IBM Consulting
Green IT and Sustainability on Azure

Client Presentation
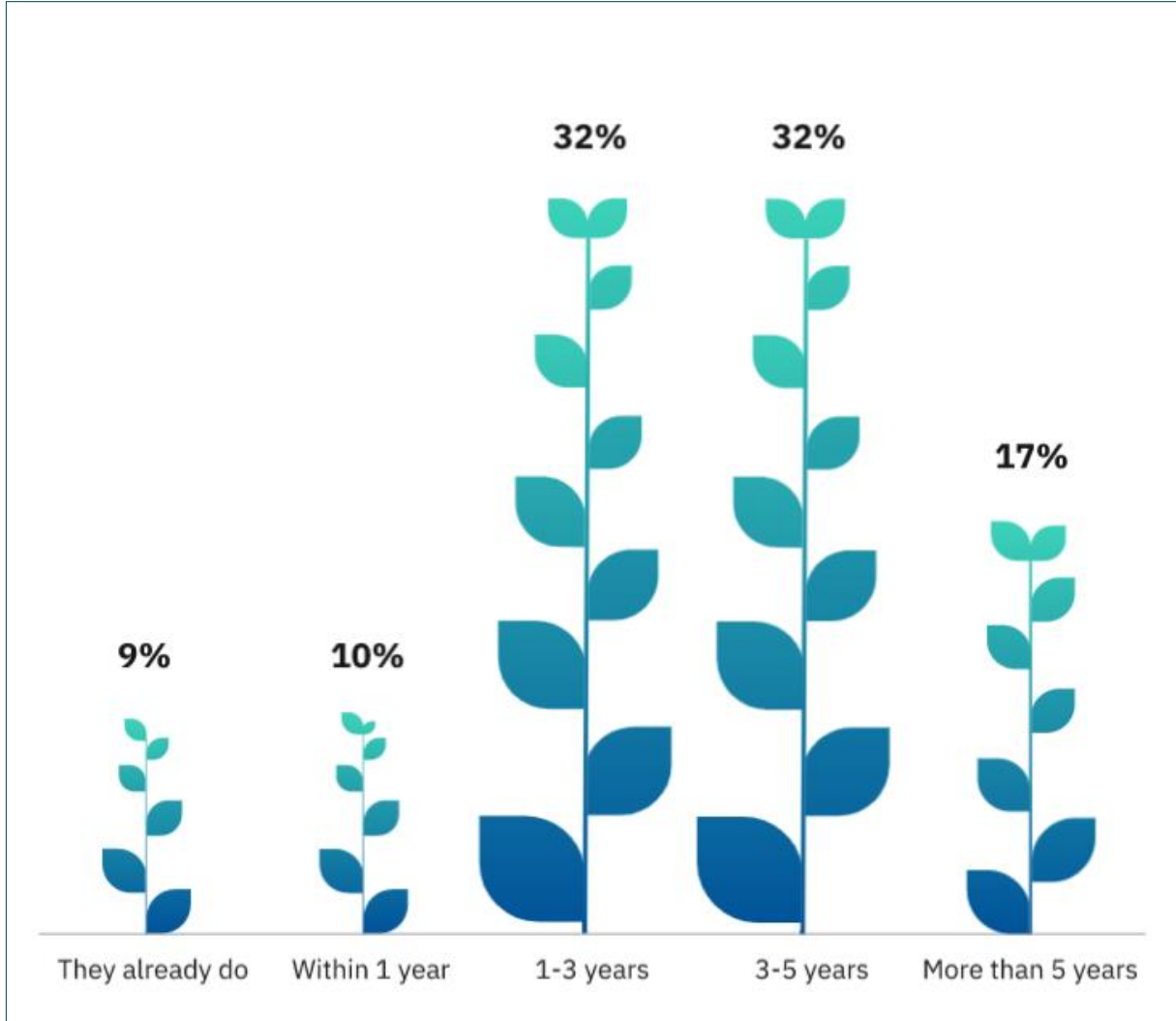
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"There has never been a more vital moment for CEOs to embrace sustainability as a core aspect of the enterprise. It's clear that environmentally minded organizations are set up for long-term success – and **the time to act is now**."

37%
more CEOs in 2022 rate sustainability as a top priority, compared to 2021
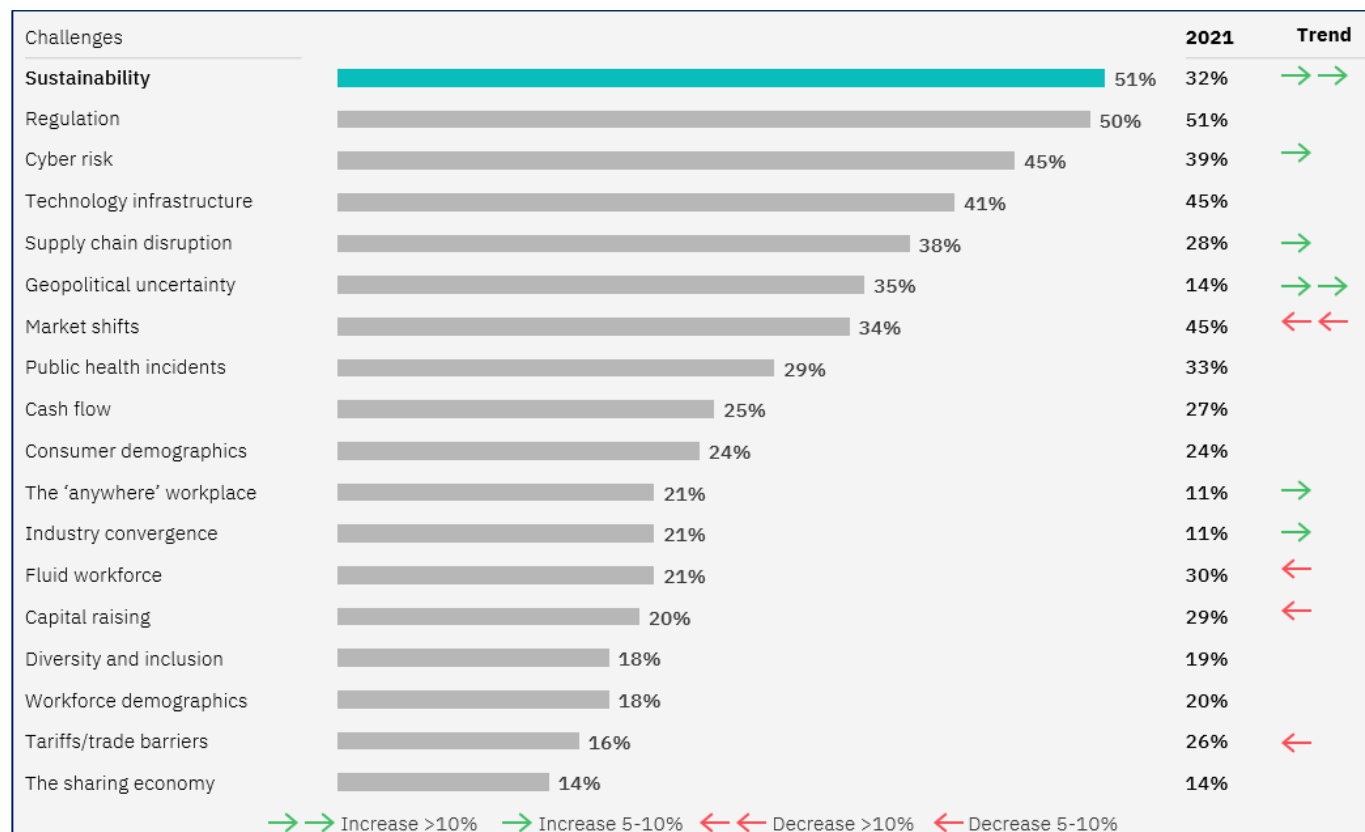
83%
of CEOs expect sustainability investments to produce improved business results in the next 5 years

Chart showing:
- They already do: 9%
- Within 1 year: 10%
- 1-3 years: 32%
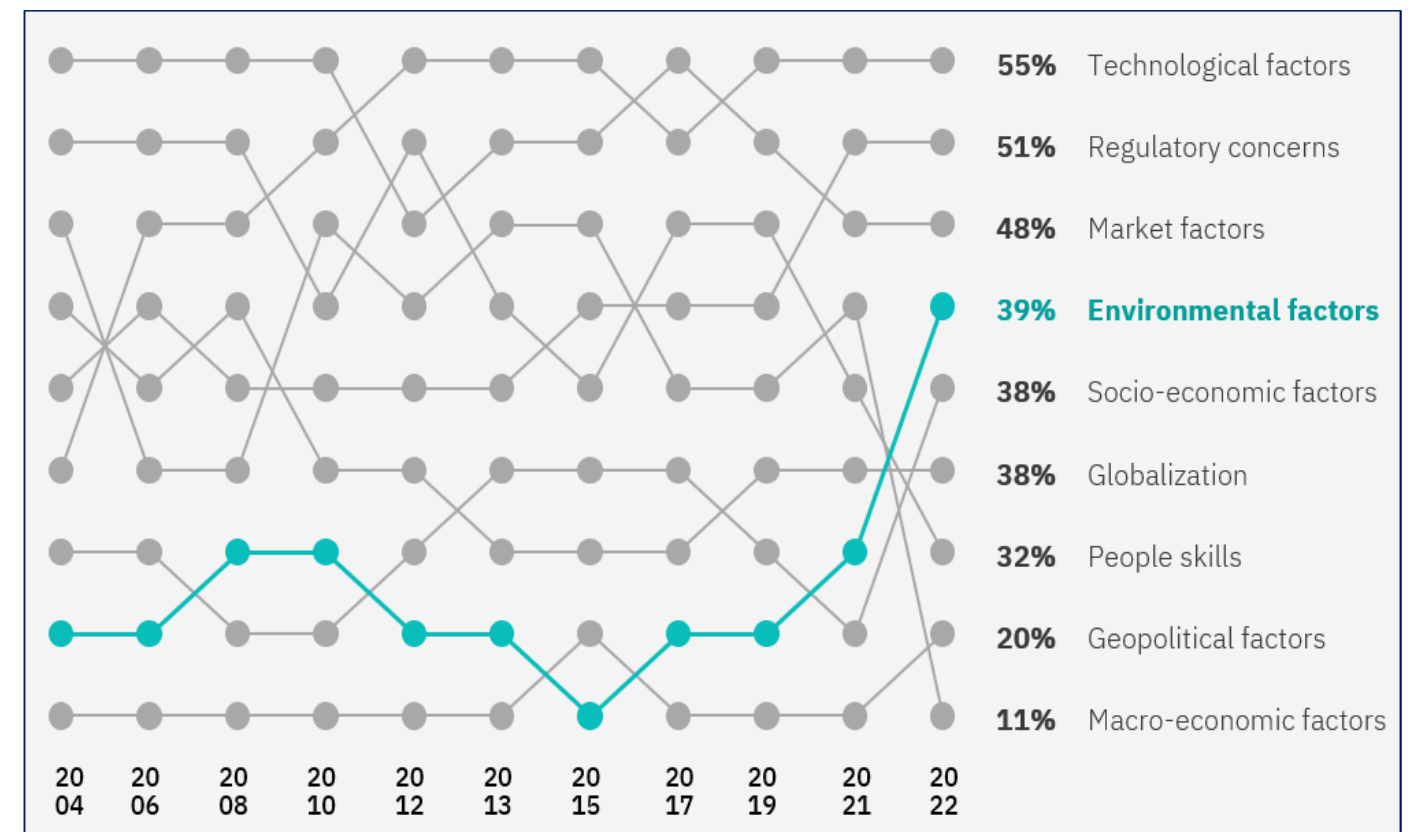- 3-5 years: 32%
- More than 5 years: 17%

Organizations **face challenges** in pursuing the target objectives and are under pressure to **improve transparency in sustainability practices**

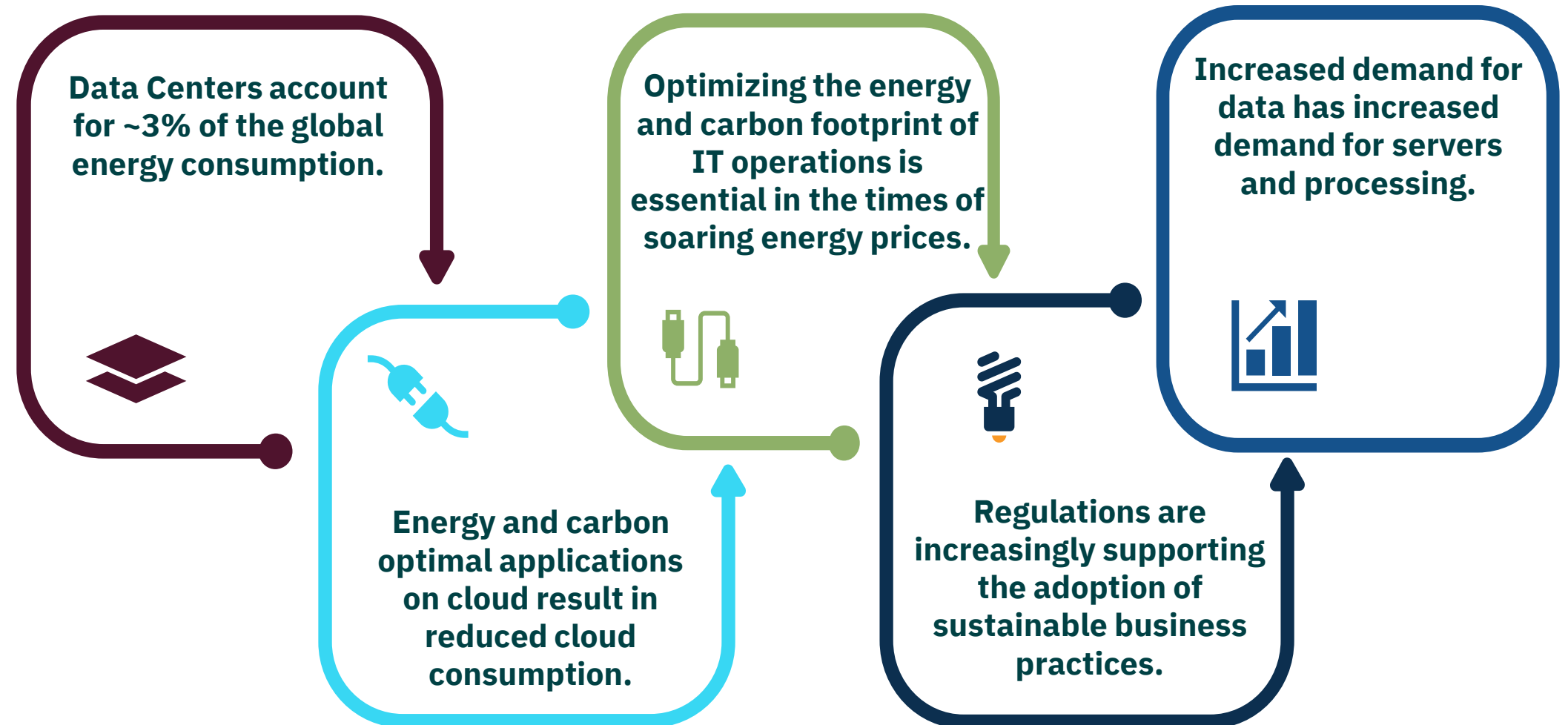## Expected greatest challenges for organization over the next 2–3 years

Challenges	%	2021	Trend
Sustainability	51%	32%	→ →
Regulation	50%	51%	
Cyber risk	45%	39%	→
Technology infrastructure	41%	45%	
Supply chain disruption	38%	28%	→
Geopolitical uncertainty	35%	14%	→ →
Market shifts	34%	45%	← ←
Public health incidents	29%	33%	
Cash flow	25%	27%	
Consumer demographics	24%	24%	
The 'anywhere' workplace	21%	11%	→
Industry convergence	21%	11%	→
Fluid workforce	21%	30%	←
Capital raising	20%	29%	←
Diversity and inclusion	18%	19%	
Workforce demographics	18%	20%	
Tariffs/trade barriers	16%	26%	←
The sharing economy	14%	14%	

→ → Increase >10%   → Increase 5-10%   ← ← Decrease >10%   ← Decrease 5-10%

Most important external forces to impact an organization's enterprise over the next 2–3 years

%	Factor
55%	Technological factors
51%	Regulatory concerns
48%	Market factors
39%	**Environmental factors**
38%	Socio-economic factors
38%	Globalization
32%	People skills
20%	Geopolitical factors
11%	Macro-economic factors

(Years: 2004, 2006, 2008, 2010, 2012, 2013, 2015, 2017, 2019, 2021, 2022)

Source: IBM Business Value, "The CEO Study - Own your impact: Practical pathways to transformational sustainability"

IT is committing itself to **sustainability and Green IT** is critical for businesses to meet their net zero goal, in turn saving on operating costs

Key drivers to embark on IT decarbonization journey

Data Centers account for ~3% of the global energy consumption.

Optimizing the energy and carbon footprint of IT operations is essential in the times of soaring energy prices.

Increased demand for data has increased demand for servers and processing.

Energy and carbon optimal applications on cloud result in reduced cloud consumption.

Regulations are increasingly supporting the adoption of sustainable business practices.

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IT sustainability can be achieved by optimal consumption of **Compute, Storage and Network**

Major Sources of Emissions

Data Centers

The global power capacity of data centers has grown by 43% in the last 3 years while server utilization rates remain between 12%-18%. NRDC estimates that increasing server utilization along with other technically feasible improvements could reduce energy consumption by 40%

AI & Big Data Analytics

Increased demand for data and usage of AI has created increased demand on servers. Switching from one programming language to another can reduce the energy consumption of an application by up to 50%

Security

Adding security features to software can increase its energy needs. As data infuses ever more business processes and decisions, the need for security grows accordingly, but it needs to balanced with energy consumption requirements

Key IT Resources Consuming Energy - Remediation

Compute	Storage	Network

Applications

- Use Green Coding & Design principles to ensure applications are designed for energy and carbon efficiency

Data

- Minimize data movement and network hops
- Infuse sustainability Design Principles to reduce IT resource consumption

Platform

- Right sizing of the platform can reduce energy consumption while ensuring business continuity

Operations

- Optimize the use of resources; Schedule IT workloads
- Use economies of scale to reduce your footprint energy carbon

IBM Sustainability Capabilities and Offerings

Current Challenges
Carbon Assessment of IT Estate

Complex carbon accounting
In order to reduce the carbon footprints of data centers, applications, and infrastructure, IT organizations must have tools with which to accurately measure their carbon emissions.

Opaque benchmarks
Organizations need context in the form of benchmarks—internal and external key performance indicators (KPIs) that give them a sense of their performance and their progress.

Ambiguous analytics
Once organizations can easily, affordably, and accurately measure and benchmark the carbon footprint of their IT estate, they will have a better sense of where they are and where they want to go.

Solution Framework
An Integrated and Continuous Process

Quantify
Energy and CFP per workload, tenant, VM, container, Service, etc.

Assess
Identify hotspots and applicable strategies and calculate potential savings.

Optimize
A set of controllers to dynamically optimize the carbon footprint and a transformational roadmap through Migration & Modernization

Operationalize
Continuously monitor, report and insight on resource consumption & IT KPIs for sustainability

The Path Forward
A Strategic Partnership with IBM

Green IT Strategy
- Carbon Footprint Measurement for IT Estate
- IT Sustainability Maturity Assessment
- IT Sustainability Strategy, Roadmap/Blueprint / CoE

Green IT Transformation
- Green Coding
- Application Build & Integration (designed for sustainability)
- Application & Data Migration (designed for sustainability)
- Application & Data Modernization (designed for sustainability)
- Platform optimization

Green IT Operations
- Sustainable IT Operations (SusOps)
- Sustainability AI Ops & Sustainability Engineering
- Sustainability Quality Engineering

IBM Consulting helps clients **assess** cloud journey through a sturdy **Sustainability Assessment Framework on Azure**
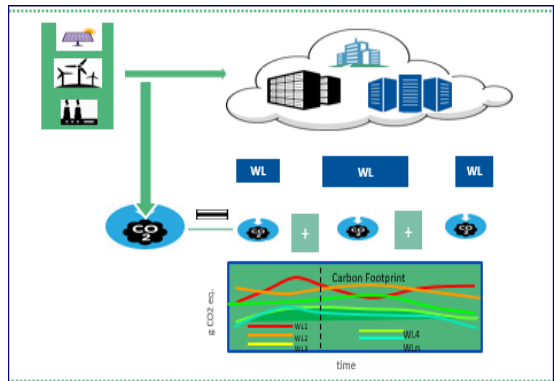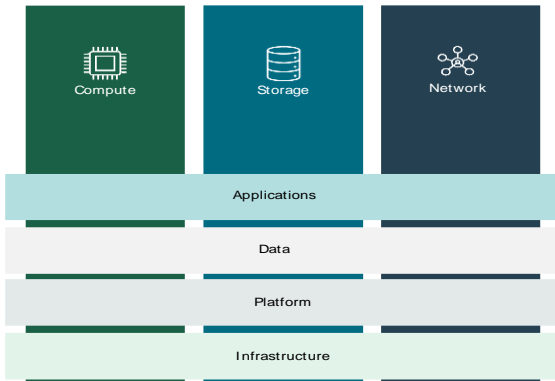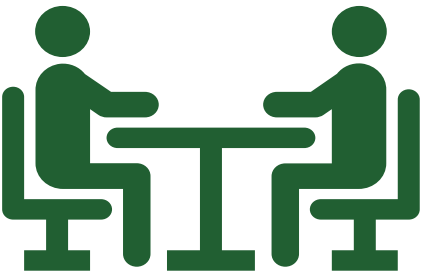
Discuss & discover
Assess the client's IT estate across Platform, Data, Applications, Operations, People and Culture areas

Determine gaps
Analyze and identify hotspots in client's current IT estate
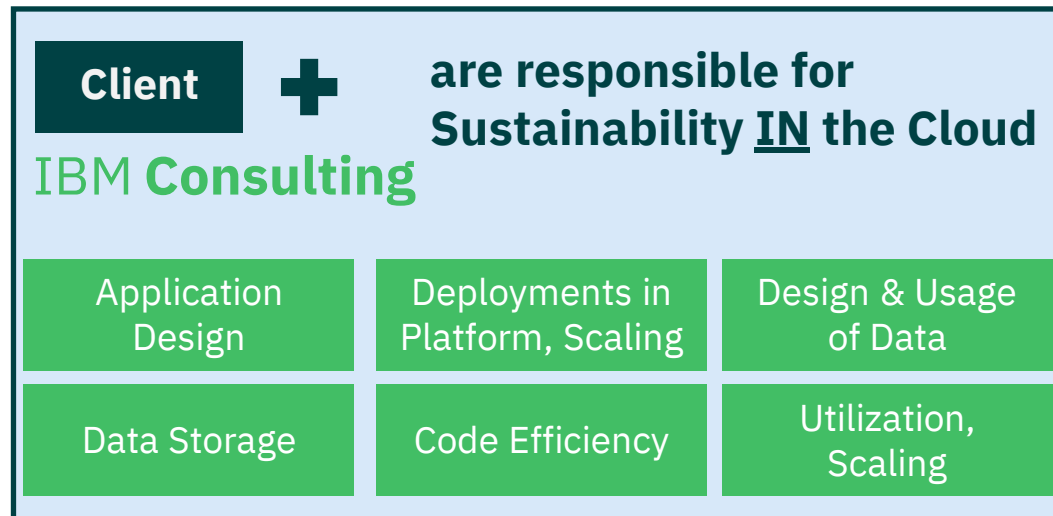
Analyze & provide actionable insights
Provide tangible corrective recommendations to meet the desired sustainability state

Transform
Demonstrate commitment to client's transformation journey as trusted partner

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Environment Sustainability is a shared responsibility

Client ➕ **IBM Consulting**
are responsible for **Sustainability IN the Cloud**

Application Design	Deployments in Platform, Scaling	Design & Usage of Data
Data Storage	Code Efficiency	Utilization, Scaling

Azure is responsible for **Sustainability OF the Cloud**

|		
Servers	Cooling	Water
Data Centres	Electric Supply	Building Materials

IBM will work with client as the Service Integrator in their sustainability journey with a set of tools and accelerators:

Enterprise Sustainability Strategy

- **IBM Green IT & sustainability Risk Assessment Framework:** Provide with Sustainability Maturity and Risk Identification, Recommendations & Mitigations
- **Nordcloud Klarity** – Measurement of Carbon footprint on Azure
- **Sustainability Advisor** – Web/ Excel based tool to provide Cost vs Sustainability benefit
- **Enterprise Sustainability Assessment** – Excel based enterprise level sustainability maturity assessment tool
- **Candidate Microservice Advisor** – Automate the discovery and design of microservices
- **Turbonomic** – Identify idle workload in VM, Storage, Database, etc.
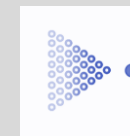
Sustainable Computing

- **Delivery Curator** – Generate modernization workbook
- **Pre-Fabricated Design Principles** – Technical guidance for carbon efficient designs for different journeys

Sustainable IT Operation

- **Turbonomic** – Resource optimization
- **Nordcloud Klarity** – Workload optimization
- **Envizi** – Carbon accounting dashboard for business use cases

🔵 IBM Assets   🔴 Partner Assets

FMCG Major

Client Success Story

IBM Consulting helped the US unit of a Global FMCG client in transforming its product portfolio by focusing on high-growth categories that meet changing consumer needs, including pet care, coffee, premium bottled water, consumer health and infant nutrition.

Client is committed to:
- achieve net zero emissions by 2050,
- make all their packaging reusable or recyclable by 2025, and
- invest more than $3 billion globally over the next few years to accelerate this work.

IBM is their trusted partner in this journey.

Client Pain Points	Client Value & Business Outcomes	IBM Value & Differentiation	Delivery Solution Highlights
• Meet net zero objectives at organization level to become carbon neutral by 2035 • Not sure how IT can play a role for meeting net zero goals • Sustainable by Design is a cultural shift and want to enable green behavior at workplace • Not having Green Reference Architecture to drive the sustainable objectives to technical community and considering sustainability as non-functional requirements	Actionable insights and recommendations to improve architecture the heavily used B2B conversational AI app and make it more sustainable • API specific improvements • Bot UX optimization • Workflow optimization • DevOps microservices • Azure focused improvements • Design consideration & best practices	• Deep knowledge and technical eminence of sustainable design & architecture • Green IT assessment framework for Azure, a unique solution for IT sustainability • Well defined and ready to consume sustainability design principles addressing all aspects of reference architecture • High impact solution that optimizes highly used B2B chat bot app	Understand and clarify • Client priorities and requirements • Interactions and interviews with Client team for better understanding of enterprise architecture Assess • Client Bot application architecture review (as-is) in detail • Possible areas of improvements • Trade off analysis of improvement options along with security and cost implications Recommend • Architecture or design changes needed to make Bot application more sustainable in nature. • Roadmap for injecting Green IT best practices, design techniques and implementation approach

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