Natural Resources Canada | Ressources naturelles Canada

The Hydrogen Strategy for Canada - Opportunities for Collaboration

Canada

Outline

- Canada’s Hydrogen Advantages
- Canada’s Opportunity
- Key Findings
- Remaining Challenges
- Targeted Recommendations
- Vision for 2050
- CCUS perspectives
- Opportunities for International collaboration
- Questions

Canada's Advantages

ABUNDANT FEEDSTOCKS	• Low emitting grid, strong renewable potential, vast conventional resources, tier -1 nuclear, expertise in CCUS
LEADING INNOVATION	• Leading Technology companies – global IP leadership • Strong federal labs
STRONG ENERGY SECTOR	• 900,000 direct and indirect jobs - $596 billion investment – extensive infrastructure • Tier 1 Nuclear country
INTERNATIONAL COLLABORATION	• Expertise attracts direct foreign investment • Strong international collaborations
ACCESS TO EXPORT MARKETS	• Proximity to global markets Japan, South Korea, California, Europe • Established pipeline networks.
UNIQUE STARTING POINT	• Top 10 hydrogen producers in the world (leading in clean hydrogen production) • History of world leading deployment

Canada's Opportunity

Key Findings

Highlights from Consultations

- **Global momentum growing** - need to act now or risk falling further behind
- **Canada has significant domestic and international opportunities**
- **Actions required across entire value chain** – ensuring supply and demand grow at same pace
- Early adoption likely a mix of
  - **HUBS** – bringing multiple stakeholders, across value chain together; and
  - **Larger scale "signature projects"** - which could be highlighted internationally
- **Large-scale domestic deployment** best way to ensure Canada seizes export potential
- Focus needs to be on **carbon intensity of hydrogen**, with increasing stringency over time

Environmental Benefits

- **30%** of Canada's energy mix in **2050**
- up to **190 Mt CO2e reduction in 2050**
- **Emissions reductions** primarily in heavy-industry like freight, mining, steel, manufacturing, and oil and gas.

Economic Benefits

- **~350,000 hydrogen sector jobs**
- **>$50 billion in domestic revenue**
- **$50B in exports** in a $11.7T global market
- **>5 million fuel-cell electric vehicles** (e.g. cars, trucks, and buses)
- **Nationwide hydrogen fueling network**

Remaining Challenges

ECONOMICS	• Up-front cost differential, and risk aversion to new technologies impedes early adoption
INNOVATION	• Technologies continue to be costly compared to incumbent technologies, low carbon hydrogen costs more than conventional hydrogen, global investments in innovation are putting Canada's leadership role at the cutting edge of clean technology in jeopardy
POLICIES	• Lack of clear, long-term policy signal that recognizes hydrogens essential role in Canada's net-zero future causes uncertainty to investors
CODES & STANDARDS	• Gaps in existing codes and standards – (e.g. hydrogen blending limits in natural gas pipelines) need to be addressed to enable adoption
AVAILABILITY	• Domestic supply of and access to low-carbon intensity hydrogen is limited in many parts of Canada today, preventing both pilot and commercial rollout
AWARENESS	• Lack of awareness about the opportunities and safety aspects of hydrogen within the general public, as well as within industry and government, impedes uptake.

Recommendations to Guide Actions

- Strategic Partnerships
- De-Risking Investments
- Codes and Standards
- Innovation
- Enabling Policies and Regulations
- Awareness
- International Markets
- Regional Blueprints

Canada's strengthened climate plan includes $1.5B to grow the domestic market for clean fuels, including early actions outlined in this Strategy

Vision for Hydrogen in Canada in 2050

We're leading global collaboration – CEM Hydrogen Initiative

- The **cornerstone of international activities** to advance commercial scale hydrogen and fuel cell deployment globally, across all sectors of the economy.
- CEM provides opportunity to showcase to Energy Ministers, the full potential that **hydrogen** can play in the global energy transformation
- **Complementary to Mission Innovation** – covering entire spectrum from R, D&D to full scale commercialization
- Canada led, with Japan, the Netherlands, EU, and US as co-leads, with more than 20 countries
  - Austria
  - Australia
  - Brazil
  - Canada
  - China
  - **Chile**
  - **Costa Rica**
  - EU
  - Finland
  - Germany
  - Italy
  - India
  - Japan
  - Netherlands
  - New Zealand
  - Norway
  - Saudi Arabia
  - South Africa
  - South Korea
  - United Kingdom
  - United States
  - Portugal (New in 2020)

HYDROGEN INITIATIVE

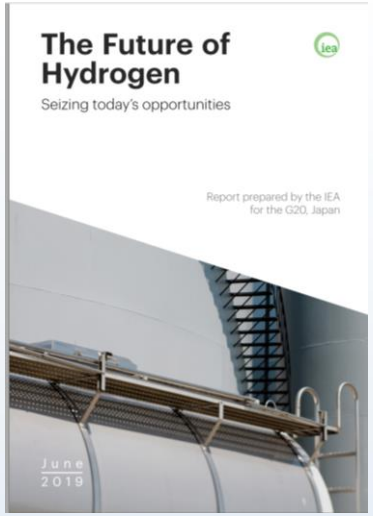
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

CEM Hydrogen Initiative - Activities

HYDROGEN INITIATIVE
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Comprehensive multi-year work plan focussed on real actions:

- **Twin Cities Program:** best urban areas for integrating hydrogen into energy supply, and diversity of end use
- **Public/private multi-jurisdictional partnerships - commercial scale projects**
- **Working groups**
  - Clean hydrogen production and distribution
  - Certification
  - Ports
  - Transportation – focus on medium and heavy duty vehicles, rail and marine
  - Industry – in hard to abate sectors (oil and gas, steel, cement, **mining**)
  - Sustainable finance (i.e. de-risking capital investments along the supply chain)
- **Workshops/ webinars**
  - Hydrogen and Nuclear – **webinar** Feb. 2020
- **Biannual Hydrogen Report** - tracking commercial scale deployment and progress on global targets.



QUESTIONS?

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