FuelCellToday
The leading authority on fuel cells

analyst view

Methanol and Fuel Cells: Renewable Methanol

06 JUNE 2012

(Photo: Steve Jurvetson/Flickr)

In the previous Analyst View, I discussed the advantages methanol offers as a fuel and mentioned the caveat that carbon dioxide emissions are generated at the point of use. How much of a problem this is depends, of course, on where the carbon comes from.

Annual global demand for methanol as a chemical feedstock or transportation fuel is around 50 million metric tonnes a year. Currently, the vast majority of this methanol is produced from natural gas or, in China particularly, from gasified coal and is non-renewable. However, new developments are making renewable methanol available in industrial quantities, and fuel cell suppliers can capitalise on this as a green fuel for their products.

Biofuel producer BioMCN has modified a traditional methanol plant in the Netherlands to produce bio-methanol. The feedstock for this process is for the most part crude glycerine, formed as a residue of biodiesel production; however, any form of biomass that can be converted to syngas is usable. BioMCN is also investigating the use of biogas from vegetable residues as an alternative feedstock to natural gas. Renewable fuel is not necessarily the same as sustainable fuel and, recognising this, the company says it only uses feedstocks 'derived from organic waste materials and crops other than those used for food consumption'. According to BioMCN's Eelco Dekker, the company's product emits 78% less carbon dioxide than conventional methanol on a life-cycle basis.

The plant produces 200,000 tonnes of bio-methanol annually (about 250 million litres). Although this is a small fraction of total global methanol demand, it is not insignificant and comfortably exceeds current demand from the fuel cell industry. To give an indication: Per Sune Koustrup of Nordic green, the company which is BioMCN's sales representative for fuel cell applications, says that 200,000 tonnes translates to 8,000 truckloads per year, and puts the current methanol requirement of one of the major direct methanol fuel cell suppliers at less than one percent of this. As it stands then, the availability of bio-methanol is not a limiting factor to its use in fuel cells, and it is reasonable to assume that as markets grow, so will production capacity and competitiveness.

In October last year, IdaTech became the first commercial fuel cell system supplier to offer bio-methanol as a fuelling option for its products. Its branded fuel, bio-HydroPlus, is a blend of deionised water and bio-methanol from BioMCN and can be used to fuel its ElectraGen ME back-up power systems. These integrate a fuel processor to produce hydrogen from the liquid fuel on site, which is then fed to the proton exchange membrane fuel cell as required.

There are other ways to produce renewable methanol, and there are a number of other renewable methanol producers around the world (although as far as I am aware only BioMCN is targeting fuel cell applications so far). Additionally, and as I touched on in the previous Analyst View, certain companies are working on the production of methanol from captured carbon dioxide emissions and hydrogen. Towards the end of last year, a commercial-scale plant to produce methanol this way was commissioned in Iceland by Carbon Recycling International (CRI). Both the carbon dioxide feedstock and the renewable power for producing the hydrogen (by electrolysis) are supplied by the nearby geothermal power plant at Svartsengi. CRI says the plant produces around 5 million litres per year (~4,000 tonnes), which will supply about 2.5% of Icelandic gasoline consumption. The plant recycles 5,000 tonnes of carbon dioxide per year.

But even renewable fuels must be used as efficiently as possible and, as fuel cell technology continues to commercialise, the ideal way to do this is by putting them through a fuel cell.

Marge Ryan Market Analyst
margeryan@fuelcelltoday.com
www.fuelcelltoday.com