



Shaping tomorrow: Sustainability innovation in the technology landscape across Asia-Pacific and Japan

The Asia-Pacific and Japan (APJ) region stands at a pivotal juncture, balancing rapid economic growth with high population density and pressing sustainability challenges. The region accounts for more than half of the annual global greenhouse gas (GHG) emissions: Only 27% of the electricity in the region comes from renewable sources, and coal-fired power plants are responsible for more than half of electricity generated.

The urgency to decarbonize the region's economies is undeniable. Artificial intelligence (AI) and other technologies hold immense potential as catalysts for transformation by driving innovation and enabling smarter, sustainable solutions redefining industries and elevating quality of life with smarter, data-driven outcomes. However, the accompanying rise in computing demands, energy consumption and electronic waste underscores the need for infrastructure that prioritizes efficiency, circularity and renewable energy integration.

Governments across the region are responding to the issues related to climate change — temperatures now surpass the 1.5°C threshold outlined in the Paris Agreement — resource scarcity and pollution with ambitious policies aimed at achieving net-zero emissions and promoting sustainable practices. Major global regulatory frameworks, such as the International Sustainability Standards Board (ISSB) standards, are being adopted — driving the evolution of reporting standards across jurisdictions to bring about greater transparency and accountability. However, the API region remains fragmented in terms of the pace and scope of disclosure requirements. Advanced technologies such as Al and the internet of things (IoT) can streamline regulatory compliance, as well as transform data management, revolutionize processes and enhance supply chain transparency.

Enterprises in APJ — including established industrial powerhouses — are increasingly integrating sustainability considerations into their IT infrastructure strategies and procurement decisions. Asia's e-waste recycling rates have been low, but circularity and recycling are now drawing greater focus. While the demand for carbon-neutral products is emerging in certain parts of APJ, however, questions about the integrity of related carbon credits persist.

¹ "About the International Sustainability Standards Board," IFRS Foundation

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Sustainability implications for technology and AI-led transformation

Al's integration into key industries promises to address critical challenges with smarter, data-driven solutions. Potential use cases for AI include supporting sustainability and climate change mitigations with new energy efficiency tools, GHG emissions tracking and reporting, and climate scenario modeling. But while accelerated AI adoption and digital transformation in the APJ region bring immense opportunities, they also raise important challenges that demand thoughtful solutions. With Al driving unprecedented growth in computing requirements, data center capacity across APJ is set to increase significantly in the coming years.

As AI adoption across industries accelerates, there will be greater scrutiny of the carbon emissions from data centers running workloads — particularly in relation to the application of AI to enable sustainability. Indeed, the growth in data center capacity demand to run these AI workloads is already impacting energy demand across key markets in APJ. The challenge is further exacerbated by the lower percentage of renewable electricity in APJ markets, potentially delaying the phase out of fossil fuel-based power generation — even as the region's governments are making significant investments to strengthen renewable energy infrastructure.

Governments in countries like Singapore, Japan and China are pushing for more sustainable operations by introducing energy efficiency standards and stricter zoning policies. For instance, Singapore imposed a moratorium on new data center construction in 2019, only lifting it in 2022 with rules prioritizing energy efficiency and green technologies.² Similarly, Japan has encouraged renewable-powered data centers in northern regions to reduce the strain on its energy grid.3

Numerous organizations are closely examining the influence of Al-driven transformation on their sustainability objectives and net-zero commitments. The burgeoning cost of electricity in markets like Australia, Singapore and India make energy-efficient hardware and operations critical commercial priorities. Green data centers, leveraging solutions like liquid cooling and renewable energy transitions, are gaining competitive advantages as they attract eco-minded corporate clients. Hence, making data centers more efficient while increasing the share of renewable energy will remain key to addressing the sustainability challenge.

² "Singapore lifts data center moratorium - but sets conditions," DCD/Data Center Dynamics, January 12, 2022

³ "Japan data centres: algorithm, resilience and carbon neutral," JLL/Jones Lang LaSalle, July 17, 2024

The advantages of circularity

Of course, upgrading technology infrastructure at scale highlights the need to address the ongoing challenge of electronic waste. The regulatory landscape is evolving to encourage responsible AI adoption and foster a circular economy. Customers, both enterprises and individuals, are actively shaping this landscape by prioritizing the use of vendors aligned with their sustainability values, reflecting a commitment to responsible stewardship of the planet.

The growing volume of electronic waste presents a significant challenge for IT infrastructure. In 2022 alone, over 63 million tons of e-waste was generated — an 82% increase from 2010.4 This figure is expected to rise to 82 million tons by 2030, highlighting the critical need to prioritize circularity in IT investments for a more sustainable future.

While Australia and New Zealand have a remarkable track record on recycling e-waste, the rest of the API region has a lot to catch up on, with only 12% of e-waste recycled through formal channels. However, there is a greater focus on making IT assets circular across APJ markets driven by three key factors: Regulatory pressures, greater emphasis on sustainability and cost advantages.

Australia's National Waste Policy, introduced in 2009 and updated in 2018, has been vital in advancing its shift to a circular economy. India's updated E-Waste (Management) Rules now require companies to improve the collection and recycling of electronics. Meanwhile, nations like Japan, South Korea and Singapore set standards with strong laws that support hardware reuse and material recovery.

Circular IT infrastructure offers significant sustainability and socioeconomic benefits. Recycling and refurbishing IT assets lowers embodied carbon emissions and reduces resource extraction. Refurbished devices also enhance accessibility by making technology more affordable for small businesses, communities and individuals, empowering them to engage in digital economies. By cutting costs and minimizing environmental impact, circularity in IT creates shared value for all stakeholders.

Adopting circular practices often leads to cost savings for organizations. For example, using reclaimed and refurbished materials lowers production costs, while e-waste take-back programs offer a way to grow consumer loyalty. Industry leaders implementing circular economies also gain reputational advantages through sustainability commitments. The upfront costs of establishing recycling infrastructure or remanufacturing processes, however, can be a challenge for smaller players in the market.

Numerous organizations are closely examining the influence of Aldriven transformation on their sustainability objectives and net-zero commitments.

⁴ "Global e-Waste Monitor 2024: Electronic Waste Rising Five Times Faster than Documented E-waste Recycling," UNITAR/United Nations Institute for Training and Research, 20 March 2024

Customers are rethinking product life cycles and recycling as awareness grows around planned obsolescence and the environmental impact of e-waste. Many now prioritize responsibly recycling devices at the end of their life cycle, while reinvesting in technology upgrades. At the same time, businesses are increasingly exploring refurbished and second-life products, driven by the confidence that these solutions can deliver both reliability and sustainability.

Decarbonization demands change

Net-zero goals and rising climate accountability are pushing decarbonization to the center stage in API. Governments are making strides in aligning with benchmarks to tighten emissions reporting requirements, implementing carbon taxes (as seen in markets like Singapore and Japan) and incentivizing renewable energy growth⁵ — nudging technology providers and users alike to rethink old models in favor of greener, low-emission technologies.

The rapid expansion of data center capacity across the APJ region, combined with limited access to cleaner energy sources, poses a challenge in managing the carbon footprint associated with AI adoption. Furthermore, the region's tropical climate intensifies energy demands due to higher cooling requirements. These factors underscore the urgent need for developing and applying sustainable solutions and accelerating the decarbonization of data center operations.

Enterprise customers are increasingly nudging their technology providers to deliver environmentally conscious solutions to address these challenges. These customers are also demanding better transparency around energy consumption and carbon footprints, thereby influencing how data-driven businesses select technology hardware solutions. This is where AI could help address the adverse impact of data center-driven energy demand growth. Al-enabled tools can help drive efficient use of hardware and manage energy consumption to make the most of the clean energy available on grid while optimizing energy costs.



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⁵ "Carbon Pricing Navigator - Carbon Pricing in Asia-Pacific," Climate Governance Initiative, 2024

Use of carbon credits

Voluntary carbon markets witnessed a rapid growth trajectory leading up to 2023, at which time there was greater scrutiny on carbon credits due to concerns over the quality and veracity of the carbon reductions delivered by projects.⁶ This uncertainty led to the reduced supply and prices of these credits. Still, across the APJ region, many companies are exploring the use of carbon credits to address residual, hard-toabate emissions. Academia and standard setters continue to urge organizations with net-zero commitments to prioritize decarbonization of operations and value chains, while ensuring that carbon credits used for offsetting genuinely deliver the promised reductions and removals — driving meaningful climate impact.⁷

At the same time, carbon credits are gaining more attention within APJ's regulatory landscape. For instance, global frameworks like the Taskforce on Scaling Voluntary Carbon Markets have influenced national guidelines for carbon offsets. South Korea leads with its cap-and-trade system, encouraging businesses to use offsets to meet emission targets.8 Singapore has also positioned itself as a hub for the global carbon market trade with its carbon exchange. Companies in Singapore can use carbon credits to offset up to 5% of their taxable emissions from their carbon tax liability as part of the International Carbon Credit Framework implemented in January 2024. Japan has made progress on this front with the launch of Carbon EX and signing of the mutual recognition agreement to facilitate bilateral carbon trading with Indonesia.

There is a growing interest in carbon-neutral IT products across several APJ markets, delivered by bundling of carbon credits with devices. However, concerns linger around the quality of such credits and the actual impact they create.

Looking ahead

Evolving regulatory frameworks across APJ are paving the way for greater accountability and greener operations. At the same time, customer demand for eco-friendly practices is steering businesses toward transparency and alignment with sustainability goals. By harnessing innovation, fostering shared responsibility and prioritizing sustainable development, the APJ region can effectively use technology to drive economic growth while proactively addressing its sustainability challenges.

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⁶ "A tale of two carbon markets," S&P Global, March 13, 2024

⁷ "Oxford Principles for Net Zero Aligned Carbon Offsetting," Carbon Market Institute, 18 April 2024

^{8 &}quot;Korea Emissions Trading System (K-ETS)," International Carbon Action Partnership, 2025

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