

# Hydrogen BC | What is Hydrogen?

Hydrogen is the lightest and most abundant element in the universe! Hydrogen is a non-toxic gas which exists naturally in water, plants, humans and other organic matter. Although hydrogen does occur naturally, most of the hydrogen used today is manufactured. When hydrogen is split from water or organic material, it becomes a versatile energy carrier that can be used in various energy systems.

## WHY DO WE NEED HYDROGEN?

The CleanBC Roadmap to 2030 outlines how British Columbia (BC) can achieve net zero by 2050. This will include utilizing clean fuels, such as hydrogen, in sectors that are hard to electrify.

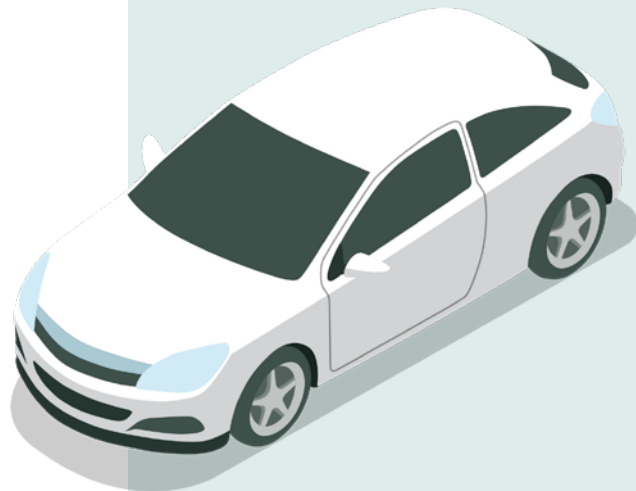
In sectors that are difficult to directly electrify, where fossil fuels are the main source of energy such as heavy-duty transportation and industry, hydrogen can be used as a clean substitute to decarbonize these sectors.

## IS HYDROGEN SAFE?

As with any substance, hydrogen must be handled safely. Hydrogen is a non-toxic gas that has been used by industry for over a century. A number of hydrogen's properties make it safer to handle and use than other fuels commonly used today. For example, because hydrogen is lighter than air, it dissipates rapidly when it is released. This reduces the risk of ignition at ground level.

Some of hydrogen's properties require additional engineering controls to enable its safe use. For example, hydrogen can ignite more easily than gasoline or natural gas because it requires less energy to ignite and has a wider range of flammability in the air. To ensure the safe handling of hydrogen and to mitigate the sources of ignition, it is important to have sufficient ventilation and effective leak detection. It is also important to use appropriate personal protective equipment (PPE) and specialized equipment to prevent explosions and reduce the risk of fires.

Industry and government have taken significant measures to develop best practices and allocate resources to meet safety guidelines. Both nationally and provincially, there are guidelines, regulations, codes, and standards to facilitate the safe use and handling of hydrogen. To learn more, check out these resources on the right.



Gas Safety Regulation  
- Technical Safety British Columbia →

Standards, Codes, and Activities  
for the Hydrogen Ecosystem  
- CSA Group →

Standards for hydrogen production  
- CSA Group →

Standards for hydrogen vehicles  
and fuel cell technologies  
- CSA Group →



To learn more go to [www.canadah2bc.ca](http://www.canadah2bc.ca)

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## USES OF HYDROGEN

Today, hydrogen is predominantly used in ammonia production and oil refinery processes. Hydrogen's versatility gives it great potential as a low-carbon energy carrier to deliver clean energy.

Hydrogen has the potential to replace fossil fuels in energy-intensive industrial processes that are difficult to electrify, such as steel production, cement manufacturing, and chemical production.

Blending hydrogen with natural gas can reduce the CO<sub>2</sub> emissions associated with heating and power, which largely depend on natural gas. This offers a cleaner energy solution for various heating and power uses, such as in buildings, infrastructure, and industrial facilities.

In remote and rural communities, hydrogen has the potential to replace or provide backup for diesel power generation. Hydrogen can also be integrated with renewable resources, such as solar and wind, for power generation.

Hydrogen can be combined with other elements to produce other low-carbon fuels, such as ammonia, methanol, and synthetic fuels, to reduce emissions in transportation, industry, and other sectors.



Hydrogen has the potential to reduce CO<sub>2</sub> emissions in the transportation sector. In fuel cell electric vehicles (FCEVs), hydrogen is supplied to an onboard fuel cell, where it is converted into electricity. This electricity powers a motor that propels the vehicle. Hydrogen FCEVs produce only heat and water vapor at the tailpipe, with no other pollutants.

Hydrogen is a promising low-carbon alternative to fossil fuels in heavy-duty transportation. It weighs less per unit of energy than gasoline or diesel, making it suitable for vehicles carrying heavier payloads over longer driving ranges. Refueling an FCEV also takes roughly the same amount of time as refueling conventional gasoline or diesel-powered vehicles, enabling heavy-duty vehicles to maintain continuous operation without lengthy downtime.

FCEV technology already exists, with several companies producing light-, medium- and heavy-duty FCEVs. Medium- and heavy-duty FCEVs have already begun to replace fossil fuel dependent vehicles in [long-haul trucking](#), and in [port operations](#), and light-duty or 'personal' hydrogen vehicles are already on BC roads!



## WHERE CAN I FIND HYDROGEN FOR MY CAR TODAY?

A network of five fueling stations exists in BC, providing infrastructure for light-duty FCEVs. The BC Hydrogen Fueling Infrastructure Program, which is managed by the Canadian Hydrogen Association, aims to expand the availability of hydrogen fueling stations in BC, thereby removing a key barrier to the market adoption of hydrogen vehicles. To learn more about the hydrogen fueling station network in BC, please visit: [Hydrogen Fueling Stations - HTEC](#).

To learn more go to [www.canadah2bc.ca](http://www.canadah2bc.ca)