

January 2015 Highlights

ORNL Fuels, Engines, and Emissions Research Center

TECHNICAL HIGHLIGHTS

Ford Fiesta EcoBoost Demonstrates Improved Performance and Thermal Efficiency with E15 Blend

A 2014 Ford Fiesta with the 1.0 liter, 3 cylinder gasoline direct-injection turbocharged EcoBoost engine and 5-speed manual transmission was evaluated in the Fuels, Engines, and Emissions Research Center (FEERC) vehicle laboratory with retail E0 gasoline with 87 pump octane (91 RON), and the same fuel splash-blended with ethanol to make E15 (the vehicle is warranted for E15 use). The addition of ethanol boosted the octane number of the E15 blend to 93 pump octane (98 RON), allowing for improved performance and thermal efficiency, despite lower energy density (Btu/gallon). Chassis dynamometer experiments were performed for the Environmental Protection Agency (EPA) Federal Test Procedure (FTP), Highway Fuel Economy Test (HFET), and US06 certification test cycles and at wide-open throttle (WOT) conditions. Acceleration time at WOT (30–90 mph) improved by 4–5%. The E15 fuel only contains 94.4% volumetric heating value (BTU/gallon) compared to the E0, but EPA test cycle thermal efficiency improved for the higher octane ethanol blend. The highest improvement was for the high-load US06 cycle in which E15 mpg values were only 1% lower for E15, indicating a 4.6% thermal efficiency gain. These results highlight the fuel economy potential for downspeeded, boosted engines with high octane fuels, a research topic receiving considerable attention from the Vehicle Technologies Office (VTO), Bioenergy Technologies Office (BETO), and industry.

AWARDS

(ORNL Team Wins Prestigious Society of Automotive Engineer (SAE) Horning Award

Jim Szybist and Brian West were honored with the prestigious SAE Horning Award for their 2013 publication entitled ‘The Impact of Low Octane Hydrocarbon Blending Streams on the Knock Limit of “E85”,’ published in the *SAE International Journal of Fuel and Lubricants*. This award is given once a year to the best paper published through SAE related to the better mutual adaptation of fuels and internal combustion engines. This work showed that an ASTM-compliant Flex Fuel blend containing 51 vol% ethanol and 49 vol% sub-octane hydrocarbon (anti-knock index of 63.1) could outperform a premium grade gasoline in a modern direct-injection engine. This work highlights the potency of ethanol at upgrading the octane number of a range of fuels and helped build the foundation for the very active ongoing debate regarding the best use of ethanol and octane level of future fuels to support higher efficiency vehicles. The award will be formally presented at the 2015 World Congress in April.

FEERC Researcher Named to Engineering Meetings Board (EMB) Membership Committee

Scott Sluder is starting a second term on SAE's EMB and has accepted a nomination to EMB's Membership Committee as the automotive sector representative. The membership committee is made up of a representative from each of SAE's business sectors: automotive, aerospace, and commercial vehicle plus the EMB chair, vice-chair, and past-chair. The membership committee is charged with recommending and nominating candidates for EMB member-at-large to the SAE Board of Directors and focuses on maintaining a geographically and technically diverse membership for EMB. The membership committee is also charged with nominating the incoming vice-chair of EMB.

Contact

Robert M. Wagner, Ph.D.
Director, FEERC
Oak Ridge National Laboratory
865.946.1239
wagnerrm@ornl.gov

feerc.ornl.gov

ORNL is managed by
UT-Battelle for the
US Department of Energy

FEERC Researcher to Receive SAE Lloyd L. Withrow Distinguished Speaker Award

FEERC's Scott Sluder will receive the SAE Lloyd L. Withrow Distinguished Speaker Award at the awards ceremony held at the SAE 2015 World Congress. Established in 1984, the award recognizes individuals who have demonstrated outstanding presentation skills. The intent of the award is to maintain a high level of presentations at SAE technical sessions by recognizing individuals who make outstanding presentations at those sessions. Recipients must have previously received SAE's Outstanding Oral Presentation Award more than twice. The award is named in honor of the late Lloyd L. Withrow, a former Department Head of the General Motors (GM) Research Laboratories Fuels and Lubricants Department who was also an SAE Fellow and noted speaker.

ORNL Research and Development (R&D) Staff Researcher Recognized with the SAE Myers Award for Previous Graduate Study Research at the University of Wisconsin Engine Research Center

Established in 1997, the SAE Myers Award is given annually for the best technical paper presented by a student. The paper must be based on work done by the lead author(s) while a student. The time of the work determines student status. The presentation of the technical paper must be made by the student at a major SAE meeting. Papers can be on any topic and from students worldwide. Technical papers presented from June through May of the following year are eligible for the award annually. Dr. Derek Splitter, now a Staff Researcher at ORNL, led the research and analysis effort with his team while at the University of Wisconsin Engine Research Center. The awarded manuscript provided timely insight into the complex thermodynamic relations governing internal combustion engine efficiency. The results and analysis illustrated a pathway to increase engine efficiency through minimizing emissions and heat transfer losses. The award will be presented at the SAE World Congress meeting in Detroit, Michigan, April 2015.

OUTREACH

FEERC Staff Member Volunteering as Tutor for High School Students through a local Urban Outreach Organization

John Thomas has been volunteering for a second school year with Emerald Youth Foundation as a "JustLead" tutor and resource person to low income high school students. Duties vary with the immediate needs of the students, but generally involve math and science tutoring one night per week. Emerald Youth Foundation is an urban youth ministry serving over 1,350 young people in Knoxville in various capacities and is a United Way Agency. <http://www.emeraldyouth.org/>