Capgemini | DCF DIGITAL CONNECTIVITY FORUM

AI for Sustainability

Accelerating Net Zero in the UK Telecoms Sector

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Executive summary

As the UK telecoms sector intensifies its journey toward Net Zero and with 6G on the horizon, artificial intelligence (AI) is emerging as both a transformative enabler and a sustainability challenge. This white paper explores the dual role of AI, its potential to drive environmental progress for the sector and the imperative to manage its own resource footprint.

Climate change presents urgent risks to telecoms infrastructure, from extreme weather to supply chain disruptions. At the same time, it catalyses innovation, prompting telecoms organisations to rethink their operations and invest in sustainable technologies.

AI is increasingly central to this transformation, offering opportunities to optimise energy use, reduce emissions, and enhance climate resilience, but failure to act now presents material risks (operational, regulatory, reputational, and financial), making sustainable AI adoption both imminent and essential.

This whitepaper outlines key AI-driven sustainability use cases across six domains:

- **Energy Optimisation:** AI solutions like network load balancing and predictive cooling reduce energy consumption in towers and data centres.
- **Customer Carbon Reporting:** AI models estimate Scope 3 emissions and help customers understand and reduce their impact.
- **Upskilling for Sustainability Literacy:** AI-powered tools personalise sustainability education and promote behavioural change.
- **Scope 3 & Supply Chain:** AI enhances supplier profiling, lifecycle emissions analysis, and procurement efficiency.
- **Sustainability Decision-Making:** AI supports infrastructure planning and operational efficiency, reducing emissions and resource use.
- **Climate Resilience & Adaptation:** AI enables predictive modelling and real-time climate and weather monitoring to anticipate and mitigate risks.

Optimising the use of AI in telecoms must go together with sustainability. It is not just about deploying AI; it is about doing so responsibly, with the right controls, standards, and technology foundations in place. To ensure AI itself is sustainable, we recommend six practical levers that organisations can activate to embed sustainability into their AI journey.

Governance for Sustainable AI: Establish cross-functional oversight and ethical standards.

Develop the right data and technology foundations: Build scalable, trustworthy, and efficient data platforms.

Embed 'sustainable by design' within AI development: Embed ESG principles into AI design and prioritise energy-efficient models.

Assess AI's environmental impact: Use tools and methodologies to assess and report AI's footprint.

Mitigate AI's environmental impact: Optimise models, hardware, and infrastructure to reduce energy and carbon intensity.

Educate employees on Sustainable AI: Upskill teams across roles and lifecycle stages to embed sustainability into AI.

The whitepaper concludes with a call to action for telecoms leaders: embrace AI responsibly to meet regulatory expectations, unlock business value, and lead the transition to a low-carbon digital future.

A dual approach ensures technological innovation supports the climate agenda.

02

Foreword / Introduction

Climate change is one of the most pressing challenges globally, reshaping how industries operate to ensure business continuity. In the telecoms sector, extreme weather events and rising temperatures, along with other climate risks, can affect telecoms infrastructure from stations to supply chains, not just posing a threat for businesses but also acting as a catalyst for innovation. For example, data centres are evolving by integrating renewables, optimising resource consumption and measuring their carbon footprint for decision-making.

Telecoms firms expect the impact of climate change risks will increase over time, creating the need to act now[1]. The telecoms system plays a crucial role in driving sustainability, given the digital era we live in. As the digital backbone facilitating connectivity, remote work and smart cities, it has a significant role to advance the sustainability agenda. The rollout of 5G inevitably requires innovation to factor in the increase in energy consumption, leveraging technologies such as artificial intelligence and machine learning for energy efficiency and upgrading legacy networks.

AI is a rising topic across telecoms businesses' agendas for its optimisation potential. Optimising the use of resources contributes to minimising the carbon footprint of telecoms operations; hence, AI is as relevant to driving more sustainable and efficient businesses as other decarbonisation levers. AI enables smarter operations across the telecoms system, from network traffic optimisation to supply chain analytics and carbon reporting. However, AI also introduces challenges due to energy and water demand for computational demands. A dual approach between AI for sustainability and Sustainable AI is central to ensuring technological innovation supports the climate agenda.

03 The Case for Action in the Telecoms Sector

The telecoms sector is under pressure to achieve net zero goals, driven by investors, regulations and consumer sentiment. The telecoms sector contributes 1.6% of global carbon emissions, with 80-90% related to scope 3 emissions[2]. As the digital era evolves, with consumers increasing data traffic and a future move towards 6G beginning early 2030s, the environmental footprint is expected to grow unless sustainable practices are implemented.

Investors and regulators are increasingly focusing on value chain emissions, given the substantial proportion of environmental footprint, pushing for accurate data and transparency of practices from procurement to customer energy use. Similarly, physical climate risks such as flooding and heatwaves are already impacting telecoms infrastructure, driving regulators such as Ofcom to assess the impacts on the sector[3]. Recently, the European Union announced the definition of a Code of Conduct for Sustainable Electronic Communication Networks, outlining best practices across energy, climate and the environment, which is expected to be published at the end of 2025[4].

AI is both a strategic answer to these pressures and a differentiator. Telecoms value chain players that embed AI into their sustainability journeys gain a competitive advantage by increasing adaptability to a complex ESG regulatory landscape, volatile energy markets and supply chain disruptions, and optimising resources.

Failure to act on net zero by leveraging innovative technologies such as AI presents material risks to the telecoms system, including operational, regulatory, reputational and financial risks. Operationally, the telecoms industry could face reliance on inefficient networks with inefficient energy use and limited visibility into emissions hotspots across infrastructure.

From a regulatory and reputational perspective, compliance could remain costly and complex, resulting in penalties and reputational damage. Financially, telecoms organisations may face higher operating costs and exclusion from ESG investments by not innovating at the same pace as peers, leveraging AI.

04 What can Telecoms Companies do

AI has the potential to accelerate sustainable business by investing in the right use cases. Capgemini Research Institute identified more than 100 use cases across business functions and sectors, including the telecom sector. 46% of sustainability executives are already leveraging AI for sustainable outcomes such as ESG reporting automation and ESG data generation[5].

Companies should pinpoint sustainability initiatives where AI can drive meaningful outcomes like cutting emissions, boosting energy efficiency, and enhancing operations.

These initiatives should be easy to scale across the organisation and prioritised based on their potential benefits (economic, environmental, operational) against their costs (financial, ecological, implementation challenges, and time).

For every chosen use case, expected outcomes should be defined using key performance indicators to track success.

Through case studies from telecoms and other industries, we demonstrate how AI can be leveraged for sustainability use cases and drive innovation.

4.1 Energy Optimisation

With the increased demand for digital connectivity, energy consumption is also expected to increase. Ericsson estimates that mobile data traffic will increase 26% per year, while fixed data traffic will increase 14% per year until 2028[6]. Energy consumption accounts for up to 40% of telecom's network OPEX[7], however, addressing or influencing the energy consumption of customers is equally important. Hence, reducing the energy need per unit of traffic brings a reduction of operational costs but also additional benefits such as ESG investments and reputational benefits[8].

AI can assist with **network load balancing** to help distribute traffic evenly, preventing overuse of certain nodes and allowing underutilised ones to enter low-power states, reducing unnecessary energy consumption. Tata Communications Transformation Services (TCTS) developed an AI-driven Traffic Load Balancing solution to balance traffic across radio cells[9]. Energy consumption from **data centres** can also be reduced with AI through intelligent workload distribution, predictive cooling, and server optimisation, all of which reduce energy demand. Virgin Media O2 is leveraging Internet of Things (IoT) and AI to track data centre cooling performance, which has allowed the organisation to save £1 million per year in energy costs[10]. In **mobile towers,** AI enables dynamic adjustments like switching off radios during low-traffic periods, significantly cutting power usage as shown by Ericsson and Vodafone trials *(Case study 4.1).*

Energy consumption accounts for 40% of telecom's network OPEX.

4.1

Case study

Ericsson launches 5G energy-efficient solution driven by AI

Ericsson launched Ericsson's Service Continuity AI App suite with Intelligent Energy Efficiency, an AI and Machine Learning (ML) software solution that enables networks to power down 5G radio units during off-peak hours when traffic is low and reactivate them when required.

The solution can predict periods of low demand to automatically signal which components enter ultra-hibernation mode. It does not compromise the network experience as end users can still navigate and make use of 5G connectivity.

Network operators can benefit from the solution with operational cost savings coming from energy savings, which in turn reduces emissions. Ericsson is already conducting trials with Vodafone UK in London with meaningful results, such as a 33% reduction in daily power consumption of 5G Radio Units and a 70% reduction of energy consumption during low-traffic hours.

Other use cases that the AI/ML solution caters for are 4G Cell Deep Mode Orchestration to optimise cell sleep parameters and Radio Power Efficiency Maps using ML-driven heatmaps to identify underperforming sites[12].

4.2 Customer Carbon Reporting

AI is increasingly being used to support customer carbon reporting, especially to estimate Scope 3 emissions and help customers understand their impact. AI models can analyse large datasets from multiple sources, including at the use stage. For example, a network operator that wants to assess B2B customer emissions can use AI to integrate data from data traffic records and device energy use and link it with customer profiles.

By consolidating and analysing these sources, the operator can get an accurate view of specific customer impact. Telecoms actors can also use AI to influence their customers to reduce and avoid emissions. This is the case of Gigaclear using agentic AI to analyse videos taken by customers, living in rural settings, before installation and avoid site visits unless required *(Case study 4.2).*

4.2

Case study

Gigaclear avoids travel emissions linked with customer visits with AI video technology

Gigaclear, a British retail fibre provider for rural communities, adopted Vyntelligence's AI video technology, which allows customers to share videos of their homes through their smartphones. The AI agent can assess the installation complexity of the customer's home and provide an initial analysis for engineers and contractors to prepare ahead of the installation or to request a follow-up property survey. The solution helps in reducing unnecessary customer visits and consequently avoiding travel emissions and minimising disruptions in hard-to-reach areas. 200 site visits have been avoided by implementing the technology, which will be rolled out for all Gigaclear customers, and it is expected to bring cost reductions of 10% annually for new customer installations. The AI partnership supports Gigaclear's sustainability goals by reducing travel emissions and the overall environmental impact of fibre installations[13, 14].

4.3 Upskilling for sustainability literacy

Impactful ways for AI to drive change in sustainability are developing knowledge graphs for sustainability intelligence and personalised sustainability learning. Knowledge graphs are structured networks of information connecting concepts and their relationships that can help map environmental-related data such as regulations, emissions sources and best practices. AI also enables scalable and personalised education based on analysis of user knowledge and interests. UC Irvine, a public university in the United States, is already developing an AI-driven personalisation system for sustainability based on student interests, enabling young generations to develop green skills[15]. Other sectors, such as automotive, are using AI as a catalyst for behavioural change and collaborative decarbonisation *(Case study 4.3).*

4.3

Case study

Martur Fompak International integrates AI to educate customers

Martur Fompak International (MFI), a global leader in automotive interior solutions, has integrated AI into its sustainability strategy to educate and empower employees and customers. MFI developed a real-time AI tool, 'Cockpit Configurator', which allows internal and external stakeholders to visualise the carbon footprint of different cockpit configurations, such as seats and door panels[16].

The customer takes an image, and AI analyses the material choices, providing instant feedback on how material choices affect emissions and fostering awareness of automotive OEMs and design teams to make more sustainable decisions.

One key aspect of the tool is that it integrates with SAP solutions such as SAP Sustainability Footprint Manager and SAP S/4 HANA to provide carbon data 50 times faster than with manual processes[17].

While developed for the automotive sector, similar tools could be used to upskill field engineers, procurement teams and customers on the environmental impact of actions in the telecoms value chain, from equipment selection to network deployment.

This can drive behavioural change and team alignment about sustainability objectives.

4.4 Scope 3 and Supply Chain

AI offers the potential to analyse large quantities of supplier data to identify emissions hotspots, suppliers with high carbon intensity and support the granularity of lifecycle emissions. Not only does this enhance supply chain decision-making, but it also drives transparency into supply chain emissions, helping suppliers to adopt sustainable practices. Alternative approaches include leveraging AI to automate Scope 3 calculations. This is the case of Climatiq, a solution provider that uses NLP models to map purchase and material data to emission factors[18], and optimising procurement processes as demonstrated by BT Sourced *(Case study 4.4).*

4.4

Case study

BT Sourced optimises sourcing processes with AI

BT Sourced, a BT Group-owned company that manages its global procurement operations, is working with AI-powered platform Globality to increase efficiency across procurement processes. BT Sourced is leveraging Gen AI features for scoping processes, procurement needs definition, e-negotiation and non-disclosure agreements (NDAs) to speed up and simplify procurement processes.

The results have shown a significant improvement in time-to-market of 1.1 working days against 7-10 working days with traditional procurement processes. Additionally, BT Sourced is exploiting AI to synthesise supplier profiles, including earnings reports, news, projected spend and available ESG information as part of its supplier negotiation process[19]. Recently, BT Sourced has announced a global start-up competition calling for AI solutions that can further improve supplier engagement, procurement data analysis and increase efficiency[20].

By engaging with early-stage AI companies, BT can develop tailored solutions to drive their sustainable procurement objectives and gain a competitive advantage against peers using AI.

4.5 Sustainability decision making

Data plays a vital role for sustainability teams to develop tailored action plans and engage with other functions. AI supports the speed at which insights are generated. For example, AI models can improve the quality of operations *(Case study 4.5)* and infrastructure planning, cutting down on unnecessary travel, fuel consumption and resource usage. Telefonica implemented an AI-driven programme to bring connectivity to remote locations in Latin America, considering location, transport network data and historical operations data[21]. From a sustainability perspective, optimised network planning supports travel emissions reduction and optimised resource use by investing in the right locations.

4.5

Case study

City Fibre is using AI to ensure the quality standards of fibre network deployment

CityFibre, the UK's largest independent full-fibre infrastructure provider, partnered with Deepomatic, a leader in visual automation, to revolutionise how fibre networks are deployed and maintained. Faced with the challenge of scaling its operations while maintaining high-quality standards, CityFibre turned to AI to enhance decision-making and operational efficiency.

Through Deepomatic's AI-powered computer vision platform, field technicians capture images during installation and maintenance, and instantly analysed by AI to verify work quality, detect anomalies, obtain feedback on issues on-site and ensure compliance with technical standards. CityFibre has reported 55 minutes saved per quality control review compared with manual reviews, a reduction of 92%[22].

By minimising errors and optimising technician routes, CityFibre reduces travel emissions of quality assurance managers (Scope 3). Moreover, the data generated through Deepomatic's platform supports strategic decision-making by providing insights into field performance and streamlining operational data, allowing CityFibre to continuously refine its processes and contribute to sustainability goals.

4.6 Climate resilience & climate adaptation

AI enables companies to massively enhance and streamline data analytics, the results of which would be too complex to obtain with traditional data processing techniques. This is the case for predictive climate models and image analysis that can proactively identify climate risks[23]. This could enable telecoms organisations to identify climate risks and their impacts on network infrastructure over larger timelines and scales. Telecoms tech-heavy infrastructure could also support other sectors to raise awareness of climate change impacts, as shown by Vodafone UK *(Case study 4.6)*.

4.6

Case study

Vodafone UK and UK National Parks Partnership for AI-Powered Habitat Mapping

Vodafone UK, in collaboration with UK National Parks, is supporting the Landscape Observatory initiative to deliver AI-powered habitat mapping across protected landscapes. This partnership focuses on using advanced technology to monitor ecosystem health and biodiversity more effectively. The project leverages AI to process environmental data and generate insights that help predict ecological stress and inform conservation strategies.

Rather than deploying standalone sensors for real-time monitoring, the initiative integrates Vodafone's connectivity solutions with AI-driven analytics to map habitats and assess changes over time[24]. This approach enables conservation teams to identify areas at risk and prioritise interventions. The partnership builds on Vodafone's previous innovation, Network-as-a-Sensor, which has been successfully used for applications such as rainfall prediction along the River Severn[25].

05 Key Levers for Action

Data centres and cloud computing powering AI consume significant amounts of electricity and water due to model training, such as large language models (LLMs). In addition, the need for specific hardware for AI, such as Graphics Processing Units (GPUs) and Tensor Processing Units (TPUs) and their lifecycle emissions increases the environmental burden of AI. Hence, its potential must be weighed against the technology's environmental cost.

It is possible to design AI sustainably and minimise its environmental impact using targeted tools and frameworks. The key levers outlined below show how to achieve this transformation.

AI's potential must be weighed against the technology's environmental cost.

Lever 1: Governance for sustainable AI

Organisations must establish strong governance to ensure AI is used ethically and sustainably. Over 60% of executives believe proper guardrails can reduce their environmental impact, while half cite lack of governance as a major challenge. A centralised governance body can accelerate decision-making, enforce accountability, and align AI use with sustainability goals. Effective governance requires collaboration across sustainability, tech, and operational teams. 57% of leaders highlight poor cross-team coordination as a key challenge. To manage AI's footprint, organisations should assess pilots based on their own frameworks, using criteria relevant to the organisation, such as cost, feasibility, sustainability outcomes, and environmental impact. Broad collaboration, including governments, academia, and industry, is essential to develop sustainable AI standards, share best practices and drive collective action[26].

Over 60%

believe proper guardrails can reduce its environmental impact.

Lever 2: Develop the right data and technology foundations

AI relies heavily on robust, high-quality data. However, most organisations are not yet equipped to fully leverage their potential for sustainability. Research shows that 60% of data leaders anticipate major changes in how data is collected, stored, and governed to support AI models like Gen AI. Yet only a third of organisations currently monitor data quality, and just 20% have automated emissions data collection[27]. To effectively use AI for sustainability, organisations must:

Figure 1.
Considerations for building solid data and technology foundations.

Define a Holistic Data Strategy	Ensure Data Trustworthiness	Develop Scalable Data Platforms	Democratize Data Access	Strengthen Data Governance	Promote Sustainable Data Practices
Establish a vision for how data will support sustainability goals. Identify data availability and quality gaps. Map accurate and granular internal and external data sources. Build architecture for efficient data processing.	Establish process to prequalify data sources and set standards to ensure consistency and reliability of AI outcomes. High-quality data can become a strategic asset, giving companies a competitive edge.	Automate data ingestion from diverse sources. Centralize data into a unified platform to create a *"single source of truth."*	Use data mesh architectures to make data accessible across business units. Empower non-technical users to explore and act on data insights independently.	Assign clear accountability for data standards, audits, and collection processes. Foster collaboration between AI, data, and technology leaders to align efforts.	Reduce unnecessary storage and processing. Focus on relevant and impactful data sources.

Source: Adapted from Capgemini Research Institute.

Lever 3: Embed *'sustainable by design'* within AI development

> **Harnessing AI responsibly is a matter of increasing importance.**

'Sustainable by Design' in AI design and development means integrating sustainability principles at every stage – from concept to development to training to in use, ensuring that environmental, social and ethical considerations are foundational, rather than afterthoughts. Sustainable AI by design will promote not only operational efficiency but also accountability, transparency, and long-term business value.

Organisations can employ a "decision tree" approach to strategically evaluate if and what "type" of AI is necessary for a given use case, considering alternatives that may have a lower environmental footprint, e.g. a rules-based approach. While implementing AI models, it is important to choose and prioritise energy-efficient algorithms, optimise model architectures for low power and fewer parameters, and adopt techniques like model pruning or federated learning to reduce unnecessary and unwanted computational loads. One widely referenced approach is Microsoft Azure Well-Architected Framework, which outlines sustainable AI design across model design, data design and operations. It recommends the use of small language models (SLMs), reusing pretrained models and optimising data storage[28].

Data efficiency is key – it is important for organisations to minimise dataset use, leverage transfer learning, and focus on synthetic/ self-supervised learning to reduce resource consumption. Where feasible, organisations should adopt decentralised architecture e.g. Edge AI, to reduce data transmission energy costs and distribute loads. Whilst evaluating the connected energy to AI infrastructure, physical as well as digital, organisations should use green infrastructure, procure renewable energy for data centres and compute resources to lower operational carbon and energy footprints.

As the world realises AI's potential, harnessing it responsibly is a matter of increasing importance. The OECD AI principles, the first intergovernmental standard on AI, which the UK has adhered to, include value-based principles on sustainable development, human rights, transparency, robustness and accountability[29]. The International Organization for Standardization (ISO) has recently launched the standard ISO/ IEC TR 20226:2025 on Environmental sustainability aspects of AI systems, providing an overview of environmental footprints such as carbon impact, workload, location and other related metrics[30]. In the telecoms sector, GSMA's AI for Impact Initiative has established best practices for telecoms companies to achieve maturity in Responsible AI, of which sustainable AI is one of its seven principles[31].

Lever 4: Assess AI's environmental impact

Organisations are increasingly recognising that while AI offers transformative potential, it also comes with high environmental and operational costs, particularly in terms of energy and water usage. These challenges can make AI economically and environmentally demanding.

While over half of executives believe that including sustainability as a criterion in selecting AI vendors could reduce environmental impact, only a small fraction (15%) is currently doing so[32]. This highlights a significant gap between awareness and action. Many organisations lack transparency from AI providers regarding energy efficiency and carbon footprints, which is crucial for informed decision-making.

Additionally, only a minority of companies are actively monitoring and disclosing the environmental footprint of their AI models, and even fewer have set reduction targets. This indicates a broader need for lifecycle assessments and accountability in AI operations.

Evaluating the energy sources used by providers and leveraging tools like Google's Carbon Sense Suite to monitor cloud energy consumption is central to understanding AI's cloud footprint. Furthermore, conducting lifecycle assessments of AI systems, factoring in training location, hardware type, and token usage, can help organisations estimate and manage their environmental impact.

Tools such as CodeCarbon support this analysis, whose results can be used for sustainability reporting and setting reduction targets for AI-specific implementations. In the telecoms sector, network operators are already developing carbon dashboards for customers to assess how AI is impacting their carbon footprint.

Orange's AI Carbon Value Navigator tool provides an initial assessment of any AI project, leveraging external frameworks and partnerships, such as AFNOR's frugal AI standards and Boavizta's EcoLogits tool[33].

Lever 5: Mitigate AI's environmental impact

Key actions to mitigate the environmental impact include optimising language models, hardware and sustainable structure and aligning AI's operations with low-carbon and renewable energy sources.

Reduce reliance on LLMs

Organisations are exploring the use of more efficient approaches such as SLMs, trained on focused datasets and optimised for specific tasks. These models consume fewer resources and are more cost-effective to run, allowing for frequent use at lower expense, also referred to as "compressed knowledge." For less complex tasks, prebuilt models may be more energy-efficient than tailored ones.

Use model-optimisation techniques

Model optimisation techniques such as quantisation, distillation, and pruning help tailor AI for resource-constrained environments without sacrificing performance. Additionally, switching programming languages and embedding multiple models within a single system can further reduce energy demands. Implementing checkpoints in training workflows also helps conserve computational resources by allowing interrupted jobs to resume efficiently.

Deploy energy-efficient, recyclable and sustainable hardware

Using energy-efficient and recyclable hardware, whether in-house or through partners, is another key step, especially when combined with idle power consumption. Emerging sustainable hardware, like neuromorphic and analogue processing circuits, offers promising alternatives, inspired by biological systems for extreme energy efficiency.

Select cloud providers with efficient data centres

Organisations can significantly reduce the environmental impact of AI by carefully selecting cloud providers and infrastructure. Leveraging shared, on-demand AI inference environments in public cloud services increases utilisation rates, which helps optimise resource use and reduce overall energy consumption.

Choose server regions with lower environmental impact

The location of servers is a factor affecting the environmental impact of AI. AI systems hosted in regions with cleaner energy grids, such as those powered by renewables, have a much smaller carbon footprint compared to those in areas reliant on fossil fuels. Scheduling workloads based on real-time carbon intensity data allows organisations to align AI operations with periods of lower environmental impact.

Lever 6: Educate employees on Sustainable AI

Organisations need skilled professionals to design and manage sustainable AI systems. Currently, only 24% of executives feel their teams have the necessary skills. To successfully embed sustainability into AI practices, organisations must focus on educating and upskilling employees in a way that reflects both their roles and the stages of the AI lifecycle.

For instance, end users need to understand the environmental impact of AI and how to use AI tools responsibly, while engineers and architects require deeper technical knowledge, such as how to design AI sustainably, write energy-efficient code, and manage data responsibly. Leaders must be equipped with skills to champion sustainable AI, foster a culture of accountability, and align sustainability goals with business strategy. By taking a persona-based approach, organisations can ensure that each group, whether technical, operational, or strategic, is empowered to contribute meaningfully to sustainable AI outcomes.

Equally important is aligning these skills to the stages of the digital lifecycle. In the design phase, employees should be trained in systems thinking and sustainable-by-design AI principles, with a strong understanding of the environmental and societal impacts of technology. Incorporating Sustainable AI frameworks and carbon-aware design choices at an early stage can reduce long-term impact.

As teams move into the build phase, upskilling should focus on adopting efficient development practices, such as green software and energy-efficient models. During testing and deployment, it is essential to guide teams on how to use monitoring tools to track energy consumption and emissions to help teams make informed decisions and optimise performance. In the run and maintain phase, employees need to be aware of how their individual roles can help mitigate AI's impact using tools to drive engagement, such as storytelling, gamification, and real-world examples

Conclusion

Roaming Towards a More Sustainable Future

As the UK telecoms sector accelerates its journey toward Net Zero, AI emerges as both a powerful enabler and a challenge to sustainability. This whitepaper highlights how AI can drive meaningful environmental outcomes, from optimising energy use and reducing emissions to enhancing climate resilience and supply chain transparency. Yet, it also underscores the importance of managing AI's own environmental footprint through sustainable by design principles, governance, monitoring and assessment.

To unlock AI's full potential sustainably, telecoms leaders must adopt a dual approach: using AI to advance sustainability goals while embedding sustainability principles into AI itself. This means prioritising use cases but also the use of efficient models, selecting low-impact infrastructure, and fostering cross-functional collaboration. It also requires upskilling teams, establishing robust governance, and measuring AI's environmental impact with transparency and accountability.

The path forward calls for bold action, strategic investment, and sector-wide ambition. By embracing AI responsibly, telecoms companies can not only meet regulatory and stakeholder expectations but also lead the way in shaping a resilient, low-carbon digital future.

References

1. Ofcom, “Resilience to climate change in the telecoms sector Ofcom report to Defra;” December 19, 2024.
2. Edie,” British telecommunications giants join forces to tackle industry emissions;” July 14, 2023.
3. Ofcom, “Resilience to climate change in the telecoms sector Ofcom report to Defra;” December 19, 2024.
4. European Commission, “Green and sustainable telecom networks;” October 6, 2025 (last accessed).
5. Capgemini Research Institute, “Developing Sustainable Gen AI;” January 2025.
6. Ericsson, “Ericsson Mobility Report;” June 2023.
7. GSMA Intelligence, “The Sustainable Telco;” December 2021.
8. World Broadband Association, “The importance of environmental sustainability in telecom service providers' strategy;” September 26, 2022.
9. Tata Communications Transformation Services, “Intelligent Traffic Load Balancing for Optimizing RF Network Performance, October 6, 2025 (last accessed).
10. Virgin Media O2, “Virgin Media O2 works with EkkoSense to unlock data centre cooling energy savings worth over £1 million per year;” September 18, 2024.
11. Vodafone UK: “Vodafone UK and Ericsson trial AI solutions for improved 5G energy efficiency;” March 11, 2025.
12. Ibid, endnote 11.
13. Vyntelligence, “Gigaclear becomes first retail fibre provider to harness Vyntelligence AI technology, transforming rural broadband installations;” September 17, 2025.
14. Vyntelligence, “New Installations for Telecoms;” October 27, 2025 (last accessed).
15. UC Irvine, “Building a Novel AI System for Personalized Sustainability Education;” September 9, 2024.
16. Martur Fompak International, “Sustainability Report 2023;” October 7, 2025 (last accessed).
17. SAP, “AI-Driven Sustainable Innovation: Redefining Cockpit Customization in Automotive Industry by Martur Fompak International;” October 7, 2025 (last accessed).
18. Climatiq, “AI-powered emission calculations for scope 3;” October 8, 2025 (last accessed).
19. BT Group plc, “Annual Report 2024;” October 8, 2025 (last accessed).
20. Supply Chain Digital, “Inside BT Sourced's Procurement-Focused AI Contest Launch;” April 14, 2025.
21. Telefonica, “Telefónica presents “Internet para todos”, a collaborative project to connect the unconnected in Latin America;” February 26, 2018.
22. Deepomatic, “CityFibre & Deepomatic: Scaling quality in fibre optic operations;” October 8, 2025 (last accessed).
23. Capgemini Invent, “Climate adaptation: Harnessing tech-driven resilience to create sustainable value;” June 2025.
24. Vodafone UK, “Vodafone and UK National Parks partnership uses AI technology to help connect people with nature and protect it for the future;” April 29, 2025.
25. Vodafone UK, “Vodafone and River Severn Partnership trial ‘network-as-a-sensor proposition’ to improve rain forecasting;” April 9, 2025.
26. Capgemini Research Institute, “Developing Sustainable Gen AI;” January 2025.
27. Ibid, endnote 25.
28. Microsoft, “Well-Architected Framework AI workload assessment;” January 8, 2025.
29. OECD, “OECD AI Principles;” October 9, 2025 (last accessed).
30. ISO, “ISO/IEC TR 20226:2025 Information technology: Artificial intelligence – Environmental sustainability aspects of AI systems;” October 10, 2025 (last accessed)
31. GSMA, “Best Practice Tools: Examples supporting responsible AI maturity;” October 2025.
32. Capgemini Research Institute, “Developing Sustainable Gen AI;” January 2025.
33. Orange, “The carbon impact of AI: Orange’s navigator for the net-zero carbon transition;” September 16, 2025.
34. Capgemini Research Institute, “Developing Sustainable Gen AI;” January 2025.

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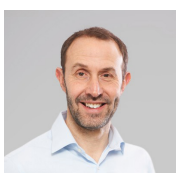

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Rory leads Capgemini Invent UK's Sustainable Futures team, helping clients achieve their sustainability ambitions from strategy to digital transformation. He has over 25 years' experience as a strategy and transformation expert, focussed on bringing innovation to transform business and delivering complex change for international organisations. He is also responsible for Capgemini UK's Sustainability Centre of Excellence and is a member of the UK Decarbonisation Board.

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Natalia has 7+ years of professional experience in consulting and carbon intensive industries, helping organisations to accelerate decarbonisation efforts and increase resources efficiency. She has broad sector experience from engagements with clients in telecoms, manufacturing, energy, and utilities sectors, and holds a unique skill set in business, sustainability, and engineering. She also supports clients in scaling circular economy across products and services.

Digital Connectivity Forum

Climate & Sustainability Working Group

The Digital Connectivity Forum (DCF) is the UK Government's advisory group on digital connectivity issues. Its members collaborate, source evidence, provide expertise and make recommendations to Government, regulators and industry, with the aim of developing policies which deliver seamless digital connectivity across the UK.

The Climate & Sustainability working group focuses on sustainability issues across the industry by providing a neutral forum for collaboration and the sharing of best practice to provide recommendations on how to reach a sustainable future for UK telecoms.

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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About the Digital Connectivity Forum (DCF)

The Digital Connectivity Forum (DCF) is the UK Government's advisory group on digital connectivity issues. Its members collaborate, source evidence, provide expertise and make recommendations to Government, regulators and industry, with the aim of developing policies which deliver seamless digital connectivity across the UK.

Uniting the digital ecosystem | **www.connectivityuk.org**