

# ACCELERATING SUSTAINABLE ACTION THROUGH THE INTERNET OF THINGS (IOT)

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# FOREWORD

## ACCELERATING SUSTAINABLE ACTION THROUGH THE INTERNET OF THINGS (IOT)

As extreme weather increases in frequency and ferocity, and employee safety and wellbeing remains at the top of the news agenda, the global focus on key environmental and social issues is intensifying. Businesses are urged to play their part in solving these challenges.

In line with this, we're also seeing a shift in focus from planning and talking about Environmental, Social and Governance (ESG) targets to actually meeting these goals and demonstrating as much to customers, investors, and the general public. Corporate responsibility is very much growing in breadth and depth.

At the same time, companies are increasingly accepting improved ESG reporting and sustainability outcomes as a key driver of profitability and investment.

However, are firms sufficiently equipped to meet ambitious ESG targets, improve sustainability and boost profitability all at the same time? The simple answer is not yet.

This is where the use of the Internet of Things (IoT) becomes vital, helping to facilitate better real-time monitoring and reporting on key ESG metrics through reliable, always-on big data aggregation, analysis and analytics, leading to improved business sustainability outcomes.

The good news is, as highlighted in our previous report, *Industrial IoT in the time of Covid-19*, businesses have greatly accelerated their pace of IoT adoption over the past few years. The top drivers for IoT adoption in 2021 include the desire to improve operational efficiencies and business sustainability. Organisations are just starting to harness the full potential of IoT and this will mean better data, more robust ESG reporting and stronger sustainable outcomes very soon.

**// You can't manage what you can't measure, and automation and digitalisation of the data capture process to collect granular, real-time results, is becoming increasingly essential. //**

This year, with pressure growing to improve ESG reporting and broader sustainability behaviours, we decided to take a closer look at the concerns of technology and ESG leaders across five key industries that are vital for delivering against the global Scope 1, 2 and 3<sup>1</sup> decarbonisation agenda – namely agriculture, mining, oil and gas, utilities and transport. We surveyed them to get a better understanding of their current use of IoT to improve ESG reporting and sustainability outcomes, as well as their expectations for what space-based technologies can deliver for sustainability on Earth going forward.

Positively, most agree that IoT can provide the insights to help companies provide transparent data for ESG reporting purposes. You can't manage what you can't measure, and automation and digitalisation of the data capture process to collect granular, real-time results, is becoming increasingly essential to help organisations track their ESG progress more accurately, in addition to generating meaningful data to share with third parties to help improve sustainability practices more broadly.

What's more, sustainable outcomes driven by IoT solutions go well beyond external ESG reporting. Think of the value of being able to quickly identify or even prevent oil or gas leaks to reduce any negative environmental impact and ensure employee safety. Or being able to improve water usage and employee productivity in agriculture where field-based satellite IoT monitoring ensures full visibility into crop cultivation, through data analysis of a variety of factors from weather conditions to soil moisture and pest monitoring.

Unfortunately, some businesses are still struggling to leverage the full potential of IoT technology, with smaller firms in particular facing challenges resulting in delays to broader progress. While explanations for these difficulties may vary – with many pointing to cost and skills gaps as the key issues – the reality is, IoT is nothing without effective connectivity.

(continued...)



**JAT BRANCH**

Chief Commercial and Product Officer.

<sup>1</sup><https://www.carbontrust.com/resources/briefing-what-are-scope-3-emissions>

To realise the full potential of IoT solutions, cellular, fibre and Long Range Wide Area Networks (LPWAN) are essential, yet not entirely sufficient as they cover approximately 10% of the Earth's surface.<sup>2</sup> They simply cannot provide the global coverage that is essential to capture all the relevant data points, particularly with the most valuable insights often in the most remote locations, i.e. where extraction, agriculture or the movement of goods is taking place.

This is where satellite-based IoT communications architecture comes in. Today, satellite is the only way to ensure high and narrow bandwidth and reliable connectivity at the required latency anywhere in the world. No alternative can connect IoT devices anywhere on the planet, meaning many projects are only possible through satellite-enabled IoT.

Space-based technologies can unlock vast potential to decarbonise planet Earth, in addition to supporting broader sustainability targets. However, with time running out to halve emissions by 2030 and build a Net Zero world by 2050<sup>3</sup> every opportunity to improve sustainable outcomes matters.

As such, there is an urgent need for businesses to pick up the pace of IoT adoption, and ensure that ultra-reliable, global, weatherproof connectivity is not an afterthought, but a top consideration from the get-go.

For maximum impact, satellite technologies and the mission-critical data they transmit must be more readily included in decarbonisation and sustainability strategies, not only among key industry sectors, but by policymakers and regulators too. However, as this research report shows, fascinating contradictions in the world of ESG reporting and business sustainability first need tackling so governments, regulators and companies alike can effectively collaborate to drive the change we all need.

Ultimately, the message from us is simple. Satellite-enabled IoT must become a central pillar in global sustainability strategies. Doing so will add another powerful tool to our arsenal as we collectively fight to combat climate change and improve broader sustainability at speed.

## METHODOLOGY

This report is based on independent research conducted by Censuswide on behalf of Inmarsat, surveying more than 1,000 senior technology and ESG professionals with sustainability decision-making power across a range of business sizes (sole trader, 1-9, 10-49, 50-99, 100-249, 250-500 and 500+ employees).

Survey respondents spanned five industrial sectors (agriculture, mining, oil and gas, utilities and transport).

Respondents spanned across all major continents including Europe, North America, South America, Africa and Asia.

As such, the results are representative of a broad range of businesses at various stages of their sustainability and industrial IoT adoption journeys. Data collection took place in August and September 2022.

## TERMINOLOGY

Please note, the term 'ESG' is used throughout this report to refer to a set of Environmental, Social and Governance-focused criteria and corporate policies that encourage companies to act responsibly and communicate their environmental progress and performance.

The term 'sustainability' refers to sustainable business outcomes more broadly, including sustainable business and environmental performance matters. The term 'business sustainability' refers to certain measures taken by companies to improve their business performance and business resilience to also deliver sustainable outcomes (e.g. lower carbon emissions and lower business costs as a result of energy efficiency improvements). 'Environmental sustainability' implies the responsibility to conserve natural resources and protect global ecosystems (e.g. save fresh water as a result of the use of intelligent IoT solutions).

<sup>2</sup><https://www.saftbatteries.com/energizing-iot/sensor-space-how-saft-batteries-support-satellite-iot-connectivity-ensure-continuous>

<sup>3</sup><https://www.inmarsat.com/en/insights/corporate/2022/space-around-us.html>



# SUSTAINABILITY AND IOT: EXECUTIVE SUMMARY

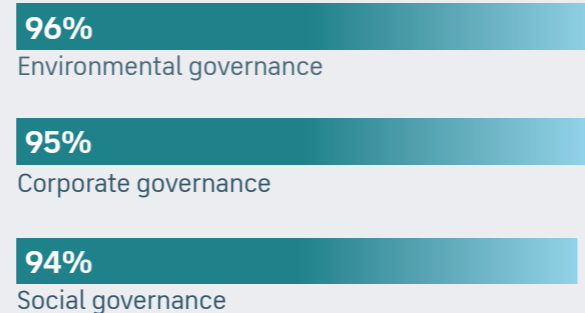
Improved business sustainability is an increasing priority across all industries as the world looks to combat climate change and overcome broader negative environmental and social impacts while simultaneously improving profitability. Emerging technologies such as 5G, blockchain and AI are unlocking new use cases for smart, connected devices that make up IoT. In response, technology-focused organisations are rolling out sustainability programmes with IoT at their heart. This means designing new products and services and implementing new processes, with specific environmental, social and governance (ESG) targets in mind in addition to broader sustainability goals.

While the specific challenges each industry faces as it attempts to improve its sustainability credentials vary, several common themes emerged from this research. It explores how organisations use insights from IoT data to measure, report and tangibly improve their ESG performance, as well as highlighting the major contradictions emerging as companies come under increasing pressure to speed up their sustainability progress. These contradictions need to be explored and resolved before businesses can unleash IoT's full potential to help drive more sustainable outcomes. Respondents overwhelmingly agree that IoT has potential for quantifying sustainability gains in-house and across supply chains, as well as identifying further areas of improvement. This is potential we cannot afford to squander if we are to halt climate change and overcome broader sustainability-focused issues.

## Businesses across the board are taking their ESG responsibilities seriously

Respondents overwhelmingly agree that environmental issues are important to senior management at their business, with 96% indicating as much. The fact that corporate governance and social elements of ESG are given almost equal priority at 95% and 94% respectively, illustrates how sensitive respondents are to the need for action across the board.

## Individual elements of ESG almost equal in importance to senior management



### But the lack of trust among industry peers is a problem

Despite a clear desire for most businesses to become more sustainable across the board, respondents believe their competitors are more focused on creating 'green' business perceptions rather than tangible outcomes, with 76% doubting their peers' ESG reporting. This disconnect mirrors broader social mistrust in industry benchmarks and suggests seeing is believing when it comes to ESG performance, underscoring the value that detailed data can add to the credibility of such reporting. A point illustrated by the fact that 81% believe the use of IoT solutions to measure progress will help overcome deeply ingrained trust issues around their peers' ESG claims. IoT is therefore key to driving meaningful progress on ESG reporting and broader sustainability.

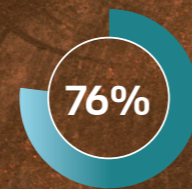
### The value of IoT solutions to help businesses measure, analyse and report on actual progress against their ESG targets is clear to all, but there are hesitations around sharing data externally

Most respondents agree IoT is critical to improving operational efficiencies (84%), commercial results (82%) and sustainability (82%). They also agree their business could be doing more to effectively leverage IoT solutions to produce the data needed to understand the impact of their ESG initiatives, with 80% planning to use more IoT for this purpose over the next year.

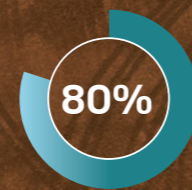
Although 81% of respondents agree that IoT solutions can help improve business sustainability and rebuild industry trust, only 47% would be happy to share all of their ESG data with third parties over the next 1-3 years to improve industry reporting and benchmarking. While mandatory ESG reporting is set to expand in terms of what it covers and who has to comply over the coming years, the current dichotomy suggests that the lack of trust may run deeper than respondents perceive. Substantial work needs to be done to create an environment where partners inside and outside organisations feel comfortable sharing both mandatory and additional voluntary ESG data so businesses can best collaborate to deliver the profound sustainability transformation we all need.



#### Lack of trust is a problem for all industries surveyed

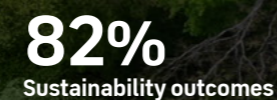


of respondents do not trust their peers' sustainability reporting



of respondents believe their peers are focused on perception rather than tangible sustainability outcomes

#### Respondents believe IoT is critical to overall business success



### Implementing IoT solutions can be tricky

Businesses are facing real challenges in deploying IoT - including hurdles related to cost, skills gaps, compatibility and - increasingly importantly - access to reliable, always-on IoT connectivity. All these factors have the potential to keep enterprises from fully realising their sustainability and commercial potential, making the right partnerships with connectivity and sustainability experts even more vital to ensure success.

### Finally, the consensus is clear - satellite connectivity holds the key to unlocking true sustainability progress via connected IoT solutions

The huge problems facing society today, from climate change to supply chain issues, are not local to specific cities or countries. They are global. If IoT is to play a part in addressing these problems, always-on connectivity is required everywhere, even in the most remote areas where terrestrial connectivity is not readily available.

Respondents overwhelmingly agree that ubiquitous satellite communications plays an integral role in the success of IoT initiatives. Particularly as companies increasingly seek to scale their ESG solutions into more remote, off-grid locations globally to monitor and analyse data via central hubs in near real-time. Therefore, reliable satellite connectivity is becoming even more mission critical as a cost-effective solution in remote regions, as well as providing backup for unexpected outages and downtime in networks overall. This is why 91% of respondents believe that satellite connectivity is key to improving the overall effectiveness of IoT-based sustainability solutions.

This report explores in more detail the key challenges, opportunities and priorities businesses are juggling as they look to improve their ESG reporting and broader sustainability credentials over the coming years and the role satellite-enabled IoT solutions will play in driving this change.

### Top challenges for businesses looking to leverage IoT solutions to become more sustainable

37%  
Cost of implementing IoT solutions

34%  
Access to reliable IoT connectivity

33%  
Difficulties implementing IoT solutions in remote locations

32%  
IoT skills gaps in organisations

### Satellite connectivity is integral to harnessing the full potential of sustainability-focused IoT technologies

91%  
of businesses believe satellite connectivity is key to improving the effectiveness of IoT sustainability solutions

# LACK OF INDUSTRY TRUST IN PEER ESG REPORTING RISKS STIFLING SUSTAINABILITY PROGRESS

Ever since businesses started to ramp up their messaging around their sustainability initiatives, the lack of verifiable ESG data to back these claims up has driven industry scepticism and mistrust. Our research reveals that it's not only environmental activists and consumers who are sceptical of companies' sustainability claims, but also their industry peers.

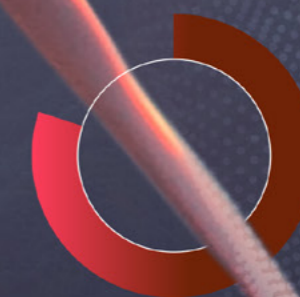
As businesses and supply chains become more complex and global in nature, the ability to monitor, analyse and act on environmental and business-linked ESG data is essential.

Inmarsat's survey of more than 1,000 senior managers with technology or ESG responsibilities across five major sectors found that three quarters (76%) do not believe their peers' sustainability claims.

Technology professionals tended to be more sceptical than their ESG colleagues, with 84% of technology respondents convinced the misrepresentation of businesses' sustainability progress was commonplace in their sector, vs. 67% of ESG respondents. Similarly, 80% of respondents feel their peers are more focused on perceptions around sustainability than tangible outcomes, with 85% of technology respondents and 75% of ESG respondents indicating as much.

Lack of industry trust in sustainability claims is no longer just an image concern, but is increasingly becoming an emerging liability risk for businesses. As recently reported by Reuters<sup>4</sup>, securities litigation involving misleading ESG claims is on the rise and financial regulators are stepping up their requirements for disclosures related to ESG claims. At the same time, a myriad of reporting frameworks, standards and stakeholder needs are making ESG reporting more and more complex, leading to increased reporting times and delaying outcome-oriented action.

Thankfully, there is promising alignment and optimism across both technology and ESG leaders on the use of IoT solutions to overcome these challenges. As IoT is not just enabling transparency in ESG reporting - it is also key to measuring and monitoring progress against ESG targets and facilitating actual sustainability change more broadly.



<sup>4</sup><https://www.reuters.com/legal/legalindustry/greenwashing-wave-hits-securities-litigation-2022-09-22/>



The overwhelming majority of respondents also agree that IoT solutions will help overcome trust issues (81%), while 82% agree that such solutions will be critical to actually improving sustainability outcomes. In addition, 78% also said they'd already seen a Return on Investment (ROI) for IoT initiatives that improve sustainability.

As a result, 80% plan to increase their use of IoT solutions to more accurately measure and understand the impact of their sustainability initiatives over the next 12 months, with many indicating they have significant expectations for the next 1-3 years.

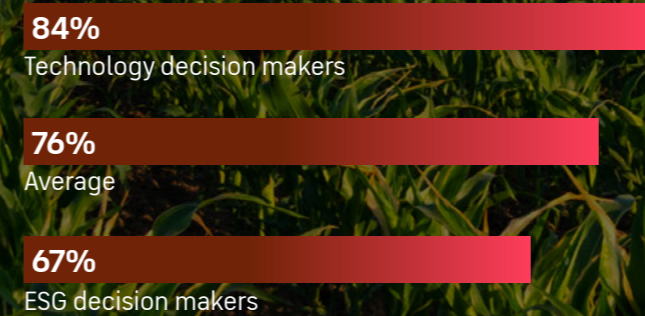
For instance, a third of respondents (32%) expect IoT to feed into more transparent and robust ESG reporting and help ease industry trust issues during this period. More than half (54%) believe it will be integral to improving the sustainability of supply chains (by enabling more ethical sourcing of materials, improving efficiencies, and helping to meet Scope 3 emissions targets).

Three quarters (72%) expect IoT to play a key role in strengthening their own environmental credentials (including reducing energy and water usage, minimising use of harmful pollutants and improving biodiversity).

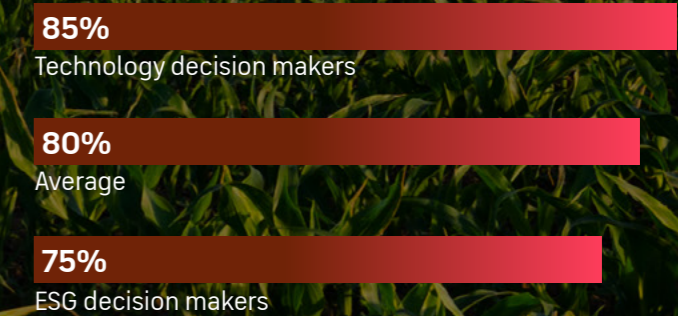
Although a lack of trust in ESG reporting is a pronounced issue across all the industries surveyed, one thing is clear: using IoT to collect and report on progress against ESG targets, will be a key part of their efforts to put this right and facilitate positive sustainability progress more broadly.



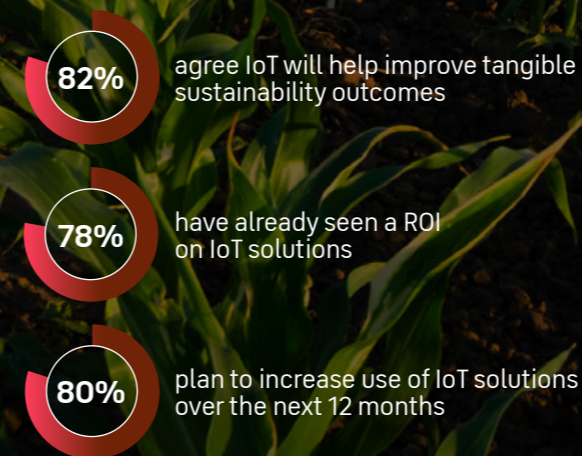
**Businesses sceptical about industry peers' ESG reporting**



**Businesses believe peers are more focused on perceptions than tangible sustainability outcomes**



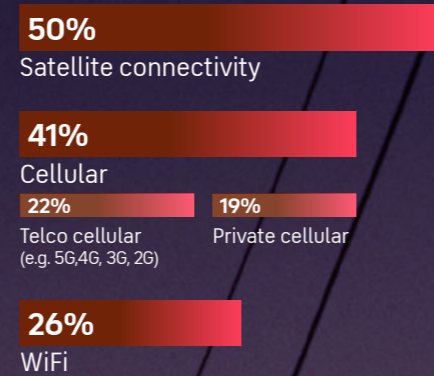
**Businesses believe IoT is the answer to improving sustainability**



**Businesses expect to see a range of positive outcomes as a result of deploying IoT technologies over the next 1-3 years**



**Businesses expect to turn to satellite networks more than traditional methods of connectivity over the next decade**



# UBIQUITOUS CONNECTIVITY IS ESSENTIAL

Despite clear consensus on the potential for IoT solutions to turbocharge sustainability efforts, significant challenges remain. In today's uncertain economic climate, the most commonly cited challenge was the cost of implementing IoT solutions (37%). This is closely followed by difficulties gaining access to reliable connectivity (34%).

This finding reflects the fact that as the digital transformation takes hold, people take for granted that the connectivity they use works anywhere. As 'Internet' in the name suggests, the true power of IoT solutions comes from their network connectivity, which enables real-time visibility and provides an alternative to slow, labour-intensive manual data collection processes. For IoT solutions to work as intended, having reliable, always-on connectivity where it is needed is essential. This is where satellite comes into play.

Satellite-enabled IoT delivers the coverage needed across a vast array of industries, with some of the most valuable ESG-focused data points being created in the most inaccessible places. Satellite connections can help extract data right across the global supply chain from even the most inhospitable locations with high reliability and low latency, while geostationary constellations can specifically provide businesses with high-quality connections for multiple moving assets across land, sea and air.

Positively, businesses are already increasingly viewing satellite networks as the key to enabling optimal IoT connectivity, ensuring robust, resilient connection irrespective of how remote or challenging the environment. Over a third (36%) of businesses are currently using satellite for their IoT solutions, with such networks set to become the most popular connectivity method for IoT in the future with half of all respondents (50%) expecting to leverage its capabilities over the next 10 years. Across the board, respondents also overwhelmingly agree that satellite connectivity is key to improving the effectiveness of IoT solutions focused on bettering business sustainability – 91%.

With increasing pressure to extend IoT initiatives into areas where conventional Wi-Fi, Ethernet or cellular networks are unavailable, it is clear that satellite will play an integral role in helping companies improve ESG reporting and deliver on their sustainability commitments over the coming years. The issue now is translating this knowledge into action and increasing the urgency in the uptake of satellite-enabled IoT solutions across key industries sooner rather than later.

# AGRICULTURE: SATCOM SET TO SOAR

With operations spread over large, often remote geographic areas, the agriculture industry faces many challenges that are a natural fit for IoT support. The sector has been a leader in deploying creative IoT solutions to date, for applications including field and ranch monitoring, precision farming, and infrastructure management. More broadly, fast-moving consumer goods (FMCG) companies are also increasingly looking to IoT solutions to support with Scope 3 emissions reporting and assessing their wider downstream environmental impact.

In agriculture, field-based satellite IoT monitoring ensures full visibility into crop cultivation, with data being gathered on weather, soil moisture, and the presence of pests or disease to help minimise any negative environmental impact and increase operational efficiencies. For livestock farmers, satellite connections are improving efficiency and peace of mind through real-time status updates on water troughs and fences, plus animal tracking and remote camera applications. Broader sustainability benefits also include water conservation, increased energy efficiency and lower fuel usage.

Our research suggests a significant proportion of businesses are already bought into the benefits of IoT-based ESG data. Two thirds (65%) of respondents believe IoT-enabled insights focused on improving monitoring of their business' internal and external environments – such as measuring the temperature of storage facilities or tracking weather conditions are key to improving sustainability more broadly. Elsewhere, other valuable IoT-enabled insights businesses believe will help improve sustainability include infrastructure monitoring and control

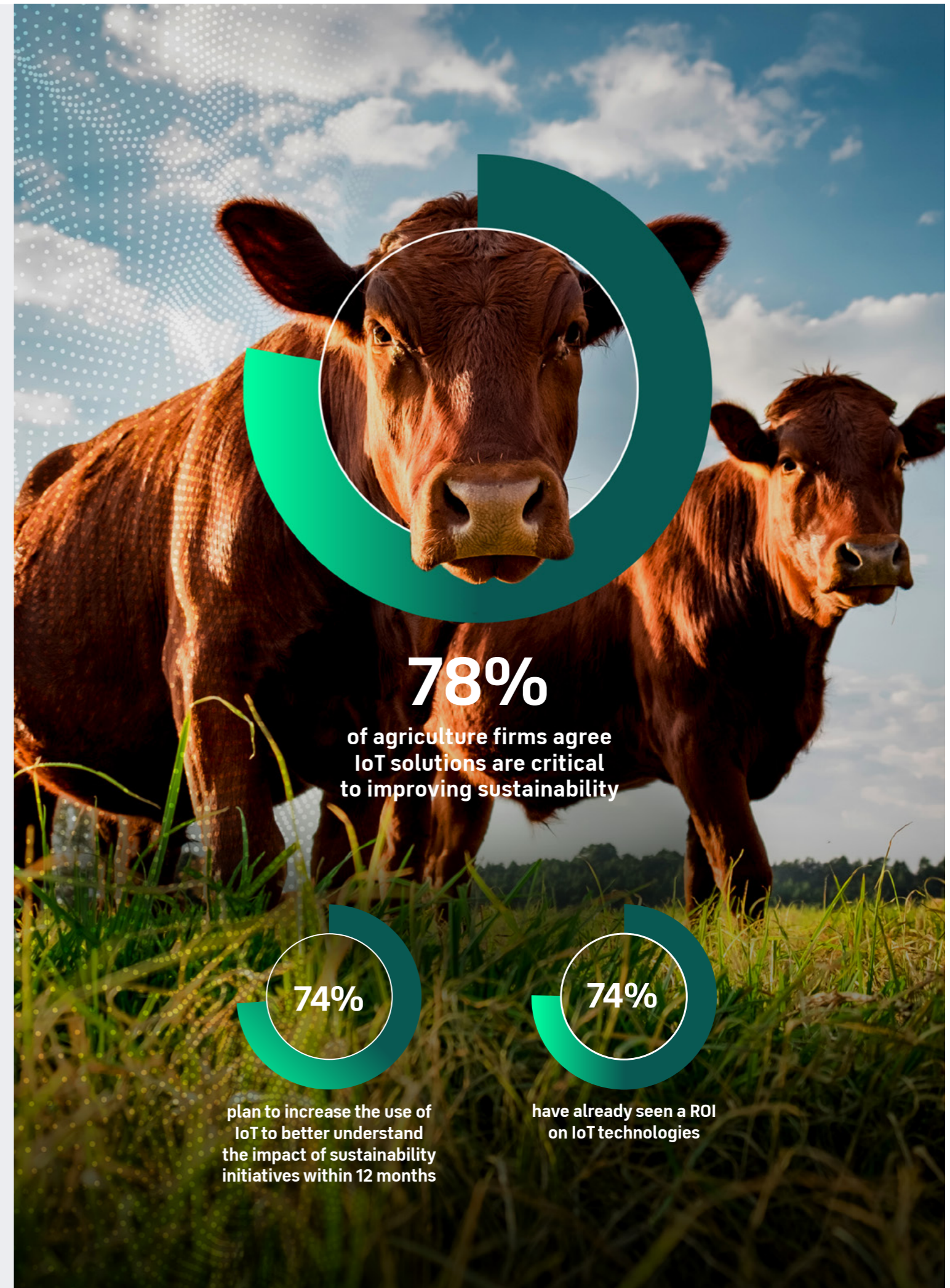
(i.e. efficiently managing resources like water and electricity and reducing travel to remote sites) (45%), inventory tracking (38%) and the use of remote communications tools to improve staff safety (33%).

Three quarters of businesses (78%) agree that IoT solutions are critical to improving sustainability, with 74% having already seen a ROI here. The majority of respondents also agree that IoT solutions are critical to improving operational efficiencies (80%) and commercial results (77%).

A similar proportion of businesses (74%) plan to increase their use of IoT to better understand the impact of their sustainability initiatives within the next 12 months. This correlates strongly with the 75% who believe the use of IoT solutions to produce actionable data will help overcome the lack of trust in sustainability claims and ESG reporting.

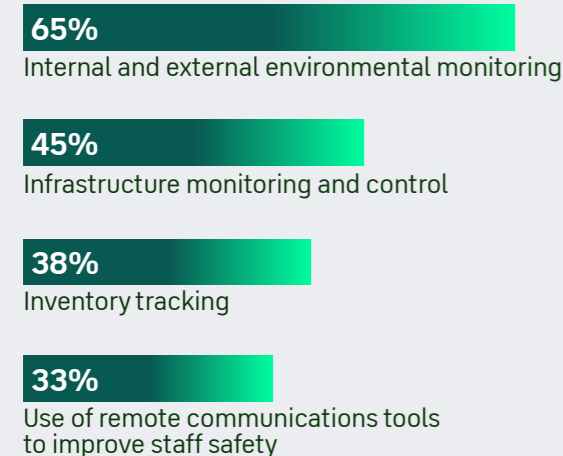
Of those already using IoT solutions, most report having seen a broad range of sustainability benefits. The majority (87%) have seen improved environmental outcomes as a result of leveraging such tools (including a decrease in water and energy usage, reduction in harmful pollutants and improvements in local biodiversity).

**86%**  
of agriculture firms believe satellite connectivity is key to improving the effectiveness of IoT sustainability solutions



Two thirds (65%) have seen improvements in the sustainability of their supply chain (including more ethical sourcing of materials, increased efficiencies and improved ability to meet Scope 3 emissions targets). Another third (31%) have already seen improvements in the credibility of their ESG reporting as a result of leveraging IoT technologies.

**Businesses gain access to improved sustainability insights as a result of leveraging IoT tools**



Yet, agriculture enterprises are experiencing some hurdles as they look to get the most from their IoT solutions. The cost of implementing IoT technology is a top concern for many, as cited by 38% of respondents, followed closely by access to reliable IoT connectivity (36%) and difficulties implementing IoT solutions in remote locations (35%), which were both also flagged as key challenges.

Given the latter two difficulties in particular, the sector places a high value on the power of satellite connectivity. Almost nine out of ten (86%) agriculture respondents agree that satellite connectivity is key to improving the effectiveness of IoT solutions focused on bettering sustainability.

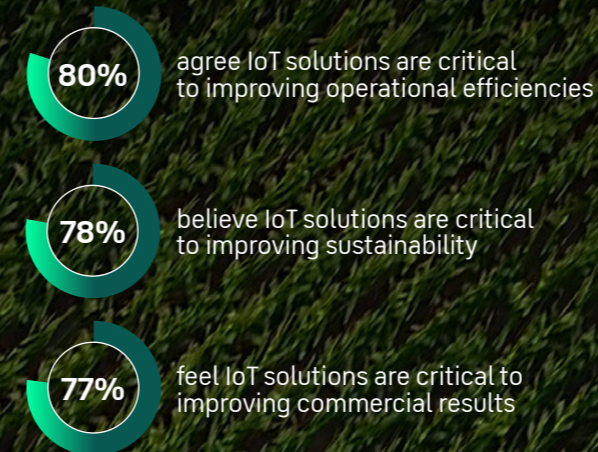
With a third of respondents (34%) already leveraging satellite connectivity to power their IoT solutions, such networks are set to become the most popular IoT connectivity method for the agricultural sector over the next 10 years, with 59% of respondents expecting to be using it by this time. This outpaces expectations for traditional connectivity, including Wi-Fi and telco cellular, which only 22% and 20% of respondents expect to be leveraging within the same timeframe, respectively.

With satellite connectivity looking set to soar in popularity among agriculture firms over the coming years, there is significant opportunity ahead for businesses keen to improve their operational efficiencies in the current climate without having to compromise on sustainability progress.

**Agriculture businesses point to a range of improvements as a result of leveraging IoT**



**Agriculture firms agree IoT is key to improved business outcomes**



**Satellite connectivity set to soar in popularity among agriculture firms over next decade**



# MINING: IT'S ALL ABOUT THE DATA

## 86%

of mining businesses believe the use of IoT solutions to produce data will help improve trust in industry-wide ESG reporting

The same proportion plan to increase the use of IoT solutions to track sustainability initiatives within the next 12 months

## 80%

have already seen the ROI of IoT solutions for improving sustainability

While the mining sector is often a key target for environmental criticism, there is no denying it has an important part to play in the green energy transition across a range of areas, including the mining of lithium, copper and other elements that are key to the production of battery storage and electric vehicle solutions.

With Net Zero mining widely considered the ultimate goal of the wider supply chain, mining firms looking to improve their sustainability credentials know data is king. So much so that 85% feel their organisations could be doing more to effectively leverage IoT solutions to produce data to feed into ESG reporting.

A solid majority of respondents (53%) agree that improved automation and digitalisation of the data capture process could help mining companies better measure and understand their sustainability successes and failures, while almost half (47%) think the industry needs granular, real-time data to measure and analyse ESG progress more accurately.

With IoT offering solutions for both, its potential seems to be well understood, as 86% of mining respondents say their businesses plan to increase the use of IoT solutions to track sustainability initiatives within the next year. The same share of respondents (86%) believe the use of IoT solutions to produce data will help improve trust in ESG progress claims and also agree that they will be critical to tangibly improving sustainability more broadly.

Many firms already leverage IoT sensors to capture telemetry data which can be backhauled to a central location and used to underpin smarter, more efficient sustainability decision-making. Current use cases include applications that monitor tailings facilities, water dams, and geohazards, in addition to enabling remote video inspection and data capture for connected vehicles. Improving staff safety is also a key element of IoT utilisation across the sector with many firms turning to video and communications-based solutions to support 'zero harm' policies.

### Mining firms believe data is key to improving sustainability outcomes

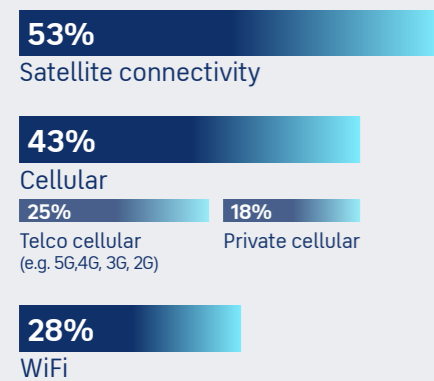


### Positive outcomes reported by mining firms already utilising IoT solutions



Four in five (80%) say they have already seen the ROI of IoT solutions for improving sustainability, reporting a range of positive outcomes as a result of leveraging such tools. The majority have seen a reduction in overall environmental impact (90%) – including a decrease in energy and water usage, reduction of harmful pollutants and improvements in local biodiversity. Respondents also report seeing increased sustainability across their supply chains as a result of introducing IoT tools (59%) – citing more efficient and ethical sourcing of materials and improved ability to meet Scope 3 emissions targets.

**Satellite connectivity expected to outstrip traditional networks among mining firms in next 10 years**



However, with mining firms operating in some of the most remote regions on Earth, an overwhelming 96% of respondents agree that satellite connectivity is key to harnessing the full potential of IoT solutions. So far, 41% of mining respondents are already using satellite networks to connect their IoT solutions and 53% expect to be doing so over the next decade.

Some firms across the sector may require a little additional support as they look to incorporate satellite to get the most from their IoT solutions. For example, mining firms are most likely to experience difficulties analysing sustainability-related data quickly and effectively (31%) compared to respondents from other industries. They are also most likely to feel IoT skills gaps in their organisation are slowing their progress (37%).

Fortunately, support exists for businesses looking to get the most from satellite-enabled IoT solutions. They can tap into ecosystems which bring together a range of experts who share knowledge and provide access to a broad range of IoT solutions.

While satellite may still feel a bit of jump for some, the reality is it is becoming increasingly accessible and should be considered a top priority in sustainability strategies – particularly for businesses within the mining industry where access to reliable connectivity and robust ESG data is often a mission critical requirement.

**96%**  
of mining firms believe satellite connectivity is key to improving the effectiveness of IoT sustainability solutions



# OIL AND GAS: THE INDUSTRY SUFFERS FROM A LACK OF TRUST ON ESG

At a time when reducing carbon emissions has become the world's top environmental priority, no industry faces greater scrutiny than the oil and gas sector. Not only are oil and gas producers under tremendous pressure to reduce their environmental impact, but they are also obvious targets for scrutiny on their broader ESG performance – including by some of their own industry peers.

Almost three quarters (72%) of survey respondents from the oil and gas sector say businesses in their industry overstate sustainability claims, while 74% believe their peers are more focused on perception around sustainability rather than tangible ESG metrics.

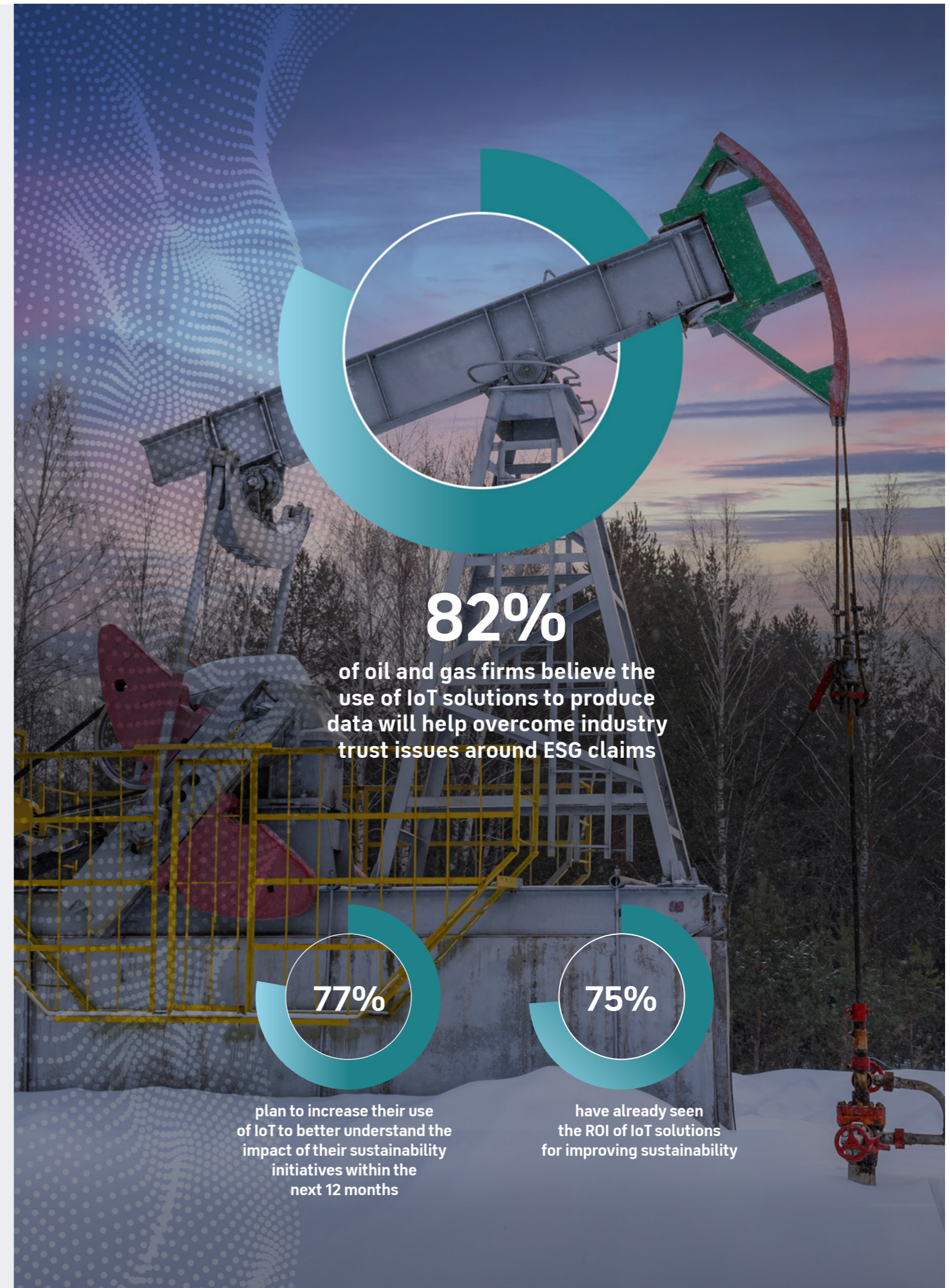
At the same time, 82% perceive their own businesses to be more sustainable than those of their competitors, highlighting an urgent need for hard data to help companies benchmark their actual ESG progress and get a clear understanding of the impact of their broader sustainability initiatives.

Illustrating that businesses are open to improving their sustainability progress irrespective of how well they already believe themselves to be doing, half (51%) of respondents agree that access to granular, real-time data would help their companies better understand their sustainability successes and failures. Meanwhile 47% express a desire for better automation and digitalisation of data capture.

## Lack of trust evident across oil & gas industry



In line with this, many organisations throughout the oil and gas sector are already adopting IoT applications which enable more sophisticated data capture capabilities, as well as remote tracking and control of infrastructure to improve environmental sustainability, staff health and safety, and operational efficiencies. Use cases include IoT solutions focused on monitoring, controlling and managing artificial lifts, drill rigs and oil pipelines in challenging and often remote locations. Such technologies make difficult and potentially costly operations safer, as well as supporting smarter ways of working and providing access to actionable data to drive meaningful progress on environmental sustainability.



**Satellite connectivity is integral to harnessing the full potential of sustainability-focused IoT technologies**

**81%**

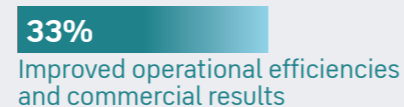
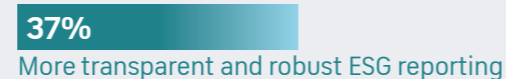
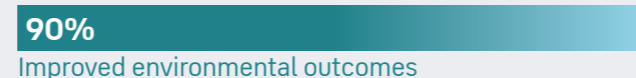
of businesses believe the use of IoT solutions is critical to improving sustainability

Of those businesses already using IoT solutions, 90% of respondents say they have seen better environmental outcomes as a result (including less energy and water usage, reduction in harmful pollutants and improved biodiversity where they operate). Meanwhile, 61% report supply chain improvements (including more ethical sourcing of materials, improved efficiencies and an increased ability to meet Scope 3 emissions targets). Positively, 37% also say IoT solutions have already enabled more transparent and robust ESG reporting to help reduce the trust gap, highlighting the continued potential of such tools moving forward.

More broadly, the majority of respondents agree that IoT-enabled data insights will help overcome the issue of industry mistrust in ESG reporting (82%), while four in five (81%) agree that the use of IoT solutions is critical to actually improving broader sustainable outcomes.

When it comes to plans to increase the use of IoT solutions to support sustainability initiatives, 77% say their companies plan to do so within the next year and almost the same proportion (75%) have already seen the ROI of IoT solutions in this regard.

**Positive outcomes reported across the sector as a result of leveraging IoT solutions**



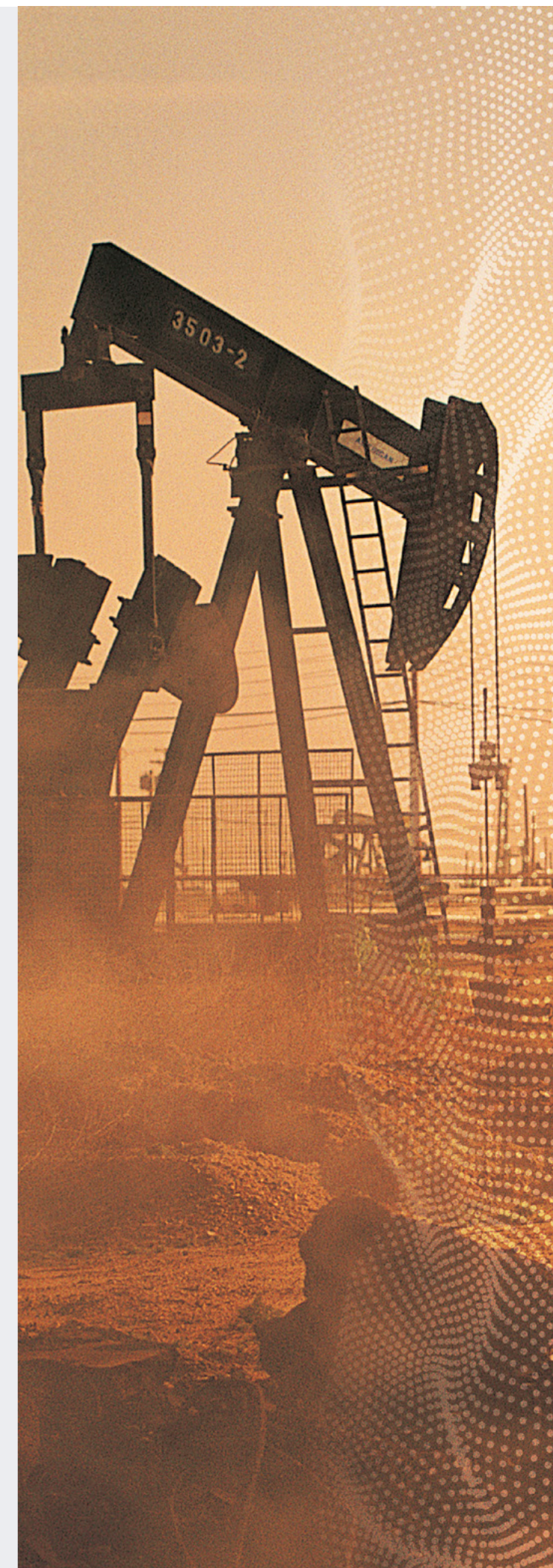
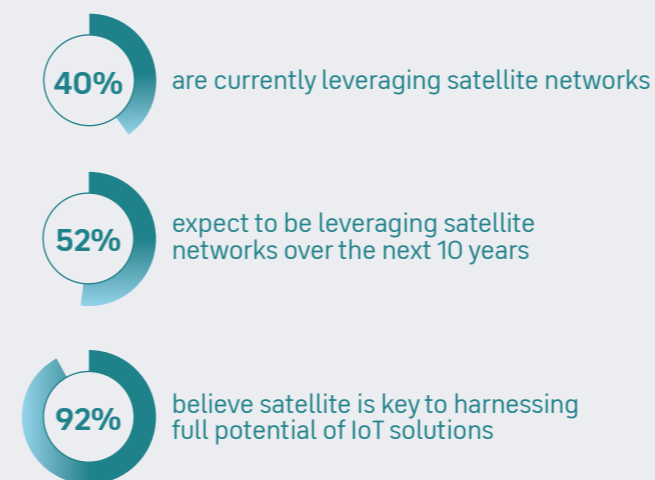
However, like other industries operating in remote environments, access to reliable satellite connectivity is vital for the oil and gas sector. Two in five (40%) respondents are already using satellite to power their IoT solutions and over the next decade more than half (52%) expect to be leveraging it to turbocharge their sustainability efforts. What's more, the vast majority (92%) believe that satellite connectivity is key to harnessing the full potential of IoT initiatives focused on improving sustainability. This points to further appetite to increase the use of satellite networks beyond current expectations.

That said, oil and gas companies pointed to several obstacles in their path as they look to successfully deploy their IoT solutions. These include lack of access to reliable connectivity (indicated by 37% of respondents), difficulties identifying the right IoT solutions for their needs (36%) and the cost of implementing IoT solutions (35%).

Positively, IoT solution providers are well positioned to help oil and gas firms overcome all of these barriers, working closely with them to understand their needs and recommend the right IoT solutions and connectivity mixes to meet their objectives and budgets.

With the oil and gas industry facing significant pressures to meet ESG targets and improve sustainability performance at speed, satellite-enabled IoT solutions will play an integral role in meeting these expectations - both in terms of facilitating tangible change and demonstrating as much to key stakeholders over the months and years to come.

**Oil and gas firms agree satellite connectivity is key to optimising sustainability-focused IoT solutions**

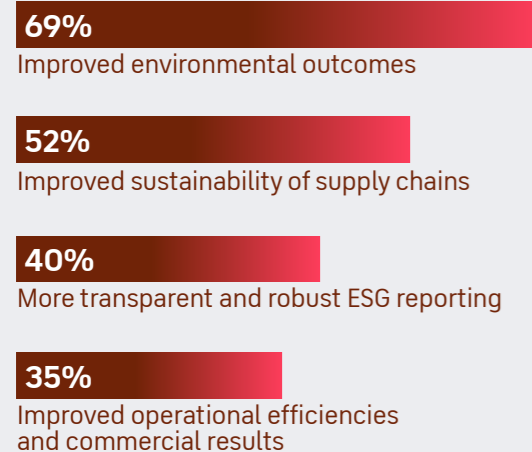




# TRANSPORT AND LOGISTICS: OVERCOMING MOBILE CONNECTIVITY CHALLENGES

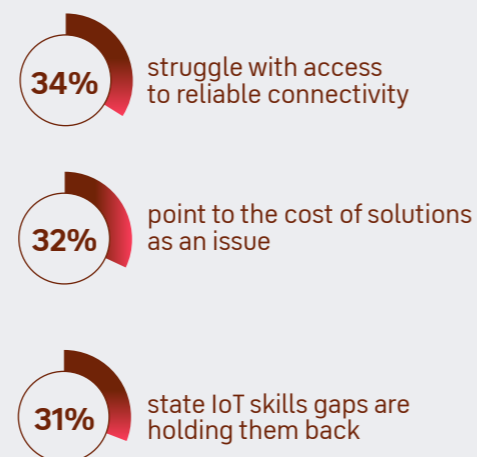
The transport and logistics industry is by its very nature distributed and always moving, making it a particularly promising candidate to reap the rewards of connected IoT technologies. As such, many businesses across the sector are already using the technology for a range of applications including real-time fleet management, supply chain visibility and tracking, and telemetry and advanced signalling systems (such as those used for controlling trains).

## Transport firms highlight various positive outcomes as a result of leveraging IoT technologies



The vast majority of transport respondents (79%) believe the use of IoT solutions is critical to improving sustainability, and 77% say they've already seen the ROI of IoT solutions in this regard. Interestingly, however, transport respondents were least likely to feel they're leveraging their IoT solutions more effectively than their peers (69%) compared to other sectors that were more confident in their ability to utilise such technologies, suggesting there is still some way to go for transportation firms to feel they are getting the most from such devices. Positively, 80% are planning to increase their use of IoT solutions to measure and understand the impact of their sustainability initiatives more accurately within the next 12 months, demonstrating clear appetite to better leverage connected solutions to overcome the distinct challenges the industry faces.

## The industry faces challenges as it looks to leverage IoT solutions to improve sustainability



80%

of transport firms expect to increase their use of IoT solutions to better understand the impact of their sustainability initiatives within the next 12 months

78%

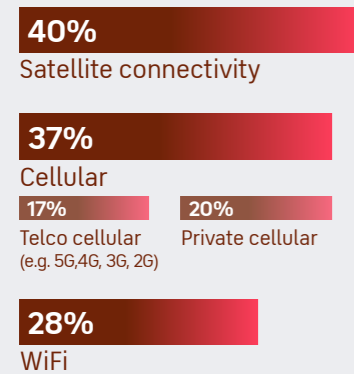
believe the use of IoT solutions to produce data will help overcome industry trust issues around reported ESG progress

77%

have already seen an ROI for IoT solutions linked to sustainability

Of those currently using IoT solutions, over two thirds (69%) say they have seen improved environmental outcomes as a result – including less energy and water usage, reductions in harmful pollutants and improved local biodiversity – while half (52%) report greater supply chain sustainability – including more ethical sourcing of materials, improved efficiencies and better ability to meet Scope 3 emissions targets.

**Satellite connectivity set to outpace traditional network usage among transport firms over the next decade**



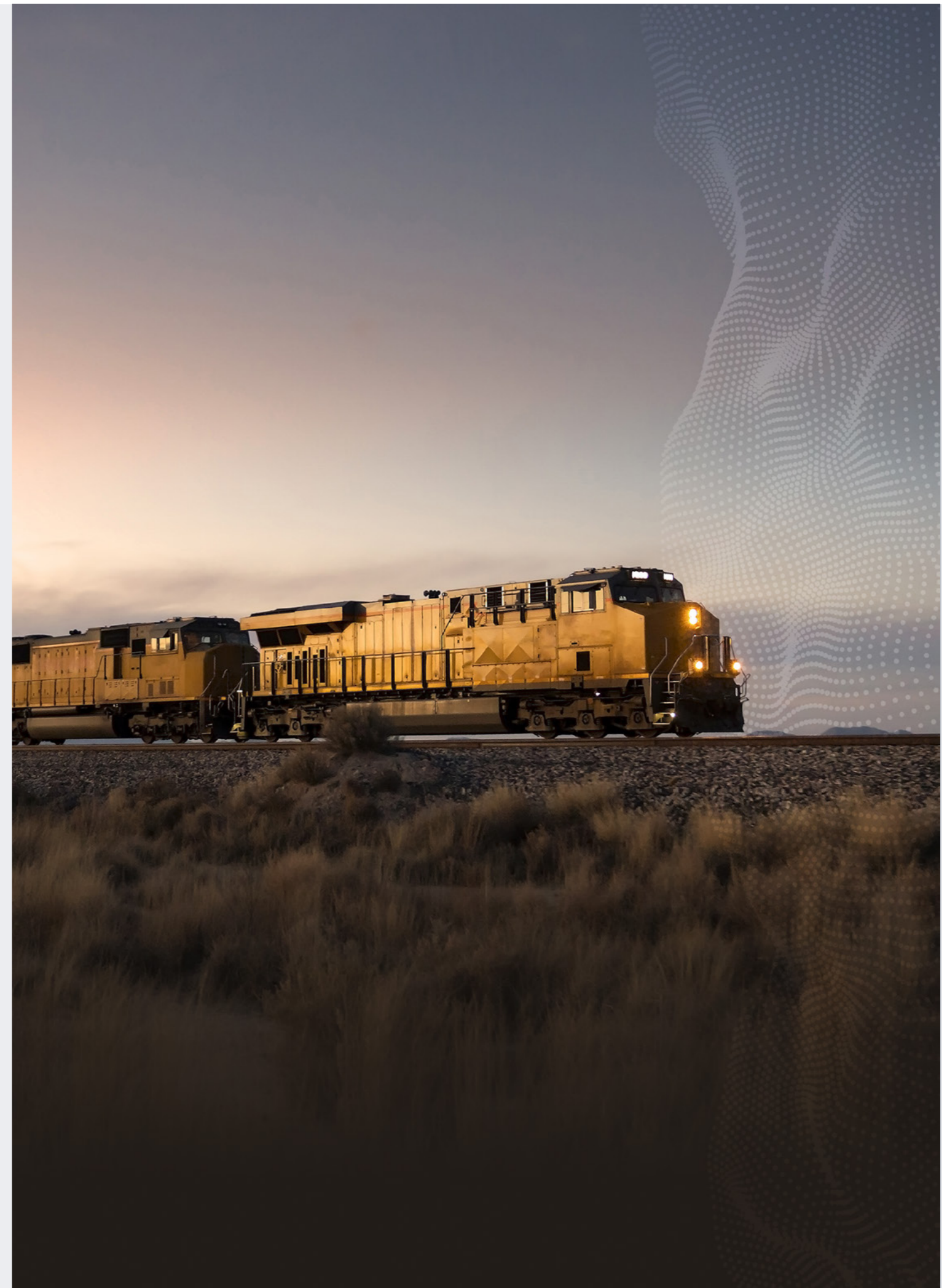
Two fifths (40%) also felt IoT solutions had already helped to close the trust gap and made their ESG reporting more transparent and robust.

However, the sector is not without its challenges and many transport firms have struggled with access to reliable connectivity (34%) as they look to leverage IoT solutions to improve their sustainability credentials – a particularly pertinent challenge given much of the industry’s use cases are focused on monitoring and analysing mobile assets. Respondents also point to costs (32%) and IoT skills gaps in their organisation (31%) as key challenges in this regard.

In spite of these challenges, the majority of transport respondents agree satellite connectivity is the key to unlocking the full potential of IoT solutions, especially those leveraged on mobile assets and travelling through remote or challenging environments. At present, a third (31%) of transport respondents are leveraging satellite networks to drive their IoT solutions. However, with 91% agreeing that satellite connectivity is key to improving the effectiveness of IoT solutions in the sustainability arena, such networks look set to soar in popularity over the coming years.

As the transport industry seeks to improve the sustainability credentials of mobile assets spanning land, air and sea ahead of 2050, it faces a unique set of challenges. Encouragingly, satellite-enabled IoT technology can provide tailor-made solutions for these challenges, helping businesses across the sector support the industry’s ESG and broader sustainability ambitions.

**91%**  
of transport firms believe satellite connectivity is key to improving the effectiveness of IoT sustainability solutions



# UTILITIES: THE TECHNOLOGY AND ESG DISCONNECT

With the widespread shift toward electrification in support of decarbonisation goals, the electrical grid has never been more important as it plays a key role in facilitating the energy transition.

Utilities firms are being challenged to optimise distribution and maximise uptime, and expectations for both will only continue to grow in the years to come. To create the most efficient network possible as we transition to renewable energy, smart grid technology is essential. This enables electricity distribution, consumption and loads to be more effectively managed, with expectations that this will eventually lead to the move to a decentralised grid model (vs. the highly centralised energy delivery of the past). As this shift takes place, IoT solutions enabling remote monitoring and localised control of the numerous points of generation in such systems will also grow in importance.

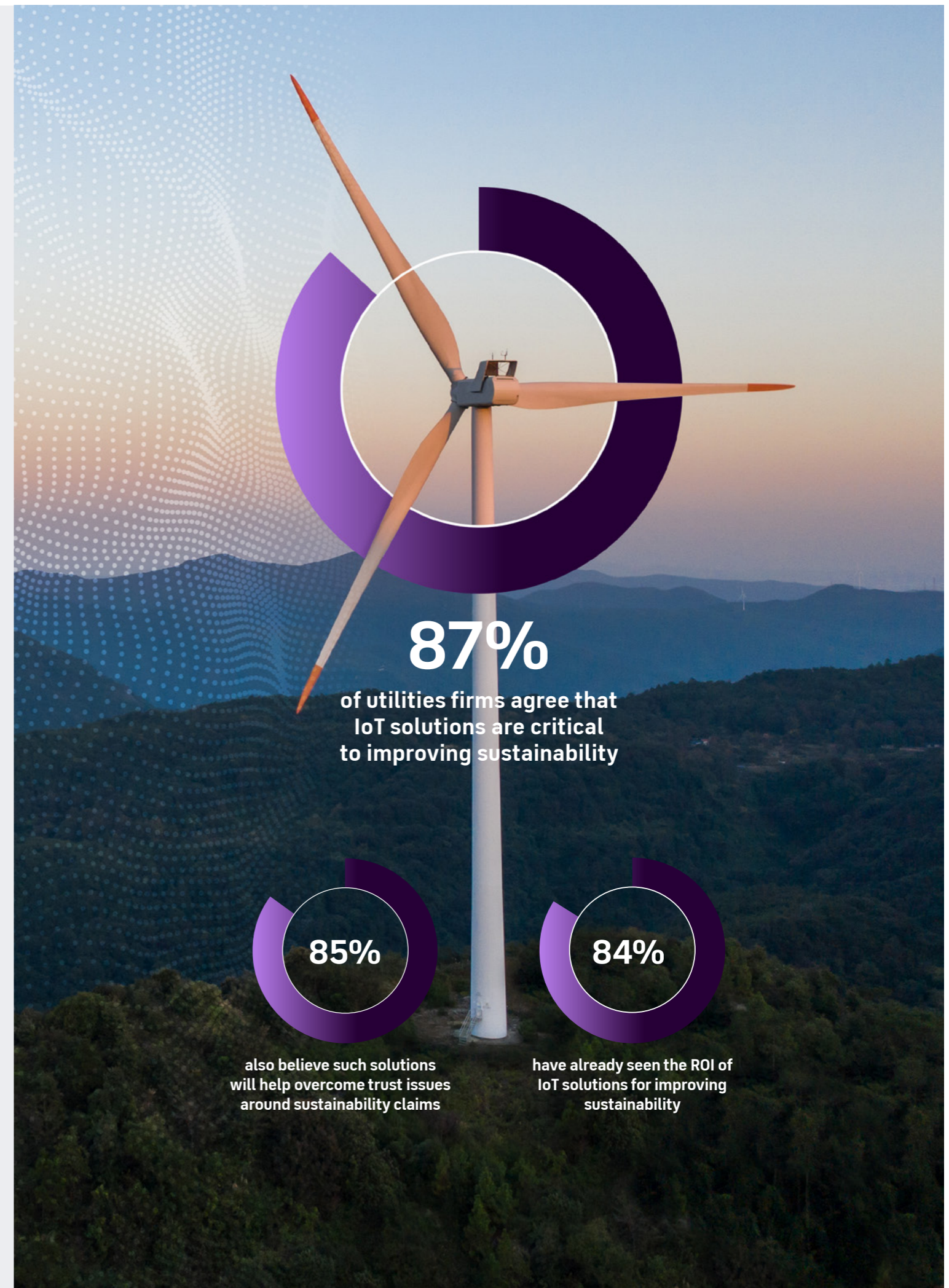
At the same time, with climate change making wildfires more frequent and deadly across the globe, there is a greater burden for utilities firms to carefully monitor and maintain their infrastructure to avoid contributing to such environmental disasters. In California, for example, Pacific Gas and Electric recently paid \$55 million in penalties to avoid criminal charges in connection with two wildfires that were allegedly sparked by its transmission lines.

IoT solutions can play a vital role in overcoming these challenges. Today, energy firms are looking to monitor and automate reclosers, manage advanced metering infrastructure and address other aspects of the smart grid. Many IoT solutions are purpose built to meet these needs, in addition to aiding

workforce safety optimisation through access to high-quality, reliable and secure video sharing from remote locations. In fact, almost nine out of ten respondents agree that the use of IoT solutions will be critical to improving sustainability (87%), commercial results (87%), and operational efficiencies (88%) respectively.

Notably, however, technology professionals in the sector appear to be more confident in the benefits of IoT than their ESG-focused peers. Clearly, there is work to be done to ensure the latter are equally aligned to the benefits of IoT, with 87% of technology respondents indicating that their businesses plan to increase the use of sustainability-related IoT solutions in the next 12 months, compared to just 78% of ESG respondents. Technology professionals in the sector were also more likely than ESG leaders to indicate that they had already seen the ROI for IoT initiatives focused on improving sustainability (94% vs. 74%). This was also the case for improving operational efficiencies (93% vs. 75%) and commercial results (91% vs. 83%) – perhaps explaining why the former are more likely to increase their adoption of such tools going forward.

Nonetheless, the good news across the board is 85% of sector respondents believe the use of IoT solutions to produce data will help overcome industry trust issues linked to ESG reporting. This suggests the lack of cohesion on the level of perceived benefits should not deter progress too much over the longer term.

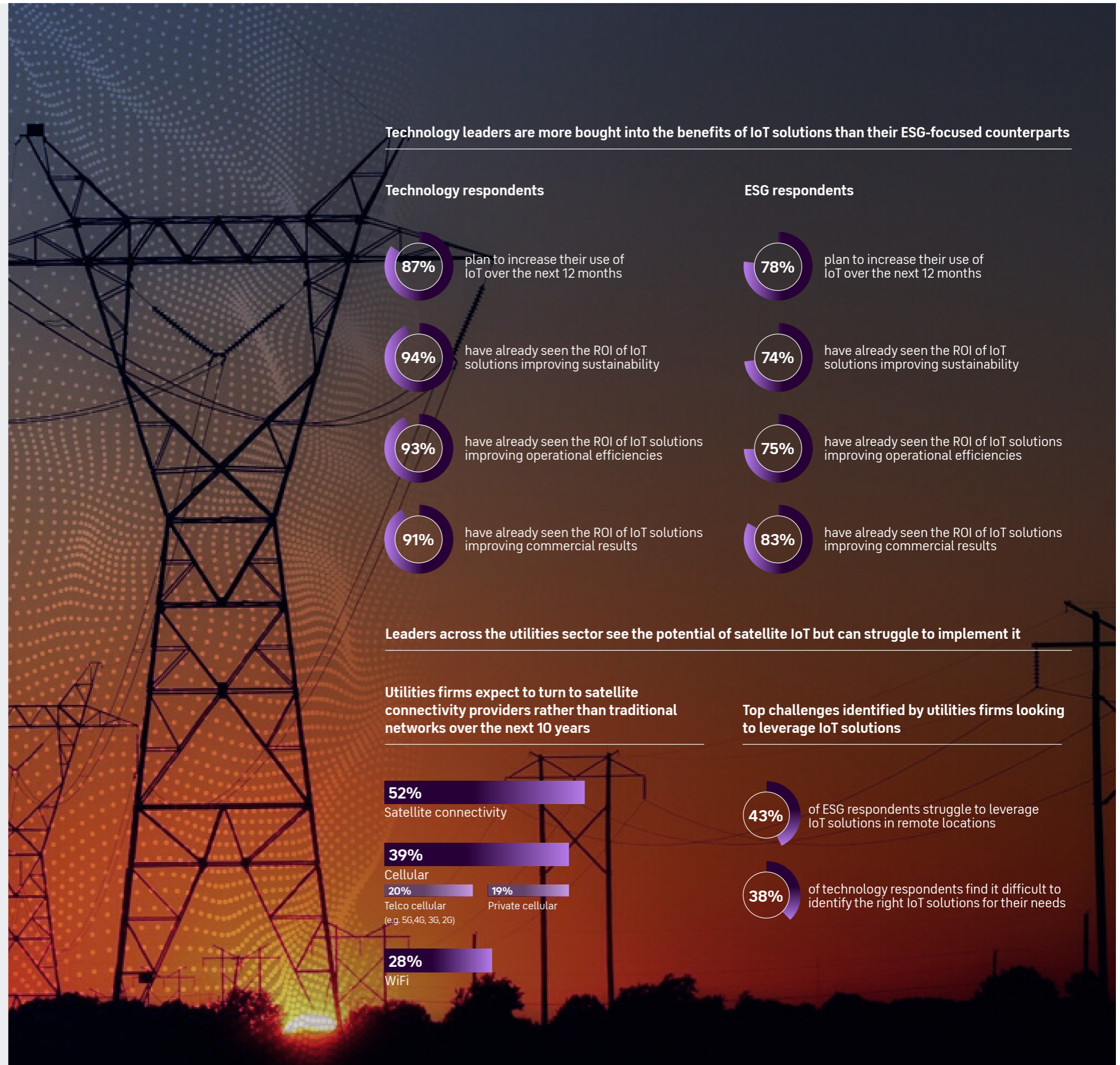


Respondents across the sector are also agreed on the potential for satellite connectivity to supercharge the effectiveness of IoT solutions focused on improving sustainability. At present, WiFi is the most popular network for IoT solutions, with 47% of utilities firms relying on it vs. 36% leveraging satellite networks. However, over the next ten years, satellite network usage is expected to outstrip WiFi connectivity with 52% of respondents believing they will be using satellite vs. just 28% using WiFi. What's more, with 91% of respondents agreeing that satellite connectivity is key to improving the effectiveness of IoT solutions, there is clearly opportunity for far greater uptake of satellite connectivity over the coming years than currently planned.

More broadly, satcom providers can also help utilities organisations resolve wider challenges when it comes to successful implementation of IoT tools. They can support the integration of satellite connectivity into a business' existing network - solving the top obstacle cited by 43% of ESG respondents who have experienced difficulties leveraging IoT solutions in remote locations. They can also help businesses identify the right IoT solutions to support their specific needs - the top challenge cited by 38% of technology respondents. Across the board, utilities respondents were also most likely to flag cost as a top challenge to the successful implementation of IoT tools.

Nonetheless, as the utilities industry undergoes a significant period of change over the coming years and plays a key role on the road to Net Zero, satellite networks will be an integral element in ensuring the efficiency and overall success of this transition.

**91%**  
of utilities firms believe satellite connectivity is key to improving the effectiveness of IoT sustainability solutions



# SUSTAINABILITY AND IOT: THE MAJOR TAKEAWAYS

This report demonstrates that businesses are undoubtedly taking their sustainability responsibilities seriously. Most have already turned to some form of IoT-based solution to improve their ability to capture ESG-related data and strengthen their overall sustainability outcomes or are planning to do so very soon.

However, a disconnect remains between those currently making real, tangible progress against their goals and those only claiming to do so.

With industry mistrust high, the solution is simple. When it comes to ESG performance, seeing really is believing and those that do not have access to granular, robust data to back up their sustainability claims will face increasing scrutiny - and likely investor and regulatory pressure - in the near future.

Nonetheless, we are all aware that the transition to a greener future will not be without its challenges. Businesses face hurdles in deploying IoT technologies as effectively as possible, with cost and skills gaps key barriers to improving usage of such tools.

A reluctance to share ESG data externally is also dampening the potential for enterprises to fully realise their sustainability and commercial potential more broadly. Establishing industry partnerships and building the trust needed to collect and share data across key groups is vital to driving real change across supply chains and industries.

While these factors all undoubtedly present challenges to businesses, one finding is consistent - satellite connectivity is undeniably perceived as the key to overcoming barriers and unlocking the full potential of IoT solutions to improve sustainability outcomes.

As the world races towards a Net Zero future, there is now a pressing need for companies to translate this understanding into action. With sustainability being the defining challenge of our time, leading companies have the right technology solutions at their disposal to tackle their ESG objectives and meet their sustainability commitments. All they need to do now is prioritise their connectivity needs, via ultra-reliable narrowband satellite networks to ensure their IoT solutions are working as hard as possible to meet their goals now, rather than later.





## ELERA IOT

### A UNIQUELY VERSATILE SATELLITE IOT PLATFORM

ELERA IoT is Inmarsat's IoT platform. Built on the ELERA L-band network, the global network for satellite IoT and narrowband communications, it underpins proven connectivity services such as IsatData Pro, BGAN M2M and IoT Connectivity Leasing.

**FIND OUT MORE AT [INMARSAT.COM/ELERA\\_IOT](http://INMARSAT.COM/ELERA_IOT)**

## ELEVATE

Further enabling the entire IoT ecosystem, the Inmarsat ELEVATE programme helps IoT solution providers integrate satellite connectivity into their products to rapidly scale their businesses up to serve the growing demand for IoT. For enterprises looking to adopt IoT to enhance their performance, ELEVATE is also a marketplace for finding the solutions they need.

**FIND OUT MORE AT [INMARSAT.COM/ELEVATE](http://INMARSAT.COM/ELEVATE)**

## ABOUT INMARSAT

Inmarsat is the world leader in global, mobile satellite communications. It owns and operates the world's most diverse global portfolio of mobile telecommunications satellite networks, and holds a multi-layered, global spectrum portfolio, covering L-band, Ka-band and S-band, enabling unparalleled breadth and diversity in the solutions it provides.

The company has an unrivalled track record of operating the world's most reliable global mobile satellite telecommunications networks, sustaining business and mission critical safety and operational applications for more than 40 years. It is also a major driving force behind technological innovation in mobile satellite communications, sustaining its leadership through a substantial investment and a powerful network of technology and manufacturing partners.

Inmarsat operates across a diversified portfolio of sectors with the financial resources to fund its business strategy and holds leading positions in the Maritime, Government, Aviation and Enterprise satcoms markets, operating consistently as a trusted, responsive and high-quality partner to its customers across the globe.

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