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A survey of urban and suburban methane hotspots across five European capitals

Robert Panetta (1), Gloria Jacobson (1), Irène Xuref-Remy (2), and Eric Crosson (1)

(1) Picarro, Inc., Santa Clara, United States (rpanetta@picarro.com), (2) Laboratoire des Sciences du Climat et de l'Environnement (LSCE), Gif-sur-Yvette, France

A growing awareness that urban and suburban areas are greenhouse gas emissions hotspots has resulted in calls to quantify and study the primary sources from cities. Of especial focus is methane, which is 25 times more potent as a greenhouse gas than CO_2. Early studies have hinted at obvious sources of methane, such as industrial sites, landfills and waste water treatment plants. However, the size, density and diversity of urban and suburban areas suggest that these cannot be the only significant sources of methane emissions. Recent work has revealed that leaks from natural gas distribution networks are a major source of methane emissions in Boston, the totality of which has the potential to swamp all other sources of urban methane in accounting schemes. Such a result also indicates that not all methane sources are obvious, and that in-depth on-site investigation across large swaths of urban areas will be needed to properly appreciate the full magnitude of methane emissions from urban and suburban areas across the globe. The challenge of measuring methane emissions from large urban areas is greatly reduced by employing the Investigator, which combines the high precision of cavity ring-down spectroscopy with geospatial and metorological data. In this presentation, we will show results of such Investigator runs conducted between November 2011 to December 2012 in and around Amsterdam, Geneva, Istanbul, London, and Paris. A number of significant sources were common to all locations including the obvious (landfills, industrial sites and waste water treatment plants), the disconcerting (natural gas leaks at street level) and unexpected (recreational marinas, "green" public transport). The overall view from the Investigator runs show that even though emissions sources in and around major European cities are highly diverse, they share much commonality, suggesting harmonized emissions reductions schemes across borders are possible. The results also clearly indicate that the infrastructural problems that give rise to natural gas leaks from distribution networks are very real across Europe. Finally, it demonstrates the relative ease with which large-scale spatial emissions data can be collected using the Investigator.