

Building the Hydrogen Economy

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In our lecture, Dr. Gary McDarby came in to talk to us about innovation in technology and combating climate change specifically by using hydrogen as a source of energy instead of fossil fuels, doing this requires innovation in the energy sector.

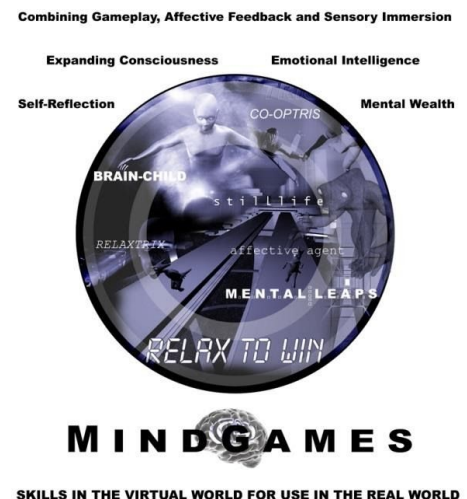
Volunteer work in Liberia

In 1992, Dr. McDarby visited Liberia in West Africa as a volunteer, as the nation was suffering due to civil unrest and a military coup. He showed particular interest in a boy named Prince who suffered from severe trauma from what he had witnessed growing up at this time in Liberia. Prince's trauma was so bad that he was unable to sleep at night, Dr. McDarby had a Sony Walkman at the time and gave it to Prince which helped him immensely to relax and to sleep also. It was at this time Dr. McDarby realised the impact technology can have on people's lives.



Career

After finishing his PhD, Dr. McDarby helped set up the MIT Media Lab in Dublin in 1999. The lab focused on researching the human impact of technology. Out of this, he created and led the MindGames group, a group consisting of talented engineers, designers, psychologists, computer scientists, and artists. This group focused on gaming and how to combine it with biomedical engineering and psychology. They developed a game, designed to help people learn how to relax. This then evolved and was commercialised as a Bluetooth biosensor using the same 'Relax to Win' concept.



The Computer Clubhouse

Dr. McDarby also convinced the Media Lab to setup a clubhouse on its campus, where young people from the community could get access to technology, and learned how to use different tools from the workers in the Media Lab. This space encouraged learning, innovation, and helping the youth build on their own interests.

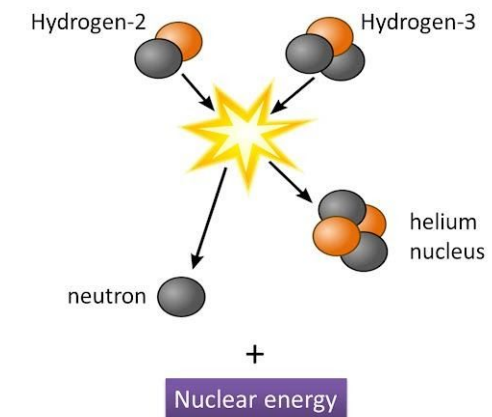
The Hydrogen Economy

Dr. McDarby spoke about climate change and the biggest factor contributing to that right now is an excess of CO₂ emissions around the globe. Our dependence on fossil fuels as a source of energy is a main cause of this, therefore we need a new clean and powerful energy source. Using hydrogen is one potential solution.

Hydrogen is the most abundant element in the universe and stars use hydrogen along with nuclear fusion to create energy, if we could learn to effectively do this, we would have the “ultimate clean energy source”. Dr. McDarby explained how batteries, electrolysis, and hydrogen fuel cells work, and the potential for using gas canisters full of hydrogen instead of natural gas which is commonplace at the moment.

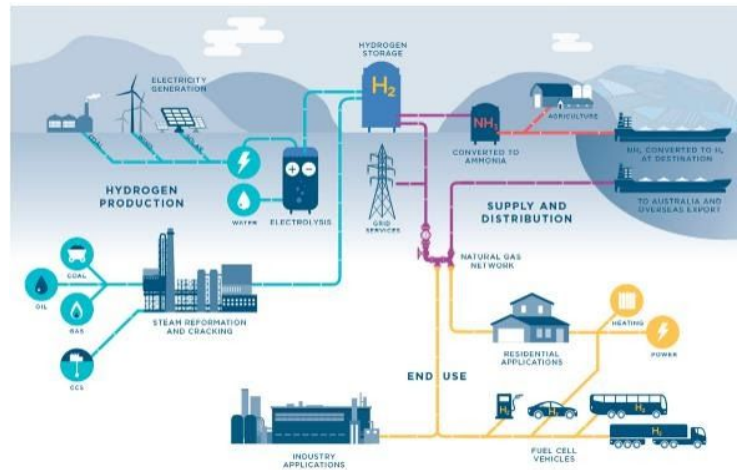
How to get hydrogen

There is only a small amount of hydrogen in the atmosphere so the best way to collect hydrogen is through electrolysis of water. This is done by running an electrical current through ionised water, separating it into its two elements - hydrogen and oxygen. This requires power though so a solution is to use renewable energy sources such as wind and hydroelectric power to extract the hydrogen. At the moment a lot of renewable energy is wasted, for example, at night it is usually windier, so it is when wind turbines generate the most energy, but it is also when demand is at its lowest, so using this energy to extract hydrogen is a great way of storing and making effective use of this power.



Uses for hydrogen

Hydrogen can be stored in gas canisters which can be used by cars, lorries, buses, ovens, and heaters. Using it as a fuel for flight is also very effective as it is extremely light compared to regular aeroplane fuel, and it has zero carbon emissions. The side products from making hydrogen fuel cells are water and heat so these can also be used for households around the globe. Fuel cell cars, in particular, are a very promising concept and already some of these vehicles have been invented by car companies such as Hyundai, Honda and Toyota.



Other benefits of hydrogen

The use of hydrogen as a main fuel source in the world has many other economic and sociological impacts. This would massively reduce our carbon footprint and help stop climate change before it becomes too late for us. Also with easy access to an immense amount of energy, it could greatly benefit developing countries, giving them access to technology and resources they couldn't have before. The development and advancement of these countries will also end wars and increase their standards of living immensely.

Final Thoughts

Overall I found Dr. McDarby's presentation very interesting, especially because of the topics he spoke about. I have a keen interest in science and found the hydrogen economy concept very interesting and he explained everything and how it worked very well. The topic of climate change is also one of the most important issues in the world today so a good plan to combat this is very beneficial and interesting to me.

It is clear that advancements need to be made and more effort and resources put towards solving the problems in our society, and the benefits of using hydrogen as a energy are obvious, it's economical and sociological advantages cannot be ignored and I can only hope it can become a possibility in the future.