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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.

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Links to additional resources for this topic			
Applications Student Powerpoint	Applications Extra Information for Teachers	Kahoot Quiz	

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

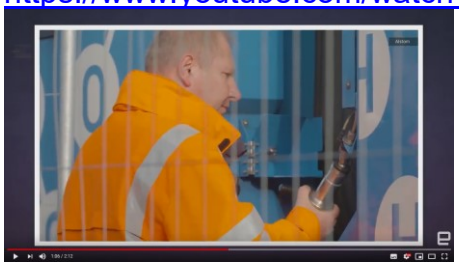
Applications - Bicycle - 1.05 - Strange design - Silent
https://www.youtube.com/watch?v=8rO3h5LrctM

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

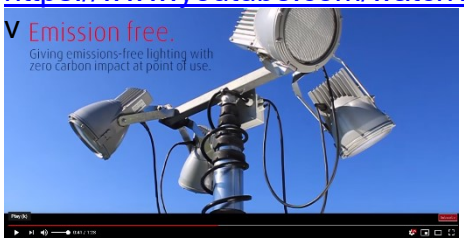
Applications - How a bus is made - design ideas? 5.08 (Dull) - Silent
https://www.youtube.com/watch?v=PHxhN5-fVDo

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

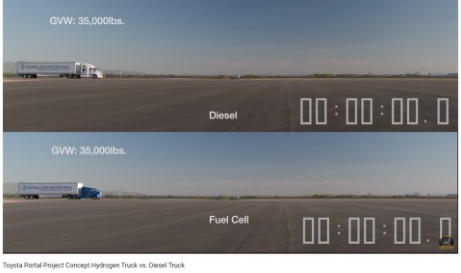


Applications - Energy of the future - portable energy - 2.19 – English with all other subs
https://youtu.be/ejywStfecv4

Portable lights – Music – 1.28 - Silent
https://www.youtube.com/watch?v=XdJZWgBDn_I&feature=youtu.be



Hydrogen truck v Diesel truck 0.27 - Silent
https://youtu.be/Od81_2mglRE



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

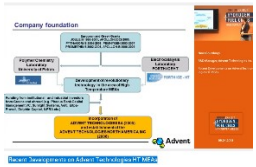
10.15 Advent Technologies High Temperature MEAs

https://youtu.be/6mD8JwLynn4

Advent Technologies High Temperature MEAs

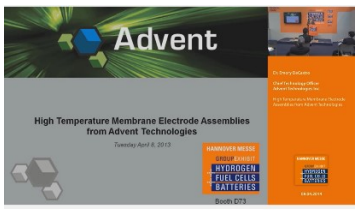
18.40 Recent Developments on Advent Technologies HT MEAs

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



21.13 High Temperature Membrane Electrode Assemblies from Advent Technologies

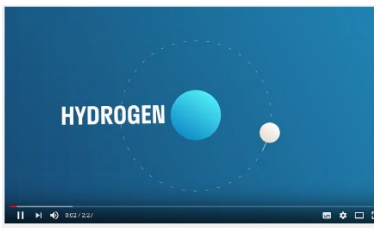
https://www.youtube.com/watch?v=kgEULQdXqDg



High Temperature Membrane Electrode Assemblies from Advent Technologies

2.27 All about Hydrogen

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



All about Hydrogen