

Connecting to a more sustainable future

A six-step blueprint
for sustainable
transformation in
telecom



Executive summary

Claiming telecom’s role as a sustainability leader

Sustainability remains one of the defining challenges of our generation, and the telecom industry has made notable progress over the past decade. Between 2022 and 2024, the industry saw a 15-point rise in Capgemini’s sustainability maturity index. However, our latest sustainability report, *A world in balance*, revealed the index dropped by 9 points in 2025—a development that needs addressing.

This downward trend on an increasingly urgent issue does not position our industry as the leader that we are—nor the one the world needs us to be. As the backbone of our connected world, telecoms power critical services that enable communication, learning, and work for billions of people.

As connectivity expands, our carbon footprint increases, and so must our responsibility: networks that power the digital economy must also enable a sustainable future.

Furthermore, for telecoms, there’s a strong business case for sustainability. The acceleration of sustainable practices and the pursuit of Net Zero goals come with the promise of lower costs, higher efficiency, and massive circularity-related benefits.

The real question now is *how*.

In the pages that follow, we explore practical and actionable ways telecoms can reignite their sustainability mandate—starting within their own operations and expanding across supply chains and customer ecosystems. Our goal is not only to return sustainability to the very top of the executive agenda, but to relentlessly execute and create a blueprint for transformation that other industries can follow.

I am sure on the sustainability issue, telecoms can certainly lead.
Will you seize the opportunity?

Praveen Shankar
EVP and Global Telecom Industry Leader
Capgemini

Introduction

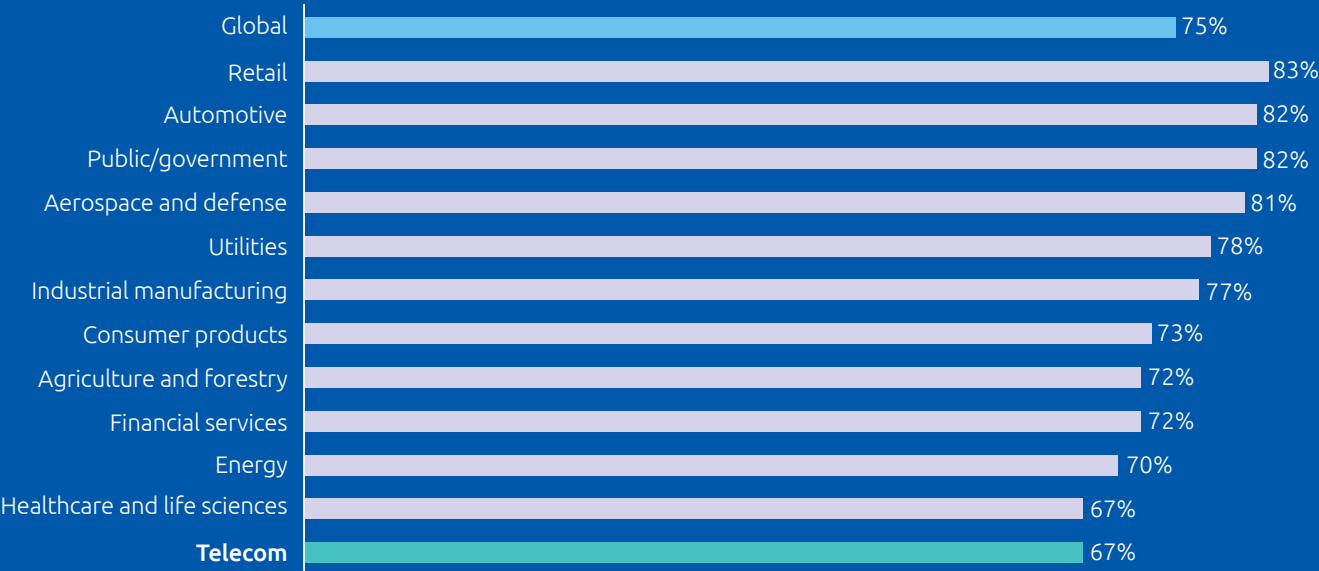
Gap between aspiration and action

For telecoms, the urgent and irrefutable need to address sustainability is not just a challenge—it’s a call to lead.

Our research reveals a complex picture of where telecoms stand on this issue. While **77% of telecom leaders** identify environmental sustainability as a top priority—second only to financial services—and **81% planned to increase investment** in 2025, just **67% of telecom executives** view it as central to future-proofing, placing our industry last among those surveyed.

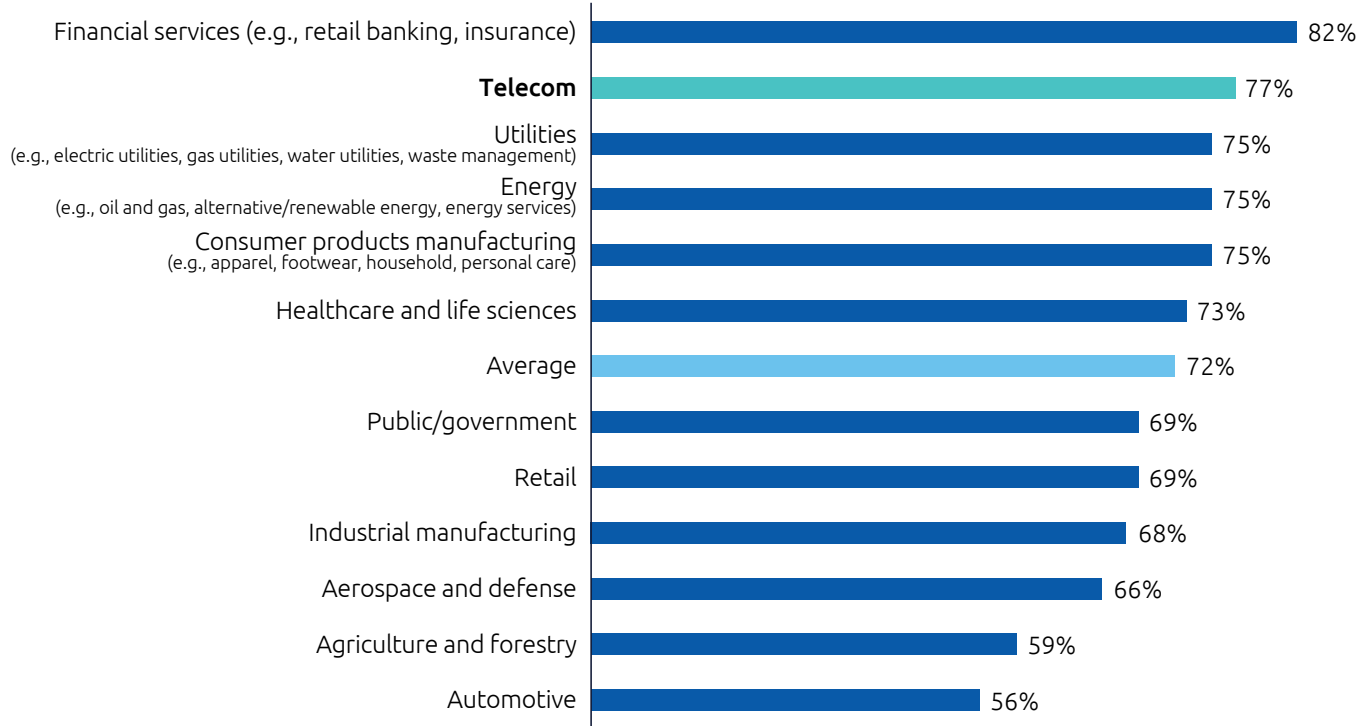
This gap between aspiration and action highlights a deeper challenge: the industry risks not only lagging behind peers but also forfeiting its potential to lead the sustainability agenda.

Percentage of executives, by sector, who agree with the statement:
Sustainability is a core future-proofing strategy for our organization



Source: Capgemini Research Institute, [Sustainability transformation trends survey](#), June-July 2025, N= 2,146 executives.

% of organizations across industries who continue to consider environmental sustainability as a top priority



Source: Capgemini Research Institute, [Sustainability business value survey](#), March 2025, N = 1,001 executives



1. WHY

The case for sustainability action in telecom

A. Sustainability for your business

Minimizing costs and maximizing growth

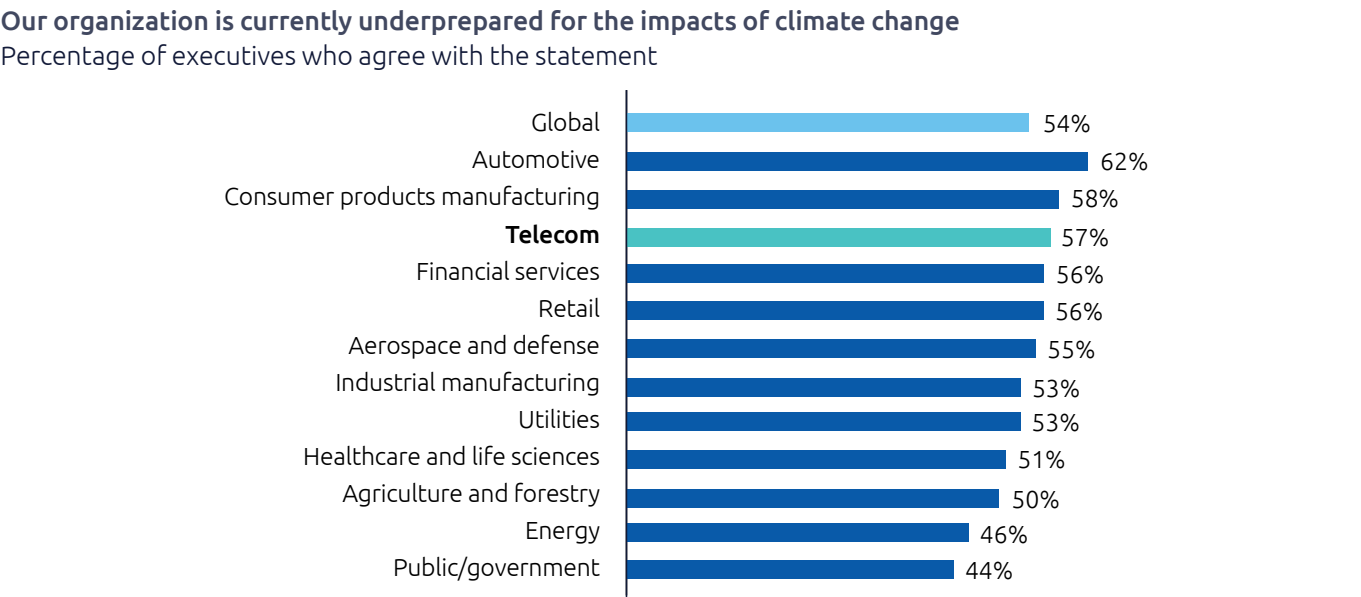
Rising data demands and volatile energy costs make efficiency a strategic necessity for telecoms. At the same time, modernization also opens the door to growth, fueling innovation in products, premium services, and market expansion.

Innovation	Cost reduction	Market growth	Competitive differentiation
65% of telecom orgs have developed new products through sustainable design. Source: Driving business value through sustainability	3 in 4 telecom executives expect sustainability to save above 20% in supply chain costs in the next 3 years. Source: Driving business value through sustainability	2 in 3 telecom organizations agree that sustainable product design is helping them tap new markets. Source: Driving business value through sustainability	62% of consumers are willing to pay a premium for sustainable telecom products and services. Source: Driving business value through sustainability

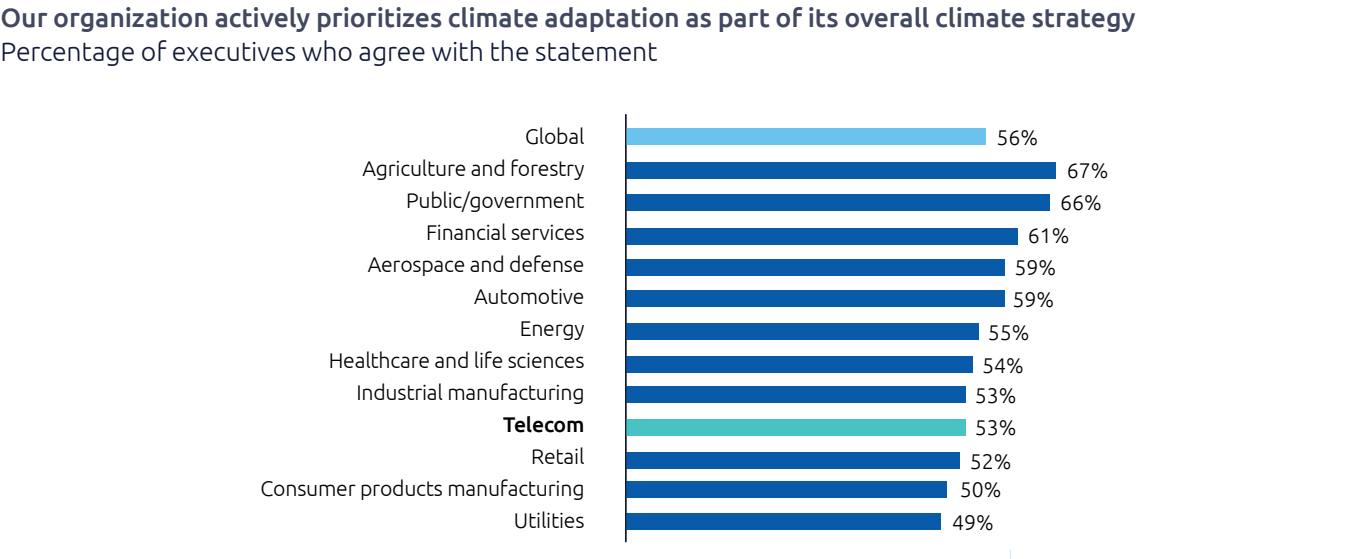
B. Sustainability for your customers and stakeholders

Protecting networks

The World Meteorological Organization (WMO) projects a **70% chance** that global temperatures will exceed the critical 1.5°C threshold between 2025 and 2029. Telecom leaders need to do more to adapt. **57% admit they are underprepared** for climate change impacts, and only **53% are prioritizing adaptation** as part of their overall climate strategy.



Source: Capgemini Research Institute, [Sustainability transformation trends survey](#), June-July 2025, N = 2,146 executives.



Source: Capgemini Research Institute, [Sustainability transformation trends survey](#), June-July 2025, N = 2,146 executives.

This presents a clear and imminent risk. Telecom networks span thousands of geographically dispersed sites—many vulnerable to flooding, rising sea levels, and energy instability. With this connectivity serving as the lifeblood of modern economies, resilience has become existential.

C. Sustainability for your regulators

Making compliance automatic

In sustainability, what was once a voluntary commitment is now a compliance imperative.

This is particularly true in Europe, where companies are compelled to meet targets laid out in the **Science Based Targets initiative (SBTi)**, which requires mobile network operators to cut emissions by 45%, fixed network operators by 62%, and data centers by 53% between 2020 and 2030.

Beyond cutting emissions, the regulatory landscape is evolving and expanding to include resource circularity, e-waste reduction, and responsible recycling practices. These regulations are reshaping how telecom organizations design, deploy, and retire infrastructure, software, and connected devices.

Waste Electrical and Electronic Equipment (WEEE) Directive (2012/19/EU)	Sets collection, recycling, and recovery targets for electrical and electronic goods. The WEEE was also adapted and implemented in UK in 2013. Learn more.
Circular Economy Action Plan (2020)	Core component of the European Green Deal, promoting sustainable product design, reuse, and recycling. Learn more.

D. Sustainability for society

Narrowing the digital divide

Sustainability is more than just climate change; it is about doing the right thing for society, practicing ethical governance, supporting vulnerable populations, and bridging the digital divide. This makes telecoms’ commitment to sustainability inseparable from their commitment to accessibility. By investing in resilient, low-carbon infrastructure and supporting inclusive policy initiatives, operators can narrow the digital divide despite ongoing disruption.



2. WHAT sustainability looks like in telecoms

Exploring the 3 areas of sustainable influence

Area 1: Sustainability within your business.

The journey to a sustainable world starts within your own business. Scope 1 & 2 emissions are where a company has both the most insight and most control. Unfortunately, these emissions typically account for only **30% of the total end-to-end emissions**, underscoring the need for a broader strategy that addresses the full value chain.

Area 2: Sustainability across the supply chain.

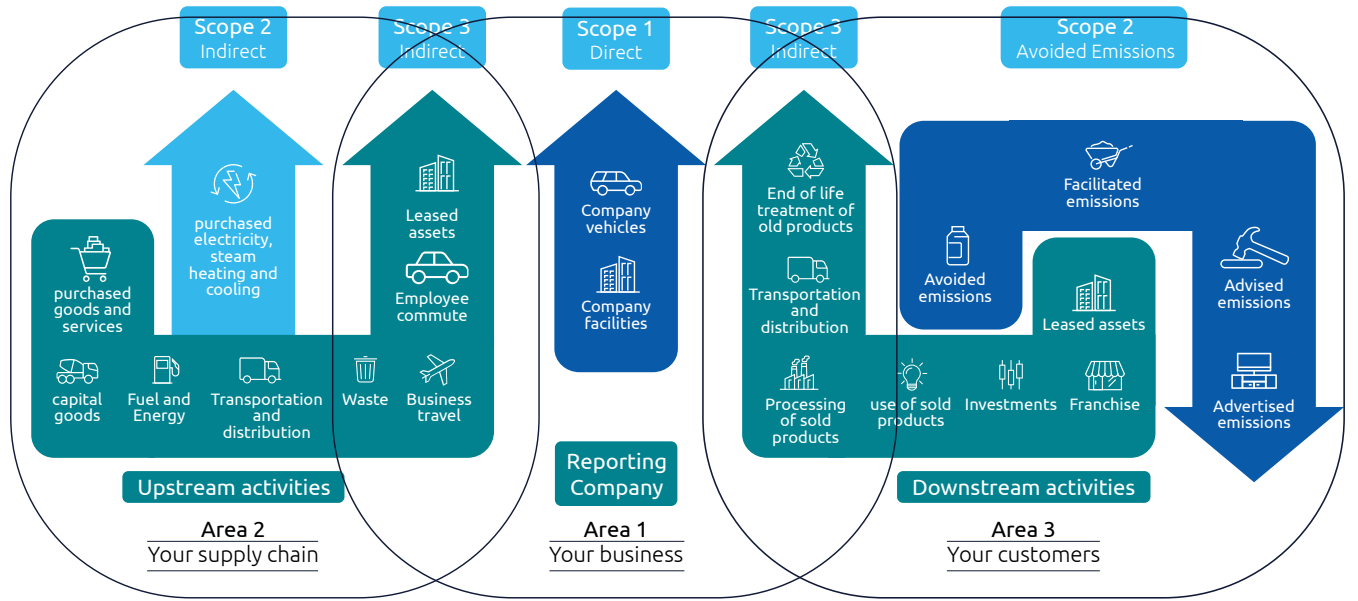
Scope 3, which represents an estimated **70% of emissions** in the telecoms sector, poses the biggest challenge in the move to Net Zero. This is due not only to the scale of these emissions, but also to the challenge of measuring factors that lie beyond telecom companies' direct control.

Area 3: Sustainability with customers and consumers.

The telecoms sector has unparalleled global reach and influence, placing it in a unique position to drive meaningful progress on the global sustainability agenda. The ultimate sustainability goal for a telecom organization is to help their customers and end consumers avoid emissions through the company's services and solutions. While avoided emissions typically do not qualify as a carbon offset under the Science Based Targets initiative's (SBTi), these emissions offer telecom companies an opportunity to extend their sustainability impact and demonstrate how other industries can play a broader role in achieving global sustainability goals.

Understanding telecom GHG emissions

Scope 1	Scope 2	Scope 3	Scope 4
Direct emissions from owned or controlled operations.	Indirect emissions from the generation of purchased energy such as electricity, steam, heat, and cooling.	All other indirect emissions across the value chain.	Avoided emissions that occur outside a company's direct operations or value chain as a result of using its products or services.
• Fleet vehicles • Backup power systems and generators • Natural gas-powered HVAC	• Electricity used to power data centers, network base station site, offices & infrastructure	• Purchased goods and services, including network equipment • Capital goods (e.g., emissions from construction of infrastructure) • Fuel-and-energy related activities • Use of sold products (i.e., energy use by customers' devices and data traffic) • Employee commuting and business travel	• Avoided travel emissions by enabling work from home or remote meeting capabilities • IoT solutions Note: not officially recognized as part of the GHG Protocol.





3. HOW

From vision to execution

Six steps telecoms must take now for a more sustainable future

Step 1	Review and refine your holistic sustainability strategy.
Step 2	Embed the measurement and management of sustainability KPIs throughout the business.
Step 3	Align with and drive progress toward near-, mid-, and long-term science-based targets.
Step 4	Build a robust foundation of data, processes, systems, and controls.
Step 5	Launch targeted initiatives for high impact areas.
Step 6	Foster ecosystem collaboration to reduce Scope 3 and 4 emissions.

1. Review and refine your holistic sustainability strategy

While nearly all telecommunications providers have established sustainability strategies, their tangible impact particularly progress toward the Paris Agreement objectives—has slowed, mirroring trends seen across other industries. Now is the time to redefine the vision through a holistic, evidence-based strategy grounded in today’s geopolitical and economic realities. Further, companies must ensure that the scope of their plan extend beyond internal operations to influence the broader ecosystem—empowering suppliers, partners, and customers to take meaningful action and contribute to shared goals and a common mission.

To that end, telecoms can leverage frameworks, tools, and best practices from organizations like GSMA, NGNM Alliance and Next G Alliance to standardize efforts and accelerate collective progress. This will help move sustainability beyond a box-ticking exercise to becoming a core organizational value, helping companies drive tangible outcomes rather than symbolic gestures both within the organization and across the value chain.

Organization	Initiative	Action
GSMA	GSMA’s “Pathway to Net Zero” provides a global framework for emissions reduction and climate targets across the mobile industry.	- Align corporate sustainability roadmaps to GSMA benchmarks - Leverage reporting tools to standardize data collection and analysis
NGMN Alliance	The “NGMN Green Future Network” initiative promotes energy-efficient network design and sustainable operations.	Leverage best practices to enhance energy savings through network optimization
Next G Alliance	This North American initiative includes a sustainability workstream focused on green 6G development and lifecycle impact	- Engage with the alliance to enhance early-stage collaboration - Adopt lifecycle metrics for future networks

2. Embed the measurement and management of sustainability KPIs throughout the business

While each organization defines its own sustainability KPIs—typically focusing on metrics such as carbon emissions avoided, energy saved, or the percentage of waste and equipment recycled or reused—true progress requires alignment across the industry. To move the telecom sector forward collectively, KPIs must be consistent from company to company, enabling meaningful comparison and shared accountability.

The GSMA has addressed this need by establishing the [ESG Metrics for Mobile](#), a sector-specific reporting framework that includes 11 standardized KPIs to help telecom operators measure, compare and communicate their sustainability performance effectively and consistently. This framework, which is organized around four key pillars, serves as a powerful first step towards creating industry-wide standards. The priority is to establish a comprehensive set of KPIs, measure them consistently, and ensure relentless execution through a robust and empowered governance framework.

GSMA: ESG Metrics for Mobile

Environment	Digital inclusion	Digital integrity	Supply chain
Measures the operational impact of networks and the company's commitment to climate targets.	Assesses how operators are contributing to social progress by ensuring and enhancing access.	Focuses on the responsibilities of operators in protecting user data and ensuring ethical practices.	Addresses the social and environmental standards applied throughout the operator's value chain.
- Emissions - Energy - Waste reduction Source: GSMA ESG Metrics for Mobile	- Network coverage - Affordability - Digital skills	- Customer data incidents - Digital rights policy - Online safety measures	- Sustainable procurement - Supplier assessments

3. Align with and drive progress toward near-, mid-, and long-term science-based targets

After setting a common KPI framework, telecom companies must then add a deeper level of credibility through clear, achievable targets, measurable progress, and transparent reporting. Most notably, companies can set science-based targets, validated by initiatives like the SBTi and aligned with the [Paris Agreement](#). Publicly committing to these validated targets also demonstrates to stakeholders that sustainability efforts are credible, measurable, and aligned with industry best practices and expert guidance.

In addition to setting science-based targets, the sustainability strategy must be aligned with the objectives of senior leadership across the business to effectively drive intended benefits and value creation.

4. Build a robust foundation of data, processes, systems, and controls

While defining a set of KPIs is relatively straightforward, obtaining reliable data to support them remains highly challenging due to fragmented systems within organizations and across the broader value chain. Replacing all legacy systems isn't feasible, so the solution lies in creating a common data framework that harmonizes terminology, granularity, and structure across diverse sources. This should be paired with a

unified control layer and sustainability dashboard to aggregate data, ensure consistency, and provide a holistic view—enabling both internal alignment and, ultimately cross-industry comparability of KPIs. Creating consistent internal data standards not only strengthens reporting within an organization but also lays the groundwork for future data sharing across the value chain. Implementing this foundational data system will help enable more advanced capabilities, such as upstream and downstream emissions tracking and product circularity. As such, when creating the dashboard, organization must keep flexibility in mind, ensuring the system can adapt and evolve to accommodate increasingly complex metrics and broader supply chain data.

5. Launch targeted initiatives for high impact areas

Establishing early momentum is critical to driving engagement on the path toward a sustainable future. Targeted initiatives, supported by a clear business case, can achieve this—but they must be tailored to the specific context of each telecom operator. Below are examples of how industry leaders have successfully initiated this within their organizations.

Fleet modernization

A significant portion of many telecoms' Scope 1 emissions comes from their vehicle fleet. Some industries are already phasing out emissions-heavy internal combustion engine (ICE) vehicles in favor of electric vehicles (EVs). And in many countries, EVs will soon be mandated by law.

For example, at the beginning of 2025 [BT Group ordered 3,500 new EVs](#), bringing its fleet to nearly 8,000 by 2026. The move supports the company's goal to reach net-zero emissions by March 2031 and contributes to its 61% reduction in carbon emissions intensity since 2017.

Next-gen infrastructure

New technologies are enabling telecoms to reduce their dependence on physical infrastructure – and with it, their material consumption. Virtualization, digital service models, cloud-based services, and software-defined networks (SDNs) are now being used to reduce hardware requirements. For example, Vodafone and Deutsche Telekom both partner with network equipment suppliers, including Nokia and Ericsson, which offer highly energy-efficient radio and core equipment. Nokia AirScale and Ericsson's AIR antennas are lighter, more energy-efficient, and easier to recycle, which helps these operators simultaneously reduce power consumption and enable circular practices through refurbishment and reuse programs. While software-based or virtual networks are generally more energy-efficient than hardware-driven ones, they introduce a new layer of responsibility: understanding and managing cloud energy consumption and its associated carbon footprint. Shifting workloads to the cloud doesn't eliminate emissions—it simply relocates them. As technologies like generative AI add further computational demand, only companies that actively measure and optimize their digital energy use will achieve true efficiency and sustainability.

“Telecoms must rebuild from the ground up – adopting quick fixes today while reimagining tomorrow's infrastructure. True transformation tackles both symptoms and root causes simultaneously.”

Guillermo Pedraja
Head of Telecom, Media, Technology & Services Unit
Capgemini Invent UK



Climate resilient design

Climate resilience in telecoms must extend beyond equipment to include the civil infrastructure that supports it. From fiber installations and fixed-line nodes

Only 12% of telecoms measure Gen AI’s footprint

Source: [Developing sustainable Gen AI](#)

to mobile towers and small cells, network design should integrate climate resilience principles from the start—considering site selection, vulnerability to flooding or rising sea levels, and exposure to energy shocks. Achieving this requires close coordination between network engineering teams, civil construction partners, and regional maintenance divisions to ensure resilience is built into every layer of the network by design.

AI-powered autonomous networks

Autonomous networks represent one of the greatest opportunities for telecom companies to enhance sustainability through improved efficiency. By leveraging advanced technologies such as AI and automation, networks can dynamically respond to changes — like demand spikes or failures — without human intervention. This enables organizations to optimize performance, minimize waste, and unlock significant efficiency gains. TM Forum’s [autonomous networks maturity model](#) offers a clear roadmap forward for telecom operators, enabling them to progressively advance from Level 0 to Level 5 while minimizing operational disruption. Telecom companies can also tap into the potential of digital twin technology to drive energy savings. By creating a virtual replica of the physical network environment, digital twins enable real-time monitoring and predictive analysis of energy consumption across RAN, transport, core, and data centers. This helps identify inefficiencies, forecast future energy needs, and optimize operations — all while maintaining network performance.

Green energy use and storage

Telecoms are among the world’s largest consumers of electricity, making energy sourcing one of the most critical levers for reducing both cost and carbon impact. To address this, the industry must accelerate the transition to green energy—integrating on-site renewable generation such as solar and wind and complementing it with renewable energy purchases through power purchase agreements (PPAs), green tariffs, or renewable energy guarantees of origin (REGO). Telcos are uniquely positioned to play a leading role in advancing energy storage solutions. With their extensive, geographically dispersed infrastructure—much of it now underutilized due to increasing levels of network virtualization—telecom operators can repurpose existing sites to host distributed battery systems. By partnering with energy storage specialists, they can not only enhance their own energy resilience but also help accelerate the broader transition to sustainable power. For example, Finnish telecom operator Elisa has transformed its mobile base stations into a [distributed virtual power plant \(VPP\)](#). The AI-powered system charges batteries when electricity is inexpensive and discharges them during peak demand, enabling the company to cut costs, lower emissions, and support grid stability via Finland’s reserve market. Recognized by TM Forum, the initiative highlights how telcos can use AI, IoT, and existing infrastructure to advance sustainability and energy collaboration.

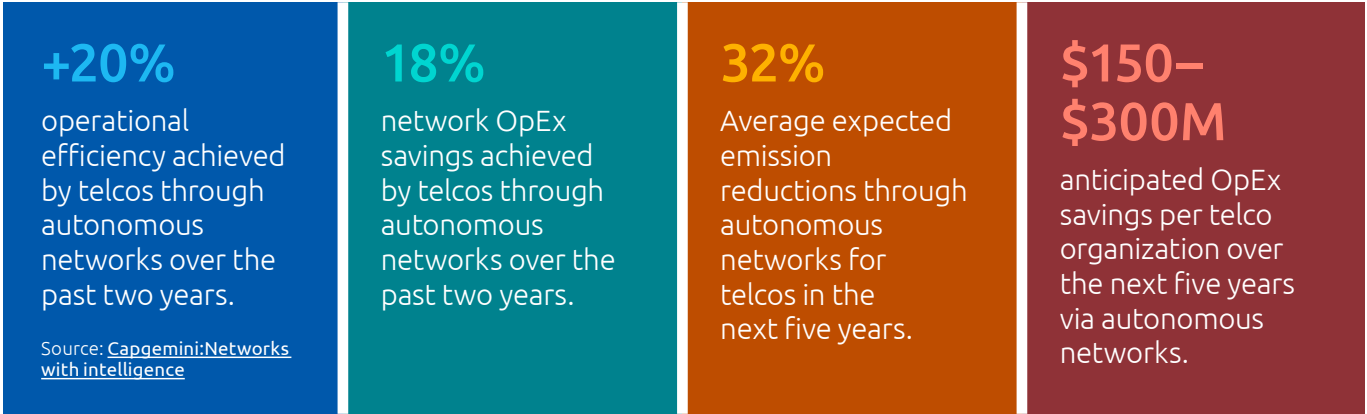
Circular supply chain

Circularity is vital to the telecom industry’s future, as materials and manufacturing contribute to [70–90% of a smartphone’s total emissions](#). With millions of devices discarded each year, extending the product lifespan through repair and refurbishment is a powerful way for telecoms to reduce emissions and cut costs. At the same time, circularity has become a standard expectation, emphasizing the need for effective component reuse and responsible e-waste recycling. Such programs have proven to be an effective way to conserve critical materials that are increasingly scarce in today’s uncertain geopolitical climate. For example, Telia has actively promoted circular economy consumer behavior through [repair, reuse, and buy-back programs](#), incentivizing customers to return old phones and offering refurbished devices at lower prices.

6. Foster ecosystem collaboration to reduce Scope 3 and 4 emissions

Engaging the end-to-end supply chain

With Scope 3 emissions accounting for [70% of the telecom sector’s carbon footprint](#), collaboration across the value chain is essential. Yet progress remains difficult due to fragmented data, inconsistent standards, and limited transparency. Operators with a common data framework and unified internal view are better positioned to lead by example, enabling them to improve visibility, share insights, and track common goals more easily across the value chain. Telecoms can also strengthen supplier partnerships by equipping their suppliers with tools, frameworks, and processes, and by incentivizing sustainable practices. One effective approach is carbon insetting—funding sustainability initiatives within suppliers’ operations. This allows telecoms to cut Scope 3 emissions while helping suppliers reduce their Scope 1 and 2 footprints, often at a lower cost than tackling telecoms’ own hardest-to-abate emissions. For example, Deutsche Telekom has reported that approximately [98% of its total climate-related emissions fall under Scope 3](#), which are largely generated across its supply chain and product lifecycle. To address these emissions, the company implemented a [Supplier Sustainability Program](#) which supports suppliers with tools, benchmarks, and reporting to help reduce operational emissions. Though the company does not market this as “insetting”—and indeed this is not a term used widely in the telecom industry—the collaboration program directly supports suppliers in



Sustainable RAN: Project Bose

Project Bose is Capgemini’s award-winning holistic energy saving program that tackles the ever-rising carbon footprint of networks. Developed in partnership with Intel, this program illustrates how telcos can leverage AI/ML capabilities to achieve significant energy savings across RAN, edge, and core. [Learn more.](#)

This vendor-agnostic, self-learning solution achieved energy savings of 18%, resulting in a 14% reduction in CO2 emissions and a 12% decrease in operating expenses—with no negative impact on quality.

Mastering enterprise-wide energy efficiency

Smart building management systems can deliver significant energy savings, often ranging from 15–30% or more. Since approximately 80% of CO2 emissions stem from energy use, eliminating waste is one of the fastest and most cost-effective ways to reduce energy consumption, emissions, and costs. [Capgemini’s Energy Command Center \(ECC\)](#) acts as a centralized control tower to monitor, optimize, and manage operations, maintenance, and performance across facilities. The approach begins with assessing the current infrastructure, defining a target operating model and roadmap, and then developing and implementing a tailored solution.

improving their internal practices, ultimately helping Deutsche Telekom reduce Scope 3 emissions. This example illustrates how collaboration with suppliers can be accelerated by turning shared goals into a joint program. Rather than imposing requirements through contracts, telecoms can drive faster progress by creating integrated data views, shared benchmarks, and aligned processes. This represents a shift in mindset—from managing suppliers to partnering with them—to achieve collective impact and long-term sustainability.

Engaging customers and end-consumers

Telecoms have an important role to play in educating B2B customers about how their use of telecom services contributes to Scope 3 and Scope 4 emissions. Once a solid data foundation is in place, sharing a unified emissions view enables customers to understand the impact of their product and service choices in real time. This transparency not only supports customers in meeting their own sustainability goals but also helps telcos advance their Scope 4 targets by driving more sustainable usage across their ecosystem. While consumer appetite for sustainable products is growing, it remains a relative niche with a gap between intent and action. The most impactful consumer education focuses on extending product lifecycles, encouraging repair, reuse, and delaying upgrades to maximize the amortization of embodied carbon from manufacturing. This approach requires coupling consumer awareness with new business models that profit from lower rather than higher material consumption.

For example, many telecom operators already operate device buyback programs and refurbish customer-premises equipment (CPE) to enable re-use and reduce e-waste. Expanding these circularity initiatives and switching to a leased assets model can help to further reduce this waste downstream. High rates of product return at the end of leased assets contracts have enabled few telcos to re-use and recycle CPEs, amortizing their carbon impact over a longer timeframe.

Energy efficiency for Scope 3 indirect emissions

Capgemini, in collaboration with Nokia and Google, has developed a minimum viable product (MVP), **Energy Efficiency for Scope 3 Indirect Emissions**—an on-device app designed to raise awareness about energy consumption among network subscribers. The app includes features such as personalized CO₂ impact scores, actionable insights and behavioral nudges, and gamification and incentives to lower data use and energy consumption. By nudging millions of users toward smarter habits—like switching to Wi-Fi or streaming in lower resolution, the app incentivizes subscribers to cut energy use on the network making a measurable dent in Scope 3 emissions.

Conclusion

Turning telecom commitment into measurable change

As climate change accelerates, the imperative for telecoms is clear: the industry that connects the world must now become its most sustainable. The six steps outlined in this report offer a practical path forward—from strengthening data foundations and collaboration across the supply chain to embracing renewable energy and circular design. Together, these points help form a comprehensive blueprint for change—helping telecoms advance their own global sustainability agenda and drive systemic transformation across industries and ecosystems.



Capgemini recognized as a leader in sustainability in both thought and action

Capgemini has a long and deep commitment to sustainability. Our company has committed publicly to achieving a 90% reduction in emissions across Scopes 1, 2, and 3, and reaching Net Zero by 2040. Our latest targets have been validated under the Science Based Targets initiative's (SBTi) Corporate Net-Zero Standard, and in February 2025, our leadership in addressing climate change was reaffirmed when global non-profit CDP placed us on their prestigious 'A List.'

As a leader in sustainability, we understand our responsibility to share our expertise.

We do this both by partnering with our clients to advance their sustainability agendas as well as through our award-winning research. The third edition of A World in Balance report from the Capgemini Research Institute was recognized by Source Global Research, a leading UK-based professional services research and advisory firm, as a gold standard in sustainability thought leadership. Now in its fourth edition, the report outlines the progress organizations have made and the actions they can take to accelerate their sustainability journey.

[Download our research now to learn more.](#)

“Telecom operators are uniquely positioned to lead on sustainability. Beyond regulatory compliance, it is clear that proactive action delivers significant benefits—lower costs, enhanced resilience, and stronger engagement with customers and stakeholders. The time to seize this opportunity is now.”

Praveen Shankar
Global Head of Telecommunications
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Our Experts



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About Capgemini

Capgemini is an AI-powered global business and technology transformation partner, delivering tangible business value. We imagine the future of organizations and make it real with AI, technology and people. With our strong heritage of nearly 60 years, we are a responsible and diverse group of 420,000 team members in more than 50 countries. We deliver end-to-end services and solutions with our deep industry expertise and strong partner ecosystem, leveraging our capabilities across strategy, technology, design, engineering, and business operations. The Group reported 2024 global revenues of €22.1 billion.

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