The **U.S. National Clean Hydrogen Strategy and Roadmap** is a comprehensive national framework for facilitating large-scale production, processing, delivery, storage, and use of clean hydrogen to help meet bold decarbonization goals across virtually all sectors of the economy. Development of the *Strategy and Roadmap* was informed by extensive stakeholder feedback and it will be updated at least every three years, as required by the Bipartisan Infrastructure Law.

### The Strategy and Roadmap aligns with the Administration's goals, including:
- A 50% to 52% reduction in U.S. GHG emissions from 2005 levels by 2030
- 100% carbon pollution-free electricity by 2035
- Net zero GHG emissions no later than 2050
- 40% of the benefits of Federal climate investments delivered to disadvantaged communities.

### Opportunities

#### Clean Hydrogen Production
- 10 MMT by 2030
- 20 MMT by 2040
- 50 MMT by 2050

#### Greenhouse Gas Reduction
- 10% reduction economy-wide

#### Economic Impact
- 100,000 new direct and indirect jobs by 2030

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**Strategies and Enablers to Achieve the Clean Hydrogen Vision**

### Target strategic, high-impact end uses

1. **Achieve 10 MMT/year of clean hydrogen by 2030**

2. **Reduce the cost of clean hydrogen**
   - Enable $3/kg by electrolysis by 2025 and $1/kg by 2030!

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:

- Emission-reducing, job growth, energy security and resilience

### Work with other agencies to accelerate market lift off

- Good jobs and Workforce Development
- Safety codes and standards
- Policies and incentives
- Stimulating private sector investment
- Energy and environmental justice

### Enablers

- Identify and prioritize barriers to infrastructure roll out
- Initiate supporting infrastructure for regional hubs
- Demonstrate advanced and efficient infrastructure components
- Develop sustainable regional clean hydrogen networks
- Engage regulators to lay groundwork for strategic adoption across sectors
- Engage stakeholders; address safety codes and standards; develop critical supply chains
- Develop and expand workforce, talent pools, and apprenticeship programs
- Ensure 40% of benefits flow to disadvantaged communities impacted by DOE-funded clean H2 projects

### Actions and Milestones for the Near-, Mid-, and Long-Term

- **2022-2025**
  - Catalyze R&D in electrolysis, thermal conversion, & new pathways to meet Hydrogen Shot
  - Identify and prioritize barriers to infrastructure roll out
  - Engage regulators to lay groundwork for strategic adoption across sectors

- **2026-2029**
  - Demonstrate replicable, scalable production from renewables, nuclear, & fossil and waste with CCS
  - Initiate supporting infrastructure for regional hubs
  - Engage stakeholders; address safety codes and standards; develop critical supply chains
  - Develop and expand workforce, talent pools, and apprenticeship programs

- **2030-2035**
  - Deploy gigawatt-scale electrolyzers and develop domestic supply chains
  - Demonstrate advanced and efficient infrastructure components
  - Develop sustainable regional clean hydrogen networks
  - Achieve Justice 40, create good-paying jobs, and ensure public health and safety
  - Achieve 10 MMT production capacity and $1/kg target
  - Scale up hydrogen hubs and prepare export opportunities
Guiding Principles

Utilizing eight Guiding Principles, federal agencies, in partnership with state, local, and Tribal governments, and stakeholders, will take action to develop and deploy technologies to ensure a sustainable, resilient, and equitable clean hydrogen economy.

1. Enable deep decarbonization through strategic, high-impact uses.
2. Catalyze innovation and investment.
5. Enable affordability and versatility.
6. Advance energy and environmental justice.
7. Foster diversity, equity, inclusion, and accessibility.
8. Grow quality jobs.

Strategy 1: Target Strategic, High-Impact Uses of Clean Hydrogen

Federal agencies focus on clean hydrogen to address difficult-to-decarbonize segments of the economy.

- **Industrial Applications**: Chemicals, steelmaking, industrial heat
- **Transportation**: Medium- and heavy-duty vehicles, maritime, aviation, rail
- **Power Sector Applications**: Electricity generation, energy storage, stationary and backup power

Strategy 2: Reduce the Cost of Clean Hydrogen

Prioritize cost reductions across the value chain.

**Hydrogen Production Cost**
- By 2026 - $2 per kg
- By 2031 - $1 per kg

**Onboard Storage Cost**
- By 2030 - $9 per kWh (700-bar)

**Delivery and Dispensing Cost**
- By 2030 - $2 per kg

Strategy 3: Focus on Regional Networks

Regional networks will enable large-scale clean hydrogen production close to hydrogen users, enabling the development and sharing of a critical mass of infrastructure.

**Regional Clean Hydrogen Hubs**
- Locate large-scale clean hydrogen production near end users
- Jump-start infrastructure development

**Economic Benefits**
- Create well-paid jobs and tax revenue for regional economies
- Establish a network of hydrogen producers and consumers

Potential Demand for Clean Hydrogen across Multiple Applications (Million Metric Tons H₂ per Year)

Cost Drivers for Hydrogen Production, Distribution, and Storage Technologies

Regional Clean Hydrogen Hubs

- Clean hydrogen producers
- Connective infrastructure located in close proximity
- Clean hydrogen consumers
- Industry, power, transportation, buildings