Green Digital Certificate Capstone

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Section 1: Project Idea

IDENTIFY: What do you want to improve? Choose one of the following and elaborate on it in your own context:

 – *digital product (e.g. an existing website or app, digital device)*
 – *digital service (e.g. email, online shopping, social media, digital marketing)*
 – *digital process (e.g. virtual meetings, sharing files, data storage)*
 – *raising awareness of green digital skills*

Max. 100 words

I am developing a **digital product**, a web browser extension that modifies the **digital process** of everyday web browsing. The project is a tool that intercepts and modifies websites before they fully load. It aims to drastically reduce the data downloaded by each user, thereby lowering the carbon footprint of their browsing sessions. It also serves as a tool for **raising awareness**, as it visually demonstrates the amount of files blocked that are typically loaded unnecessarily.

ASSESS: What is the problem (gap) that you have identified with your chosen digital product/service/process/awareness? How isn't it green/sustainable?

Max. 150 words

The primary problem is **digital waste**. Modern websites are **data heavy**, designed to **automatically load** numerous high resolution images and custom web fonts on every page load. This happens whether the user needs or sees that content or not. This constant, automatic data transfer consumes significant energy at the **data center**, across the **network**, and on the **user's device**. This contributes directly to the internet's growing carbon footprint. The average user is unaware of this impact and has no simple, practical tools to control it, making their daily browsing habits inherently unsustainable.

IMPROVE: What is your idea to improve it? *How will you make the internet more sustainable/green? Describe your digital sustainability improvement plan. Consider solutions provided throughout the course.*

Max. 200 words

My idea is a Chrome browser extension that acts as a "**green filter**" for the web. It improves sustainability by implementing solutions discussed in the course:

- **Reduces Data Transfer:** It uses a network-level rule to block all images and font files from downloading.

- **Optimizes User Experience (UX):** Instead of a broken page, a content script injects lightweight placeholders for all blocked images. These placeholders display the image's `alt` text and a "Load" button, allowing the user to download only the images they need "on-demand loading."

- **Optimizes Fonts:** A CSS file is injected to override all website fonts with a single, universal system font, eliminating font file downloads completely.

- **Raises Awareness:** A popup dashboard counts the number of images and fonts blocked, providing tangible, measurable feedback to the user.

A "**whitelist**" feature gives the user full control to disable the extension on specific sites, ensuring usability.

VISION: Connect your idea with a larger vision. Keep it concise and inspirational. Focus on the "why" and the "what" of your environmental initiative goals: *Why have you chosen this project? What is your motivation? What do you think you can change? Why do you want to change it?*

Max. 200 words

My motivation is to make digital sustainability accessible to everyone. Many users feel powerless against the massive energy consumption of the digital world. This project changes that by providing a simple, free tool that puts control back into their hands. My vision is to change the default browsing experience from "**load everything to load what's necessary.**"

This tool can change user behavior by making the invisible, wasteful data transfer visible through its counters. It proves that **sustainability and a functional, fast web experience can co-exist**. If even a small percentage of users adopt this tool, the collective reduction in downloaded data could be significant, demonstrating that individual actions, when amplified by technology, can create a tangible, positive environmental change.

Section 2: Action Plan

OBJECTIVES: List the specific, tangible products and deliverables that the project will deliver.

Max. 200 words

- A functional Manifest V3 **Chrome extension**.

- A declarativeNetRequest rule "rules.json" that blocks network requests for image and font resource types.

- A "background.js" script that programmatically injects scripts and updates the network blocking rule based on the user's whitelist.

- A "content.js" script that scans the Document Object Model (DOM), finds <img> tags, and replaces them with lightweight, interactive placeholders that match the original image's intended dimensions.

- A "style.css" file that overrides all page fonts with a default system font.

- A **popup UI** "popup.html" that displays dashboard metrics, including "Total Images Blocked", "Total Fonts Blocked" and "Estimated CO2 Reduced."

- A functional **settings page** "settings.html" that allows users to view and remove websites from the whitelist.

STAKEHOLDERS: Who will be involved? Who do you need to have onboard? Who will be impacted by the project?

Max. 100 words

- **Developer:** Myself, as the sole project manager and developer.

- **Primary Stakeholders (Users):** Environmentally conscious individuals, students in the Green Digital Certificate program, and any web user looking to reduce their data consumption and browsing carbon footprint.

- **Impacted Stakeholders:** Website owners and advertisers, whose visual content will be hidden by default for users of this extension.

GAPS: What are the gaps between where you are now and where you want to be? *Is your organization ready to make this change? Do you have access to the resources to implement this change? Do you have the technical skills?*

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	Max. 100 words each	*Readiness Score (Low = 1, High = 5)*
Organizational (human desirability?)	As an independent developer, organizational readiness is high (it's just me, and already developed MVP). The gap is not in my readiness, but in **user desirability**. Users may not be willing to trade a **visual web experience** for **sustainability**, which is why the **click-to-load** and **whitelist** features are critical to bridge this gap.	**4**
Functional (viability?)	The project is **highly viable** as it requires no financial resources, only development time. The main gap is a lack of a formal **QA/testing process**. The extension's success depends on it not **breaking** popular websites, which will require extensive testing and feedback from real users.	**4**
Technical (technical feasibility?)	The core MVP is **complete** and **technically feasible**. The skills for Manifest V3, JavaScript, and DOM manipulation have been **demonstrated**, check the appendix. The technical gap is **long-term maintenance** and addressing complex, **JavaScript-heavy** sites like **SPAs** or **canvas-based apps** that may bypass the observer.	**5**

STRATEGIES: What are the strategies that need to be put into place? Describe your overall approach to achieving the project objective(s).

Max. 200 words

- **Develop a Stable MVP:** (Completed) Focus on the 80/20 rule: block the two largest data sources images and fonts first, as this provides the highest carbon reduction for the effort.
- **Use Modern, Efficient APIs:** The strategy relies on Manifest V3 and the declarativeNetRequest API. This is more performant and secure than older methods, reducing the extension's own footprint and ensuring it will be accepted by the Chrome Web Store.
- **Prioritize User Control:** The whitelist is the core usability strategy. The extension must be practical, not just ideological. Users are given an "off-ramp" for any site, which encourages long-term adoption.
- **Programmatic Injection:** The strategy of injecting scripts from the background vs. automatically in the manifest is key to making the whitelist functional for both network blocking and visual modifications.

SUCCESS CRITERIA: What data will you use to determine your project meets its objectives? Make sure they're measurable!

Max. 200 words

- **Technical Success Metric:** The extension successfully blocks images/fonts and injects visible, correctly-sized placeholders on 9/10 of the top 50 most visited websites like Amazon, BBC, Etsy, news sites … etc.
- **Functional Success Metric:** The whitelist feature works with 100% reliability. When a domain is whitelisted, 0 images are blocked "verified via console", and 0 content scripts are injected "verified via service worker logs" on that domain.
- **User Impact Metric:** The dashboard counters "Images Blocked," and "Fonts Blocked" accurately increment as the user browses non-whitelisted sites.
- **Future Adoption Metric:** (when published) Achieve 100 weekly active users within 30 days of launching on the Chrome Web Store.

NEXT STEPS: What is your plan for implementing the changes? How will you bring your strategy to life? Provide a brief action plan in the following time periods:

7 days   *Max. 100 words*

Refine and Test: Perform extensive testing of the current MVP across 20+ different types of websites e-commerce, news, social media, and blogs to find and fix remaining sizing/layout bugs. Refine the visual design of the placeholder and popup UI for a more professional feel.

14 days   *Max. 100 words*

Expand Core Features: Add network-level blocking for <video> and <audio> elements by updating rules.json. Update content.js to create corresponding placeholders for media, further reducing data consumption from auto-playing videos.

30 days   *Max. 100 words*

Prepare for Launch: Write a clear privacy policy and "how-to" guide. Create the necessary store assets icons, promotional screenshots, and description. Package the extension and submit version 1.0 to the Chrome Web Store for review.

60 days   *Max. 100 words*

Launch and Promote: Once approved, publicly launch the extension. Share it on LinkedIn tagging INCO as suggested, Reddit, and other green-tech communities to attract initial users. Begin collecting user feedback and bug reports to plan for version 1.1.

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Appendix

Here is a list of websites with/without using the extension.

1. www.pexels.com

2. www.amazon.com

BBC
Register Sign In

LATEST AUDIO ›

< >

Business Daily
Raising Japan's female leaders

Business Daily
Is the AI boom a bubble?

Business Daily
Is this New York's cost of living election?

Business Daily
Business Daily meets: Harry Stine

Business Daily
Can Canada become an energy superpower?

Business Daily
Afghanistan: Can its private sector step up?

Business Daily
The blurring

Save 17 mins   Save 17 mins   Save 17 mins   Save 17 mins   Save 17 mins   Save 17 mins   Save

WORLD OF BUSINESS ›

Will quantum be bigger than AI?

The highly-complex technology is increasingly being tipped to transform computing.

Will AI mean the end of call centres?

Some commentators predict artificial intelligence is about to replace most customer support jobs.

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4. fonts.google.com

Roboto Variable (3 axes) | Christian Robertson, Paratype, Font Bureau

Everyone has the right to freedom of thought, conscience and religion; this righ

Elms Sans Variable (2 axes) | Amarachi Nwauwa

Everyone has the right to freedom of thought, conscience and religion; this righ

Stack Sans Notch Variable (1 axis) | Koto

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Open Sans Variable (3 axes) | Steve Matteson

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Roboto Variable (3 axes) | Christian Robertson, Paratype, Font Bureau

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Elms Sans Variable (2 axes) | Amarachi Nwauwa

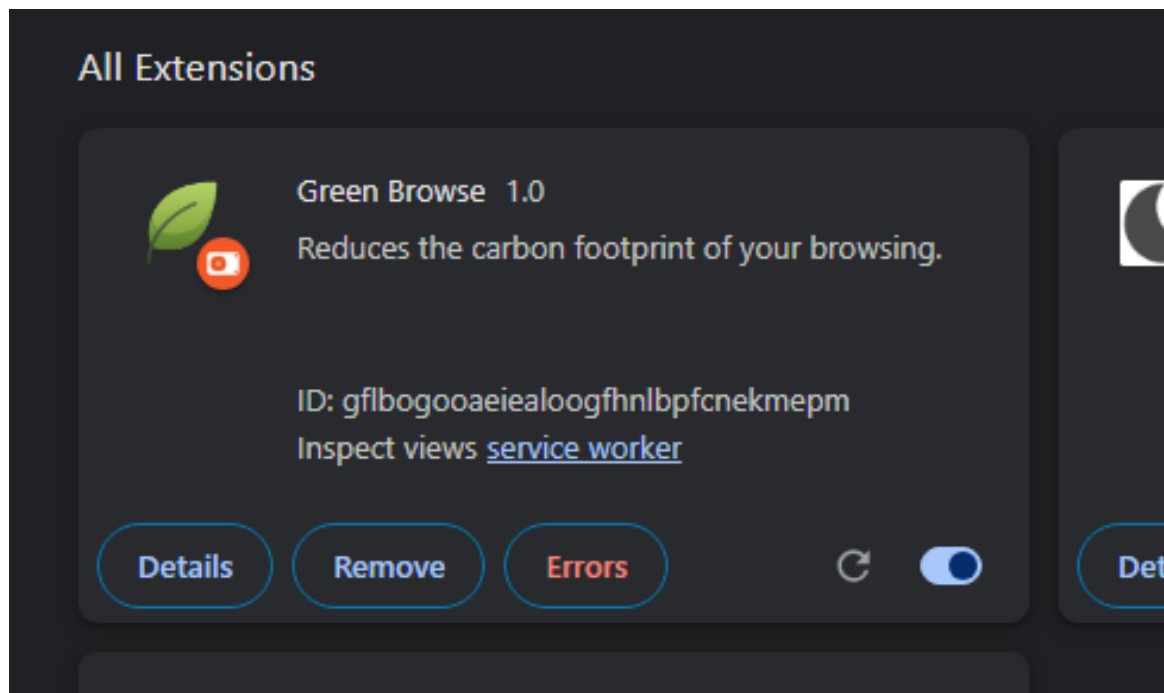Everyone has the right to freedom of thought, conscience and religion;

Stack Sans Notch Variable (1 axis) | Koto

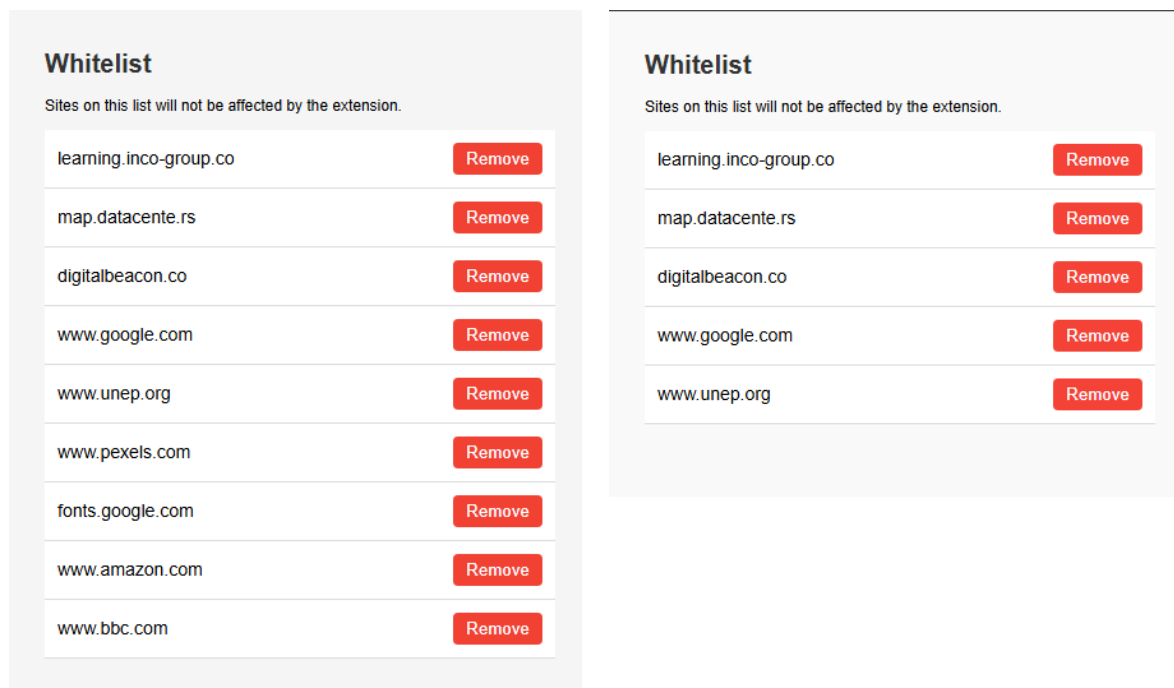Everyone has the right to freedom of thought, conscience and religion; this

Open Sans Variable (3 axes) | Steve Matteson

Everyone has the right to freedom of thought, conscience and religion; this

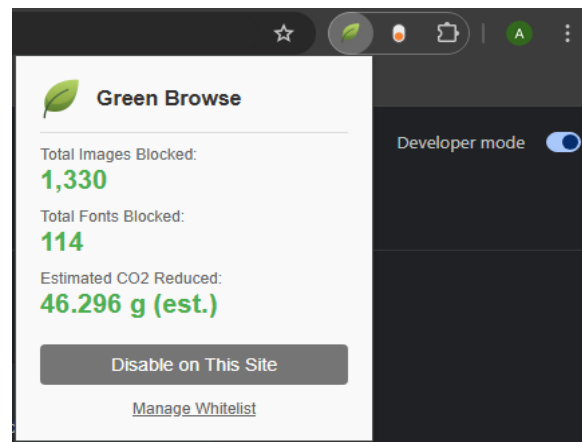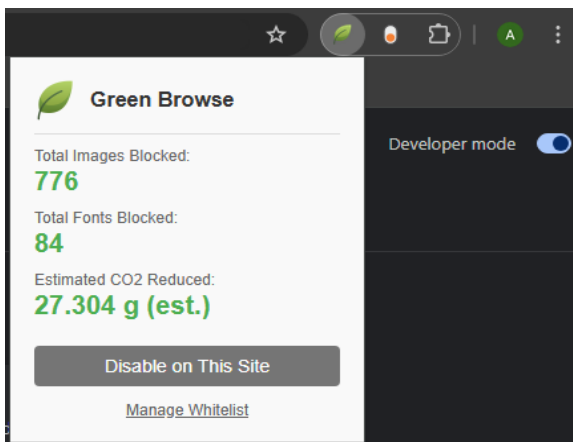Extension in Chrome >> Extension >> Manage Extensions

Whitelist page

Extension dashboard

Before visiting the 4 websites listed above   After visiting the 4 websites listed above

Note

Dashboard CO_2 estimates are based on the Beacon calculation, utilizing the OneByte methodology with an emission factor of 350 g CO_2 per GB of data.

List of Abbreviations

UX	User Experience
alt	Alternative Text
CSS	Cascading Style Sheets
V3	Version 3
json	JavaScript Object Notation
js	JavaScript
DOM	Document Object Model
img	Image
UI	User Interface
html	HyperText Markup Language
CO2	Carbon Dioxide
MVP	Minimum Viable Product
QA	Quality Assurance
SPAs	Single-Page Applications
APIs	Application Programming Interfaces
BBC	British Broadcasting Corporation