NEWS RELEASE

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Ultra-Low Emission Heavy-Duty Natural Gas Engine Tests Better Than 99.8 Percent Clean

Study of Los Angeles County Metropolitan Transit Agency Bus shows engine tests even cleaner than federal and state certification standards

RIVERSIDE, Calif., July 26, 2017 – The University of California, Riverside College of Engineering Center for Environmental Research and Technology (CE-CERT) and SoCalGas today announced the results of a new study on ultra-low emission natural gas heavy-duty engines. The study found that a Los Angeles County Metropolitan Transit Agency (Metro) bus equipped with an ultra-low emission natural gas engine performs significantly cleaner than its certification standards across all duty cycles.

Researchers tested the Cummins Westport ISL G near zero natural gas engine in a variety of conditions typical of a Metro bus. In all conditions the engine performed even better than California's toughest in the nation standard for smog-forming emissions. In some driving conditions emissions were practically zero.

"We have tested two of the ISL G near-zero 8.9 liter engines, one in a refuse hauler and one in a Metro bus. In both cases, the NOx emissions were surprisingly low and 99 percent cleaner than the current standard and 99.96 percent cleaner than the 2004 standard," said Kent Johnson, associate research engineer for CE-CERT and lead researcher on this study. "The near-zero engine will provide immediate NOx relief to our region at a low cost, and coupled with renewable natural gas (RNG), would provide long-term stability to our energy and climate change needs. Pursuing RNG technology is a promising and visionary pathway for California and is recommended by UCR's RNG research center."

"The UC Riverside data suggests that this natural gas bus is as clean as an electric bus when it comes to meeting air quality standards," said George Minter, regional vice president for external affairs and environmental strategy for SoCalGas. "And when these buses are fueled with renewable natural gas, the greenhouse gas reductions are even greater. By deploying this technology, large bus fleets like Metro's have a tremendous opportunity to achieve clean air gains."

Highlights of the study include:

• The engine tested below Environmental Protection Agency (EPA) NOx (smog-forming) emissions certification level of 0.2g/bhp-hr.

• The engine tested below the California Air Resources Board voluntary limit of 0.02 /bhp-hr. This is the only engine to meet the California standard.

• Emissions for some driving patterns, such as stop-and-go traffic were even lower still.

• In some driving conditions the bus tested as low as 0.0007g/bhp-hr, or practically zero emissions.

"This research is welcome news that the latest near-zero-emission natural gas engines are even cleaner than expected," said Wayne Nastri, executive officer for the South Coast Air Quality Management District. "Since heavy-duty vehicles are the No. 1 source of smog-forming emissions in our region, deployment of this technology in our fleets is critically important for us to achieve our clean air goals."

The California Air Resources Board set ambitious NOx inventory requirements by 2023 for the South Coast Air Basin in its Air Quality Management Plan. CARB's air quality modeling shows achieving the 2023 standard will require an additional 70 percent reduction in NOx emissions from current standards. Heavy-duty natural gas vehicles can play a vital role in cleaning air in the South Coast today.

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About the University of California Riverside's CE-CERT:
Distinguished by more than 50 years of high-impact research, the University of California at Riverside has become one of the leading institutions for the exploration of society's most pressing environmental challenges in air, energy, and transportation. CE-CERT's research focus is on using technology to achieve environmental sustainability, an ambitious goal that will require innovation in many different areas. From working to understand how emissions impact air quality to developing technologies needed to improve solar and other renewable power sources, the projects that our research teams are currently engaged in support one of more of the following focus areas: clean air, sustainable transportation, renewable fuels, climate change, and renewable energy and smart grids. Learn more at: http://www.cert.ucr.edu.

About Southern California Gas Co.
Headquartered in Los Angeles, SoCalGas® is the largest natural gas distribution utility in the United States, providing clean, safe, affordable and reliable natural gas service to 21.7 million customers in Central and Southern California. Its service territory spans 22,000 square miles from Fresno to the Mexican border, reaching more than 550 communities through 5.9 million meters and 101,000 miles of pipeline. More than 90 percent of Southern California single-family home residents use natural gas for home heat and hot water. In addition, natural gas plays a key role in providing electricity to Californians—about 60 percent of electric power generated in the state comes from gas-fired power plants.

SoCalGas has served communities in California for 150 years and is committed to being a leader in the region's clean energy future. The company has committed to spending $6 billion over the next five years

to modernize and upgrade its gas infrastructure, while also reducing methane emissions. SoCalGas is working to accelerate the use of renewable natural gas, a carbon-neutral or carbon-negative fuel created by capturing and conditioning greenhouse gas emissions from farms, landfills and wastewater treatment plants. The company is a subsidiary of Sempra Energy (NYSE: SRE), a Fortune 500 energy services holding company based in San Diego. For more information visit socalgas.com/newsroom or connect with SoCalGas on Twitter (@SoCalGas), Instagram (@SoCalGas) and Facebook.