

# The Future of the Internal Combustion Engine

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Internal combustion (IC) engines operating on fossil fuel oil provide about 25% of the world's power (~3 out of 13 billion tonnes oil equivalent per year), and in doing so, they produce about 10% of the world's greenhouse gas (GHG) emissions. Reducing fuel consumption and emissions has been the goal of engine researchers and manufacturers for decades. Indeed, major advances have been made, making today's IC engine a technological marvel. However, recently, the reputation of IC engines has been dealt a severe blow by vehicle emissions scandals that threaten the ability of this technology to make significant and further contributions to the world's reduction of transportation sector emissions. In response, there have been proposals to replace vehicle IC engines with electric-drives with the intended goals of further reducing fuel consumption and emissions, and to decrease vehicle GHG emissions. However, there is still great scope for even further improvements in IC engines with advances in combustion technologies, as will be discussed in this presentation. We are certainly in revolutionary times, but it is clear that power generation sources will not become fully renewable and transport will not become fully electric for several decades, if ever. In fact, research to improve efficiency and methods to reduce dependence on fossil fuels are exciting directions for future IC engine research, and there is a pressing need for recruiting the brightest young minds to engage in this effort.

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Prof. Reitz received the PhD degree in Mechanical and Aerospace Engineering from Princeton University in 1978. He joined UW-Madison in 1989 and was named Wisconsin Distinguished Professor from 1999 to 2015 when he became Emeritus. He also has had an extensive record of achievement in the private sector as a Research Staff member at the General Motors Research Laboratories (1982-89) and as co-founder of Wisconsin Engine Research Consultants, LLC in 1999. He has served as chair of the Institute of Liquid Atomization and Spraying Systems--North and South America, and is former director of the UW-Madison Mechanical Engineering Department's world-renowned Engine Research Center. He is co-founder and co-Editor (Americas) of the International Journal of Engine Research, and he was the founding Editor-in-Chief of the Frontiers Journal of Engine and Automotive Engineering. He has published over 550 journal papers with a google h-index over 100, and he has received a numerous professional awards, including the ASME Soichiro Honda Medal, the DOE Vehicle Technologies R&D Program Award, the ETH Zurich Aurel Stodola Medal, the ICLASS Arthur H. Lefebvre Award, plus many SAE awards (Myers, Johnson, Horning) and the ASME Internal Combustion Engine Award.