How green IT can accelerate sustainability and ESG ambitions

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Synopsis

Digital technology plays a critical role in our fight against the climate crisis. However, beyond achieving sustainability, digital technology also has the potential to contribute significantly to global greenhouse gas emissions and e-waste.

Green IT can address this issue by reducing environmental impact, including the impact of IT energy consumption. Find out how nurturing a collaborative ecosystem of stakeholders within the value chain can allow organizations to benefit from green IT and software.

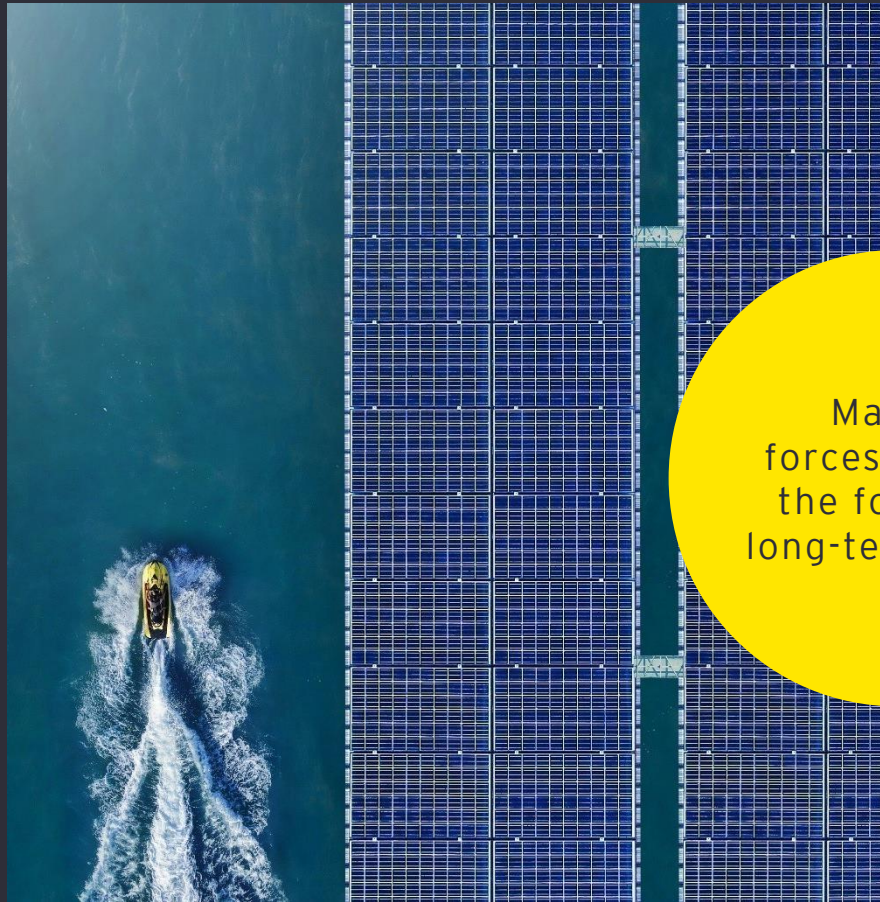[Read more in our article here](#)

Agenda

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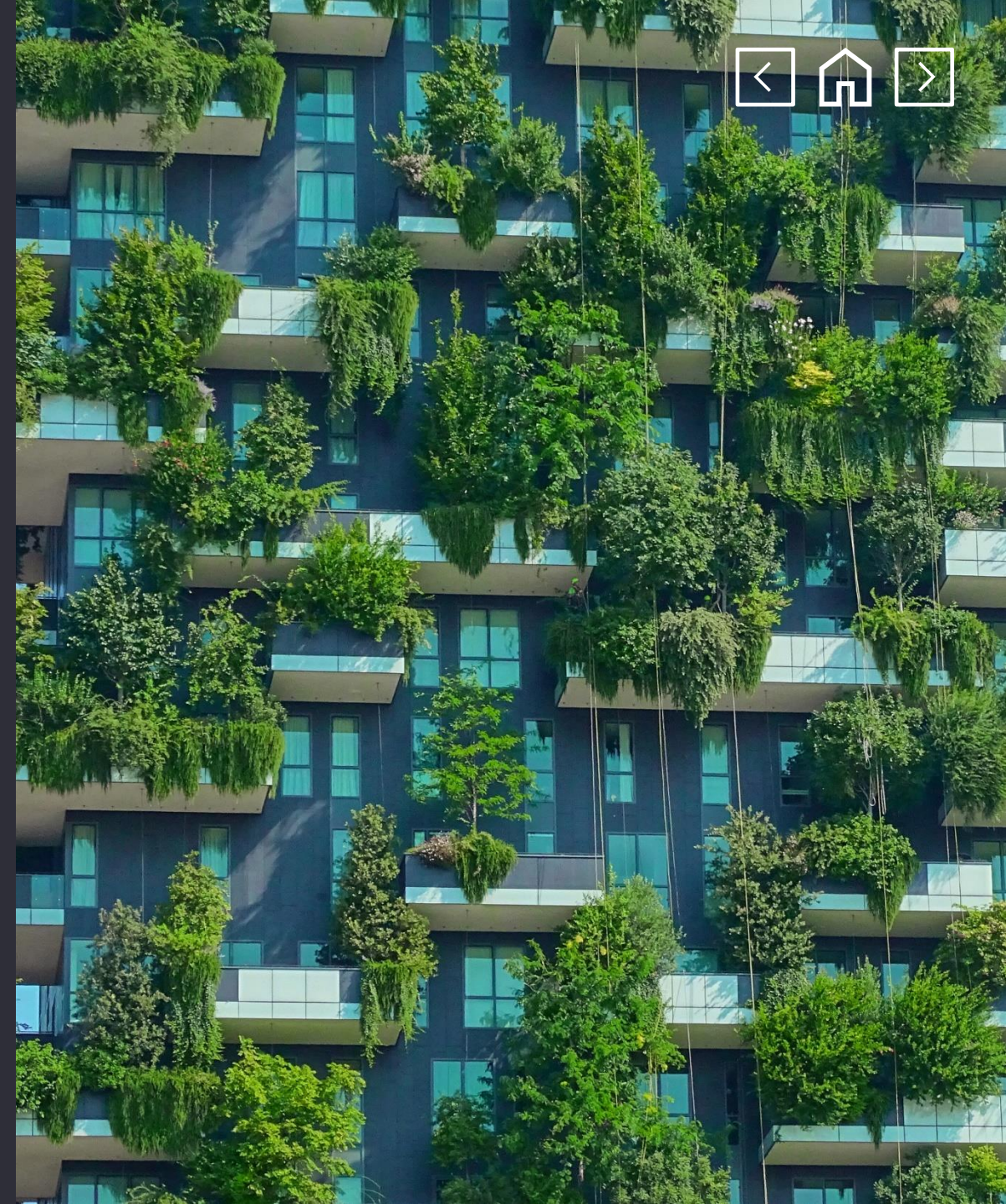
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The role of technology in sustainability

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Market forces are driving a focus to create and protect sustainable, long-term value across stakeholders

Market forces driving the focus on long-term value

1. Regulatory requirements, including mandatory International Sustainability Standards Board (ISSB) climate disclosures

2. Institutional investor scrutiny and rise of sustainable investing

3. Geopolitical conflict, supply chain disruption and rising inflation

4. Climate change, creating new global threats and opportunities

5. Employee and customer engagement

6. Racial equity, social justice and human rights

7. Rapid technological advancements and competition in a time of disruption

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Companies that take an enterprise-wide approach to sustainability and ESG are best positioned to protect and create long-term value

Holistic approach to sustainability, and environmental, social and governance (ESG) transformation

Purpose, strategy and ambition

Understand and prioritize stakeholder expectations to create a sustainability and ESG approach that is aligned to the corporate purpose and strategy. Thereafter, develop a roadmap to deliver on priorities.

Governance

Establish sustainability and ESG governance through a formalized operating model, leadership and board commitment, and end-to-end comprehensive performance management.

Performance management

Track nonfinancial and financial performance measures, and value created across the business (e.g., talent, innovation).

Risk management

Integrate sustainability and ESG issues into the enterprise risk management framework to identify, assess and prioritize risks, and implement targeted risk interventions.

Innovation across the value chain

Evaluate operations across the value chain through a sustainability and ESG lens, building the business case for changes to your operating model, products and services, supply chain and workforce.

Investment and capital allocation

Assess portfolio holistically to determine what investment is required to meet sustainability and ESG goals, the implications for M&A and divestitures, and the opportunities to leverage sustainable financing instruments (e.g., green bonds).

Data, analytics and technology platforms

Establish a data framework, internal controls and processes to collect, aggregate and analyze sustainability and ESG data, and invest in technology platforms to drive insights into decision-making.

Reporting, disclosures and messaging

Report in a reliable, objective and consistent manner aligned to regulatory frameworks, and develop a sustainability and ESG narrative that can be used consistently across channels to address financial and nonfinancial performance.

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Technology has incredible potential to accelerate sustainable transformation by increasing the productivity of systems while lowering emissions, reducing waste, monitoring resources, collecting and harnessing vast amounts of data and making breakthrough advances to drive the sustainability agenda

Robust technology platform with near real-time data

Innovative solutions to further the sustainability agenda, such as tokenization on the blockchain, allows the management of real-time emission footprint via the exchange of token or credit, as part of an offsetting strategy.

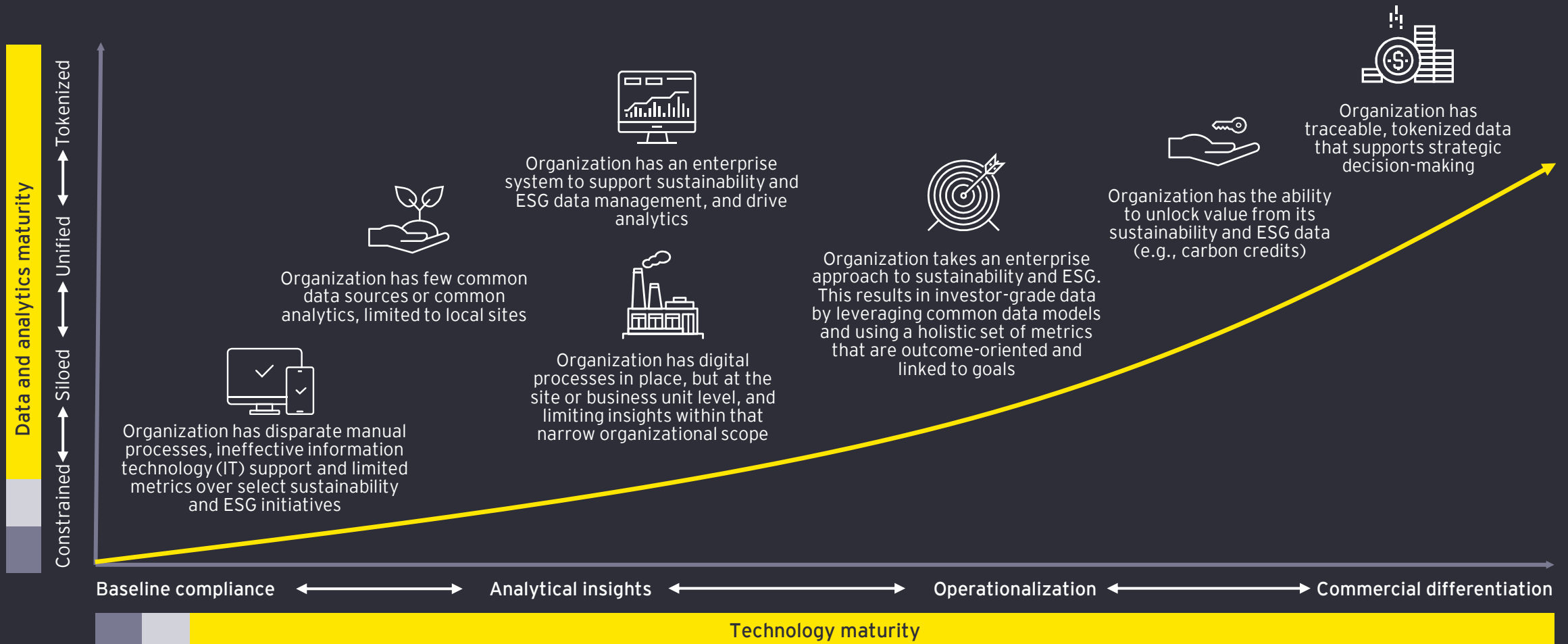### Operationalization of sustainable strategy

Data capture, system connectivity, analytics, machine learning, IoT and robust data models embedded in an organization's business operation can speed up the realization of the sustainability strategy.

High traceability, auditable and reporting of sustainability operations

Sustainability strategies can be implemented effectively by linking various levels of the organization (business units, departments and individuals) with clearly defined targets and benchmarks.

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Increasing IT's maturity across sustainability issues can help improve enterprise-wide performance

Data and analytics maturity (vertical axis): Constrained — Siloed — Unified — Tokenized

Organization has disparate manual processes, ineffective information technology (IT) support and limited metrics over select sustainability and ESG initiatives

Organization has few common data sources or common analytics, limited to local sites

Organization has an enterprise system to support sustainability and ESG data management, and drive analytics

Organization has digital processes in place, but at the site or business unit level, and limiting insights within that narrow organizational scope

Organization takes an enterprise approach to sustainability and ESG. This results in investor-grade data by leveraging common data models and using a holistic set of metrics that are outcome-oriented and linked to goals

Organization has the ability to unlock value from its sustainability and ESG data (e.g., carbon credits)

Organization has traceable, tokenized data that supports strategic decision-making

Baseline compliance ◁——▷ Analytical insights ◁——▷ Operationalization ◁——▷ Commercial differentiation

Technology maturity

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New technology solutions can help organizations drive value across their sustainability agendas

Acceleration of blockchain technology to support carbon ledgers and reduction of plastic waste

Focus on tracking emissions to the product batch level to be able to specify emissions in business-to-business (B2B) transactions and regulations

Improvement in sensor and remote monitoring technology (e.g., aerial and satellite) to more accurately quantify direct emissions

Increasing focus on supply chain tracking and management technology as reporting on Scope 3 emissions becomes more prevalent and important
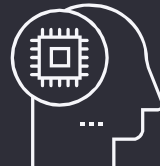
Embedding AI capabilities into carbon management systems to accelerate operational decarbonization

Significant investments in physical and transition risk models and data provision to support Task Force on Climate-related Financial Disclosures (TCFD)-style reporting

These emerging technologies must be built upon a foundation of green IT hardware and software to achieve a net positive environmental impact

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How green IT can add value to sustainability

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Green IT is fast becoming the driver to accelerating the sustainability agenda

Green IT practices

1 Energy-efficient hardware
Energy-efficient hardware such as servers, storage devices and networking equipment can significantly reduce energy consumption and operating costs.

2 Virtualization
Creating virtual versions of physical hardware, such as servers and storage devices, allow organizations to optimize their hardware utilization and reduce energy consumption.

3 Green software
Software applications and tools that are designed to be energy-efficient and environmentally responsible can help organizations further their sustainability ambitions.

4 Cloud computing
Cloud computing involves the use of remote servers to store, manage and process data. By using cloud services, organizations can optimize server efficiency and cooling, thus reducing energy consumption and operating costs.

5 Green data centers
Green data centers use energy-efficient hardware, optimized cooling, renewable energy and other sustainable practices to reduce energy consumption and improve sustainability performance.

6 Responsible disposal
Responsible disposal involves the proper disposal of IT equipment at the end of its lifecycle, such as recycling or donating to reduce waste.

What is green IT?

- Green IT involves minimizing the environmental impacts of IT systems, operations and infrastructure, while functioning as a key enabler to achieving sustainability goals and targets.

- Green IT encompasses a range of principles and practices, including the use of energy-efficient hardware, virtualization, power management and responsible disposal of IT equipment.

Why green IT?

- While the information and communications technology (ICT) sector has potential to reduce emissions by 15% in 2030, its current environmental impact include approximately 2.1–3.9% of global greenhouse gas (GHG) emissions and approximately 53.6 million tons of global e-waste annually. The exponential use of IT will increase the detrimental impact to the environment and human health.

- To mitigate and control the environmental impact, it is imperative to apply and govern the appropriate green IT principles and practices.

Notes:

"Digital technology can cut global emissions by 15%. Here's how," World Economic Forum website, Digital technology can cut global emissions by 15%. Here's how | World Economic Forum (weforum.org) , accessed 8 May 2023.

"Emissions from computing and ICT could be worse than previously thought," ScienceDaily website, Emissions from computing and ICT could be worse than previously thought -- ScienceDaily , accessed 8 May 2023

"Electronic waste generated worldwide from 2010 to 2019 (in million metric tons)," Statista website, statista.com/statistics/499891/projection-ewaste-generation-worldwide, accessed 19 April 2023.

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Organizations that adopt green IT solutions can accelerate their sustainability journey, optimize costs and differentiate themselves from their peers

Improved sustainability

▸ Green IT practices can help businesses reduce their carbon footprint and demonstrate their commitment to sustainability.

▸ By investing in energy-efficient technology, using renewable energy sources and implementing sustainable practices, businesses can reduce their environmental impact and improve their reputation with customers, stakeholders and the public.

Regulatory compliance

▸ Governments and regulatory authorities are increasingly mandating that businesses reduce their carbon footprint and adopt sustainable practices.

▸ By adopting green IT practices, businesses can ensure that they are aligned to these regulations and avoid potential penalties.

Improved productivity

▸ Green IT practices can optimize IT infrastructure, improve collaboration and reduce downtime, resulting in improved productivity and efficiency.

▸ For example, using cloud-based services can enable employees to work remotely and improve collaboration, while virtualization technology can improve the performance of applications and reduce the need for hardware maintenance, leading to improved efficiency and productivity.

Cost savings

▸ Adopting green IT practices can help businesses reduce their energy consumption and operating costs.

▸ By optimizing IT infrastructure, consolidating servers and using power management tools, businesses can save on their energy bills and reduce the need for hardware maintenance, resulting in significant cost savings over time.

Competitive advantage

▸ Businesses that are committed to reducing their carbon footprint and investing in sustainable technology will be more attractive to environmentally conscious customers, investors and partners, giving them a competitive advantage in the market.

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As software applications indirectly contribute to growing emissions, best practices must be adopted

What is green software?

▸ Green software refers to software applications or solutions developed to keep energy consumption and carbon footprint low, while maintaining or improving performance, functionality and user experience. This involves integrating sustainability considerations into the software development lifecycle, from ideation to retirement.

▸ With technology applications being used in all aspects of business, green software is much needed to support organizations progressing with their sustainability goals.

▸ Green software applications that are modular and scalable have tremendous potential to drive sustainability.
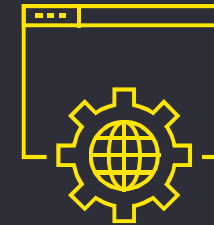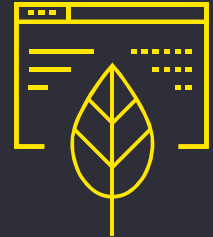
Best practices in green software

Optimize the code to minimize CPU and memory usage, and disk access

Build functionality within the software to detect and prioritize the use of renewable energy sources

Include power management features such as sleep or hibernate in green operating system software

Adopt green software development practices such as being agile to streamline the development process

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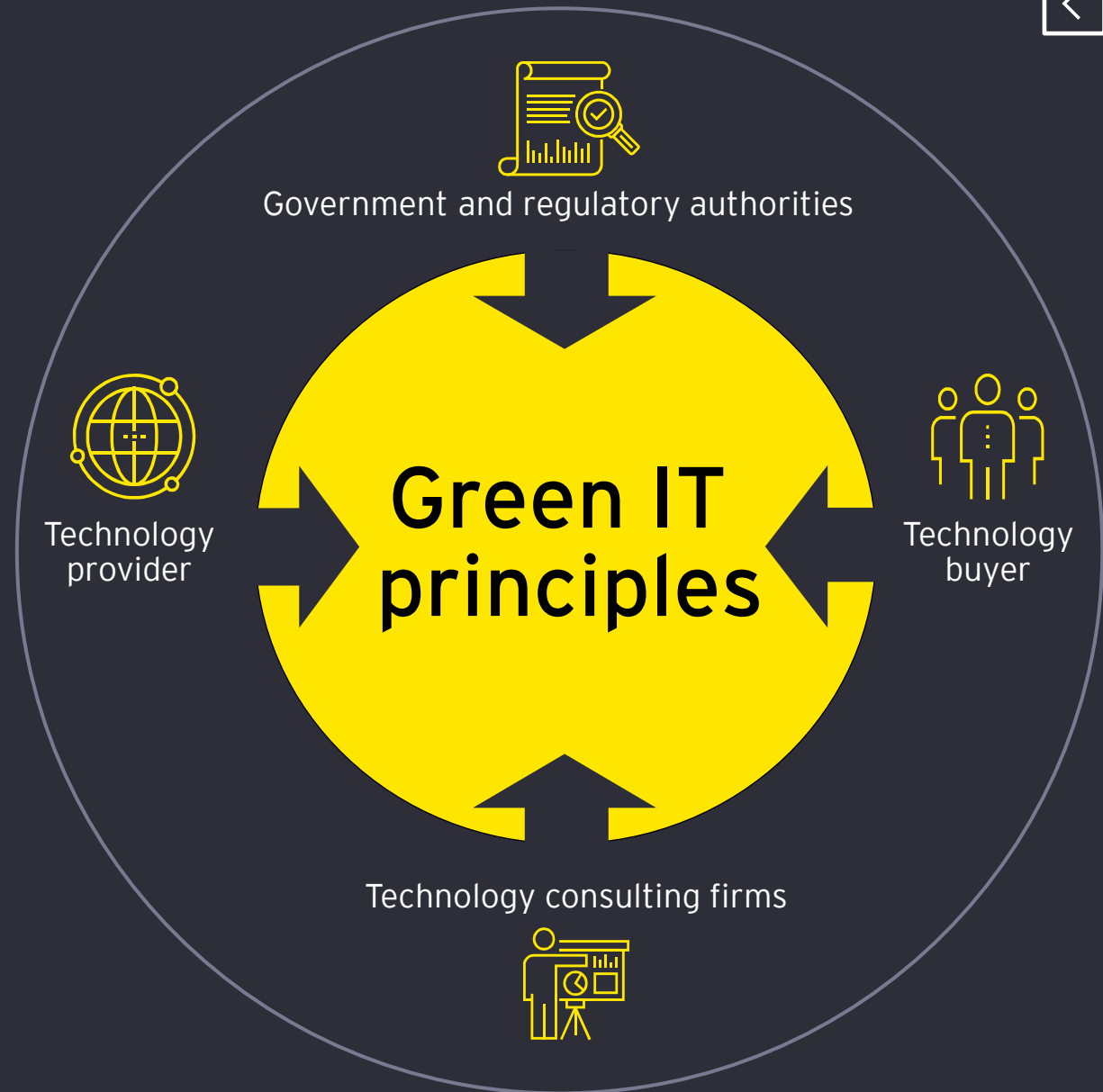# Building a green
IT ecosystem

A green IT ecosystem requires key stakeholders within the technology value chain to align on green IT principles

Organizations can realize the positive impact of green IT and software by nurturing a collaborative ecosystem of stakeholders within the value chain, aligned to green IT principles.

Green IT principles:

▸ Fit-for-purpose
▸ Energy efficient
▸ Compliance to standards
▸ Green design
▸ Cost effective
▸ Scalable
▸ Use green energy

Government and regulatory authorities

Technology provider

Green IT principles

Technology buyer

Technology consulting firms

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Technology providers are increasingly applying green IT principles in technology invention and innovation to respond to market demand for sustainability

The role of technology providers

- Technology providers are racing to create technology innovations to support sustainability-focused solutions while incorporating energy-efficient features and green design products that use fewer resources and emit fewer greenhouse gases.

- The speed of green IT innovations and availability in the market will drive the achievement of global sustainability goals through positive environmental impact.

Best practices for technology providers

1 Develop green design products and services for technologies that consume less resources and energy

2 Offer virtualization and cloud-based services to help businesses consolidate their IT infrastructure

3 Innovate sustainable solutions, such as carbon management tools, health and safety monitoring, performance monitoring and disclosure, and sustainability supply chain operations

4 Adhere to technical standards and guidelines to ensure compliance and functionality along with green features

5 Proactively work with governments and regulatory authorities to develop policies and standards

Examples and case studies

Dell Technologies has implemented circular economy principles in their production process, such as using recycled plastics in their products and reducing waste generation. They also provide recycling programs to enable customers to dispose of their end-of-life products in an environmentally responsible manner.

IBM has developed a range of sustainable data center solutions, including its **Green Data Center** program that helps organizations design and build data centers that are energy efficient, environmentally friendly and cost-effective. They also offer a range of sustainable technologies, such as advanced cooling systems and energy management software.

Notes:

"Accelerating the circular economy to reduce waste and protect the planet," Dell Technologies website, Accelerating the Circular Economy | Dell Singapore, accessed 9 May 2023

"Cisco Energy Management Solution At-A-Gance," Cisco Systems website CiscoGovernmentEnergyManagement_AAG_D11.pdf, accessed 9 May 2023

"Are Your Data Centers Keeping You From Sustainability?," IBM website, Are Your Data Centers Keeping You From Sustainability? | IBM, accessed 9 May 2023

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Technology buyers who adopt green IT and green software as part of their sustainability levers will gain competitive advantage while contributing to global sustainability goals

The role of technology buyers

▸ Technology buyers purchase green IT hardware, software and services that are environmentally sustainable and aligned with their organization's sustainability goals. They have significant influence in advancing green IT through the following means:

1
Driving Innovation in green IT

Buyers can work with technology providers by sharing their specific business needs and sustainability goals, identifying gaps in the market, collaborating on product development, and helping to pilot test and improve new solutions.

2
Accelerating shift to greener IT

By integrating the sustainability strategy in their corporate IT governance, buyers drive the adoption of green IT and influence their IT procurement to encourage providers to invest in sustainable technology development.

3
Educating employees and stakeholders

Buyers create a sustainability culture by increasing awareness of the benefits of green IT solutions and promoting the use of energy-efficient devices and software. This can be extended to supply chain partners and the local community as part of corporate social responsibility.

Examples and case studies

The **Australian National University** implemented a green IT strategy that included **virtualizing its server infrastructure**, implementing **energy-efficient hardware**, and **consolidating its data centers**. As a result, the university reduced its energy consumption by 40% and saved millions of dollars in energy costs.

The **National Supercomputing Centre (NSCC) Singapore** uses a **water-based cooling system** that relies on ambient air to cool the water, reducing their energy consumption by up to 40% compared to traditional cooling methods.

Notes:

"Five ways we're working towards 100% renewable energy by 2030," Unilever website, How we're working towards 100% renewable energy by 2030 | Unilever, accessed 8 May 2023

"Case Study: ANU Virtual Desktop as a Service," AUCloud website, Case Study: ANU Virtual Desktop as a Service - AUCloud (australiacloud.com.au), accessed 8 May 2023

"NUS NSCC i4.0 DC A Tropical Supercomputing DC," NSCC website, Updates on ASPIRE2A delay (nscc.sg), accessed 8 May 2023

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Governments and other regulatory authorities can drive green IT adoption by building awareness, setting policies and standards, and investing or co-investing the stimulus

The role of government and regulatory authorities

▸ Governments and regulatory authorities have a crucial role in promoting the adoption of green IT and driving sustainability. They usually achieve this using several regulatory, financial and social works levers:

1
Establishing energy efficiency standards

2
Providing financial incentives

3
Mandating sustainable IT practices

4
Supporting research and development

5
Educating the public

Examples and case studies

The US Environmental Protection Agency (EPA) established the Energy Star program to promote energy efficiency in electronics, including computers, monitors and servers. Products that meet the Energy Star requirements are more energy-efficient, resulting in lower electricity bills and reduced carbon emissions.

Singapore's Infocomm Media Development Authority (IMDA) launched the Green Data Centre Innovation Programme to support the development of sustainable data centers in Singapore through research grants, collaborative partnerships and an innovation hub.

The EU Eco-Design Directive sets minimum energy efficiency requirements for energy-using products, including computers, servers and other IT equipment. The directive aims to reduce energy consumption, increase resource efficiency and reduce environmental impact.

The International Telecommunication Union (ITU) organizes an annual Green Standards Week, which brings together experts from around the world to discuss and develop standards relating to the environment and climate change.

Notes:

"About ENERGY STAR," ENERGY STAR website, About ENERGY STAR | ENERGY STAR, accessed 9 May 2023

"Green ICT," National Climate Change Secretariat website Green ICT (nccs.gov.sg), accessed 9 May 2023

"Ecodesign Directive," European Council for an Energy Efficient Economy website, https://www.eceee.org/ecodesign/process/, accessed 9 May 2023

"ITU Green Standards Week," ITU website, ITU Green Standards Week, accessed 9 May 2023

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Consulting firms offer expertise to support technology providers, buyers and governments in the end-to-end execution of green IT solutions

The role of IT consulting firms

‣ IT consulting firms offer technology and industry expertise to create value in green IT innovation, adoption and governance, such as:

1
Develop strategy, goal, process and governance

2
Identify risks and opportunities

3
Establish technology roadmap

4
Support the transformation

5
Measure performance and monitor progress

6
Provide long-term support and maintenance

EY client story

‣ **Business challenge:** A global petrochemicals company recognized the need to track the use of recycled feedstock, renewable energy, water and other metrics through sustainability certifications. This accountability would support the positioning and pricing of their premium green products.

‣ **Solution and technology implemented:** EY teams built out a lean, customized, Microsoft-enabled program to analyze the use of renewable materials, energy consumption and the carbon stamp across the production cycle. The company was able to accelerate the digital transformation that led to an advanced Sustainability Certification Application, setting the foundation for a future blockchain.

‣ **Sustainability value:**
  ‣ Presents solid evidence of recycled feedstock, renewable energy use and other sustainability objectives
  ‣ Accelerates deployment of cost-effective certification application
  ‣ Leverages diverse technology, business and sustainability skills across global teams to create a comprehensive solution
  ‣ Leading business and technology functionalities serve as a competitive differentiator in sustainability

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The green IT ecosystem lays the foundation for technology and digitalization to become key enabler in achieving sustainability goals

In conclusion

▸ Green IT is increasingly gaining momentum as technology plays a key role in helping organizations achieve their sustainability goals and reduce carbon footprints.

▸ Green software, as part of green IT practice, reflects a growing trend towards incorporating sustainability considerations into the entire software lifecycle.

▸ The adoption of green IT and green software is not only an ethical imperative but also a business necessity as organizations seek to remain competitive in an increasingly sustainability-focused landscape. By leveraging the latest technological advances and incorporating sustainability into their IT operations, organizations not only achieve their sustainability goals, they also benefit from cost savings and increased productivity.

▸ Establishing a green IT ecosystem requires collaboration among the key entities within the IT value chain, including technology providers, buyers, governments and regulatory authorities, and consulting firms. The collaboration will require significant effort by aligning and setting mutual and tangible sustainability commitments, targets and pathways.

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Explore our insights on what it takes to develop sustainability and ESG strategies that create and protect value

What is the CIO's role in the ESG equation?

Overarching ESG challenges will require working together to address many questions related to people, technology, processes and metrics.

Is your ESG data unlocking long-term value?

Improved environmental, social and governance (ESG) insight and data analytics could be important to delivering long-term value.

How CIOs can take the lead on sustainability and ESG

CIOs and their IT organizations play a key role in advancing ESG goals – in close collaboration with others – while serving as a catalyst for real enterprise change.

Can a supply chain digital twin make you twice as agile?

Using real-time data from across the supply chain, digital twins help sense and respond to disruptions, enabling better and quicker decision-making.

How will ESG performance shape your future?

How will ESG performance shape your future? The fifth EY investor study of ESG trends sees a significant shift in how investors assess and use ESG information in their decision-making.

Four opportunities for enhancing ESG oversight

Using a survey of nearly 400 directors, we provide four opportunities for boards to consider as they enhance their oversight of environmental, social and governance issues.

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