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Business context

User stories

As a...	I want...	So that...	Acceptance criteria
Potential customer	To book a consultation for solar panel, EV charging station or smart home installation	I can receive professional advice and explore my options for green tech solutions	- User can see and select desired service - User can choose a consultation date - Booking system shows slots available in real time.
User	To see available products and services	I can explore the options and decide which service i want to learn more about or book	-Website displays clear list of available products - Each product has a detailed descriptions and pricing info - Users can filter products based on preferences
User	To calculate my carbon footprint to receive a rating.	I can understand my environmental impact and see if green technology solutions could reduce it	- Users input data related to energy consumption - Website calculates rating based on inputted data - Rating is displayed with actionable tips on how to reduce carbon footprint with green tech - Users can view recommendations
Registered user	To log in to my account	I can manage my bookings, or track my carbon footprint ratings	-Users can log in with email and password - User can reset password via email

Empathy map

Says	Thinks
“I want to reduce my carbon footprint” “I need help understanding what green technologies are best for me” “I’m looking for a simple way to book a consultation” “How much can I save with solar panels” “I want to see my options before making a decision”	“I’m not sure I can afford these services” “How will this affect my utility bills” “Is this company the best option for my needs” “I want to make sure im making an eco-friendly choice”
Does	**Feels**
Visits website to learn more about available products and services Searches for green tech solutions Uses carbon footprint calculator to see their impact Compares different products and pricing Books a consultation through an easy to use booking system	Frustrated: confusing technical terms or complex product and service options Excited: positive environmental impact Overwhelmed: many different options and consultation or installation process Hopeful: Reduce energy costs and environment impact Curious: Learning how green solutions will improve their home

Functional requirements

Navigation bar:

The website should have a static navigation bar on the screen at all time times to provide a simple and clear way to navigate the main parts of the website. The navigation bar should include:

1. Profile: A button that takes the user to their profile or statistics section.
2. Home: A button that takes the user back to the home page
3. Our services: A button that takes the user to a page that lists all available products and services
4. Contact us: A button that takes the user to the function that handles scheduling and contacting
5. Sign in / log out: A button that takes user to logging in and out page

No data inputs are required for this function.

Services:

The website should have an “Our services” page with detaile information on what services and products are provided. Each product should have it’s own panel with a “Find out more” button that redirects the user to the product’s profile, which contains more details with descriptions, specifications, images and videos, and a “Book a consultation button”.

Search bar and filters:
This page should have a functionality to narrow down results. This incudes a filter option, to sort products and services by categories, prices etc, and a search bar, to search for individual products and services.

Data input will be received from the search bar function.

Tracking and calculating carbon footprint:

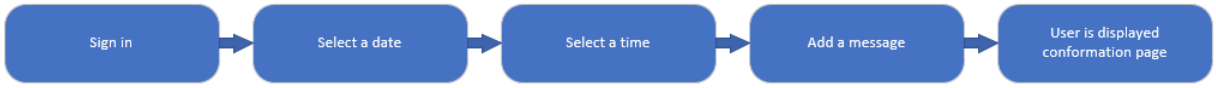
This function should provide a page that allows the user to enter information into a form and then receive a rating of their carbon footprint. All information entered should be secure. The function should provide a logical and accurate response and save the rating to a database with a date so the user might track their ratings over time.

Data input will be received from a HTML form.

Schedule consultations and contacting:

This function should provide a means of choosing a date and time for a consultation. The user should be able to see both available and unavailable dates and times. The user should be able to change or cancel existing consultations. The function should record bookings into a database. This process will be simplified for the user as most information required is linked to their account.
The page should also provide a customer support email address for questions or problems.

Book consultancy flow:



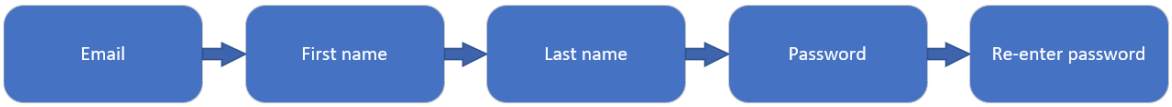
Data inputs	Data retrieved from user account
Date Time	Full name Email Phone number Address Postcode City

Account management:

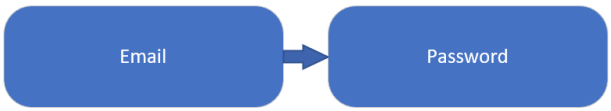
The user should be able to securely sign up, sign in and sign out.
Passwords should be required to be complicated enough to be secure.
A user shouldn't be able to register multiple accounts with the same email address or phone number.
Passwords should be hashed using SHA-25.

The user should not be required to sign in to access the website, but required to access the calculate energy functions. This will decrease the site's bounce rate.

Sign up form flow:



Sign in form flow:



Non- Functional requirements

Accessibility

The system should be accessible to users with a wide range of disabilities. This includes ensuring that the website is usable for individuals with visual, auditory motor and cognitive impairments. The website should comply with accessibility standards to ensure that all content is easily navigable and comprehensible.
Features like screen reader compatibility, keyboard navigation, and alternative text for images should be implemented.
The websites should also be easily adjustable to allow for user preferences such as text size adjustments to be compatible with the system.

Scalability and reliability

The system should be able to handle increasing amounts of traffic and perform optimally. This would allow the system to run smoothly during peak times. Longer page load times and issues with accessibility can discourage users. The page load times should be 2-5 seconds.

The system should flexible enough to allow for more functionality to be added in the future. This is important for a progressive emerging technology company due to rapidly changing business needs.

The system should be scalable and reliable to provide a faster and better user experience.

Usability

The website should be intuitive and have a clear, straightforward interface to provide ease of use and simplicity for the user.

The site should be learnable by having a consistent and familiar layout.

The content and functionality should be relevant to the users' needs to ensure engagement and value.

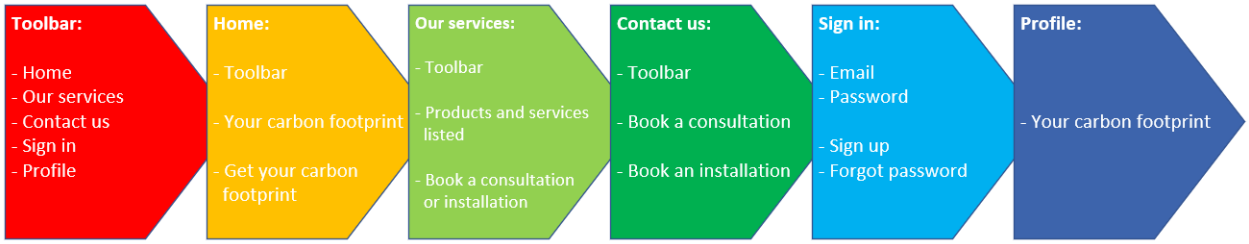
Security

The website should have strong login security. This includes:

- Strong password requirements
- Passwords should be hashed using SHA-256
- Input validating to protect against injection attacks

The website cookie should have a set session expiration time.

Decomposition



Key Performance Indicators

Website KPIs

Page load time:

This KPI will help keep track of changes in the site's performance. This is crucial in tracking performance at different times of day, use on different kinds of devices, when changes are made to the website, etc, allowing us to more quickly diagnose problems with the system.

Engaged sessions / Bounce rate:

This KPI wil track how many users leave the website straight away. This can help indicate whether you're delivering a positive first impression and user experience.

Average session duration:

This KPI will track the amount of time users remain on the website. Longer session duration indicates higher engagement and content relevance, while shorter duration may signal usability issues or lack of interest.

Business KPIs

Visitor satisfaction rate:

This KPI can be tracked through short surveys/questionnaires or even single questions after using the website. For example: “Did you find this information meaningful”. This is a reliable way of collecting quantitative and qualitive data on user experience and satisfaction.

Reviews

Reviews would be useful for gaining reliable and meaningful feedback from users. Reviews can also help build a positive reputation for the company/website.

Number of consultations/sales

Simply tracking the number of sales made gives reliable data on how effecting the system is.

Proposal

So far in this document I have thoroughly broken down each part and component of the system. In this proposal I am going to summarise the eventual end goal of how the website and system will meet the criteria of the proposed brief.

Key features:

A means of browsing available products and services

The website will have a page where users can easily browse all the products and services offered by the company. Each product and service will have it's own detailed profile including key specifications, features, benefits and usage instructions. Each profile will be presented with pictures, videos and descriptions.
This information will be contained in a CSV file so that new products and services can be added.
A search bar and filter system will be featured to narrow down options based on categories, price ranges, or specific needs. Each listing will have a "book a consultation" button to keep teh journey from browsing to booking smooth.

Easy booking of a consultation or installation

The proposed idea of this system is to create a means of users making accounts and booking consultations linked to their accounts. This allows customers to easily make appointments, and allows the back end part of the system to store all booking information.
Using this database to display information to the front end can also inform the user what days and times are available, and would prevent any overlapping appointments.
This would be a reliable and foolproof method of organising appointments due to the lack of potential for human error.

Ability to calculate and track carbon footprint rating

The carbon footprint rating feature will provide users with a means of assessing the environmental impact of their actions, specifically in relation to services and products they use. When visiting the site, users will be prompted to complete a questionnaire that gathers relevant information. The system will use an algorithm to calculate the carbon footprint score. The score would be presented with an easy to understand format, using a number out of 100, with colour coded levels.
Users can track their progress over time by logging in and updating their information periodically, encouraging users to engage more with the website in the future.

Justification

Key features: How does this solution meet the needs of the clients?

A means of browsing available products and services

Using a dedicated page for browsing products and services creates a user-friendly experience that allows customers to find and learn about the company's offered products and services. Providing detailed profiles for each products and service, user will have all the necessary information available to make informed decisions. This will increase customer satisfaction by providing transparency and clarity.
Using a CSV file to store this information ensures that the system is flexible and scalable, allowing the company to easily add new products and services as they become available without requiring significant changes to the website's front or back end.
The search bar and filter system will improve the user experience by making it easier for customers to narrow down their browsing based on specific needs.
The "Book consultation" button on each product profile will streamline the process from browsing to action. A more direct pathway will improve conversion rates and overall customer satisfaction.

Easy booking of a consultation or installation

The implementation of account-based booking system will enhance both the back end architecture and user experience by providing a more centralised and secure method for customers to manage appointments. Having booking information stored in a structured database will provide scalability and maintainability because new users can register and manage their appointments without having to contact the company to manually update appointment information.
A dynamic online booking system will provide real-time availability to users and ensure a responsive experience. Displaying available and unavailable days and times will prevent scheduling conflicts. This will enhance the system's usability and reliability by offering a seamless experience and ensuring back end integrity.
By automating the booking process, there is less potential for human error, ensuring appointments are organised in a foolproof manner.

Ability to calculate and track carbon footprint rating

This feature allows users to assess their environmental impact in relation to the company's products and services. Using a colour-coded score out of 100 will offer an easily understandable metric for users to track. The feature is designed to be scalable and offer flexibility for future enhancements.

Risk Mitigation

Clear product description
Risk of customer dissatisfaction if descriptions are misleading:
Descriptions and images must bedetailed and accurate. Include key details like specifications and dimensions. Allow customers to ask questions through the system.

Scheduling conflicts
Risk of system creating inaccurate bookings:
Back end systems must be reliable to not cause any problems with scheduling consultations.
Real-time availability updates will ensure the system displays up to date booking slots.
Have a system that alerts administrators of any booking issues in case they appear.

Error handling
Risk of customer dissatisfaction if errors aren't handled:
Errors must not crash the system, errors must display on the current page, not create a new page. This is to ensure a smooth and uninterrupted experience for the user.
Log errors securely.
Allow users to save progress.
Test all functionality thoroughly during development.

Scalable infrastructure
Risk of poor performance and crashes under heavy traffic:
Website must be scalable: optimise server settings and change load balancing to adjust to changes in demand.
Regular load testing and load testing during development will ensure scalability.

Legal compliance
Risk of fines or legal issues if not adhering to regulations:
Ensure system is up to date with relevant laws and regulations.
Clearly display terms of service, cookie notices etc.

Regulatory Requirements

The website will comply with all necessary regulatory requirements including GDPR.
The website's accessibility standards will meet at least the AA level of WCAG.

Appendix

NHS England » Online consultation tools

“Digital tools are changing the way primary care is delivered. By providing practices with a range of features, digital tools enable them to develop new care pathways and workflows that can enhance the delivery of healthcare.

Online consultation tools allow patients to contact their practice without coming into the surgery or waiting on the telephone. They allow patients to provide the reason for their request and provide any clinical or admin-related information. “

Website scalability: what is it and why is it so important? | Devispace

“Scalability allows for effective financial management. The ability to increase or decrease resources as needed allows optimization of operating costs. This allows companies to better control their expenses and invest in developing other areas of the business. On top of this, costly changes to the site can be avoided in the future.

To create a scalable website, there are several key aspects to consider:

Choosing the right architecture: Using a microservices architecture instead of monolithic one allows for better management and scaling of individual site elements.

Choosing the right database: Scalable databases, such as NoSQL (e.g., MongoDB) or distributed databases (e.g., Cassandra), can better handle large amounts of data.

Website optimization: Reducing file size, minimizing code and using resource loading optimization techniques (e.g., lazy loading) affect the speed of the site.

Load balancing: distributing traffic among several servers ensures stability and continuity of the site, even under heavy load.”

The principles of website usability - 99designs

“Availability. Availability is simply how easy it is to access your website. Your website’s availability can be affected by the web hosting platform you use and by how compatible it is with the devices users are accessing it with.

Clarity. Clarity is the core of website usability. Visitors come to your site with specific goals in mind, and we promise those goals don’t include checking out your web design skills! If your website’s design distracts or confuses visitors, they’ll either need more time to find what they came for, or they might forget their initial goal altogether and leave. In either case, they’re leaving dissatisfied and unlikely to come back.

Recognition. Recognition is a way of describing the learning process users undertake when they visit a new site. You might not feel that your website needs to be studied to be used, but in reality, all sites require at least a few seconds of assessment before a user can interact with them. The vast majority of users will, for instance, need to navigate back to your homepage at some point, and most will look for a logo in the top left corner of their screen to do so. If your

website works differently, they'll have to spend a few seconds learning how to get back to the homepage. When you design for usability, strive to keep this learning curve as short as possible.

Credibility. Even if customers can easily find the content or functionality they're looking for, if they don't trust it, the website is worse than useless for them. There are a lot of ways to demonstrate your credibility through your website design, like being transparent about your business and goals.

Relevance. Relevance is perhaps the most complex issue in usability because it describes whether the content that your customers see on your site is engaging. Creating engaging content involves carefully defining your target audience, determining what they want and meeting their needs as clearly as possible.

These five principles are the most important aspects of website usability. But it can be difficult to see how these elements are implemented in the real world"

Website Usability: The Ultimate Guide for 2025

"Availability and Accessibility: A website must be available to users around the clock and accessible to everyone, including those with disabilities. This means ensuring the site is up and running and that it supports assistive technologies for users with various impairments.

Clarity: The site should present information and options in a clear way so that users can easily understand what they can do and find what they are looking for without confusion.

Learnability: A website should be easy to learn, allowing users to quickly become familiar with the interface and use it with proficiency on subsequent visits.

Credibility: The website must be trustworthy, providing content that is accurate and reliable so that users feel confident in the information provided and the integrity of the site.

Relevancy: Content and functionalities should be relevant to the users' needs and interests, ensuring that the website delivers value and maintains the users' engagement.

By focusing on these web usability guidelines, you can create websites that are efficient, effective, and satisfying to use."

Best Practices for Secure Coding in Web Applications - GeeksforGeeks

Secure coding practices are the muse of Internet software program protection. Developers must observe regular coding practices to lessen the threat of vulnerabilities and insects that attackers can take advantage of. The following are a few examples of solid coding practices:

Input validation: Validate all consumer entries to prevent attacks inclusive of SQL injection and pass-internet web page scripting (XSS).

Parameterized queries: Use parameterized queries to prevent SQL injection attacks.

Avoid hardcoding passwords and credentials: Store sensitive records which incorporates passwords and credentials securely.

Use cryptographic libraries and skills: Implement stable encryption algorithms to guard touchy statistics.

Regular code evaluations: Conduct normal code opinions to end up aware of and fix potential protection problems.

6. Use Input Validation

Input validation is the technique of checking consumer input to make sure that it's far legitimate and steady to use. Failure to validate consumer enter can bring about safety vulnerabilities, along with SQL injection, cross-website scripting (XSS), and command injection.

8. User Session Management

User session manipulate is a critical thing of web software safety that involves the control and manipulate of consumer periods to prevent unauthorized get right of entry to. Session hijacking and consultation fixation are two commonplace attacks that could compromise patron durations.

Set Session Expiration Time: Sessions have to have an expiration time, after which the customer is mechanically logged out. This allows to save you attackers from the usage of a consultation ID that has been energetic for a long time.

9. Error Handling and Logging

Proper errors handling and logging are crucial for detecting and fixing protection problems in net programs. Errors and exceptions can offer attackers with precious information about the application's vulnerabilities, so it's critical to cope with errors and log them appropriately. Implementing right errors dealing with and logging can help discover and fix capability protection issues before they grow to be big troubles.

Top Website Performance Metrics and KPIs to Track | Databox Blog

Engaged Sessions

Engaged sessions (formerly known as bounce rate in Universal Analytics) is the metric that displays the amount of time visitors spend on your website.

For a session to be counted as an *engaged* session, it has to last at least 10 seconds, have 1 or more conversion events, or 2 or more page/screen views.

Average Session Duration

Average session duration represents the average amount of time users spend on your website during a single session. This metric is one of the best indicators of your website's engagement.

Longer average session duration indicates that users are spending more time engaging with your content. It suggests a higher level of interest and engagement, as users are actively exploring your website, reading articles, watching videos, or interacting with various elements.

Bridget Poetker of Loop & Tie puts it in a content marketing perspective and says that it's a "big indication as to how valuable your content is to your readers."

User Experience Metrics

User experience metrics are crucial in assessing the various aspects of a user's interaction and perception of your website.

These metrics go beyond simple engagement and conversion numbers to evaluate the overall quality of the user experience – they provide valuable insights into website usability, accessibility, page load times, content relevance, and similar factors.

Find out more about these individual metrics below:

- Page Load Time
- Time on Page
- Pageviews

Risk Mitigation Strategies for Web and App Development - SoftwareSeni

Understanding the common risks in web and app development projects is the first step towards effective risk mitigation. These risks can be broadly classified into several categories:

1. **Technical Risks**: These involve challenges related to the technology stack, such as software bugs, integration issues, and platform compatibility problems. Technical risks can lead to system failures, data loss, and performance issues.
2. **Security Risks**: With increasing cyber threats, security risks are paramount. These include vulnerabilities that can be exploited by hackers, leading to data breaches, loss of sensitive information, and compromised user trust.
3. **Scope Creep**: Often, projects suffer from uncontrolled changes in the project scope, known as scope creep. This occurs when new features or requirements are added without corresponding adjustments in time, budget, or resources, leading to project delays and cost overruns.
4. **Operational Risks**: These are risks associated with the development process itself, such as inadequate resource allocation, poor project management, and lack of communication within the team. Operational risks can derail a project if not managed properly.
5. **Market Risks**: The dynamic nature of the market can pose significant risks. Changes in user preferences, market competition, and regulatory requirements can impact the relevance and compliance of the developed product.
6. **Client-Related Risks**: Miscommunication or misunderstandings with clients can lead to mismatched expectations and dissatisfaction. Ensuring clear and continuous communication with clients is essential to mitigate these risks.

Ensuring scalability and flexibility in your application architecture is crucial for accommodating growth and adapting to changing requirements. Scalability allows your application to handle increased load, while flexibility ensures it can easily adapt to new features and technologies.

To achieve scalability and flexibility, consider the following practices:

- **Modular Design**: Design your application in a modular way, where different components can be developed, tested, and deployed independently. This makes it easier to scale specific parts of the application as needed.
- **Microservices Architecture**: Consider using a microservices architecture, where the application is divided into small, independent services that communicate with each other. This approach enhances scalability and flexibility, allowing you to scale individual services based on demand.
- **Cloud-Based Infrastructure**: Utilize cloud-based infrastructure to take advantage of its scalability and flexibility. Cloud platforms like AWS, Azure, and Google Cloud offer tools and services that make it easier to scale your application and respond to changing requirements.

By designing your application with scalability and flexibility in mind, you ensure that it can grow and adapt without compromising performance or security.