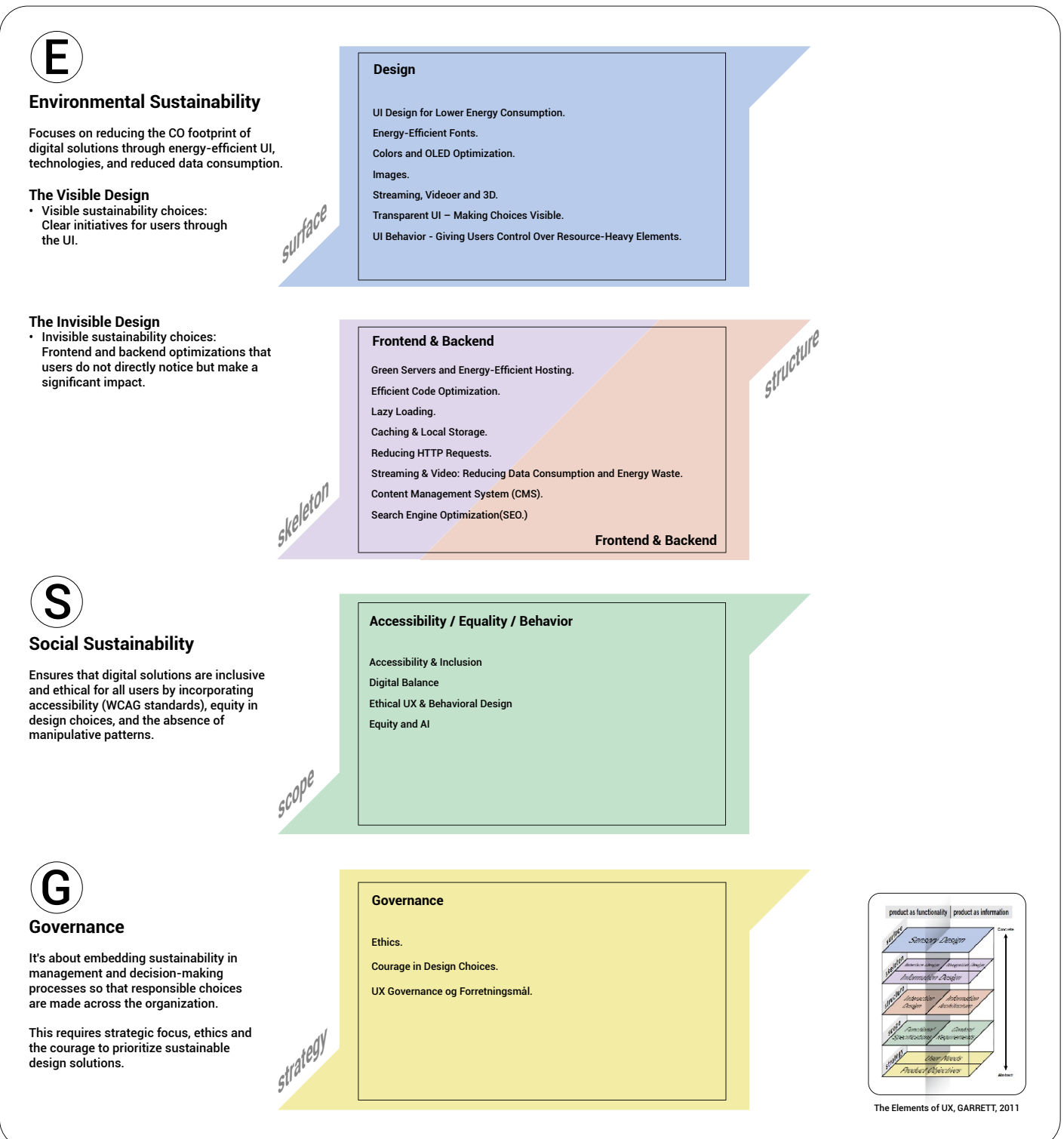


# The Sustainable UX Canvas

The Sustainable UX Canvas is a model based on the ESG goals (Environmental, Social, Governance), providing a structured approach to balancing usability, business objectives, and sustainability. By using the model, digital solutions can be optimized to be environmentally responsible, socially inclusive, and strategically anchored in sustainable principles.

The model is built around three key areas:

1. Environmental Sustainability (E - Environment), incl. visible and invisible sustainability choices
2. Social Sustainability (S - Social)
3. Governance (G - Ethics and Leadership)



## The Visible Design (UI)

The visual and interactive elements that users experience, including images, fonts, videos, and UI components.

### UI Design for Lower Energy Consumption

An efficient UI design can significantly impact energy consumption and CO2 emissions. By keeping the design simple and avoiding heavy, unnecessary elements, we can ensure faster loading times, lower power consumption, and a more sustainable user experience.

#### Recommendations:

- Simplify the UI:  
Remove redundant elements and focus on essential content.
- Identify and delete inactive pages:  
Use analytics tools (e.g., Google Analytics) to find pages with little or no traffic.
- Digital cleanup:  
Regularly remove outdated content that unnecessarily burdens the server.
- Optimize media use:  
Choose images instead of videos when it does not compromise the message.

### Transparent UI – Making Choices Visible

A transparent UI provides users with clear insight into how their digital choices impact the environment. By displaying CO2 emissions for different delivery methods in an online store or showing energy consumption

for various video quality options in a streaming service, users become more aware and empowered to make sustainable decisions.

#### Recommendations:

- Make consequences visible:  
Present concrete data on CO2 emissions, so users can see the difference between options.
  - Example:  
An online store could display at checkout:
    - » Express delivery (1 day) = 2 kg CO2
    - » Standard delivery (3 days) = 1 kg CO2
- When users directly see the climate impact of their choices, they are more likely to make environmentally friendly decisions.
- Continuous evaluation:  
Monitor how users respond to transparency efforts and refine the design accordingly. If few users choose a greener option, highlight the benefits more clearly to encourage sustainable choices.

### Energy-Efficient Fonts.

Fonts play a role in energy efficiency. Web fonts must often be downloaded from external servers, increasing data consumption and potentially slowing load times. System fonts, already installed on users' devices, can reduce resource use and improve the user experience.

#### Recommendations:

- Prioritize system fonts:  
If possible, use system fonts (e.g., Arial, Times New Roman) for faster loading and lower data consumption.

- Use only necessary variations:  
When using web fonts, limit the number of weight and style variations (e.g., bold, italic) to minimize unnecessary downloads.

### Colors and OLED Optimization.

On OLED screens, only active pixels consume power, meaning darker colors use less energy than lighter ones. Implementing Dark Mode or generally using a darker color scheme can conserve battery life and promote a more sustainable design.

#### Recommendations:

- Enable Dark Mode by default:  
Start apps in dark mode, especially on OLED devices, to immediately reduce energy consumption.
- Maintain good contrast:  
Ensure color combinations enhance readability and usability—even in dark mode.

### Images

Images often constitute a significant part of digital solutions and can heavily impact both the user's device and server resources if not optimized. Choosing efficient file formats, optimizing resolution, and using techniques such as Lazy Loading can reduce load times and overall CO2 emissions. Additionally, AI-generated images come with an environmental cost that should be factored into decision-making.

#### Recommendations:

- File formats:  
Use WebP or SVG instead of JPEG/PNG for smaller file sizes and faster loading.
- Responsive adaptation:

Serve images in resolutions suited to the user's device to avoid unnecessarily large files.

- **Lazy Loading:**  
Implement Lazy Loading so images load only when they become visible on the screen, saving both data and energy.
- **Sharpness and detail:**  
Consider reducing image detail (e.g., using blurred backgrounds) to decrease file size.
- **AI-generated images:**  
Be mindful of the carbon footprint of AI-generated images—plan their use carefully and optimize them like traditional images.

## Streaming, Videoer and 3D.

Streaming, videos, and 3D elements enhance user experience but also require more data and processing power, increasing energy consumption. Optimizing these elements is crucial for making digital solutions more sustainable for both user devices and server infrastructure.

### Recommendations:

- **Avoid autoplay:** Let users choose when to play a video, reducing unnecessary data use.
- **Use efficient video formats:**  
Opt for AV1 or VP9, which reduce data consumption compared to older formats.
- **Shorter and lower-resolution videos:**  
Keep videos concise and offer lower resolution options to minimize energy impact.
- **Optimize 3D elements:**  
3D graphics require intensive rendering. When possible, use vector graphics or simple animations instead.

## UI Behavior: Giving Users Control Over Resource-Heavy Elements

Not all users want automatic sustainability optimizations. Providing them with the ability to control resource-intensive features prevents forcing green solutions upon them and ensures a flexible user experience.

### Recommendations:

- **Optional media loading:**  
Allow users to decide whether large images or videos should load, reducing data usage and giving them full control.
- **Newsletter opt-out:**  
Automatically unsubscribe users who do not open emails after multiple attempts, reducing unnecessary server load.
- **Sustainable default choices:**  
Set sustainable options—such as pickup locations instead of home delivery—as the default while allowing users to change them.

# The Invisible Design

The Invisible Design (Technical Optimizations): Behind-the-scenes code, server efficiency, and data management that improve performance and reduce energy consumption.

## Green Servers and Energy-Efficient Hosting.

Server choices significantly impact a digital solution's sustainability, as data centers consume vast amounts of energy for both operation and cooling. Choosing hosting providers powered by renewable energy can help reduce a website's carbon footprint..

### Recommendations:

- Choose green hosting:  
Verify your hosting provider via platforms like the Green Web Foundation to ensure renewable energy use.
- Optimize server usage:  
Avoid over-provisioning—unused server capacity results in wasted energy.
- Monitor performance: Track load and power consumption to respond quickly to peak demand and maximize efficiency.

## Efficient Code Optimization.

Unnecessarily large files increase load times and resource consumption. Compressing HTML, CSS, and JavaScript can reduce file sizes and improve performance. Minification removes redundant code, while bundling CSS and JavaScript files minimizes HTTP requests.

### Recommendations:

- Minify files:  
Remove unnecessary code and whitespace in HTML, CSS, and JavaScript to reduce file size.
- Bundle files:  
Combine multiple CSS or JS files into one to reduce the number of HTTP requests.
- Continuous review:  
Regularly audit the codebase to remove inefficiencies and ensure optimal performance.

## Lazy Loading

Lazy Loading ensures that images and videos load only when they become visible to the user, saving data and energy.

### Recommendations:

- Gradual implementation:  
Start with images and expand to videos for maximum efficiency.
- Use placeholder elements:  
Prevent layout shifts by reserving space for images before they load.
- Test performance:  
Measure load times before and after Lazy Loading to validate improvements.

## Caching & Local Storage

Caching stores frequently used data locally, reducing server requests and speeding up load times. Local Storage works similarly but retains data on the user's device for longer, reducing the need for repeated server requests.

### Recommendations:

- Enable browser caching:  
Configure cache headers (e.g., cache-control, expires) to reuse static assets.
- Set expiration dates:  
Ensure cached and locally stored data updates regularly to prevent outdated information.

## Reducing HTTP Requests

Fewer server requests improve site speed and energy efficiency. This can be achieved by bundling files, using CSS sprites for images, and implementing Content Delivery Networks (CDNs).

### Recommendations:

- Bundle CSS and JavaScript:  
Reduce load time by minimizing file requests.
- Use sprites:  
Consolidate icons and small images into a single file to limit server calls.
- Leverage CDNs:  
Deliver static content from servers closer to the user to enhance speed and efficiency.

## Streaming & Video: Reducing Data Consumption and Energy Waste

Videos and animations are data-intensive and energy-consuming. To minimize their environmental impact, Adaptive Bitrate Streaming can adjust quality based on the user's network conditions, Lazy Loading can prevent unnecessary preloading, and energy-efficient formats like AV1 and VP9 can significantly reduce file sizes.

#### Recommendations:

- Adaptive Bitrate Streaming: Automatically adjust video quality based on the user's network conditions.
- Disable autoplay: Let users choose whether to start a video, and remove loop functions where possible.
- Choose energy-efficient formats: Use AV1 or VP9 to reduce file size without significant quality loss.

### Content Management System (CMS)

An updated CMS operates more efficiently and requires fewer resources. Removing unnecessary plugins, cleaning up inactive pages and unused content, and implementing caching can help reduce server load.

#### Recommendations:

- Keep the CMS updated:  
New versions are often more efficient and secure.
- Remove unnecessary plugins:  
Eliminate outdated or redundant plugins that burden the system.
- Use caching wisely:  
Select a caching solution suited to the CMS to avoid unnecessary server requests.

### Search Engine Optimization (SEO)

An efficient search function reduces unnecessary browsing and server load. Clear navigation and precise search results help users find information faster, minimizing time spent clicking through pages.

#### Recommendations:

- Optimize search functionality:  
A well-structured search minimizes the need for

excessive navigation.

- Clear navigation:  
Organize the website so users can quickly locate what they are looking for, reducing unnecessary page views.
- Regular updates:  
Ensure that titles, meta descriptions, and links remain relevant to prevent search engines and users from wasting resources on outdated content.

## Social Sustainability

Social sustainability in UX design is about creating inclusive, ethical, and responsible digital experiences that respect users' rights, well-being, and choices. This includes ensuring accessibility for all, counteracting deceptive design practices, promoting conscious user behavior, and reducing unnecessary digital consumption.

## Accessibility & Inclusion

A socially sustainable digital solution ensures that all users, regardless of abilities or disabilities, can navigate and interact with the system. Accessibility is not just about complying with WCAG standards (Web Content Accessibility Guidelines) but about designing with empathy and understanding for diverse user needs. This includes using high-contrast colors, readable fonts, and navigation options for users with visual or motor impairments. Additionally, software and development tools should support screen readers and alternative input methods.

### Recommendations:

- Leverage WCAG actively: Follow WCAG guidelines for contrast, navigation, and language to ensure accessibility for all users.
- Empathetic design: Consider users' diverse needs from the beginning—test with screen readers, alternative input methods, etc.
- Flexible settings: Allow users to adjust font size and color themes so the solution suits individual preferences.

## Digital Balance

Many digital platforms are designed to keep users engaged for as long as possible through infinite feeds, autoplay videos, and constant notifications. This can lead to excessive digital consumption, unnecessary data use, and energy waste. Consider alternative feed structures that do not rely on endless scrolling and make it easier for users to clean up old content, reducing server load.

### Social Media & Infinite Scroll

Instead of endless scrolling, use a "Load More" button so that data is only loaded when needed. Also, make it easy for users to delete old posts or other irrelevant content.

### Streaming & Autoplay

Let users choose streaming quality, implement a "Ask before playing the next episode" feature, and disable autoplay by default. This helps reduce data consumption and CO2 footprint.

### Recommendations:

- Limit infinite scrolling: Avoid automatically loading content; instead, offer a "Load More" button.
- Introduce user control: Let users decide when videos should start and in what quality.
- Content cleanup: Make it easy to delete outdated data or inactive posts to reduce unnecessary server load.

## Ethical UX & Behavioral Design

UX design influences digital behavior—either posi-

tively or negatively. Ethical design ensures that users have control over their choices without being manipulated or coerced into unwanted actions. Deceptive design tricks users into making undesired choices (e.g., hidden unsubscribe buttons or false urgency), while ethical nudging can be used to guide users toward sustainable choices without limiting their freedom.

### Recommendations:

- Avoid deceptive design: Ensure all buttons and options are clearly visible and provide precise information about the consequences of user actions.
- Use nudging responsibly: For example, set more sustainable options (e.g., delivery to a pickup location) as the default while allowing users to choose alternatives freely.
- Make consequences visible: Inform users about environmental impact or time savings so they can make conscious decisions.

## Equity and AI

When discussing social sustainability in UX, it's essential to create digital solutions that actively counteract inequality and discrimination. Whether related to gender, ethnicity, language background, or physical abilities, design should provide equal opportunities for accessing and using technology. Modern AI solutions play a significant role in many digital products, but without conscious effort, algorithmic bias can reinforce existing inequalities.



## AI Fairness – Making Artificial Intelligence Accessible and Fair

AI can significantly enhance user experiences, but if datasets and algorithms reflect biases or only represent a narrow group of users, some people may be excluded. To promote fairness, AI-driven functions must be intuitive for all users, regardless of their technological literacy, and continuously tested for discriminatory patterns. Additionally, development teams should reflect a diverse user base so that AI systems are trained on varied datasets.

## Gender Neutrality and Equality in UX

Gender bias can be embedded in language, visual elements, and the underlying structure of a digital product. Offering only “male” or “female” options in forms excludes users who do not identify with these categories. A more inclusive design approach includes gender-neutral profiles, clear communication about pronoun choices, and visual materials that equally represent different genders and life situations.

## Cultural Equity – Understanding User Context

Digital solutions are used across different countries and cultures, and design choices can have unintended consequences. Color schemes, symbols, and language may be offensive or confusing in one culture while being perfectly acceptable in another. By testing usability globally and involving cultural experts or local users during development, designers can minimize the risk of excluding or offending certain groups.

## Inclusion – Creating Equal Opportunities for All Users

Inclusive design also means considering technical and physical barriers. Not everyone has access to high-speed internet, and some users rely on older de-

vices. Additionally, some users with disabilities need screen readers, alternative input methods, or specific color schemes. A truly inclusive solution supports a wide range of network speeds, hardware capabilities, and accessibility needs.

### Recommendations:

- **Test for AI bias:**  
Review datasets and algorithms to identify potential discriminatory patterns. Involve external experts or representatives from minority groups in the testing phase.
- **Make AI functions understandable:**  
Design AI-driven features so they can be used by all, including those with low technical literacy. Avoid complex explanations and ensure transparency in results.
- **Offer gender-neutral options:**  
Provide alternatives beyond “male”/“female,” or allow users to opt out of specifying gender. Ensure labels and messages are inclusive.
- **Use diverse language and imagery:**  
Ensure illustrations, icons, and examples represent a broad cross-section of the population. Similarly, avoid stereotypes in language.
- **Cultural adaptation:**  
Test the product across different countries and languages. Be aware that symbols or colors that are harmless in one context may be offensive in another.
- **Inclusive technology:**  
Ensure your solution works on slow networks, older devices, and with assistive tools (e.g., screen readers). This guarantees a usable experience for all users, regardless of their technological situation.

## Governance

# Organizational Responsibility for Sustainable UX Choices

A holistic sustainability strategy must include both environmental and social sustainability. This means creating digital products that are energy-efficient, ethical, and inclusive so that all users—regardless of abilities, background, or social conditions—can have a fair and positive experience. To succeed, clear guidelines and leadership-driven sustainability initiatives are required so that UX designers are not left alone with the responsibility.

### Ethics

Ethics play a central role in governance. Without formal guidelines for both environmental and social aspects of sustainable UX design, solutions may be inconsistent or arbitrary. A project may be strong in visual and technical energy efficiency but fail in areas such as accessibility or data protection.

#### Recommendations:

- Define shared criteria: Develop company-specific guidelines that include both environmental and social sustainability metrics for UX.
- Transparency and ethics: Share ethical guidelines internally so that everyone—from developers to top management—understands and follows principles of social inclusion, data protection, and environmental responsibility.

### Courage in Design Choices

UX designers often face a dilemma between creating an engaging experience and maintaining sustainability, both environmentally and socially. If leadership primarily focuses on user engagement or conversions, efforts like reducing energy and data consumption or adopting a more inclusive design approach may be deprioritized.

#### Recommendations:

- Involve leadership: Ensure top management is engaged in decision-making from the beginning so that green and social considerations are strategically embedded in company objectives.
- Establish decision-making authority: Give UX designers the right and resources to propose and implement both technical and social improvements—such as making dark mode the default setting or ensuring compliance with accessibility standards.

### UX Governance og Forretningsmål

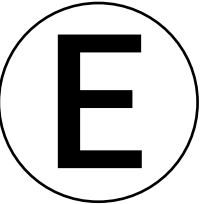
Without UX governance, a company may have “green” initiatives or social focus areas in other departments while still launching a digital product that is neither inclusive nor resource-efficient. Therefore, leadership should integrate UX into both the company's sustainability strategy and its overall business objectives..

#### Recommendations:

- Anchor UX in the strategy: Ensure that UX efforts for both environmental and social sustainability align with product development, marketing, and financial planning.
- Assess holistic value: Sustainable and socially responsible design choices can reduce envi-

ronmental impact, increase accessibility, and improve the company's reputation, ultimately strengthening the bottom line.





## Environmental sustainability

### The Visible UI Design

Design decisions the user sees and interacts with:

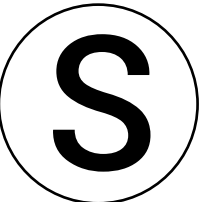
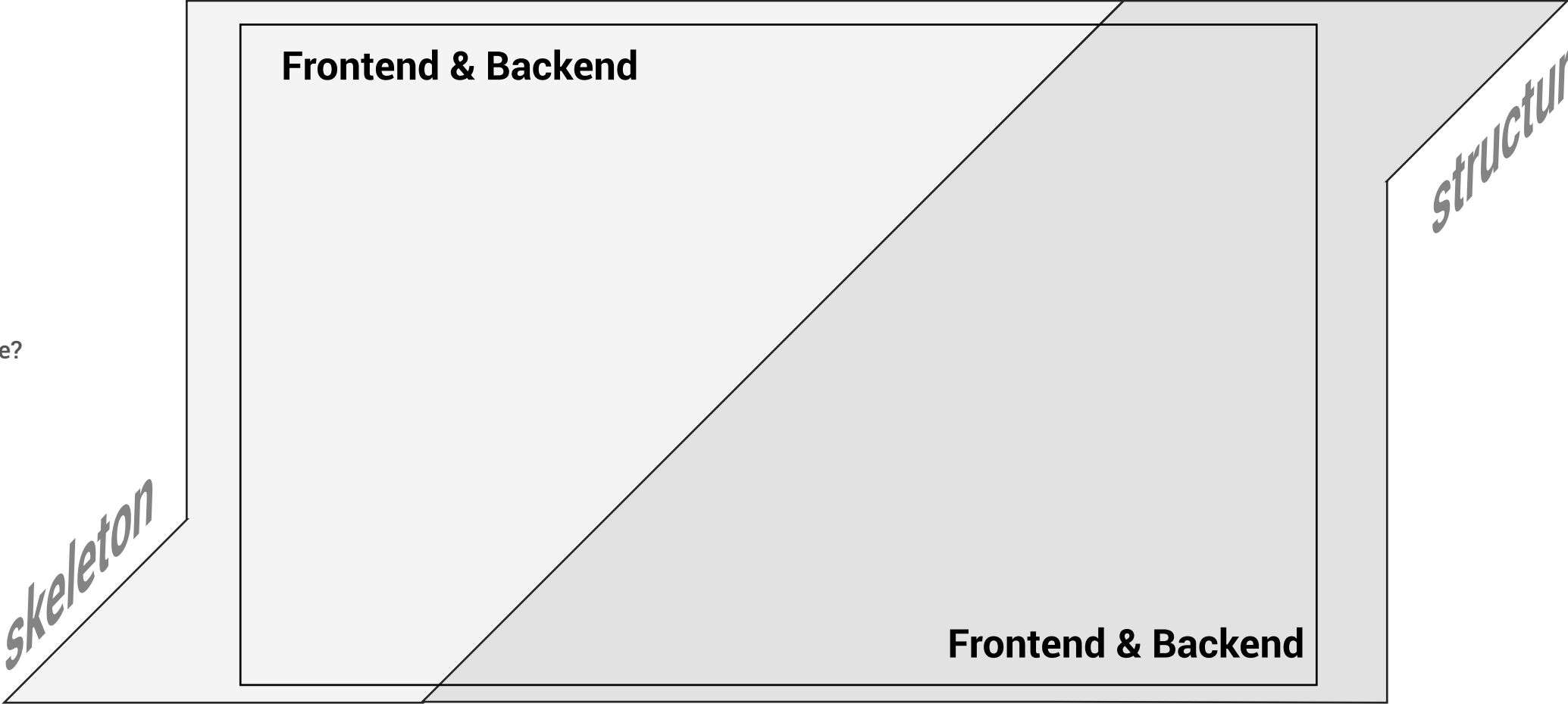
- How do we show that the solution is sustainable?
- Can we simplify or lighten the visual design?
- Do we give users control over heavy elements like images or video?
- Do our visual choices support energy efficiency?
- Are we guiding users toward more sustainable decisions?



### The Invisible Design

Technical decisions behind the user experience:

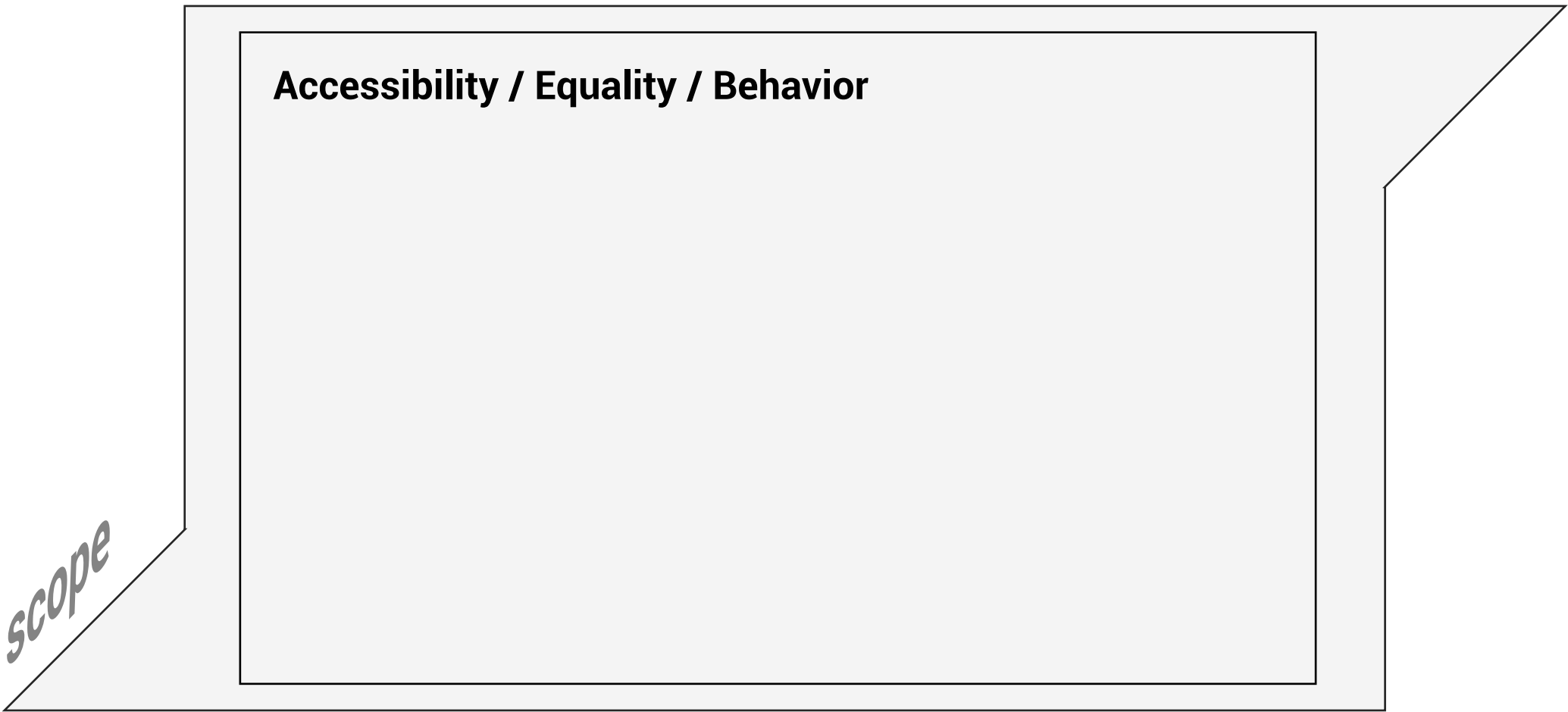
- What are we doing to reduce energy and data consumption?
- Is our solution fast and lightweight to load?
- Is our code and data management optimized for sustainability?
- Have we chosen sustainable servers and technologies?
- Are we caching effectively to reduce data transfers and loading time?



## Social Sustainability

Reflections on inclusion, ethics, and behavior:

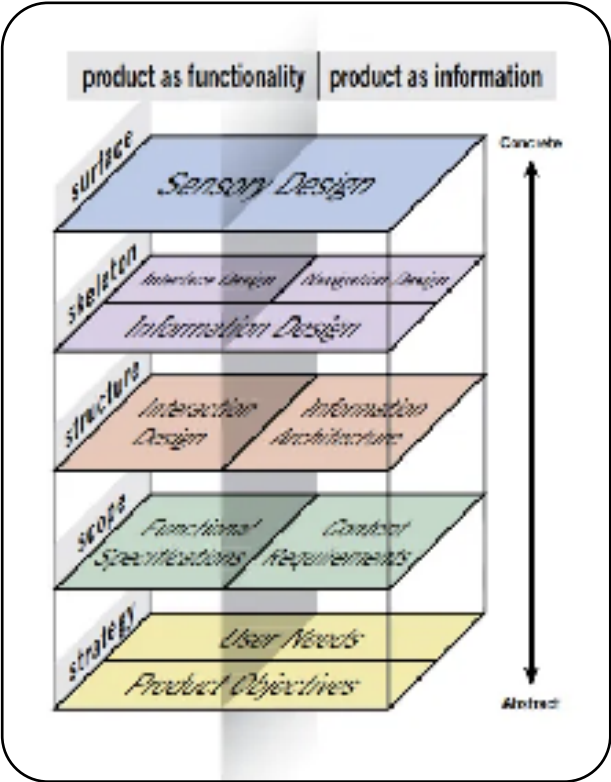
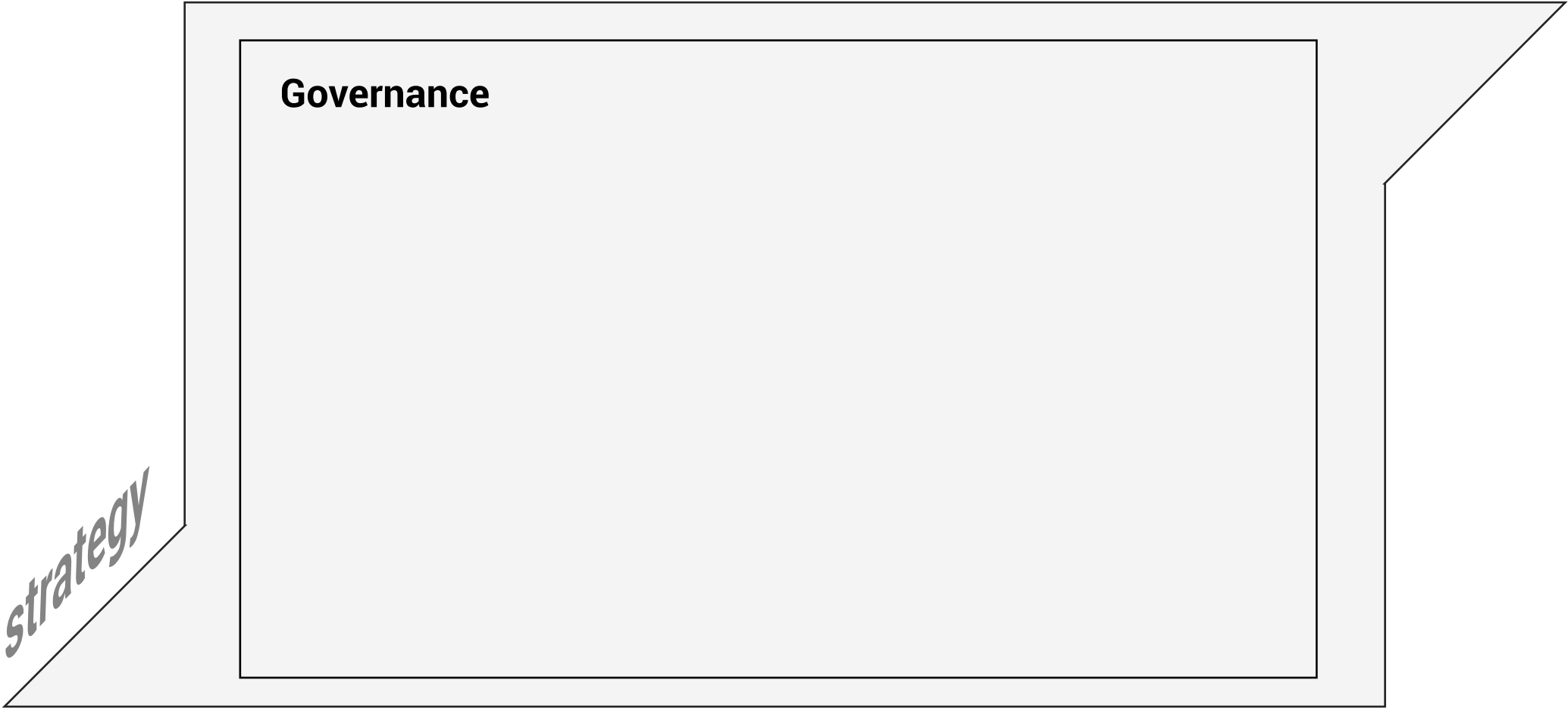
- Is our design inclusive and accessible to all?
- Do we respect the user's time and choices?
- Are we avoiding dark patterns?
- Do we guide users toward conscious decisions?
- Are all users fairly represented?



## Governance

Ethical principles, processes, and strategic anchoring:

- Is there a strategy or process for sustainable UX?
- Are designers supported in making responsible choices?
- Is sustainability embedded throughout the digital solution?
- Do we follow ethical principles—even when it's challenging?



The Elements of UX, GARRETT, 2011