

What you need to know about...

Fill 'er up... with a biofuel

DESPITE RECORD PRICES, consumption of transportation fuel is rising – largely due to a jump in minivan and sport utility vehicle (SUV) use and the increased amount of freight shipped by truck. Not surprisingly, the transportation sector is the largest single source of Canada's greenhouse gas (GHG) emissions, responsible for 27 percent of the total. Vehicle emissions also are the biggest source of smog.

This past spring, the federal government released: *Moving Forward on Climate Change: A Plan for Honouring our Kyoto Commitment*. The \$10-billion package of regulations, tax and consumer incentives, and partnerships, sets Canada's reduction target for 2008-2012 at 270 megatonnes of GHG emissions a year. And a key objective is to help communities, companies and individuals reduce transportation emissions by using cleaner fuels, such as biofuels.

Ethanol and biodiesel are biofuels, meaning they are made from renewable biological products. Neither is new. Henry Ford designed the Model T to use ethanol, believing it would be a major automobile fuel, and Rudolf Diesel designed his signature engines to run on peanut oil. Both were bypassed when less expensive gasoline and diesel emerged as the dominant transportation fuels of the 20th century.

But the tables are turning.

Fuel ethanol is a high-octane, water-free alcohol additive in gasoline. It is made from corn, sugar, grain, and even straw. The most common blend of 10 percent ethanol and 90 percent gasoline (known as E10) can be burned in all cars made since 1980. It is available at more than 1,000 gas stations across Canada, generally at the same price as low-octane unleaded gas.

Ethanol blends of up to 85 percent (E85) can be used in specially designed, flexible-fuel vehicles (FFVs). GM, Ford, Chrysler, Nissan, Isuzu, and Mazda all make flexible-fuel versions of some models at prices comparable to standard engines, but sometimes as a fleet-only option.

Most ethanol is made from corn or sugar, but Ottawa-based Iogen Corp. has become a world leader in developing cellulose ethanol made from waste straw. Royal Dutch/Shell and Petro-Canada have invested in the company. When world leaders arrived at the recent G8 Summit in Scotland, they did so in vehicles powered by a 5 percent cellulose ethanol and gasoline blend donated by the company.

According to Natural Resources Canada (NRCAN), a blend of 10 percent ethanol in gasoline reduces GHG emissions up to 4 percent when using grain-based ethanol, and up to 8 percent when using cellulose ethanol. E85 can lead to a 45 percent GHG reduction.

Biodiesel is made from animal fats and virgin and recycled vegetable oils derived from soybeans, canola, corn, and sunflowers, as well as tall oil, produced from wood pulp waste. Biodiesel, which is not widely available in Canada, can be blended with petroleum diesel in any concentration, usually determined by cost and availability. All vehicles can use blended biodiesel and many new vehicles can use pure biodiesel.

Compared with conventional diesel, biodiesel combusts better, burns cleaner and produces fewer GHG emissions. Technological advances in production may reduce costs. Pure biodiesel reduces GHG emissions by 60-90 percent, according to NRCAN. A 20 percent blend (B20) will reduce emissions by 12-18 percent.

Plus, biodiesel is produced from local resources. In Brandon, Manitoba, five new buses run on biodiesel made from discarded deep-fryer oil obtained from five local restaurants. And last year, all Halifax buses switched to biodiesel made from fish oil produced at a fish plant in nearby Mulgrave, NS.

As biodiesel and cellulose ethanol fuels become a larger percentage of renewable fuel use, environmental benefits increase, particularly because these fuels use products that would otherwise become waste.

What is new

Only about 7 percent of gasoline sold in Canada today is blended with ethanol. Ontario, Manitoba and Saskatchewan have mandated that ethanol account for a fixed percentage of all gasoline sold within the next few years. The federal government is aiming to have 35 percent of gasoline contain ethanol blends of up to 10 percent by 2010. A \$118-million federal Ethanol Expansion Program (EPP) was set up in 2003 to boost supply. In July, EPP provided substantial federal investments to Commercial Alcohols Inc., Husky Oil Marketing Company, Integrated Grain Processors Co-Operative Inc., Permolex Ltd., and Power Stream Energy Services Inc. to build or expand ethanol plants in the Ontario towns of Windsor, Brantford, and Collingwood, Minnedosa, Manitoba and Red Deer, Alberta.

Plus, the federal government earmarked \$11.8 million to support research and provide incentives for industrial-scale biodiesel pilot plants and to promote broader use of this cleaner-burning alternative to conventional diesel.

Dispelling myths

Some argue that ethanol production consumes enough fossil fuel to render any benefit as marginal. But Agriculture Canada concludes that ethanol contains about twice the energy used to produce it. Others have questioned government subsidies to get biofuels to market. But a May 2005 article in *The Economist* argued that subtracting subsidies from soaring prices of mineral fuel reveals a clear net benefit for users. And, the article concluded, even if oil prices fall drastically, no one believes any longer that biofuels are merely a green diversion.

For more information

Natural Resources Canada: www.oeenrcan.gc.ca.

Canadian Renewable Fuels Association: www.greenfuels.org.

BioProducts Canada: www.bio-products-canada.org.

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