may assert copyright in copyrightable works, such as software, first produced under the award without DOE approval. When copyright is asserted, the government retains a paid-up nonexclusive, irrevocable worldwide license to reproduce, prepare derivative works, distribute copies to the public, and to perform publicly and display publicly the copyrighted work. This license extends to contractors and others doing work on behalf of the government.

O. Export Control

The U.S. government regulates the transfer of information, commodities, technology, and software considered to be strategically important to the U.S. to protect national security, foreign policy, and economic interests without imposing undue regulatory burdens on legitimate international trade. There is a network of federal agencies and regulations that govern exports that are collectively referred to as "Export Controls". To ensure compliance with Export Controls, it is the prime recipient's responsibility to determine when its project activities trigger Export Controls and to ensure compliance.

Certain information, technology or material under an award may be considered export-controlled items that cannot be released to any foreign entity (organization, company, or person) without a license. All recipients and subrecipients must take the appropriate steps to obtain any required licenses, monitor and control access to restricted information and material, and safeguard all controlled items to ensure compliance with Export Controls. Under no circumstances may any foreign entity (organizations, companies, or persons) receive access to an export controlled item unless proper export procedures have been satisfied and such access is authorized pursuant to law or regulation.

The recipient must immediately report to DOE any export control violations related to the project funded under the DOE award, at the recipient or subrecipient level, and provide the corrective action(s) to prevent future violations.

P. Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment

As set forth in 2 CFR 200.216, recipients and subrecipients are prohibited from obligating or expending project funds (federal funds and recipient cost share) to:

(1) Procure or obtain;

(2) Extend or renew a contract to procure or obtain; or

(3) Enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in Public Law 115-232, Section 889, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).

(i) For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).

(ii) Telecommunications or video surveillance services provided by such entities or using such equipment.

(iii) Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

See Public Law 115-232, Section 889, and 2 CFR 200.471 for additional information.

Q. Personally Identifiable Information (PII)

All information provided by the applicant must to the greatest extent possible exclude PII. The term “PII” refers to information which can be used to distinguish or trace an individual's identity, such as their name, social security number, biometric records, alone, or when combined with other personal or identifying information which is linked or linkable to a specific individual, such as date and place of birth or mother’s maiden name. See OMB Memorandum

M-07-16 dated May 22, 2007, found at: https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/memoranda/2007/m07-16.pdf

By way of example, applicants must screen resumes to ensure that they do not contain PII such as personal addresses, personal landline/cell phone numbers, and personal emails. **Under no circumstances should Social Security Numbers (SSNs) be included in the application**. Federal agencies are prohibited from the collecting, using, and displaying unnecessary SSNs. (See, the Federal Information Security Modernization Act of 2014 (Pub. L. No. 113-283, Dec 18, 2014; 44 U.S.C. § 3551).

R. Annual Independent Audits

If a for-profit entity is a prime recipient and has expended $750,000 or more of DOE awards during the entity's fiscal year, an annual compliance audit performed by an independent auditor is required. For additional information, please refer to 2 CFR 910.501 and Subpart F.

If an educational institution, non-profit organization, or state/local government is a prime recipient or subrecipient and has expended $750,000 or more of federal awards during the non-federal entity's fiscal year, then a Single or Program-Specific Audit is required. For additional information, please refer to 2 CFR 200.501 and Subpart F.

Applicants and subrecipients (if applicable) should propose sufficient costs in the project budget to cover the costs associated with the audit. DOE will share in the cost of the audit at its applicable cost share ratio.

APPENDIX A – LIST OF ACRONYMS

AEO	Annual Energy Outlook
AHJ	Authority Having Jurisdiction
BIL	Bipartisan Infrastructure Law
BP	Business Plan
CBP	Community Benefits Plan
CESER	Office of Cybersecurity, Energy Security, and Emergency Response
CFDA	Catalog of Federal Domestic Assistance
CHPS	Clean Hydrogen Production Standard
CIP	Critical Infrastructure Protection
CO_2	Carbon Dioxide
COI	Conflict of Interest
CCS	Carbon Capture and Storage
CFR	Code of Federal Regulation
C2M2	DOE Cybersecurity Capability Maturity Model
D&D	Disposition and Decommissioning
DBA	Davis-Bacon Act
DEC	Determination of Exceptional Circumstances
DEIA	Diversity, Equity, Inclusion, and Accessibility
DMP	Data Management Plan
DOE	Department of Energy
DOL	Department of Labor
EA	Environmental Assessment
EEJ	Energy and Environmental Justice
EERE	Energy Efficiency and Renewable Energy
EIA	U.S. Energy Information Administration
EIS	Environmental Impact Statement
EIV	Environmental Information Volume
EJ	Environmental Justice
EO	Executive Order
EPAct 2005	Energy Policy Act of 2005
EPC&O	Engineering, Procurement, Construction and Operations
ESA	Endangered Species Act
ET	Eastern Time Zone
FAPIIS	Federal Awardee Performance and Integrity Information System
FAR	Federal Acquisition Regulation
FCOI	Financial Conflict of Interest
FEED	Front End Engineering Design
FFATA	Federal Funding and Transparency Act of 2006
FFRDC	Federally Funded Research and Development Center

FLSA	Fair Labor and Standards Act
FOA	Funding Opportunity Announcement
FOIA	Freedom of Information Act
FP	Financial Plan
GAAP	Generally Accepted Accounting Principles
GHG	Greenhouse Gas
GIS	Geographic Information System
GREET	Greenhouse gases, Regulated Emissions, and Energy use in Technologies model
H2Hub	Regional Clean Hydrogen Hub
HAZOP	Hazard and Operability Analysis
HBCU	Historically Black Colleges and Universities
HFTO	Hydrogen and Fuel Cell Technologies Office
HHV	Higher Heating Value
HSP	Hydrogen Safety Panel
ICS	Industrial Control Systems
IE	Independent Engineering (or Independent Engineer)
IED	Intelligent Electronic Device
IEEE	Institute of Electrical and Electronics Engineers
IIJA	Infrastructure Investment and Jobs Act
IP	Intellectual Property
IPMP	Intellectual Property Management Plan
IPS	Integrated Project Schedule
IRB	Institutional Review Board
ISO	International Organization for Standardization
kg	Kilogram
kWh	Kilowatt-hour
LCA	Life Cycle Analysis
LHV	Lower Heating Value
LLC	Limited Liability Corporation
MB	Megabyte
mmBtu	Million British thermal units
MMT	Million Metric Tons
MP	Management Plan
MPIN	Marketing Partner ID Number
MS	Microsoft
MSI	Minority-Serving Institution
MT	Metric Tons
MW	Megawatt
MWh	Megawatts per hour
NAICS	North American Industry Classification System

NDA	Nondisclosure Agreement
NEPA	National Environmental Policy Act
NHPA	National Historical Preservation Act
NLRA	National Labor Relations Act
NNSA	National Nuclear Security Administration
NO_x	Nitrous Oxide
NSF	National Science Foundation
NSPM	National Security Presidential Memorandum
O&M	Operations and Maintenance
OCED	Office of Clean Energy Demonstrations
OFCCP	Office of Federal Contractor Compliance Programs
OIG	Office of Inspector General
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
OSTI	Office of Scientific and Technical Information
PDF	Portable Document Format
PII	Personal Identifiable Information
PMP	Project Management Plan
POC	Point of Contact
PPA	Power Purchase Agreement
PSC	Product and Service Code
R&D	Research and Development
RCS	Regulations, Codes, and Standards
RFI	Request for Information
RFP	Request for Proposal
RMP	Risk Management Plan
SAM	System for Award Management
SCA	Service Contract Act
SF	Standard Form
SMART	Specific, Measurable, Achievable, Relevant, and Timely
SOPO	Statement of Project Objectives
STEM	Science, Technology, Engineering, and Mathematics
TEA	Techno-economic Analysis
TPC	Total Project Cost
TRL	Technology Readiness Level
UCC	Uniform Commercial Code
UEI	Unique Entity Identifier
USD	United States Dollar
V&V	Verification and Validation
WBS	Work Breakdown Structure
WP	Work Proposal

APPENDIX B – DOE TECHNOLOGY READINESS LEVEL SCALE

Relative Level of Technology Development	Technology Readiness Level	TRL Definition	Description
System Operations	**TRL 9**	Actual system operated over the full range of expected conditions	Actual operation of the technology is in its final form, under the full range of operating conditions. Examples include using the actual system with the full range of wastes.
System Commissioning	**TRL 8**	Actual system completed and qualified through test and demonstration	The technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental testing and evaluation of the system with real waste in hot commissioning.
	TRL 7	Full-scale, similar (prototypical) system demonstrated in relevant environment	Prototype full scale system. Represents a major step up from TRL 6, requiring demonstration of an actual prototype system in a relevant environment. Examples include testing the prototype in the field with a range of simulants and/or real waste and cold commissioning.
Technology Demonstration	**TRL 6**	Engineering/pilot-scale, similar (prototypical) system validation in relevant environment	Representative engineering scale model or prototype system, which is well beyond the lab scale tested for TRL 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype with real waste and a range of simulants.
Technology Development	**TRL 5**	Laboratory scale, similar system validation in relevant environment	The basic technological components are integrated so that the system configuration is similar to (matches) the final application in almost all respects. Examples include testing a high-fidelity system in a simulated environment and/or with a range of real waste and simulants.
	TRL 4	Component and/or system validation in laboratory environment	Basic technological components are integrated to establish that the pieces will work together. This is relatively "low fidelity" compared with the eventual system. Examples include integration of "ad hoc" hardware in a laboratory and testing with a range of simulants.
Research to Prove Feasibility	**TRL 3**	Analytical and experimental critical function and/or characteristic proof of concept	Active research and development is initiated. This includes analytical studies and laboratory scale studies to physically validate the analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative. Components may be tested with simulants.
	TRL 2	Technology concept and/or application formulated	Invention begins. Once basic principles are observed, practical applications can be invented. Applications are speculative, and there may be no proof or detailed analysis to support the assumptions. Examples are still limited to analytic studies.
Basic Technology Research	**TRL 1**	Basic principles observed and reported	Lowest level of technology readiness. Scientific research begins to be translated into applied R&D. Examples might include paper studies of a technology's basic properties.

APPENDIX C – INTEGRATED PROJECT SCHEDULES

All schedules provided as part of the application or during later phases should include and clearly identify:

- Project Critical Path and key sub- or non-critical paths if relevant
- Anticipated project baseline schedule
- Major project milestones and deliverables associated with all project areas, including but not limited to, technology maturation, business development, engineering, procurement, construction, Community Benefits Plan implementation, permitting, safety, and regulatory
- Activities supporting completion of those milestones and deliverables
- Schedule dependencies, including predecessors and successors as well as parallel and sequential activities

For purposes of the Full Application, the following table may be used to guide schedule development. Please note that the below descriptions should be considered indicative of expectations and non-exhaustive.

Table C1: Integrated Project Schedule Level of Detail Examples

Level 1	Summary schedule including major project milestones, deliverables, and related activities.
Level 2	A more detailed version of the Level 1 schedule that should include a breakdown into major project categories such as engineering, design, construction, procurement, permitting and regulatory, Community Benefits Plan implementation, and others as appropriate.
Level 3	Integrated roll up of Level 4 schedules. Should reflect breakout of activities underlying elements of the Level 2 schedule including anticipated start and finish dates for each activity. Often developed by the executing contractor using detailed information from project and/or construction managers and is used for project progress reporting.
Level 4	Detailed working schedule used to manage day-to-day activities or other near term work plans. Should be resource loaded. Often called Execution or Working schedule or similar.

APPENDIX D – COST SHARE INFORMATION

How Cost Sharing Is Calculated

As stated above, cost sharing is calculated as a percentage of the Total Project Cost. FFRDC costs must be included in Total Project Costs. The following is an example of how to calculate cost sharing amounts for a project with $500,000,000 in federal funds with a minimum 50% non-federal cost sharing requirement:

- Formula: Federal share ($) divided by federal share (%) = Total Project Cost
  Example: $500,000,000 divided by 50% = $1,000,000,000
- Formula: Total Project Cost ($) minus federal share ($) = Non-federal share ($)
  Example: $1,000,000,000 minus $500,000,000 = $500,000,000
- Formula: Non-federal share ($) divided by Total Project Cost ($) = Non-federal share (%)
  Example: $500,000,000 divided by $1,000,000,000 = 50%

What Qualifies For Cost Sharing?

While it is not possible to explain what specifically qualifies for cost sharing in one or even a couple of sentences, in general, if a cost is allowable under the cost principles applicable to the organization incurring the cost and is eligible for reimbursement under a DOE grant or cooperative agreement, then it is allowable as cost share. Conversely, if the cost is not allowable under the cost principles and not eligible for reimbursement, then it is not allowable as cost share. In addition, costs may not be counted as cost share if they are paid by the federal government under another award unless authorized by federal statute to be used for cost sharing.

The rules associated with what is allowable as cost share are specific to the type of organization that is receiving funds under the grant or cooperative agreement, though are generally the same for all types of entities. The specific rules applicable to:

- FAR Part 31 for For-Profit entities, (48 CFR Part 31); and
- 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.

In addition to the regulations referenced above, other factors may also come into play such as timing of donations and length of the project period. For example, the value of ten years of donated maintenance on a project that has a project period of five years would not be fully allowable as cost share. Only the value for the five years of donated maintenance that corresponds to the project period is allowable and may be counted as cost share.

Additionally, DOE generally does not allow pre-award costs for either cost share or reimbursement when these costs precede the signing of the appropriation bill that funds the

award. In the case of a competitive award, DOE generally does not allow pre-award costs prior to the signing of the Selection Statement by the DOE Selection Official(s).

General Cost Sharing Rules on a DOE Award

1. Cash Cost Share – encompasses all contributions to the project made by the recipient or subrecipient(s), for costs incurred and paid for during the project. This includes when an organization pays for personnel, supplies, or equipment for their own company with organizational resources. If the item or service is reimbursed, it is cash cost share. All cost share items must be necessary to the performance of the project.

2. In-Kind Cost Share – encompasses all contributions to the project made by the recipient or subrecipient(s) that do not involve a payment or reimbursement and represent donated items or services. In-Kind cost share items may include volunteer personnel hours, donated existing equipment, or donated existing supplies. The cash value and calculations thereof for all In-Kind cost share items must be justified and explained in the Cost Share section of the project Budget Justification. All cost share items must be necessary to the performance of the project. If questions exist, consult your DOE contact before filling out the In-Kind cost share section of the Budget Justification.

3. Funds from other federal sources MAY NOT be counted as cost share. This prohibition includes FFRDC subrecipients. Non-federal sources include any source not originally derived from federal funds. Cost sharing commitment letters from subrecipients must be provided with the original application.

4. Fee or profit, including foregone fee or profit, are not allowable as project costs (including cost share) under any resulting award. The project may only incur those costs that are allowable and allocable to the project (including cost share) as determined in accordance with the applicable cost principles prescribed in FAR Part 31 for For-Profit entities and 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.

DOE Financial Assistance Rules 2 CFR Part 200 as amended by 2 CFR Part 910

As stated above, the rules associated with what is allowable cost share are generally the same for all types of organizations. Following are the rules found to be common, but again, the specifics are contained in the regulations and cost principles specific to the type of entity:

(A) Acceptable contributions. All contributions, including cash contributions and third-party in-kind contributions, must be accepted as part of the prime recipient's cost sharing if such contributions meet all of the following criteria:

(1) They are verifiable from the recipient's records.

(2) They are not included as contributions for any other federally-assisted project or program.

(3) They are necessary and reasonable for the proper and efficient accomplishment of project or program objectives.

(4) They are allowable under the cost principles applicable to the type of entity incurring the cost as follows:

a. For-profit organizations. Allowability of costs incurred by for-profit organizations and those non-profit organizations listed in Attachment C to OMB Circular A–122 is determined in accordance with the for-profit cost principles in 48 CFR Part 31 in the FAR, except that patent prosecution costs are not allowable unless specifically authorized in the award document. For more information, see FAR Subpart 31.2—Contracts with Commercial Organizations; and

b. Other types of organizations. For all other non-federal entities, allowability of costs is determined in accordance with 2 CFR Part 200 Subpart E.

(5) They are not paid by the federal government under another award unless authorized by federal statute to be used for cost sharing or matching.

(6) They are provided for in the approved budget.

(B) They are valuing and documenting contributions:

(1) Valuing recipient's property or services of recipient's employees. Values are established in accordance with the applicable cost principles, which mean that amounts chargeable to the project are determined on the basis of costs incurred. For real property or equipment used on the project, the cost principles authorize depreciation or use charges. The full value of the item may be applied when the item will be consumed in the performance of the award or fully depreciated by the end of the award. In cases where the full value of a donated capital asset is to be applied as cost sharing or matching, that full value must be the lesser of the following:

a. The certified value of the remaining life of the property recorded in the recipient's accounting records at the time of donation; or

b. The current fair market value. If there is sufficient justification, the Contracting Officer may approve the use of the current fair market value of the donated property, even if it exceeds the certified value at the time of donation to the project. The Contracting Officer may accept the use of any reasonable basis for determining the fair market value of the property.

(2) Valuing services of others' employees. If an employer other than the recipient furnishes the services of an employee, those services are valued at the employee's regular rate of pay, provided these services are for the same skill level for which the employee is normally paid.

(3) Valuing volunteer services. Volunteer services furnished by professional and technical personnel, consultants, and other skilled and unskilled labor may be counted as cost sharing or matching if the service is an integral and necessary part of an approved project or program. Rates for volunteer services must be consistent with those paid for similar work in the recipient's organization. In those markets in which the required skills are not found in the recipient organization, rates must be consistent with those paid for similar work in the labor market in which the recipient competes for the kind of services involved. In either case, paid fringe benefits that are reasonable, allowable, and allocable may be included in the valuation.

(4) Valuing property donated by third parties.

a. Donated supplies may include such items as office supplies or laboratory supplies. Value assessed to donated supplies included in the cost sharing or matching share must be reasonable and must not exceed the fair market value of the property at the time of the donation.

b. Normally only depreciation or use charges for equipment and buildings may be applied. However, the fair rental charges for land and the full value of equipment or other capital assets may be allowed, when they will be consumed in the performance of the award or fully depreciated by the end of the award, provided that the Contracting Officer has approved the charges. When use charges are applied, values must be determined in accordance with the usual accounting policies of the recipient, with the following qualifications:

i. The value of donated space must not exceed the fair rental value of comparable space as established by an independent appraisal of comparable space and facilities in a privately-owned building in the same locality.

ii. The value of loaned equipment must not exceed its fair rental value.

(5) Documentation. The following requirements pertain to the recipient's supporting records for in-kind contributions from third parties:

a. Volunteer services must be documented and, to the extent feasible, supported by the same methods used by the recipient for its own employees.

b. The basis for determining the valuation for personal services and property must be documented.

APPENDIX E – WAIVER REQUESTS

A. Foreign Entity Participation

1. Waiver for Foreign Entity Participation

For projects selected under this FOA, all recipients and subrecipients must be organized, chartered, or incorporated (or otherwise formed) under the laws of a state or territory of the United States; have majority domestic ownership and control; and have a physical location for business operations in the United States. To request a waiver of this requirement, an applicant must submit an explicit waiver request in the Full Application.

Waiver Criteria

Foreign entities seeking to participate in a project funded under this FOA must demonstrate to the satisfaction of DOE that:

a. Its participation is in the best interest of the U.S. industry and U.S. economic development;
b. The project team has appropriate measures in place to control sensitive information and protect against unauthorized transfer of scientific and technical information;
c. Adequate protocols exist between the U.S. subsidiary and its foreign parent organization to comply with export control laws and any obligations to protect proprietary information from the foreign parent organization;
d. The work is conducted within the U.S.; and
e. The foreign entity will satisfy other conditions that may be deemed necessary by DOE to protect U.S. government interests.

Content for Waiver Request

A Foreign Entity waiver request must include the following:

a. Information about the entity: name, point of contact, and proposed type of involvement;
b. Country of incorporation, the extent of the ownership/level control by foreign entities, whether the entity is state owned or controlled, a summary of the ownership breakdown of the foreign entity and the percentage of ownership/control by foreign entities, foreign shareholders, foreign state or foreign individuals;
c. The rationale for proposing a foreign entity participate (must address criteria above);
d. A description of the project's anticipated contributions to the U.S. economy;

- How the project will benefit the U.S., including manufacturing, and contributions to employment in the U.S. and growth in new markets and jobs in the U.S.;
- How the project will promote domestic American manufacturing of products and/or services;

e. A description of how the foreign entity's participation is essential to the project;
f. A description of the likelihood of IP being created from the work and the treatment of any such IP; and
g. Countries where the work will be performed (Note: if any work is proposed to be conducted outside the U.S., the applicant must also complete a separate request foreign work waiver).

DOE may also require:

- A risk assessment with respect to IP and data protection protocols that includes the export control risk based on the data protection protocols, the technology being developed, and the foreign entity and country. These submissions could be prepared by the subrecipient, but the prime recipient must make a representation to DOE as to whether it believes the data protection protocols are adequate and make a representation of the risk assessment – high, medium, or low risk of data leakage to a foreign entity.
- Additional language be added to any agreement or subagreement to protect IP, mitigate risk, or other related purposes.

DOE may require additional information before considering the waiver request.

The applicant does not have the right to appeal DOE's decision concerning a waiver request.

B. Foreign Work

1. Waiver for Performance of Work in the United States (Foreign Work Waiver)

As set forth in Section IV.J.iii. Performance of Work in the United States, all work under funding by this FOA must be performed in the United States. To seek a waiver of the Performance of Work in the United States requirement, the applicant must submit an explicit waiver request in the Full Application. A separate waiver request must be submitted for each entity proposing performance of work outside of the United States.

Overall, a waiver request must demonstrate to the satisfaction of DOE that it would further the purposes of this FOA and is otherwise in the economic interests of the United States to perform work outside of the United States. A request for a foreign work waiver must include the following:

1. The rationale for performing the work outside the U.S. ("foreign work");
2. A description of the work proposed to be performed outside the U.S.;
3. An explanation as to how the foreign work is essential to the project;
4. A description of the anticipated benefits to be realized by the proposed foreign work and the anticipated contributions to the U.S. economy;
5. The associated benefits to be realized and the contribution to the project from the foreign work;
6. How the foreign work will benefit the U.S. including manufacturing, and contributions to employment in the U.S. and growth in new markets and jobs in the U.S.;
7. How the foreign work will promote domestic American manufacturing of products and/or services;
8. A description of the likelihood of IP being created from the foreign work and the treatment of any such IP;
9. The total estimated cost (DOE and recipient cost share) of the proposed foreign work;
10. The countries in which the foreign work is proposed to be performed; and
11. The name of the entity that would perform the foreign work.

DOE may require additional information before considering the waiver request.

The applicant does not have the right to appeal DOE's decision concerning a waiver request.

APPENDIX F – REQUIRED USE OF AMERICAN IRON, STEEL, MANUFACTURED PRODUCTS, AND CONSTRUCTION MATERIALS BUY AMERICA REQUIREMENTS FOR INFRASTRUCTURE PROJECTS

A. Definitions
For purposes of the Buy America requirements, the following definitions apply:

Construction materials includes an article, material, or supply—other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives[66] —that is or consists primarily of:

- non-ferrous metals;
- plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
- glass (including optic glass);
- lumber; or
- drywall.

Infrastructure includes, at a minimum, the structures, facilities, and equipment for, in the United States, roads, highways, and bridges; public transportation; dams, ports, harbors, and other maritime facilities; intercity passenger and freight railroads; freight and intermodal facilities; airports; water systems, including drinking water and wastewater systems; electrical transmission facilities and systems; utilities; broadband infrastructure; and buildings and real property. Infrastructure includes facilities that generate, transport, and distribute energy.

Project means the construction, alteration, maintenance, or repair of infrastructure in the United States.

B. Buy America Requirements for Infrastructure Projects ("Buy America" requirements)
In accordance with Section 70914 of the BIL, none of the project funds (includes federal share and recipient cost share) may be used for a project for infrastructure unless:

(1) all iron and steel used in the project are produced in the United States--this means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States;

(2) all manufactured products used in the project are produced in the United States—this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or

[66] BIL, § 70917(c)(1).

manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation; and

(3) all construction materials[67] are produced in the United States—this means that all manufacturing processes for the construction material occurred in the United States. The Buy America requirements only apply to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does a Buy America requirement apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project, but are not an integral part of the structure or permanently affixed to the infrastructure project.

The Buy America requirements only apply to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does the Buy America requirements apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project, but are not an integral part of the structure or permanently affixed to the infrastructure project.

These requirements must flow down to all sub-awards, all contracts, subcontracts, and purchase orders for work performed under the proposed project, except where the prime recipient is a for-profit entity. Based on guidance from the Office of Management and Budget (OMB), the Buy America requirements of the BIL do not apply to DOE projects in which the prime recipient is a for-profit entity; the requirements only apply to projects whose prime recipient is a State, local government, Indian Tribe, Institution of Higher Education, or nonprofit organization.

For additional information related to the application and implementation of these Buy America requirements, please see OMB Memorandum M-22-11, issued April 18, 2022: https://www.whitehouse.gov/wp-content/uploads/2022/04/M-22-11.pdf

Note that for all applicants—both non-Federal entities and for-profit entities—DOE is including a Program Policy Factor that the Selection Official may consider in determining which Full Applications to select for award negotiations that considers whether the applicant has made a

[67] Excludes cement and cementitious materials, aggregates such as stone, sand, or gravel, or aggregate binding agents or additives.

commitment to procure U.S. iron, steel, manufactured products, and construction materials in its project.

C. Waivers

The Cooperative Agreement between DOE and the awardee will require each recipient: (1) to fulfill the commitments made in its application regarding the procurement of U.S.-produced products, subject to a waiver process by DOE assessing the availability and cost (increasing the cost of the overall project by >25%) and (2) to fulfill the commitments made in its application regarding the procurement of other key component metals and manufactured products domestically that are deemed available in sufficient and reasonably available quantities or of a satisfactory quality at the time of award negotiation, again subject to a DOE waiver process. Applicants may also seek a DOE waiver of domestic procurement requirements based on applicable public interest factors, such as relating to minor components, international trade obligations, or other considerations.

In limited circumstances, DOE may waive the application of the Buy America requirements where DOE determines that:

> (1) applying the Buy America requirements would be inconsistent with the public interest;
>
> (2) the types of iron, steel, manufactured products, or construction materials are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality; or
>
> (3) the inclusion of iron, steel, manufactured products, or construction materials produced in the United States will increase the cost of the overall project by more than 25 percent.

If a recipient is seeking a waiver of the Buy America requirements, they may submit a waiver request after they have completed negotiations and an award is made. A waiver request must include:

- A detailed justification for the use of "non-domestic" iron, steel, manufactured products, or construction materials to include an explanation as to how the non-domestic item(s) is essential to the project
- A certification that the applicant or recipient made a good faith effort to solicit bids for domestic products supported by terms included in requests for proposals, contracts, and nonproprietary communications with potential suppliers
- Applicant/Recipient name and Unique Entity Identifier (UEI)
- Total estimated project cost, DOE and cost-share amounts
- Project description and location (to the extent known)

- List and description of iron or steel item(s), manufactured goods, and construction material(s) the applicant or recipient seeks to waive from Domestic Content Procurement Preference requirement, including name, cost, country(ies) of origin (if known), and relevant PSC and NAICS code for each
- Waiver justification including due diligence performed (e.g., market research, industry outreach) by the applicant or recipient
- Anticipated impact if no waiver is issued

DOE may require additional information before considering the waiver request.

Waiver requests are subject to public comment periods of no less than 15 days and must be reviewed by the Made in America Office. There may be instances where an award qualifies, in whole or in part, for an existing general applicability waiver.

The applicant does not have the right to appeal DOE's decision concerning a waiver request.

APPENDIX G – ENVIRONMENTAL CONSIDERATIONS SUMMARY

DOE's decision whether and how to distribute federal funds under this FOA is subject to the National Environmental Policy Act (NEPA) (42 U.S.C. 4321, *et seq.)*. Your responses will assist DOE in determining the appropriate level of NEPA review (if your proposal is selected) and in preparing an environmental assessment (EA) or environmental impact statement (EIS), if necessary. While not all information may be available at the proposal stage, please provide as much detail and information as is currently available. Consultation with experts or advisors in your organization to assist with your responses is highly recommended.

1. **Please provide a brief summary of the proposed project.** *Describe proposed activities (not goals and objectives) and specify if this project is part of a larger project or connected to another project.*
2. **Is there ongoing or anticipated federal government involvement in any aspect of this project (e.g., funding, permitting, technical assistance, project located on federally administered land)?** *If "yes," please list the agency and describe the nature of the involvement.*
3. **Is the project fully defined (i.e., all sites and activities are known)?** *If "no", please describe the sites and/or activities/tasks that are yet to be defined.*
4. **Complete the table below for each location where proposed project activities would take place:**

Proposed location (physical address or coordinates)	Setting of the proposed location (e.g., urban, industrial, suburban, agricultural, university campus, manufacturing facility, etc.) and the current condition or use of the site	General description of the proposed activities	Land administration (e.g., federal [specify BLM, USFS, etc.], Tribal, state, local, private)

5. **Attach a map showing the location(s) of the proposed project, and a site layout map showing the proposed facilities and associated infrastructure.** ~~*(A GIS shapefile is preferrable, if available.)*~~

6. **Describe new facilities to be constructed, any modifications of existing facilities, and any new infrastructure or facilities necessary for the construction or operation of the proposed project.** *(e.g., access roads, laydown areas, off-site parking areas, railroad links, docks, water outfalls and intakes, pipelines, electrical transmission, waste treatment facilities, etc.)*

7. **Identify and describe any existing, modifications to, or new permits, licenses, or authorizations that would be required to perform project activities.** *(e.g., environmental permits, operating permits, or drilling permits)*

8. **Provide a brief description of the existing environmental burdens at the proposed project location(s) and surrounding areas, including those contributed to or exacerbated by existing facilities the H2Hub will leverage or modify.** *Existing environmental burdens can be identified using available tools, such as DOE's Energy Justice Dashboard (beta) (https://www.energy.gov/diversity/energy-justice-dashboard-beta) or the U.S. Environmental Protection Agency's EJSCREEN (https://www.epa.gov/ejscreen).*

9. **Would any of the following have the potential to be impacted (directly or indirectly) by the proposed project?** *If "yes", provide a detailed description of: (1) the resources that could be affected, and (2) how project activities may affect those resources (including potential direct and indirect [visual, noise, etc.] impacts).*

a) Tribal lands or resources of Tribal interest and/or sensitivity
b) Environmental Justice (EJ) Populations *(EJ populations include minority, low-income, and Tribal populations)*
c) Historic, archeological, or cultural resources *(includes listed and eligible resources over 50 years old or of cultural significance)*
d) Areas having a special designation *(e.g., federal and state designated wilderness areas, national parks, national natural landmarks, wild and scenic rivers, state and federal wildlife refuges, and marine sanctuaries)*
e) Threatened or endangered species *(whether proposed or listed by state or Federal governments)*, including their habitat
f) Land resources *(e.g., prime farmland, unique farmland, or other farmland of statewide or local importance, tundra, rainforests)*
g) Floodplains
h) Wetlands
i) Air quality *(indoor and/or outdoor)*
j) *Greenhouse gas emissions*
k) Water quality *(surface and/or ground water and/or special sources of water including sole source aquifers)*

l) Ocean resources *(e.g., coral reefs)*
m) Coastal zones
n) Marine mammals or essential fish habitat
o) Land use
p) Socioeconomic conditions
q) Sensitive receptors *(e.g., hospitals, schools, daycare facilities, elderly housing)*
r) Navigable Airspace
s) Transportation infrastructure

10. **Please describe:**
    a) any coordination or discussions that have been initiated or the plan to coordinate with state and/or federal agencies *(e.g., State Historic Preservation Office, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Nuclear Regulatory Commission, etc.)*
    b) any coordination or discussions that have been initiated with any Tribal governments
    c) any issues that would generate public controversy regarding proposed project
    d) any studies, reviews, and/or plans that have been completed for the proposed project *(e.g., environmental site assessments, waste management plans, health and safety plans, cultural resource surveys, identification of prime or unique farmland, wildlife surveys, etc.)*
    e) any environmental considerations and/or mitigation strategies that have been incorporated into the proposed project *(e.g., measures to reduce and/or avoid greenhouse gas emissions, and/or impacts to cultural resources, historic properties, state or federally protected species, wetlands, floodplains, traffic, ambient noise, etc.)*
    f) any discussions with affected communities

APPENDIX H - PREPARATION OF ENVIRONMENTAL INFORMATION VOLUME

I. GENERAL

This volume must be completed during Phase 1 and is being provided here for information and planning purposes only. The Environmental Volume shall provide, in detail, all information as outlined in the following sections.

DOE is responsible for determining potential impacts associated with the proposed H2Hub. The information provided in this Environmental Volume will inform DOE's independent analysis. Additional information will likely be required to complete the NEPA review process.

II. CONTENT

A. ENVIRONMENTAL INFORMATION DESCRIBING THE H2HUB AND THE PROJECT SITE(S).

This section of the Environmental Volume shall contain a detailed description that summarizes the proposed action, its alternatives, and, most importantly, the existing environment. It shall be prepared in the following format:

1. Summary

This section shall contain a succinct summary of the proposed H2Hub and its potential environmental, safety, health, and socioeconomic impacts. A brief description of the proposed construction and operation activities, including the duration and schedule shall also be provided. The summary shall focus on both beneficial and detrimental impacts, as well as any major risks associated with constructing, operating, maintaining, and decommissioning of proposed H2Hub facilities, if applicable.

2. Proposed H2Hub and Its Alternatives

a. Proposed H2Hub

This section shall discuss the objectives of the proposed H2Hub, and shall describe the proposed site(s), system(s), and/or process(es). It shall also describe the work that would be performed, the schedule, associated requirements (e.g., land, natural resources), and any changes that would be necessary to the existing site, system, or process.

The description shall include a project site plan and topographic map of the area. Any off-site facility requirements shall also be identified in this section. Additionally, any reasonably foreseeable additions or modifications to the initial H2Hub shall be described.

b. Alternatives to Proposed H2Hub

A complete description of likely alternatives to the project, as currently proposed shall be provided. The description shall address alternatives that have been considered but dismissed and those that are still being considered. Alternatives could include, but are not limited to alternative technologies, H2Hub configuration, H2Hub sites, waste disposal sites, etc.

3. Existing Environment
This section shall discuss the existing environment at the project location(s). The prime applicant and all proposed subrecipients shall discuss the following:

a. Land Use
This section shall provide a description of the affected land area and its dimensions; a discussion of current land usage (e.g., farming, industrial, etc.); and descriptions of nearby pipelines and transmission lines, as well as transportation access (rail, road, barge, etc.).

b. Atmospheric Conditions/Air Quality
This section shall identify the air quality control regions where the H2Hub would be located; and describe the local climate and existing air quality conditions in the immediate vicinity of the proposed site.

c. Hydrologic Conditions/Water Quality
This section shall identify any watersheds and downstream drainage, surface and groundwater quality (nearby aquifers and the depth of groundwater) in the proposed project area, existing floodplains, unique aquatic habitats, recreational areas, public water supplies; describe any constraints on water availability imposed by treaties, court decree, state and Federal water laws; and identify existing wastewater treatment and/or disposal facilities.

d. Geologic/Soil Conditions
This section shall describe the topographic stability (e.g., formations and/or faulting), the productivity of soil, any unique soil species, and the soil's susceptibility to erosion.

e. Vegetation and Wildlife Resources
This section shall describe any indigenous flora and fauna, state and Federally listed endangered or threatened species and their habitats, and sensitive habitats such as wetlands, floodplains, or other ecologically sensitive terrain that could be impacted by any aspect of the proposed H2Hub.

f. Socioeconomic Conditions
This section shall discuss the population in the project area(s) and shall describe the employment and labor mix.

g. Historic/Cultural Resources
The section shall describe any historic and/or cultural places in the project area(s), as well as archeological sites.

h. Visual Resources
This section shall describe any scenic vistas or existing aesthetic landscaping in the project area(s).

i. Health and Safety Factors
This section shall discuss **current** emissions (toxic and non-toxic), effluents, and noise levels at the project area(s).

B. ENVIRONMENTAL IMPACTS OF THE WORK TO BE PERFORMED.

This section of the Environmental Volume shall describe the anticipated environmental impacts from the proposed H2Hub. It shall describe all impacts and consequences of the H2Hub (at the selected site[s] and the alternative site[s], if appropriate). The existing environment (described in Section A.3) shall be evaluated in terms of the potential impacts from any construction, operation/testing, and disposition activities. Any mitigative measures that would address these impacts shall also be identified.

The description shall address the environmental categories listed below. Please ensure that all direct, indirect, short-term, and long-term impacts resulting from H2Hub activities are identified clearly.

1. Land Use
This section shall describe land use impacts from proposed construction and operation activities.

2. Atmospheric Conditions/Air Quality
This section shall discuss projections in air quality changes; estimated process emissions (e.g., stack emissions); construction emissions from land disturbance or the operation of machinery/equipment, solid waste disposal operations and handling, etc.; and the source, emission rate, duration, and frequency of all emissions.

3. Hydrologic Conditions/Water Quality
This section shall describe any changes in groundwater/surface water quality and quantity, stream diversion resulting from construction and operation.

4. Geologic/Soil Conditions

This section shall describe any subsidence that might be caused by construction and operation; any possible erosion, stream diversion, floodplain and wetland intrusion, and any increase or decreases in soil permeability and filtration.

5. Vegetation and Wildlife Resources
   This section shall describe any potential impacts to indigenous flora and fauna, state and Federally listed endangered species and their habitats, and sensitive habitats such as wetlands, floodplains, or other ecologically sensitive terrain.

6. Socioeconomic Conditions
   This section shall describe any increases/decreases in labor requirements or changes in labor mix.

7. Historic/Cultural Resources
   This section shall describe any disturbance to historical or archaeological sites caused by construction, interference with Native American Tribal or other religious practices or sites; impacts on local community character.

8. Visual Resources
   This section shall describe any impacts to scenic vistas or existing aesthetic landscaping.

9. Health and Safety Factors
   This section shall discuss occupational hazards of project activities; exposure to toxic/hazardous substances; and increases in ambient noise, odor, and heat.

10. Solid and Hazardous Wastes
    This section shall describe any and all waste material that is generated from project activities. This description shall include the source/type of any and all wastes produced, and the approximate weight, density, and volume of the waste, and its method of disposal, location, and any permitting requirements necessary.

11. Impacts on Regional or Local Plans
    This section shall describe any impacts to regional or local plans for fuel, water resources, solid waste, land, air quality, and labor force; commitment of resources and opportunities to reuse and recycle resources (wastes, water).

12. Environmental Justice
    This section shall describe potential impacts of construction and operation of the proposed H2Hub to low-income and/or minority populations.

C. POTENTIAL LIABILITIES OF EXISTING CONDITIONS AT THE SITE(S).

This section shall detail any previous research, development, construction, and/or demonstration testing that could potentially have impacts on the existing project site(s) and therefore, the proposed project.

D. ABILITY TO MEET COMPLIANCE REQUIREMENTS AT THE SITE(S).

This section shall identify all of the environmental laws and regulations (Federal, state, and local) for which compliance would be necessary. It should include, but should not be limited to the Resource Conservation and Recovery Act, the Comprehensive Environmental Response, Compensation, and Liability Act, Toxic Substance Control Act, Water Pollution Control Act, Clean Air Act, and Occupational Safety and Health Act. Any necessary permits, manifest, etc., shall be discussed.

The strategy for meeting all compliance requirements shall be discussed in detail. Identify the best available control technology and feasible practices for compliance with Federal air, land use, and water quality statutes. In addition, whether the proposed site is in attainment or non-attainment with current standards shall be discussed.

APPENDIX I – EXAMPLE COVER PAGE FOR H2HUB APPLICATIONS

Project Title:	
Exchange Control Number:	Geographic Region:
Prime Applicant:	
Sub-Recipients/Project Partners:	
Do the proposed prime recipient and all subrecipients qualify as domestic entities*? ☐ Yes ☐ No If not, which entities will require a foreign entity waiver:	* To qualify as a domestic entity, the entity must be organized, chartered, or incorporated (or otherwise formed) under the laws of a particular state or territory of the United States; have majority domestic ownership and control; and have a physical place of business in the United States.
H2Hub Program/Project Manager:	Email: Phone:
Business Contact:	Email: Phone:
Confidentiality Statement:	
H_2 Production Capacity: *(metric tons H_2/day)*	Total Period of Performance: *(yrs)*
Total H2Hub DOE Funding Request: *($M USD)*	Total H2Hub Non-Federal Cost Share: *($M USD)*

For each category, please select all that apply:

Energy Feedstock:

- ☐ Renewables: _____
- ☐ Nuclear
- ☐ Fossil fuels
- ☐ Other: _____

Production Technologies:

- ☐ Electrolysis
- ☐ Thermal conversion *(e.g., reforming, gasification, pyrolysis)*
- ☐ Other: _____

End-uses:

- ☐ Electric power generation
- ☐ Industrial *(e.g., ammonia, steel, synthetic fuel production)*
- ☐ Residential or commercial heating
- ☐ Transportation
- ☐ Other: _____

Connective Infrastructure:

- ☐ H_2 pipelines
- ☐ H_2 carriers
- ☐ Underground H_2 storage
- ☐ Above ground H_2 storage
- ☐ H_2 fueling stations
- ☐ Other: _____

APPENDIX J – CONGRESSIONAL AUTHORIZATION

Statutory Requirements - BIL Section 40314 (Additional Clean Hydrogen Programs): EPAct Sec. 813 Regional Clean Hydrogen Hubs

SEC. 40314. ADDITIONAL CLEAN HYDROGEN PROGRAMS.

Title VIII of the Energy Policy Act of 2005 (42 U.S.C. 16151 et seq.) is amended—

(1) by redesignating sections 813 through 816 as sections 818 through 821, respectively; and

(2) by inserting after section 812 the following:

SEC. 813. REGIONAL CLEAN HYDROGEN HUBS.

(a) DEFINITION OF REGIONAL CLEAN HYDROGEN HUB.—In this section, the term 'regional clean hydrogen hub' means a network of clean hydrogen producers, potential clean hydrogen consumers, and connective infrastructure located in close proximity.

(b) ESTABLISHMENT OF PROGRAM.—The Secretary shall establish a program to support the development of at least 4 regional clean hydrogen hubs that—

(1) demonstrably aid the achievement of the clean hydrogen production standard developed under section 822(a);

(2) demonstrate the production, processing, delivery, storage, and end-use of clean hydrogen; and

(3) can be developed into a national clean hydrogen network to facilitate a clean hydrogen economy.

(c) SELECTION OF REGIONAL CLEAN HYDROGEN HUBS.—

(1) SOLICITATION OF PROPOSALS.—Not later than 180 days after the date of enactment of the Infrastructure Investment and Jobs Act, the Secretary shall solicit proposals for regional clean hydrogen hubs.

(2) SELECTION OF HUBS.—Not later than 1 year after the deadline for the submission of proposals under paragraph (1), the Secretary shall select at least 4 regional clean hydrogen hubs to be developed under subsection (b).

(3) CRITERIA.—The Secretary shall select regional clean hydrogen hubs under paragraph (2) using the following criteria:

(A) FEEDSTOCK DIVERSITY.—To the maximum extent practicable—

(i) at least 1 regional clean hydrogen hub shall demonstrate the production of clean hydrogen from fossil fuels;

(ii) at least 1 regional clean hydrogen hub shall demonstrate the production of clean hydrogen from renewable energy; and

(iii) at least 1 regional clean hydrogen hub shall demonstrate the production of clean hydrogen from nuclear energy.

(B) END-USE DIVERSITY.—To the maximum extent practicable—

(i) at least 1 regional clean hydrogen hub shall demonstrate the end-use of clean hydrogen in the electric power generation sector;

(ii) at least 1 regional clean hydrogen hub shall demonstrate the end-use of clean hydrogen in the industrial sector;

(iii) at least 1 regional clean hydrogen hub shall demonstrate the end-use of clean hydrogen in the residential and commercial heating sector; and

(iv) at least 1 regional clean hydrogen hub shall demonstrate the end-use of clean hydrogen in the transportation sector.

(C) GEOGRAPHIC DIVERSITY.—To the maximum extent practicable, each regional clean hydrogen hub—

(i) shall be located in a different region of the United States; and

(ii) shall use energy resources that are abundant in that region.

(D) HUBS IN NATURAL GAS-PRODUCING REGIONS.—To the maximum extent practicable, at least 2 regional clean hydrogen hubs shall be located in the regions of the United States with the greatest natural gas resources.

(E) EMPLOYMENT.—The Secretary shall give priority to regional clean hydrogen hubs that are likely to create opportunities for skilled training and long-term employment to the greatest number of residents of the region.

(F) ADDITIONAL CRITERIA.—The Secretary may take into consideration other criteria that, in the judgment of the Secretary, are necessary or appropriate to carry out this title

(4) FUNDING OF REGIONAL CLEAN HYDROGEN HUBS.—The Secretary may make grants to each regional clean hydrogen hub selected under paragraph (2) to accelerate commercialization of, and demonstrate the production, processing, delivery, storage, and end-use of, clean hydrogen.

(d) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary to carry out this section $8,000,000,000 for the period of fiscal years 2022 through 2026.