

# Delphi gasoline-injection engine technique rivals hybrid's edge

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Single-cylinder Hydra engine. Image: Delphi

(Phys.org) -- Running a diesel like engine on gasoline is something Delphi is doing in notable fashion. They claim they are on to a promising way to enjoy an engine that gives the vehicle owner high efficiency and low emissions. Delphi, a major Michigan-based auto-parts supplier, is developing this technology which has shown impressive results in tests. Delphi tried out its combustion concept, which reaps the best of two worlds of low-emission gas and efficient diesel engines. Delphi claims its technology is an improvement upon the fuel economy of gas-powered cars, and can bring forth benefits of the hybrid at less the cost of a large battery and electric motor.

Running a diesel-like engine on gasoline is something that researchers have tried in the past. [Diesel engines](#) are 40 to 45 percent efficient in using the energy in fuel to propel a vehicle, compared to roughly 30 percent efficiency for

gasoline engines. But diesel engines are dirty. As the Delphi engineers say, "Diesel engines are challenged to meet future stringent NOx and PM emissions regulations at acceptable cost."

Tested on a single-cylinder engine, Delphi's approach is called a gasoline-direct-injection compression ignition. Engine-operating strategies leverage advanced fuel [injection](#) and air intake and exhaust controls. The researchers wrote a technical paper on the subject, which was presented at SAE, an association of engineers and other experts in aerospace, automotive, and commercial vehicle industries. Delphi's team, Mark Sellnau, James Sinnamon, Kevin Hoyer, and Harry Husted are the authors of the paper, "Gasoline Direct Injection Compression Ignition(GDCI) Diesel-like Efficiency with Low CO<sub>2</sub> Emissions." Their experiments were carried out on a Ricardo Hydra light-duty single-cylinder engine, which they said was considerably flexible, with parts that can be easily interchanged.

"Tests were conducted at 6 bar IMEP - 1500 rpm using various injection strategies with low-to-moderate injection pressure," they said. Their results showed that what they called "triple injection GDCI" achieved about eight percent greater indicated thermal efficiency and about 14 percent lower specific CO<sub>2</sub> [emissions](#) relative to diesel baseline tests on the same engine.

The researchers' reference to triple injection GDCI refers to their approach of injected gasoline in three precisely-timed bursts, avoiding the rapid [combustion](#) that has caused past experimental engines to be noisy. They also succeeded in burning the fuel faster than in conventional [gasoline](#) engines, to get the most out of the fuel.

Mark Sellnau, engineering manager of advanced powertrain technology at Delphi, says the engine could be used along with a battery pack and electric motor, as in hybrids, which may improve efficiency still more. He also added that it was not

clear to him whether the cost of doing that would be worth it.

**More information:** Tech paper:

[delphi.com/pdf/techpapers/2011-01-1386.pdf](http://delphi.com/pdf/techpapers/2011-01-1386.pdf)

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