U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Hydrogen and Fuel Cell Day Remarks

Dr. Sunita Satyapal, Hydrogen and Fuel Cell Technologies Office Director and Hydrogen Program Coordinator, U.S. Department of Energy

October 8, 2021

National **Hydrogen** &
Fuel Cell Day | 10·08

7th Annual National Hydrogen and Fuel Cell Day

National Hydrogen and Fuel Cell Day was created to help raise awareness of a clean energy technology that is here **now**. October 8th (10.08) was chosen in reference to the atomic weight of hydrogen (1.008)

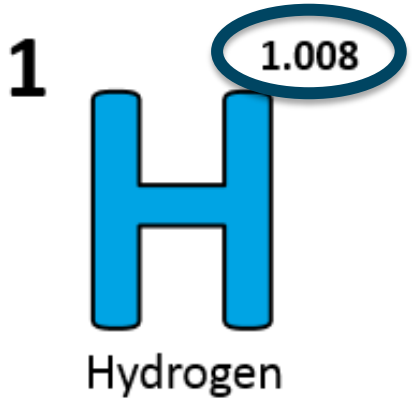
Established by the U.S. Fuel Cell and Hydrogen Energy Association (FCHEA) 7 years ago!
Passed by Congress and now being celebrated worldwide!

http://hydrogenandfuelcellday.com/

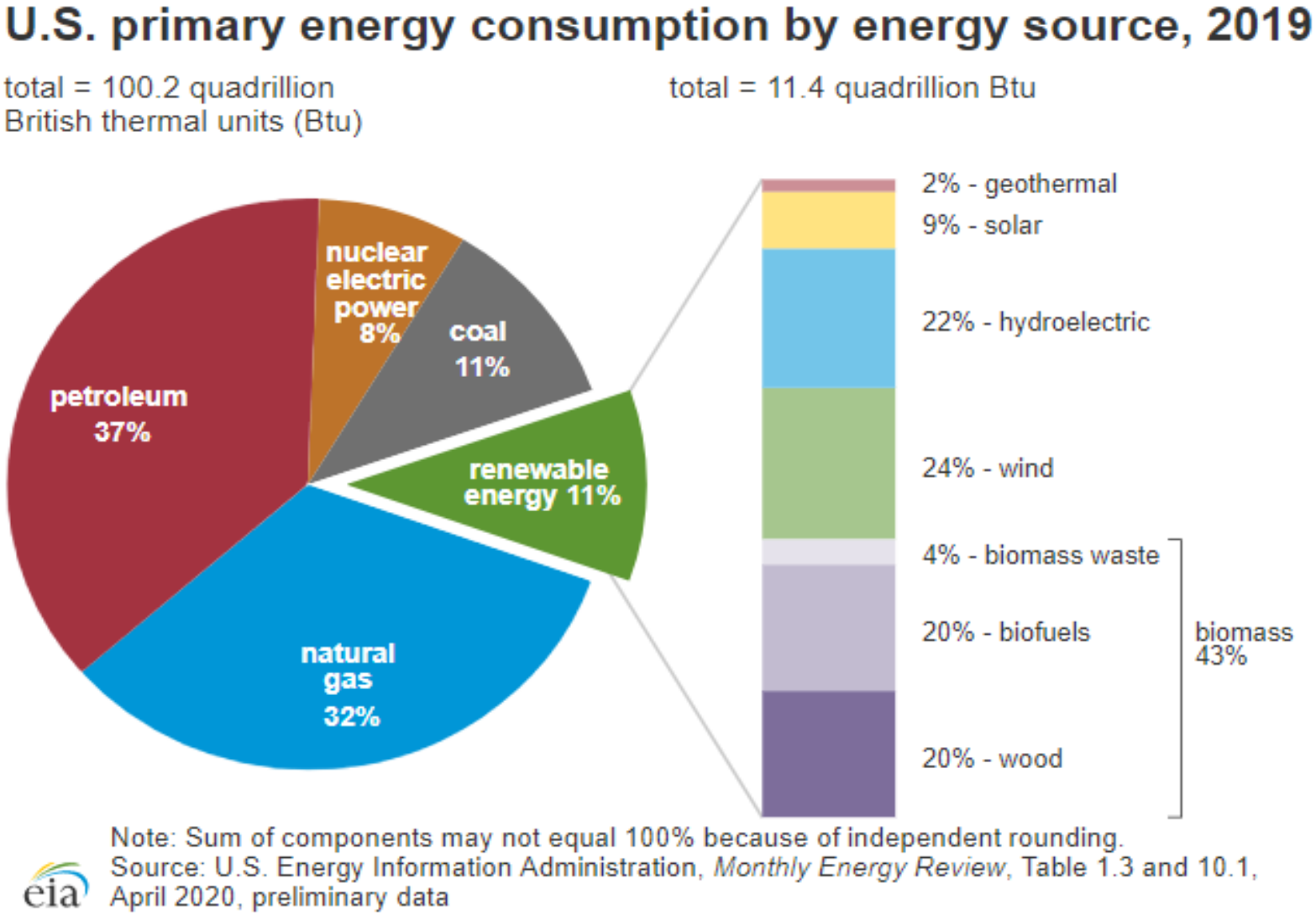
In Celebration of Hydrogen and Fuel Cell Day… October 8

Join us in a 1.008 mile walk or run on October 8th to celebrate Hydrogen and Fuel Cells Day!

Follow along with #H2DayRun and #H2DayWalk



U.S. Energy Landscape and Key Goals



Administration Goals include:

- Net zero emissions economy by 2050
- 100% carbon-pollution-free electric sector by 2035

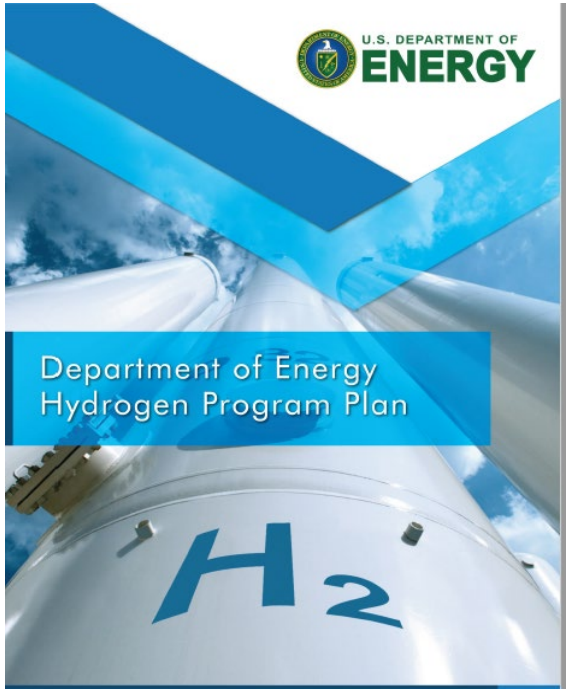
Priorities: Ensure benefits to all Americans, focus on jobs, EJ40: 40% of benefits in disadvantaged communities

EJ: Environmental Justice

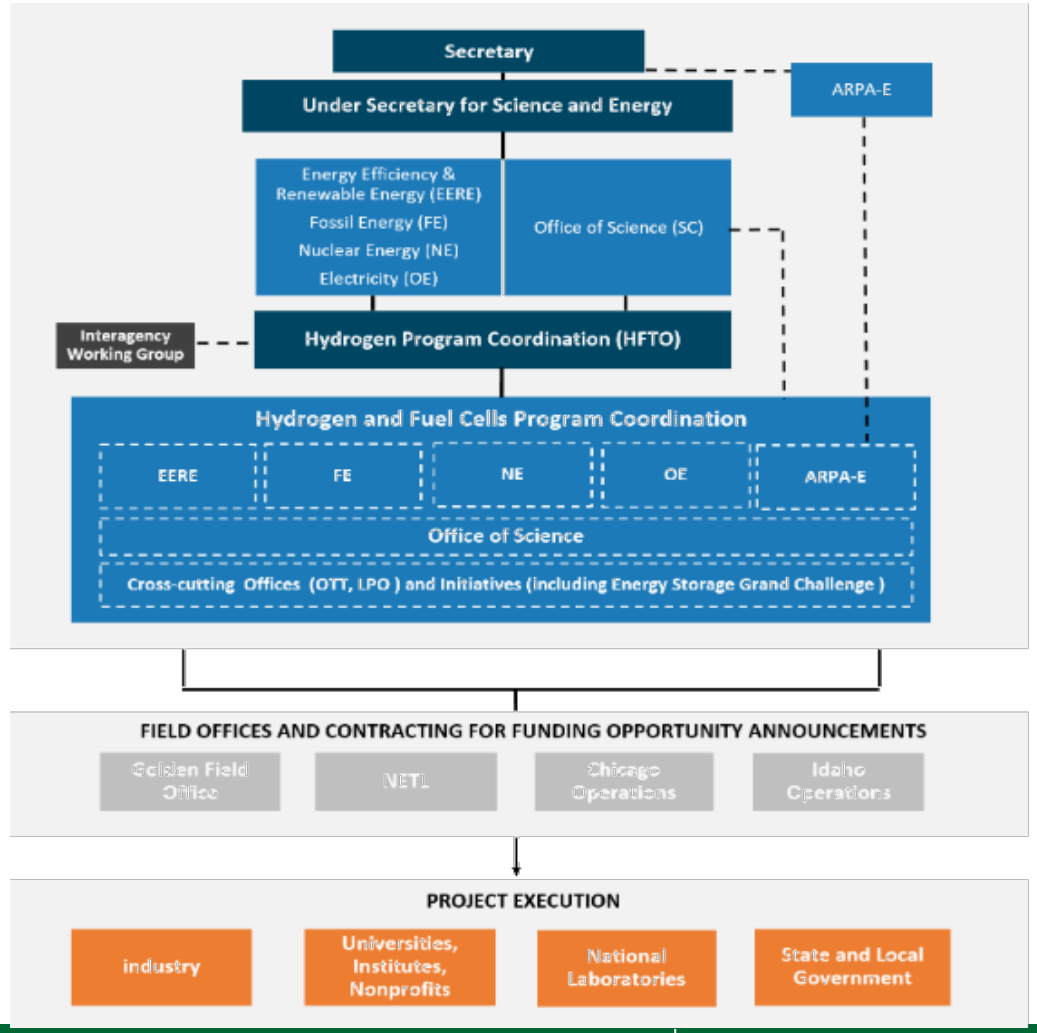
The U.S. DOE Hydrogen Program

The Energy Policy Act (2005) Title VIII and Energy Policy Act of 2020 provide key authorization, coordinated across DOE Offices

Hydrogen is one part of a broad portfolio of activities



www.hydrogen.energy.gov

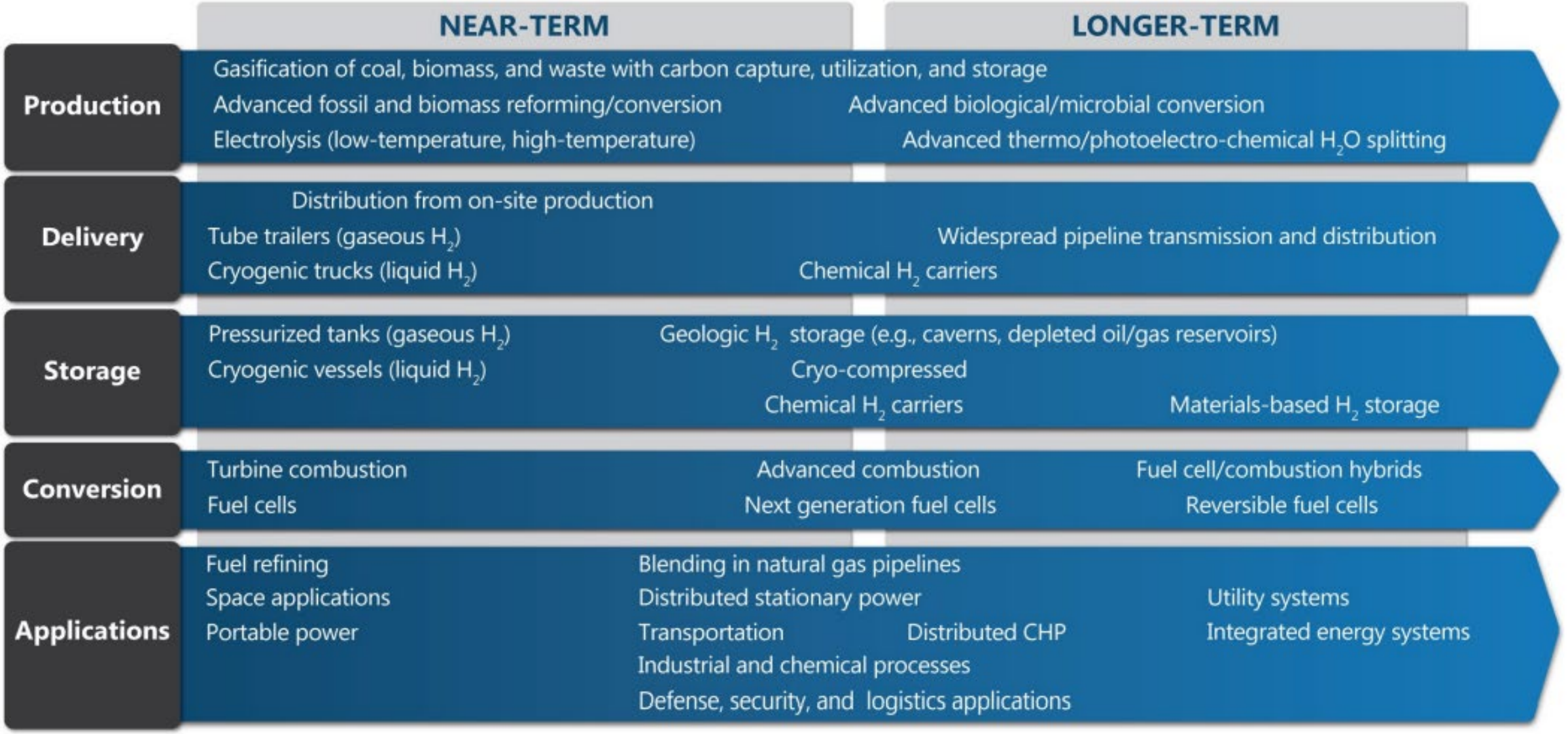


Priorities

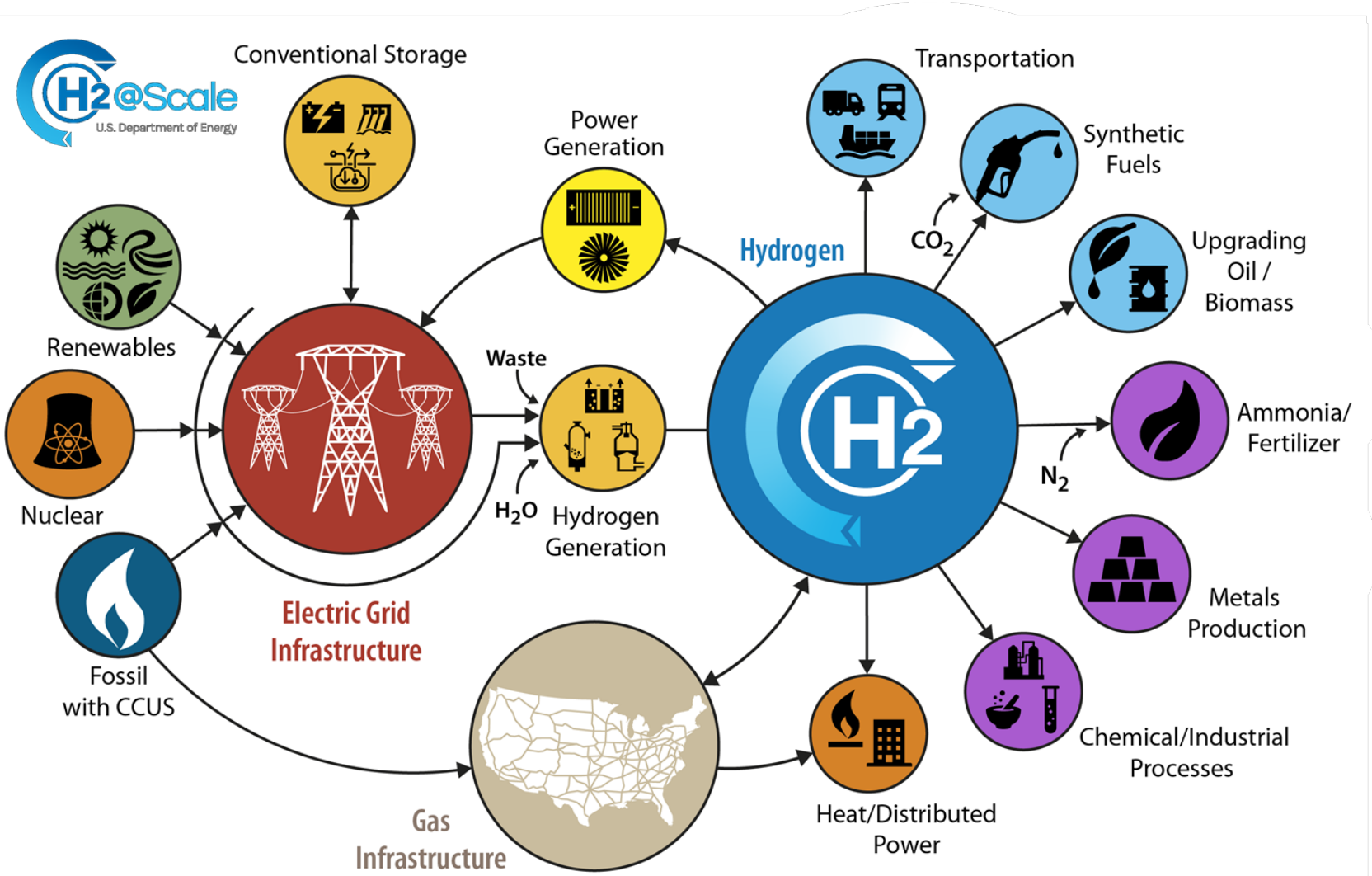
1. **Low cost, clean hydrogen**
2. **Low cost, efficient, safe hydrogen delivery and storage**
3. **Enable end use applications at scale for impact**

Workforce development, safety, codes, standards, and Environmental Justice priorities

Comprehensive Strategy Across the Hydrogen Value Chain



H2@Scale: Enabler for Deep Decarbonization across Sectors and Jobs



Key Opportunities

- **Industry and Chemicals**
  Steel, ammonia, cement, syn fuels (e.g., aviation), exports
- **Transportation**
  Trucks, marine, buses, etc.
- **Power and Energy Storage**
  Long duration storage, NG blending, turbines, fuel cells

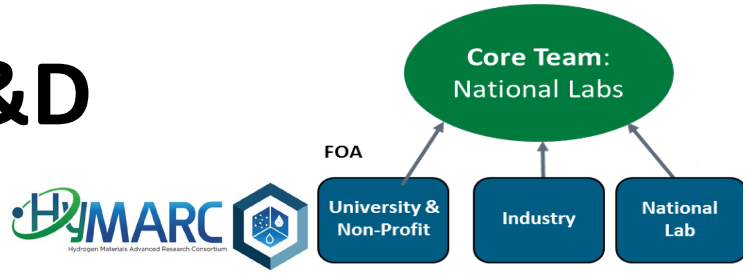
U.S. Snapshot

- 10 MMT of H_2/yr produced today with scenarios for 2-5X growth.
- +10 MMT H_2 would ~ double today's solar or wind deployment
- Potential for 700K jobs, $140B by 2030

DOE Program Implementation includes RDD&D

R&D

Focused Consortia with labs, industry, universities



HydroGEN Advanced Water Splitting Materials

HyMARC Hydrogen Materials Advanced Research Consortium

ElectroCat Electrocatalysis Consortium

New: $100M/5yrs

H2NEW U.S. DEPARTMENT OF ENERGY

ACT U.S. DEPARTMENT OF ENERGY

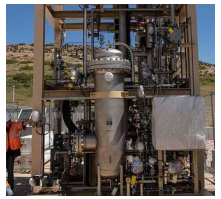
MILLION MILE FUEL CELL TRUCK

2016 2018 2020

D&D

Trucks, GSE

Infrastructure



CO_2+H_2

Renewables to H_2

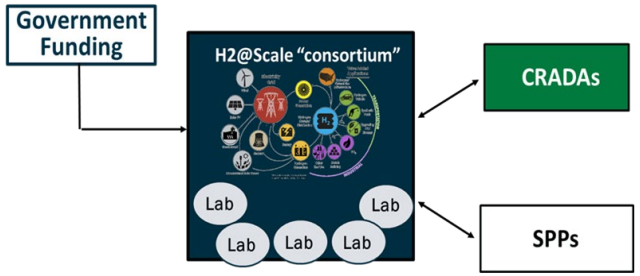
Data Center

Nuclear to H_2

New: Super Truck FOA and more…

Ammonia (ARPA-E)

Enablers



Comprehensive analysis, tools and models to accelerate progress

Safety, codes, standards, workforce development

Systems integration and validation

H-Mat Hydrogen Materials Compatibility Consortium

CENTER FOR Hydrogen SAFETY Connecting a Global Community

H_2EDGE Hydrogen Education for a Decarbonized Global Economy

HyBlend U.S. DEPARTMENT OF ENERGY

Key 2030 Targets

Clean Hydrogen
- $1/kg production
- $2/kg delivery
- $9/kWh storage

Electrolyzers
- $150/kW
- 73% efficiency
- 80Khr durability

Fuel Cells
- $80/kW
- 25Khr durability

Enable EJ40 Priorities, DEI

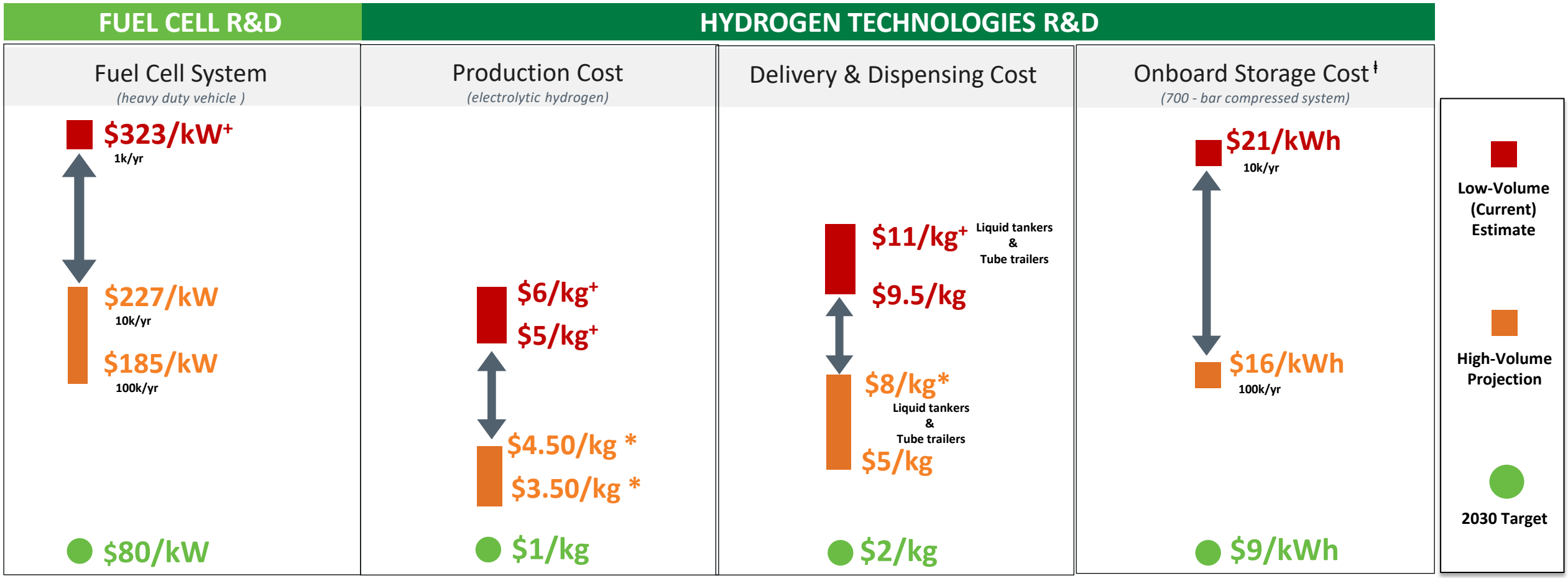
Deployment in collaboration with Loan Program Office

Examples shown, not exhaustive. Over 190 companies, 109 universities, 16 national labs in the last decade; CRADAs are Cooperative Research And Development Agreements

Research and Development

Technology Targets Guide Research and Development Activities

Key Goals: Reduce the cost of fuel cells and hydrogen production, delivery, storage, and meet performance and durability requirements – guided by applications specific targets



†Based on 275 kW Heavy Duty Fuel Cell System Cost Analysis (2021), adjusted to reflect cost of system that meets 25,000 hours durability

‡5 to 7 cents/kWh, 90% capacity factor at $1500/kW
*5 to 7 cents/kWh, 90% capacity factor at $460/kW

†For range: Delivery and dispensing at today's (2020) stations with capacity ~450 kg/day
*For range: Delivery and dispensing at today's (2020) stations with capacity 450-1,000 kg/day at high volume manufacturing

‡Storage costs based on 2019 storage cost record

All costs based on $2016

Note: Graph is not at scale. For illustrative purposes only

Million Mile Fuel Cell Truck Consortium (M2FCT)

"Team-of-teams" approach that allows for rapid feedback, idea development, and information exchange, resulting in an effort that is more than the sum of its parts

HD MEA Projects

Carnegie Mellon University, GM, Nikola

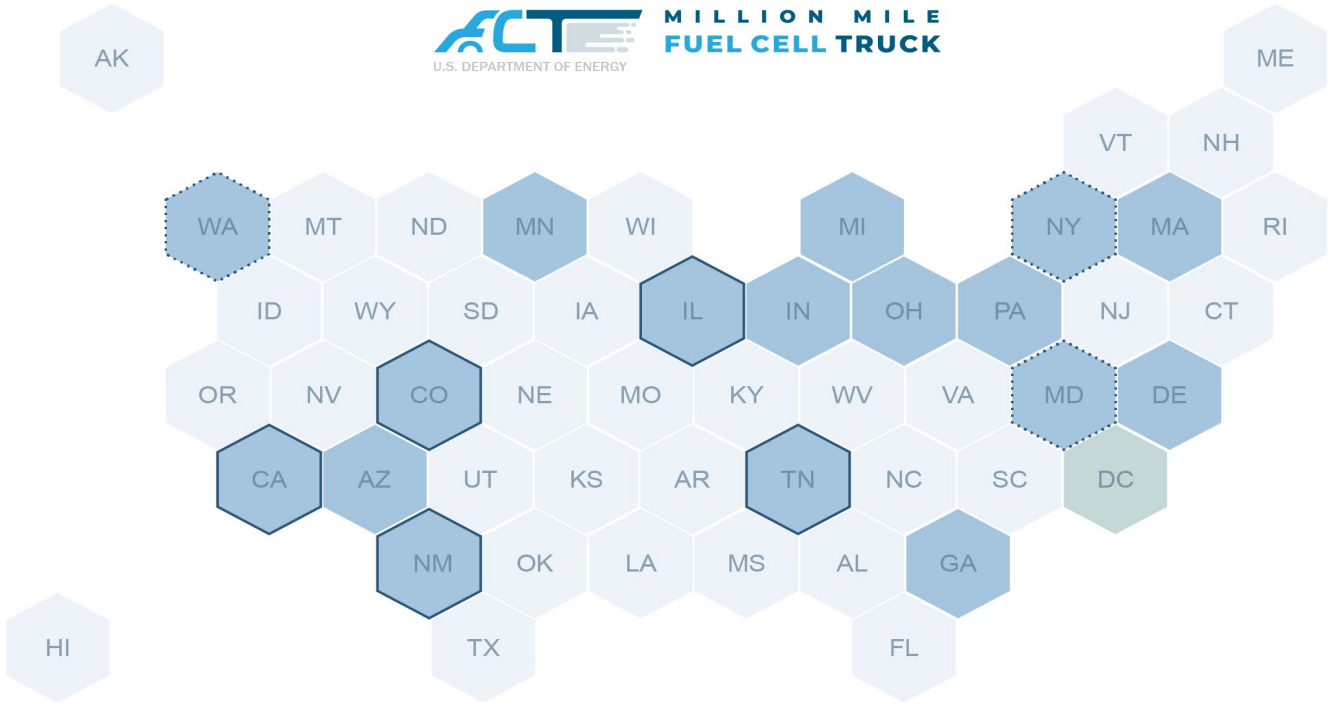
HD Membrane Projects

Tennessee, Lubrizol, 3M, Nikola

HD Stack Projects

Cummins, Plug Power

To add FOA bipolar plate and air management projects in FY21



Primary Labs	Partners Labs	Partners Academia	Partners Industry	
LBNL	PNNL	Cornell	3M Company	Kodak
LANL	BNL	Carneige Mellon Univ.	Akron Polymer Products	Lubrizol
ANL	NIST	Colorado School of Mines	Ballard	Nikola Motors
NREL		GeorgiaTech	Chemours	Pajarito Powder
ORNL		Northeastern	Cummins	Plug Power
		University of Tennessee	General Motors	

Main Laboratories

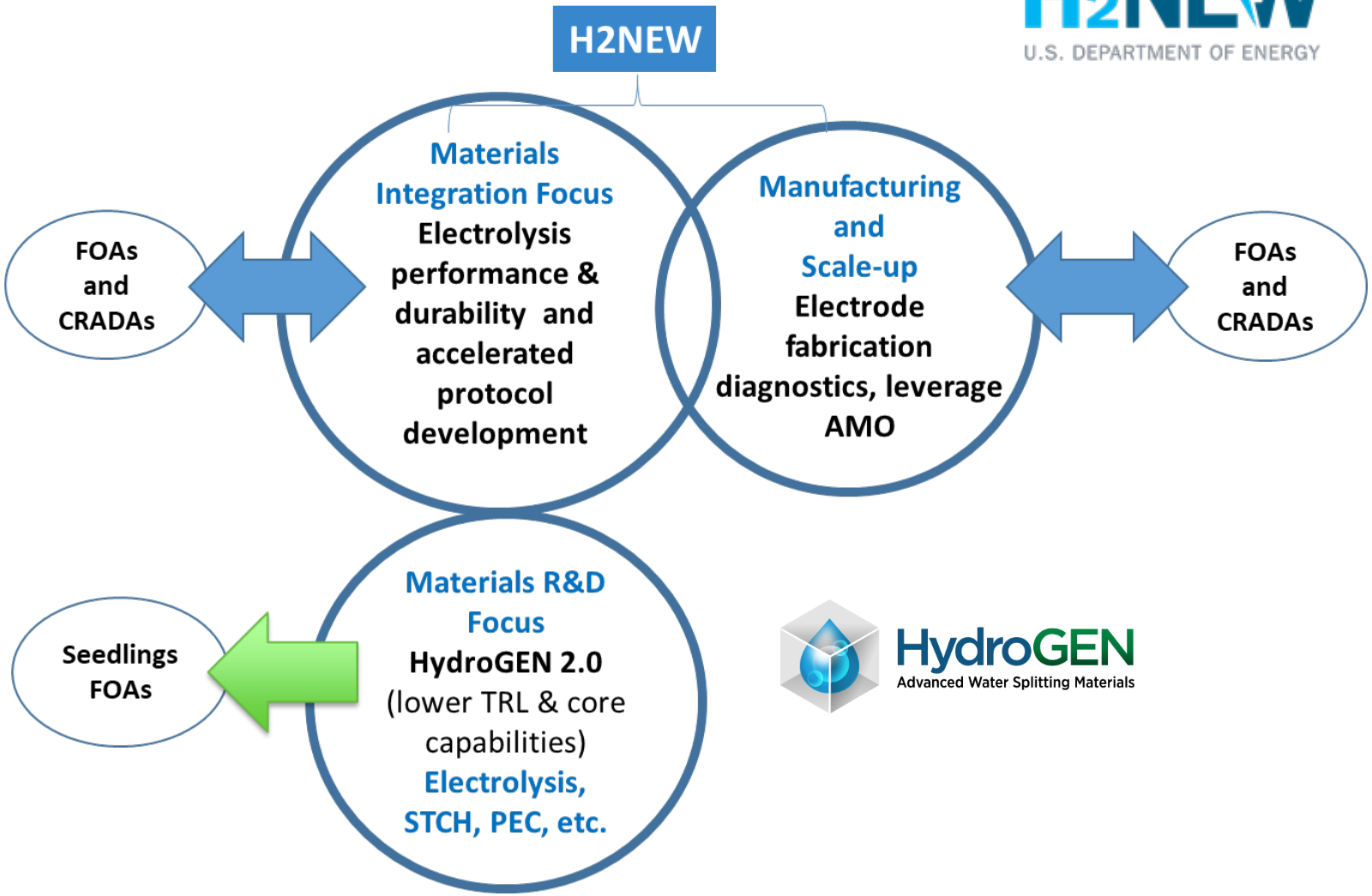
Los Alamos National Laboratory, Berkeley Lab, Oak Ridge National Laboratory, NREL National Renewable Energy Laboratory, Argonne National Laboratory

Affiliate Laboratories

Pacific Northwest National Laboratory, Brookhaven National Laboratory, NIST National Institute of Standards and Technology

H2NEW Consortium to Accelerate Progress in Electrolyzers

H2 from the Next-generation of Electrolyzers of Water



H2NEW
U.S. DEPARTMENT OF ENERGY

National Lab Consortium Team

NREL NATIONAL RENEWABLE ENERGY LABORATORY
INL Idaho National Laboratory
Argonne NATIONAL LABORATORY
BERKELEY LAB
Pacific Northwest NATIONAL LABORATORY
Los Alamos NATIONAL LABORATORY
Lawrence Livermore National Laboratory
OAK RIDGE National Laboratory
NETL NATIONAL ENERGY TECHNOLOGY LABORATORY

Clear, well-defined stack metrics

Electrolyzer Stack Goals by 2025

	LTE PEM	HTE
Capital Cost	$100/kW	$100/kW
Elect. Efficiency (LHV)	70% at 3 A/cm^2	98% at 1.5 A/cm^2
Lifetime	80,000 hr	60,000 hr

Demonstration and Deployment

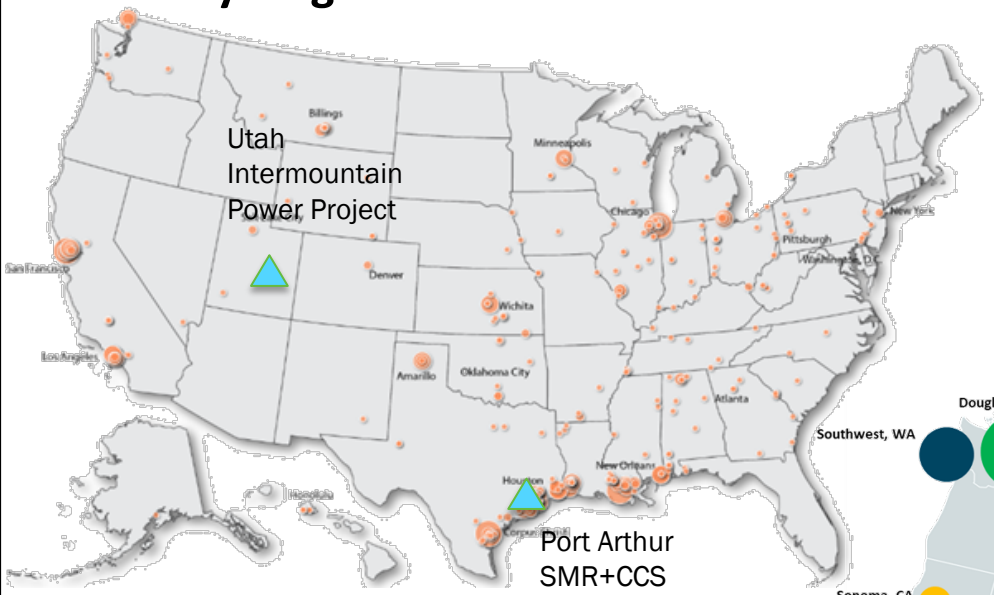
Snapshot of Hydrogen and Fuel Cell Applications in the U.S.

Examples of Applications Deployed

- **>500MW** Backup Power
- **>40,000** Forklifts
- **>172 MW** PEM* Electrolyzers
- **>60** Fuel Cell Buses
- **>45** H_2 Retail Stations
- **~11,000** Fuel Cell Cars

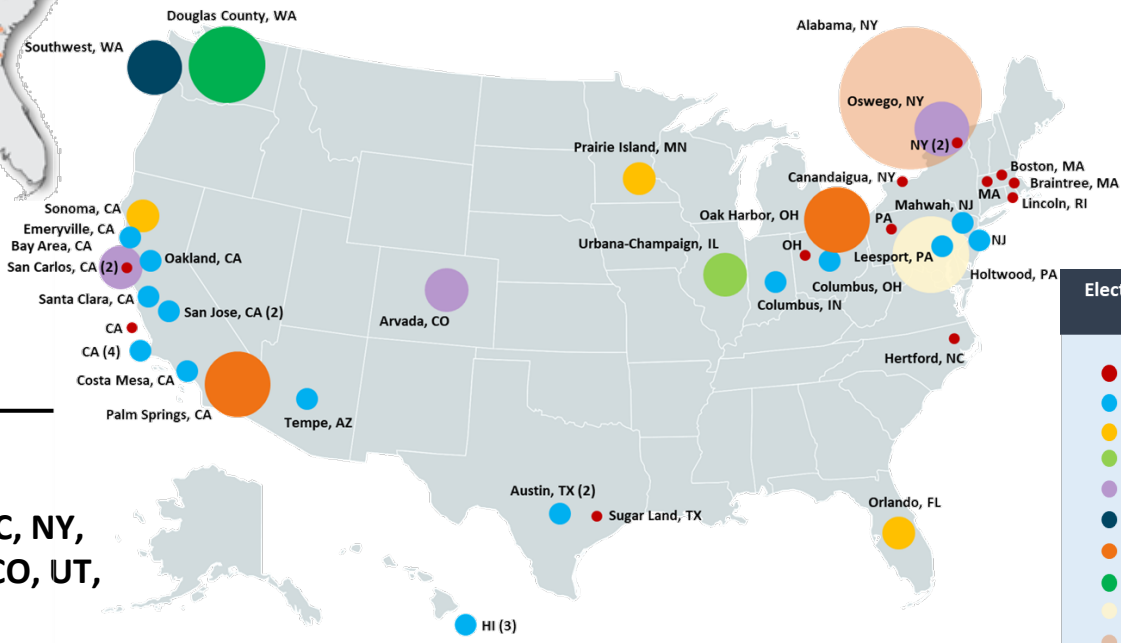
* Polymer electrolyte membrane

Hydrogen Production Facilities



- 10 million metric tons produced annually
- More than 1,600 miles of H_2 pipeline
- World's largest H_2 storage cavern

PEM Electrolyzer Installations



Current and under construction installations over 120 kW as of Jun. 2021

** Source: Arjona, et al, DOE HFTO Program Record, June 2021*

Hydrogen Stations Plans Across States

California
200 Stations Planned
California Fuel Cell Partnership Goal

Northeast
12 – 20 Stations Planned

HI, OH, SC, NY, CT, MA, CO, UT, TX, MI
And Others

Examples of H2@Scale Projects to Demonstrate Technology and Train Future Workforce

Different regions, hydrogen sources, end uses & educational opportunities

H_2 for Marine Application

California

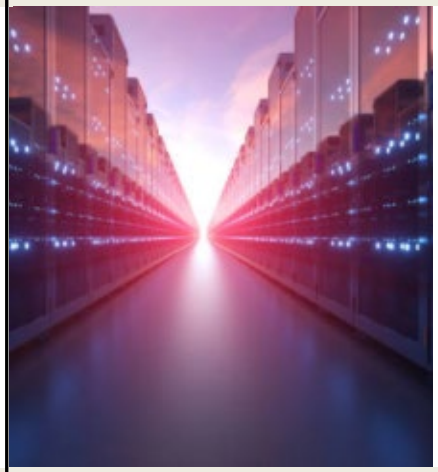
1st-of-its-kind maritime H_2 refueling on floating barge - up to ½ ton H_2/day

H_2 from Renewables

Texas

Integrates wind, solar, RNG from waste with onsite electrolysis and multiple end-uses

H_2 for Data Center



Washington

Integrates a 1.5MW fuel cell with a data center to provide reliable and resilient power

H_2 for Steel Production

Missouri

Reduction of 30% in energy and 40% emissions vs. conventional processes

H_2 from Nuclear

Eastern US

Demonstrates a MW electrolyzer with a nuclear plant (collaboration with Nuclear Office)

Workforce Development

Multi-state

A Training, education and recruiting program to build skills needed in the H_2 industry

Financing to Enable Deployment at Scale

$40 Billion in Available Debt Capital

LPO offers project financing across energy sectors through three distinct loan programs.

Includes Clean Hydrogen

LPO Loan Programs

TITLE 17
Loan Guarantees

- Renewable Energy and Efficient Energy — **$3 Billion Available**
- Advanced Nuclear Energy — **$10.9 Billion Available**

ATVM
Direct Loans

- Advanced Technology Vehicles Manufacturing — **$17.7 Billion Available**

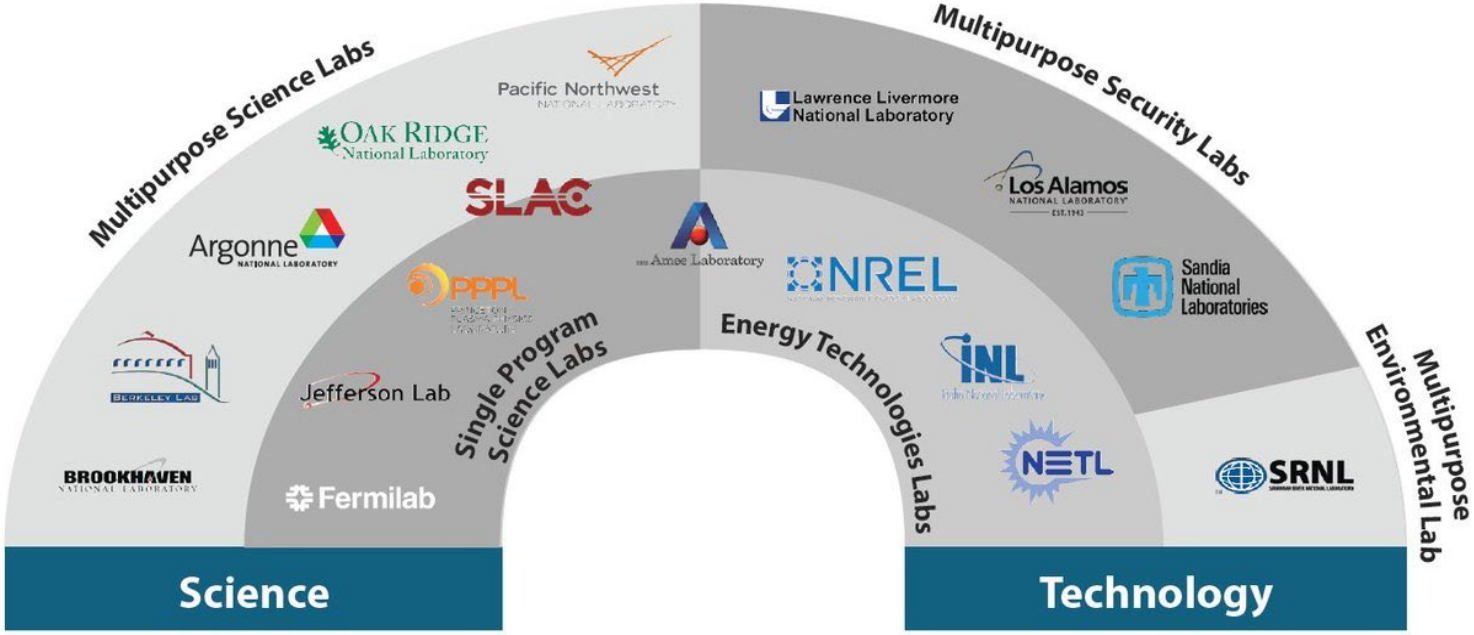
TELGP
Partial Loan Guarantees

- Tribal Energy Projects — **Up to $2 Billion Available**

Enabling Activities

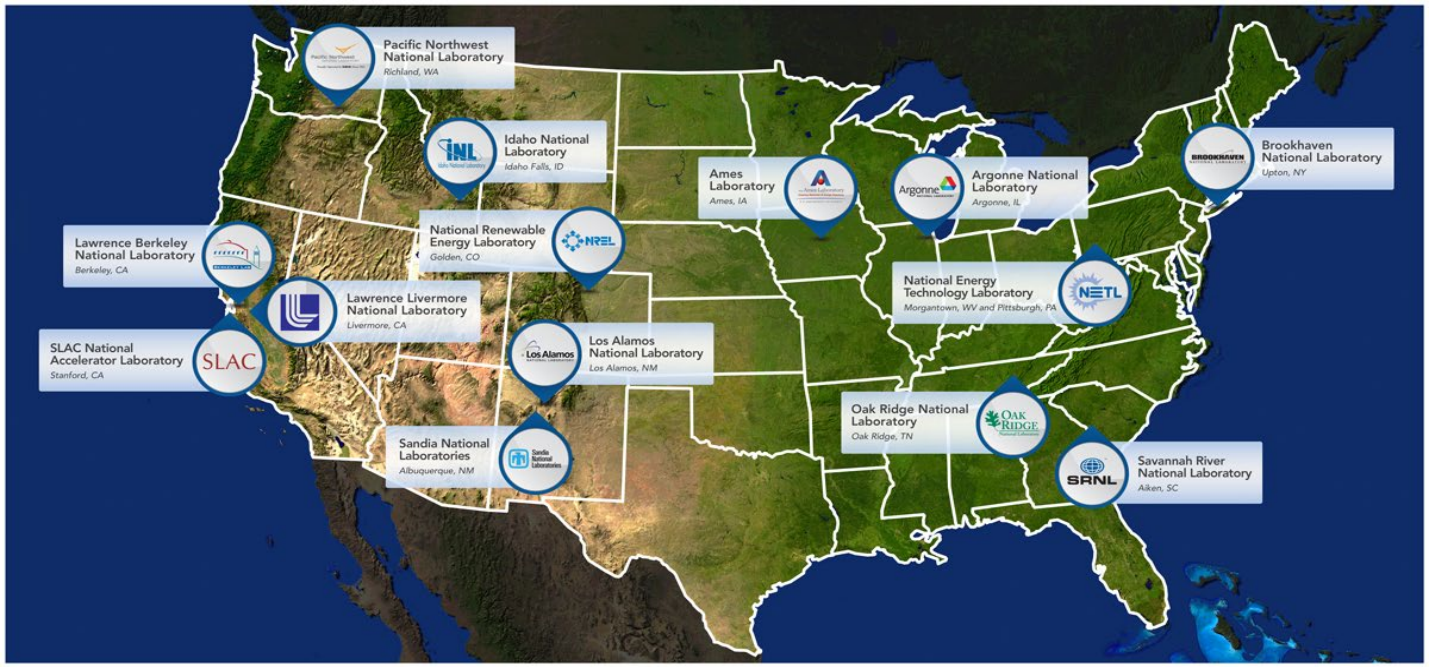
DOE National Laboratories

HFTO has activities at 14 National Laboratories across the portfolio



DOE National Laboratories across energy, science, and security:

- Support RD&D
- Offer User Facilities and science resources
- Help to de-risk technology adoption, accelerating progress.



HyBlend and H-Mat Consortia

To assess and enhance compatibility of key materials with hydrogen, and to accelerate the use of hydrogen in multiple applications (including in natural gas blending)

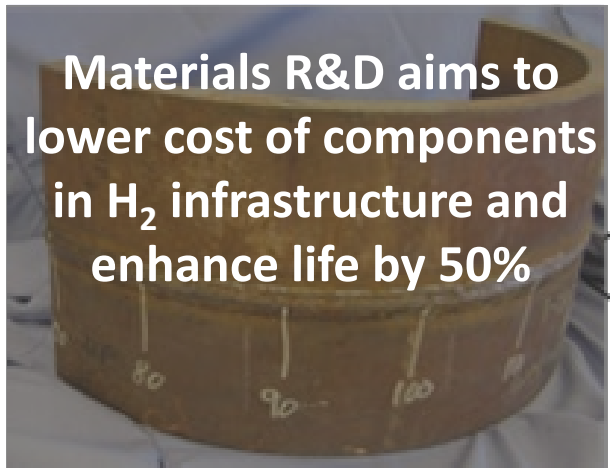
H-Mat Hydrogen Materials Compatibility Consortium

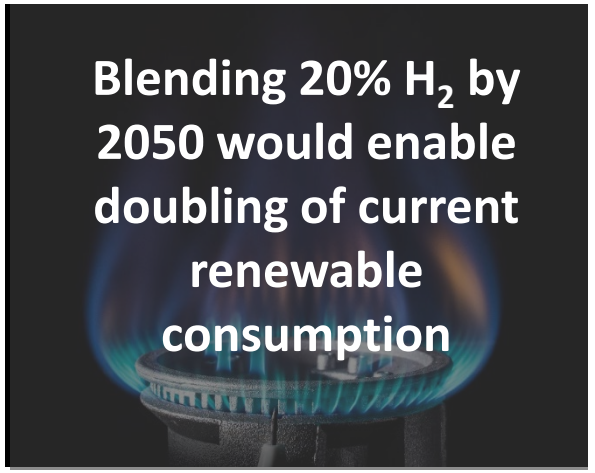
National lab consortium to assess and improve performance and reliability of materials in hydrogen, reduce costs, and inform codes & standards.

HyBlend U.S. DEPARTMENT OF ENERGY

Pipeline materials compatibility R&D, technoeconomic analysis, and life cycle analysis to assess the feasibility of hydrogen blending in the US natural gas pipeline infrastructure.

Over 40 partners





Labs | Sandia National Laboratories | PNNL | SRNL | Oak Ridge National Laboratory | Argonne National Laboratory

Labs | NREL National Renewable Energy Laboratory | Sandia National Laboratories | PNNL | Oak Ridge National Laboratory | Argonne National Laboratory | NETL

Enabler: Center for Hydrogen Safety

Global Center for Hydrogen Safety established to share best practices, training resources and information

High Priority:
Lessons learned and best practices on safety

Encourage membership (industry, govt, universities, labs) to join CHS

CENTER FOR 水素安全センター Hydrogen SAFETY
Connecting a Global Community

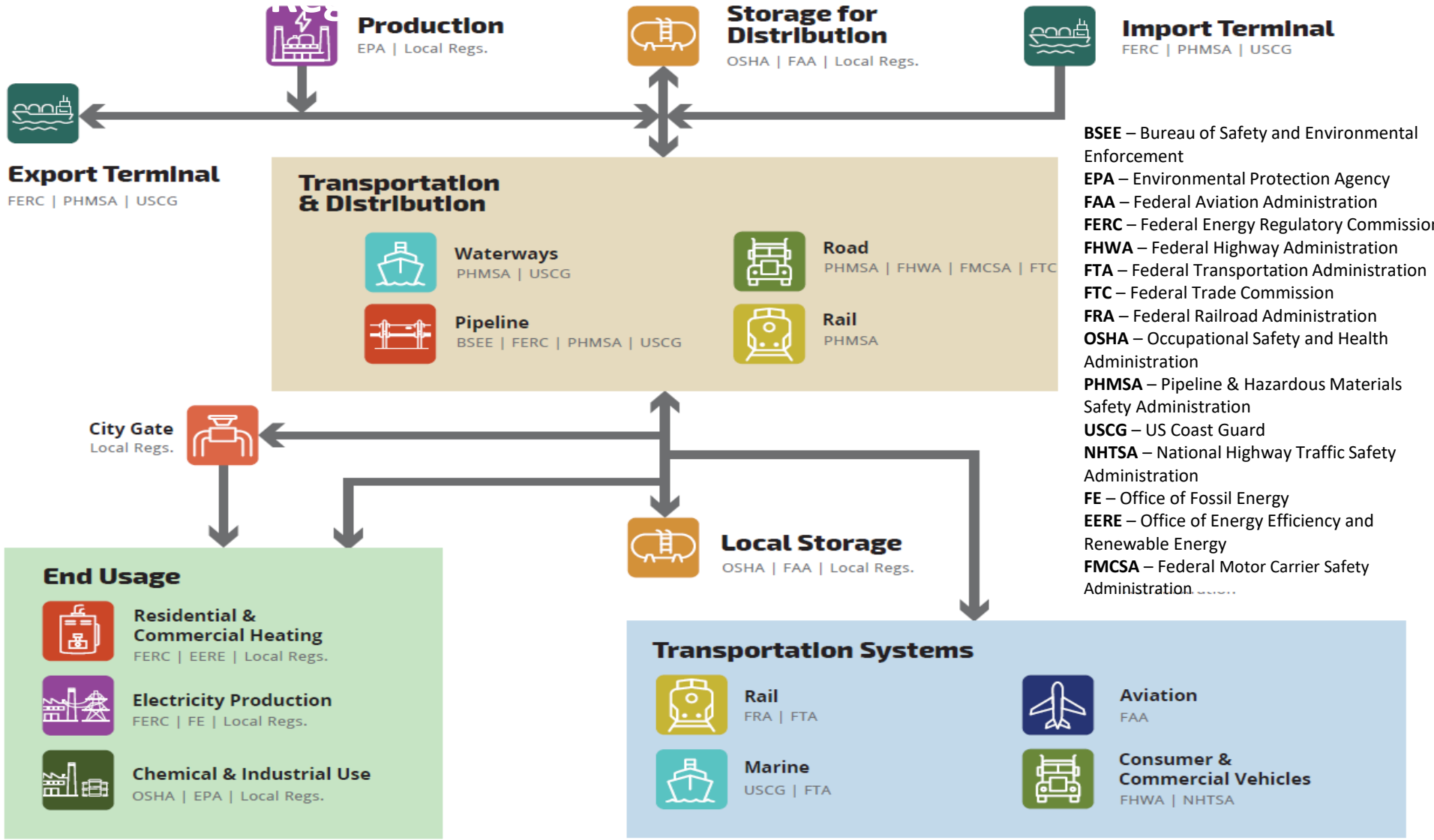
www.aiche.org/CHS

IPHE
Hydrogen Council
AIChE
Pacific Northwest NATIONAL LABORATORY
hySafe INTERNATIONAL ASSOCIATION FOR HYDROGEN SAFETY

Over 60 partners: government, industry, universities and more

Access to >110 countries, 60,000 members

Enabler: Developed Federal Regulatory Map & Identified Gaps



BSEE – Bureau of Safety and Environmental Enforcement
EPA – Environmental Protection Agency
FAA – Federal Aviation Administration
FERC – Federal Energy Regulatory Commission
FHWA – Federal Highway Administration
FTA – Federal Transportation Administration
FTC – Federal Trade Commission
FRA – Federal Railroad Administration
OSHA – Occupational Safety and Health Administration
PHMSA – Pipeline & Hazardous Materials Safety Administration
USCG – US Coast Guard
NHTSA – National Highway Traffic Safety Administration
FE – Office of Fossil Energy
EERE – Office of Energy Efficiency and Renewable Energy
FMCSA – Federal Motor Carrier Safety Administration

Gaps Identified

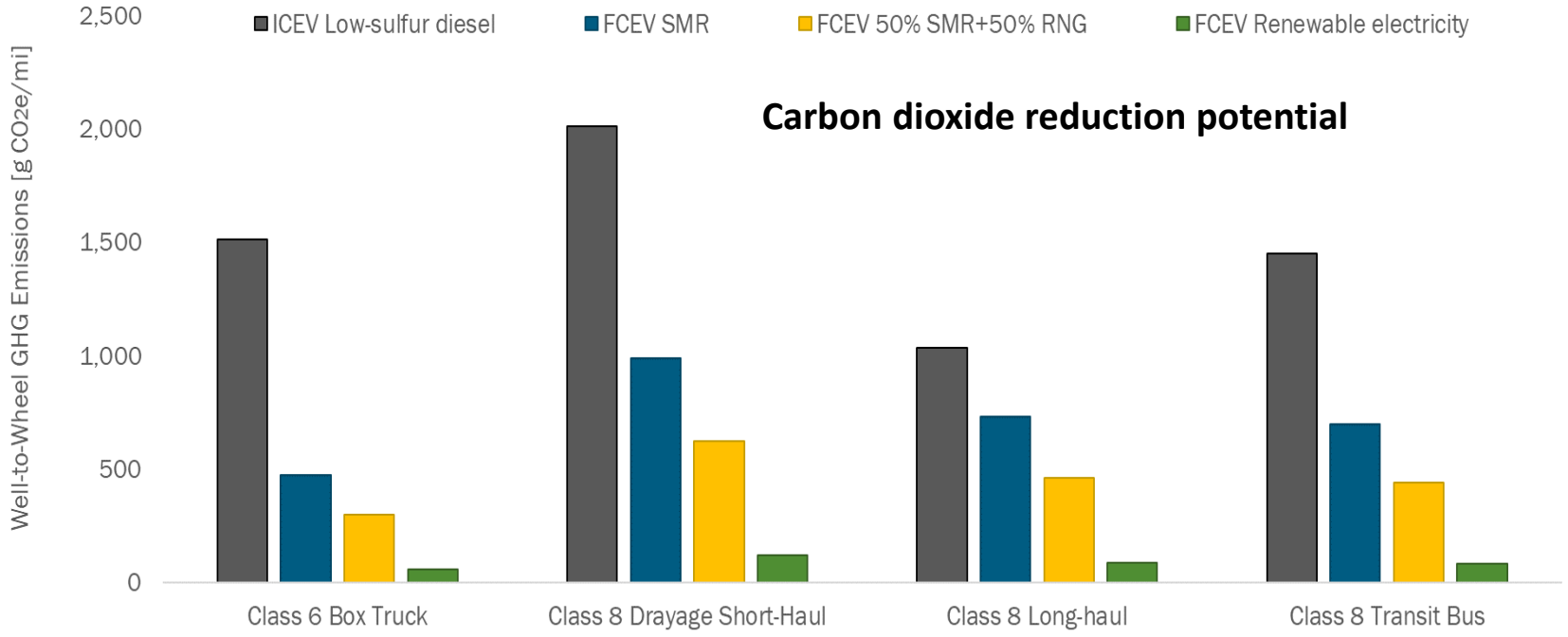
- **FERC for pipeline transmission, electricity production, and heating**
- **FHWA for bridges and tunnels**
- **FRA, USCG, and FAA for rail, maritime, and aviation use**

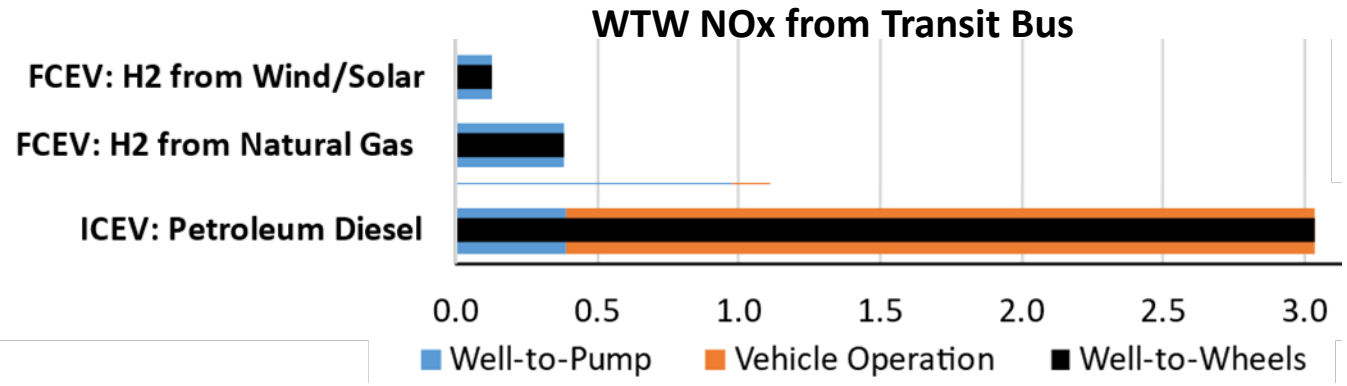
Final Report Available:
energy.sandia.gov/wp-content/uploads/2021/03/H2-Regulatory-Map-Report_SAND2021-2955.pdf

Interagency Working Group on Hydrogen and Fuel Cell Technologies

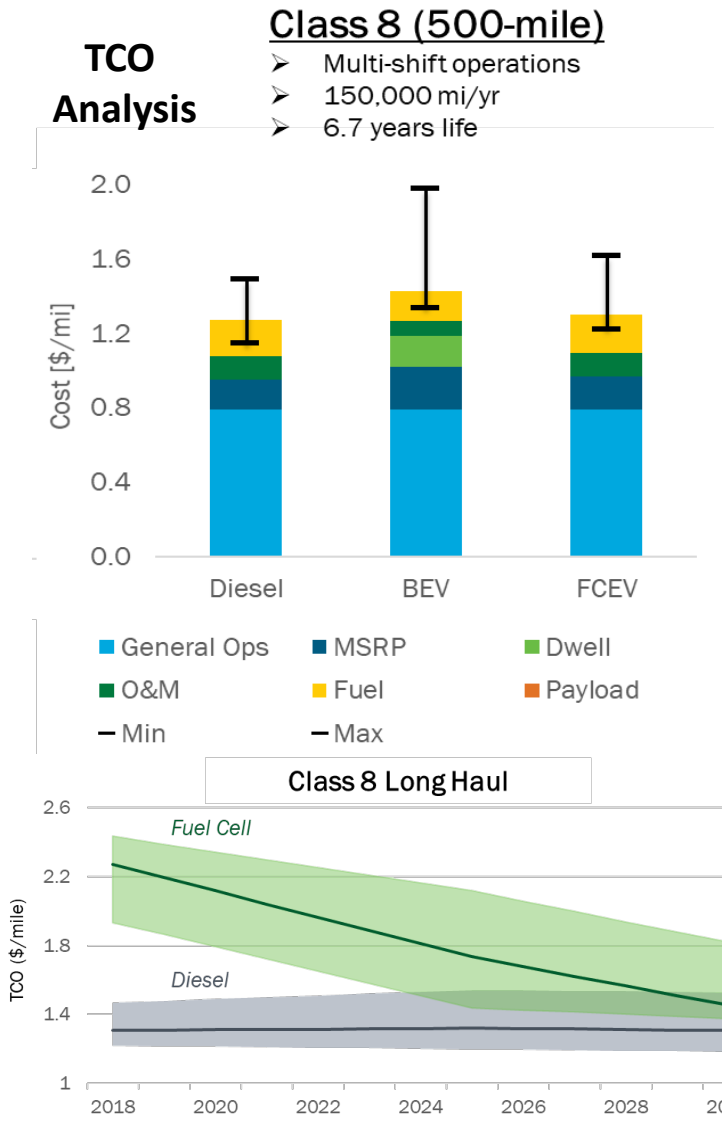
Example Joint Agency H2Rescue Truck
DOE, DOD, FEMA

Enabler: Analysis Guides Portfolio, Decision Making, and Impact





Source: Elgowainy, et. al. (ANL), 2021



Preliminary analysis

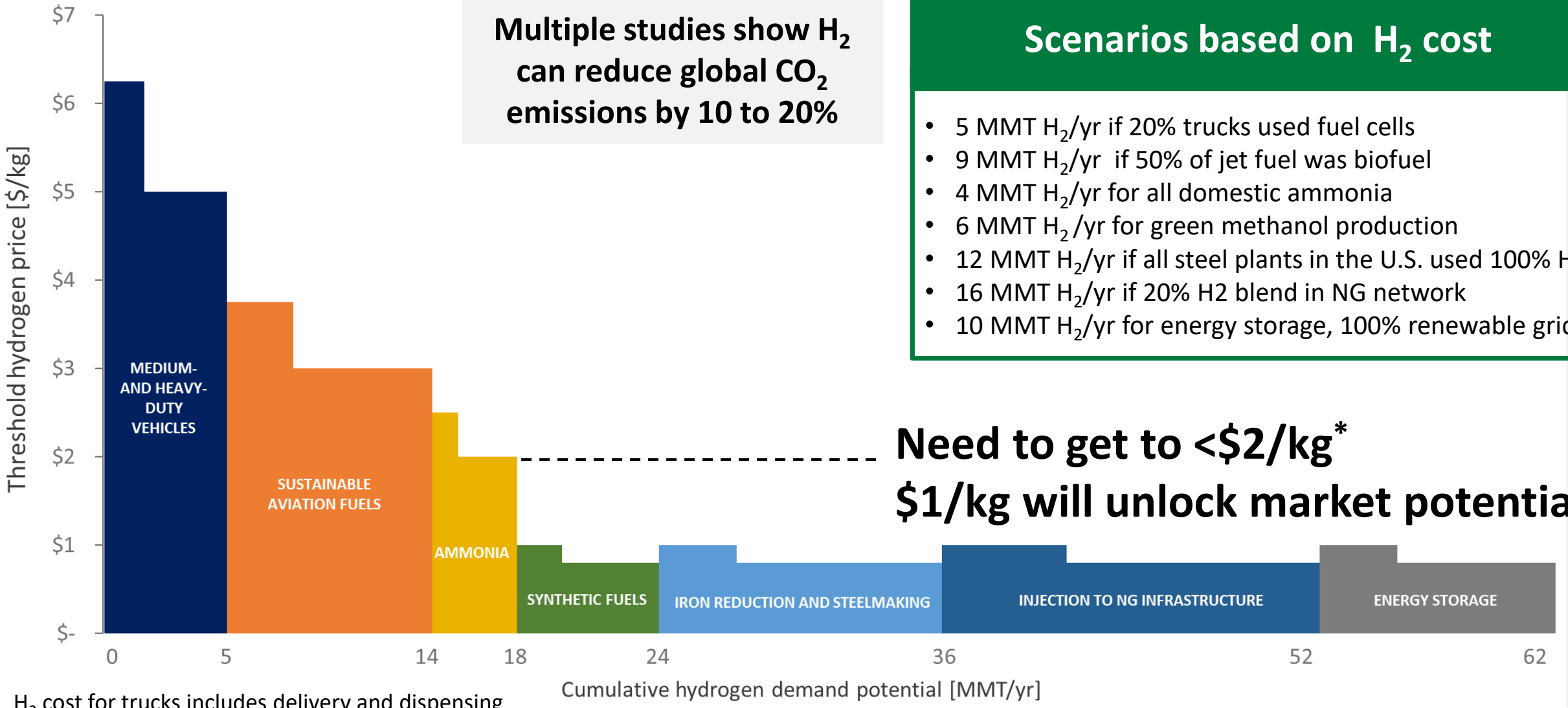
Source: Hunter, et al, NREL, 2021

Analysis Determines Market Potential Scenarios

Multiple studies show H_2 can reduce global CO_2 emissions by 10 to 20%

Scenarios based on H_2 cost

- 5 MMT H_2/yr if 20% trucks used fuel cells
- 9 MMT H_2/yr if 50% of jet fuel was biofuel
- 4 MMT H_2/yr for all domestic ammonia
- 6 MMT H_2 /yr for green methanol production
- 12 MMT H_2/yr if all steel plants in the U.S. used 100% H_2
- 16 MMT H_2/yr if 20% H2 blend in NG network
- 10 MMT H_2/yr for energy storage, 100% renewable grid



**Need to get to <$2/kg*
$1/kg will unlock market potential**

H_2 cost for trucks includes delivery and dispensing

* H_2 could compete at $1 to $2/kg higher cost with a carbon price

Results based on preliminary analysis

President Biden and Energy Secretary Granholm at Climate Summit

"…I've asked the Secretary of Energy to speed the development of critical technologies to tackle the climate crisis. No single technology is the answer on its own because every sector requires innovation to meet this moment."

President Joseph R. Biden
April 23, 2021

Launch of Hydrogen Energy Earthshot
First of the Energy Earthshots
June 7, 2021
at DOE Hydrogen Program Annual Merit Review

Secretary Jennifer Granholm
June 7, 2021

ENERGY earthshots | Hydrogen
U.S. DEPARTMENT OF ENERGY

Hydrogen Energy Earthshot

“Hydrogen Shot”

“1 1 1”
$1 for 1 kg clean hydrogen in 1 decade

Launched June 7, 2021

Context

Hydrogen Shot Summit
Aug 31-Sept 1, 2021

Sets the stage
Covers all technical pathways, deployment, financing, EJ & DEI

Series of smaller tailored RD&D innovation workshops

Regional and pathway analyses; Deployment-focused workshops

Output guides:

- **RDD&D strategy**
- **EJ & Equity Priorities**
- **Funding**
- **Partnerships**

Enables achieving Hydrogen Shot

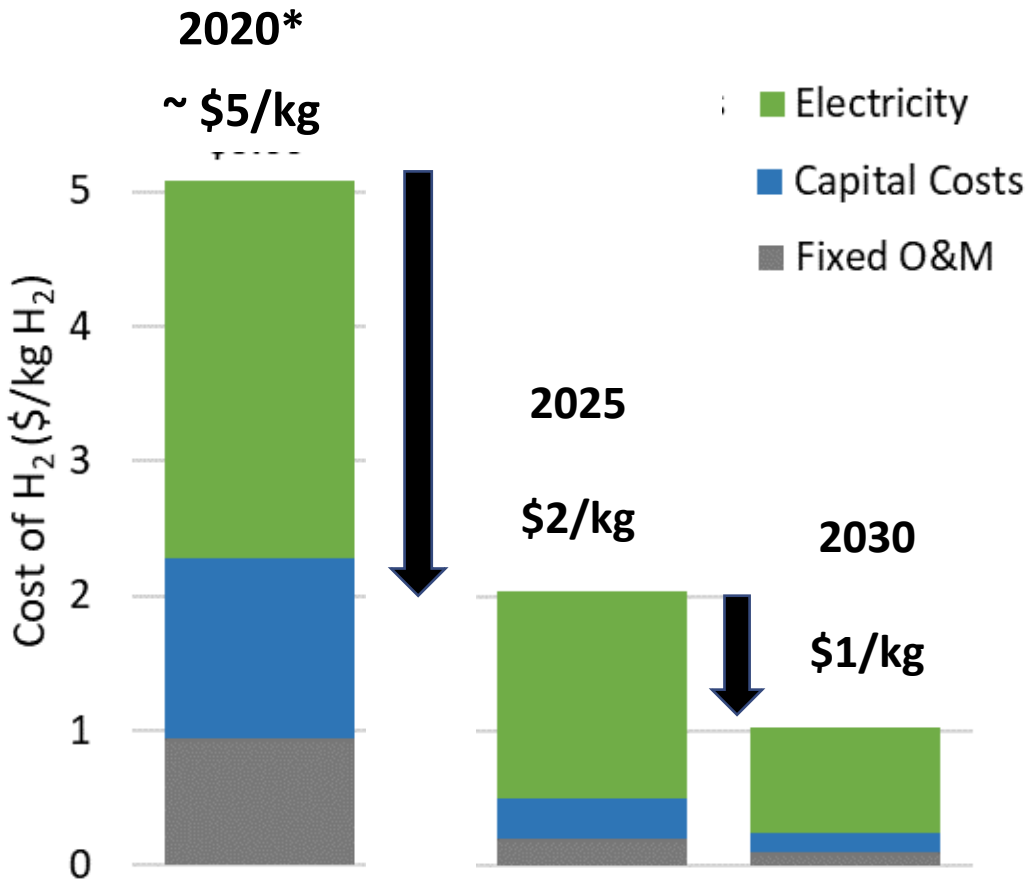
1 Dollar

1 Kilogram

1 Decade

Breakout Session 1: Electrolysis

Example: H_2 Cost from PEM Electrolysis



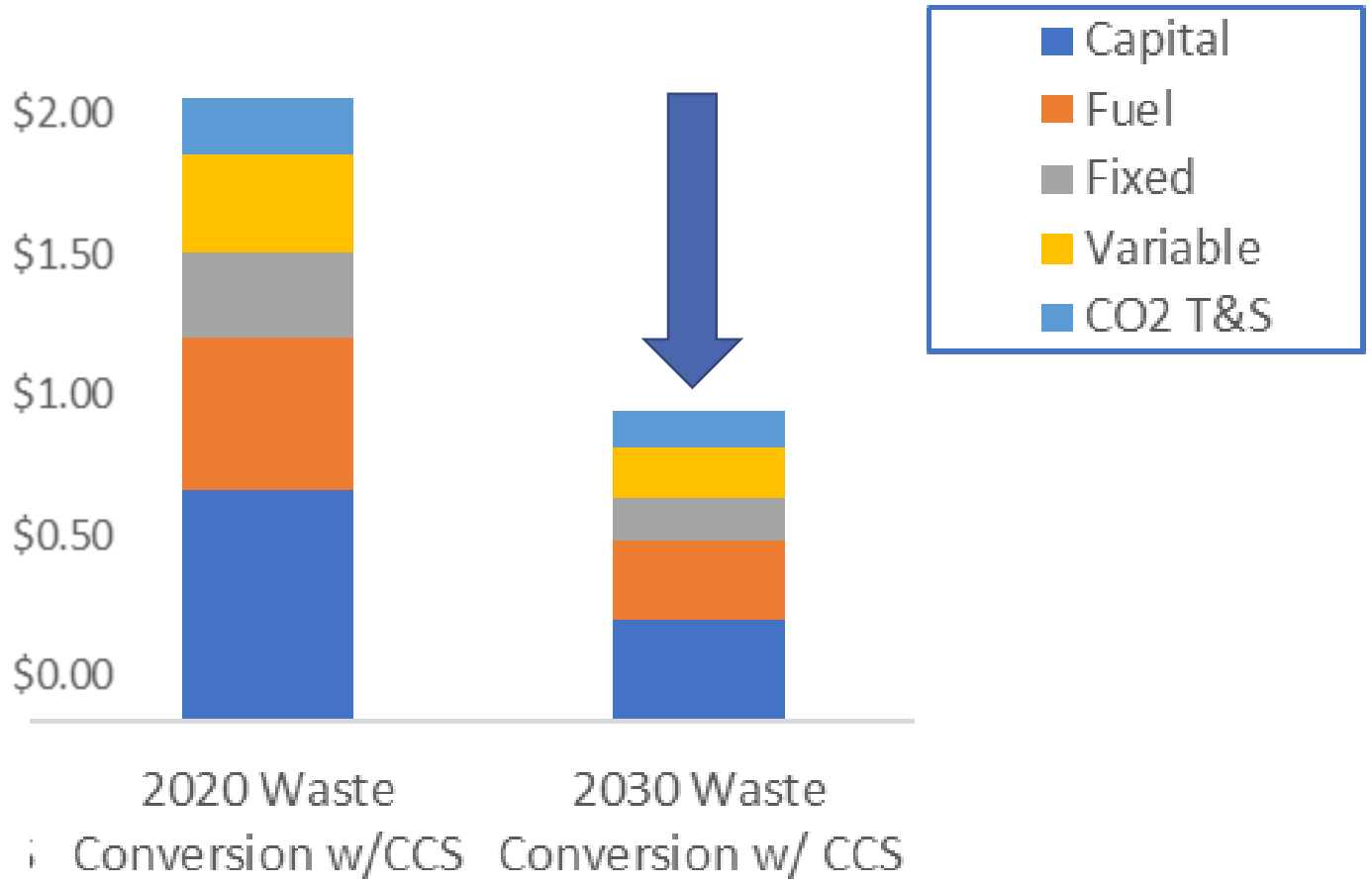
Pathways to meet Goal

- Reduce electricity cost and improve efficiency and utilization
- Reduce capital cost >80%
- Reduce operating & maintenance cost >90%

*2020 Baseline: PEM (Polymer Electrolyte Membrane) low volume capital cost ~$1,500/kW, electricity at $50/MWh. Pathways to targets include capital cost < $300/kW by 2025, < $150/kW by 2030 (at scale). Assumes $50/MWh in 2020, $30/MWh in 2025, $20/MWh in 2030

Breakout Session 2: Thermal conversion

Example: H_2 Cost from Waste Conversion + CCS



* Waste coal, plastics, biomass residuals, municipal solid waste (MSW), and biogas

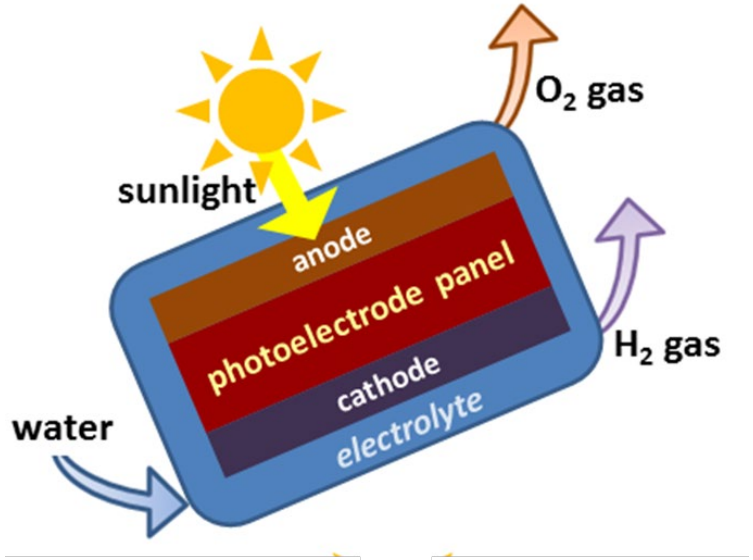
Examples of RD&D

- Includes reforming, pyrolysis, and other pathways with focus on low life cycle emissions
- Process intensification and optimization
- Improvements in air separation, catalysts, carbon capture, and upstream emissions

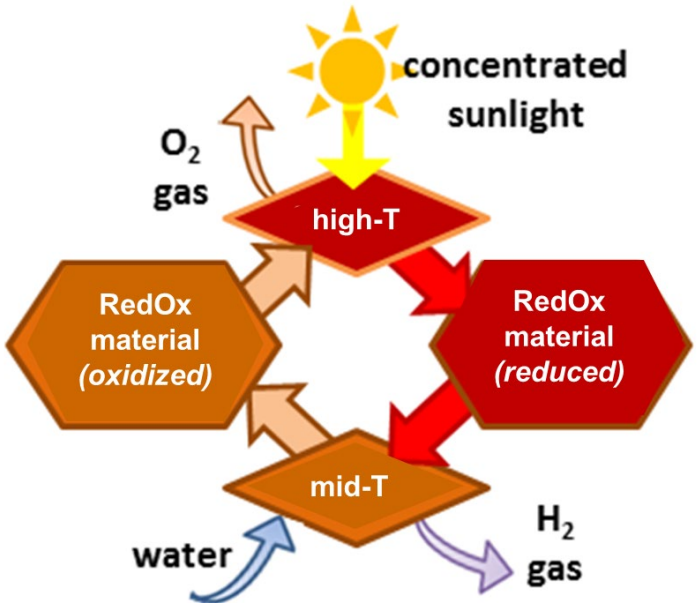
Breakout Session 3: Advanced Pathways

Includes higher-risk/high-reward approaches. R&D needed on efficiency, durability, and cost.

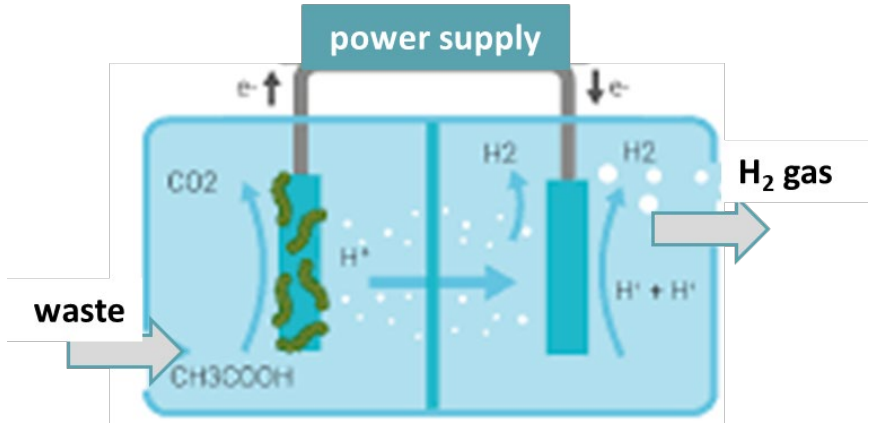
Photoelectrochemical solar water splitting (PEC)



Thermochemical solar water splitting



Microbial electrolysis of waste streams



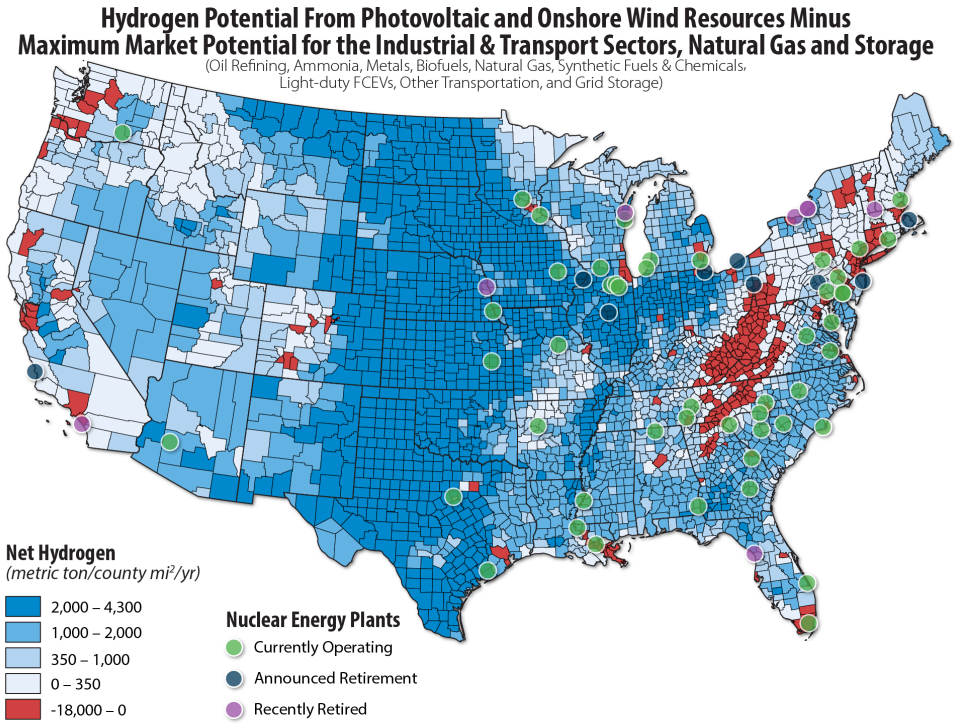
Basic and foundational science and innovation applies to all pathways

Results of Office of Science Round Table coming soon

You can’t undo the knot by pulling tighter on the rope

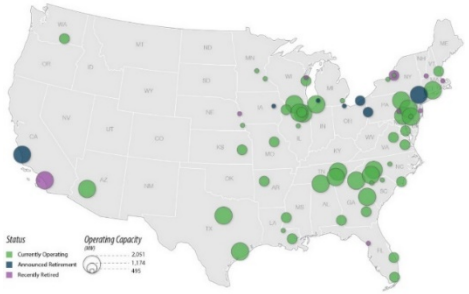
Stakeholder Engagement, Production and End-Use Collocation and Environmental Justice to Drive Activities

Renewables



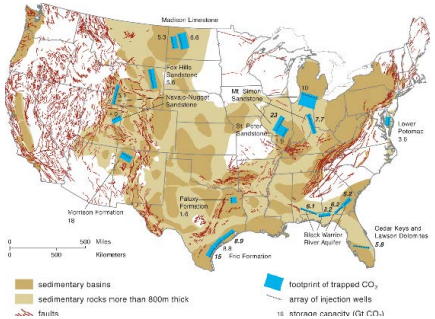
Red: Regions where projected industrial & transportation demand exceeds local supply.

- Hydrogen Shot Summit and Stakeholder Engagement occurred Aug 31-Sept 1
- Request for Information on Key Topics Issued



Natural Gas (SMR)

CCS



DOE Request of Information covered key themes:

- Production, Resources, Infrastructure
- End Users, Cost, Value Proposition
- Co-location potential
- Emissions Reduction Potential
- DEI, Jobs, EJ
- Science & Innovation Needs and Challenges

DEI: Diversity, Equity and Inclusion
EJ: Environmental Justice

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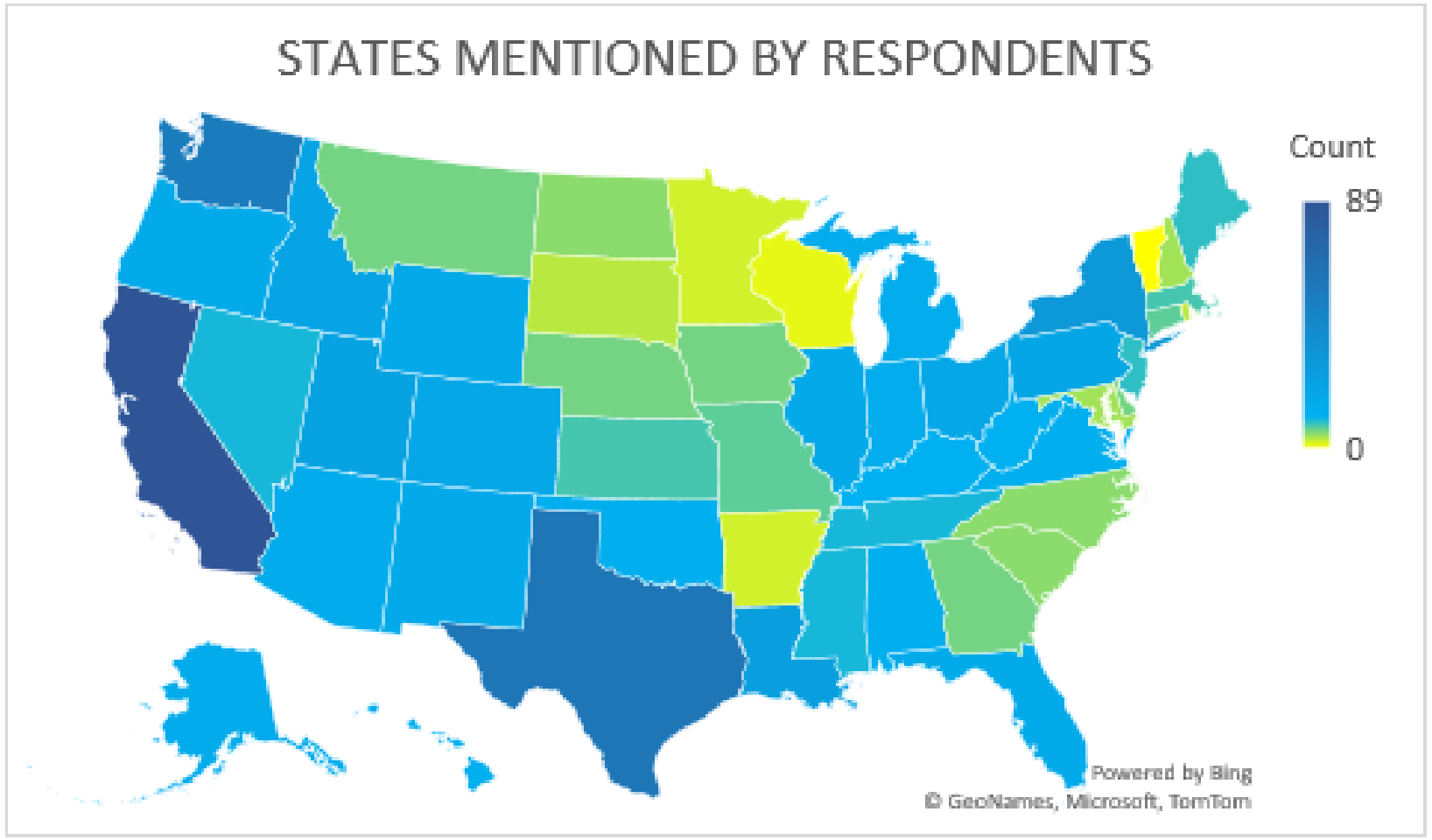
Breakout Session 4: Deployment and Financing

Includes regional, EJ, tribal, investor, and industry perspectives



Over 200 RFI responses described diverse resources, end-uses and impact potential in various regions

About our Audience

Convening thousands of stakeholders

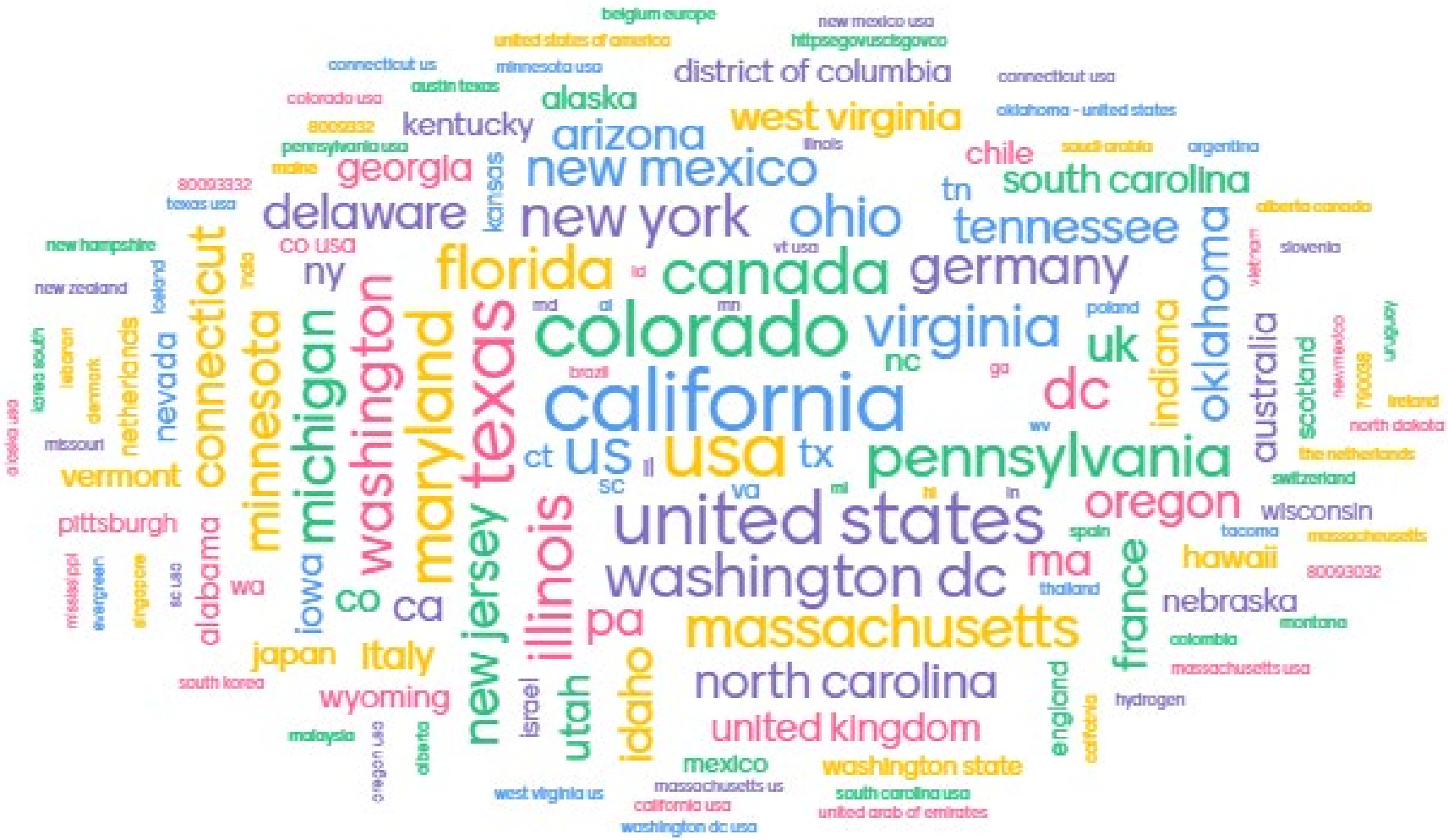
4900+ total registrants

3,200+ participants in Plenary

Participants from across the US and around the world

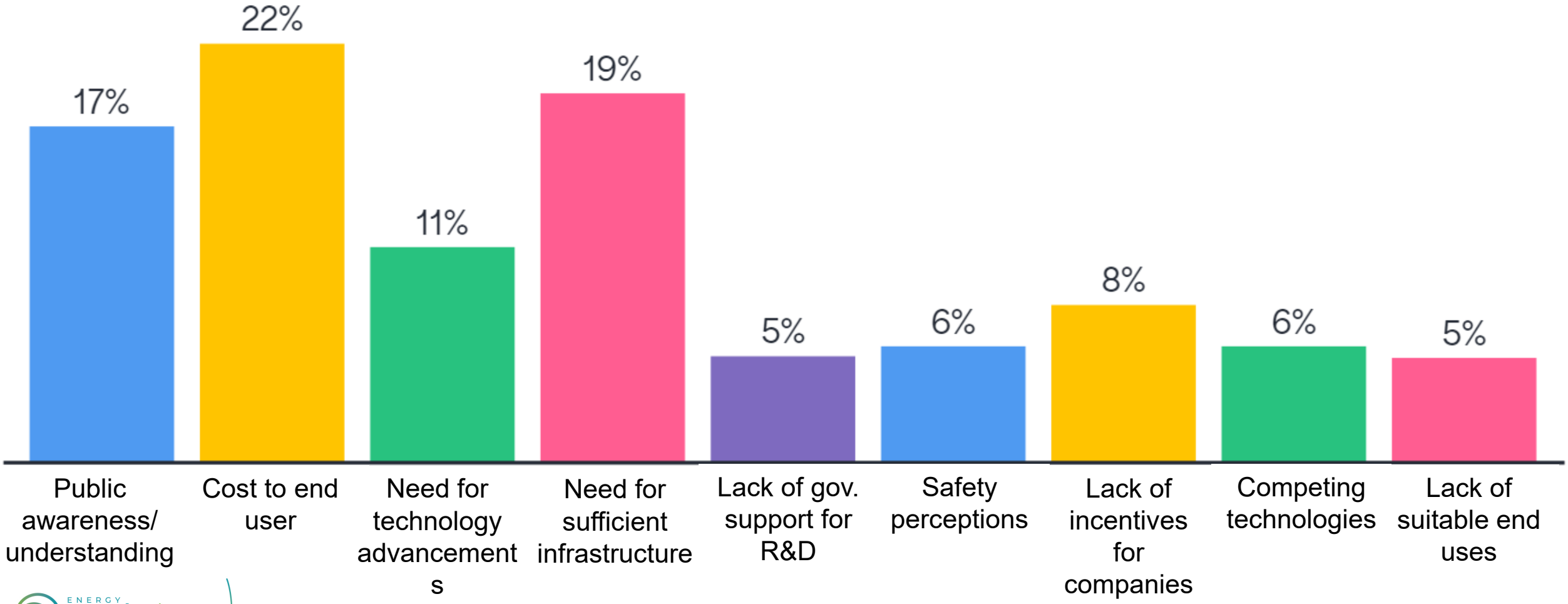
48 states + DC

33 countries + USA



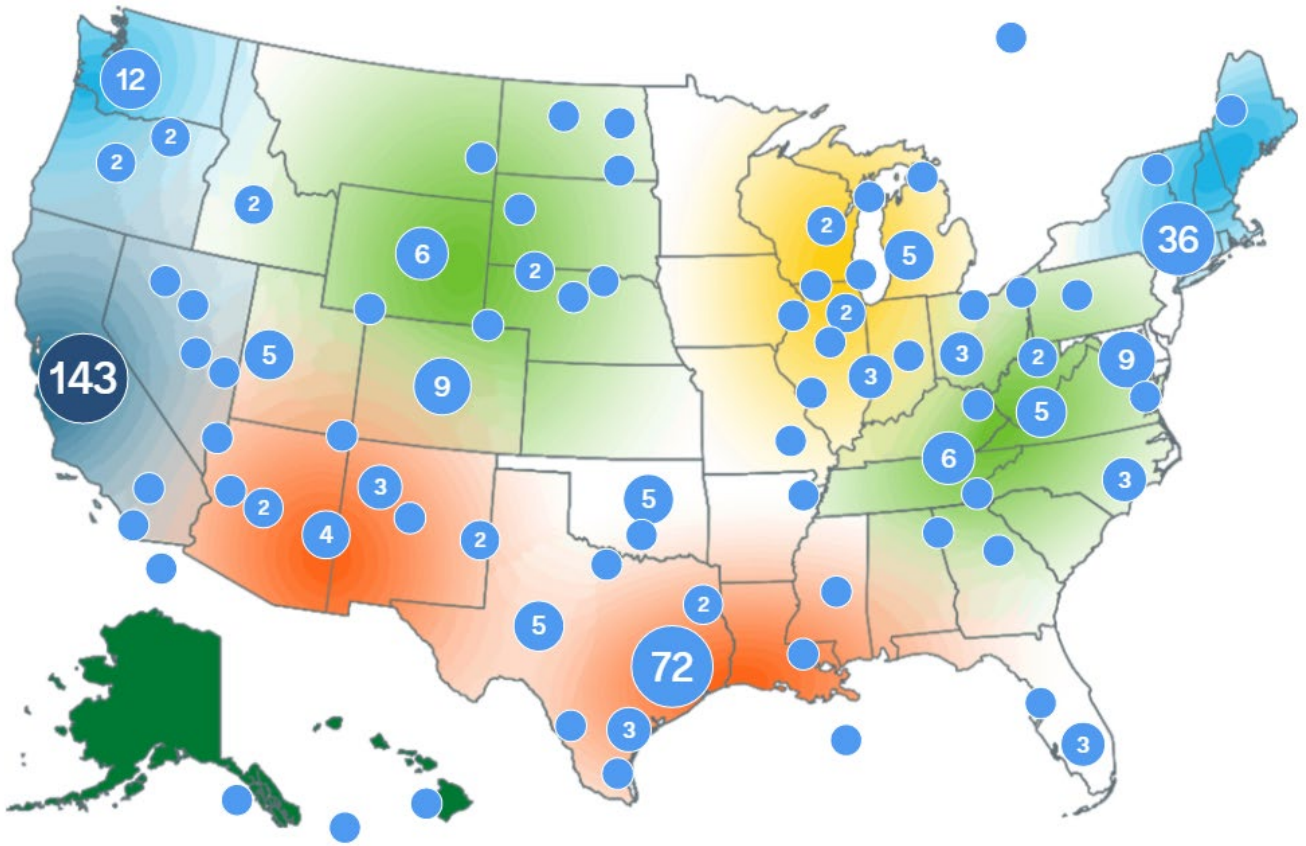
DOE Hydrogen Shot Summit Stakeholder Feedback

Responses to: Which are the greatest barriers currently preventing public acceptance of wide-spread hydrogen in the US?



Potential Locations for Hydrogen Demonstrations

Please select the region that you believe is most ready for a large-scale hydrogen demonstration.



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Source: Wieliczko, Harting, et al, DOE HFTO

How Can We Succeed?

What are your top 3 priorities for Hydrogen Shot to be successful?

Increase R&D to reduce cost
20%

Focus on scale and deployments
20%

Develop partnerships
14%

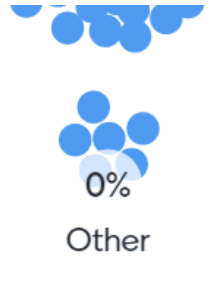
Policies to increase scale and cost parity
18%

Increasing supply chain
6%

Delivery and storage infrastructure
11%

Reducing siting/permitting barriers
5%

Address hydrogen safety
5%

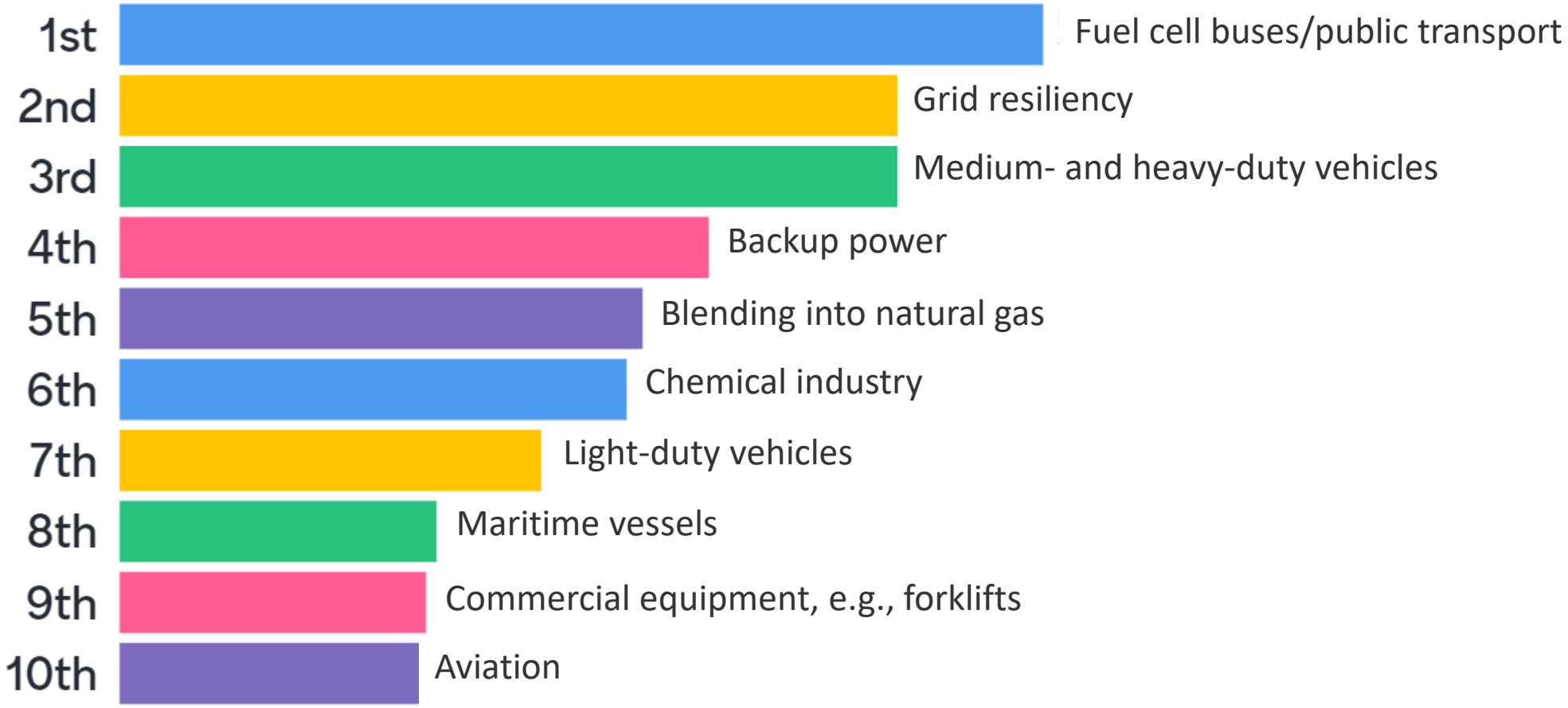


0%
Other

Source: Wieliczko, et al, DOE HFTO

Identifying DEI Opportunities

Please rank these end use applications by the potential impact to underserved communities.



Source: Wieliczko, et al, DOE HFTO

RFI findings: Regional clusters and geographic factors

Pacific Northwest

- *Port communities*
- *Tribal communities*
- *Extensive renewables*
- *8 jobs per $1M invested in H_2*

California

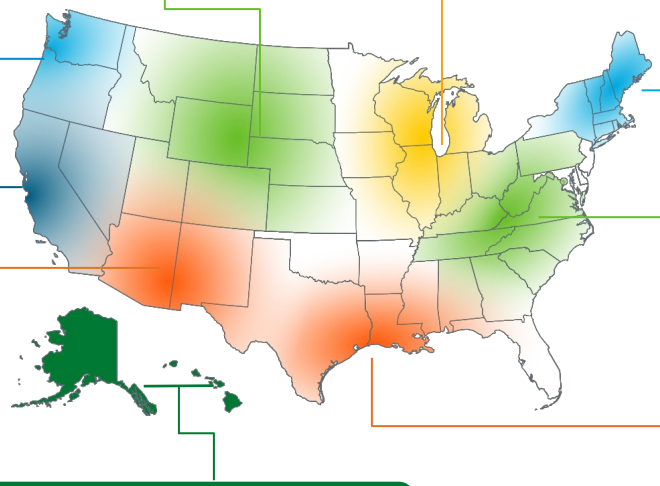
- *Diverse populations*
- *Extensive infrastructure*
- *Emissions regulations*
- *40,000+ jobs*

Southwest

- *Tribal and Hispanic communities*
- *Underutilized solar*
- *Nuclear power*
- *Up to 2B tonnes/yr emission reduction potential*

Central U.S.

- *Ample wind*
- *Geological storage*
- *Railway transport*
- *Nuclear resources*
- *>630,000 tonnes/yr CO_2 reduction*



Alaska and Hawaii

- *Extensive renewables – geothermal, solar, ocean*
- *Backup power*
- *Isolated communities*
- *86,000 tonnes/yr emission reduction*

Great Lakes

- *Major national corridors* • *Nuclear power* • *60,000+ jobs*

New England

- *Offshore wind*
- *Fishing communities*
- *Backup power and winter heating*
- *~120K tons CO_2/year reduction*

Appalachia

- *Retiring fossil plants*
- *Mining, refining transferable skills*
- *Carbon capture and sequestration*
- *70,000 tons/yr H_2 production*

Gulf Coast

- *Existing infrastructure*
- *Multiple opportunity zones*
- *Renewable resources*
- *1,000s of jobs*
- *Chemical industry*

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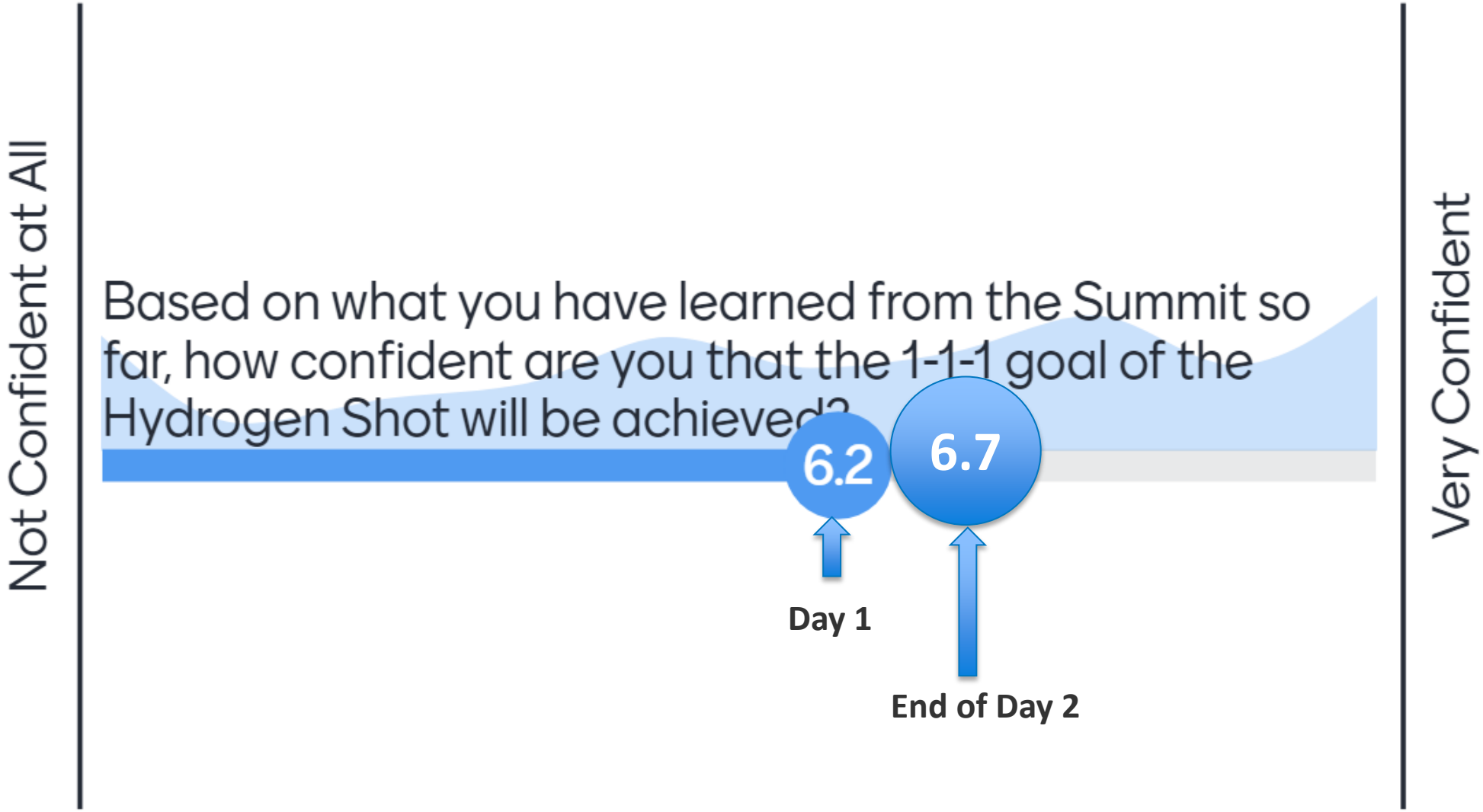
Will We Succeed?



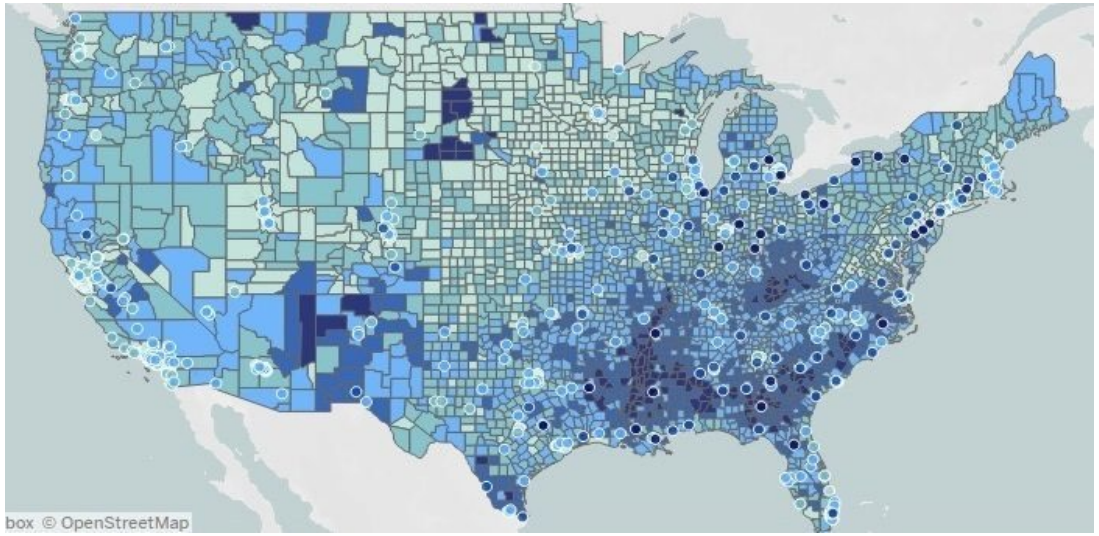
Source: Wieliczko, Harting, et al, DOE HFTO


Collaboration
Diversity, Equity, Inclusion

“No one can whistle a symphony. It takes a whole orchestra to play it.”

- H. Luccock

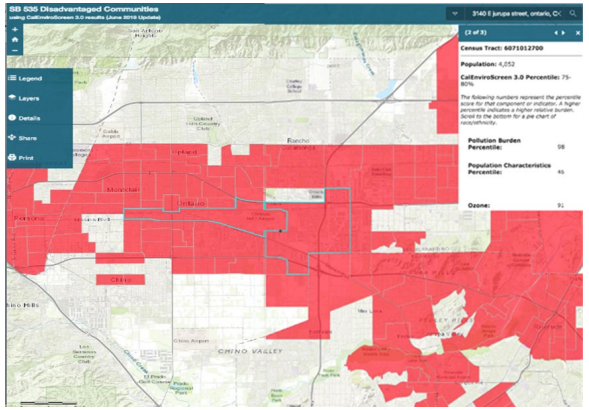
Focus on Benefits in Underserved & Disadvantaged Communities



New index ranks America's 100 most disadvantaged communities | University of Michigan News (umich.edu)

Funding Opportunities will encourage broader engagement, demonstrating benefits, including DEI (minorities, gender equity, etc.)

Example: DOE project with CTE for UPS Fuel Cell Delivery Vans



Trucks will be demonstrated in Ontario, CA- disadvantaged community

Goal: Demonstrate 15 fuel cell trucks (up to 125-mile range)

Project impact per year: Savings of

- **285 metric tons of CO_{2e}**
- **280,000 grams of criteria pollutants**
- **56,000 gallons of diesel**

Examples of International Collaborations

CLEAN ENERGY MINISTERIAL
Advancing Clean Energy Together

IEA

HYDROGEN INITIATIVE
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

MISSION INNOVATION

CLEAN HYDROGEN MISSION

CENTER FOR 水素安全センター Hydrogen SAFETY
Connecting a Global Community

hySafe
INTERNATIONAL ASSOCIATION FOR HYDROGEN SAFETY

FCH FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

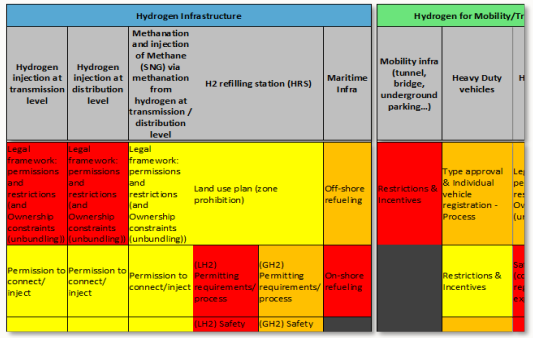
PRHYDE
Protocol for heavy-duty Hydrogen refuelling

PRESLHY

IPHE
The International Partnership for Hydrogen and Fuel Cells in the Economy
Enabling the global adoption of hydrogen and fuel cells in the economy
www.iphe.net

Regulations, Codes, Standards, Safety and Education & Outreach Working Groups

RCS&S Compendium

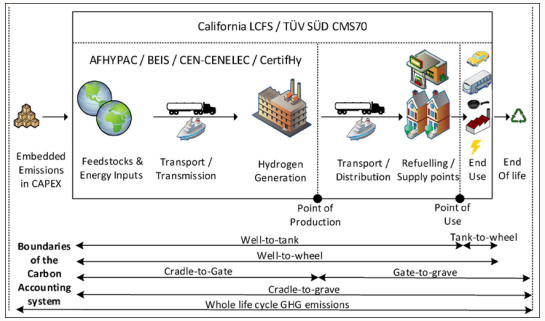


- Reports, workshops, safety sharing
- Assessing gaps
- Education, student engagement, compiling country info

Task Force to facilitate international trade of H_2

H_2 Production Analysis (H2PA)

- Developing a common analytical framework to determine emissions footprint for H_2
- Harmonizing approach across countries and pathways



(Source: Abad et al., Energy policy 138 (2020) 111300)

IPHE Early Career Network

Calling all hydrogen-enthusiast **STUDENTS** (undergrad & grad), **POST-DOCS**, and **EARLY CAREER PROFESSIONALS** worldwide!

Connect with peers, mentors, scientific researchers, industry professionals, and policymakers!

www.iphe.net/early-career-chapter

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Christine Watson (USA)

Co-Chair
Kendall Parker(USA)

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Social Media Director
Yangwei Liu (USA)

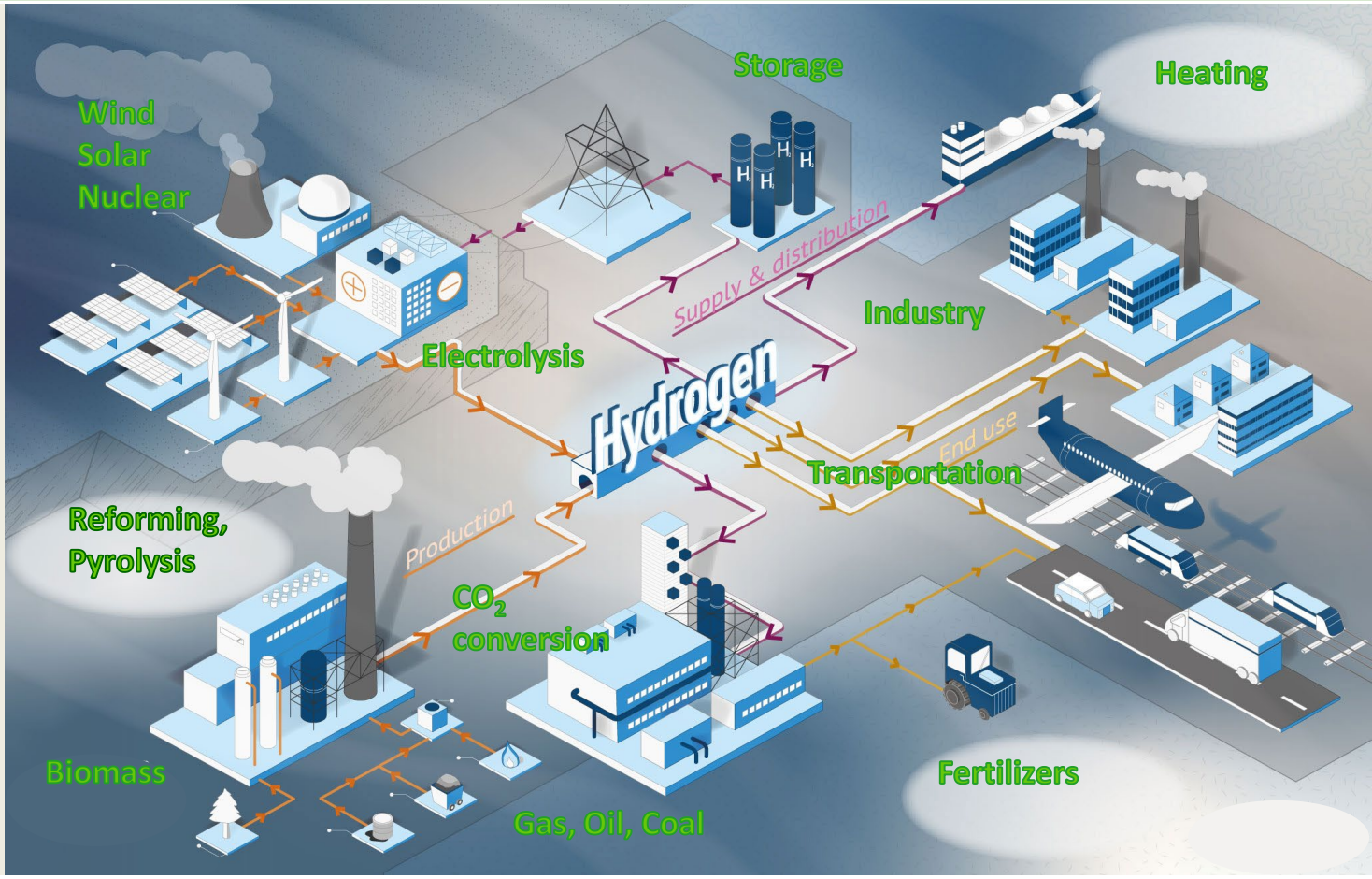
Special Events Director
Sanskar Vaishnev (Denmark)

Regional Director (Europe)
Thilo Krechlak (Germany)

Co-Chair & Regional Director
(Middle East, Asia, USA)
Gaurav Shukla (India)

Summary: Strategy and Next Steps

1) **Accelerate R&D to reduce cost**
2) **De-risk demonstration and enable deployments**
3) **Strategic scale up**
   - **Clusters**: co-locate supply and demand (e.g., at ports) and enable infrastructure
   - **RFI feedback** and regional analysis help guide activities



Identify jobs, EJ, and workforce development opportunities (e.g., transition from fossil fuel to H_2, ports, etc.)

Upcoming Opportunities for Engagement

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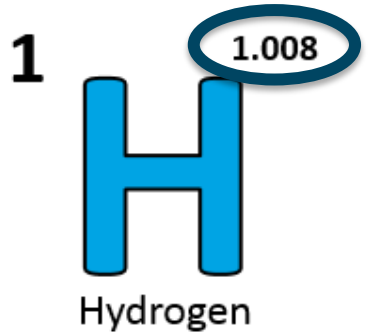
DOE Annual Merit Review and Peer Evaluation Meeting June 6 -9, 2022

Hydrogen and Fuel Cells Day October 8

- Held on hydrogen's very own atomic weight-day



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Learn more at: energy.gov/eere/fuelcells AND www.hydrogen.energy.gov

Celebrating Hydrogen and Fuel Cells Week

- Hydrogen Business Case Prize Announced americanmadechallenges.org/h2businesscase/
- Quiz: How Much Do You Know About Hydrogen and Fuel Cells? www.energy.gov/articles/quiz-how-much-do-you-know-about-hydrogen-and-fuel-cells
- Mark your calendar on October 8 at 12:30 p.m. ET for an H2IQ Hour webinar!

Join us in a 1.008 mile walk or run on October 8th to celebrate Hydrogen and Fuel Cells Day! Follow along with #H2DayRun and #H2DayWalk

Thank you

Dr. Sunita Satyapal
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Coordinator, DOE Hydrogen Program
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U.S. Department of Energy

www.energy.gov/fuelcells
www.hydrogen.energy.gov