



February 2023

# CSA Group Standards Initiatives for Hydrogen deployment



# CSA Group



# Standards

## MISSION

- Established in 1919
- Independent, not-for-profit
- Accredited by
  - Standards Council of Canada (SCC) in Canada
  - American National Standards Institute (ANSI) in the U.S

We are a **leader in standards research, development, education, and advocacy**. The technical and management standards developed by our **10,000 members** improve safety, health, the environment, and economic efficiency in Canada and beyond.



“The use of CSA standards provides a clear and consistent best practice approach that facilitates regional planning and development. Standards take the guess work out, ensuring taxpayer’s dollars deliver the best outcomes and are used in the best way possible.”

*COLLEEN SKLAR, EXECUTIVE DIRECTOR, WINNIPEG METROPOLITAN REGION*

# CSA Group Standards

## OVERVIEW

### Standards Development

Standards promote:

- Safety
- Health
- The environment
- Economic efficiency

### Education

- Provides access choices based on user needs
- Increases user knowledge of standards
- Guides the accurate application in workplaces and communities



### Research

- Explores potential for new standards solutions
- Provides evidence to inform and accelerate standards development

### Advocacy

- Drives public awareness of standards
- Promotes the value and use of standards
- Engages a new generation of standards developers and users

## What is a Standard?

- Establish enforceable minimum safety requirements
- Practical and easy to implement
- Written in terms that are measurable or enforceable
- Have clear and readily understood language
- Avoid ambiguity – “shall”, “should” & “may”
- Provide maximum benefit to large segment of population
- Reflect the state of the art
- Voluntary until adopted into regulation
- Discussion on revision every 5 years (minimum)

## The Process

**Open.**

**Balanced Interests.**

**Due Process.**

**Consensus.**

# CSA Group Hydrogen Landscape & Harmonization

# Standards for the Hydrogen Ecosystem

CROSS-SECTOR SOLUTION TO SUPPORT CANADIAN AND U.S. STRATEGIES

## CSA Group plays a key role across all segments of the ecosystem

- Energy Source
- Production and Generation
- Distribution, Delivery, and Storage
- End Use

*“Modernize existing and develop new codes and standards to keep pace with this rapidly changing industry and remove barriers to deployment, domestically and internationally.”*

-Natural Resources Canada’s Hydrogen Strategy, 2020

*“Addressing safety and developing the necessary codes, Standards and enabling international harmonization of codes and standards related to hydrogen technologies.”*

-U.S. DOE National Clean Hydrogen Strategy and Roadmap (Draft), 2022



# Standards Research

FROM PRODUCTION TO END USE

## Support Innovation through Research Projects

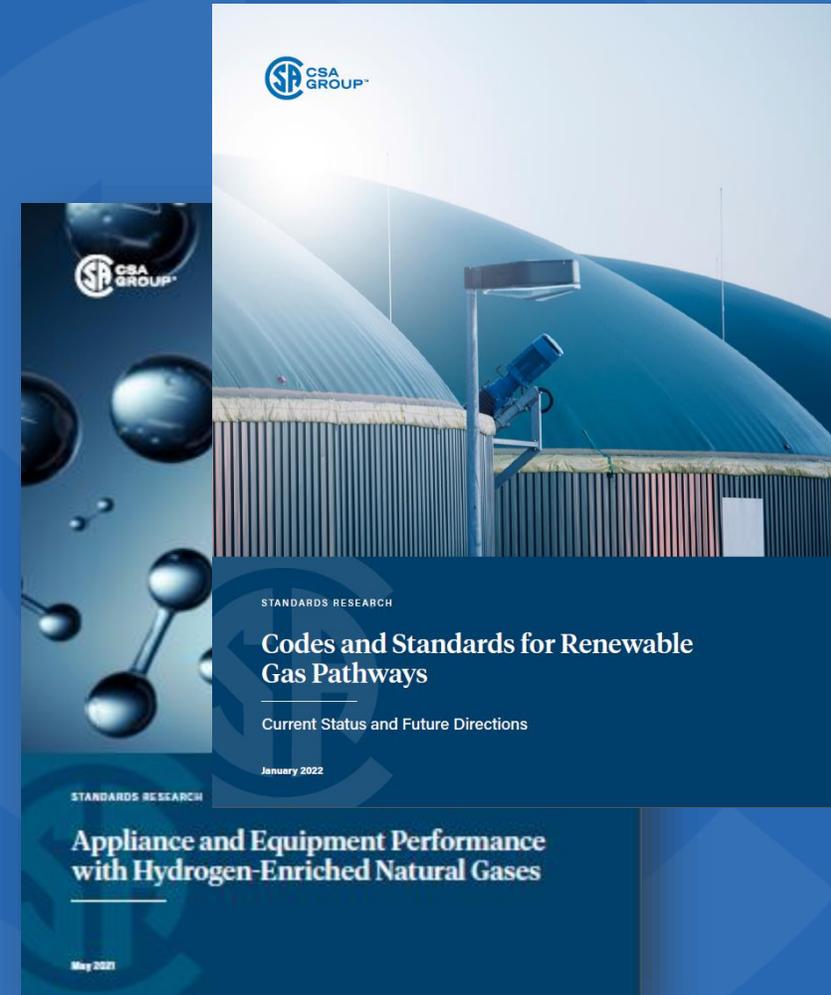
- Hydrogen production using nuclear and fossil fuels
- Underground storage of hydrogen
- Hydrogen blending in pipelines
- Hydrogen impact on components and materials carrying hydrogen
- Appliance and equipment performance with hydrogen blends
- Renewable gas pathways

**3 Research Papers published**

**11 Research Papers in development**



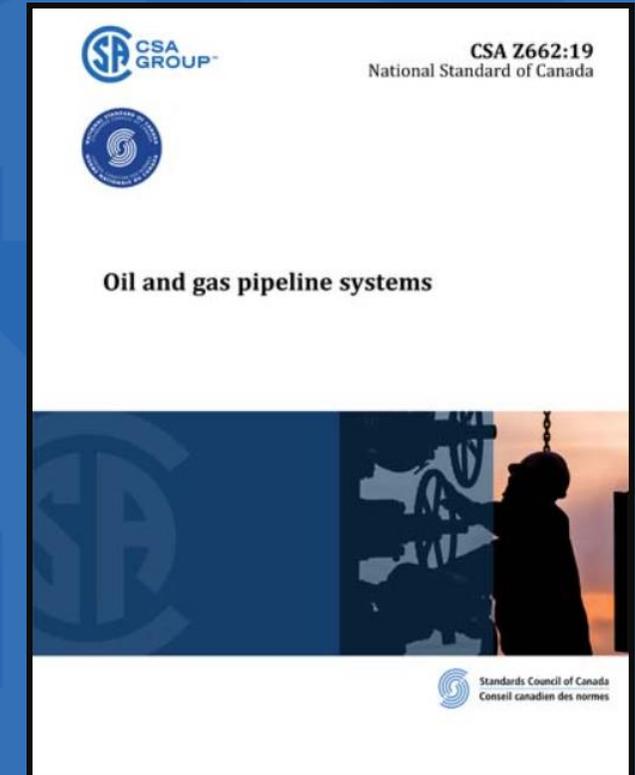
Understanding our changing world to drive tomorrow's solutions



# Enabling Hydrogen Use through Standards

FROM PRODUCTION TO END USE

- **GHG Classification of Hydrogen Production**
- **Hydrogen Production Equipment**
  - CSA/ANSI B22734 *Hydrogen generators using water electrolysis – Industrial, commercial, and residential applications*
  - CSA/ANSI FC 5:21 *Hydrogen generators using fuel processing technologies*
- **Delivery, Transmission and Distribution**
  - CSA Z662:19 *Oil and gas pipeline systems*
- **Hydrogen Storage**
  - CSA Z341:18 *Storage of hydrocarbons in underground formations*
  - CSA Z741:12 *Geological storage of carbon dioxide*
  - CSA B51:19 *Boiler, pressure vessel, and pressure piping code*



# Enabling Hydrogen Use through Standards

FROM PRODUCTION TO END USE

- **Gas Installations**
  - CSA B149.1:20 *Natural gas and propane installation code*
- **Appliances & Equipment**
  - CSA Z21 *Series of 60+ standards for appliances*
  - CSA Z83 *Series gas-fired heating and cooking*
- **Transportation**
  - Hydrogen Fueling stations and vehicle components
- **Power Generation**
  - Fuel Cell Power Systems and Fuel Cell Modules



[Standards for hydrogen vehicles and fuel cell technologies - CSA Group](#)

# Harmonization

CSA GROUP APPROACHES FOR HYDROGEN

Binational Technical  
Committees

Binational Standards  
Referenced in National  
Codes

Collaboration with other  
SDOs

International Standards –  
Participation & Contribution

## Levels of Harmonization

- International
- Regional
- National

## International Standardization

### ISO/TC 197 *Hydrogen Technologies*

- 18 Published standards
- 5 In development
- CSA Group standards used as seed documents
- 30 Participating Countries
- CGA Committee Manager for the U.S. TAG; BNQ Committee Manager for the Canadian Mirror Committee

### ISO/TC 197 SC 1 *Hydrogen at scale and horizontal energy systems*

- 1 Standard under development
- 22 Participating members
- CSA Committee Manager

**NEW**

### IEC/TC 105 *Fuel Cell Technologies*

- 30 Published standards
- 16 In development
- 19 Participating countries
- CSA Group administrator of the U.S. TAG and Canadian Mirror Committee

**North America is adopting selected ISO and IEC standards**

# North American Codes

## HYDROGEN CODES AND STANDARDS

- NFPA 2
  - NFPA 2 *Hydrogen Technologies* published in 2022
  - CSA Group is a voting member of NFPA 2
- BNQ
  - CAN/BNQ 1784-000 *Canadian Hydrogen Installation Code* published May 2022
  - CSA Group participated in the development of CHIC
  - [Available for free download](#)

**Key CSA hydrogen station standards  
referenced in CHIC and NFPA 2**



# Standards - Education & Advocacy

PROVIDING FLEXIBILITY AND ENHANCING LEARNING & BUILDING AWARENESS AND RECOGNITION

## Education

- Trainings for Codes and Standards
- Infographics
- Standards ViewAccess
- Free Download – research papers

## Advocacy

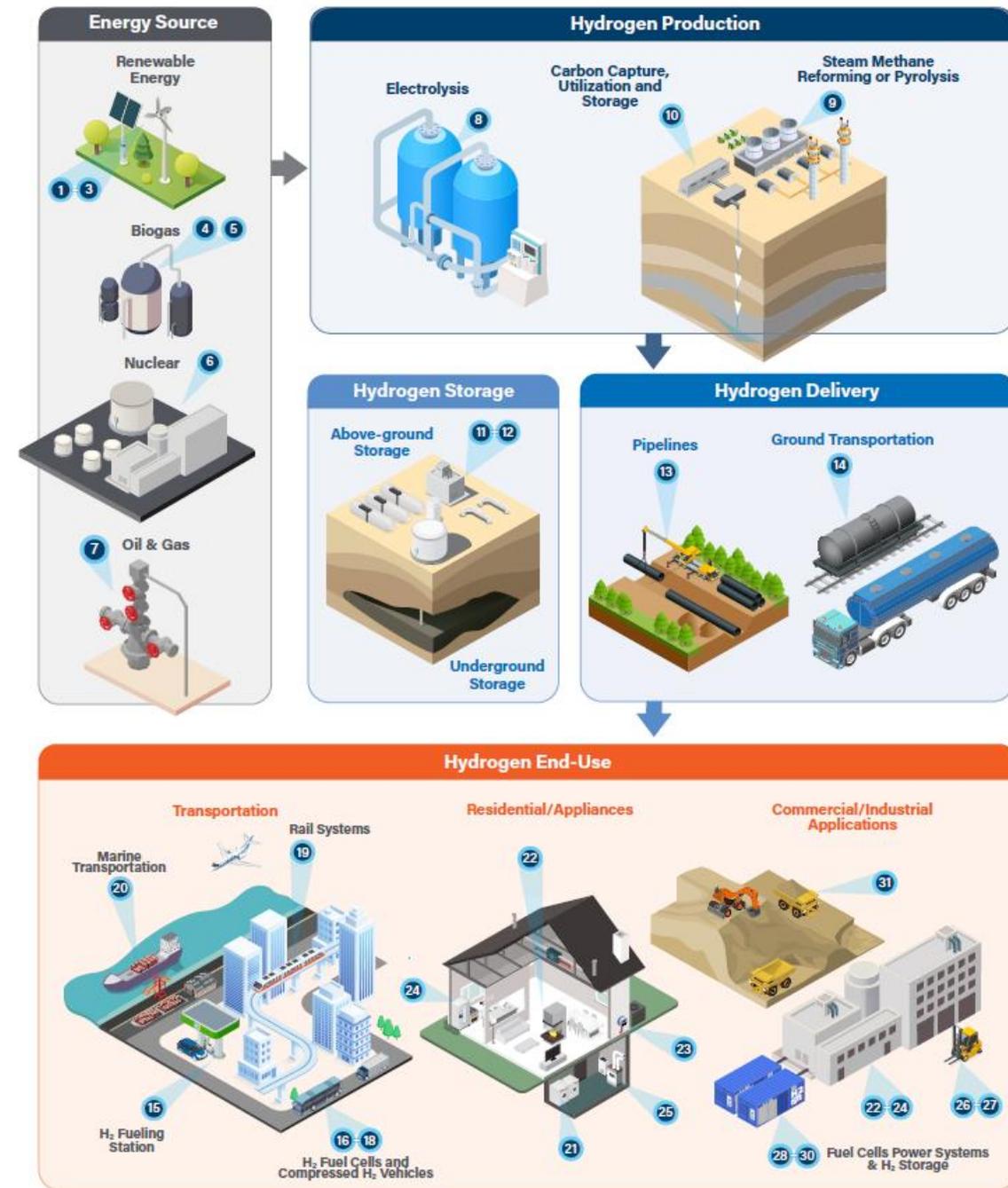
- Coordination with government authorities and regulators
- CSA Group Seminars & Workshops
- Dedicated teams to support standards uptake
- CSA Communities for Hydrogen Ecosystem

# Coordination effort

BRIDGING THE GAPS BETWEEN SECTORS

- CSA Group Communities – an open collaborative platform
- Workshops/Seminars
- CSA Hydrogen Advisory Group

**Enable relevant and timely harmonized standards to support the safe and effective deployment of hydrogen in Canada and the United States**

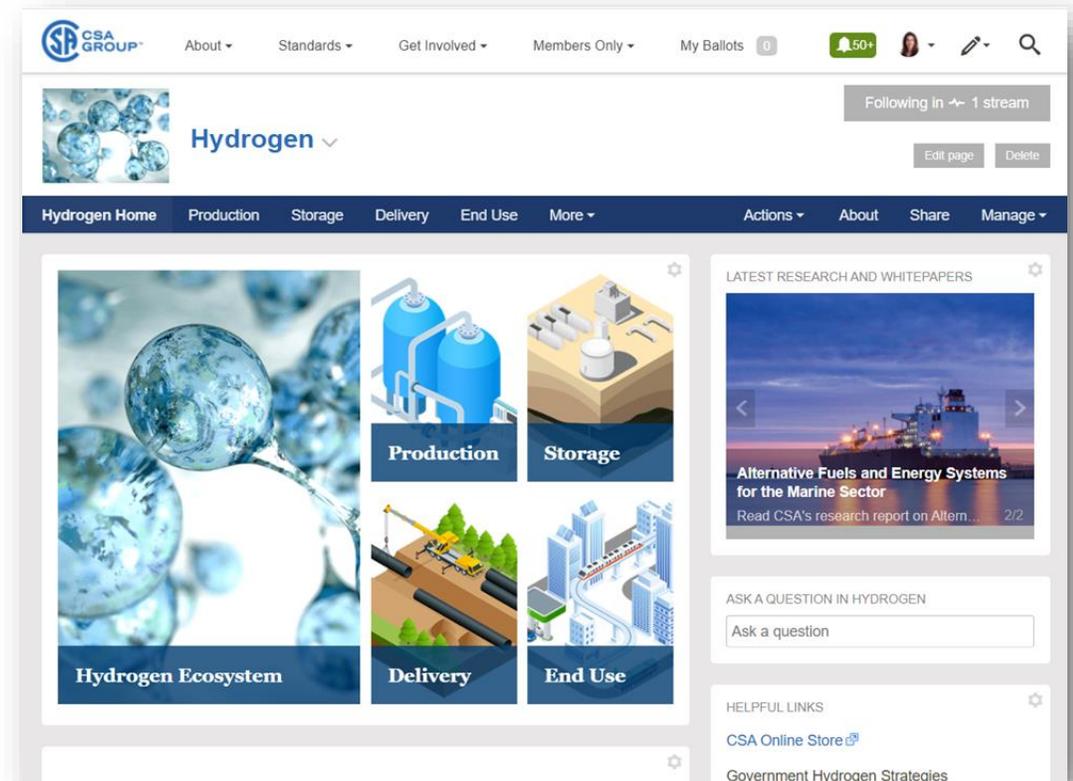


## Summary

- CSA Group hydrogen standards for transportation and fuel cells launched 20+ years ago and portfolio continues growing
- Utilizing CSA Research to explore new areas and innovation, such as railway and aviation
- Canadian and U.S. Governments recognize the need for standards solutions through formal strategies
- CSA Group supports hydrogen deployment through a cross-sectoral coordination

# Explore More and Get Involved!

- **COLLABORATE** with CSA Group to explore opportunities for standardization in new and emerging areas that are important to the hydrogen ecosystem.
- **SUPPORT** standards development through your participation on hydrogen-related groups, review of upcoming research and feedback on draft standards open for public review.
- **REVIEW IMPACTFUL RESEARCH** that touches on new and emerging areas like hydrogen, by providing valuable evidence-based data, information and insights.  
<https://www.csagroup.org/standards/standards-research>
- **ENGAGE** in our initiatives on the hydrogen ecosystem by joining CSA Communities forum on Hydrogen and exploring all the cross-sectoral standardization activities that are underway.  
<https://community.csagroup.org/community/hydrogen>  
[Standards for hydrogen vehicles and fuel cell technologies - CSA Group](#)





# Thank you!

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