



Office of Technology Transitions



Commercialization Tools Overview

Renewable Energy Markets 2023, Washington, DC

September 19, 2023

Edward Rios

OUR STATUTORY (ENERGY ACT 2020) MISSION IS:

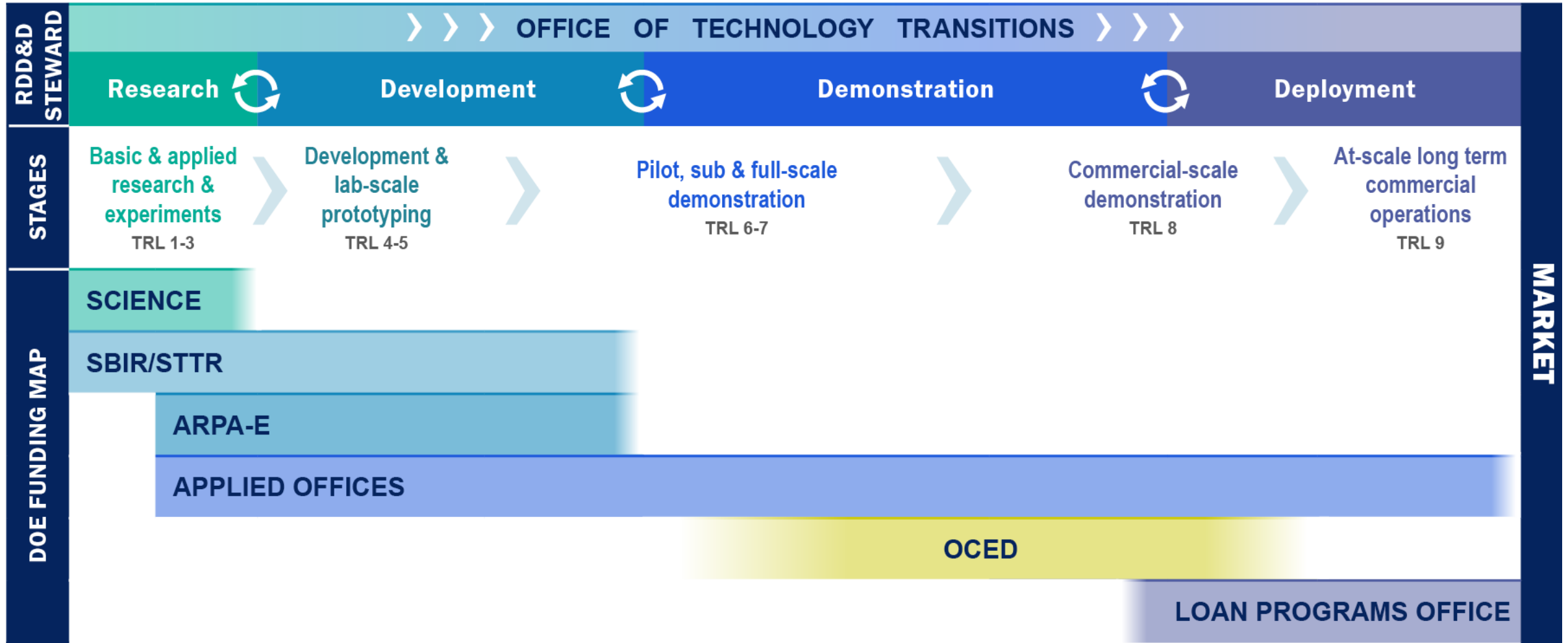
“to expand the commercial impact of the research investments of the Department.”

DOE’s Office of Technology Transitions (OTT) **stewards commercialization programs across the Department and labs.**

We *“oversee delivery of the DOE strategic goals for technology commercialization and streamlining access to DOE’s national labs to foster partnerships with the private sector to move solutions to market.”*

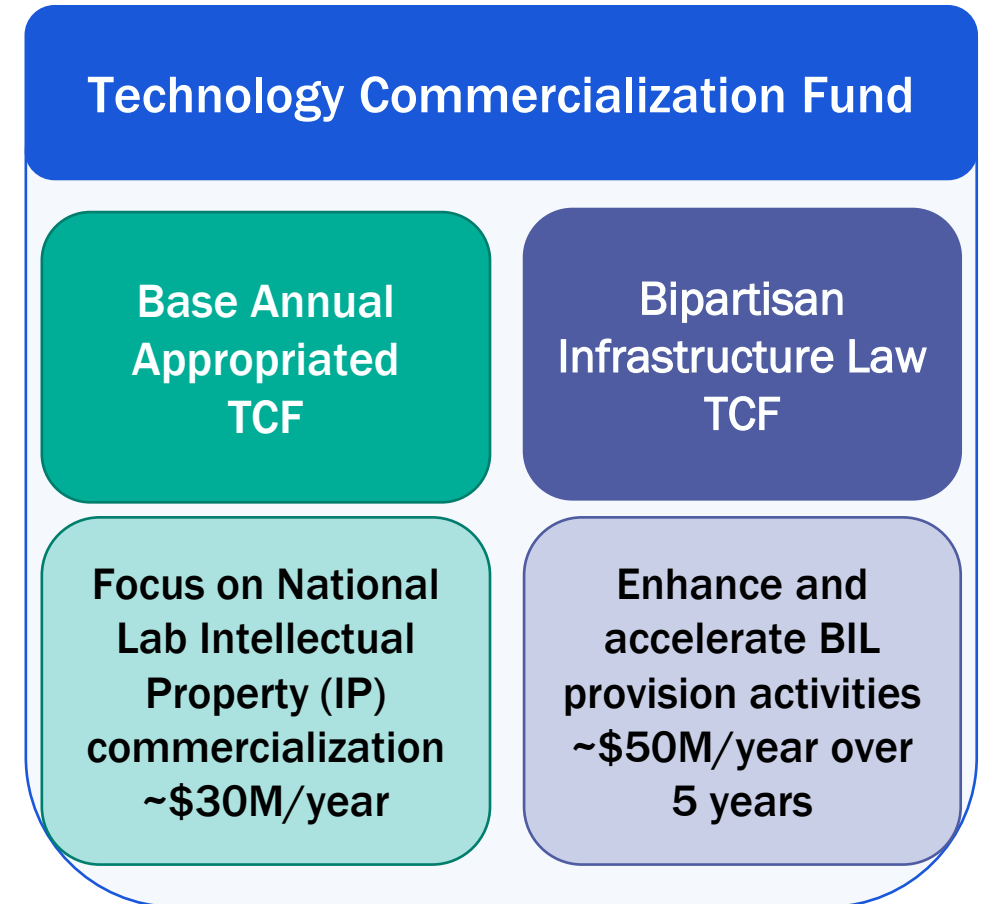
We also have congressional mandate to report out on tech transfer activities across DOE.

OTT helps steward the RDD&D continuum



Technology Commercialization Fund Overview

- Established by Congress through the EPACT 2005 and reauthorized by the recent EA2020 to “0.9% of RDD&C funding to promote promising energy technologies for commercial purposes.”
- TCF has evolved and plays a critical role in DOE’s RD&D activities:
 - Focus on commercialization
 - Uniquely additive to program office missions creating a support ecosystem around funding programs to enhance their reach and impact
 - Centralized management by OTT enables collaborations that wouldn’t otherwise happen



MAKE IT Prize

Manufacture of Advanced
Key Energy Infrastructure
Technologies (MAKE IT)
Prize



U.S. DEPARTMENT OF
ENERGY | Energy Efficiency &
Renewable Energy



MAKE IT aims to catalyze domestic manufacturing and commercial liftoff of clean energy demonstration projects:

- Moving manufacturing facilities from planning to shovel-ready.
- Enabling communities to prepare strategies for vibrant manufacturing activity in their area.

<https://americanmadechallenges.org/challenges/>



Approximately \$30M in cash prizes



MAKE IT Facilities Track

Track Overview

This track will support a robust and secure domestic supply chain for critical components for the clean energy industry.

Eligibility

Entities interested in establishing a manufacturing plant for a clean energy technologies. Specific components related to hydrogen, storage, the electric grid, and carbon capture are eligible.

Prize

Up to \$5M for shovel-ready facilities (site access secured, permits obtained, blueprints finalized, financing secured).

MAKE IT Strategies Track

Track Overview

This track will support communities developing a roadmap for establishing clean energy manufacturing in their region, particularly in disadvantaged and underserved areas.

Eligibility

Entities that work to promote economic development in their region.

Prize

Up to \$250k for communities who have developed a roadmap and can prove interest from one entity considering a manufacturing site in their region.





*Technology
Commercialization
Fund*

Voucher Program





energywerx ECOSYSTEM

CHALLENGES

Can my technology pass certification testing?

Is my technology bankable?

How can we improve our permitting processes?

Commercialization Support
VO-1 VO-4 VO-5

Permitting & Siting Support
VO-3

Testing & Validation Support
VO-2 VO-5

SOLUTIONS



Voucher Recipient

Voucher Provider

VOUCHER PROJECTS

Voucher Mechanism



Voucher Opportunity



The voucher opportunity defines objectives and scope of voucher projects (eligible voucher providers and recipients, total funding level, expected max funding per voucher, etc.)



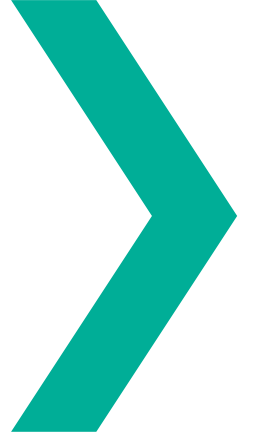
Selection & Matchmaking



ENERGYWERX coordinates process to select voucher providers/recipients, facilitates matching for voucher projects, and manages agreements with non-National Lab voucher providers to execute voucher projects.








Voucher Project



Voucher providers execute according to their agreement, provide support to voucher recipient(s), and report back to DOE on project activities, outputs, and outcomes.

At a glance

- ✓ Over **\$32M** in funding available
- ✓ Individual voucher projects estimated to range from **\$50,000-250,000**
- ✓ **5** active voucher opportunities spanning the OCED, FECM, and EERE technology portfolios

| | Expected max voucher | Expected # of OCED vouchers | Expected # of EERE vouchers | Expected# of FECM vouchers |
|--|----------------------|-----------------------------|-----------------------------|----------------------------|
|  VO-1 Pre-Demonstration Commercialization Support (OCED/EERE) | \$50,000 | 100 | 5 | |
|  VO-2 Performance Validation, Modeling, and Certification Support (OCED/EERE) | \$250,000 | 60 | 3 | |
|  VO-3 Clean Energy Demonstration Project Siting/Permitting Support (OCED/EERE) | \$100,000 | 50 | 5 | |
|  VO-4 Commercialization Support (EERE) | \$50,000 | | 20 | |
|  VO-5 Commercialization Support (FECM) | \$100,000 - 250,000 | | | 25 |

For more details on the 5 active voucher opportunities visit: <https://energywerx.org/opportunities/>

Upcoming Deadlines

1 Voucher Providers

Submission Deadline: Sept. 26, 2023, 5 p.m. ET !!

2 Voucher Recipients

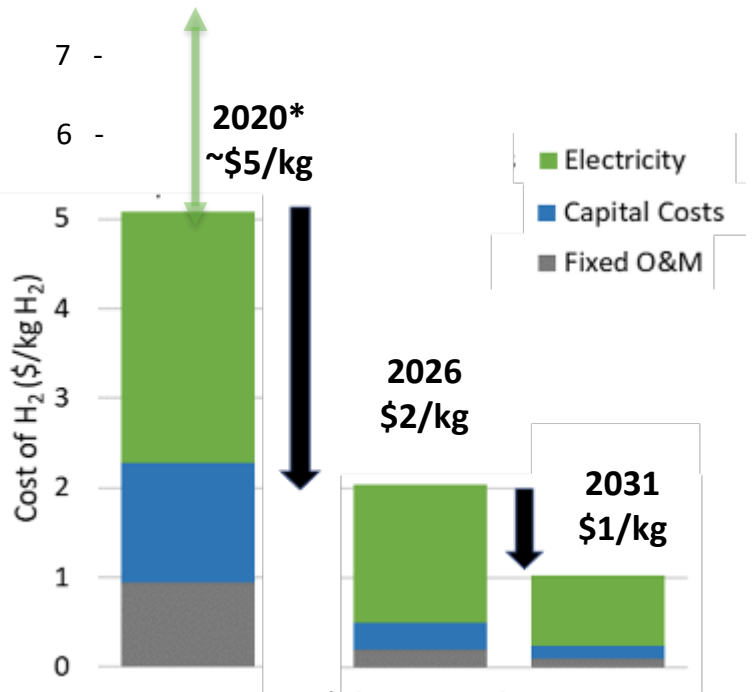
Submission Deadline: Nov. 7, 2023 (expected)

Details for each voucher opportunity are available online: <https://energywerx.org/opportunities/>

Reducing Clean Hydrogen Cost: Examples across multiple pathways

Strategies and scenarios being developed to reduce cost and emissions across pathways

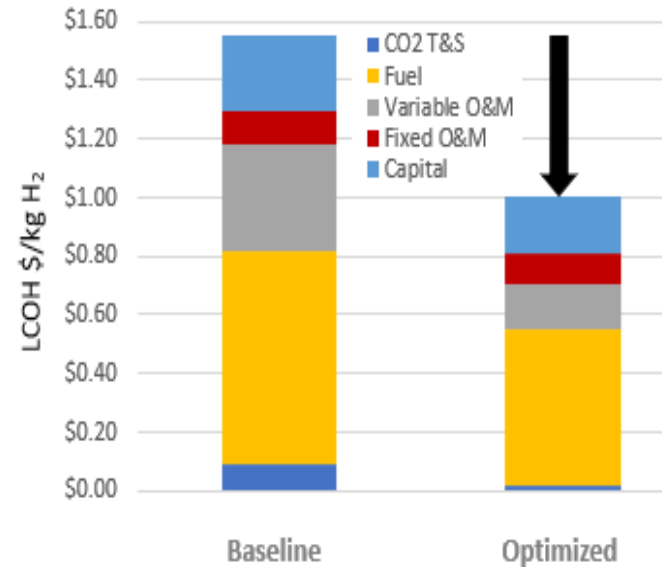
H₂ from Electrolysis



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

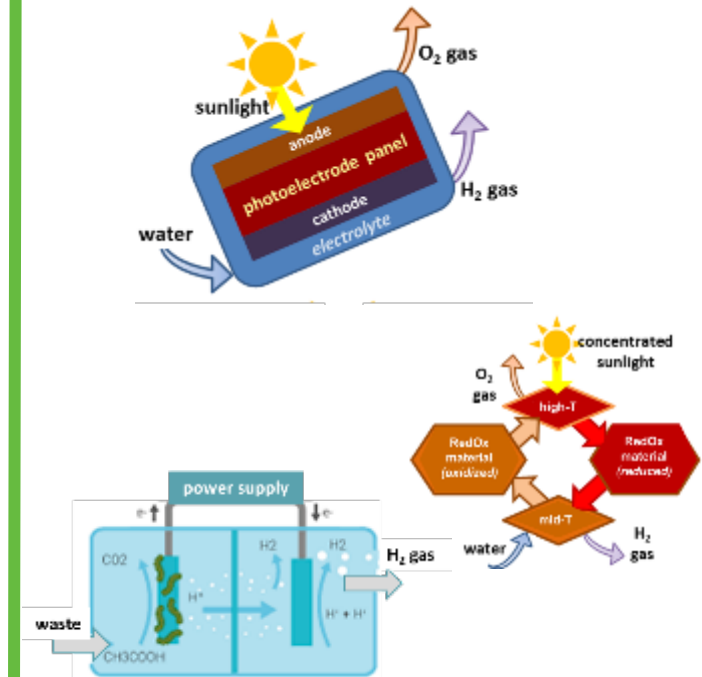
Thermal Conversion

Example: Autothermal Reforming + CCS



- Retorting; pyrolysis; air separation; catalysts; carbon capture and storage (CCS); upstream emissions

Advanced Pathways



- Photoelectrochemical (PEC), thermochemical, biological, etc.

*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



H2 Twin Cities 2023 Applications Open

Seeking Mentor-Mentee Pairings to Accelerate Progress and Adoption





HYDROGEN AMERICAS 2023 SUMMIT & EXHIBITION

2 – 3 OCTOBER 2023

RONALD REAGAN INT. TRADE CENTER,
WASHINGTON D.C.

**CONNECTING
THE WORLD'S SENIOR
HYDROGEN LEADERS
WITH THE AMERICAS**

CO-HOSTED BY:



U.S. DEPARTMENT OF
ENERGY

SAVE THE DATE!

YOUR FREE ACCESS TO HYDROGEN AMERICAS
EXHIBITION AND H2 TECH SERIES

Meet with over **3000 industry leaders** from across the **value chain**, including **government representatives, hydrogen and energy stakeholders, service providers and end-users.**

Free-to-attend H2 tech series designed specifically to provide you with a steppingstone into further research and collaboration.

Access to a wide range of **hydrogen research, demonstrations and analysis** to embark on your journey into the hydrogen value chain.

www.hydrogen-americas-summit.com

Questions?

Edward Rios

edward.rios@hq.doe.gov

U.S. Department of Energy

Backup Slides

Deploy, Deploy, Deploy

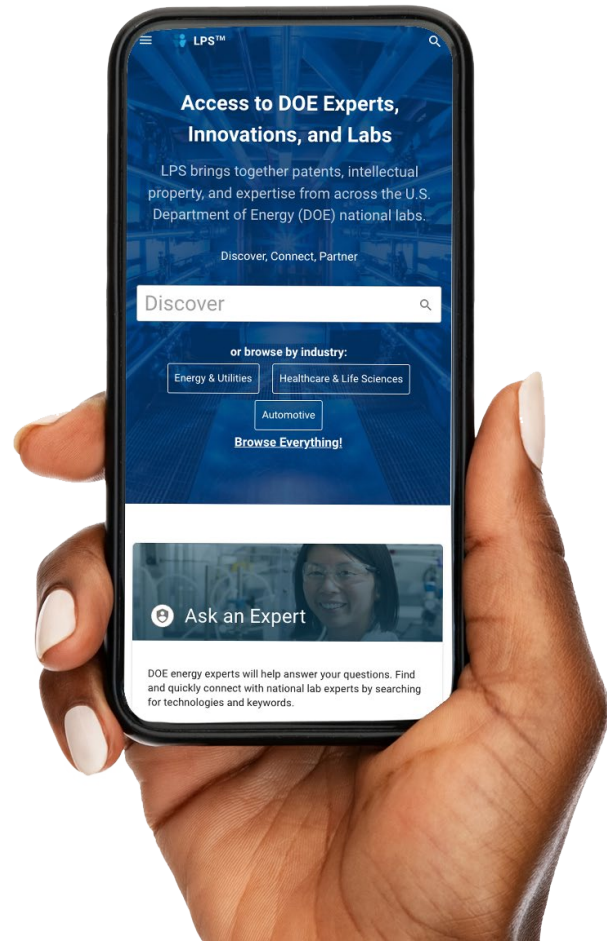
- The U.S. Department of Energy (DOE) has a 40+ year track record as a major research, development, and demonstration government agencies
- DOE is playing a larger role in commercialization turbocharged by BIL and IRA.
- There is renewed focus on deeply engaging with the private sector



NREL Bioreactor Dedication, 2019

Connecting with the external world - Lab Partnering Service

[LabPartnering.org](https://labpartnering.org) is an on-line public portal where the public can go through a keyword search and access our portfolio.



Technology Summaries

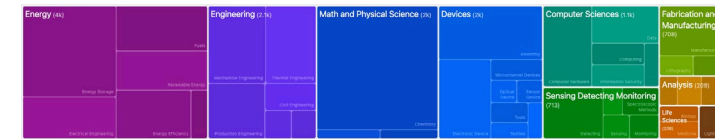
- 1500+ tech summaries
- Flexible keyword search
- 330+ success stories

Bio-based Bisabolene: Diesel or Jet Fuel Additive with a Very Low Cloud Point

Stage: *Prototype*

Visual Patent Search

- 40,000+ patents and applications
- Intuitive navigation
- COVID-19 patent search built in



Facilities & Researchers

- Contact researchers directly
- Access DOE facilities
- Test & validate technology

Lab Partnering Service Discovery

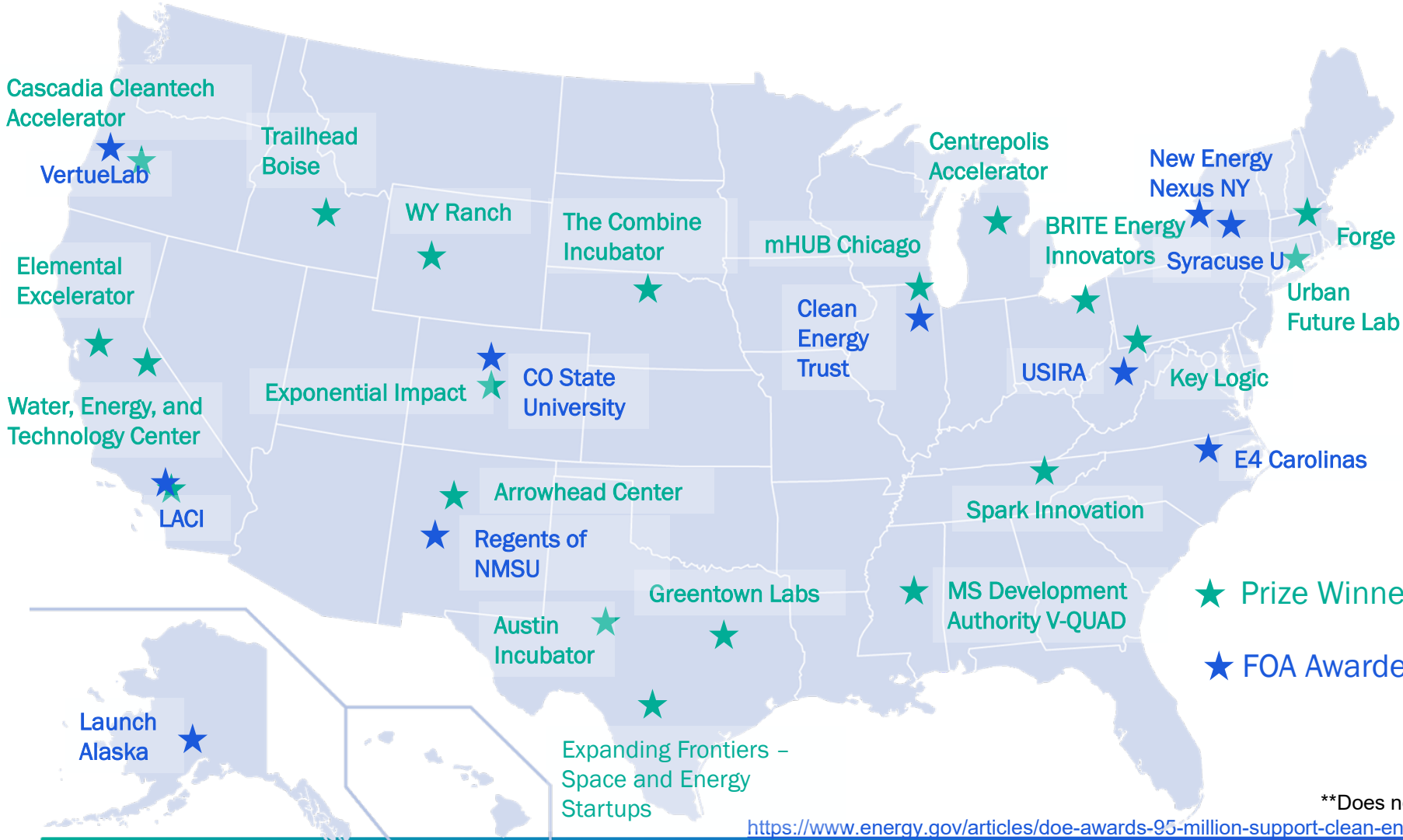
Climate Portal

- Launching around Earth Day
- Curated web portal
- Quick access to related researchers and facilities



**Does not include Program Direction/Staff costs to manage this

Energy Program for Innovation Clusters (EPIC)



- \$5MM in annual appropriations starting FY20
- Program is to boost regional energy innovation & jobs with targeted funding for incubators & accelerators
- Notably, EPIC represents OTT's first-ever Prize and its first-ever FOA.

EPIC Prize: October 2020

- \$1MM
- 20 winners @ \$50,000

EPIC FOA: June 2021

- \$9.5MM
- 10 awardees

★ Prize Winners
★ FOA Awardees

**Does not include Program Direction/Staff costs to manage this

<https://www.energy.gov/articles/doe-awards-95-million-support-clean-energy-innovation-and-commercialization-across-america>

OTT's Scope and Engagement

Commercialization

Expand the commercial impact of the research investments of the department and focus on commercializing technologies that support the missions of DOE

Engagement

The Chief Commercialization Officer shall coordinate with

- DOE senior leadership
- Relevant DOE program offices
- National Labs
- Other stakeholders including private industry

Technology Transfer Programs

- Develop programs that support regional energy innovation systems and incubators
- Provide financial and technical assistance for entrepreneurial fellowships at National Labs,
- Encourage students and researchers develop entrepreneurial skillsets and engage in entrepreneurial opportunities
- Support private companies partnering with National Labs

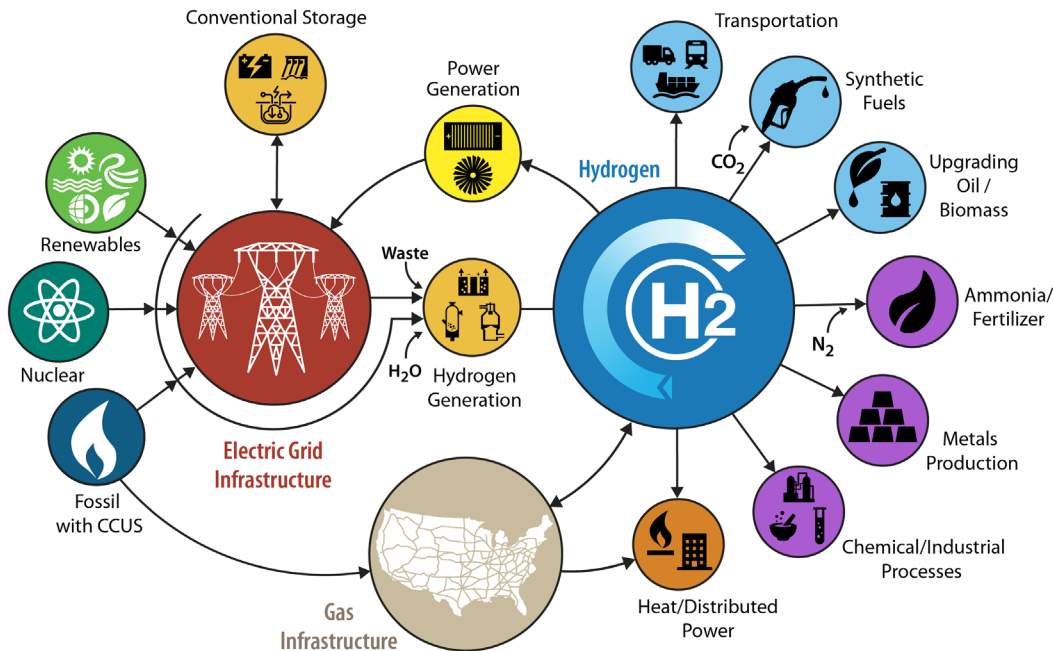
+6 new Authorities

- **9.002:** Lab Partnering Service Pilot
- **9.003:** Technology Commercialization Fund
- **9.004:** Streamlining Prize Competitions
- **9.005:** Reporting on milestone-based demonstration projects
- **9.006:** Looking at other transaction authority extensions
- **9.007:** Reporting on technology transfer reports & evaluations

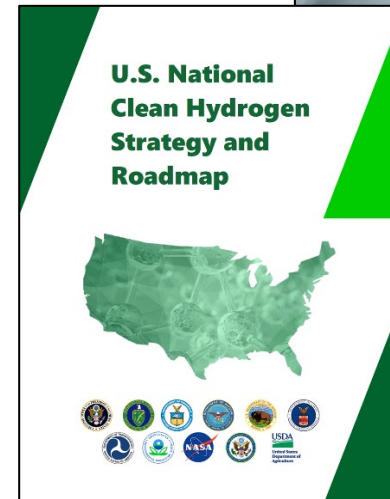
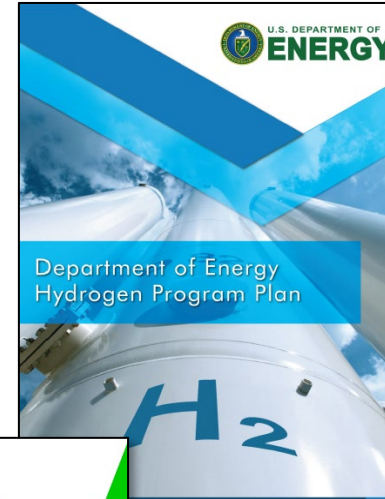
= OTT is an innovation sandbox!

U.S. DOE Hydrogen Program

Hydrogen is one part of a broad portfolio of activities
Includes multiple offices and the entire RDD&D value
chain from production through end use



www.hydrogen.energy.gov



Priorities

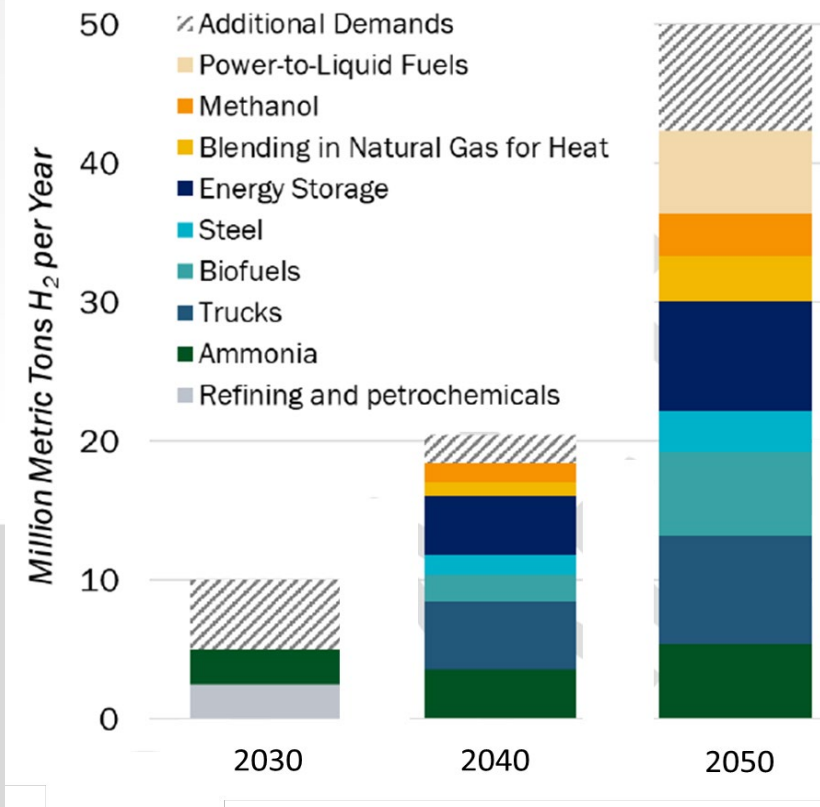
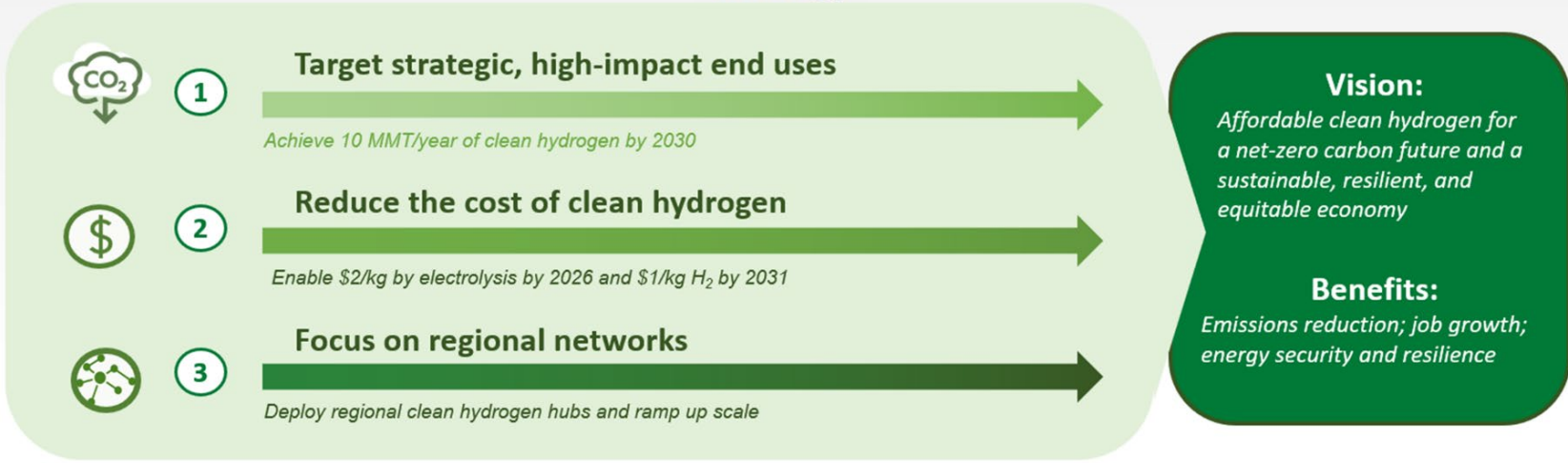
1. Low cost, clean hydrogen
2. Low cost, efficient, safe hydrogen delivery and storage
3. Enable end use applications at scale for impact

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

Coordinated across Offices by DOE Hydrogen and Fuel Cell Technologies Office (HFTO)

U.S. National Clean Hydrogen Strategy and Roadmap

Strategy



Opportunity: 10MMT/yr by 2030 → 20 MMT/yr by 2040 → 50 MMT/yr by 2050