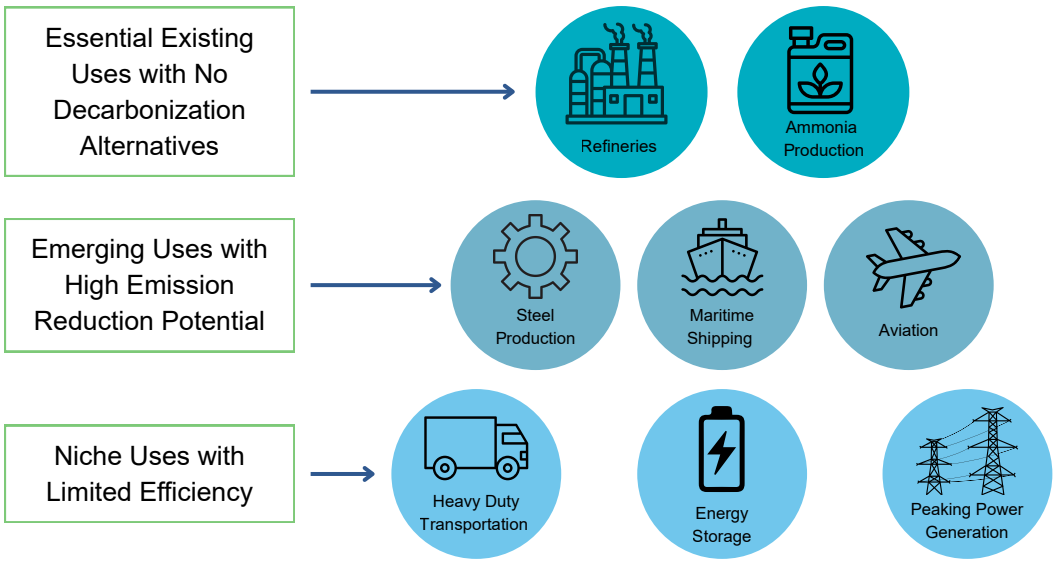
ENCOURAGING CLEAN HYDROGEN UPTAKE IN KEY SECTORS:
A POLICY HANDBOOK FOR PRACTICIONERS

Clean hydrogen is an essential component of the clean energy transition, offering a pathway to decarbonize sectors that are difficult to electrify. As a versatile energy carrier, feedstock, and fuel, use of clean hydrogen can reduce greenhouse gas emissions across multiple industries.

Focusing hydrogen uptake on key sectors is essential to use clean hydrogen efficiently and maximize climate benefits.

This approach helps to:

- manage near-term costs of decarbonization,
- reduce the risk of stranded assets, and
- improve public health outcomes.



This resource outlines 13 policy options to create demand for clean hydrogen across key end-use sectors. These policies fall into three categories—financial incentives, regulations, and market-based mechanisms. The menu of policy options includes analysis of key tradeoffs to be considered, including cost and emissions benefits.

Incentives	Regulations	Market-Based
Tax Credits	Clean Fuel Standards	Carbon Tax
Contracts for Difference	Emission Standards	Cap & Trade
Auctions	Clean Portfolio Mandates	Buyers Alliance
Grants		Procurement Policy
Low-Interest Loans		Book & Claim

High climate benefit · *Low cost to government* · *High political feasibility* · *Easy to administer* · *Low cost to consumers*

Three case studies demonstrate how targeted policies can advance clean hydrogen use in key end-use sectors. The case study recommendation below are illustrative of how the menu of policy options can be applied in other jurisdictions.

California: Hydrogen in Refining, Fertilizer, & Maritime Fuels

California accounts for 16% of the U.S. crop economy and relies heavily on ammonia-based fertilizers. Due to various factors including supply chain disruptions and natural gas prices, fertilizer prices have more than doubled since 2020, creating an opportunity for green fertilizers. California is also a major maritime hub, with the Ports of Los Angeles, Long Beach, Oakland, and Stockton handling substantial shipping traffic.

Policymakers should:

- Expand the existing Clean Hydrogen Program to **include a CfD program** to catalyze private investment in fertilizers. Partner with Oregon and Washington to pool funds for a regional CfD program aimed at the maritime sector. If funding is constrained, expand the Clean Hydrogen Program to provide low-interest loans to fertilizer and/or maritime fuel consumers to transition to clean hydrogen.
- Institute a **new Clean Hydrogen Use Mandate** that requires 5–10% of hydrogen used in California to be clean by 2030, increasing to 100% by 2050. Today, this mandate would apply to refineries that are already using hydrogen in California.
- **Modify California's existing LCFS** to allow for customizable upstream inputs, creating an incentive for refiners to transition to clean hydrogen in refineries, including when used to make maritime fuels.

Pennsylvania: Hydrogen for Steel Production

Pennsylvania produces 5% of steel in the U.S. and is home to 18 steel facilities. Steel production accounts for 40% of the state's industrial emissions. PA currently offers a tax credit that is part of the Economic Development for a Growing Economy "EDGE" package, but eligibility is limited to large projects tied to Hydrogen Hubs.

Policymakers should:

- **Modify the "EDGE" tax credit**: remove association with a Hydrogen Hub, reduce or remove the high capital expenditure requirement, and limit uses of hydrogen to steel, fertilizer, refineries, and aviation & maritime fuels.
- Prioritize **workforce development** for local workers by utilizing the existing WEDnetPA program to support the transition of fossil fuel workers to clean industries.
- Convene industry, labor, and other interested parties to develop policy recommendations that will advance green steel production while establishing a **diverse and bipartisan coalition**.

Washington: Ammonia or Methanol for Maritime Fuels

Washington ports, especially Seattle and Tacoma, are major maritime hubs. The state uses about 1.75 million tons of bunk fuel annually, creating an opportunity to replace harmful fuels with clean hydrogen-derived maritime fuels.

Policymakers should:

- Implement a **grant program** to support the procurement of ships that run on hydrogen-derived fuels and fund at-port transitions like refueling infrastructure and ammonia bunkering.
- Establish a grant program that supports companies' participation in ZEMBA, a buyers alliance, or other **demand aggregation** programs.
- **Modify the existing CFS** to allow customizable upstream inputs to fuel lifecycle emissions to encourage refiners and fuel producers to transition to clean hydrogen.
- Establish regulations for GHG and criteria air pollutant emissions for ships at-berth.