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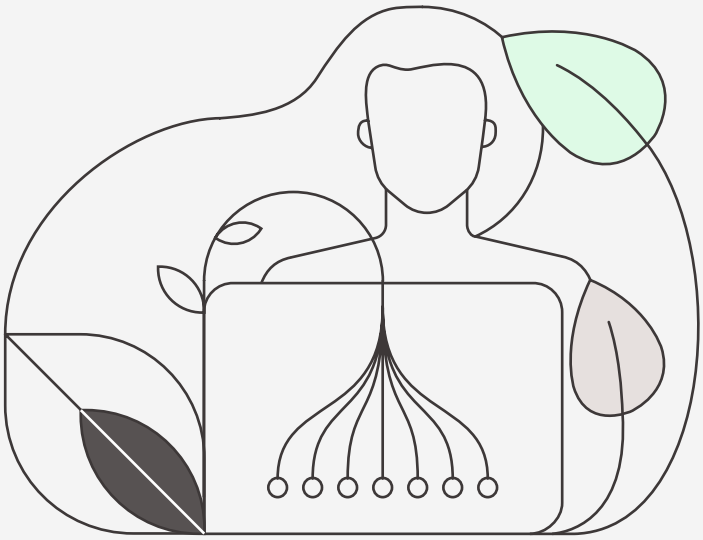
IBM Design for sustainability

and design heuristics for sustainability

IBM



Introduction

IBM designers are committed to making progress to improve the human condition, society, and the environment.

As designers we define sustainability as bringing prosperity to all people, communities, and the planet. Sustainability includes reducing our impact on limited resources. To achieve this vision of sustainability, we practice **IBM Design for sustainability** and use it as a framework for how we satisfy the needs of the present without compromising the future. This is how we ensure that IBM's designers and their teams create more sustainable value.

Design for sustainability requires a diverse and empowered team. As a team, we make sure that the user, community, and social value of the experience outweighs any negative environmental and social impact. Understanding these impacts and their effect on the delivered experience is especially critical when AI is included. An efficient and inclusive front end has only so much impact on sustainability unless equal attention is given to the development and operations of the experience.

The EU Science Hub's Sustainable Product Policy estimates that "over 80% of all product-related environmental impacts are determined during the design phase." Design has an immense opportunity to increase positive impacts while reducing harm. When we design digital experiences, our goal is to optimize performance, speed, and responsiveness for both the user and the system.

> "Good design is good business. Good design is also more sustainable."

Chris Hammond
Design Principal
IBM Sustainability Software

Our guiding principles are:

Enabled by diverse empowered teams.

Inclusive for all living things.

Easy to learn and to use for all people.

Efficient for users and power consumption.

IBM Design practices for sustainability

Many IBM Design practices improve sustainablility.

Enterprise Design Thinking and sustainability

- Enterprise Design Thinking (EDT) has always emphasized the need for diverse teams to deliver intuitive, efficient, and inclusive solutions.
  - EDT activities include sustainability considersations to deliver human-centered outcomes without compriomising the needs of future generations.
  - EDT activities consider enviornmental and social sustainability impacts.

IBM Design Research and insights

- Great experiences are always founded on users and contextual insights.
- Context must include diverse representation of people, communities, and the planet.
- Well-researched experiences are intuitive, use fewer resources, and reduce design errors that lead to costly post-production rework.
- Continuous insight collection informs priorities and drives design efficiency by eliminating work with no market fit.
- Usability studies are conducted regularly to improve user efficiency and effectiveness.

IBM Design Language and Carbon Design System

- The IBM Design Language guides designers to consider usefulness, remove anything unnecessary, and positively advance the world.
- IBM's design system, the Carbon Design System, is built on the IBM Design Language. The design system contributes to sustainability through:
  - Shared common components and reusable assets that are:
    - Based on usability best practices.
    - Built-in accessibilty to ensure inclusion.
  - Consolidation and reduction of code creating more efficient libraries and packages.
  - Reduced time to design and build experiences.
  - An open source design system to expand access and enable contribution from diverse users.

Inclusive design

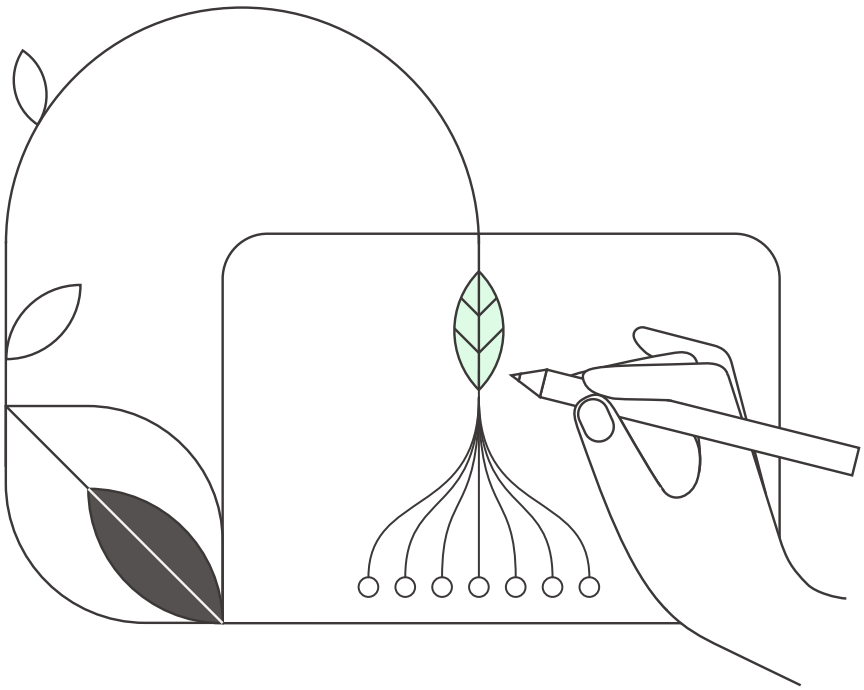
- Our experiences go beyond being human-centered to encompass good stewardship of our planet's limited resources for all living things, now and in the future.
- IBM believes that our experiences must include everyone, across the broad spectrum of race, color, religion, gender, gender identity or expression, sexual orientation, national origin, ability, political affiliation, age, and veteran status. Inclusion increases user satisfaction across a wider population.
- IBM is committed to Racial Equity in Design and openly shares our expertise in nurturing inclusive design culture.
- Accessibility provides equal access and ease of use for all users, regardless of their abilities. Accessible design translates into increased performance with fewer required resources.

IBM Design for AI

- Technology must always be in service of improving the human condition without causing harm. The needs of the living always outweigh technology. Our designed experiences can impact millions.
- IBM considers the generated user value against the environmental impact to train and maintain the systems.
- Creates value in the form of augmented human capabilities that improve over time.
- We enable trustworthy outcomes, through the application of our AI design ethics that consider accountability, value alignment, explainability, fairness, and user data rights.

IBM Design heuristics for sustainability

- IBM uses heuristics to evaluate overall product usability and desirability, improve inclusive and accessible design practices, and reduce the size of the design, the bits and bytes required to deliver the experience.
- As part of IBM's Design & User Experience (D&UX) reviews, IBM created sustainable design heuristics to help teams evaluate experiences against sustainability best practices, including optimizing performance, speed, and responsiveness.
  - IBM considers design size, bits, and bytes required to deliver the experience. Larger images and files increase size and impact energy consumption and associated emissions. Longer load times decrease user satisfaction. Reducing the size of our design is a effective change that, cumulatively, can positively impact data usage and the environment.
  - The heuristics include considerations for sustainability across user experience, visual design, content design, inclusion, and performance.



IBM Design culture for sustainability

Education

– IBM provides sustainability training and certification, including Enterprise Design Thinking for sustainability. Education includes core sustainability concepts, practical applications, and facilitator training to help practitioners scale these practices.

– IBM Design is a prominent track in the IBM Accelerate program to provide opportunities to all in design and technology.

Design for sustainability practices and tools

– A more-sustainable future is based on the awareness of our impacts. Fully remote work is challenging to relationships. Fully in-office work imposes a wellness burden on employees and increases greenhouse gas emissions. IBM Design is a hybrid work environment, where collaboration often occurs in person and the focused work of individuals occurs remotely.

– IBM's digital design toolset helps drive remote collaboration, increase efficiency, and reduce environmental impacts.

Diversity, equity, and inclusion

– The Racial Equity in Design initiative is committed to ensuring racial equity is instilled in the design culture inside and outside of IBM by driving change through our interactions, investments, and actions that impact behaviors, policies, and deep-seated assumptions. Career success resources are shared publicly so that other organizations can leverage our assets.

– IBM Accessibility is a market leader. All resources, including the IBM Equal Access Toolkit, are available to help anyone create products that work for everyone.

– The IBM Inclusive Design Guild goals are to effect a culture of inclusivity through systemic change, enable inclusive design through diversification of our tools and processes, and expose stories of diverse lived experiences to create design experiences that are inclusive of everyone and every living thing.

– IBM Design strives to nurture complex problem solvers, creative innovators, and radical collaborators to deliver experiences that exemplify design excellence by considering a diverse and inclusive range of user needs.

IBM Design heuristics for sustainability

Many of these concepts might be familiar. These heuristics help us to view good design practices through a sustainability lens. Most design decisions have sustainability implications. Understanding the downstream impact of our design choices helps to build our sustainability consciousness, resulting in more sustainable designs.

Intended outcomes

– **Reduce resource use.**

  We design and deliver experiences that reduce the use of resources. The fewer computing, storage, and network requirements, the smaller the impact to the environment. This decrease in required resources translates to less energy consumption, fewer greenhouse gas emissions, and less water consumption. Small actions cumulatively deliver positive impacts on sustainability.

– **Create better experiences for everyone.**

  We design and deliver experiences that increase ease of use, task efficiency, system responsiveness, and user satisfaction. Overall, simplified experiences are more efficient and inclusive because the content works for the largest possible number of people.

Familiar examples of design pactices viewed through a sustainability lens

Content design

Use best practices that optimize for accessibility, usability, and search. Information efficiency, concise text, and plain language help users find content and accomplish their tasks quickly.

Inclusive design

Understand the potential range of platforms, devices, and connection speeds. Not all users have equal access to technology. The environment in which your users are operating also differs in terms of noise, lighting, and other factors.

User experience design

Focus on usability to help people achieve their goals efficiently and with satisfaction, and reduce unnecessary page loading in the context of use.

Visual design

Concentrate on key visual assets: video, images, and fonts. These assets significantly affect both page size and overall application size, which impact sustainability.

Design considerations

Content · Inclusion · User experience · Visual

General

- [ ] Simplify the experience to increase task efficiency (C I U)
- [ ] Reuse content and assets when possible (C U)
- [ ] Remove pages and assets that aren't used (C I U V)
- [ ] Guide users to complete their work: (C U)
  - [ ] Optimize user flows to help the user navigate with ease
  - [ ] Optimize search to help users find content with accurate and straightforward results
  - [ ] Optimize clear messaging that helps the user to act
- [ ] Use accessible embedded assistance and online documentation (C I U V)
- [ ] Clearly explain user data policies with a focus on fairness (C I)
- [ ] Use accessibility audit tools to evaluate, understand, and optimize inclusion (C I U V)
- [ ] Use tools to evaluate, understand, and optimize the weight of each page (C I U V)

Color

- [ ] Use accessible color combinations and color contrast (I V)
- [ ] Communicate information in ways that do not rely on color alone (I V)
- [ ] Provide a choice for light or dark mode based on user and system preference (U V)

Teaming

- [ ] Collaborate with engineering to optimize impact to compute, store, and network (C I U V)
- [ ] Collaborate with team to ensure AI social value is greater than negative social and environmental impact (C I U)
- [ ] Collaborate with engineering to estimate the environmental impact of your experience, including AI training and maintenance (C I U)
- [ ] Collaborate with your team to set sustainability targets for your next release (C I U V)

Context

- [ ] Understand the potential range of platforms, devices, and connection speeds, including mobile, cloud, edge, and desktop (I U)
- [ ] Understand different environments and access to technology, such as older devices and less bandwidth (I U)
- [ ] Understand the range of different user backgrounds and abilities (I U)
- [ ] Understand the variety of potential input methods, such as keyboard, touch, and voice (I U)

Image

- [ ] Provide the smallest image with the same visual impact (V)
- [ ] Deliver expression with vector graphics or CSS style when possible (V)
- [ ] Reduce images that are not visible to the user, such as in carousels (V)
- [ ] Include accessible captions for images (C I)
- [ ] Use alternative (alt) text for all nondecorative images (C I)
- [ ] Minimize the number of images and ensure the user value for each image (C I U V)

Video

- [ ] Minimize video length while still conveying the same message (C)
- [ ] Remove auto play (C I)
- [ ] Include preview images for video playback (C I V)
- [ ] Include accessible captions for videos (V)
- [ ] Minimize the number of videos and ensure the user value for each video (C V)

Font

- [ ] Load only the fonts that are needed (V)
- [ ] Minimize the font footprint (V)
- [ ] Use appropriate font sizes (I V)