SUSTAINABLEIT.ORG

IT Standards for Environmental, Social, and Governance Sustainability
Introduction

Technology has a formidable role to play in sustainability transformation—beginning with the IT function and technology infrastructure, expanding to enable and innovate enterprise-level sustainability, and ultimately, scaling to industry-level impact.

This presentation makes the case that IT is the critical path to sustainability in environmental, social and governance (ESG) impacts. We highlight the challenges, including technology’s carbon and e-waste footprints and the rapidly evolving areas of sustainable AI, socially responsible innovation and the “Future of Work.”

We explore the levers of impact available to all IT leaders willing to leave the sidelines and make a difference. We outline essential goals with IT-tailored ESG Impact Models. And we present for the first time nearly 100 IT-tailored quantitative and qualitative ESG standards—topics, metrics and KPIs—that IT can choose from to guide its sustainability journey.

SustainableIT, a CIO/CTO-led nonprofit, is here to help jumpstart, accelerate and scale IT-led sustainability transformation. We hope this overview is informative and that the IT standards introduced will be useful in the journey to a sustainable operations.
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The Case for Sustainable IT

Definitions, benefits, and why CIOs should lead
What is IT Sustainability

The strategic leadership of enterprise technology to minimize negative and maximize positive impacts on the environment, society and governance (ESG). Key IT sustainability targets across the ESG pillars are shown at right.

**ENVIRONMENT**
- Carbon-neutral, green IT infrastructure and operations
- Circular technology lifecycle and e-waste elimination

**GOVERNANCE**
- Data usage, privacy, and security management
- Environmentally, socially, and economically responsible technology innovation

**SUSTAINABLE IT'S KEY GOALS**

**SOCIAL**
- Technology accessibility
- Inclusiveness of technology systems design

**Socio-economic**
- Upskilling and, reskilling for Future of Work
- Sustainable AI

**Socio-environment**
- IT & business resiliency
- Digital community engagement/digital divide

**Eco-efficiency**
- Transition to renewable energy
- Sustainable tech sourcing

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Sustainability Benefits Span Financial to Reputational

From 2013 to 2020, companies with consistently high ESG performance achieved **2.6x higher total shareholder return** than mid-level ESG performers. And companies with high sustainability maturity were more likely to see brand image, CSAT and tax savings improvements.

**IT financial value**
- Cost optimization (efficiency and productivity from structural transformation)
- Cost savings from lower IT energy use
- Cost savings from longer hardware/device lifecycles

**Business financial value**
- Cost savings from lower business energy use (green buildings, active energy management, transportation efficiencies, etc.)
- Appeal to “ESG investors”
- Readiness for regulatory mandates for disclosure and business partner requirements

**Non-financial value**
- Brand perception
- Appeal to younger demographic (employees and customers)
- Greater workforce loyalty

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**Sustainable IT benefits**

<table>
<thead>
<tr>
<th>Improvement in brand image</th>
<th>Improve customer/client satisfaction</th>
<th>Tax savings due to green practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>61%</td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td>35%</td>
<td>43%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Sources: Accenture analysis, Capgemini Research Institute

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Why CIOs Should Lead

IT can play a key role in developing strategic plans to meet sustainability goals, measuring performance, monitoring risks, and responding to disclosure requirements.

As Leaders of Digital Transformation, CIOs/CTOs Have Right Strategies, Tools and Relationships

Sustainability strategies already among IT’s responsibilities
- Automation of labor-intensive processes
- Migration to cloud
- Consolidation, simplification, deactivation
- Hybrid/remote worker enablement
- Technology innovation process, facilities (e.g., lab) & partner connections

Data stewardship has traditionally been an IT role
- System usage and performance metrics
- Data sourcing, smart capture, integration and virtualization
- AI for smart data capture, decision support, anomaly detection

IT has the relevant relationships
- Digital business transformation – guiding enterprisewide infrastructure and process modernization and the attendant change leadership
- Monitoring, measuring, and compliance reporting
- Vendor performance assessment and certification (outsourcers, hyperscalers)
- Strategic relationships with every business unit/function (BRMs & Business Partners)
One in Four IT Organizations are Not Supporting Any ESG Mandates; Across 11 Industries, Only 18% Have Sustainable IT Strategies

IT's anticipated involvement in ESG initiatives in 2023

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting environmental mandates</td>
<td>56%</td>
</tr>
<tr>
<td>Supporting governance mandates</td>
<td>45%</td>
</tr>
<tr>
<td>Supporting social mandates</td>
<td>37%</td>
</tr>
<tr>
<td>Not supporting ESG mandates (25%)</td>
<td>25%</td>
</tr>
</tbody>
</table>

Companies with sustainable IT strategies (with well-defined goals and target timelines) by industry

- Insurance: 24%
- Banking: 23%
- Telecom: 20%
- Retail: 19%
- Consumer products: 19%
- Industrial manufacturing: 17%
- Energy and utilities: 17%
- Automotive: 16%
- Life sciences and healthcare: 14%
- Public sector: 10%

Source: Info-Tech “Tech Trends 2023;” Capgemini Research Institute
The Role of Standards
ESG sustainability is a Journey

The Environmental, Social, and Governance (ESG) Imperative and Its Impact on Organizations

Gain customer trust through a holistic, proactive, and transparent sustainability program

ESG Program Journey

1. Understand the ESG drivers
   - CO - INFORMED
   - “ESG assets are expected to surpass $50 trillion by 2028, globally.”
     - Bloomberg Intelligence (2021)
   - Visibility of climate change
   - Regulatory requirements
   - Risk in ESG investing
   - Younger generations with strong convictions & financial influence

2. Set the program purpose
   - CO - INFORMED
   - Clarify ESG goals and intentions with respect to the organization.

3. Assess the material impact of ESG factors on your business
   - CO - INFORMED
   - “This ability to anticipate stakeholder reactions to emerging sustainability issues and how they will affect a business and its performance is crucial.”
     - Mark Economy (2019)

4. Weigh risks, opportunities, and financial impact
   - CO - CONSULTED/ EXECUTED
   - Weight ESG factors and adjust your business operating model to align with your purpose.

5. Define approach and governance
   - CR - CONSULTED/ EXECUTED
   - “14% of CEOs believe that the full board must commonly assess all material risk and opportunities. While 20% do so in line with existing board governance committees.”
     - EY (2021)
   - Foundational elements of a successful ESG program are consistent, but organizational approaches vary based on industry and size.

6. Identify gaps against desired outcomes
   - CR - CONSULTED/ EXECUTED
   - IT impacts of an ESG program extend beyond the data challenge.

7. Deliver on goals and disclosure
   - R - CO - RESPONSIBLE
   - Supplier Management
   - Privacy & Security
   - IT Architecture
   - Data Management
   - Information Reporting
   - Business Resilience
   - Supplier Assessment

8. Continuously report and measure
   - R - CO - RESPONSIBLE

Source: Info-Tech “The ESG Imperative and Its Impact on Organizations.” Used by permission.
What are ESG sustainability standards?

ESG standards are sets of measurable topics that provide a consistent way of describing or “disclosing” a company’s sustainability current state to regulatory bodies and shareholders.

Do standards set target quantities, e.g., 90% of phones to be recycled?

No, ESG standards typically do not provide numeric goals or quantities that companies should aspire to reach. Those must be determined by companies individually, usually based on benchmarks, industry commitments, or levels set by governing institutions.

What’s special about SustainableIT’s standards?

Our IT ESG standards are tailored by CIOs for maximum relevance to enterprise IT organizations. They adapt existing standards while adding new ones to address gaps in established general standards bodies such as Global Reporting Initiative (GRI), or Sustainability Accounting Standards Board (SASB).

The SustainableIT standards are meant to empower IT leaders with a uniform foundation on which to build an action plan for sustainability in their functions, enterprises, and industries.

How do IT organizations use SustainableIT’s standards?

IT leaders should select from the lists any environmental, social and governance high-level topics they wish to include on their transformation agendas. They then can drill down into each topic to choose metrics, standard units of measure, and descriptions for use in baselining, tracking, and reporting/disclosing. (See page 45 for more how-to details.)
Pick Your Priorities

Although the scope and granularity of sustainability standards may seem overwhelming, it is possible to start with just a few goals and organizational steps. Most teams start with environmental initiatives. See next page for materiality matrix to further refine your priorities.

**Governance**
- Develop and communicate vision for a sustainable IT operating model. Align to existing enterprise sustainability vision.
- Define sustainability responsibility in IT -- executive sponsor, team leads, data and measurement team, and key business stakeholders.
- Conduct a materiality assessment (see next page).

**Energy and emissions**
- Begin monitoring energy consumption of major IT assets, and type of energy (renewable, coal, etc.).
- Develop or accelerate server migration plan to low-carbon intensity cloud.

**IT hardware circularity**
- Assess current hardware disposal methods; initiate or expand IT asset disposition to reduce landfill.
- Assess impact of prolonging IT hardware lifecycle on IT asset classes (servers, laptops, etc.).

**Vendor management**
- Communicate sustainability vision and plans to key vendors. Ask hyperscalers for existing sustainability data for your Scope 1 and 2 emissions.
Prioritize Standards That Have Highest “Materiality” – Importance to IT/Business Stakeholders and Potential Business Impact

Further refine priorities based on standards in which IT can have a major, visible and rapid impact.
IT’s Environmental Impact, Levers, and Standards
Environmental Challenges: Carbon Levels, Temperatures Rising in Tandem

Atmospheric CO₂ 1960-2021

Yearly surface temperature difference compared to 20th Century average

Source: Climate Change – Atmospheric Carbon Dioxide, Climate Change – Global Temperature, NOAA Climate.gov
Impacts on Health

Rising GHG, Temperatures Part of Cycle Degrading Human Health, Increasing Mortality

- **Health-related illness and death, cardiovascular failure**
- **Injuries, fatalities, mental health impacts**
- **Severe Weather**
- **Air Pollution**
- **Changes in Vector Ecology**
- **Increasing Allergens**
- **Water and Food Supply Impacts**
- **Water Quality Impacts**
- **Malnutrition, diarrheal disease**
- **Cholera, cryptosporidiosis, campylobacter, leptospirosis, harmful algal blooms**
- **Respiratory allergies, asthma**
- **Malaria, Dengue, Encephalitis, Hantavirus, Rift Valley fever, Lyme disease, Chikungunya, West Nile virus**

Source: U.S. Centers for Disease Control and Prevention, 2022

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Current Emissions Improvement Scenarios Fall Short of Target Needs

“To get on track to limiting global warming to 1.5°C, we would need to cut 45% off current greenhouse gas emissions by 2030. A stepwise approach is no longer an option. We need system-wide transformation.”

– Inger Andersen, Executive Director, United Nations Environment Programme
Emissions Gap Report, UN Environment Programme, October 2022

![Emissions needed to achieve 2030 warming limit targets (billion metric tons CO₂e)](source: 2022 Emissions Gap Report, UN Environment Program, October 2022)

*Figures are medians; percentages differ due to rounding.
**Nationally Determined Contributions (NDCs) were required by signatory nations under the Paris Agreement, specifying their intended unconditional climate actions to reduce emissions and adapt to the impacts of climate change.

Source: 2022 Emissions Gap Report, UN Environment Program, October 2022
Emissions Types Attributable to Business Operations—Scope 2, 3 Emissions Generally Greater

**Scope 1**
Direct emissions from owned assets
- Facilities
- Equipment
- Vehicles
- Onsite landfills

**Scope 2**
Direct emissions from purchased energy
- Electricity
- Heating
- Cooling

**Scope 3**
Indirect emissions from third-parties, leased assets
- Transportation and distribution
- Waste
- Energy and fuel usage, travel
Scope 3 Emissions Dominant in Most Industries, Requiring Inter-Company Cooperation to Drive Change

<table>
<thead>
<tr>
<th>Industry</th>
<th>Scope 1</th>
<th>Scope 2</th>
<th>Scope 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive and components</td>
<td>3%</td>
<td>10%</td>
<td>87%</td>
</tr>
<tr>
<td>Basic consumer goods</td>
<td>10%</td>
<td>9%</td>
<td>81%</td>
</tr>
<tr>
<td>Energy</td>
<td>77%</td>
<td>5%</td>
<td>18%</td>
</tr>
<tr>
<td>Financial Services</td>
<td>5%</td>
<td>9%</td>
<td>86%</td>
</tr>
<tr>
<td>Healthcare</td>
<td>28%</td>
<td>12%</td>
<td>60%</td>
</tr>
<tr>
<td>IT and software</td>
<td>12%</td>
<td>10%</td>
<td>78%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>13%</td>
<td>8%</td>
<td>79%</td>
</tr>
<tr>
<td>Non-basic consumer goods</td>
<td>16%</td>
<td>15%</td>
<td>69%</td>
</tr>
<tr>
<td>Raw materials and supplies</td>
<td>30%</td>
<td>12%</td>
<td>58%</td>
</tr>
<tr>
<td>Real estate</td>
<td>20%</td>
<td>10%</td>
<td>70%</td>
</tr>
<tr>
<td>Telecom services</td>
<td>29%</td>
<td>9%</td>
<td>62%</td>
</tr>
<tr>
<td>Transportation</td>
<td>53%</td>
<td>5%</td>
<td>42%</td>
</tr>
</tbody>
</table>
IT's Share of Carbon Has Grown 2.5X Since 2007

IT's Scope 2 and 3 GHG emissions are equivalent to the United Kingdom total annual emissions and half that produced by the aviation industry. Training a single AI model emits as much as 5 average cars over their lifetimes.

Data centers consumed 220-320 TWh (trillion watt hours) in 2021. Roughly 7% of what the entire US consumes annually.

Training the chatbot GPT-3 is estimated to have taken as much electricity as 120 US homes would consume in a year, and equates to 502 tons of carbon emissions. Google AI burns 2.3 terawatt hours annually, as much electricity as all the homes in a city the size of Atlanta.

57 Mts (megatons or 1 million metric tons) of e-waste was generated in 2021, heavier than the entire Great Wall of China. By 2030, e-waste will reach 74 Mts. In 2019, only 17% of e-waste was known to be recycled.

Technology Contributes as Much as 45% of Scope 2 Emissions

<table>
<thead>
<tr>
<th>Industry</th>
<th>Technology's S2 + S3 Emissions (Mts CO₂e)</th>
<th>Technology's share (%) of total industry S2 Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications, media, and services</td>
<td>40% 60% 80-85</td>
<td>35</td>
</tr>
<tr>
<td>Banking and investment services</td>
<td>21% 79% 60-65</td>
<td>36</td>
</tr>
<tr>
<td>Government²</td>
<td>17% 83% 55-60</td>
<td>0</td>
</tr>
<tr>
<td>Manufacturing and natural resources</td>
<td>22% 78% 50-55</td>
<td>2</td>
</tr>
<tr>
<td>Energy and utilities</td>
<td>18% 82% 20-25</td>
<td>3</td>
</tr>
<tr>
<td>Insurance</td>
<td>14% 86% 20-25</td>
<td>45</td>
</tr>
<tr>
<td>Education</td>
<td>19% 81% 15-20</td>
<td>6</td>
</tr>
<tr>
<td>Retail</td>
<td>14% 86% 15-20</td>
<td>2</td>
</tr>
<tr>
<td>Healthcare providers</td>
<td>15% 85% 10-15</td>
<td>9</td>
</tr>
<tr>
<td>Transportation</td>
<td>16% 84% 10-15</td>
<td>11</td>
</tr>
<tr>
<td>Wholesale trade</td>
<td>22% 78% 5-15</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: The Green IT Revolution, McKinsey & Company 2022
End-user Devices, Data Centers Account for 50% of IT’s Scope 2, 3 Emissions

Emission contributions by technology type

- **End-user devices**
  - Scope 2: 68%
  - Scope 3: 32%

- **Data centers**
  - Scope 2: 31%
  - Scope 3: 23%

- **Software**
  - Scope 2: 20%
  - Scope 3: 3%

- **Telecom**
  - Scope 2: 3%
  - Scope 3: 20%

- **IT services**
  - Scope 2: 20%
  - Scope 3: 3%

- **Other**
  - Scope 2: 55-65%
  - Scope 3: 50-60%

**Scope 2**
- **End-user devices**: 8-10
- **Data center**: 63-75
- **Cloud**: 2-5
- **Software**: 65-70
- **IT services**: 50-60
- **Telecom**: 0-5
- **Internal services**: 350-400

**Scope 3**
- **End-user devices**: 115-125
- **Data center**: 90-95
- **Cloud**: 25-30
- **Software**: 55-65
- **IT services**: 80-95
- **Telecom**: 270-305
- **Internal services**: 350-400

¹Megatons of carbon dioxide equivalent gases.
²Includes emissions from on-premises data center and co-location.
³Infrastructure as a service (IaaS) only, Software as a service (SaaS) and Platform as a service (PaaS) spending accounted for in software category.

Source: The Green IT Revolution, McKinsey & Company 2022
IT Leaders Have Three Sustainability Tiers of Impact That Scale in Consequence

1. **IT function** – As a function, IT exemplifies sustainable design and operations by shifting to cloud-hosted infrastructure, uses energy-efficient hardware and software coding, automates IT services, establishes a circular lifecycle for end-user devices, optimizes data center energy consumption, and establishes vendor sustainability requirements.

2. **Enterprise** – As IT drives digital business transformation, it virtualizes services infrastructure (Everything-as-a-Service), automates emission-intensive business processes, enables paperless operations, supports an optimal hybrid workforce model, and reduces need to travel through virtual meeting support. As principal data managers, IT facilitates sustainability accounting, reporting and decision-making, and enterprise risk management.

3. **Industry/sector** – IT cooperation within and across industries will scale digitization of common operating processes, certified technology sourcing and circular lifecycle management, pervasive as-a-service infrastructure, best-practice climate risk management; and standardized sustainability accounting and reporting facilitated by a common platform.

- E.g., technology’s Scope 2 emissions in healthcare provider industry: 2.3 Mts CO₂
- E.g., total healthcare provider industry Scope 2 emissions: 25 Mts CO₂
IT’s Environmental Sustainability Levers

Environmental sustainability in IT
- Data Center & Cloud Computing
- Sustainable Software Development
- Circular IT Hardware
- IT Vendor Management & Procurement
- E-waste

Environmental sustainability by IT for the enterprise
- Energy-efficient Buildings
- Energy Resource Management
- Hybrid Work
- Eco-friendly Travel & Transportation
- E-services

Environmental sustainability by IT for the industry/sector
- Common Process Digitization
- Standard Sourcing Certifications
- As-a-Service Infrastructure
- Climate Risk Management
- ESG Accounting & Reporting Platform

Source: Adapted from Sustainability IT Playbook for Technology Leaders, Niklas Sundberg, Packt, 2022

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# Environmental Impact Model – Goals by Category

## Energy

**Common technology certification standards**
- Industry-pervasive as-a-service platforms
- Common energy-sourcing and facility standards

**100% certified hardware and end-user devices**
- Fully cloud-hosted infrastructure
- 100% green-certified facilities

**Preferred Energy Star-certified (etc.) hardware**
- SaaS and cloud-hosted IT services
- 100% renewable energy

## Emissions

**Industry**
- Common industry process standards

**Enterprise**
- Fully digitized enterprise business processes

**Function**
- Fully automated IT services

**Sourcing**
- Common procurement practices and standards
- Common sustainable technology requirements

## Sourcing

**Industry**
- Common supplier certification standards

**Enterprise**
- Sustainability-certified supply chain partners

**Function**
- Sustainability-certified technology vendors

## Waste

**Common water resource management standards**
- Industrywide digital document management
- Industrywide technology circular lifecycles

**100% enterprise direct-use water recycling**
- Fully paperless enterprise
- 0 enterprise technology landfill

**Low-impact data center cooling (on-prem and hosted)**
- Digitized documents
- Circular lifecycles for all end-user devices

## Energy

- 100% sustainable technology requirements
- 100% sustainably sourced IT services

## Emissions

- Carbon-negative/neutral industry
- Carbon-negative/neutral enterprise
- Carbon-neutral technology infrastructure

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## Environmental Sustainability Standards

<table>
<thead>
<tr>
<th>In IT</th>
<th>Energy</th>
<th>Emissions</th>
<th>Waste</th>
<th>Sourcing</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Technology infrastructure energy consumption (kWh, % renewable)</td>
<td>• Technology infrastructure emissions</td>
<td>• Device and hardware lifecycle circularity (E.g., servers, laptops, phones, monitors, printers, network equipment reused, refurbished, repurposed, recycled, remanufactured)</td>
<td>• Software sourced sustainably (i.e., vendors, manufacturers and supply chain sustainability)</td>
<td></td>
</tr>
<tr>
<td>• Data center energy consumption</td>
<td>• Owner/on-premises</td>
<td>• Percentage IT devices reused/refurbished or repurposed</td>
<td>• Hardware sourced sustainably</td>
<td></td>
</tr>
<tr>
<td>• Percentage workloads considered portable</td>
<td>• Third party-source/ hosted</td>
<td>• Percentage IT devices recycled/remanufactured</td>
<td>• Eligible technology devices/hardware meeting ENERGY STAR®, Epeat, and/or TCO Certified criteria</td>
<td></td>
</tr>
<tr>
<td>• End-user devices energy consumption</td>
<td>• Data center emissions</td>
<td>• Percentage equipment not disposed sustainably (i.e., landfilled)</td>
<td>• IT outsourcing process sustainability</td>
<td></td>
</tr>
<tr>
<td>• Application portfolio energy consumption</td>
<td>• End-user device emissions</td>
<td>• Percentage of device/hardware units donated responsibly</td>
<td>• Outsourcer sustainability</td>
<td></td>
</tr>
<tr>
<td>• Percentage green design</td>
<td>• Average lifecycle of end-user devices</td>
<td>• Refresh cycle of IT devices</td>
<td>• Infrastructure services sourced sustainably (e.g., cloud, data centers, e-commerce providers)</td>
<td></td>
</tr>
<tr>
<td>• Number applications per user</td>
<td>• Average emissions reduction achieved by lifecycle extension</td>
<td></td>
<td>• Business services sourced sustainably (e.g., consulting firms, integrators)</td>
<td></td>
</tr>
<tr>
<td>• Percentage of compute workloads cloud-hosted</td>
<td>• Percentage end-user devices BYOD</td>
<td></td>
<td>• Mobile communication services sourced sustainably</td>
<td></td>
</tr>
<tr>
<td>• Lifecycle energy consumption of IT products and services</td>
<td>• Application portfolio emissions (avg. workloads)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Percentage energy sources controlled/influenced</td>
<td>• Lifecycle emissions of IT products and services</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>By IT*</th>
<th>Emissions</th>
<th>Waste</th>
<th>Sourcing</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Enterprise facility energy consumption</td>
<td>• Enterprise facilities emissions</td>
<td>• Water consumption and discharge</td>
<td>• Supply chain vendor (e.g., transportation, delivery) sustainably</td>
</tr>
<tr>
<td>• Hybrid workforce enablement</td>
<td>• Virtual meetings enablement</td>
<td>• Enterprise facilities</td>
<td>• Procurement process sustainability</td>
</tr>
<tr>
<td>• Enterprise manufacturing energy consumption</td>
<td>• Eco-friendly business travel</td>
<td>• Third-party facilities</td>
<td>• Sustainable sourcing for manufacturing</td>
</tr>
<tr>
<td>• Percentage energy sources controlled/influenced</td>
<td>• Enterprise transportation emissions</td>
<td>• Paperless enterprise enablement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Procurement emissions</td>
<td>• Percentage of enterprise processes electronic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Enterprise supply-chain emissions</td>
<td>• Manufacturing waste</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Enterprise manufacturing emissions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Sourcing E-sustainability requirement categories**
- Energy - Transportation - Waste - Packaging

**Criteria for sustainability within above categories**
- Carbon product footprint
- Ecolabel/energy certifications
- Renewable energy use: Solar, wind, geothermal, hydropower, tidal, biomass
- GHG emissions
- Low-carbon fuels/electric vehicles in fleet
- Product lifespan
- Commitment to recycled material in product, packaging
- Waste reduction
- Compliance with government rules, directives

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IT’s Social and Governance Impacts, Levers, and Standards
IT Must Acknowledge and Manage Two-Sided Impacts

Positive Impacts

Health
- AI accelerates clinical trials
- Devices and wearables enable preventative and wellness monitoring
- Telemedicine improves equitable and accessible access

Flexibility of work
- Virtual collaboration platforms, 5G and cloud hosting enables remote work
- Improves productivity, reduces commuting stress and emissions

Education
- Virtual learning improves accessibility
- VR, AI and learning sciences enable immersive, holistic experience

Diversity, equity, and inclusion
- Use of AI to screen data can ID and remove bias in recruitment and pay systems, and reveal equity gaps.

Socio-environmental
- Sensing devices optimize smart building energy usage; detect wildfires earlier
- IOT optimizes waste management process and city traffic patterns

Negative Impacts

Health
- Workstations and devices can cause eyestrain, repetitive motion disorders
- Social media use can cause distraction and harm mental health
- Heavy sedentary technology use contributes to obesity

Remote work
- Can lead to isolation, work-life imbalance and decline in creativity
- Increases cybersecurity risk and distractions (avg. 2.5 hours wasted daily)

Diversity, equity, and inclusion
- IT careers under-represent, under-pay and under-promote women and people of color
- 47% of population lack access to high-speed broadband; 2.9 billion have no Internet access
- Only 3% of the Internet is accessible to people with disabilities
- Lawsuits claiming digital violations of the ADA and other acts jumped 52% from 2018 to 2020.

AI ethics
- AI can be used in unethical ways and can perpetuate bias

Sources: Screen Education survey; WebAIM; TechRepublic; UsableNet
IT Must Close its Substantial Workforce Diversity Gap

Studies show gender and ethnic diversity on executive teams results in a 25% and 36% greater likelihood to outperform EBIT industry averages, respectively.

### Diversity in IT workforce 2022

#### Gender

- Male: 24%
- Female: 67%
- Prefer not to answer: 9%
- Unspecified: 4%

#### Ethnicity

- White (e.g., North America, Western Europe): 12%
- Asian (e.g., Japan, India, Philippines, Uzbekistan): 7%
- Black (e.g., Africa, Caribbean, North American): 4%
- Latin/Hispanic (e.g., South and Central America, Spain): 3%
- Middle Eastern (e.g., Lebanon, Lybia, Iran): 3%
- Indigenous (Native American, Inuit, Maori): 2%
- Indo-Caribbean (e.g., Trinidad & Tobago, Guyana, St. Vincent): 1%

### Representation in major industries

(2022 USA statistics)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Women</th>
<th>Black/African-American</th>
<th>Hispanic or Latino</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>28%</td>
<td>3%</td>
<td>25%</td>
</tr>
<tr>
<td>Finance &amp; Insurance</td>
<td>53%</td>
<td>12%</td>
<td>12%</td>
</tr>
<tr>
<td>Hospitals and health services</td>
<td>78%</td>
<td>17%</td>
<td>14%</td>
</tr>
<tr>
<td>Hospitals and health services</td>
<td>78%</td>
<td>17%</td>
<td>14%</td>
</tr>
<tr>
<td>Management, scientific, and technical consulting</td>
<td>43%</td>
<td>9%</td>
<td>8%</td>
</tr>
<tr>
<td>Retail</td>
<td>48%</td>
<td>13%</td>
<td>19%</td>
</tr>
</tbody>
</table>

Automation Is Changing Tasks, Roles and Skills

Percentage of companies with expected changes to workforce by 2025

- Modify the composition of value chain: 55%
- Redo current workforce due to technological integration or automation: 43%
- Expand use of contractors doing task-specialized work: 42%
- Modify locations where organization operates: 38%
- Expand current workforce due to technological integration or automation: 35%

Share of task hours performed by humans and machine – 2020 versus 2025

- Information & data processing
  - 2020: 55% Human, 43% Machine
  - 2025: 42% Human, 58% Machine
- Looking for/receiving information
  - 2020: 42% Human, 58% Machine
  - 2025: 38% Human, 62% Machine
- Performing complex/technical activities
  - 2020: 55% Human, 45% Machine
  - 2025: 43% Human, 57% Machine
- Administering
  - 2020: 55% Human, 45% Machine
  - 2025: 42% Human, 58% Machine
- Identifying/evaluating information
  - 2020: 55% Human, 45% Machine
  - 2025: 43% Human, 57% Machine
- All tasks
  - 2020: 55% Human, 45% Machine
  - 2025: 42% Human, 58% Machine
- Physical/manual work
  - 2020: 55% Human, 45% Machine
  - 2025: 43% Human, 57% Machine
- Communicating/interacting
  - 2020: 55% Human, 45% Machine
  - 2025: 43% Human, 57% Machine
- Reasoning/decision-making
  - 2020: 55% Human, 45% Machine
  - 2025: 43% Human, 57% Machine
- Coordinating/managing/advising
  - 2020: 55% Human, 45% Machine
  - 2025: 43% Human, 57% Machine

Source: World Economic Forum
IT Leaders Must Help Today’s Employees Become Tomorrow’s Effective Workforce

The Challenge: The decrease in roles made redundant by automation is exceeding the growth in roles from emerging professions, according to a 2020 study by the World Economic Forum.

- By 2025, this could result in a net loss of 85 million jobs.
- Reskilling effort will be significant: 50% of workers will need to change an average of 40% of their core skills by 2025.

Top job roles with increasing and decreasing demand across industries

Decreasing demand
1. Data entry clerks
2. Administrative & executive secretaries
3. Accounting, bookkeeping & payroll clerks
4. Accountants & auditors
5. Assembly & factory workers
6. Business service & administration managers
7. Client information & customer service workers
8. General & operations managers
9. Mechanics & machinery repairers
10. Material-recording & stock-keeping clerks
11. Financial analysts
12. Postal-service clerks

Increasing demand
1. Data analyst or scientists
2. AI & machine learning specialists
3. Big data specialists
4. Digital marketing or strategy
5. Process automation specialists
6. Business development professionals
7. Digital transformation specialists
8. Information security analysts
9. Software & application developers
10. Internet of things specialists
11. Project managers
12. Business services & administration managers

Top skills for 2025
1. Analytical thinking & innovation
2. Active learning & learning strategies
3. Complex problem-solving
4. Critical thinking & analysis
5. Creativity, originality & initiative
6. Leadership & social influence
7. Technology use, monitoring & control
8. Technology design & programming
9. Resilience, stress tolerance & flexibility
10. Reasoning, problem-solving & ideation
11. Emotional intelligence
12. Troubleshooting & user experience

Source: World Economic Forum
IT Can Enable a Sustainable Future of Work

Technology is key to Future of Work and must share accountability for its sustainable enablement.

Technology is a chief enabler of Future of Work

Social and governance responsibilities associated with Future of Work

- Provide a robust and agile virtual collaboration platform
- Enable seamless remote and hybrid work by individuals and teams
- Mitigate cyber risk associated with work taking place outside of secured office environments
- Monitor decision quality, productivity and performance impacts of AI-based and automated assistance
- Manage cultural impacts of less face-to-face time of managers, staff and peers
- Plan for and manage reskilling and upskilling for new roles replacing positions eliminated or changed by automation and digitalization

Source: Society for Human Resource Management
Sustainable Data Governance is a Critical IT Responsibility

### IT Must Ensure Socially Responsible, Equitable and Secure Use of Data

**Key responsibilities for data governance**

- **Data privacy protection** – Data is collected, generated, analyzed and disseminated in ways that do not harm people and society.

- **Data security** – Protecting data from harm, internal or external, intentional or unintentional.

- **Data stewardship** – Ensuring management and use of personal data is consistent with the expectations of those who are sharing it, and that data is not used in ways that cause harm to health and safety.

- **Data transparency, equity** – Demonstrating openness in use of personal data; clarifying and potentially increasing the benefits people receive in exchange for sharing their data.

- **Anti-bias** – AI algorithms trained to avoid biased conclusions; data used for training and analysis must itself be unbiased.
AI Ethics are Evolving Daily in Labs and Courts

A 141-point UNESCO recommendation on AI ethics has been adopted by 193 member states

### AI ethics challenges

- Lack of transparency – AI decisions are not always understandable or explainable even by their programmers.
- Questionable neutrality – AI decisions are susceptible to inaccuracies and discriminatory outcomes due to biases.
- Environmental harm – AI’s energy consumption and emissions intensity are greater than other forms of computing. Lack of AI development transparency frustrates ability to make ethical environmental choices.
- Degraded creativity value-chain – Creator integrity and copyrights are being challenged as AI grows capable of producing “art.”
- Negative externalities – AI-enabled platforms’ unregulated use of personal data could accelerate loss of citizen privacy to corporations and governments, damage competition, propagate false information in social media “echo chambers,” degrade the value of workers, and create a net loss of jobs.
- Weaponization of AI superintelligence could destabilize balance of power and enable systems to make decisions that cause harm not intended by their creators or commanders.

### Recommendations to address AI ethics from UNESCO report

- Put in place multi-stakeholder and adaptive governance and collaboration.
- Conduct ethical and privacy impact assessments.
- Adopt government regulatory frameworks or certification systems.
- Continually evaluate training data for bias and programming for bugs.
- Inform people when a decision is made on basis of AI algorithms, and provide a means to correct the decision.
- Protect personal data throughout the AI systems lifecycle.

Sources: Bloomberg; Harms of AI; Daron Acemoglu, MIT; UNESCO

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IT Must Address AI Bias

Documented AI pattern biases have ranged from facial recognition systems to credit-limit setting to racial bias in healthcare risk analysis to job candidate screening – all based on erroneous interpretations of data.

How bias enters AI cycle

- Deployment bias from use in ways and contexts not intended by AI developers
- Confirmation bias for results aligning with existing beliefs
- Error propagation – Biased or flawed ML applications generate inputs for other ML algorithms
- Lack of diversity in AI design teams
- Exclusionary design, model building and testing
- Data sampling and selection bias
- Bias and discrimination embedded in data distributions
- Lack of representative data sets and underrepresentation of marginalized groups
- Lack of adequate cross validation

Ways to minimize AI bias

- Test algorithms in real-life situations
- Establish processes and practices for bias monitoring, detection and correction
- Increase transparency on how the algorithms are being trained and which are being used
- Include a “human-in-the-loop” that creates a continuous feedback loop leading to greater accuracy
- Integrate fairness definitions into the training process.
- Consider rounding out problematic data sets with synthetic data
- Deploy tools created to reduce bias (e.g., IBM’s AI Fairness 360)
IT’s Social and Governance Levers

Social sustainability
- Technology accessibility
- Employee and tech partner Diversity, Equity and Inclusion
- Technology systems design inclusiveness
- Vendor social accountability
- Employee Health and Safety

Governance sustainability
- Governance and Accountability
- Investment and Training
- Data Usage, Privacy, Security
- Business Resiliency
- Enterprise Risk Management
- Economic Risk Mgmt. and Fraud Prevention
- Sustainable Future of Work
- Workforce Reskilling
- Responsible Technology Innovation
- AI Governance

Source: Adapted from Sustainability IT Playbook for Technology Leaders, Niklas Sundberg, Packt, 2022
## Social Impact Model – Goals by Category

Tier 1 goals are first priority and the fundamentals on which Tier 2 and 3 accomplishments are built.

### Social and Economic Inclusion

<table>
<thead>
<tr>
<th>Tier 3</th>
<th>Tier 2</th>
<th>Tier 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclusiveness considered in systems’ origination and early design</td>
<td>Accessibility criteria included in systems design and engineering</td>
<td>Technology vendor ecosystem diversity exceeds industry averages</td>
</tr>
<tr>
<td>Inclusiveness criteria applied to systems design and engineering</td>
<td>Full accessibility of digital products and services</td>
<td>Diversity in IT talent pipeline exceeds industry averages</td>
</tr>
<tr>
<td>User inclusiveness measured and tracked for diverse populations</td>
<td>Robust adoption of assistive technology</td>
<td>Diversity in IT staff exceeds industry and regional averages</td>
</tr>
</tbody>
</table>

### Sourcing Social Accountability

<table>
<thead>
<tr>
<th>Tier 3</th>
<th>Tier 2</th>
<th>Tier 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% of technology vendors and compliant with code/criteria</td>
<td>100% of enterprise vendors and compliant with code/criteria</td>
<td></td>
</tr>
<tr>
<td>Human rights practices code/criteria applied to new technology vendors</td>
<td>Human rights practices code/criteria applied to new enterprise vendors</td>
<td></td>
</tr>
<tr>
<td>Technology vendors assessed for human rights risk and practices</td>
<td>Enterprise vendors assessed for human rights risk and practices</td>
<td></td>
</tr>
</tbody>
</table>

### Health and Safety

- 0 Incidents of IT product/service non-compliance with health and safety policies
- IT products, services assessed for health and safety impacts
- Potential health and safety impacts of IT product and services identified
## Governance Impact Model – Goals by Category

Tier 1 goals are first priority and the fundamentals on which Tier 2 and 3 accomplishments are built.

<table>
<thead>
<tr>
<th>Culture</th>
<th>Data governance</th>
<th>Technology and innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees fully engaged in sustainability mission</td>
<td>Adequate pipeline for sustainability-related skills</td>
<td>Full compliance with data security policies</td>
</tr>
<tr>
<td>Transparent sustainability mission, goals, initiatives, and progress</td>
<td>Mentoring, coaching in place for sustainability teams</td>
<td>Full compliance with data privacy policies</td>
</tr>
<tr>
<td>Sustainability governance and accountability in place</td>
<td>Sustainability training in place</td>
<td>Full compliance with data usage policies</td>
</tr>
</tbody>
</table>

### Risk management

| Full compliance with sustainability-related risk management policies | Essential workers enabled to work remotely/alternate sites | Full compliance with financial fraud and corruption policies |
| Environmental, social and economic risks evaluated regularly | Resiliency requirements, oversight in place for key vendors/providers | Financial reviews are transparent, redundant, frequent |
| Enterprise risk management incorporates ESG risks | Business continuity plans in place and up to date | Financial fraud and corruption safeguards in place |

### Data governance

<table>
<thead>
<tr>
<th>Tier 3</th>
<th>Tier 2</th>
<th>Tier 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full compliance with data security policies</td>
<td>Root-cause investigations for data security incidents</td>
<td>Data security policies regularly reviewed and assessed</td>
</tr>
<tr>
<td>Personal data mgmt. consistent with expectations of owners</td>
<td>Data owners have control and visibility over how their data is used</td>
<td>Data lifecycle management is conducted sustainably</td>
</tr>
</tbody>
</table>

### Technology and innovation

<table>
<thead>
<tr>
<th>Tier 3</th>
<th>Tier 2</th>
<th>Tier 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full compliance with responsible technology innovation policies</td>
<td>Innovative technology projects assessed for ESG impacts</td>
<td>Technology innovations are developed and implemented sustainably</td>
</tr>
<tr>
<td>Full compliance with ethical AI policies</td>
<td>AI management balances transparency, privacy and security</td>
<td>AI products and services are developed and implemented sustainably</td>
</tr>
<tr>
<td>Workers displaced by automation are reskilled/ upskilled for new roles</td>
<td>Automation impacts routinely assessed</td>
<td>Future of Work sustainability strategy in place</td>
</tr>
</tbody>
</table>
## Social and Governance Sustainability Standards

Social 1 standards are top priority and core IT responsibilities, and typically addressed before Tiers 2 and 3.

<table>
<thead>
<tr>
<th>TIER 1 (top priority)</th>
<th>TIER 2</th>
<th>TIER 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social Standards</strong></td>
<td><strong>Governance Standards</strong></td>
<td><strong>Social Standards</strong></td>
</tr>
<tr>
<td>• IT products and services with potential for negative health impacts</td>
<td>• IT and enterprise sustainability mission, core values, and communication approach</td>
<td>• IT products and services with potential for negative health impacts</td>
</tr>
<tr>
<td>• Percentage relevant IT products and services assessed for health and safety impacts</td>
<td>• ESG governance approach</td>
<td></td>
</tr>
<tr>
<td>• Accommodations and approach to ensure accessibility of digital products and services</td>
<td>• Accountability for sustainability reporting (i.e., completeness, accuracy, timeliness)</td>
<td>• Percentage relevant IT products and services assessed for health and safety impacts</td>
</tr>
<tr>
<td>• Accessibility criteria and application</td>
<td>• Frequency of data security policy/procedure review and update</td>
<td>• Accommodations and approach to ensure accessibility of digital products and services</td>
</tr>
<tr>
<td>• Extent of adoption of assistive technology</td>
<td>• Incidents of noncompliance with data security policies/procedures, over time period</td>
<td>• Accessibility criteria and application</td>
</tr>
<tr>
<td>• Approach to increase diversity in workforce and talent pipeline</td>
<td>• Approach to provide constituents with greater control of personal data</td>
<td>• Extent of adoption of assistive technology</td>
</tr>
<tr>
<td>• Representation of diverse groups in IT staff</td>
<td>• Approach to ensure personal data management consistent with constituent expectations</td>
<td>• Approach to increase diversity in workforce and talent pipeline</td>
</tr>
<tr>
<td>• Inclusiveness categories, criteria and approach applied to IT systems design and engineering</td>
<td>• Substantiated complaints of data misuse or noncompliance with constituents' data instructions</td>
<td>• Representation of diverse groups in IT staff</td>
</tr>
<tr>
<td>• Approach to hold IT vendors socially accountable</td>
<td>• Number, percentage of constituents impacted by data exposure or loss, over time period</td>
<td>• Inclusiveness categories, criteria and approach applied to IT systems design and engineering</td>
</tr>
<tr>
<td>• Approach to diversify partner ecosystem</td>
<td>• Approach to assess and minimize environmental and economic risks to enterprise systems and service continuity</td>
<td>• Approach to hold IT vendors socially accountable</td>
</tr>
<tr>
<td>• Percentage of diverse technology vendors/service providers, and percentage of total spend</td>
<td>• Resiliency requirements, assessments and oversight of key vendors</td>
<td>• Approach to diversify partner ecosystem</td>
</tr>
<tr>
<td>• Social sustainability criteria for IT vendors</td>
<td>• Incidents resulting in business interruption/downtime, and average and cumulative duration, and constituents affected over time</td>
<td>• Percentage of diverse technology vendors/service providers, and percentage of total spend</td>
</tr>
<tr>
<td>• Approach to assess, monitor and hold accountable IT vendors and supply chain partners for social requirements compliance</td>
<td>• Percentage essential workers enabled to work remotely or from alternative/back-up locations</td>
<td>• Social sustainability criteria for IT vendors</td>
</tr>
<tr>
<td>• Percentage new and existing IT vendors compliant with social sustainability requirements</td>
<td>• Approach for funding IT and enterprise ESG initiatives</td>
<td>• Approach to assess, monitor and hold accountable IT vendors and supply chain partners for social requirements compliance</td>
</tr>
<tr>
<td>• Approach to assess and address corruption risk in IT vendors and supply chain partners</td>
<td>• ESG-specific funding as percentage of relevant budgets</td>
<td>• Percentage new and existing IT vendors compliant with social sustainability requirements</td>
</tr>
<tr>
<td>• Approach to address digital divide in underserved communities</td>
<td>• Sustainability as a factor in setting and approving technology budgets</td>
<td>• Approach to assess and address corruption risk in IT vendors and supply chain partners</td>
</tr>
</tbody>
</table>

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How to Use the Standards
Sustainability Standards are Topics Against Which Improvement is Targeted, Measured, and Reported

They provide IT leaders a uniform foundation on which to build their action plans

Examples of IT standards topics

Environment
- Technology infrastructure energy consumption (kWh, % renewable)
- Lifecycle energy consumption of IT products and services
- Technology infrastructure emissions
- Lifecycle emissions of IT products and services
- Device and hardware lifecycle circularity
- Percentage IT devices reused/refurbished or repurposed
- Refresh cycle of IT devices
- Virtual meeting enablement
- Eco-friendly business travel
- Paperless enterprise enablement
- Water consumption and discharge
- Sourcing environmental sustainability impact assessment
- Eligible tech meeting certification criteria
- IT procurement process environmental impact assessment

Social
- Health and safety impacts of IT products and services
- Technology systems user-accessibility
- Technology design inclusiveness
- IT workforce diversity, equity and inclusion
- Vendor ecosystem diversity
- Digital community engagement/digital divide reduction
- Technology vendor human-rights requirements, assessment and accountability
- Supply-chain human rights requirements, assessment and accountability

Governance
- Sustainability governance and accountability
- Sustainability funding and incentives
- Sustainability training, coaching and talent pipeline
- Environmentally, socially and economically -responsible technology innovation
- Future-of work-strategy sustainability enablement
- Reskilling automation-displaced workers
- Governance of data usage, security, and privacy
- Business continuity/resilience strategy and planning for enterprise and value-chain partners
- Enterprise risk management incorporating ESG risks
- Financial fraud and corruption safeguards
- AI governance (transparency, privacy, security, ethics, environmental impact)
Nested within topics are the actual metrics IT should assess

Each metric has a unit of measure (e.g., kWh, %), suggested metric categorization (e.g., by location, per end user) and a unique identification code.
SIT Sustainability.org standards

The first E indicates Environmental

F for Function (IT) or E for Enterprise
the two tiers to which the standards can apply

The numeric value indicates a group or “family” designation (e.g., emissions or risk management)
Code Breakdown – Social and Governance Standards

SIT
Sustainability.org standards

S or G for Social or Governance

400
The numeric value indicates a group or “family” designation (e.g., Culture or Risk Management)
Prioritize Standards That Have Highest “Materiality” – Importance to IT/Business Stakeholders and Potential Business Impact

Further refine priorities based on standards in which IT can have a major, visible and rapid impact.
# Use Standard Topics and Metrics in Setting Targets and Sustainability Improvement Strategy

<table>
<thead>
<tr>
<th>Goal</th>
<th>Combat climate change via energy/emissions reductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prioritized IT Standards Topics</td>
<td>Data center energy consumption and emissions (SIT EF 111 and EF 211)</td>
</tr>
</tbody>
</table>

## General Steps

<table>
<thead>
<tr>
<th>Metrics, Challenges and actions</th>
<th>Set targets based on industry benchmarks</th>
<th>Identify hurdles and pain points</th>
<th>Identify required capabilities and step-changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline current state</td>
<td>8.5 kWh per end user</td>
<td>Limited energy management and tracking</td>
<td>Energy management and control over sources</td>
</tr>
<tr>
<td>34 kWh all locations (SIT EF 110-1.a)</td>
<td>0.8 mts GHG emissions</td>
<td>C-suite reluctance to move data to hosted cloud</td>
<td>Full migration of data servers to hosted environments</td>
</tr>
<tr>
<td>2.3 mts GHG emissions all locations (EF 211-1)</td>
<td>85% renewable energy sources by 2025 in EU; 60% in North America</td>
<td>Lack of sustainability requirements in current data hosting contracts</td>
<td>Renew and replace host contracts with sustainability requirements</td>
</tr>
<tr>
<td>43% renewable energy sources EU location; 28% North American locations (SIT EF 110-1.b)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80% of energy sources controlled (SIT EF 140)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Jumpstart Your Journey Today

For more information and guidance, contact us at standards@sustainableIT.org or visit sustainableIT.org/standards
Our mission is to unite the world’s largest community of technology and sustainability leaders to define sustainable transformation programs, author best practices and frameworks, set standards and certifications for governance, provide education and training, and raise awareness for IT-centric ESG programs that make their organizations and the world sustainable for generations to come.

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