



Rethinking emissions
management:
A pathway to the future

03

No time to waste

04

Now is the time

06

Estimation
is no longer
good enough

07

A great
opportunity... and
some significant
challenges

08

Three major
challenges in
the emissions
management
space

12

Seizing the
opportunity

19

What does the future
hold for emissions
management?

21

Creating a bridge
to the future

22

Source Information



CLIMATE CHANGE:

No time to waste

According to the latest Intergovernmental Panel on Climate Change (IPCC) report, *Climate Change 2022: Mitigation of Climate Change*, global greenhouse gas (GHG) emissions need to peak before 2025 and then drop by 43% by 2030 to avoid the most extreme effects of climate change. Moreover, according to IPCC estimates, methane alone would need to decline by almost a third in less than a decade.¹

While lowering GHG emissions is an immediate imperative, it is also an incredible opportunity. Investors are increasingly interested in companies with a demonstrated ability to monitor and abate their emissions. At the same time, market conditions are set to change and begin favoring products like lower emission natural gas, underscoring the need for precise measurement and increased transparency when reporting emissions. Companies that are proactive in emissions measurement and management can set themselves up as market leaders.

Of course, while the opportunity represented by improved emissions management is significant, there are still obstacles blocking the way to meaningful emissions reduction. First, setting up a baseline for actual emissions has proven difficult for many companies. Most emissions remain estimates rather than actual measurements, making it difficult to show tangible, transparent progress in reducing emissions. Second, there is a real concern in some sectors of the economy, like oil and gas production, that emissions reduction will be prohibitively expensive.

Fortunately, solutions already exist that can overcome these obstacles, but companies hoping to reap the economic and social benefits associated with reducing their emissions will still need to adopt the right solutions for a rapidly changing business and regulatory environment.

Now is the time

There is already significant movement in both the public and private sectors that reveal a commitment to making progress on emissions reduction.

In the public sector, over 110 countries have joined the Global Methane Pledge, aimed at cutting methane emissions 30% by 2030. Additionally, there are a number of upcoming regulations and emissions disclosure standards driving the disclosure of Scope 1, 2, and 3 emissions.

“Cutting back on methane emissions is one of the most effective things we can do to reduce near-term global warming and keep to 1.5°C.”

Ursula von der Leyen, President of the European Commission

In the United States, the Securities & Exchange Commission (SEC) recently proposed a rule that will require greenhouse gas emissions reporting of all publicly traded companies in the US by the year 2024. And the US Department of Energy has also set up the “Better Climate Challenge” initiative to work with companies to reduce portfolio-wide scope 1 and 2 emissions by at least 50% within 10 years, all without the use of offsets. Over 90 large companies have already joined the Challenge.

In Europe the EU is finalizing its Corporate Sustainability Reporting Directive, which will be supplemented by a set of additional standards. Finally, the influential non-profit International Financial Reporting Standards (IFRS) Foundation is currently formulating its own sustainability disclosure standards, which include global GHG emissions standards.²

While regulations are encouraging the private sector to embrace improved emissions management, increasing demand from customers to understand the emissions data of the products they consume is also putting pressure on companies. And improved emissions monitoring via advanced software applications, better data reporting techniques, and new continuous monitoring technologies now allow companies to provide the data customers want.

Collectively, all these developments underscore the importance of detection, measurement, quantification, and mitigation of GHG. This is particularly important for the oil and gas sector. As a result, many of these companies are now interested in tracking emissions along the value chain, from production to transmission, and from distribution to product use.

In fact, the industry itself has created partnerships to establish several initiatives to tackle GHG emissions. One of them, the Oil and Gas Methane Partnership (OGMP), has even designed its own reporting framework backed by players from various segments of the natural gas value chain.³





Estimation is no longer good enough

Most emissions today are estimated, but that leaves the data vulnerable to inaccuracies. A 2021 Boston Consulting Group report showed serious issues in many companies' emissions monitoring and reporting, with an estimated 30%-40% error rate.⁴ And a recent report from the International Energy Agency (IEA) concluded that global methane emissions from the energy sector are about 70% greater than the amount national governments have officially reported.⁵

“I’ve never seen as much demand for independent and verified tracking of methane and CO₂ emissions as in the last 24 months.”

Wendy Lam, Product Director for Emissions Measurement and Detection, Baker Hughes

The combination of increasing interest in emissions management and a simultaneous need for more accurate reporting is driving many companies to look for partners who can quantify what a company's real emissions are while also independently certifying and validating the low methane or carbon intensity of their operations.

Unfortunately, the task is not without its difficulties.

A full-page photograph of a male worker in a green Baker Hughes uniform, white safety helmet with a clear visor, and safety glasses. He is standing in an industrial environment, possibly a refinery or chemical plant, with large metal structures and pipes visible. The lighting is dramatic, with strong highlights and deep shadows. The Baker Hughes logo is visible on his chest and sleeve.

A great opportunity... and some significant challenges

Pressure from regulators, customers, and investors is creating an opportunity for companies to seize the current momentum in the marketplace and rapidly advance their own emissions measurement and management. But first, we must acknowledge three major challenges in the emissions management space.



Three major challenges

in the emissions
management space



The first challenge: Sources of uncertainty

There is a great deal of uncertainty in emissions management from both a regulatory and technological perspective.

Currently, emissions management is not being done in a consistent manner, largely due to a patchwork regulatory framework and an evolving set of voluntary emissions reporting standards. Regulations not only differ based on jurisdiction but are also changing at different rates in different places. For example, rules in the European Union are evolving rapidly while those in many developing economies are moving more slowly.

And the changing nature of regulations can make it difficult for companies to know the exact rules they will need to play by in the future. While there are certainly indications of broad trends, like methane regulations becoming stricter across the globe, the details that companies could use to plan their methane emissions management remain difficult to determine.

In addition to regulatory uncertainties, there are other less traditional sources of ambiguity. For example, there is

“There’s probably no other area of public policy more dynamic than energy policy.”

Stuart Levenbach, Energy Transition Policy and Funding Leader, Baker Hughes

uncertainty among some companies about what technology they should apply to the problem. There are multiple effective emissions management technologies on the market, but some organizations are wary of choosing the wrong one for their needs.

While many emissions monitoring and reduction technologies on the market are considered to be tried and true, it is unclear how long these solutions will remain economically viable in the face of competition and changing regulations. That has left many companies wondering which set of tools is best for them in a market where the rules are prone to change.

The second challenge: An avalanche of data

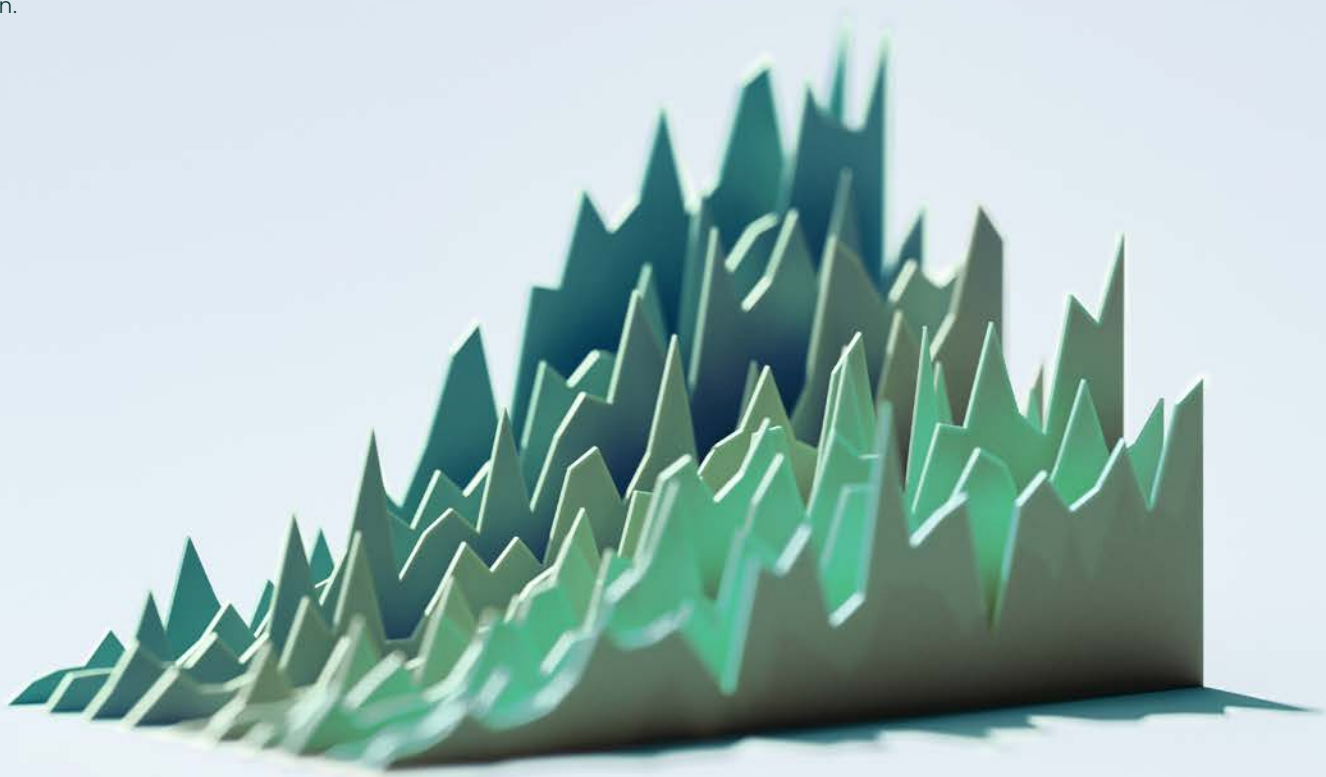
Accurate emissions management will not only create a staggering amount of raw data but also different types of data that may be difficult to track, store, and operationalize.

A significant amount of the existing monitoring technologies will not meet the methane reduction goals laid out by regulators because they are too intermittent to provide realistic emissions measurements. This may result in a requirement for continuous emissions monitoring to comply with emerging regulations.

But continuous monitoring brings new data challenges, including exponentially more data than has been generated by emissions monitoring in the past, along with the accompanying challenge of collection, storage, and data visualization.

And while continuous monitoring can deliver more accurate numbers, even the most accurate data can still be fragmented, fail to deliver granular insight at the equipment level, or provide limited real-time insights. In addition, inefficiencies in the data management process can prevent companies from identifying emission reduction opportunities beyond those already obvious.

That means the best data needs to be more than just accurate. It also must be organized and point to the most efficient ways to reduce emissions.



The third challenge: From measurement to reduction



**the challenge is
matchmaking – finding
the solutions that fit
best for certain assets
and operations.**

The goal is not to simply design a perfect emissions measurement strategy. Ultimately, the objective is to reduce emissions. As more companies adopt the more accurate measurement technologies that are currently on the market and data transparency increases, the pressure to show improvements in emissions over time will also increase.

The good news is that there are many emissions reduction solutions available, and these solutions have already been used across several sectors of the oil and gas industry. Now the challenge is matchmaking – finding the solutions that fit best for certain assets and operations.

Right now, most companies are in the process of creating multiple solution abatement plans, which include before and after measurements of emissions benefits, along with economic and operational analysis. The companies that can best identify, prioritize, and plan will be the ones that eventually reach the lowest emissions levels and the best capital efficiency.

“We have the opportunity to do something really interesting, really powerful, and really impactful. We’re talking impactful on a global scale.”

Ben Linke, Vice President – Emissions Management, Baker Hughes

Seizing the opportunity

Despite these challenges, the current moment in emissions management represents a tremendous opportunity.

Developments in measurement and quantification of emissions will help companies better report their overall emissions, increasing transparency and enhancing companies’ social license to operate. At the same time, the opportunities to abate and prevent emissions are also growing, getting the world closer to goals set out by international climate agreements.



From awareness to action: A five step approach to reducing emissions



Start at the beginning

Assess your baseline and identify emissions sources. This provides a starting point to measure improvement against desired target.



Monitor and measure

There are different methods for quantifying emissions. Pick an approach that helps meet sustainable targets but also allows for an adjustment of plans where necessary.



Create a roadmap

Set reduction targets and determine how to achieve them. Consider basing your roadmap on industry best practices or standards.



Mitigation options

When it comes to mitigating emissions, one size doesn't fit all. Explore every option to determine which works best in a particular situation.



Communicate and report

Communicate progress made to stakeholders, industry commitments, and society using reliable, transparent, and verified data.



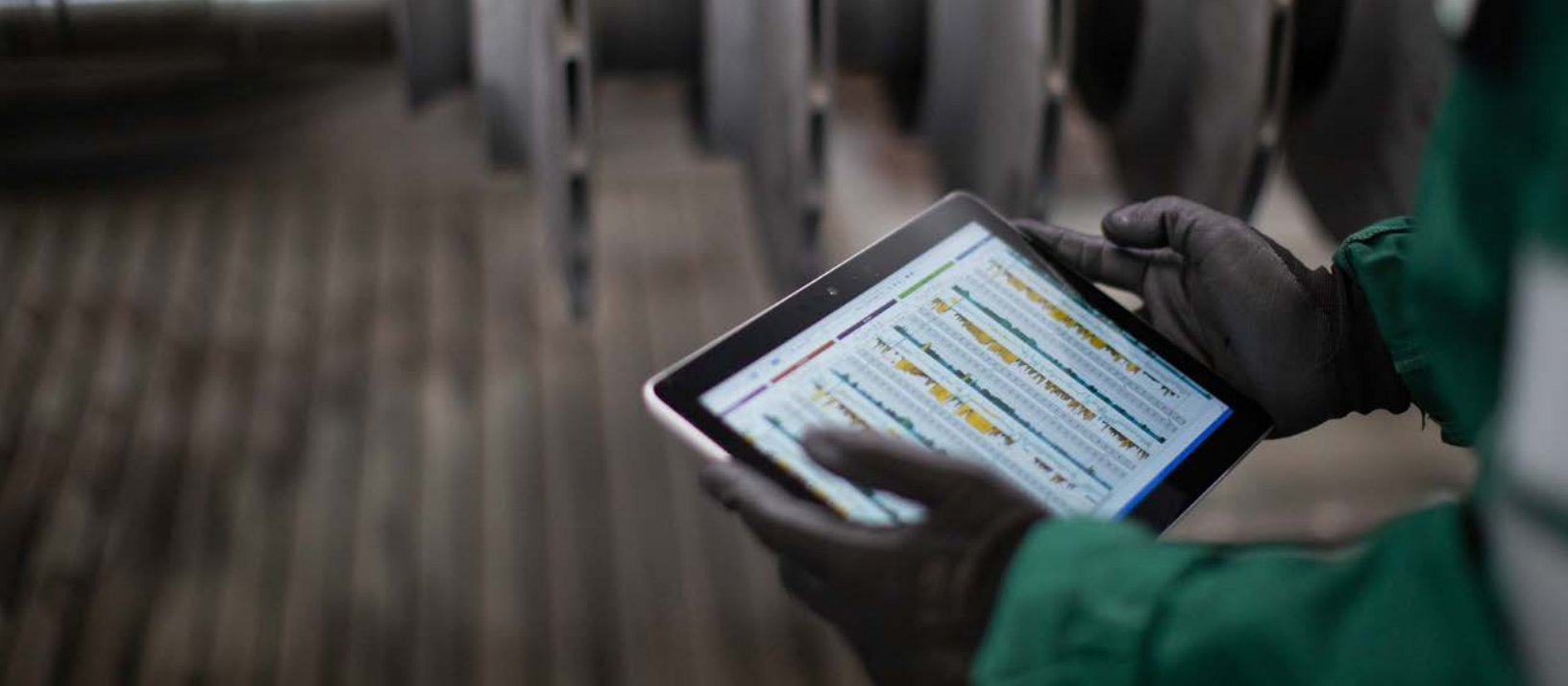
Addressing the first challenge: Sources of uncertainty

While companies may not have a crystal ball that can predict the future of regulations or see the next technological breakthrough before it occurs, they can act now to deliver on their longer-term emission reduction targets.

Proactive voluntary detection and mitigation of emissions can help reduce regulatory and reputational risks that many companies face today. Fully integrated monitoring technologies that actively track and manage emissions set companies up as future market leaders, allowing them to get ahead of their competition while also meeting many of their most prominent business goals.

Companies can work with partners that help them leverage advanced measurement techniques and work both across an enterprise and at an equipment level, with alerting features enabling fast response to emission anomalies. For example, an integrated monitoring solution like Baker Hughes' LUMEN provides continuous monitoring through ground-based or aerial-based methods to detect methane leaks, quantify the rate of leakage, and deliver real-time alerts so an operator can take immediate action.





Addressing the second challenge: An avalanche of data

The information a company receives regarding issues like leaks directly influences the actions they choose to take. But with the large amount of data associated with continuous monitoring, the numbers need to both clearly articulate the problem and point to a solution.

However, not all solutions are created equal. Many players have a niche focus only on data. While data is a crucial part of determining the scope of the challenge, addressing data needs is only a part of the problem. Even when a solution collects the right data, additional expertise is required to identify the actual emissions challenges and assist with the right course of action. The key to both managing and operationalizing data is a holistic approach that involves players who also have operational know-how, abatement solutions, and engineering capabilities.

That means partnering with emissions management providers knowledgeable about assets, production, safety requirements, and general industry standards so their solutions can effectively utilize data to reduce emissions across the value chain.

Addressing the third challenge: Measurement is only part of the process

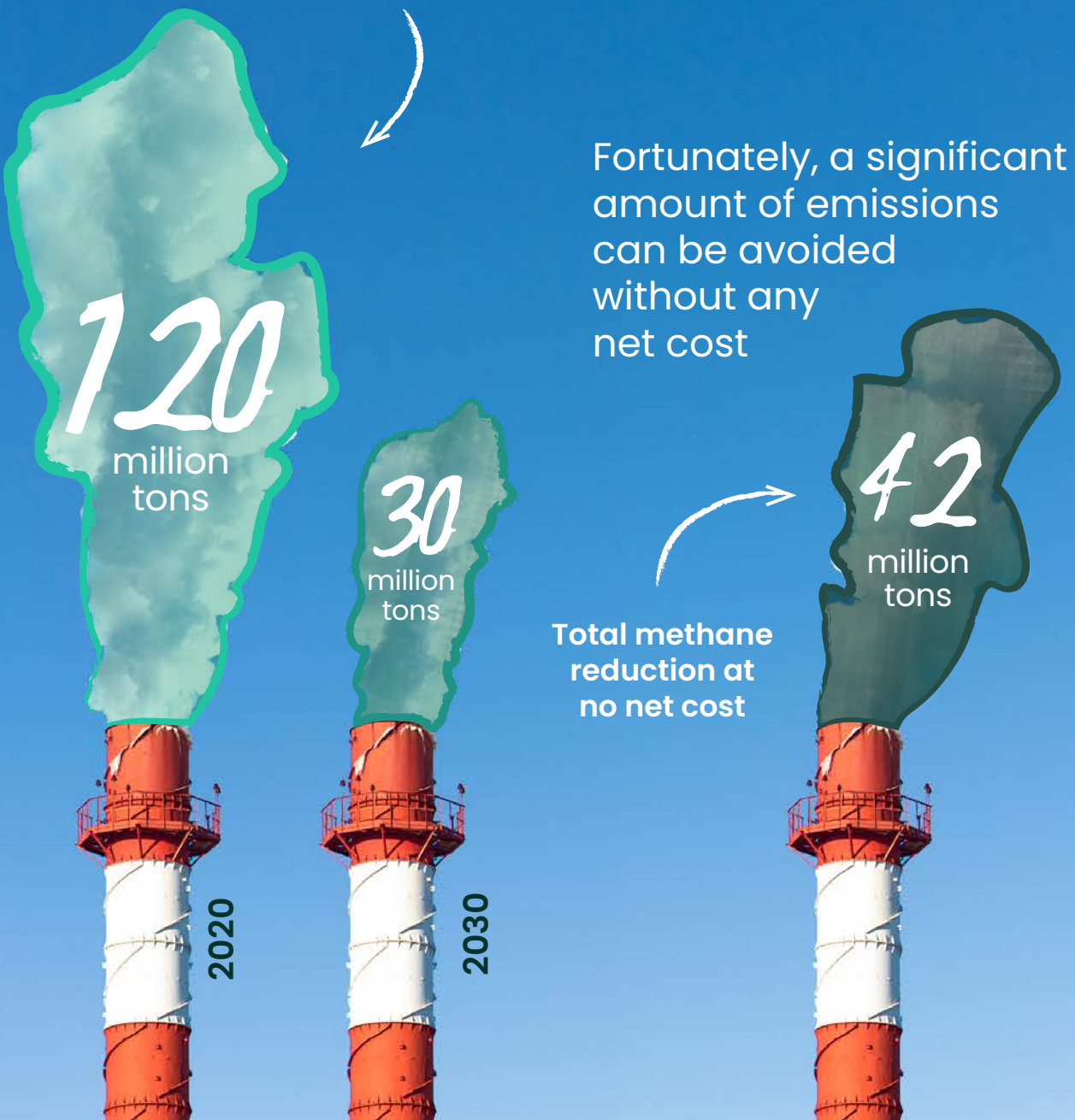
There are actually a number of opportunities to increase revenue via abatement. That's because many abatement solutions are attractive not only from an emissions reduction point of view, but also because they increase efficiency, boost production, and reduce waste.

Analysis from the International Energy Agency (IEA) shows that the global oil and gas industry can eliminate 40% of its methane emissions at no net cost.⁶ But finding and applying the technologies that lead to the best capital efficiency requires deep understanding of equipment, operations, and local requirements. That means providers have an important role to play in helping oil and gas companies identify abatement solutions to reach immediate emissions reductions.



In the IEA's Roadmap to Net Zero Emissions, methane emissions from fossil fuel operations need to fall by around 75% between 2020 and 2030

Required methane emissions reduction







What does the future hold for emissions management?

In the short term, there will be an increasing number of stakeholders, especially from industry, working together to set goals and establish roadmaps for emissions reductions to ensure both competitiveness and progress in lowering specific emissions. This will lead to increased transparency about actual emissions rather than just estimates. In the near future, we will know an incredible amount about true emissions, creating opportunities for greater efficiency.

In the medium term, we will begin to see actual emissions numbers being treated more like financial statements. The rules regarding emissions by the SEC in the United States and proposed methane regulations by the EU are simply the beginning. Emissions data will be audited and publicly available. Getting ahead of this process can give companies a competitive edge by demonstrating good stewardship and efficient use of assets. Just as importantly, it will also require less haste to catch up with reporting regulations in the future.



Additionally, we will begin to prevent emissions via new technologies. Improved detection and quantification will help us understand where the biggest problems consistently occur, and we will begin preventing these issues before they happen rather than simply trying to abate the resulting emissions after the fact. For example, by knowing a pipeline's corrosion rate, we will be able to repair it before it begins leaking. This automation and anticipation of emissions makes management even more cost-effective.

In the long term, we will see a gradual transformation in the way emissions management is implemented. More direct measurement of emissions will enable a more accurate lifecycle analysis that will help the industry understand emissions over the life of a product. This, in turn, will create greater insight into how decisions made in one part of the value chain impact other parts of the chain. As a result, products like certified low-emission gas will likely become a reality.

Emissions management tech will also become more automated, shifting from widget-driven to data and analytics-driven via the increasing application of AI and machine learning. Combining AI with direct measurements and process-based predicted emissions that use physics-based models will lead to more intelligent models of emissions performance and smarter abatement planning.

By knowing a pipeline's corrosion rate, we will be able to repair it before it begins leaking. This automation and anticipation of emissions makes management even more cost-effective.

Creating a bridge to the future



Today, there is a broad spectrum of emission reduction solutions available. This provides companies, especially those in the oil and gas industry, the opportunity to work with partners to diagnose, prioritize, and abate emissions. But not everyone is taking advantage of these solutions.

In fact, there is already data showing that emissions intensity varies widely among both companies and countries. The best performing countries are more than 100 times better than the worst.⁷ Closing this gap, whether it be between countries or companies, is not only possible but also profitable. And because many emissions abatement solutions bring operational benefits, managing emissions can be sustainable and economical. In short, emissions management should be seen as a competitive advantage for companies, both today and in the future. That means the sooner a company can begin adopting the next generation of emissions management solutions, the sooner it can begin differentiating itself from its competitors.



Source Information:

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