Sustainable Technology: An Urgent Need

Technology both improves and harms environmental sustainability. It's a double edged sword. While emerging technologies such as AI, IoT, AR/VR and others are being used to help achieve sustainability goals, these technologies when put into mainstream adoption will leave a hefty environmental footprint.

What's Inside

01 The Urgent Need for Sustainable Technology
02 A Framework for Sustainable Technology in Datacenters
03 Implementing our Sustainable Technology Framework
04 The Five-Level Enterprise Roadmap

Appendix
Data Centers will become the Oil Fields of the Future

Data centers will soon be the largest contributors to emissions

- **12x** the amount of CO2 emitted today*
- **3x** the amount of water consumed today
- **17x** the amount of water consumed today
- **17%** of E-waste generated is recycled. The remainder resides in landfills in developing nations.

Data centers will be huge consumers of water

Data centers will be large contributors to landfills

If we continue on our current trajectory data centers will leave a huge footprint on our planet.

---

2. https://theshiftproject.org/
* Data calculated by Lab45 using power consumption data projections till 2030
The Urgent Need for Sustainable Technology

Beyond Data Centers - The Impact of key ICT components

It’s projected that Information and Communication Technologies (ICT) components will emit 692x the amount of CO2 as they do today. ICT components are used in IoT devices, smartphones, PCs, and other electronics.

**IoT devices:** Projections indicate that the number of IoT devices will reach 200 billion by 2050. More IoT devices also result in greater storage and computing needs, contributing to the increase.

**Smartphones & PCs:** CO2 emissions and electricity consumption are expected to increase 138% and 120%, respectively, by 2050. It’s projected that by 2050 there will be 10.75 billion active smartphones*.

Beyond electricity consumption and CO2 emissions, ICT components also generate large amounts of E-waste. The majority of E-waste is stored in landfills.

---

1. [https://www.statista.com/](https://www.statista.com/)
2. [https://theshiftproject.org/](https://theshiftproject.org/)

* Data calculated by Lab45 using power consumption data projections till 2030
A Framework for Sustainable Technology in Datacenters

Our Approach to Sustainable Technology

In order to address the need for technological sustainability, we developed a framework to understand the IT lifecycle. This framework consists of a stack of building blocks. Most organizations structure their IT systems along the lines of this model.

Sustainable Technology framework

The Framework is divided into four high-level functions (shown in blue boxes) and six sub-functions (light-grey boxes).

Our Sustainable Technology Framework is designed to facilitate a comprehensive and structured implementation of a sustainability strategy. Traditional IT stacks are repurposed to achieve sustainability objectives. The Framework is divided into four high-level functions (shown in blue boxes) and six sub-functions (light-grey boxes).

In the drawing, the blocks below the line have a first order effect on sustainability metrics since they represent the physical parts of IT. The blocks above the line have a second order but equally important impact since the decisions made in those blocks flow down to the bottom blocks.

As the graphic to the right shows, using an example initiative of app portfolio rationalization, the three layers on the top have indirect impact on sustainability and the three below have direct impact.

The strategy of rationalizing application portfolio will reduce redundancy in IT Dev & Ops

Reduced redundancy will streamline IT infrastructure and supporting infrastructure

Efficient IT design & expenditure will result in less environmental impact (Electricity, Water, Co2).

Efficient IT infrastructure will result in optimization of asset lifecycle
Implementing our Sustainable Technology Framework

Stack-level insights

As organizations move forward with sustainable strategies, we outline a few high level insights that will drive actions at each level of the stack.

<table>
<thead>
<tr>
<th>IT Strategy</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Application</td>
<td>• CTO Org directly controls application architecture modernization</td>
</tr>
<tr>
<td></td>
<td>• Rationalization of Application portfolio tradeoffs with Business objectives</td>
</tr>
<tr>
<td>Sustainable Coding</td>
<td>• The choice of programming language has more impact than the quality of the code</td>
</tr>
<tr>
<td></td>
<td>• Increased automation of code development and deployment</td>
</tr>
<tr>
<td>Sustainable Data</td>
<td>• Data policies aligned with industry and regulatory requirements</td>
</tr>
<tr>
<td></td>
<td>• Data privacy, security and scalability in data lifecycle management</td>
</tr>
</tbody>
</table>

Measuring progress: key metrics

As organizations proceed with their sustainability initiatives, it is critical to measure the impact of their actions. Metrics may be derived from recommendations from firms like Sustainable IT. They may also aligned with broader GRI and SASB sustainability standards. While some are easy to measure, others will need processes, tools and technology for accurate measurement.

Metric achievement can be benchmarked against peer firms while new goals and milestones are established to guide a firm’s sustainability journey.

Key metrics may include:

- % of electricity used
- % portfolio on renewable
- Total volume of E-waste
- % of data compressed
- Number of IT sustainability measures reported in annual reports

1. [https://www.sustainableit.org/](https://www.sustainableit.org/)
The Five-Level Enterprise Roadmap

For organizations building sustainable technology systems, we recommend they follow the Sustainable Technology Maturity model as a roadmap. They are encouraged to continually work to iterate their processes along its guidelines.

The 5-level Sustainability Maturity model is a high-level guide for organizations evaluate their current level of sustainability maturity. A more detailed study can be conducted to identify specific actions, goals and metrics that can be implemented at different levels of the model or the IT stack.

The graphic on the right details how to implement the 5-Level Sustainability Maturity model, while another graphic on the next page comprehensively details the 5-level model.
Sustainable Technology Maturity Model

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1</strong></td>
<td>The organization has no sustainability objectives, goals, or strategies in place. The organization is taking sustainability action on an ad-hoc and as-needed basis.</td>
</tr>
<tr>
<td><strong>Level 2</strong></td>
<td>The organization has begun to understand the various requirements and standards. Basic documentation is in-place and teams for application or infrastructure optimization have been formed.</td>
</tr>
<tr>
<td><strong>Level 3</strong></td>
<td>Organizations begin to follow a more-integrated approach. They begin to manage improvement opportunities, individually and as part of a portfolio. The sustainability goals of the organization align with those of the employees.</td>
</tr>
<tr>
<td><strong>Level 4</strong></td>
<td>Sustainability strategy is integrated into the overall firm strategy as a transformation program. It’s included in firm culture, operations, comms, and more. The firm begins to identify opportunities for greater impact.</td>
</tr>
<tr>
<td><strong>Level 5</strong></td>
<td>The organization is continuously evolving and acting strategically, solving for gaps and further implementing sustainability. It becomes an industry thought leader. It invests and establishes partnerships to create a greater collective impact through forums, R&amp;D, and innovation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coding</td>
<td>No KPIs for Sustainable IT goals and objectives.</td>
<td>Understanding developer KPIs for Sustainable IT goals and objectives.</td>
<td>Aligning developer KPIs for Sustainable IT goals and objectives.</td>
<td>Implementation of Sustainable IT goals and objectives.</td>
<td>Focus on addressing balance among accuracy, speed and cost.</td>
</tr>
<tr>
<td>Data</td>
<td>No processes, workflows lifecycle management of data.</td>
<td>Identification of data certifications, lifecycle management model and intelligent workflows for data handling.</td>
<td>Alignment of data certifications, lifecycle management model and intelligent workflows for data handling with company’s sustainable strategy.</td>
<td>Implementation of data certifications, lifecycle management model and intelligent workflows for data handling.</td>
<td>Optimization of storage devices, locations and data transmissions.</td>
</tr>
<tr>
<td>Data Centres</td>
<td>No strategy for less data centre impact.</td>
<td>Defining efficient strategy and design for data centres.</td>
<td>Implementing efficient strategy and design for data centres.</td>
<td>Implementing cloud-native applications.</td>
<td>Optimization of data centre resources, wastage from cooling and production.</td>
</tr>
</tbody>
</table>
Lab45 is a visionary space developing ground-breaking solutions to foster and accelerate ideation throughout Wipro.

At Lab45, engineers, research analysts, and scientists come together to infuse creative ways of incubating solutions for customers that will transform the future. It is a space filled with ambition at the vanguard of far-reaching research across cutting-edge technologies.

Established with the Silicon Valley culture of free-flowing creativity, Lab45’s goal is to make bold ideas a reality and to invent the future of enterprise. So come, collaborate, and see what happens when ideas are left unbound.

Disclaimer: This report was created using various sources such as expert interviews, internet reports, website research and media releases. This information is collated in good faith and used on an as is and as available basis by us. Our reports should only be construed as guidance. We assert that any business or investment decisions should not be based purely on the information presented in our reports, information included in the reports. We do not guarantee or take responsibility for the accuracy, completeness, reliability and usefulness of any information. The opinion expressed in the reports is our current opinion based on the prevailing market trends and is subject to change.
Ambitions Realized.

Wipro Limited (NYSE: WIT, BSE: 507685, NSE: WIPRO) is a leading technology services and consulting company focused on building innovative solutions that address clients’ most complex digital transformation needs. Leveraging our holistic portfolio of capabilities in consulting, design, engineering, and operations, we help clients realize their boldest ambitions and build future-ready, sustainable businesses. With over 250,000 employees and business partners across 66 countries, we deliver, on the promise of helping our customers, colleagues, and communities thrive in an ever-changing world.

Wipro Limited
Doddakannelli
Sarjapur Road
Bengaluru – 560 035
India

Tel: +91 (80) 2844 0011
wipro.com