U.S. National Clean Hydrogen Strategy and DOE Hydrogen Program Remarks
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December 2023
U.S. Energy Landscape and Key Goals

Administration Goals include:

• Net-zero emissions economy by 2050 and 50–52% reduction by 2030
• 100% carbon-pollution-free electric sector by 2035

Priorities: Ensure benefits to all Americans, focus on jobs, Justice40: 40% of benefits in disadvantaged communities

U.S. primary energy consumption by energy source, 2022

Total = 100.4 quadrillion
British thermal units (Btu)

Natural Gas, 33%
Petroleum, 36%
Renewables, 13%
Nuclear, 8%
Coal, 10%

Total = 13.1 quadrillion Btu

Geothermal, 2%
Solar, 14%
Hydroelectric, 18%
Wind, 29%
Biomass, 37%

Note: Sum of components may not equal 100% because of independent rounding
Source: Data collected from U.S. Energy Information Administration, May 2023, Monthly Energy Review, preliminary data

EJ: Environmental Justice
Carbon Dioxide Emissions by Sector

Source: Annual Energy Outlook 2021, DOE National Clean Hydrogen Strategy and Roadmap
Bipartisan Infrastructure Law

- Includes $9.5B for clean hydrogen:
  - $1B for electrolysis
  - $0.5B for manufacturing and recycling
  - $8B for at least four regional clean hydrogen hubs
- Requires developing a National Clean Hydrogen Strategy and Roadmap

Inflation Reduction Act

- Includes significant tax credits (e.g., up to $3/kg for production of clean hydrogen)
U.S. National Clean Hydrogen Strategy and Roadmap

**Strategy**

1. **Target strategic, high-impact end uses**
   - Achieve 10 MMT/year of clean hydrogen by 2030

2. **Reduce the cost of clean hydrogen**
   - Enable $2/kg by electrolysis by 2026 and $1/kg H₂ by 2031

3. **Focus on regional networks**
   - Deploy regional clean hydrogen hubs and ramp up scale

**Vision:**
Affordable clean hydrogen for a net-zero carbon future and a sustainable, resilient, and equitable economy

**Benefits:**
Emissions reduction; job growth; energy security and resilience

**Enablers**
- Good Jobs and Workforce Development
- Safety, codes and standards
- Policies and incentives
- Stimulating private sector investment
- Energy and environmental justice

**Work with other agencies to accelerate market lift off**
Opportunities for Clean Hydrogen Across Applications

Clean Hydrogen Use Scenarios

- Catalyze clean H₂ use in existing industries (ammonia, refineries), initiate new use (e.g., sustainable aviation fuels (SAFs), steel, potential exports)
- Scale up for heavy-duty transport, industry, and energy storage
- Market expansion across sectors for strategic, high-impact uses

Range of Potential Demand for Clean Hydrogen by 2050

- Core range: ~18–36 MMT H₂
- Higher range: ~36–56 MMT H₂

U.S. Opportunity: 10MMT/yr by 2030, 20 MMT/yr by 2040, 50 MMT/yr by 2050. ~10% Emissions Reduction. ~100K Jobs by 2030

Refs: 1. NREL MDHD analysis using TEMPO model; 2. Analysis of biofuel pathways from NREL; 3. Synfuels analysis based off H2@Scale; 4. Steel and ammonia demand estimates based off DOE Industrial Decarbonization Roadmap and H2@Scale. Methanol demands based off IRENA and IEA estimates; 5. Preliminary Analysis, NREL 100% Clean Grid Study; 6. DOE Solar Futures Study; 7. Princeton Net Zero America Study
Stakeholder Reported Barriers to Hydrogen Market Adoption

Over 3,000 participants at DOE Hydrogen Shot Summit were requested to provide feedback on key barriers to market adoption of hydrogen

Source: Hydrogen Shot Summit, Sept 2021

https://www.energy.gov/eere/fuelcells/hydrogen-shot-summit
Hydrogen Energy Earthshot

“Hydrogen Shot”

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

Strategy also includes delivery and storage infrastructure cost reduction
Strategy 3: Focus on Regional Networks and Ramp up Scale

Build Regional Networks through “Clean Hydrogen Hubs”

Examples of Stakeholder and RFI Input

Demand side strategy for Hubs announced
President Biden Announces $7B for 7 H₂ Hubs – October 13, 2023
Whole-of-Government Approach

HIT
Hydrogen Interagency Task Force
Hydrogen Interagency Task Force (HIT) across 11 Agencies

www.hydrogen.gov
Portal for whole-of-gov activities

Working Groups

- Supply and Demand at Scale
- Infrastructure, Siting, Permitting
- Analysis and Global Competitiveness

Crosscutting Teams

- DOE JST Tech Teams: Production, Delivery, Storage, Conversion, Applications, H2 Hubs, Workforce, Equity, and Justice

JST: Joint Strategy Team. Equity, Energy and Environmental Justice is a cross cutting priority across WGs.
Energy and Environmental Justice
Diversity, Equity, Inclusion, and Accessibility
Safety, Codes, Standards
Equity and Environmental Justice Perspectives

I. Listening, Engaging & Increasing Transparency

II. Prioritizing Safety and Positive Impacts

III. Lowering Barriers

IV. Diversifying the Clean Hydrogen Workforce

V. Building Capacity & Skills

VI. Environmental Justice in Permitting and Siting

Stay tuned for more information on Community Benefits Plans, Mapping Tools, and upcoming activities
Resources and Opportunities for Engagement

Key Publications

www.hydrogen.energy.gov

Save the date!

2024 DOE Annual Merit Review May 6-9, 2024

Hydrogen and Fuel Cells Day October 8

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

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Thank you

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