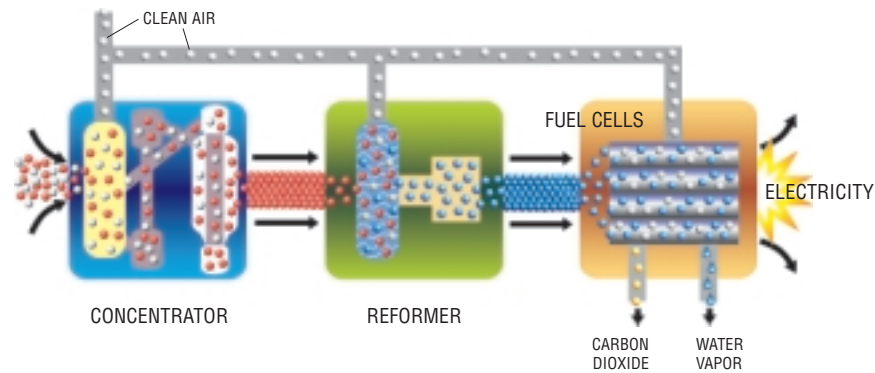




energy

CONVERTING PAINT FUMES INTO FUEL



The Fumes-to-Fuel System captures and concentrates paint fumes, reforms them into a hydrogen-rich gas, and then feeds the gas into fuel cells that generate clean electricity. The only emissions are water vapor and a tiny amount of carbon dioxide.

Inside the Ford Rouge Center paint shop, high-tech spray booths apply world-class finishes to vehicles. The process emits paint fumes that are captured and destroyed in gas-fired burners to keep them from entering the atmosphere.

As paint fumes entered the burners, engineers from the Ford Environmental Quality Office and Detroit Edison noticed that the units used less energy to operate, proving there was energy in the fumes. Could it be converted into an inexhaustible source of clean electricity?

The engineers tested their theory at the Ford Scientific Research Laboratories. They devised a three-stage process that more efficiently captures the fumes, then

uses them to create energy. In effect, they were turning waste into wattage.

Calling their invention the *Ford Fumes-to-Fuel System*, a pilot system was installed at the Dearborn Truck Plant. It captures the volatile organic compounds found in paint solvents, converts them into a hydrogen-rich gas, and feeds the gas into a stack of solid oxide fuel cells. Inside each fuel cell, a chemical reaction between hydrogen and oxygen creates electricity, water vapor, and an insignificant amount of carbon dioxide.

The new system also cleans the air more efficiently than gas-fired burners, costs less to operate, reduces carbon dioxide emissions seven-fold, and reduces the paint shop's consumption of natural gas.

While still in its pilot stage, a full-size *Fumes-to-Fuel System* would produce 55,000 watts of electricity, enough to power a small residential neighborhood.

This innovative system can run fuel cells, a Stirling engine, or a small electrical generator. Ford is studying which will work best to make its paint shops more energy-efficient and environmentally friendly.



The Ford Fumes-to-Fuel System received a Clean Air Excellence Award from the U.S. Environmental Protection Agency.