SPOTLIGHT
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Organizations looking to scale and deploy AI sustainably are aware of sustainability concerns and must integrate them into their AI strategies. Developing a holistic end-to-end approach will ensure organizations meet AI and sustainability objectives.

Dell Technologies: Developing An End-to-End Approach to Sustainable AI

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Written by: Curtis Price, Program Vice President, Infrastructure Services

The Convergence of Digital and Sustainable Transformation

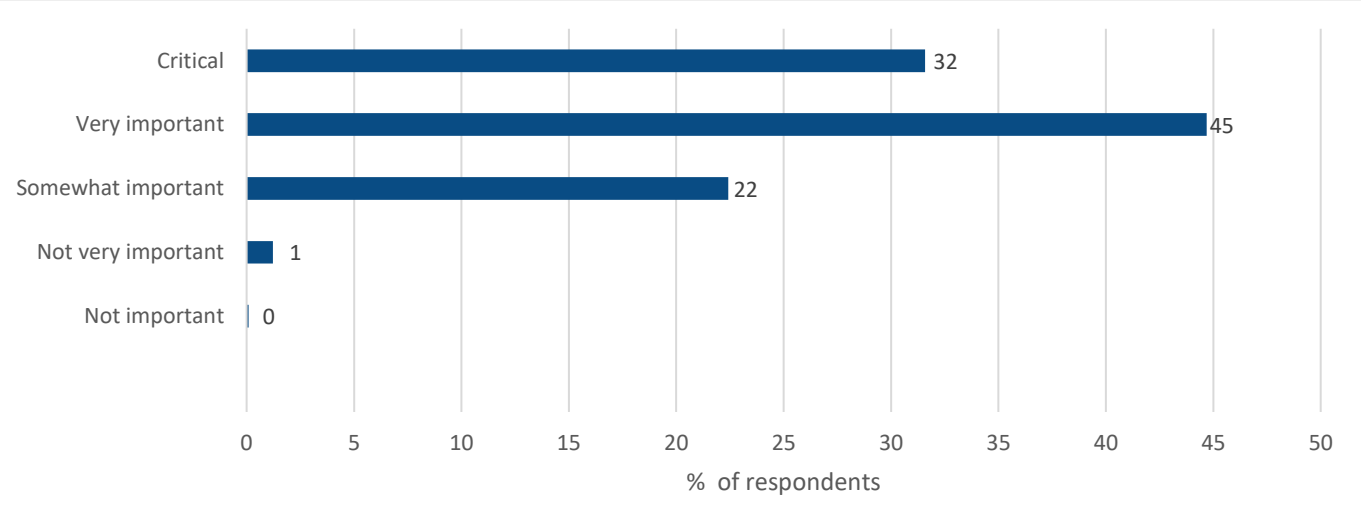
The adoption of AI has grown steadily over the past few years as organizations look to implement the technology to support various use cases. These use cases stretch across functional areas of the business and improve operations by optimizing existing processes, gaining deeper customer understanding, and providing proactive insight to maintain operational resilience. While the race is on to implement AI, organizations quickly realize that adopting the technology represents a transformational journey, accelerating the one many have been on for the last few years. As organizations scale their AI investments in production-ready use cases, they must consider various factors to ensure a successful transformation.

One key consideration for organizations is balancing the business outcomes they seek through AI investments with the commitments to achieve corporate sustainability goals. Sustainability has become a business priority for many enterprises as they seek to adhere to compliance mandates and use it to drive business value. Like the AI journey, becoming a more sustainable organization requires significant business transformation.

AI and sustainability have broad applicability across several business use cases. As a result, IDC believes that corporate sustainability and AI initiatives are converging. According to IDC's *Sustainable AI and AI for Sustainability Survey*, nearly 76% of respondents stated that AI was critical to their sustainability transformation journey (see Figure 1).

FIGURE 1. **AI's Importance to Sustainability**

Q. How important do you consider AI for your organization's sustainable transformation journey?



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Source: *Sustainable AI and AI for Sustainability Survey 2024*, *IDC*, March 2024

Key Success Factors for Sustainable AI Transformation

Organizations are in the initial stages of their AI transformation journey. However, as they move from proof of concept to scaling AI use cases for production, they must incorporate sustainability into their transformation. Becoming an AI-fueled business requires strong business and technology strategy coordination, people skilling, and a solid governance model. The abovementioned components must embed sustainability considerations to ensure AI-fueled business is sustainable.

IDC believes that organizations will seek the assistance of their technology suppliers when developing a sustainable AI strategy. When respondents to IDC's *Sustainable AI and AI for Sustainability Survey* were asked what the most important characteristics their organization will look for in a GenAI infrastructure provider, the top four responses were as follows:

- Ease of data repository integration across hybrid/multi-cloud architectures (57%)
- Sustainability performance (i.e., energy efficiency and carbon and water usage effectiveness) (55%)
- Availability of flexible consumption-based pricing options (54.4%)
- Access to the AI workload performance-optimized infrastructure (54.2%)

As organizations embark on an AI transformation journey, they must consider many factors to achieve success. The above responses highlight the significance organizations place on integrating sustainability considerations into their AI rollout to ensure they achieve business objectives for AI and sustainability.

Business Opportunities for Using AI

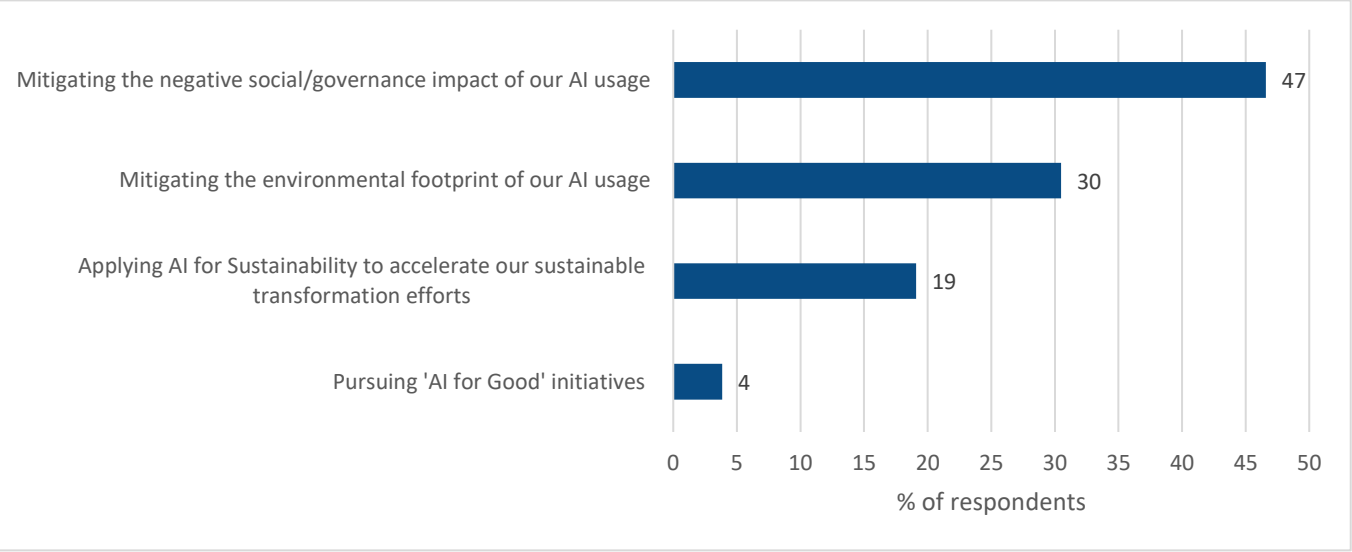
Integrating sustainability thinking into AI deployments is critical to creating a sustainable AI-fueled enterprise. When respondents to IDC's *Sustainable AI and AI for Sustainability Survey* were asked what primarily drives their sustainability-related AI strategy, 47% stated that mitigating AI usage's negative social/governance impact was their top concern. Another 31% of respondents said that mitigating AI usage's environmental footprint was the second top concern (see Figure 2).

AI can be prone to bias or unfair decision-making due to algorithm bias, so social sustainability concerns have become the top priority for many organizations, particularly in functional business areas such as supply chain management, human resources, and customer service. To guard against social sustainability risks, organizations use AI to detect and monitor algorithm bias and data quality techniques to identify and remove inaccurate data that train large language models.

Energy efficiency in the datacenter is a priority, given the expected growth in energy consumption over the next few years due to the broader adoption of AI. Datacenter operators use AI to monitor and improve power and cooling systems, provide greater insight into the energy use of server and storage resources, and optimize infrastructure to support specific AI workloads.

FIGURE 2**. Drivers of Sustainability-Related AI Strategy**

Q. Which of the following primarily drives your organization's sustainability-related AI strategy?



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Source: *Sustainable AI and AI for Sustainability Survey 2024*, *IDC*, March 2024

Implementing AI for Sustainability

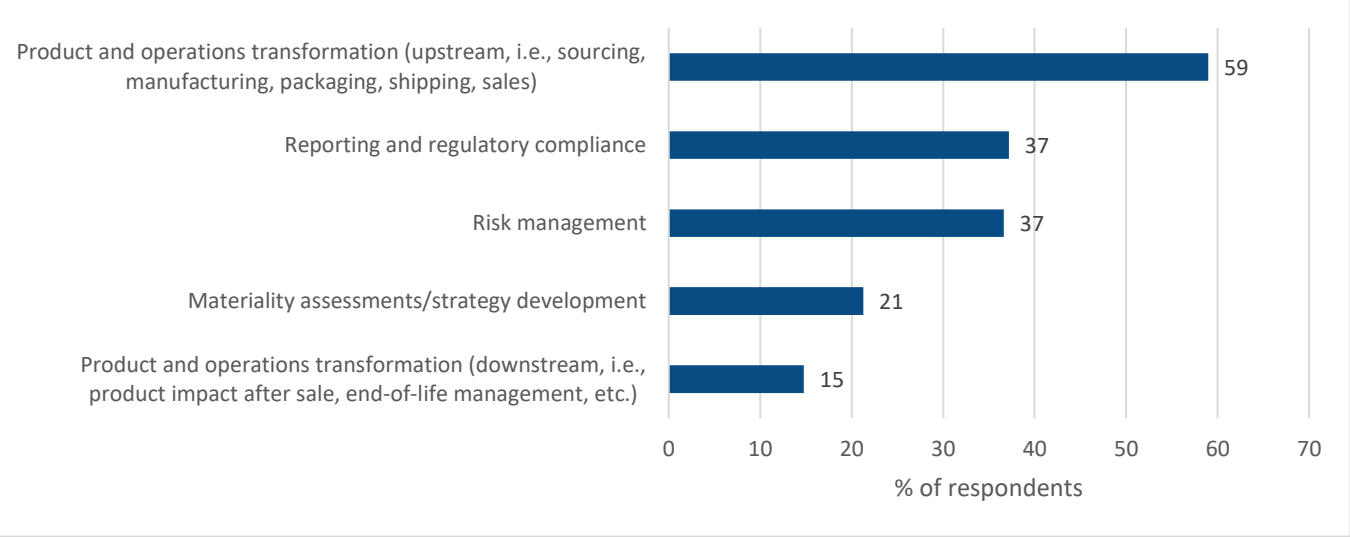
AI will impact an organization's sustainability initiatives in several areas. According to IDC's *Sustainable AI and AI for Sustainability Survey*, the top sustainability-specific use cases that will drive the use of AI are in manufacturing, sourcing, packaging, and shipping. Organizations can embed sustainability into existing processes in these business functions to improve their sustainability performance.

Another top use case for implementing AI for sustainability is accelerating the process of sustainability compliance reporting. Financial investors are putting increased pressure on companies to report non-financial risks to the business and demanding greater consistency in how companies report sustainability-related risks. The regulatory environment continues to evolve worldwide, with various sustainability policies now in place to curb carbon emissions, govern the responsible use of AI, and promote waste reduction and the recycling of plastic resources. As the regulatory landscape changes, AI will play a crucial role in helping organizations accurately report their sustainability performance.

Many organizations view sustainability as a risk to the business that needs management, just as any other business risk does. For example, companies are investing in AI-based climate risk solutions to help negate weather-related risks that negatively impact business operations or physical assets. Organizations increasingly use AI-based solutions to mitigate environmental sustainability risks that threaten business continuity and resilience. Since many of these risks affect various stakeholders, efforts to address and minimize them can positively impact an organization's ability to establish itself as a trusted brand in the eyes of its customers, partners, suppliers, and investors. Figure 3 below highlights the areas where AI for sustainability will have the biggest impact.

FIGURE 3**. AI's Impact on Sustainable Transformation Journey**

Q. *Over the next 12 months, in which phase of your organization's sustainable transformation journey do you expect AI will have the biggest impact?*



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Source: *Sustainable AI and AI for Sustainability Survey 2024*, *IDC*, March 2024

For organizations executing their sustainability targets and goals, AI represents an opportunity to accelerate them while posing significant challenges by compromising corporate sustainability goals. Developing a comprehensive AI strategy that considers sustainability issues with material impact on an organization's business is crucial to successfully executing a sustainable AI transformation.

Sustainability Challenges of AI

Energy considerations continue to be a major concern for enterprises. When respondents to IDC's *Sustainable IT Infrastructure Survey* were asked about the primary sustainability attributes they consider when acquiring new IT infrastructure, 38% cited product energy efficiency, 30% cited sustainable product design, and 32% cited carbon emissions. AI will significantly impact energy demand from the underlying infrastructure that supports AI workloads and the datacenters that house that infrastructure. Large AI model development that utilizes graphics processing units can require ten times more energy than central processing units. IDC expects global datacenter energy consumption to grow by nearly 20% from 2023 to 2028, with AI driving much of this increase.

Increased carbon emissions are another concern for organizations using AI. Many organizations have focused on decarbonization and set net-zero emissions goals. According to IDC's *Data Center CO_2 Emissions* model, carbon emissions will increase at a CAGR of 13.4% from 90 $MTCO_2$ in 2022 to 174 $MTCO_2$ in 2027. Much like the expectations for datacenter energy consumption, emerging energy-intensive AI workloads are driving the expected increase in carbon emissions.

As organizations anticipate the load AI will put on the infrastructure, many are considering techniques to lessen the burden on its existing capacity. The common techniques organizations use are consolidation and right-sizing infrastructure to better support AI workloads and minimize environmental impact.

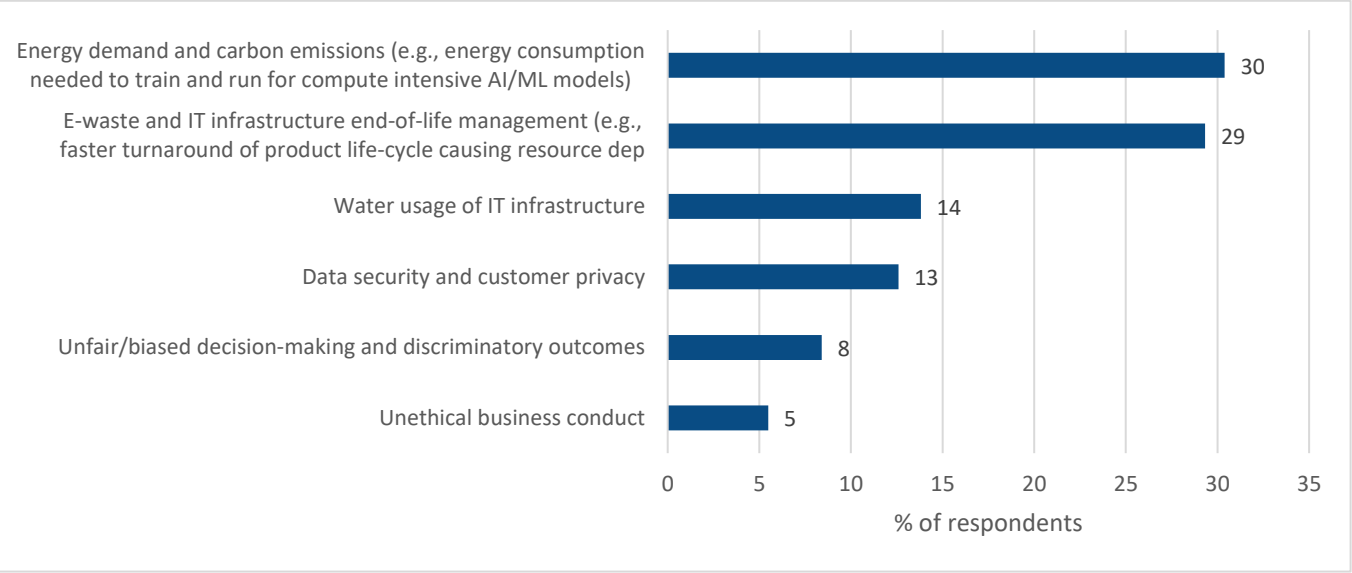
Reducing ewaste is a sustainability priority, and organizations are formulating circularity strategies to ensure the proper and responsible disposal of IT assets at the end of life. However, the availability of sustainable AI infrastructure will render existing infrastructure, which does not support AI, obsolete. This will require a comprehensive strategy for dealing with the large amount of IT equipment that may become obsolete.

In addition to the environmental challenges stated above, AI presents several social sustainability-related issues. These challenges relate to AI's responsible and ethical use, which can impact customers, suppliers, partners, and employees.

Over the next few years, AI will be central to many internal business processes and tasks. As they pursue becoming an AI-fueled enterprise, organizations must develop clear strategies for addressing the sustainability challenges of deploying AI. Figure 4 highlights the main concern that organizations have with deploying AI.

FIGURE 4. **Main Concerns with AI**

Q. What is your organization's main sustainability concern while deploying or using AI/GenAI?



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Source: *Sustainable AI and AI for Sustainability Survey 2024*, *IDC*, March 2024

Dell Technologies: Taking a Holistic Approach to Sustainability and AI

Dell has been strongly committed to sustainability, including an internal strategy and vision for sustainably operating its business and developing products and solutions that enable customers to meet their sustainability goals. Dell has a stated vision to drive impact for the planet and support sustainable, inclusive, and digitally equitable communities where we live and work. A key pillar of Dell's sustainable AI strategy is an end-to-end approach that integrates sustainability across internal operations and extends to customer-facing activities. Dell's end-to-end approach to sustainability includes the following:

- **Back end:** Focuses on how Dell embeds sustainability into operations/the supply chain to enable enterprise-wide governance, collaboration, and innovation
- **Front end:** Focuses how Dell embeds sustainability into products and offerings to support customers and channel partners in meeting their business and sustainability goals
- **Collective impact:** Focuses on how Dell delivers at scale our societal impact programs and initiatives through collaboration across our industry, communities, and society

At the corporate level, Dell has identified sustainability issues that have a material impact on the business and developed a set of metrics and targets that guide its sustainability progress. Dell has made commitments across six primary impact areas: climate action, circular economy, digital inclusion, inclusive workforce, human rights, and trust.

Dell has developed an effective operating model for ensuring accountability, achieving sustainability targets and goals, and promoting transparency through the annual reporting of its sustainability performance. An ESG steering committee sets the overall corporate ESG strategy and provides updates to the company's board of directors. The interlock team is responsible for executing the ESG strategy and is key in working across business units and other groups within Dell to ensure the alignment of sustainability activities with corporate goals.

As the use of AI broadens across various business lines, Dell's governance model for ESG/sustainability will allow the company to evaluate areas where AI can streamline its operational processes while monitoring for and negating risks that could potentially negatively impact its business.

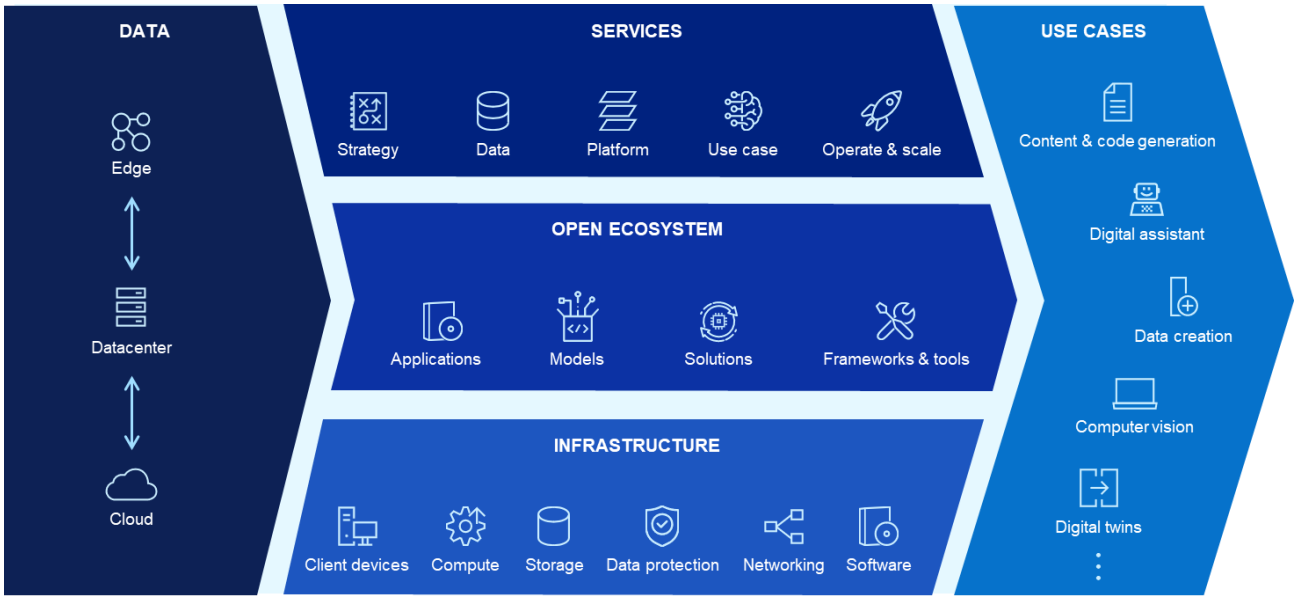
IDC believes that the internal benefits of having a solid sustainability governance model can extend to Dell customers. Many organizations struggle with how best to operationalize their ESG/sustainability strategy. Dell is in a strong position to share its operational best practices and knowledge with customers to help them develop an internal framework that provides accountability and transparency to their sustainability performance. This could represent an important source of competitive differentiation for Dell.

Enabling Sustainable AI Through Dell Products and Solutions

Dell offers a broad portfolio of products and services supporting an organization's sustainable AI journey, from strategy formulation to end-of-life management. This end-to-end approach, the Dell AI Factory, can leverage the power of AI sustainably and responsibly. Dell delivers tailored solutions to help implement and operate AI sustainably. The Dell AI Factory helps customers simplify AI deployments with validated solutions, integrated platforms, technology expertise, and guidance. Additionally, Dell ensures the protection, management, and accessibility of data for critical use cases to minimize environmental impact**.**

The Dell AI Factory is a reference architecture that offers a full-stack AI solution and integrates Dell Services and Infrastructure platforms (server, storage, PC, and laptops) with AI software from partners to allow customers to adopt and scale their AI use cases.

FIGURE 5. **The Dell AI Factory**



Source: Dell Inc., 2024

Data fuels the Dell AI Factory and can provide deep insight into crucial sustainability data such as energy usage, carbon emissions, power and cooling, and ewaste. Below, we highlight how Dell, through its Dell AI Factory, helps customers sustainably implement AI.

ProConsult Advisory Services for Sustainable Datacenters

Dell Services plays a vital role in working with customers to formulate a sustainable AI technology strategy that defines a desired outcome and designs an execution plan to achieve it sustainably. As organizations select specific AI use cases to scale, Dell ProConsult Advisory Services for Sustainable Data Centers offer advisory services and tools to help design sustainable datacenters by right-sizing the underlying IT infrastructure to support specific AI workloads. As a result, customers can improve energy efficiency, lower energy costs, and use circularity principles to reduce ewaste.

APEX AIOps

One of the key criteria that organizations use when selecting a technology partner to work with on their sustainable AI journey is the availability of an as-a-service model. Organizations view as-a-service models as a more sustainable way to consume IT resources that reduce the complexity of adhering to regulatory mandates.

Dell APEX AIOps is an IT management platform that provides visibility and control of Dell infrastructure across core, edge, and multi-cloud environments. It helps monitor and manage sustainability data such as energy usage and carbon emissions, allowing customers to automate power and thermal management in real time using telemetry data and automation to regulate power usage across Dell platforms.

Optimized AI Infrastructure

As organizations seek to drive greater energy efficiency in IT operations, they increasingly demand optimized IT infrastructure to efficiently support AI workloads. Dell's broad hardware portfolio, from the PC to the datacenter, enables organizations to right-size AI workloads on the right device with additional energy savings techniques such as thermal and liquid cooling to help customers achieve greater energy efficiency while reducing energy costs.

Circularity at Scale

Dell's overarching product design strategy is to embed sustainability in a product's design to extend its useful life by supporting the easy repair and upgradability of its products. The use of circularity principles across Dell's products is a crucial pillar of its sustainability strategy. As the adoption of AI ramps up in the coming years and the underlying infrastructure undergoes a refresh to support AI, disposal of the installed infrastructure in a sustainable manner is critical.

Dell addresses circularity across its product life cycle, from design through end of life. Some of its products use various recycled materials, including plastics, carbon fiber, cobalt, and steel. In addition, Dell uses recycled or renewable materials for 96% of its product packaging.

As customers go through technology refresh cycles, they often look for sustainable ways to dispose of legacy assets to avoid issues with ewaste. Dell addresses the asset end-of-life challenge with asset recovery services, providing secure and responsible IT asset disposal.

Dell demonstrates its commitment to positive societal impact and supports sustainability through various products and services, a strong strategy and governance, and an end-to-end approach not compromised by AI and the technology's inherent challenges to an organization's sustainability commitments. Dell has positioned itself as a credible partner for companies seeking to become a sustainable AI-fueled business.

Dell Sustainable AI Challenges and Opportunities

As Dell enables its customers to transform to sustainable AI, the company may face the following challenges and opportunities:

Challenges

- Sustainable AI transformation will involve many stakeholders in an organization. Dell must expand its influence beyond technology to reach a broader set of personas (e.g., CFO, chief risk officer, supply chain manager) that influence decisions related to sustainable AI transformation.
- While many organizations view sustainability as a risk or compliance exercise, forward-looking organizations view it as a lever for driving business value. Dell must help those compliance-focused organizations see the business value side of sustainability, focusing on outcomes such as cost savings, business continuity, and resilience.

- Organizations have a clear set of concerns specific to sustainability when deploying AI. Dell must be able to back its claims around the sustainability outcomes of deploying Dell solutions. This is critical to establish Dell as a credible partner for companies pursuing sustainable AI transformation.

Opportunities

- Transformation is a complex endeavor for an organization. However, Dell's set of sustainability-specific offerings allows the company to establish itself as a credible technology partner for enabling sustainable AI transformation.
- Through the Dell AI Factory and various ecosystem partnerships, the company can engage with customers at various stages of their transformation journey and help sustainably remove the barriers to scaling AI.
- Dell can help organizations effectively integrate their AI and sustainability strategies to reach AI and sustainability outcomes, thus satisfying the objectives of a broad set of business stakeholders.
- Having gone through its internal sustainability transformation and established best practices, Dell is in a great position to share knowledge with customers and help accelerate their sustainable AI transformation.

Conclusion

As early AI implementations scale into live production use cases, organizations will find it challenging to drive desired AI outcomes while staying true to their sustainability commitments. The key to solving this challenge is incorporating sustainability into the AI transformation journey to mitigate AI's environmental and social risks. IDC believes that Dell's step to drive sustainability into its internal operations and customer-facing activities will serve the company well as it establishes itself as a trusted enabler of sustainable AI transformation.

About the Analyst

***Curtis Price,** Program Vice President, Infrastructure Services*

Curtis Price is the Program Vice President of IDC's Infrastructure Services group. He oversees research within IDC's Sustainability, Network Infrastructure and Data Center Services. Across these areas, Mr. Price provides expert insight and analysis of the trends and market dynamics impacting enterprise and communication service providers.

MESSAGE FROM THE SPONSOR

Dell Technologies, a global leader in digital transformation, empowers organizations to achieve their AI goals sustainably. Dell helps customers align their business and environmental objectives through its comprehensive, end-to-end sustainability strategy. Dell's commitment to human progress makes it a trusted partner for organizations seeking to modernize IT while driving positive environmental impact.

IDC Custom Solutions

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IDC Research, Inc.
140 Kendrick Street
Building B
Needham, MA 02494, USA
T 508.872.8200
F 508.935.4015
Twitter @IDC
blogs.idc.com
www.idc.com