



Hydrogen Power Study Task Force: Funding Working Group Meeting #3

**Working Group Hosted by Strategen Consulting
November 18, 2022**

Meeting Logistics

- + **Mute Microphone** – in order to prevent background noise that disturbs the meeting, if you aren't talking, please mute your microphone or phone.
- + **Chat Box** – if you aren't being heard, please use the chat box or raise your hand to ask a question. Please try to limit comments in the chat as these may not be officially captured in the record.
- + **Recording Meeting** – we will record and post the meetings at www.ctgreenbank.com/hydrogentaskforce and you can also access meeting dates and dial-in information through Secretary of State.
- + **State Your Name** – for those talking, please state your name for the record.

Agenda

- + Welcome and Introductions – 10 minutes
- + Review of Progress to Date – 5 minutes
- + Overview of Other Identified Federal Funding Opportunities (Including: Inflation Reduction Act, Chips & Sciences) – 30 minutes
- + Initial Recommendations to Meet Working Group Legislative Mandate – 30 minutes
- + Stakeholder Discussion and Next Steps – 15 minutes
- + Adjourn



Introductions

Please share your name, title, and organization for the public record



Funding Working Group Meeting Schedule

	9/27 4:00 – 5:00pm	10/26 10:30am – 12:00pm	11/18 10:30am – 12:00pm	12/15 10:30am – 12:00pm
Learning Objective	Understand the opportunities & what it takes to be eligible for funding.	Learn about how others are preparing and incentivizing hydrogen; dig deeper on CT specific opportunities.	Work together to narrow down priority areas (end uses, infrastructure) for funding opportunities.	Review proposed results and findings for final legislative report
Federal Opportunities and Best Practices	Overview of federal funding opportunities and participation requirements	Hypothesis on CT areas of strength for federal funding.	Dig into additional areas for federal funding. Draft recommendations for IIJA competitiveness.	Finalize recs to position the state to take advantage of competitive incentives
Brownfield Loan Program Exploration	Intro/overview of the Targeted Brownfield Loan Program			Outline opportunities to leverage or further the program to support hydrogen
State Funding		Share how others are approaching hydrogen incentives deployed in other states.	Share hypothesis on priority areas for incentive funding based on findings from Uses, Sources & Infrastructure WG	Incentive recommendations

Reminder: Strategen's Role

- + The Strategen team will handle meeting logistics including scheduling and recording meeting minutes.
- + The Strategen team will coordinate with Working Group Co-Chairs to develop meeting agendas which will be provided to participants a week before Working Group meetings.
- + The Strategen team will provide technical assistance (including research), where appropriate, for the Working Group.
- + It is expected that this working group will meet on a monthly cadence. Meeting recordings and meeting minutes will be publicly available.

Over the course of the Task Force effort, this Working Group looks at the following areas of Special Act 22-8:

- + An examination of how to position the state to take advantage of competitive incentives and programs created by the federal Infrastructure Investment and Jobs Act;
- + Recommendations for funding and tax preferences for building hydrogen-fueled energy facilities at brownfield sites through the Targeted Brownfield Development Loan program;
- + Recommendations regarding funding sources for developing hydrogen-fueled energy programs and infrastructure.

Overview of Other (Non-IIJA) Identified Federal Funding Opportunities



IRA Financial Incentives

Clean Hydrogen Production Credit (45V)

Program Status

New

Relevant Applications

Production of clean hydrogen

Funding Details

- Funding Type: Tax Credit
- Amount: Up to \$3/kg clean H₂ on an escalator based on carbon intensity of H₂ production process on a lifecycle basis (GREET model)
 - Electricity generated from facilities taking the PTC for renewable electricity or zero-emission nuclear power credit can still take the clean hydrogen PTC
 - Facilities must choose between the carbon capture and sequestration credit and the clean hydrogen production credit
- To obtain full value of credit, the taxpayer must meet prevailing wage and apprenticeship requirements
- Timeline: 10-year incentive; facilities must begin production by 2033

45V Clean hydrogen Production Tax Credit (PTC)			
Carbon intensity	Lifecycle emissions rate	Base credit x emissions rate excl. multiplier	Credit value incl. 500% multiplier
<i>kgCO₂eq/kgH₂</i>	%	\$/kg	\$/kg
0.0-0.45	100%	0.6	3.00
0.45-1.50	33.4%	0.2	1.00
1.5-2.5	25%	0.2	0.75
2.5-4.0	20%	0.1	0.60

IRA Financial Incentives

Investment Tax Credit (48)

Program Status

Expansion of the existing Investment Tax Credit

Relevant Applications

- Clean hydrogen production facility

Clean hydrogen Investment Tax Credit (ITC)			
Carbon intensity	Lifecycle emissions rate	ITC percentage x emissions rate excl. multiplier	ITC value incl. 500% multiplier
kgCO ₂ eq/kgH ₂	%	%	%
0.0-0.45	100%	6.0%	30%
0.45-1.50	33.4%	2.0%	10%
1.5-2.5	25%	1.5%	8%
2.5-4.0	20%	1.2%	6%

Funding Details

- Funding Type: Tax Credit
- Amount: Up to 30% (base is 6%)
 - Prevailing wage and apprenticeship requirements must be satisfied (any project >1 MW)
 - Bonus available for domestic content, energy communities, and low-income
 - +10% if meeting domestic content conditions
 - +10% if sited in an “energy community”
- The credits have refundability (e.g. direct pay for tax-exempt entities) and transferability
- Timeline: Placed in service before Dec. 31, 2024 and is not claiming carbon capture tax or PTC

IRA Financial Incentives

Clean Electricity Investment Tax Credit (48E)

Program Status

Expansion of the existing Energy Investment Tax Credit until January 1, 2025

Timeline: Must be placed in service from 1/1/2022 – 12/31/2024

- After 2024, becomes the technology neutral “Energy Investment Tax Credit” (available through 2032)

Relevant Applications

- Stationary fuel cells
- Fuel cells for material handling equipment
- Hydrogen storage (qualifies under “energy storage” provision)
 - Guidance will be needed on what this includes beyond storage tanks

Funding Details

- Funding Type: Tax Credit
- Amount: Up to 30% for qualifying property (base credit of 6%)
 - 30% can be reached if:
 - The facility has a maximum net output of less than 1 MW or
 - Newly enacted prevailing wage and apprenticeship requirements are satisfied.
 - Bonus credits for (depending on when construction begins):
 - +2 - 10% if meeting domestic content conditions
 - +2 - 10% if sited in an “energy community”

IRA Financial Incentives

Alternative Fuel Refueling Property Credit (30C)

Program Status

Restores and extends credit for alternative vehicle refuelling property

Relevant Applications for CT Hydrogen

- Hydrogen fueling stations

Fund Type

Tax Credit

Funding Details

- Funding Amount: 30%
- Credit Cap: \$100,000
 - Can be used more than once per location, applies to single item
 - To access full amount, stations should be located in low-income community or non-urban area
- Timeline: Must be placed in service through 12/31/2032

IRA Financial Incentives

Qualified Commercial Clean Vehicles Credit (45W)

Program Status

New

Relevant Applications

- Applies to new FCEVs for commercial use

Funding Details

- Funding Type: Tax Credit
- Amount: Lesser of 30% of the cost of the vehicle or the incremental cost to comparable internal combustion engine vehicle
- Credit Cap: Based on gross vehicle weight.
 - \$7,500 for vehicles <14,000 lbs
 - \$40,000 for vehicles >14,000 lbs
- Timeline: Must be placed in service from 1/1/2022 – 12/31/2024

IRA Financial Incentives

Advanced Energy Project Credit (48C)

Program Status

Expansion (new funding and qualified applications) of existing Advanced Energy Products Credit

Relevant Applications

Serves to re-equip, expand, or establish industrial or manufacturing facilities. Qualifying projects include projects that manufacture (incl. production of components and materials):

- light-, medium-, and heavy-duty FCEV
- Hydrogen refueling infrastructure
- Fuel cell systems
- Energy storage systems
- Carbon capture systems
- Electrolyzers
- low- or zero- carbon heating

Funding Details

- Funding Type: Tax Credit
- Amount: Base credit at 6% of the investment, up to 30% for projects that meet prevailing wage requirements
 - 40% of credits earmarked for projects in energy communities
- New Funding Available: \$10B
- Timeline: Credits available beginning January 1, 2023

	Amount	Purpose of Funding	Administering Body	Status	Fund Type	Intended Recipient
Defense Production Act	\$500M	Appropriation for enhancing use of DPA; Promotes manufacturing and deployment of energy technologies including electrolyzers and fuel cells	DOE	RFI due Nov. 30		
Advanced Technology Vehicle Manufacturing	\$3B	Expands lending authorities to lend under this program, which aims to produce advanced technology for medium and heavy-duty vehicles, trains or locomotives, maritime vessels, aircraft, or hyperloop technology	DOE Loan Programs Office	Available through 2028	Loans	Manufacturing facilities
Domestic Manufacturing Conversion Grants	\$2B	Provides grants for domestic production of plug-in electric hybrid, plug-in electric drive, and hydrogen fuel cell electric vehicles and components of such vehicles	DOE	Available through 2031	Grant (50% cost share)	Car manufacturers and suppliers
Clean Heavy-Duty Vehicles	\$1Bn	Supports the replacement of existing Class 6 and Class 7 trucks (buses, garbage trucks, and other similarly sized vehicles) with zero-emission vehicles, as well as the construction and operation of associated charging or fueling infrastructure. 40% must go to non-attainment areas.	EPA	Available through 2031	Grants and Rebates	States, municipalities, Indian tribes, or school transportation associations
Grants to Reduce Air Pollution at Ports	\$3B	Grants are directed to purchase and install zero-emission equipment and technology at ports, as well as the development of climate action plans at ports. \$750M to be directed at ports in nonattainment areas.	EPA	Available through 2027	Grant	Port authorities, agencies with jurisdiction over a port, or air pollution control agencies
Greenhouse Gas Reduction Fund	\$27B	Establishes a clean energy deployment clean bank. Includes: \$7.0 billion deployment of zero-emission technologies in low income and disadvantaged communities. \$11.9 billion in funds is available for grants for financial assistance and technical assistance through, with \$8 billion of additional funds available specifically for low-income and disadvantaged communities.	EPA	RFI due Dec. 5	Competitive Grant	States (modelled after CT Green Bank)
United States Postal Service Clean Fleets	\$3B	Purchase of zero-emission delivery vehicles and the installation of the infrastructure needed to support this vehicle technology.	Postal Service Fund	Available through 2031		U.S. Postal Service

CHIPS and Science Act

To bolster US semiconductor capacity, catalyze R&D, and create regional high-tech hubs and a bigger, more inclusive STEM workforce.

Subtitle O: Department of Energy Research, Development, and Demonstration Activities

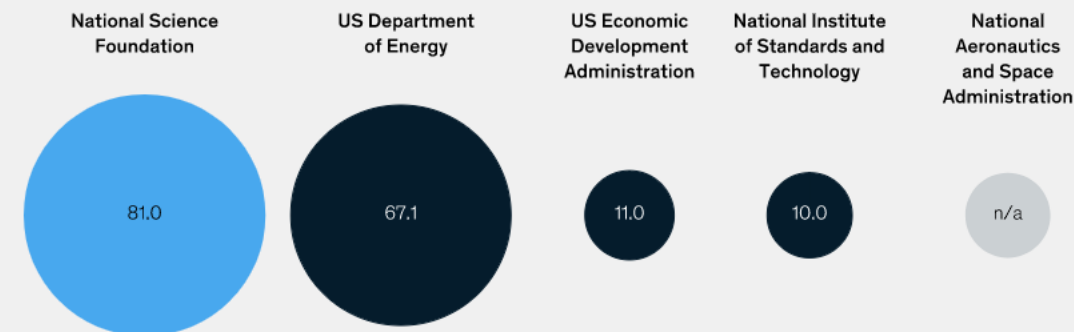
- Relevant Applications: Support RD&D activities aligned with 10 technology areas in the energy offices (incl. hydrogen, sustainable transportation, advanced manufacturing, industrial emissions reduction, & more)
 - Within Office of EERE
- Funding Type: Unknown
- New Funding Available: \$11.2 Billion

Subtitle P: Fission for the Future

- Relevant Applications: Support the research, development, and demonstration of advanced nuclear reactors; specifies prioritization of H2 projects
- Funding Type: Competitive grant
- New Funding Available: \$800 Million
- Timeline: 2023 – 2027

The CHIPS and Science Act authorizes \$174 billion for investment in science, technology, engineering, and math programs, workforce development, and R&D.

CHIPS and Science Act funding 2022–27,¹ \$ billion



¹Final funding levels subject to future budget appropriations by US Congress. Source: Congress.gov; Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act of 2022, H.R. 4346, 117th Cong. (2022)

McKinsey & Company

Sources:

U.S. House Representatives Committee On Science, Space, & Technology [Fact Sheet](#)

McKinsey & Company, [The CHIPS and Science Act: Here's what's in it.](#)

Source: H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022. (2022, August 16)

Initial Recommendations to Meet Working Group Legislative Mandate



Funding Working Group Statutory Responsibilities

A report will be submitted to the legislature on January 15, 2023. This Working Group's responsibility is to ensure we cover:

- + An examination of how to position the state to take advantage of competitive incentives and programs created by the federal Infrastructure Investment and Jobs Act;
- + Recommendations for funding and tax preferences for building hydrogen-fueled energy facilities at brownfield sites through the Targeted Brownfield Development Loan program;
- + Recommendations regarding funding sources for developing hydrogen-fueled energy programs and infrastructure.

It should be noted that the efforts of the Hydrogen Power Study Task Force and associated Working Groups are not intended to replace the stakeholder engagement process used to develop and vet updates to state policy; rather, these efforts are intended to surface new ideas for consideration regarding how to develop a clean hydrogen economy in Connecticut.

Timeline

- + Public Request for Written Comments – out now, due 12/9 at 5pm EST
 - + Opportunity to formally submit written feedback that may be included as a stakeholder perspective into the report.
- + Webinar & Listening Session – 12/8
 - + Opportunity to formally submit verbal or written feedback that may be included as a stakeholder perspective into the report.
- + Draft Final Recommendations Shared from All Workstreams – Task Force Mtg on 12/13
- + Opportunity for Task Force Review of Draft Final Report (exact date TBA, mid-Dec.)
 - + A draft of the report will be circulated for stakeholder feedback.
- + Final Report Submitted – 1/15

The report can include a comprehensive list of funding areas

Feedback Requested: Is this the right information to include? Is either format more useful?

Provision	Total Funding (\$)	Description	Funding Type	Non-Federal Match Requirement	Relevant Details on Funding Amount	Value Chain Area Addressed	End Use Addressed	Potential State Match Opportunities
Grants for Charging & Fueling Infra.	\$2.5 billion	Support development of alternative fueled infrastructure, including hydrogen fueling stations, along designated corridors.	Grant - Competitive	20%		End Use	Heavy-Duty Trucking	

OR:

Value Chain Area	Existing Connecticut Funding	Examples of Other State Funding Programs for Consideration	IIJA Federal Funding Opportunities	Additional Federal Funding Opportunities
End Use – Critical Facilities	<u>CT Gen Stat § 16-243y (2020) - Microgrid and resilience grant and loan pilot program (DEEP) (\$45 million)</u>		Building Resilient Infrastructure and Communities (Robert T Stafford Act Section 203(i)) - (\$1 mil; DHS FEMA) Regional Clean Hydrogen Hubs (\$8 billion; DOE Energy Programs)	Hazard Mitigation Grant Program (3.46 billion) Community Facilities Program

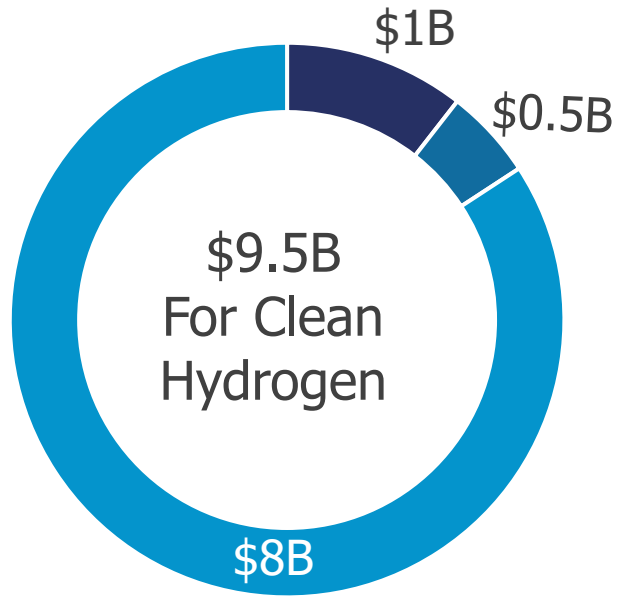
We will provide you with this spreadsheet for review and would welcome your feedback!

Legislative Mandate

An examination of how to position the state to take advantage of competitive incentives and programs created by the federal Infrastructure Investment and Jobs Act;



The IIJA has significant funding opportunities that can be applied to hydrogen deployment



- Electrolysis research, development, and demonstration
- Clean hydrogen Technology manufacturing and recycling R&D
- Regional clean hydrogen hubs (at least 4)

Provision	Funding	Description
Grants for Charging & Fueling Infrastructure	\$2.5 billion	Support development of alternative fueled infrastructure, including hydrogen fueling stations, along designated corridors.
Low or No Emission Bus Grants	\$5.6 billion	Supports the purchase or lease of zero-emission and low-emission transit buses and to purchase, construct, or lease bus related facilities.
Congestion Mitigation and Air Quality Improvement Program	\$13.2 billion	Added eligibility for the purchase of medium- and heavy-duty zero-emission vehicles, nonroad vehicles from construction or port-related freight, and related charging/fueling equipment.
Energy Efficiency and Conservation Block Grant Program	\$550 million	Includes development, implementation, and installation of fuel cells as a renewable energy technology on or in government buildings and financing for zero-emission transport/infrastructure
Carbon Reduction Program	\$6.4 billion	Supports the development of alternative fuel vehicles, including: publicly accessible H2 fueling and zero-emission construction equipment and vehicles (incl. supporting facilities).
Electric or Low-Emitting Ferry Program	\$250 million	Supports the purchase of electric and low-emission ferries.
Port Infrastructure Development Program Grants	\$2.25 billion	Supports port electrification, microgrids, and hydrogen refueling infrastructure for medium or heavy-duty trucks that service the port. \$400 million specifically for reducing idling truck emissions.
Upgrading Our Electric Grid and Ensuring Reliability and Resiliency	\$5 billion	Demonstrate innovative approaches to transmission, storage, and distribution to enhance grid resilience and reliability
Decarbonizing the Industrial Sector	\$500 million	Supports efforts to decarbonize the American industrial sector.

The IIJA grants require varying levels of match funding

Provision	Total Funding (\$)	Description	Grant Type	Non-Federal Match Requirement
Grants for Charging & Fueling Infrastructure	\$2.5 billion	Support development of alternative fueled infrastructure, including hydrogen fueling stations, along designated corridors.	Competitive	20%
Low or No Emission Bus Grants	\$5.6 billion	Supports the purchase or lease of zero-emission and low-emission transit buses and to purchase, construct, or lease bus related facilities.	Competitive	15% for buses 10% for infrastructure
Congestion Mitigation and Air Quality Improvement Program	\$13.2 billion	Added eligibility for the purchase of medium- and heavy-duty zero-emission vehicles, nonroad vehicles from construction or port-related freight, and related charging/fueling equipment.	Formula	20% typically 10% for interstate
Energy Efficiency and Conservation Block Grant	\$550 million	Includes development, implementation, and installation of fuel cells as a renewable energy technology on or in government buildings and financing for zero-emission transport/infrastructure	Block & Competitive	None
Carbon Reduction Program	\$6.4 billion	Supports the development of alternative fuel vehicles, including: publicly accessible H2 fueling and zero-emission construction equipment and vehicles (incl. supporting facilities).	Formula	20% typically 10% for interstate
Electric or Low-Emitting Ferry Program	\$250 million	Supports the purchase of electric and low-emission ferries.	Competitive	10%
Port Infrastructure Development Program Grants	\$2.25 billion	Supports port electrification, microgrids, and hydrogen refueling infrastructure for medium or heavy-duty trucks that service the port. \$400 million specifically for reducing idling truck emissions.	Competitive	20%
Upgrading Our Electric Grid and Ensuring Reliability and Resiliency	\$5 billion	Demonstrate innovative approaches to transmission, storage, and distribution to enhance grid resilience and reliability	Competitive	20% for R&D 50% for commercial
Industrial Emission Demonstration Projects	\$500 million	Supports efforts to decarbonize the American industrial sector.	Competitive	TBD

CT has some exciting areas of funding that may be able to serve in this match capacity

- + **Smart-E Loans (CT Green Bank)** provide low-interest financing with flexible terms for home energy performance upgrades.
- + **C-PACE (CT Green Bank)** provides building owners access affordable, long-term financing for qualifying clean energy and energy efficiency upgrades
- + **Capital Solutions (CT Green Bank)** seeks to provide access by project developers and capital providers or investors to Green Bank capital.
- + **Brownfield Remediation Grants and Loans (DECD)** provide loan financing or grants to eligible entities for costs associated with the investigation, assessment, remediation and development of a brownfield.
- + **The Manufacturing Innovation Fund Apprenticeship Program (DECD)** supports a combination of on-the-job training and classroom instruction for apprentices in Connecticut's manufacturing industry.
- + **The Innovative Energy Solutions Program (PURA)** provides funding projects for developers and utilities to test and demonstrate innovative technologies.
- + **Non-Residential Renewable Energy Solutions Program** provides 20-year tariffs for commercial clean energy projects, providing tariff and Renewable Energy Certificate payments. This applies to projects that are equal to or less than 2,000 kW.
- + **Residential Renewable Energy Solutions Program** provides 20-year tariffs for residential single-family and affordable housing projects, providing tariff and Renewable Energy Certificate payments.
- + **Shared Clean Energy Facility Program (DEEP)** provides a 20-year tariff term for projects between 100 kW and 4,000 kW. Credits are applied to bills of participating electric customers at no cost (primarily aimed at low-income customers or those who cannot install solar).
- + **Microgrid Grants and Loans (DEEP)** helps to support local distributed energy generation for critical facilities

To maximize the value of these opportunities to the state, CT should consider options that leverage and maximize eligible match funding for IIJA

Create a transparent source for interested applicants to access match funding or application guidance.

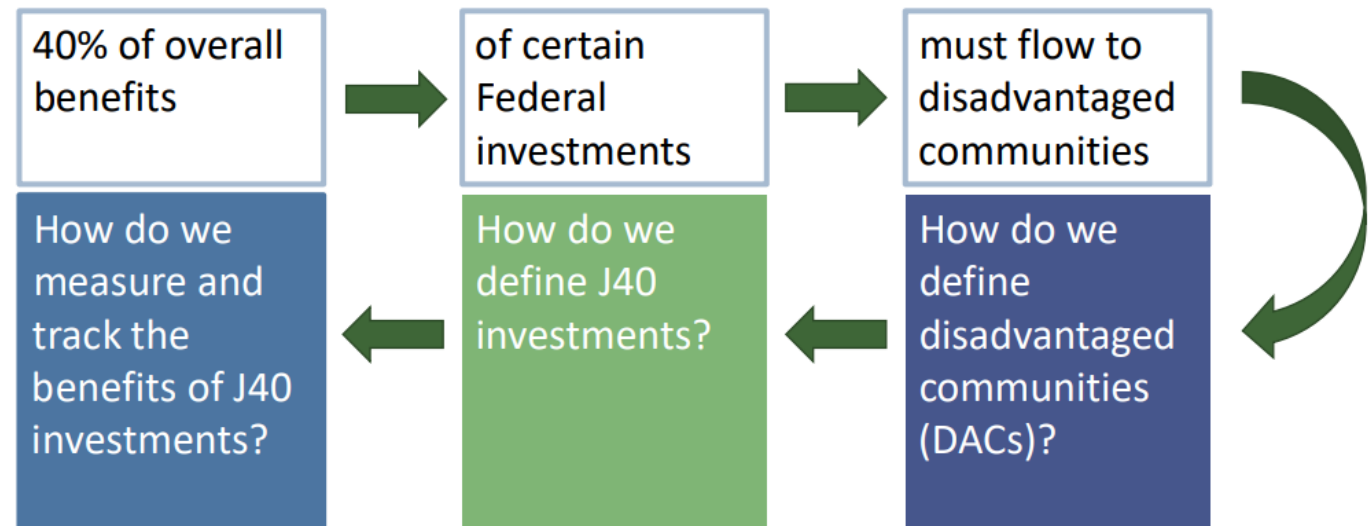
- + Forums for interested applicants to engage with relevant state entities or organizations that can provide partnership matching or application guidance.
- + Example: Colorado's Local Match grant program is used by the local government to support non-federal match requirement. [See link.](#)

Undertake closer legal evaluation of the applicability for funding avenues such as state tariffs to be used as match funding. Evaluate other potential constraints, such as timing.

Per the Justice40 Executive Order, 40% of the overall benefits of certain Federal investments must flow to disadvantaged communities*

8 Policy Priorities to Guide DOE Implementation of Justice40

1. Decrease energy burden in disadvantaged communities
2. Decrease environmental exposure and burdens for disadvantaged communities
3. Increase parity in clean energy technology access and adoption in disadvantaged communities
4. Increase access to low-cost capital in disadvantaged communities
5. Increase clean energy enterprise creation and contracting (MBE/DBE) in disadvantaged communities
6. Increase clean energy jobs, job pipeline, and job training for individuals from disadvantaged communities
7. Increase energy resiliency in disadvantaged communities
8. Increase energy democracy in disadvantaged communities



CT has a strong commitment to community benefits and very engaged community members

Sample Highlights:

S.B. 999 (Public Act 21-43)

This law ensures that host communities in which renewable energy projects $\geq 2\text{MW}$ are being installed receive real benefits from renewable energy projects by requiring developers to negotiate community benefits agreements. This codifies the industry best practice for community outreach.

Communities LEAP Program

Bridgeport, CT was one of 24 selected communities will work with DOE, its national labs and other experts, government and non-governmental partners, community-based organizations, and utilities, as well as environmental, economic development, and equity organizations to develop roadmaps for clean energy economic development pathways.

CT DEEP Environmental Justice Advisory Council

Executive Order No. 21-3 establishes a CT Equity and Environmental Justice Advisory Council ("CEEJAC"): "[t]he purpose and mission of the CEEJAC is to advise the Commissioner of DEEP on current and historic environmental injustice, pollution reduction, energy equity, climate change mitigation and resiliency, health disparities, and racial inequity.

Provide funding to increase community engagement, such as:

- + Consider intervener compensation for community participation in hydrogen-related proceedings. Example: [Minnesota PUC](#)
- + To overcome transportation challenges, funding may be needed for community members to access/work on hydrogen job sites
- + Funding for development of community benefits agreements (ex: technical expertise, compensation for time)

Align state priorities and federal priorities:

- + Prevailing wage and apprenticeship requirements in the IRA kick in at 1MW; lowering state threshold from 1 – 2 MW to align Public Act 21-43

Legislative Mandate

Recommendations regarding
funding sources for developing
hydrogen fueled energy
programs and infrastructure



High-level prioritization of opportunities will be helpful to ensure appropriate focus and attention

- + State and regional efforts will have resource and time constraints impacting their engagement on hydrogen hub and other deployment activities
 - + Funding, regulatory resources, convening opportunities, and stakeholder engagement support are all in high demand to facilitate regional hub activities
- + The ability to identify areas of highest interest for near-term action will help to enable targeted engagement in priority areas
 - + If we recommend too many actions or priorities, we may dilute meaningful action on tangible, high-value opportunities
- + Lower prioritization should not be taken as a lack of opportunity! Hydrogen strategy and deployment will be a multi-year process, we just need to figure out where to get started today

Accordingly, we are seeking to identify a set of highest priority opportunities that the funding and policy workgroups can further pursue. We are not seeking to prohibit or prevent progress on other use cases, but rather provide direction on where to prioritize effort and engagement

Use Cases were evaluated on against multiple criteria, and on stakeholder preferences

Cost-Competitiveness

Is H2 the most cost-effective way to decarbonize this end use?

GHG Reduction

What portion of CT's carbon emissions does this end use represent?

Commercial Readiness

When could hydrogen start to be deployed for this end use?

Infrastructure Requirements

How much ancillary infrastructure would need to be developed?

Environmental Justice

How would hydrogen use impact disadvantaged and frontline communities

Workforce Development

How would hydrogen use impact local workforce needs?

Resilience Value

What would be the value of improving resilience via a more diversified fuel supply?

Safety Regulation

What additional safety procedures would need to be developed?



Use case prioritization also incorporated stakeholder feedback on:

- Potential AQ Emissions and impact on disadvantaged communities
- Alignment with state policy and environmental goals
- Industry engagement or market development activity
- Workforce development opportunities

Use Cases have been prioritized by potential for societal benefits

Highest Priority for Additional Investigation	High Priority for Additional Investigation	Other Valuable Applications
<ul style="list-style-type: none"> + Focused on end uses that: <ul style="list-style-type: none"> + Are very likely to use hydrogen due to underlying economics + Create substantial societal benefits (e.g. GHG reduction, workforce development) + Proposed end uses include: <ul style="list-style-type: none"> + Critical facilities (24-hour backup need) + Aviation (long- and medium-haul) + Cargo ships + Material handling equipment (w/ long uptimes and charging space constraints) + Long-haul heavy duty trucks + Fuel cells for peak power generation + High heat industrial processes 	<ul style="list-style-type: none"> + Focused on end uses that: <ul style="list-style-type: none"> + Have a strong financial case for hydrogen use + Create societal benefit, but on a smaller scale due to size of industry + Proposed end uses include: <ul style="list-style-type: none"> + Long-distance bus routes + Ferries + Freight rail + Fleet vehicles with long uptimes and specific refueling locations + Hydrogen blending in natural gas pipelines for non-core customer (i.e. power generation and industrial heat) 	<ul style="list-style-type: none"> + Focused on end uses that: <ul style="list-style-type: none"> + Can be kept "in view" as economics of hydrogen vs. alternatives develop + Could provide additional opportunities for market development + Proposed end uses include: <ul style="list-style-type: none"> + Hydrogen blending for commercial and residential customers + Commuter buses + Heavy duty trucks with lower daily driving ranges + Privately-owned light-duty vehicles + Low heat industrial processes + Short-haul aviation

A technical assessment considered a wide range of applications connected to the identified end uses (e.g. commuter rail, short-range harbor craft, forklifts with shorter uptimes) but research suggested that these end uses present stronger cases for electrifications due to economics and technological development.

Legislative Mandate: Recommendations regarding funding sources for developing hydrogen fueled energy programs and infrastructure

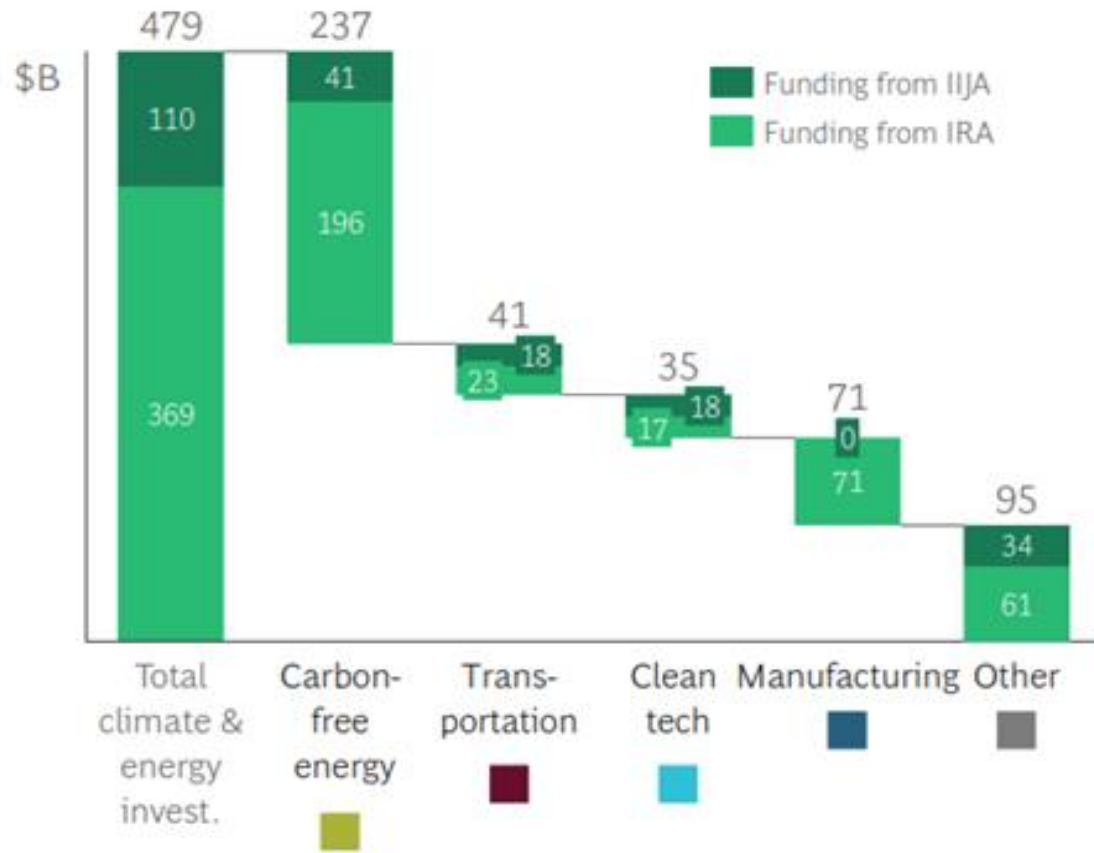
Connecticut should consider allocating/increasing grant or loan funding to enable end uses that have potential sources of federal funding, require low levels of state match funding, and can be deployed near-term (high technology readiness) to enable a hydrogen ecosystem.

- + Heavy Duty Trucks (ex. [UT HB91](#))
- + Offroad Material Handling Equipment (ex. [CA Carl Moyer Program](#))
- + Port Infrastructure (ex. [CA Port and Freight infrastructure Program](#))
 - + Enables infrastructure for H2 for shipping in the future
- + Longer Term: Aviation and Shipping: Potential Contracts for Difference program for SAF and other fuels (ex: [Proposed program in Germany](#))

Connecticut should consider developing additional funding that will attract private capital to enable further hydrogen market development.

- + Low Carbon Fuel Standard (ex. [CA](#), [OR](#))
- + Clarify Permitting Requirements for Fueling Stations (ex: [CA Governor's Office EV Charging Station Permitting Handbook](#))
- + Electrolytic Hydrogen Tariffs (ex. [WA Tacoma Power Electrofuel Service Pilot](#), [AZ APS and Nikola Hydrogen Rate Schedule](#))
- + Tax Credits for ZEV Purchases (ex. [CO HB 19-1159](#), [UT HB91](#))
- + Tax Exemptions for Facilities that Produce or Use Hydrogen (ex. [MT HB170](#), [UT HB223](#))

The IRA also presents significant funding opportunities



Invest in tools to support applicants to leverage these tax resources

Align federal and state priorities: Prevailing wage and apprenticeship requirements in the IRA kick in at 1MW; lower state threshold from 2 to 1 MW to align Public Act 21-43

Source: EPA, CBO, BCG analysis

Next Steps



Working Group Meeting Schedule

	September	October	November	December
Funding	9/27 4-5pm	10/26 10:30am-12 pm	11/18 10:30am-12 pm	12/15 10:30am-12:00 pm
Infrastructure	9/28 2-3pm	10/24 2-3pm	11/17 3-4pm	12/19 3-4pm
Policy & Workforce Development	9/26 3-4pm	10/20 12-1pm	11/29 12-1pm	12/15 12-1pm
Sources	9/27 1-2pm	10/25 2-3:30pm	11/17 11am-12pm	12/20 1-2:30pm
Uses	9/27 12-1pm		11/22 12-1pm	

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Thank You!

**Feel free to reach out with any questions!
Lbacker@strategen.com**

