

# Introducing the Center for Hydrogen Safety

Nick Barilo

AIChE

International Partnership for Hydrogen and Fuel Cells in the Economy, April 10, 2019



# Enabling Widespread Success: Addressing Safety

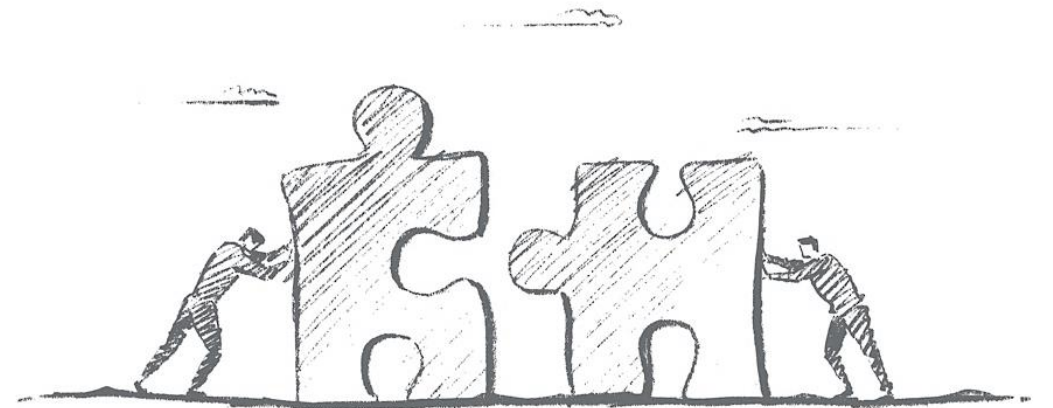
- ▶ Safety issues must be addressed for successful hydrogen technology acceptance and deployment
- ▶ Safety issues can be a ‘deal breaker’
- ▶ Hydrogen technology stakeholders may not be able to identify and effectively address all safety issues
- ▶ Stakeholders benefit from an independent and experienced hydrogen safety review (ISR) resource involved in early design and safety planning activities



# Building Blocks

While hydrogen has been used safely in industrial applications for nearly a century, a substantial expansion of its use as a fuel involves a wider and more diverse group of stakeholders

- ▶ **Communication of hydrogen specific safety guidance** will be critical to the success of hydrogen as a part of the global energy transition
- ▶ Establishing and communicating best practices **from a trusted, independent safety resource** is a valuable part of the hydrogen safety ecosystem



# Our Greatest Need, and Our Greatest Opportunity...

... communicating knowledge to enable the safe and timely transition to hydrogen and fuel cell technologies

Announce **Transfer** Publish **Advise**  
Disclose  
**Impart**  
Unfold **Connect** **Inform** Make Known  
Broadcast Declare Enlighten  
Divulge Proclaim  
**Network** **Reveal**  
Convey **Disseminate** Spread

# Safely Fueling Our Future...

...by building and enabling a global community



An AIChE Technical Community • A Global Resource On Hydrogen Safety

- ▶ A global, neutral and nonprofit resource
- ▶ Supports and promotes the safe handling and use of hydrogen across industrial and consumer applications in the energy transition
- ▶ Provides assurance that groups of experts have a common communication platform with a global scope to ensure safety information, guidance and expertise is available to all stakeholders

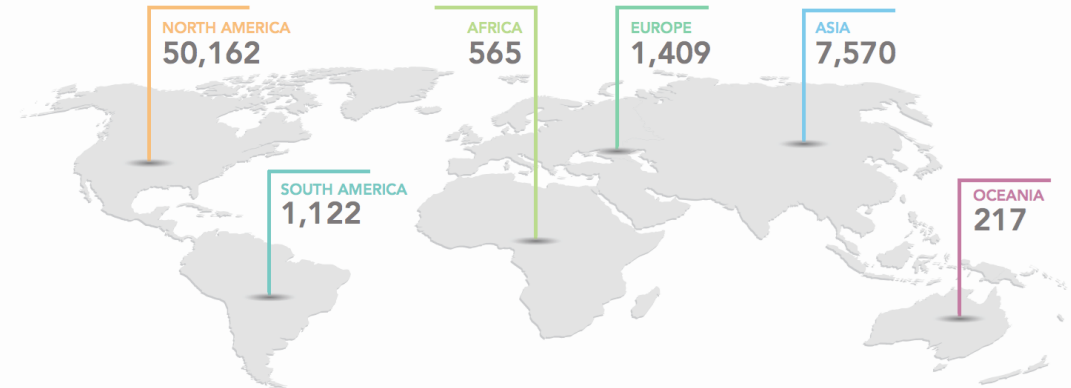
AIChE   
The Global Home of Chemical Engineers



**60,000+**  
TOTAL MEMBERS



**110**  
COUNTRIES





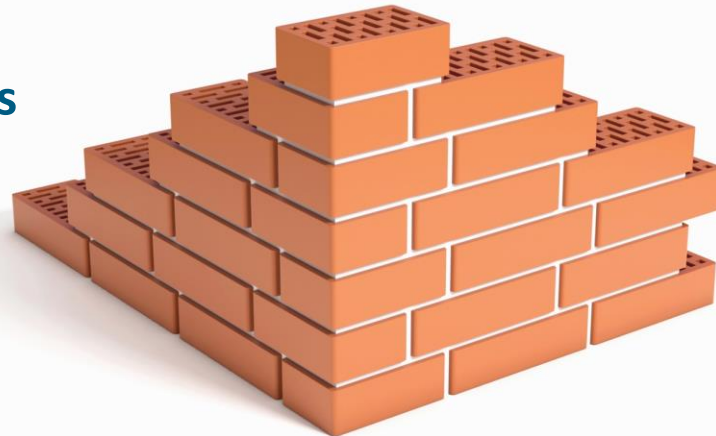
# Safely Fueling Our Future...

*...by building on a strong foundation of resources built through collaboration*



## Safety Knowledge Resources

- ▶ Hydrogen Tools Web Portal
- ▶ Hydrogen Lessons Learned
- ▶ Best Safety Practices



## First Responder Training Resources

- ▶ Online Awareness Training
- ▶ Operations-Level Classroom Training
- ▶ National Training Resource

## Hydrogen Safety Panel

- ▶ Reviews Projects and Facilities
- ▶ Identifies Gaps and Shares Learnings



# Benefits of Membership

- ▶ Participation in a global community addressing safety issues and barriers
- ▶ Comprehensive safety guidance, outreach and education materials (with CEUs for online and in person training)
- ▶ Access to the PNNL Hydrogen Safety Panel (HSP) for reviews and support
- ▶ Conferences and networking opportunities
- ▶ Participation in setting the direction and priorities for the CHS (Executive Board membership)

**CENTER FOR Hydrogen SAFETY**  
An AIChE Technical Community • A Global Resource On Hydrogen Safety

The Center for Hydrogen Safety (CHS) is a not-for-profit, non-bias, corporate membership organization within AIChE that promotes the safe operation, handling, and use of hydrogen and hydrogen systems across all installations and applications. The CHS identifies and addresses concerns regarding the safe use of hydrogen:

- As a sustainable energy carrier
- In commercial and industrial applications
- In hydrogen and fuel cell technologies

The Center for Hydrogen Safety (CHS) provides the hydrogen and fuel cell industries and its stakeholders with:

- Online and face-to-face educational products and resources
- Hydrogen safety guidelines
- Accredited first responder training
- Global workshops and conferences
- Participation to CHS prioritization activities
- Access to a support line
- Member company access to the Pacific Northwest National Laboratory Hydrogen Safety Panel (HSP) for independent safety evaluation of projects and facilities including:
  - HSP review of designs and specifications, risk assessments, safety plans, and facility operations
  - HSP investigation of safety-related incidents

2050 POTENTIAL IMPACT | \$2.5 TRILLION ANNUAL REVENUE | 30 MILLION JOBS | 18% TOTAL ENERGY DEMAND | 6 GIGATONNES CO<sub>2</sub> EQUIVALENT REDUCTION

AIChE in Partnership with PNNL

Access To And Utilization Of Hydrogen Tools Portal At <http://h2tools.org> for dissemination of information.

|   |   |   |   |   |
|---|---|---|---|---|
| Discounted HSP review charges - 10%   | ■ | ■ | ■ | ■ |
| Hydrogen Safety Training Webinar  | ■ | ■ | ■ | ■ |
| Online training materials and info packets  | ■ | ■ | ■ | ■ |
| Academia-wide webinar   | ■ | ■ | ■ | ■ |
| H <sub>2</sub> Tools Website - Access for providing specific Government hydrogen safety information | ■ | ■ | ■ | ■ |
| Invitation to attend annual HSP meeting   | ■ | ■ | ■ | ■ |
| Participation in CHS prioritization activities  | ■ | ■ | ■ | ■ |
| Conference discounts and participation in planning committee  | ■ | ■ | ■ | ■ |
| Involvement in CHS Board  | ■ | ■ | ■ | ■ |
| Company logo included on CHS members page   | ■ | ■ | ■ | ■ |

110 COUNTRIES  
OCEANIA 217  
JAPAN  
MALAYSIA  
PRAGUE  
SPAIN  
SMALL INDUSTRY/UNIVERSITY

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# Upcoming Events

- ▶ Fall 2019... Hydrogen Safety Workshop in Vancouver, BC
- ▶ Spring 2020... Hydrogen Safety Workshop in Eastern Asia
- ▶ Late Summer 2020... CHS Conference in Germany



Vancouver, BC



# Impact of Membership

Membership will ensure that:

- ▶ Safety is a fundamental principal for those deploying the technology
- ▶ Neutral and trustworthy hydrogen safety resources will be sustained and have global impact
- ▶ Safety is not a significant impediment to stakeholder and public acceptance of hydrogen technologies



*CHS will facilitate a safe and timely transition to hydrogen and fuel cell technologies, contribute to stakeholder and public acceptance of hydrogen technology, and help assure the safe operation of hydrogen facilities*

# Please Encourage Organizations and Industry in Your Country to...

- ▶ Utilize the resources to remove barriers and safeguard your mission
- ▶ Get involved! Participate in task groups, workshops and conferences
  - Network
  - Share knowledge
  - Help plan conferences and other events
- ▶ Become a member



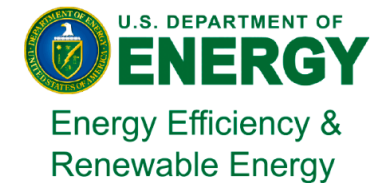
# Founding Members and Strategic Partners



## Executive Board



## Strategic Partners



# Thanks for Your Attention!

## My Contact Information:

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<http://h2tools.org>

thank  
you!