

Duke Energy powers AI platform for methane reduction

First-of-its-kind, end-to-end methane emissions monitoring and remediation solution





Call for change

For Duke Energy, one of the largest energy-holding companies in the United States, reducing methane emissions is part of its commitment to future generations. Methane is a potent greenhouse gas with 80 times the global warming potential of carbon dioxide over a 20-year period. It makes up nearly 10% of annual greenhouse gas emissions—and the energy sector is one of the largest US methane emission sources, according to the US Environmental Protection Agency (EPA).¹ Tackling this challenge is pivotal in the short-term climate fight and to the company's energy transition; acting now will have immediate effects.

Duke Energy has set ambitious industry innovation and sustainability goals—it aims to reduce the company's carbon emissions by at least 50% by 2030, reach net-zero methane emissions for its gas distribution business by 2030, and reach net-zero carbon emissions by 2050. To achieve this, it will

need innovative, technology-powered approaches to detect, monitor and remediate emissions.

Current EPA regulations require natural gas companies to estimate emissions. This is typically done using foot patrol inspections along hundreds of miles of pipeline and complex desktop calculations dictated by regulations. With 1.6 million natural gas customers and growing demand, Duke Energy knew this approach would make it virtually impossible to meet its net-zero targets. It needed real-time data to help teams quickly identify pipeline leaks and repair them. Rapid technology changes promised a way to reach net zero.

To improve accuracy, Duke Energy began testing satellites for detecting leaks on its natural gas system. However, it needed help to develop a rigorous, end-to-end approach that would monitor emissions and lay the foundation for predictive maintenance.

¹<https://www.epa.gov/sites/default/files/2021-04/documents/us-ghg-inventory-2021-main-text.pdf>

When tech meets human ingenuity

Duke Energy brought in Accenture, Avanade—a joint venture between Accenture and Microsoft—and Microsoft to help it transform its processes and make progress against emission targets. The team had a bold vision to accelerate achievement of net-zero emissions not just for Duke Energy—but across the industry.

Duke Energy and Accenture set their sights on co-innovating a pioneering solution that could lay the foundation to elevate industry and regulatory standards.

Duke Energy tapped into Accenture's and Avanade's deep technology capabilities and partner ecosystem to define an innovative end-to-end solution

that significantly improves leak surveys, emission calculations and leak remediation. The result is a first-of-its kind cloud platform that uses advanced methods, including satellite monitoring, Microsoft Azure analytics and artificial intelligence (AI) powered by machine learning, to detect and monitor baseline methane emissions from natural gas distribution assets such as pipelines and gas meters.

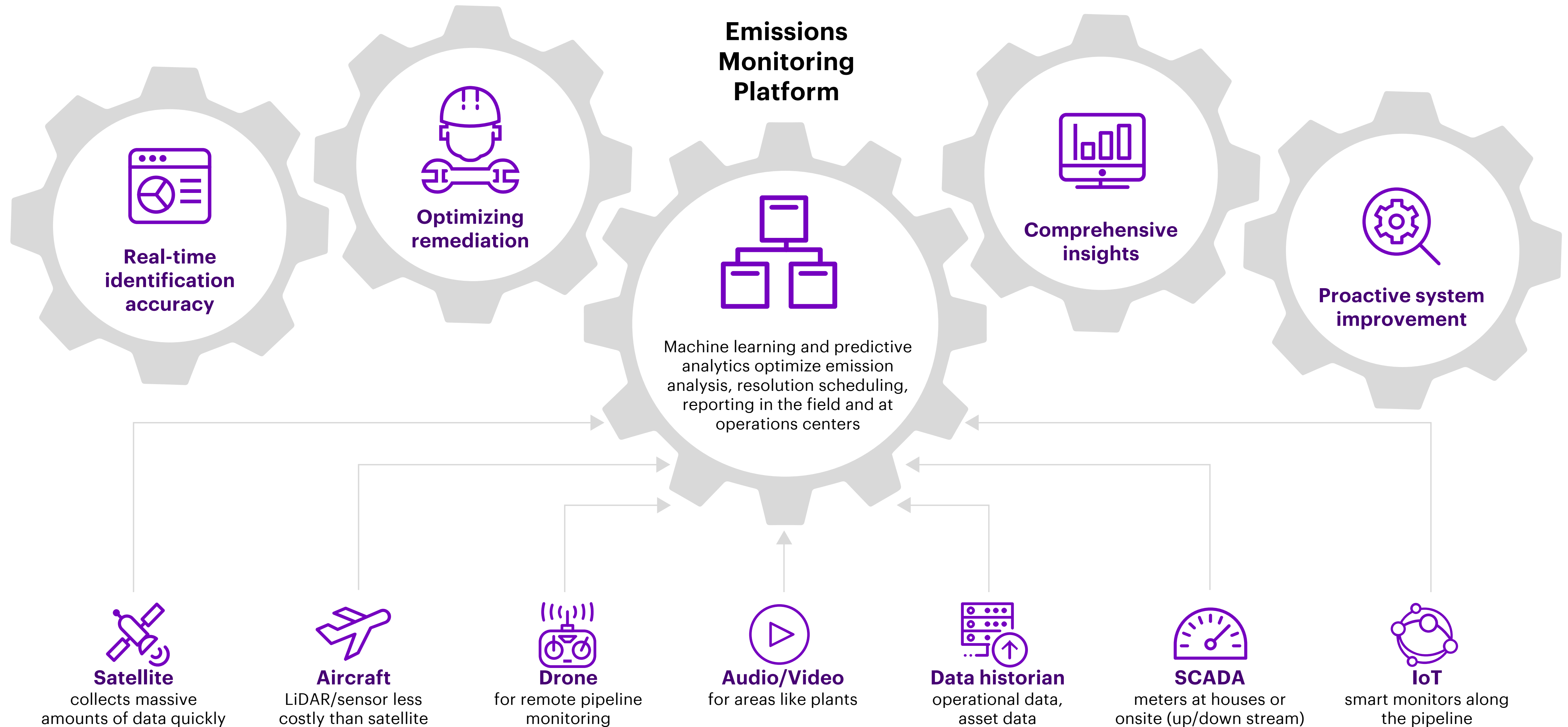
Accenture and Avanade worked together to design the platform using the power of Azure, defining a new approach that enables precise, automated detection of trace levels of methane emissions.

The cloud platform ingests and calculates high volumes of real-

time leakage data from satellites, ground-level sensing technology and other sources. It then quantifies and prioritizes findings in graphic dashboards, making data easily consumable at multiple levels of the organization, including leadership, planning and field force management.

Duke Energy and Accenture teams conducted a pilot for fugitive emission detection, executing monthly satellite captures on its pipeline system in South Carolina. Learnings from this pilot will allow the team to refine and scale the technology to other Duke Energy jurisdictions. As the solution rolls out, Accenture will continue to add new data sources, refine the AI and optimize reporting to address all methane emissions.

Methane emission monitoring platform



A valuable difference

Near real-time leak remediation will help Duke Energy to achieve its emission-reduction goals while making operational systems more flexible and resilient. The platform is already delivering results with more accurate information and measurements.

With the sophisticated technology enabling automated leak detection closer to the source, pipeline management and operations teams can dispatch repair and maintenance crews to targeted sites for remediation based on near real-time information provided on Azure cloud-enabled mobile devices. With accurate geolocation data, workers are finding leaks in minutes compared to physical inspection of pipelines and other assets—and repairing them more quickly.

For Duke Energy, the innovation has been worth going above and beyond EPA requirements for methane emission tracking. Leadership has a better understanding of emissions and is better equipped to take effective action. A holistic view of emissions is helping to improve operations and regulatory reporting. Accurate insights enable

management to make more informed decisions about assets, processes and operations, improve workforce efficiency and lower costs. These changes are helping to deliver continued value for all stakeholders.

The data and technology are also proving useful in other ways, for example, identifying and managing vegetation encroachment on assets. There is considerable potential for future use of these technologies. For example, the continued refinement of the combination of satellite monitoring and machine learning can help Duke Energy map historical leaks and identify system vulnerabilities to prevent leaks from happening in the future.

Once scaled across all asset types, emission categories and jurisdictions, the platform will help Duke Energy's natural gas business reduce methane emissions and achieve its net-zero methane goals for 2030. Importantly, this solution has the potential to accelerate the journey to net-zero for the industry. This translates into cleaner air and better health for all.





The current industry standard uses calculated data to report methane emissions, which leaves room for inaccuracies when it comes to actual methane levels. This platform will reimagine how natural gas local distribution companies calculate methane emissions and perform leak surveys, and improve the expediency with which leaks may be repaired, resulting in dramatically lower methane emissions.

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