

Ideas on the Edge

Diesel Reborn

DIRTY DIESEL IS UNDERGOING A TRANSFORMATION, THANKS TO RESEARCHERS LIKE MING ZHENG AT THE UNIVERSITY OF WINDSOR.

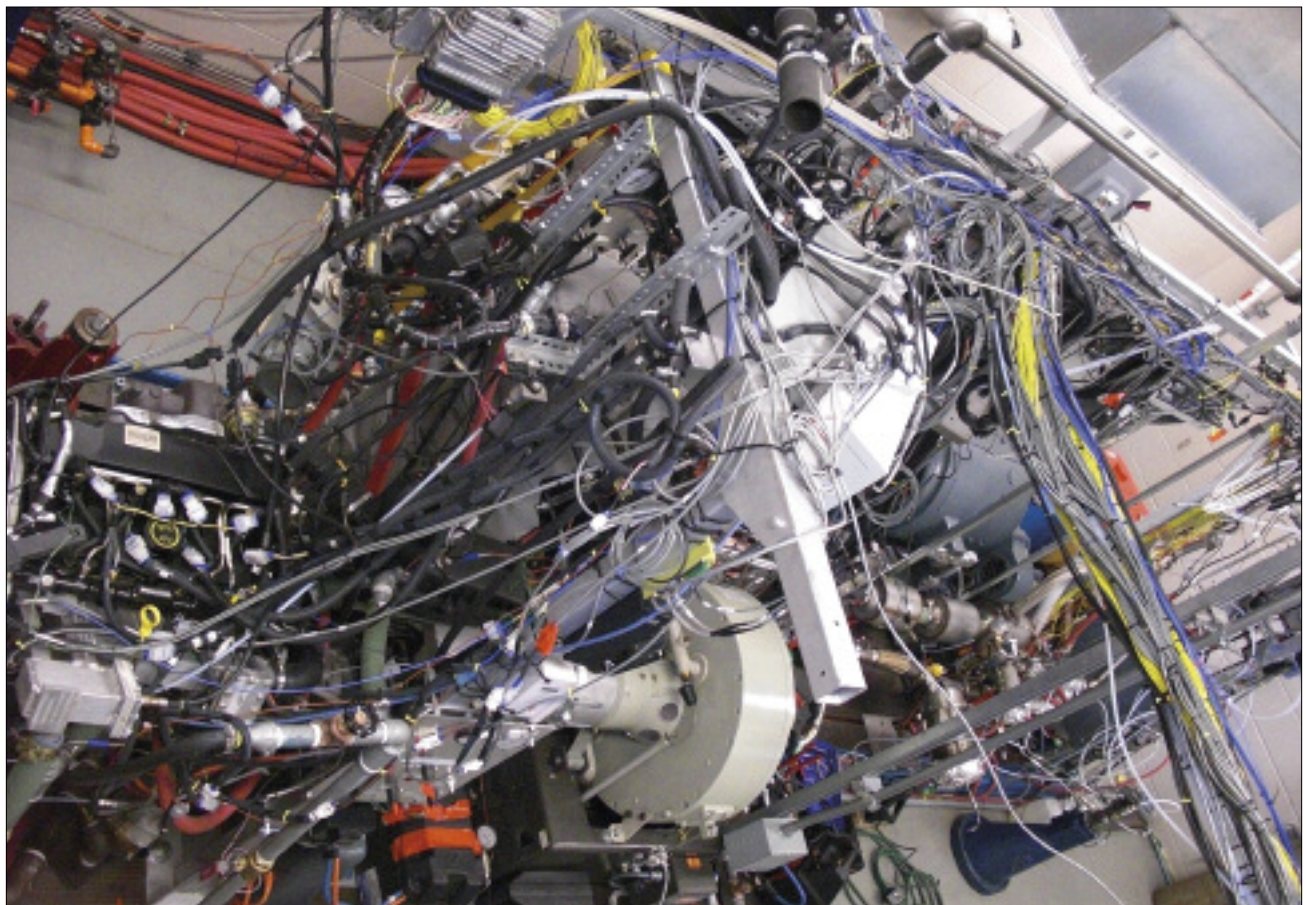
In North America, diesel has a bit of a working-class, bad boy reputation: it's tough, it's noisy and it smokes a lot. Most diesel engines on this side of the Atlantic provide power for trucks and heavy equipment.

Europeans, however, are seeing a different side of this oft-maligned fuel. Seventy percent of new cars sold in Germany, for instance, are diesels. And for good reason. While diesel costs more per litre than gasoline, it takes you further. Even more significantly, diesel has cleaned up its act in the last 10 years. The once-iconic black smoke has

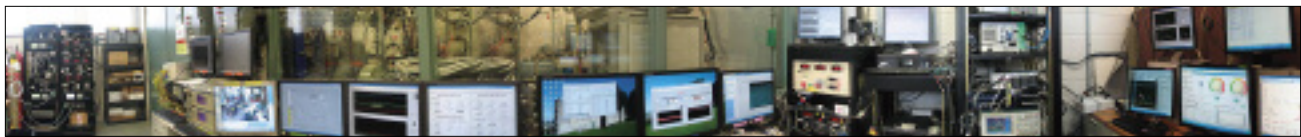
been all but eliminated by advanced combustion systems. And with other new approaches to exhaust treatment—catalytic converters don't work with diesel—emissions are comparable to those from a conventional gas engine.

Yes, diesel is moving to the right side of the tracks. It's quieter. It's more refined. It's given up smoking. But according to Dr. Ming Zheng of the University of Windsor, we've only seen the beginning of what will amount to a diesel renaissance in the 21st century.

Working in the University of Windsor's Clean Diesel



A MAZE OF WIRING CONNECTS AN EXPERIMENTAL DIESEL ENGINE (LOWER LEFT) TO MONITORING DEVICES AND COMPUTERS.



Engine Laboratory—a state-of-the-art research facility that crosses an engine repair shop with the bridge of the Starship Enterprise—Dr. Zheng and his team are exploring ways to make diesel one of the cleanest, most efficient and—yes—greenest fuels going. To that end, the team is re-thinking every aspect of diesel technology, working out new approaches to mixing fuel and air, new ways to control combustion, and new systems for treating diesel exhaust.



including biodiesel produced from renewable sources like soybean and canola instead of petroleum. Biodiesel creates more emissions challenges—and there are the wider issues of finding natural sources that don't have a negative impact on the food chain. But with diesel on a roll, Dr. Zheng is optimistic that solutions to these problems will be found as well.

“Our knowledge has increased tremendously in the last 15 years,” he says. In fact, the progress has been so

Perhaps the biggest challenge is to deal with nitrogen oxide emissions—diesel's Achilles' heel. As well as contributing to global warming, NOx is a big component of urban smog. New low-sulphur diesel formulations

are part of the answer, but Dr. Zheng is also exploring combustion schemes that reduce NOx productions, as well as the possibility of injecting NOx-neutralizing ammonia directly into the exhaust. A stop at the service station for tomorrow's diesel owners may mean checking the ammonia as well as the washer fluid.

University of Windsor

The fuel itself may also soon be greener. Dr. Zheng and his colleagues are also working on biofuel research,

remarkable that Dr. Zheng actually looks at today's diesel

as a new technology—one that could give other green fuels a run for their money in the 21st century. “In a way,” he says, “the re-born modern diesel is much younger than even fuel-cell technology. I think it may out-play other power sources in the next 50 to 100 years.”

Not bad for a noisy upstart with a bad rep.

RESEARCH THAT MATTERS
REAL-WORLD BENEFITS FOR ONTARIANS:

- greener cars, less expensive fuels
- leadership for Ontario in the emerging diesel sector of the automotive industry

Project: Clean Diesel Engine Laboratory for Active Control Aftertreatments and HCCI Enabling Technologies
Institution: University of Windsor
Research Sector: Engineering
Principal Investigator: Ming Zheng
Trust Investment: \$137,000
CFI Investment: \$137,000
Total research investment from all sources: \$362,500



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Infrastructure for Innovation About the Ontario Innovation Trust

The Ontario Innovation Trust was created in 1999 by the Government of Ontario to invest in research equipment and facilities at Ontario's universities, colleges, hospitals and other non-profit research institutions. The Trust is governed by a volunteer Board of Directors, according to the terms of a Trust agreement established by the Ontario government. A small permanent staff looks after day-to-day operations.

Since its inception, the Trust has committed almost \$843 million to strengthen Ontario's position in the global marketplace of ideas. This represents more than a third of the \$2.44 billion in total funding that has been invested in Trust-supported projects.