collaborating in
dutch digital heritage network

42 tips to make your heritage website more sustainable

Practical solutions to reduce your climate impact

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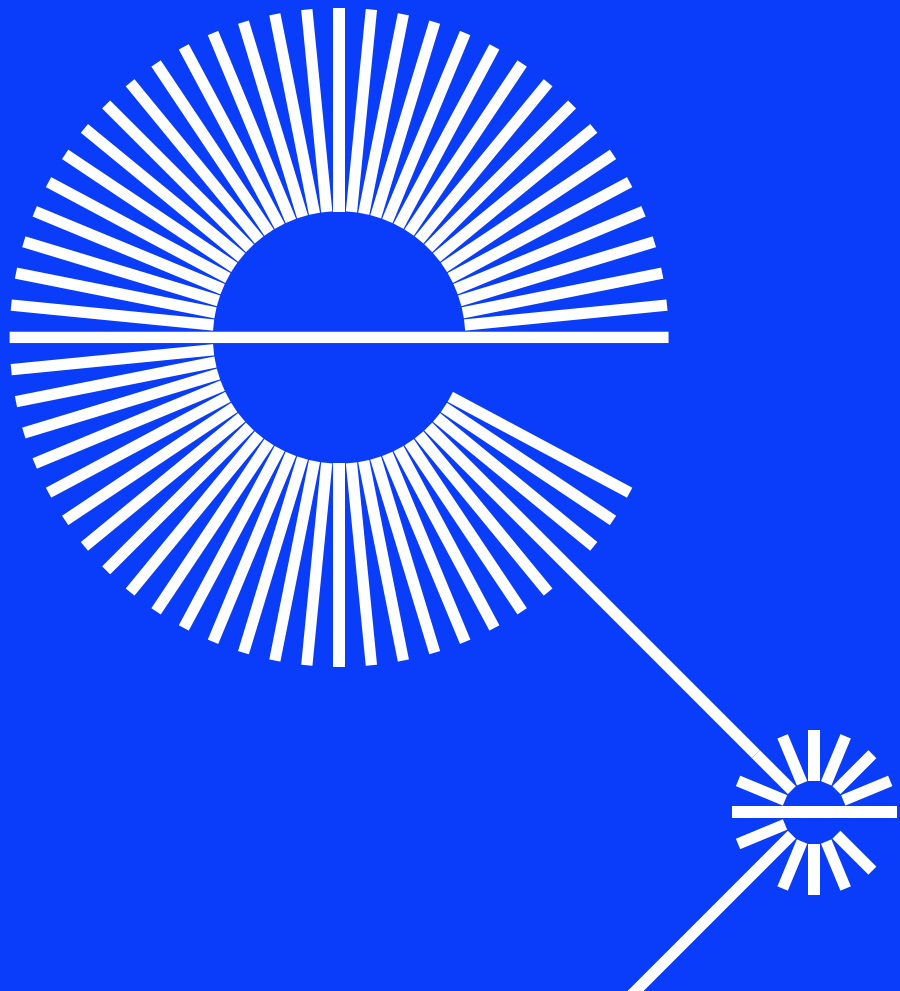
Introduction

At the start of 2024, more than 60 per cent of the world population spent an average of 7 hours on the internet every day. But despite this massive online presence, many people do not realise just how much energy the internet uses. Seemingly innocent terms like “cloud” and “virtual” mask an entire world of data centres and connected devices that consume tremendous amounts of electricity and, in doing so, contribute enormously to CO2 emissions. The heftier a web page, the more energy it needs every time it is visited by a web user, and the greater the resulting environmental impact. Multiply that by the total number of visitors to a website, and the figures soon start to skyrocket.

Ecologically sustainable websites can make a difference here. Digihobbit’s Charlotte Bax was recently commissioned by the Dutch Digital Heritage Network (Netwerk Digitaal Erfgoed, NDE) to carry out an exploratory study into the sustainability of websites in the heritage sector. Her research yielded all manner of practical guidelines to help make your heritage website more sustainable. This guide contains all the tips, ranging from simple steps you can take to more advanced techniques that require IT savvy. Of course, when unsure, it’s always best to hire professional expertise.

Good luck making your website more sustainable! And if you have any experiences worth sharing, we’d love to hear about them at info@netwerkdigitaalerfgoed.nl. Your story could inspire others.



Measure your environmental impact

You can measure the environmental impact of your website in various ways. Free online tools are a good place to start. After making improvements, you can perform a new measurement to check whether you have achieved the desired result. Don't forget to celebrate your successes, because it helps motivate everyone to keep going.

1. The Green Web Foundation: green hosting or not?

An easy way to check whether your hosting qualifies as green is at thegreenwebfoundation.org. Do note that hosting providers and data centres must actively register for this directory. If you enter your website on thegreenwebfoundation.org and the result is "not green", this could merely mean that your web hosting provider isn't registered yet. If that is so, contact your web hosting partner.

2. Digital Beacon: rating the individual components of your web page

Digitalbeacon.co measures the "weight" of web pages and calculates their CO2 emissions using the Green Web Foundation's CO2.js library. The various components of your web page are broken down into assets (files that represent a component of a web page), such as HTML files, stylesheets, scripts, images and font files. This gives you a general idea of the areas you can improve in. These assets are discussed more extensively further on in this guide.

3. Are My Third Parties Green

Are My Third Parties Green checks which specific assets (such as fonts, scripts or images) on a page are hosted by third parties and whether those parties offer green hosting or not, using The Green Web Foundation's CO2.js library.

4. Outsource the sustainability scan

Another option is to engage a third party to perform a sustainability scan of your website. This way, you'll receive a detailed report containing recommendations for improvement. You can also request a rescan to check whether the improvements you have implemented have had the desired effect.

Tidy up your website

A simple way to reduce a website's environmental impact is to clean up its content. Go through every page and check which information could be made more concise, and whether any of the images are no longer relevant. Remove anything that is no longer needed.

5. Check whether all content is still relevant

Ask yourself questions like:

- Are there news items that can be removed?
- Do we still offer all the products and services shown on the website?
- Is any information repeated across the website? Make clear choices and use internal links to other pages instead of duplicating the same content.
- Are all images still relevant? For example, are the team members' photos still up to date? Or do they include photos of former employees that can be removed?
- Be especially critical when it comes to the relevance of audio and video. Audio and video should only be used if they are absolutely essential to getting your message across.

When removing news messages, articles and other content, it is important to take into account any existing agreements within (public) organisations about the archiving of websites. This way you can avoid removing content that should be retained under these agreements. If archiving is necessary, but the information in question is rarely accessed, consider placing it in cold storage (storage that uses less energy, but takes longer to retrieve the data) instead of storing it in the cloud.

When removing content, it is also important to check whether any other pages link to the content that has been flagged for removal. Make sure to remove these links from those other pages, and ensure a 301 redirect to a comparable, relevant page. This will prevent dead links.

6. Reduce information where possible

Website texts need to be short and snappy, offering visitors quick answers to their questions. As such, paragraphs need to be short and to get to the point quickly. This will likely also improve your ranking in Google's search results, so it's a double win.

7. Make sure that information can be found quickly

People who visit a website want to find what they need, fast. It is therefore important to have a clear information architecture. Organise, structure and label the content of your website in such a way that it is easy for visitors to navigate and to find the information they are looking for, and are able to access that information.

Also make sure that your website has a good search function, so that visitors can quickly find the information they want. A clear sitemap can be helpful here – but note that it must be functional, not just a page that looks like a sitemap.

Create structure by using clear titles for your web pages and concise subheadings for paragraphs. Use semantic formatting properly: bold-printed words can be used to emphasise the most important points. Many visitors scan the information you offer rather than reading it closely, and it is important to help them by making it easy.

Make sure to regularly test the user-friendliness of your website with someone from your target demographic: this will help you optimise navigation, determine what visitors are looking for, and check that your content is easy to understand.

8. Remove data from submitted forms

This is not only important for environmental reasons, but also in connection with data protection (the GDPR). By default, many websites store the data from submitted forms in their content management system (CMS) in addition to sending them by email to the indicated address, or the information is automatically saved in a customer relationship management (CRM) system.

Instead, configure your web forms so that they are automatically removed after a certain duration: a good rule of thumb is thirty days. This gives you enough time to resolve any issues on your website, as well as to secure the data in the event that the form was not automatically forwarded due to a website error.

Choose green hosting

Choose a green hosting provider to make your website more sustainable. These providers generally use energy from 100% renewable sources such as wind, solar, tidal or hydropower. Some data centres also use surplus heat to help heat nearby communities, so that the energy is put to maximum use.

9. Want to check whether your website is hosted green?

Enter your domain name on The Green Web Foundation's website: thegreenwebfoundation.org. The Green Web Foundation keeps a database of all green hosting providers.

10. What if the test shows that your hosting provider is not green?

This does not necessarily mean that your hosting provider is not green – it may just be because they are not yet registered with The Green Web Foundation. In short, the first thing to do is to ask your hosting provider whether they run on green energy. Make sure you get a clear answer: don't be satisfied with vague promises. If your hosting provider can demonstrate that they are green, inform them that they can register with The Green Web Foundation.

11. What if your hosting provider uses grey energy (and does not want to transition to green energy)?

In that case, you might wish to find a new hosting party. First, though, check your current hosting provider's conditions for the termination of your contract. After that, you can start looking for a green hosting party.

12. Questions for green hosting providers

Make sure to ask the right questions – here are a few examples:

- Does the hosting provider use green energy, and if so, how?
- Does the provider actively invest in energy-efficient equipment to reduce energy consumption?
- Does the hosting provider apply server software optimisation?
- Do existing servers have energy-efficient functions, such as a sleep mode?
- Does the hosting provider offer resources you can use to reduce your data usage?
- How does the data centre deal with surplus heat?
- What is the source of the water used to cool the servers (raw water or drinking water)?
- How does the data centre recycle equipment (since the highest CO2 emissions occur during the production of the required equipment)?
- Where is the data centre located? If possible, choose a location close to your end users to prevent long (transoceanic) data transfers and thereby reduce environmental impact.

13. Green hosting does not exempt you from making your website more sustainable in other ways

Even after switching to a green hosting party, it is still important to continue monitoring your website's energy use and, by extension, its CO2 emissions. Green energy consumed by an energy-*in*efficient website cannot be used by other industries that also desperately need green energy, after all. So make sure to read the other tips in this guide as well.

Make effective use of images

Images are often used without much consideration, primarily for the sake of visual appeal. However, they are often much too big for online use – a website is not a billboard! There is a lot of room for improvement here.

14. Ask yourself whether each of the images on your website is really necessary

A picture is worth a thousand words, yes, but it also uses a lot of data – especially if it is not optimised for the web. As a result, a picture often weighs a lot heavier than a thousand words. In that sense, an unnecessary picture costs as much as a thousand words with little meaning. So be bold and choose not to use a picture. Instead, try using icons, emojis, Lottie animations or smart CSS to format blocks of text in a visually appealing way.

15. Replace images by scaled and optimised versions

There are various tools you can use to scale and optimise images. Experiment with the size of your files to determine the line between “still acceptable” and “too small”. By making smart use of scaling and optimisation, you can quite easily make an image at least thirty times smaller. One example of a free tool for this purpose is GIMP, an open-source alternative to Photoshop that lets you scale and export images in the web-friendly WEBP format.

Train yourself to scale down images before you upload them to your website. You’ll find various tools (and manuals on how to use them) online that can help you make your images smaller. When looking for suitable tools, use a green search engine, such as Ecosia, which uses its profits to plant trees.

16. Minimise your images’ metadata

Check whether your images contain any unnecessary metadata. The distinction between necessary and unnecessary here depends on the purpose for which the image is used and whether you wish to preserve the image for a longer duration. Digitally created files contain automatically generated technical metadata, such as the camera manufacturer and exposure time. Such data may not be relevant to your current or future use of the image.

Note: some essential embedded metadata, such as creation date, do need to be retained for the long term. Also make sure that you meet accessibility requirements, so that people with visual impairments can still understand what each image shows.

17. Whenever possible, host images yourself

It is best to host your images in an image library on your own website. Platforms such as WordPress have an image library you can use to personally manage your images. This reduces energy usage because it removes the need for third-party scripts, and it ensures that they are hosted sustainably (if you make use of green hosting). It is also a good idea to regularly go through all your images to check whether they are still needed, and delete those that are not.

18. Make use of lazy loading

With lazy loading, downloading and displaying videos and images is delayed until the website user scrolls down far enough that the content is on-screen. In short, images and other media are only loaded when they are actually needed. This shortens the page's loading time, improves your SEO score and reduces data usage (something that people with limited data subscriptions will appreciate).

Lazy loading is available via various plugins, such as Hummingbird Pro, WP-Optimize Premium and WP Rocket for WordPress. But you can implement lazy loading without a plugin as well: simply add *loading="lazy"* to the HTML code of the element in question. However, incorrect implementation can lead to errors, as a result of which the lazy loading function may not work.

19. Remove (unnecessary) background images

Background images often have no actual added value, but they do contribute to the page's total file size. It is therefore best to remove background images that serve no function.

If you want something other than a blank background, try adding an SVG pattern (you can generate one with the app Haikei, for example), a gradient (a visual effect whereby the colour of an element gradually shifts from one hue to another; this can be coded in CSS), or a solid background colour.

20. Avoid image carousels and galleries

A carousel may have a playful look, but using them is not advisable. Loading multiple images consumes a lot of energy, and it is not guaranteed that website visitors will even look at every image in the carousel. Carousels and galleries should only be used if they really offer functional added value compared to a single image. If you do find it necessary to have a carousel or library on your website, then ask yourself whether you can achieve the same effect with a smaller number of images.

Make smart use of media

Audio and video can be real heavyweight components of a website. A 30-second video easily takes up 3 MB. So before you add files of this type, it is important to ask yourself whether they are really necessary. If they are, then try to find out how you can make them more energy-efficient.

21. Only use media if they are truly functional

What goes for images goes for audio and video as well: be critical of the content you put on your website. Is this audio or video file absolutely necessary? Or can the information in it be communicated just as effectively in text, supported – if and where necessary – by a few well-chosen images?

22. Embed your videos

You can put videos on your website without downloading them first by incorporating their embed code from platforms such as YouTube or Vimeo into your website. This way, the video is still hosted on the website where it was uploaded. Be careful, though: using these services can result in a huge number of scripts on your website. Many of these relate to the video player itself, as it has more advanced functionality than the standard player of any given browser. But you'll often find that you're getting a whole load of tracking scripts along with the video as well. Where possible, choose Vimeo rather than YouTube, as it is lighter.

23. Make sure that videos don't play automatically

Not only do many users find it annoying when a video starts playing automatically, it is also not sustainable. So make sure users have control over when and whether the videos on your website are played. When you add or embed a video on your website, make sure to leave out the autoplay code. If you have videos on your website and you want to remove their autoplay function, find and delete this string in the HTML code: *autoplay=1* or simply *autoplay* (depending on how it is used in the code).

24. Do you host your own media? Then always use lazy loading

With lazy loading, content is only loaded when the user reaches it. In other words, only the visible content is loaded immediately.

In the HTML code of the relevant video element, add *preload="none"*. This ensures that the video is only loaded when a user chooses to play it.

25. Do you host media with a third party? Then make sure that it's as lightweight as possible

There are various ways to host media with third parties, such as YouTube, Vimeo or Spotify. When doing so, pay attention to the sustainability rating. For example, it is better to choose Vimeo than YouTube.

Also make sure to check whether it is possible to turn off tracking scripts. With YouTube and Vimeo, you can do that by enabling privacy mode. This way, when you embed a video, no tracking codes are placed until a visitor actually clicks the video to play it. However, be aware that removing or minimising tracking codes can affect certain functionality, e.g. the tracking of statistics and user interactions, so make sure that you know what you are doing before you disable tracking codes.

Minimise redundant code

Keeping your code neatly organised reduces unnecessary code and limits energy consumption. Accidentally removing essential code can cause problems, though, so be careful when you're tidying up.

26. Clean up your code and minimise the rest

Pruning – the process of removing unnecessary or unused elements – is an important step in optimising your website. For example, you can clean up HTML, CSS and JavaScript files by removing unused classes, IDs, comments and redundant code.

Reducing the size of CSS and JavaScript files can also help reduce the number of requests to the server and shorten your website's loading time. Various (free) tools are available online to help you minimise your code (this is known as minifying).

27. Optimise caching

The first time someone visits a web page, their browser retrieves all the information of that page from the server. Caching comes in various forms. Browser caching (or client-side caching) means that the browser stores certain parts of the web page in a temporary storage space: the cache. Server caching means that the pages are prepared in advance so that they are immediately available, instead of having to be completely rebuilt from the underlying database for every individual visitor. Upon subsequent visits, the browser can retrieve this information directly from the cache, reducing loading times and energy use. Optimising caching often does require assistance from a website administrator in order to implement it on the web server.

28. For every script, widget and plugin, ask yourself: do I really need it?

A good example of this is visitor statistics: do you make strategic use of these, or do you simply find it interesting to check user numbers every now and then? Be honest, and if you conclude that you don't actually use the function, remove it.

Or perhaps you are thinking about offering a chat function on your website (as a plugin or script)? Investigate whether this is really necessary: perhaps a contact form or an email address listed on your contact page is enough.

29. Use the WordPress plugin Asset Cleanup

Plugins, themes and other such tools often load various scripts to perform their functions, and that can increase your website's loading time. If you have a WordPress website, you can use the Asset Cleanup plugin to remove redundant code from the frontend of your website. This tool individually scans every page, determines which assets are loaded on it, and allows you to decide which ones to deactivate. Be careful: you should only use this plugin if you know exactly what you are doing, or you might accidentally remove essential components that are required for your website to display correctly.

30. Avoid jQuery

There was a time when jQuery was a useful tool to make working with JavaScript easier and make a website interactive without having to write a lot of code, but more recent JavaScript versions have made its use unnecessary except in rare cases. If you do need to use jQuery, choose the smallest possible version.

Optimise your font usage

Fonts come in all shapes, weights, sizes and variations, but using certain fonts can make a website significantly heavier to load. In some cases, a collection of fonts can weigh as much as a large image. Luckily, there are useful tips and tricks to deal with this.

31. Choose the most sustainable fonts

Most organisations have a house style that defines which fonts must be used. So before you start implementing these tips, make sure that the person who designed your organisation's house style is involved in any decisions to replace your fonts. Oftentimes, this person can also recommend a more sustainable alternative.

In the ideal situation, you already indicate that certain degrees of sustainability are desired during the design phase of the house style. Custom fonts are fine for print media, but the server has to send them as an asset every time if you use them on a web page.

For web pages, it is best to choose a universal system font for the body text. That way, no assets have to be sent. A good compromise is to use a universal system font for the body text and a custom font for the headers: that's where it makes a real difference.

Generally speaking, there are two types of fonts in website design: the universal system fonts (Arial, Verdana, Tahoma, Trebuchet MS, Times New Roman, Georgia, Courier New and Impact) and custom fonts. Custom fonts give you more design freedom, but often weigh more heavily and have a bigger impact on loading times. So consider well which types of fonts you want to use, and be mindful of their bulk.

Always avoid using too many different fonts: this has a negative effect on energy usage. And also always include a general final option in the CSS code such as "serif" or "sans-serif". This code allows the browser to choose a suitable font that is already installed on the user's device.

32. Only load the fonts your website uses

Some websites load a large number of fonts – for example, multiple variations of different fonts. Instead, you should only use the fonts you actually need for your website and make sure that all other fonts are not unnecessarily loaded. You can check which fonts your website uses in your CSS (the website that describes the styling of your website).

33. Optimise your fonts with FontSquirrel before you upload them

FontSquirrel is a useful site that collects fonts and offers a wide range of free and affordable options. After choosing a font, you can simply download it to your computer. Do not forget to check the font's licensing conditions before you use it.

FontSquirrel's tool Webfont Generator lets you convert fonts to the right format, e.g. WOFF or WOFF2. These are Web Open Font Formats that were developed by the leading web browser providers, and they ensure that the text in these fonts is supported by these browsers, so that your text is displayed correctly. WOFF2 is slightly more sustainable that WOFF, but WOFF is supported by slightly more browsers.

After the font has been optimised, you can upload it to your server. Next, use CSS to apply the new font to the desired elements on your website. Make sure to use the correct file paths for your fonts' URLs: these need to refer to the uploaded font files' correct location.

Finally, check that the fonts are displayed consistently across various devices and browsers.

34. Within the chosen font file, remove the characters you do not use

When downloading a font, you often download that font's entire library, including symbols that do not occur in the language your website uses. You can "submap" fonts, meaning that you load only those characters that your website needs. Selecting and removing redundant characters reduces your fonts' file sizes. This is easy to do with FontSquirrel's previously mentioned Webfont Generator tool.

Be critical towards plugins

When developing a website, it is often necessary to include plugins, widgets or code from other parties for additional functionality. When you use a third-party plugin, choose a lightweight option that is hosted green.

35. Use Google Maps deliberately and where necessary

A frequently used third party assets on websites is Google Maps, an online map service that lets you look up geographical locations. Although it can be useful to help visitors find and plan a route to your organisation, it is not always necessary. If you do want to use Google Maps, put it on your contact page only and avoid including it in the footer. Otherwise, the underlying script will be loaded on every single page, and that wastes energy.

36. Be critical of your statistics tool

Many websites have a bit of code on every page that tracks how often the website is visited – sometimes even including the locations of visitors. This is interesting information, but only if you actually use it for strategic purposes. If you are only tracking statistics because you are curious to see how many visitors your site is getting, or you are only storing the data to take another look at it later, consider removing the code.

Many organisations use Google Tag Manager for their statistics, but a lightweight alternative like Matomo, Microanalytics or With Cabin is better. Even better is to host your own statistics tool, so that you have complete control over the type of energy that runs the statistics tool and your website. Matomo, for example, offers a self-hosted option.

37. Prevent spam with honeypots and IP blocking

Google has created a plugin, reCAPTCHA, that checks whether a computer user is human and not a bot. This usually takes the form of a series of images that users must select before they can send a form. You should only implement reCAPTCHA on pages where user interaction takes place, i.e. forms or comment sections. If you use reCAPTCHA to prevent spam, consider replacing this with a combination of a honeypot spam filter and IP blocking for malicious bots.

This works as follows: a honeypot spam filter is a hidden field in your website form that users cannot see, but bots can. Therefore, if anything has been entered in this field, you know that the user in question was not human. In this manner, the honeypot spam filter detects bots, marks their messages as spam, and then ignores or deletes them.

IP blocking allows you to block malicious bots automatically and manually, based on IP addresses. In this way you can avoid receiving spam.

Wordfence is a handy option for WordPress sites to automatically block malicious IP addresses and prevent too much unnecessary traffic.

38. Check whether your third party assets use green hosting

The ideal scenario is to host everything in-house without relying on third party services. If this is not an option, then check whether the services you use run on green energy. Use the tool offered by aremythirdpartiesgreen.com to do so. If it turns out they are not green, then encourage them to switch to green energy or go in search of an alternative that does offer green hosting.

Make your site sustainable starting from the design phase

When improving the sustainability of an existing website, you may run into design choices that limit how sustainable you can make it. However, if there are plans to replace the website with a completely new one, this is the perfect opportunity to implement sustainability from phase one. Make sure you seize that chance!

39. Think about the functions your website needs to fulfil

During the design phase, take the time to think carefully about the functions your website needs to fulfil. Here are a number of example questions to ask yourself:

- What is your website's purpose, and what do you want to achieve? What does your website really need, and what can you leave out?
- What value do you add for your users, yourself and the world wide web in general?
- What is the best form to convey your message or achieve your goals? What is the most lightweight form you can use to achieve that?
- Specifically for the presentation of your online collection: is it necessary for your complete collection to be available online, or can parts of it be put in cold storage? After all, back in the days before computers, you always had to wait a few moments in the reading room before you received the documents you had requested.
- Which functionalities do you want to offer on your website? Are they really necessary? (E.g. a route planner, chat function or chatbot, ticket sales, etc.).

Don't forget to keep asking these questions as your website's development progresses.

40. Put certain components into a subdomain

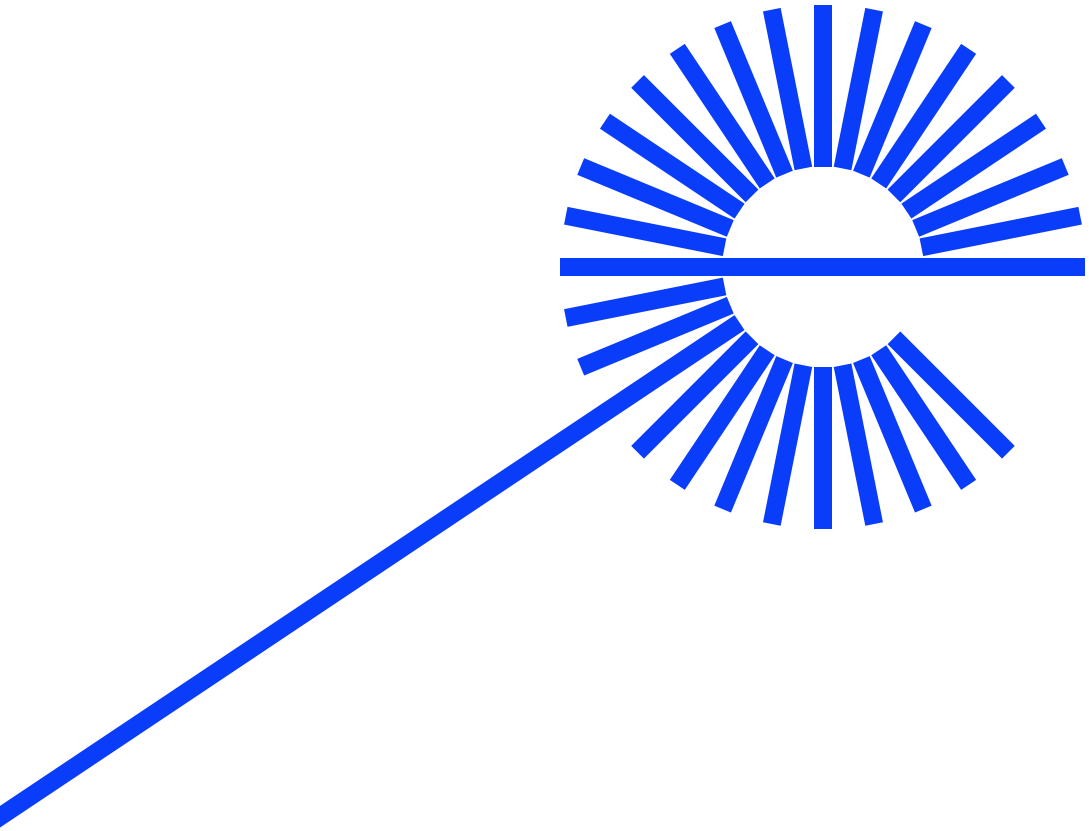
It can be useful to put certain components into a separate subdomain. That way, you do not have to load certain components for the entire website when they are in fact not needed. Examples could include statistics plugins or irrelevant sections of style sheets. For instance, your collection pages could have a very different styling than the main website.

41. Ensure a clear site structure

The quicker a user can find the information they need, the less energy is used. So make sure that your information architecture is good and that information can be requested in an efficient way.

42. Hire a sustainable web designer

Are you outsourcing the development of a new website? Then consider choosing a web designer who has experience with improving the sustainability of websites and is familiar with the tips and principles in this guide.



To work!

Now that you have read this guide, you are well prepared to make your own (heritage) website more sustainable. The difficulty levels of these practical tips differ, depending on your technical knowledge. In some cases, you may need to hire a professional (and sustainable) web designer.

If you have implemented all the sustainability tips and want to achieve a fully net-zero website, consider compensating for your remaining energy consumption by planting trees, for example. There are organisations who can help you do this, such as Trees for All.

We wish you much success and joy in improving your website's sustainability, and we are curious to hear about your experiences.

Colophon

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