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## Hydrogen Applications

Industry has safely used hydrogen for decades in applications such as petroleum refining, aerospace, pharmaceuticals and as a coolant in power plant generators. There are now new markets emerging for fuel cell powered passenger vehicles and industrial equipment, such as forklifts. This requires the building of indoor and outdoor hydrogen refuelling stations to supply hydrogen to these vehicles.

Private companies and government agencies with large warehouse or distribution centres are starting to adopt fuel cells to power their materials handling equipment. The hydrogen gas for these applications is stored outside and the refuelling dispensers are located indoors.

At least nine of the major auto manufacturers are now developing and refining their own fuel cell vehicles (FCVs) designed to run on gaseous hydrogen. More refuelling stations will require building globally to cope with this extra demand.

Some applications for stationary hydrogen fuel cells are:

- Uninterruptible power supply for hospitals and data centres
- Backup power for regional emergency shelters
- Power for lighting and telecommunications in remote locations.

The largest single use of hydrogen in the world is in ammonia manufacture. This industry currently consumes approximately two thirds of the world's hydrogen production. With the increased investment in transport applications however, these figures will potentially change exponentially over the coming years.

Hydrogen continues to be the primary rocket fuel for combustion with oxygen or fluorine and is favoured as a propellant for nuclear-powered rockets and space vehicles. Hydrogen is also involved in the pouring of special castings, in the manufacture of magnesium, in the annealing of metals and for the cooling of large, electric motors. Liquid hydrogen in laboratories is useful to produce low temperatures.

Historically, hydrogen was utilised because of its ability to inflate lighter-than-air vessels, such as dirigibles and barrage balloons, but helium is now preferred for these purposes because it is nonflammable. In the future, as technology progresses, there is the potential for hydrogen fuel cells to power anything that traditional engines and batteries can.



Links to additional resources for this topic			
<a href="#">Applications Student Powerpoint</a>	<a href="#">Applications Extra Information for Teachers</a>	<a href="#">Kahoot Quiz</a>	

### Applications videos with description

Applications - Female technician - 5.40 Making the Toyota Mirai chassis and fuel cell system assembly - Silent

: <https://www.youtube.com/watch?v=iwlvstZsRtM>



Applications - Forklifts - 3.48 Why to change to hydrogen - debate? - English with all other subs

<https://www.youtube.com/watch?v=gDz-ob2juw>





Applications - Bicycle - 1.05 - Strange design - Silent

<https://www.youtube.com/watch?v=8rO3h5LrctM>



Applications - Fire service using hydrogen vehicles - 4.34 – French with all other subs

<https://www.youtube.com/watch?v=QNqtGkVm8w8>



Applications - Overhauling transport system - 11.19 English with all other subs

<https://www.youtube.com/watch?v=Cdi1j5v3u24>



Applications - How a bus is made - design ideas? 5.08 (Dull) - Silent

<https://www.youtube.com/watch?v=PHxhN5-fVDo>





Applications - Hydrogen trains are silent - debate? 2.12 – English with all other subs  
<https://www.youtube.com/watch?v=ael-31dOULY>



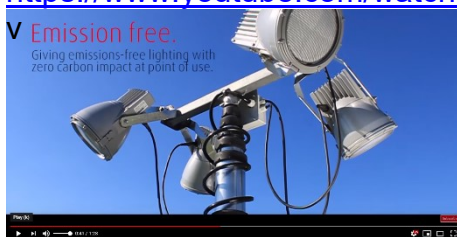
Applications - Energy of the future - portable energy - 2.19 – English with all other subs

<https://youtu.be/ejywStfecv4>



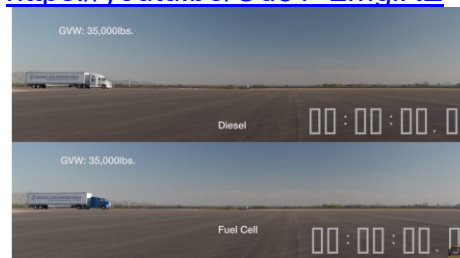
Portable lights – Music – 1.28 - Silent

[https://www.youtube.com/watch?v=XdJZWgBDn\\_l&feature=youtu.be](https://www.youtube.com/watch?v=XdJZWgBDn_l&feature=youtu.be)



Hydrogen truck v Diesel truck 0.27 - Silent

[https://youtu.be/Od81\\_2mqIRE](https://youtu.be/Od81_2mqIRE)



Toyota Mirai Project Concept Hydrogen Truck vs. Diesel Truck



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### 5.52 The experiment of the month - Friday and burning Hydrogen - January 2016 mp4 (Greek)

<https://youtu.be/5GO21tE17IA>



Το πείραμα του μήνα - Παρασκευή και καύση Υδρογόνου - Ιανουάριος 2016 mp4

### 10.15 Advent Technologies High Temperature MEAs

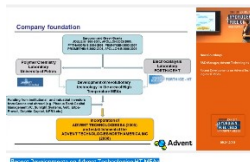
<https://youtu.be/6mD8JwLynn4>



Advent Technologies High Temperature MEAs

### 18.40 Recent Developments on Advent Technologies HT MEAs

<https://www.youtube.com/watch?v=Ox2XRCYuvUk>



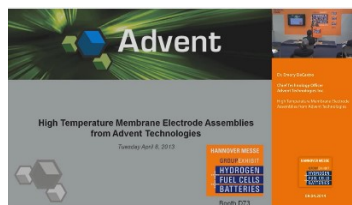


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## 21.13 High Temperature Membrane Electrode Assemblies from Advent Technologies

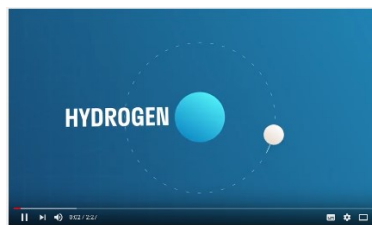
<https://www.youtube.com/watch?v=kgEULQdXqDg>



[High Temperature Membrane Electrode Assemblies from Advent Technologies](https://www.youtube.com/watch?v=kgEULQdXqDg)

## 2.27 All about Hydrogen

<https://www.youtube.com/watch?v=HZUgfkPo670>



All about Hydrogen