



Natural Resources
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Clean Fuels Education and Awareness Scan

Summary of Research Findings

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Canada 

Based on research conducted by: Hilversum Sustainability Consulting

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Introduction and objectives

Canada is committed to reducing its carbon emissions by 40 to 45 percent below 2005 levels by 2030, and achieving net-zero by 2050. The 2030 Emissions Reduction Plan lays out Canada's next steps for clean air and a strong economy, including the government's work to date and its commitments to reducing emissions through the production and use of clean fuels.

To meet our new 2030 and 2050 net-zero goals, Canada's economy will need to be powered by two equally important energy sources – clean power and clean fuels.

Electrification – clean power – provides a short-term pathway for reducing emissions in many sectors, including personal transportation and the built environment. However, clean fuels are expected to play a critical role in hard to decarbonize sectors such as industry and medium- and heavy-duty freight. Low-carbon fuels typically consist of clean hydrogen, advanced biofuels, liquid synthetic fuels, and renewable natural gas). Even in a scenario with ambitious electrification, it is estimated that 60 percent or more of national energy demand in 2050 could need to be met with clean fuels to meet a net-zero goal. Today, clean fuels make up less than five percent of total energy supply in Canada.

In 2021, Hilversum Sustainability Consulting was contracted by Natural Resources Canada (NRCan) to perform the following tasks related to awareness, education and training in clean fuels:

1. Research and analyze the types of programs and initiatives for clean fuel awareness, education, and training support available in Canada, the United States, South America, and Europe
2. Conduct qualitative, two-way consultations with key stakeholder organizations about barriers to accessing programs and initiatives for clean fuels awareness and education. The consultation sought input on:
 - common barriers across Canada.
 - localized barriers and organization-specific barriers; and
 - recommended solutions to the identified barriers.

Hilversum's research found a large number of existing clean fuels awareness, education, and training initiatives, based primarily in Europe and the US. These initiatives provide useful templates that could be translated into the Canadian context.

Awareness, education, and training project types

The research results were separated into eight main categories of project types for clean fuels awareness, education, and training:

- online education centres
- in-person professional training
- academic programs
- K-12 curriculum
- individual courses and modules
- webpages, fact sheets and manuals
- webinars and video series
- conferences

Key programs and initiatives

The research found the following programs and initiatives to be the most relevant and transferable to the Canadian context (or already based in Canada and ideal for expansion):

- [Advanced Biofuels USA online education centre](#)
- [Canadore College \(Ontario\) Hydrogen Technician program](#)
- [BiofuelNet Canada Advanced Biofuels Course](#)
- [University of Idaho Biodiesel Education Program \(online & K-12\)](#)
- [US Department of Energy HCF Technologies Office \(online education centre\)](#)
- [FuelCellHydrogen Education Europe \(Online Education Center\)](#)
- [Hydrogen Tools Portal \(US online education centre\)](#)
- [Hy2Green Project \(EU professional training\)](#)
- [International Civil Aviation Organization: Sustainable Aviation Fuels \(online education centre\)](#)
- [Southern Alberta Institute of Technology LNG Program \(Professional Training\)](#)
- [Canadian Biogas Association education initiatives](#)
- [Canadian Fuels Association webinars with Canadian General Standards Board and Empire Club](#)

Highlights of key barriers and opportunities

As part of this research, clean fuels stakeholders from across Canada were interviewed, including representatives from industry associations and leading research organizations. Among many highlights, the following barriers and opportunities were mentioned repeatedly:

- For many clean fuels, educating and raising awareness among consumers is as important as educating industry, so that all parties can support well informed decision-making.
- There are different barriers for different audiences. For example, if the audience is the general public, more time is needed to explain *why* a zero-carbon fuel is important than if the audience is industry stakeholders.

- In Canada, we need to figure out how to incorporate clean fuel education into formal, regulated education. Where does it fit into standards so that educators can easily incorporate it?
- We need to raise the confidence and understanding of both the public and industry that hydrogen is a key fuel on the path to net-zero GHG emissions. These points are key:
 - Hydrogen is equally viable as an alternative to electrification and to biofuels.
 - Hydrogen fuel cell electric vehicles and battery electric vehicles are complementary technologies.
 - Education on safety remains relevant for hydrogen, as some consumers and members of industry continue to express concerns.
- For sustainable aviation fuel (SAF) education: ensure both carrots and sticks for adoption of SAF (and other clean fuels) to avoid lessons from the US vs Europe
- Apply communications expertise to convey only the key elements of the overwhelming amount of clean fuels information in a way that does not exclude any particular field.
 - Track awareness and knowledge to understand which approaches are working.
- We (industry, government, academia, non-governmental organizations, etc.) need to find creative ways to explain that we need multiple tools and that there is no single solution.
- Recruiting teachers for clean fuel education will be challenging. Outreach and recruitment for instructors and facilitators needs to start early in the process of designing awareness or education programs.
- We need to explain in our awareness and education programs that this effort is not science fiction – even if it sounds like it.

Recommendations to the federal government

1. Drive innovation

- Determine the challenges and barriers that affect innovation and deployment of next generation fuels and target awareness and education to address those barriers.

2. Match education to the stage of fuel ecosystem development and audience knowledge

- Different education tools can support clean fuels at different stages of development.

3. Support the Government of Canada's strategic vision with investments in awareness and education

- The strategy needs to be aligned and support Canada's climate goals, including the clean fuel standard.
- The strategy also must be aligned with zero-emission vehicle education initiatives.

4. Support more effective education tools

- Apply approaches from the communications and marketing world to educational tools.
- Use a broad approach to disseminating information when the target audience is broad or when there is no specific audience.
- Use a focussed approach to disseminating information when the audience is well known, then customize the awareness and education efforts.
- Help create a network to enable wider delivery of education.
- For coordination and support, NRCan and the Government of Canada should take on the role of enabling strategic application of education tools.

Conclusion

In Canada, a clear gap exists between our rising clean economy and energy transition and the availability of clean fuels awareness and education programs. Particularly lacking in Canada right now are awareness and education programs for hydrogen and sustainable aviation fuel.

As these sectors continue to grow, so will the need for professional training programs, along with public and industry awareness initiatives. Moreover, as clean fuels become more advanced (e.g., the current rise in advanced biofuels and clean hydrogen), applicable education programs in Canada will need to align with continuous innovation.

Also imperative is implementing clean fuels education programs for the K-12 level because Canada's clean economy is dependent on this stakeholder group for its future workforce.