

# Direct Measurements Show Decreasing Emissions from Local Natural Gas Distribution Systems IN THE UNITED STATES

Washington State University conducted a nationwide field study to measure methane emissions from natural gas utility systems. Measurements taken at 230 individual underground pipeline leaks and 229 metering and regulating facilities help form the basis for new emissions factors and national emissions estimates.

Based on the Washington State University (WSU) data, methane emissions are 36 to 70 percent less than the 2011 U.S. Environmental Protection Agency (EPA) inventory. The EPA currently uses data collected in the 1990s in a study sponsored by the Gas Research Institute and the EPA. The new study's lower estimates reflect significant upgrades to the natural gas distribution system at metering and regulating stations, improvements in leak detection and maintenance activities, replacement of older pipeline materials, as well as differences in methodologies between the studies.

## RESULTS

Sampled data was used to create new emissions factors that are used to estimate emissions from natural gas distribution systems.

For city metering and regulating stations, the study shows significant improvements in equipment at these facilities with 7 to 13 times fewer emissions compared to facilities measured in the 1990s.

Underground pipeline leak emissions estimates, including pipeline mains and services, show differences of 11 percent to 68 percent from emissions estimated in the EPA Inventory because of changes in the underlying emission factors.

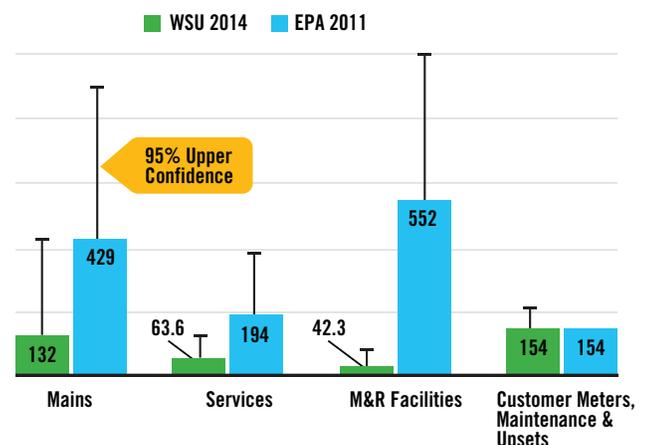
The underground pipeline leak distribution measured is comprised of lower leak rates as compared with the Gas Research Institute and EPA study.

The study concludes that 0.10 percent to 0.22 percent of the natural gas delivered nationwide is emitted from local distribution systems.

For all categories of pipeline leaks and metering and regulating stations, a few high emitters accounted for a large fraction of the total measured emissions.

Emissions measured at more than 400 sites on the natural gas distribution system are 36% to 70% less than EPA estimates on average.

Summary of the Methane Emission Inventory for US Natural Gas Distribution Systems for WSU Study and the 2011 EPA GHG Inventory (Gg)



# System Modernization



## PIPELINE LEAKS ARE DECREASING EVEN AS THE SYSTEM EXPANDS

Results suggest that the number of pipeline leaks have decreased 25 percent for mains and 16 percent for services due to the use of better pipe materials, efforts to seal cast iron joints, and enhanced leak detection and repair procedures.

System modernization and continually improving practices have spurred substantial replacement and upgrades of metering and regulating equipment. Improvements in leak survey methods and an increased emphasis on reporting have further reduced emissions.

Since 1992, local gas companies have expanded pipeline main by 44 percent to 1.2 million miles and added 63 million customer services lines while replacing vintage cast iron and unprotected steel pipeline with modern materials made of plastic and protected steel.

The number of pipeline leaks have decreased 25% for mains and 16% for services.

## THE MOST COMPREHENSIVE STUDY IN MORE THAN TWENTY YEARS

A WSU research team led by Regents Professor Brian Lamb, in coordination with engineers at Conestoga-Rovers and Associates, directly measured individual leaks from underground pipelines and from various categories of meter and regulating stations from across the U.S. This survey of natural gas distribution systems in the U.S. is the most comprehensive since the 1990s. The 13 natural gas distribution companies that participated account for a significant portion of the industry and natural gas deliveries to consumers. These companies own and operate 19 percent of the distribution pipeline mileage, 26 percent of the services, and account for 16 percent of the total gas delivered to customers in 2011. The specific leaks and facilities sampled were selected randomly from utility company leak survey data and facility lists for the targeted areas.

Sampling within these target categories occurred from May through November 2013. Data from direct measurements of emissions from underground pipeline leaks and from various categories of metering and regulating facilities across the U.S. were used to develop new emissions factors. The authors also compiled information from company surveys to update estimates for emissions from maintenance blow-downs and pipeline dig-ins. This information was compiled to form an estimate of the total amount of methane emitted from the U.S. natural gas distribution system.



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