Case Study

Unitil

Enhancing Methane Emission Reductions with Picarro's Direct Measurement Technology

PICARRO

Operating in Maine, Massachusetts, and New Hampshire
105,000 natural gas customers
$2.13 billion in asssets
2,160 miles of network

Introduction

In 2023, Unitil, an investor-owned utility company serving natural gas and electric customers across Maine, New Hampshire, and Massachusetts, embarked on a groundbreaking methane emissions assessment initiative. Leveraging Picarro's Network Intelligence solution, Unitil sought to improve the accuracy and efficiency of its methane emissions monitoring program. This case study explores how Unitil used vehicle-based direct methane measurements to surpass traditional estimation methods, accurately identify super-emitters, and streamline repairs to reduce methane emissions.

Project Description

Unitil's natural gas distribution system spans over 2,160 miles, with a mix of modern and leak-prone materials. In an effort to align with regulatory standards and enhance its sustainability initiatives, Unitil adopted Picarro. The technology allowed Unitil to gather detailed, real-time data on methane leaks, quantify emissions at flow rates spanning 5 orders of magnitude, and prioritize repairs for the largest leaks—those contributing the most to total emissions.

During the initial phase of the project in 2023, Unitil achieved 92% coverage of its Massachusetts assets, using a four-pass survey protocol over two nights. This provided comprehensive insights into the state of the network and the magnitude of emissions from various sources, enabling the company to focus its repair efforts on the most significant emitters.

Approach

Unitil's adoption of Picarro involved several key steps:

Measurement-Based Emissions Inventory: Unlike traditional emissions factor-based methods, Unitil used direct measurements to create a more accurate emissions inventory. This method captured real-time data on both large and small leaks, providing a precise view of methane emissions across its network.

Target Super-Emitters: Consistent with other operators in the natural gas industry, Unitil identified that a small percentage of leaks (5%) were responsible for approximately 50% of total emissions. By focusing on these super emitters, Unitil could achieve significant emissions reductions with targeted repairs.

Data-Driven Leak Prioritization: Picarro enabled Unitil to rank leaks by size and emission flow rate, allowing for a more strategic and less disruptive repair process. This approach minimized operational strain and maximized emissions abatement.

Comprehensive Network Coverage: In the first month, Unitil's Picarro deployment covered 249 miles of mains and more than 16,000 services in its Massachusetts service area, gathering crucial data that informed repair decisions and future planning.

Results Achieved

More Accurate Emissions Inventory: Unitil's use of direct methane measurements revealed that the greenhouse gas inventory (GHGI) factor was nearly three times higher than estimated using traditional methods, while the EPA's emissions factor was almost 10 times greater than actual measured emissions. This underscores the importance of accurate, real-time data for regulatory compliance and emissions reduction.

Identification of Super-Emitters: By focusing on the largest leaks, Unitil was able to prioritize and repair leaks that were contributing disproportionately to overall emissions, significantly improving efficiency and emissions abatement.

Reduction in Repair Time: The ability to geolocate super-emitters with precision allowed Unitil to reduce the time and resources required for repairs, cutting down operational costs while accelerating emissions mitigation efforts.

Improved Regulatory Compliance: Unitil's direct measurement approach aligns with industry standards such as the Veritas and OGMP 2.0 protocols, ensuring compliance with both current and future regulatory frameworks for methane emissions reporting.

Conclusion

Unitil's innovative use of Picarro marks a significant advancement in methane emissions management. By shifting from traditional, estimation-based methods to a data-driven, direct measurement approach, Unitil has gained a more comprehensive understanding of its emissions landscape, allowing it to target the most significant emitters efficiently.

This strategy not only enabled Unitil to achieve substantial emissions reductions but also positioned the company for continued success in its sustainability initiatives. As Unitil expands its use of Picarro's technology, it is well-positioned to transform from leak detection to Network Intelligence.

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The results from this project demonstrate that direct methane measurements can significantly improve the accuracy of emissions inventories, streamline repairs, and enhance regulatory compliance. Moving forward, Unitil plans to leverage these insights to further optimize its emissions reduction strategies and continue its progress toward achieving long-term sustainability goals.

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