



Driving Europe's climate revolution: Technology leadership's pivotal role in sustainable transformation

As Europe navigates unprecedented environmental challenges and socioeconomic transformation, the quest for sustainability has become both an urgent imperative and a defining opportunity. In this dynamic landscape, technology emerges as a pivotal force in driving Europe's sustainability agenda.

From the bustling urban centers of Western Europe to the evolving industrial hubs of Eastern Europe, the integration of advanced technologies is reshaping how the continent addresses climate change, optimizes resource use and fosters economic resilience. In this context, technology leadership is not just about adopting the latest innovations: It's about strategically harnessing technological advancements to create sustainable value.

Al technology across Europe's regions

Technology leadership for sustainability looks different across Europe's regions due to dissimilarities in local economic structures, natural resources and political priorities. But one thing is common across the continent — the increasing use of artificial intelligence (AI). AI algorithms analyze vast amounts of data from smart grids, weather forecasts, energy consumption patterns and more to improve efficiency, predict demand and manage energy storage, enabling better integration of renewable energy sources and reducing reliance on fossil fuels.

In Western Europe, particularly Germany, France and the Netherlands, Al is being leveraged to optimize energy consumption, reduce emissions and enhance industrial efficiency. For example, predictive maintenance technologies, powered by AI, can identify potential manufacturing equipment failures before they occur, reducing downtime and resource waste. And Western Europe's strong industrial base and advanced technological infrastructure create opportunities to integrate AI into many kinds of traditional industries, driving significant sustainability gains.

Western Europe's leadership in developing AI ethics frameworks will ensure that AI applications are socially responsible and environmentally friendly.

Northern Europe, including the Nordic countries and the UK, is leading in applying Al for smart cities and renewable energy management. Al-powered systems are optimizing urban planning, reducing traffic emissions and managing energy consumption in real time. The region's extensive renewable energy resources, such as wind and hydroelectric power, are further enhanced by AI, which improves grid stability and energy storage efficiency. Integrating Al into these sectors not only boosts sustainability but also positions Northern Europe as a global leader

in sustainable urban and energy solutions^{1a}. Smart grids and Al-driven energy management systems help balance supply and demand, optimize energy use and reduce waste.

As **Southern Europe** faces distinct challenges related to climate change, particularly in agriculture and water management, AI offers significant opportunities for optimizing irrigation, improving crop yields and predicting climate impacts. Precision farming techniques enabled by IoT and AI can optimize water and fertilizer use, reduce chemical runoff and improve crop yields.

Eastern Europe is in the early stages of digital transformation, with significant opportunities to integrate Al and emerging technologies into its industrial base. Al can help reduce the carbon footprint of energy-intensive industries, optimize resource usage and improve efficiency^{1b}. The region's ongoing economic development offers a unique opportunity to build sustainability into the foundation of its digital infrastructure. The European Union's (EU's) funding and support for Al initiatives in Eastern Europe are critical in driving these changes, allowing the region to leapfrog into more sustainable industrial practices.

Across Europe, AI can support the circular economy by enhancing recycling processes, optimizing supply chains and enabling the development of sustainable products. AI algorithms can identify recyclable materials in waste streams, improve sorting efficiency and design products for longer life cycles and easier recycling.

The EU Artificial Intelligence Act encourages the development and use of AI apps to support climate action and biodiversity goals. This means that energy and resource reporting is integrated, regardless of where the AI services are consumed², and AI platforms are built and operated internally. Compliance with these regulations is not just a legal obligation but is also important to business value. Companies that proactively align with these frameworks can avoid penalties, gain access to incentives and position themselves as industry leaders in sustainability.

^{1a, 1b, 2} "Accelerate sustainability with AI: Embracing innovation for a better world", Microsoft; "The Northern European approach: A driving force behind the energy transition", Adven, 19 December 2024:

[&]quot;Northern Europe", Sustainable Development Solutions Network [SDSN] - UN;

[&]quot;Follow Sustainable Cities of Northern Europe", Equity, Land, and Food Systems (ELFS) - University of California at Davis, 2025;

[&]quot;Al and Sustainability: The Power of Integration", Bain & Company, 2024;

[&]quot;Inside Microsoft's Al-Powered Sustainability Initiatives", Sustainability magazine, March 10, 2025

Energy usage in the data center and infrastructure

Data centers and infrastructure are the backbone of the digital economy, powering everything from cloud computing and AI applications to online services and communication networks. As demand for data storage and processing grows exponentially in Europe, driven by trends such as the internet of things (IoT), 5G and digital transformation, the energy consumption needs and environmental impact of data centers have become critical concerns. Ensuring the sustainability of these key technology enablers is not only vital for reducing Europe's carbon footprint but also for maintaining the digital ecosystem's long-term viability.

Data centers are notorious for high levels of energy consumption. According to estimates, they account for around 2 – 3% of global electricity use³, a figure expected to rise with increasing digitalization⁴. Given that stringent climate targets are in place in Europe, the energy efficiency of its data centers is under intense scrutiny.

To reduce the environmental impact of data centers, DXC Technology and Dell Technologies have taken some essential steps — transitioning to energy-efficient hardware, optimizing cooling systems and implementing energy management practices. Technologies like Al-driven energy optimization and liquid cooling systems are increasingly being adopted to address these challenges⁵.

Driving sustainability in data centers also involves a shift toward renewable energy. Dell's goals for all of its facilities include the following: To source 75% of electricity from renewables by 2030, and 100% by 2040; and for the 2040 goal, by doing so, to drive scope 2 emissions to nearly zero⁶.

Energy from renewable sources helps companies transition away from carbonintensive sources and reduce their emissions. As a member of the global corporate renewable energy initiative RE100, Dell has used renewable energy in the form of onsite solar generation, green power sources and unbundled and bundled renewable energy certificates (RECs) for Dell's locations in the United States⁷. This transition not only aligns with the EU's European Green Deal objectives but also sets a standard for other industries to follow.

³ Data centres in the EU used an estimated 45-65 TWh of electricity in 2022 (1.8-2.6% of total EU electricity use), while telecommunication networks used an estimated 25-30 TWh of electricity (1-1.2% of total EU electricity use). "Energy Consumption in Data Centres and Broadband Communication Networks in the EU", European Commission report, 2024

⁴ "Global data center electricity use to double by 2026 - IEA report", Data Center Dynamics (DCD) Academy, January 26, 2024

⁵ The EU's data center reporting rules are part of a larger regulatory package ultimately aimed at reducing energy consumption by 11.7% between 2020 and 2030. Regulators are targeting data centers because they are estimated to consume 2% to 3% of all energy used in the EU, with processing-heavy AI technologies driving the demand for greater computing power and more data centers.

[&]quot;EU moves toward regulating data center energy and water use", CIO magazine, May 15, 2024

⁶ "Carbon Reduction Plan", Dell Corporation Limited, 2 August 2024

⁷ "Environmental, Social and Governance Report - FY24", Dell Technologies

Envisioning the future of sustainability

The EU and its member states have set ambitious targets and policies aimed at achieving a more sustainable future. In the coming years, several key challenges and opportunities will shape the region's sustainability landscape.

CHALLENGES

- · Economic issues, such as inflation and energy price volatility, could hinder sustainability investments. Political shifts within EU member states or global tensions could impact the stability and continuity of sustainability initiatives.
- The pace of technological development and the availability of sustainable infrastructure may not meet the demands of rapid decarbonization. This is particularly evident in the energy sector, where grid capacity and storage solutions are critical.
- Sustainability must not exacerbate social inequalities. The concept of a "just transition" is central to European policy, but balancing economic, social and environmental goals requires careful planning and stakeholder engagement.
- · The shift toward sustainability in Europe may expose supply chain risks, particularly in critical raw materials for renewable energy technologies, like lithium and cobalt. Geopolitical factors and resource scarcity could disrupt supply chains, increasing costs and delaying progress.

Beyond energy, sustainability in data centers also involves resource efficiency. E-waste from outdated equipment and the need for rare materials in data center infrastructure pose significant environmental risks. Embracing circular economy principles — such as recycling, repurposing hardware and extending the life cycle of equipment — can mitigate these impacts.

Going up against greenhouse gas emissions

Sustainability value creation in Europe is increasingly tied to how companies address their greenhouse gas emissions, classified into scope 1, 2 or 3. Each scope presents distinct regional opportunities and challenges across Europe, shaped by varying levels of industrialization, energy sources and supply chain complexities.

Scope 1 emissions

Scope 1 emissions, which are direct emissions from owned or controlled sources, present opportunities and challenges that differ regionally in Europe.

Western and Northern Europe, with their advanced industrial bases and strong regulatory frameworks, offer significant opportunities for reducing scope 1 emissions through investments in energy efficiency, electrification of transport and adoption of renewable energy. Companies in these regions can create value by lowering their carbon footprint, thereby reducing operational costs.

In Eastern and Southern Europe, where heavy industries and fossil fuel dependency are more prevalent, reducing scope 1 emissions is more challenging. The economic transition in these regions makes it difficult to rapidly shift away from high-emission activities.

Scope 2 emissions

Scope 2 emissions, which involve indirect emissions from purchased electricity, heat and steam, also present varied regional scenarios.

Northern Europe, particularly the Nordic countries, has a significant opportunity to create value by leveraging its abundant renewable energy resources. Companies in these areas can achieve near-zero scope 2 emissions by sourcing energy from wind, hydroelectric and geothermal sources. This not only reduces their carbon footprint but also enhances their sustainability credentials, attracting green investment and consumer loyalty.

In regions like Central and Eastern Europe, where coal and natural gas still dominate the energy mix, reducing scope 2 emissions is more complex. The challenge lies in transitioning to renewable energy sources while ensuring energy security and affordability. This transition requires significant investment in renewable infrastructure and grid modernization, which could strain regional economies but also presents opportunities for long-term value creation through green energy projects.

OPPORTUNITIES

- Europe is a global leader in green finance, with a strong market for green bonds and sustainable investment funds. The EU's taxonomy for sustainable activities provides clarity for investors and companies, encouraging investment in projects that contribute to sustainability goals.
- · By adopting circular principles, businesses can reduce costs, increase competitiveness and create new markets for recycled materials and sustainable products. If e-waste collection and recycling targets of 60% were met by 2030, the benefits — including those achieved by minimizing human health risks — could exceed \$38 billion8.
- Europe's investments in offshore wind power generation, green hydrogen production and energy storage will drive growth and innovation in the energy sector.
- · The transition to a sustainable economy has the potential to create millions of jobs in renewable energy, energy efficiency and the circular economy.

Dell recognizes that reaching its ambitious climate goal requires deep collaboration throughout the value chain and adjusting how we do business. Read the full, published plan here: Dell's Climate Transition Action Plan.

Scope 3 emissions

Scope 3 emissions, which include all other indirect emissions across the value chain, represent the most complex challenge for European companies.

Western European companies, especially those in sectors like consumer goods and automotive, have opportunities to lead in scope 3 emissions reduction by influencing supply chains. This can be achieved through sustainable sourcing, logistics optimization and product life cycle management, creating value by meeting the growing demand for sustainable products and services.

The complexity of scope 3 emissions, particularly in countries with extensive global supply chains, such as Germany and France, poses significant challenges. Tracking and reducing these emissions requires collaboration across borders and industries, which can be logistically and financially demanding. Moreover, many smaller companies in **Eastern and Southern Europe** may lack the resources and expertise to effectively manage scope 3 emissions, thereby creating a need for supportive policies and frameworks.

Value creation in sustainability across Europe involves addressing the distinct challenges and opportunities associated with scope 1, 2 and 3 emissions. Regional differences in industrialization, energy sources and economic conditions mean that tailored approaches are necessary to maximize value while reducing emissions. By navigating these regional nuances, European companies can contribute to a more sustainable future while securing long-term competitive advantages.

Strategic alliances and proactive partnering

As Europe stands on the brink of a new era in sustainability, the convergence of technology leadership and proactive partnerships offers a roadmap to success. The challenges of climate change, resource scarcity and environmental degradation are daunting, but they are matched by the transformative potential of cutting-edge technologies and collaborative efforts. The continent's journey toward a sustainable future hinges not only on technological innovation but also on the strategic alliances that amplify its impact.

We've seen how technology is fundamentally reshaping Europe's sustainability landscape. From Al-driven energy management systems that optimize the integration of renewables to smart cities that redefine urban living through efficient resource use, technology is at the heart of Europe's environmental strategy. The power of these innovations is magnified when coupled with proactive partnerships across industries, governments and research institutions, and the technology sector itself.

Proactive technology partnerships, such as those in which companies like DXC and Dell are leading the way, are essential in overcoming the fragmented approach that can stymie progress. By fostering collaborations among tech innovators, policymakers and industry leaders, Europe can focus on developing solutions that are

^{8 &}quot;Global E-Waste Monitor 2024: Electronic Waste Rising Fives Times Faster Than Documented E-Waste Recycling", UNITAR, 20 March 2024;

[&]quot;Electronic waste rising five times faster than documented e-waste recycling: UN", ITU - UN, 20 March 2024

advanced, practical and positioned for broad adoption. These partnerships facilitate the sharing of knowledge, resources and best practices — driving systemic change that transcends regional boundaries and integrates diverse technological solutions into a cohesive sustainability strategy.

Both DXC and Dell view sustainability as a business imperative. Alongside actively leading the way in technological innovation, both companies follow an integrated, end-to-end approach that requires collaboration across our ecosystems to address environmental and societal issues^{9,10,11}.

To align with global carbon emissions reduction goals and support climate change resilience, it will be important to champion public policies — including shaping climate-related regulations — that ensure a consistent regulatory environment across all global regions. This requires specifically focusing on global standards for reporting and disclosure of climate-related risks and opportunities, governance of climate issues, and GHG emissions inventories¹².

Europe's path to sustainability is illuminated by the dual forces of technological innovation and strategic partnerships such as those of DXC and Dell. By embracing these elements, Europe can transform its environmental challenges into opportunities for growth and leadership. The continent's commitment to technology leadership and proactive collaboration will be critical in shaping a sustainable future — one where economic prosperity and environmental stewardship are inherently intertwined. As Europe advances, it sets a global precedent, demonstrating that with the right blend of technology and cooperation, a sustainable and prosperous future is not only possible but well within reach.



⁹ "Empowering sustainability efforts through strong collaborative relationships", DXC Technology and Dell Technologies

^{10 &}quot;An End-to-End Sustainability Approach to Drive Greater Impact for All", Dell Technologies, June 25, 2024 11 "Delivering IT and business modernization - DXC Technology and Dell Technologies, DXC and Dell Fact Sheet, April 2022

^{12 &}quot;Goal 13: Climate Action - Take urgent action to combat climate change and its impacts", The Global Goals; "Climate Policies with Real-World Results", World Bank Group, September 19, 2023;

[&]quot;The Paris Agreement - What is the Paris Agreement?", United Nations Climate Change secretariat; "IFRS S2 Climate-related Disclosures - Standard 2023 Issued", IFRS Foundation, June 2023;

[&]quot;Scopes 1, 2 and 3 Emissions Inventorying and Guidance", EPA Center for Corporate Climate Leadership, February 18, 2025

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