

Global Energy Demand and Opportunities to reduce the Carbon Footprint of Transportation

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Global energy demand continues to rapidly increase with growth in population and increased access to energy. Transportation accounts for 20% of the global energy consumption with significant growth anticipated, specifically, with over 40% additional vehicles expected in the world by 2040. As internal combustion engine (ICE) vehicles will continue to increase for the next decades and these vehicles constitute the largest share of light-duty energy demand to 2050, further reducing the carbon footprint and criteria pollutants of ICE vehicles offer significant opportunity toward our goal of driving lower emissions in transportation. Opportunities to further improve the fuel efficiency and reduce carbon emissions throughout the life cycle of transportation will be examined with specific examples provided for spark-ignition, diffusion compression ignition, and low-temperature compression ignition combustion technologies.

Dr. David Cleary currently leads Aramco's Detroit Research Center located in Novi, MI. Aramco is the U.S. subsidiary of Saudi Aramco, the world's largest fully integrated energy enterprise.

Dr. Cleary has nearly 25 years of experience focused in the areas of transportation energy, powertrain and fuel technologies. He began his career with General Motors in 1994 as a senior research engineer within the R&D organization, where he was responsible for contributing toward the innovation, exploration and development of advanced engine technologies. In 2008, Dr. Cleary became a group manager responsible for establishing the General Motors China Science Lab's Engine and Transmission Systems research group located in Shanghai China. Dr. Cleary joined Aramco in 2013 to lead the transportation energy and engine research activities. He received his Ph.D. in Mechanical Engineering in 1994 at the University of Wisconsin – Madison.

