### ****Rolsa Technology Proposal****

Table of Contents

[Rolsa Technology Proposal 1](#_Toc192521855)

[Introduction 1](#_Toc192521856)

[Proposed Solution 2](#_Toc192521857)

[Decomposition of Problems 7](#_Toc192521869)

Risk Mitigation 8

[Regulatory requirements and guidelines 8](#_Toc192521871)

[Functional and non-Functional requirements 8](#_Toc192521872)

[KPI 8](#_Toc192521873)

[UAC 8](#_Toc192521874)

[Summary 8](#_Toc192521875)

# **Introduction**

Dear Rolsa Technologies

As somebody who is in green energy solutions, your commitment to sustainability and innovation is admirable and great in the industry. Your expertise in solar panel installation EV charging stations and smart home energy management systems has made a significant impact on reducing carbon footprints and promoting renewable energy. However, in today’s digital-first world having a **dynamic user-friendly website** is essential for staying competitive and meeting the evolving needs of customers.

#### ****The Challenge****

Customers face several challenges when interacting with services:

* **Access to Information**: Customers often struggle to find comprehensive up-to-date information about your products and services online.
* **Carbon Footprint Tracking**: There is no easy way for the customers to calculate and monitor their carbon footprint through your already existing platforms.
* **Scheduling Consultations**: The process of booking consultations and installations is not streamlined leading to potential delays and frustration.
* **Accessibility**: Your current digital presence may not yet fully accommodate users with disabilities limiting your reach and inclusivity.

These challenges highlight the need for a **modern feature-rich website** that not only showcases your offerings but also provides practical tools to engage and support your customers.

#### ****The Opportunity****

The proposed website we will make will serve as a **central hub** for all customer interactions offering:

1. **Comprehensive Product Information**: A dedicated section for solar panels EV charging stations and smart home systems with detailed descriptions benefits and case studies.
2. **Carbon Footprint Calculator**: An interactive tool that allows users to calculate and track their carbon footprint based on their energy usage.
3. **Online Scheduling System**: A seamless booking system for consultations and installations integrated with your team’s calendar for real-time availability.
4. **Accessibility Features**: A website designed to meet WCAG 2.1 standards ensuring it is usable by all customers including those with disabilities.

#### ****Who Will Benefit?****

This website is designed to cater to your diverse audience:

* **Residential Customers**: Homeowners are looking to adopt solar panels, EV charging stations or smart home systems to reduce energy costs and environmental impact.
* **Commercial Customers**: Businesses are seeking sustainable energy solutions to meet their corporate social responsibility (CSR) goals and reduce their operational costs.
* **Existing Customers**: Current clients who want to manage their installed systems track, energy usage and schedule maintenance or upgrades.
* **Potential Customers**: Individuals and businesses who are exploring green energy options and trying to find reliable information and services.

#### ****Why This Matters****

By developing this website Rolsa Technologies will:

* **Enhance Customer Engagement**: Provide a seamless intuitive platform for customers to explore your services and take actionable steps toward sustainability.
* **Streamline Operations**: Automate scheduling and will greatly reduce manual processes freeing up your team to focus on delivering exceptional services to your customers.
* **Strengthen Your Brand**: Position yourselves as a forward-thinking leader in the green technology sector with a modern professional online presence.
* **Drive Sustainability Goals**: Empower your customers to make greener choices by contributing to a more sustainable future.

This proposal outlines how we can work together to create a website that not only meets the business objectives but also delivers an great user experience. We are excited about the opportunity to collaborate with Rolsa Technologies and build a digital platform that reflects your commitment to innovation and sustainability.

# Business Context

Rolsa Technologies is a leading provider of green energy solutions specialising in **solar panel installation and maintenance electric vehicle (EV) charging stations** and**smart home energy management systems.** As the demand for sustainable energy solutions grows Rolsa Technologies aims to empower customers to reduce their carbon footprint and transition to renewable energy sources. However, the company has identified several challenges in its current operations and customer interactions which hinder its ability to fully meet customer needs and scale its impact.

#### ****Customer Challenges****

Based on market research conducted by Rolsa Technologies customers face the following challenges:

1. **Lack of Centralised Information**: Customers these days struggle to find comprehensive up-to-date information about green energy products and services.
2. **Difficulty Tracking Carbon Footprints**: There are no easy way for customers to calculate and monitor their carbon footprint.
3. **Inefficient Scheduling**: The process of booking consultations and installations is manual and very time-consuming leading to many delays and frustration.
4. **Limited Accessibility**: The current digital platforms are not fully accessible to users with disabilities limiting inclusivity.

#### ****Customer-Suggested Features****

To address these challenges Rolsa Technologies' customers have suggested the following features for the digital solution:

* **Account Registration**: Allow customers to create their accounts to manage their consultations and energy usage data.
* **Accessibility Features**: Ensure that the platform is usable by a wide range of users including those with disabilities.
* **Energy Usage Tracking Tool**: Provide an efficient tool for calculating and tracking energy usage to help the customers to reduce their carbon footprint.

#### ****Industry Trends and Emerging Technologies****

The energy sector is rapidly evolving with advancements in **Internet of Things (IoT)** for smart home systems **Artificial Intelligence (AI)** for energy usage predictions and **blockchain** for secure energy transactions. These technologies present many opportunities to enhance Rolsa Technologies' digital solution by:

* Integrating IoT devices to provide real-time energy usage data.
* Using AI to offer personalised energy-saving recommendations.
* Leveraging blockchain for secure and transparent energy transactions.

By addressing these challenges and incorporating customer-suggested features and emerging technologies Rolsa Technologies can strengthen its position as a leader in the green energy sector and deliver a superior customer experience.

# Proposed Solution

**What Solution Are You Proposing?**

We propose the development of a **modern user-friendly and feature-rich website** for Rolsa Technologies. This website will serve as a **centralised digital platform** to:

* Showcase your own products and services.
* Provide tools for customers to calculate and track their carbon footprint.
* Streamline the process of scheduling consultations and installations.
* Ensure accessibility for all users including those with disabilities.

The website will be designed to reflect your brand’s commitment to sustainability and innovation whilst also delivering an exceptional user experience.

**Description of the Solution**

The proposed website will be a **responsive multi-page platform** built using modern web development technologies. It will include:

* **Front-End Development**: A visually appealing and intuitive interface designed using HTML CSS and JavaScript.
* **Back-End Development**: A robust back-end system built with a suitable framework (e.g., Node.js Django or Laravel) to handle user data scheduling and calculations.
* **Database Integration**: A secure database (e.g., MySQL or MongoDB) to store user information appointment details and energy usage data.
* **Third-Party Integrations**: APIs for carbon footprint calculations and calendar scheduling.

The website will be **mobile-friendly** **secure** and **compliant with accessibility standards** (WCAG 2.1) It will also include **analytics tools** to track user engagement and improve performance over time.

**Pages and Features**

The website will include the following pages each with specific functions and features:

**1. Homepage**

**Purpose**: To provide an overview of Rolsa Technologies and its services while encouraging user engagement.

**Features**:

* **Hero Section**: A large visually appealing banner with a tagline (e.g., "Empowering a Greener Future") and call-to-action buttons (e.g., "Calculate Your Carbon Footprint" and "Schedule a Consultation")
* **Service Highlights**: Brief descriptions and icons for your core services (solar panels EV charging stations smart home systems)
* **Testimonials**: Quotes from satisfied customers to build trust.
* **Newsletter Signup**: A form for users to subscribe to updates and promotions.

**2. About Us**

**Purpose**: To tell the story of Rolsa Technologies and build a connection with your audience.

**Features**:

* **Company History**: A timeline or narrative about your journey and mission.
* **Team Introduction**: Photos and bios of key team members.
* **Values and Vision**: A section highlighting your commitment to sustainability and innovation.

**3. Services**

**Purpose**: To provide detailed information about your products and services.

**Features**:

* **Service Pages**: Dedicated pages for each service (solar panels EV charging stations smart home systems) with:
  + Descriptions and benefits.
  + Case studies or success stories.
  + High-quality images and videos.
* **Pricing Information**: General pricing guidelines or a request-a-quote form.

**4. Carbon Footprint Calculator**

**Purpose**: To help users calculate and track their carbon footprint.

**Features**:

* **Input Fields**: Users can enter data such as electricity usage gas consumption and vehicle mileage.
* **Instant Results**: A visual display of their carbon footprint (e.g., a pie chart or comparison to averages)
* **Tips for Reduction**: Suggestions for reducing their carbon footprint (e.g., switching to solar panels using public transport)

**5. Schedule a Consultation**

**Purpose**: To allow users to book consultations and installations online.

**Features**:

* **Calendar Integration**: A user-friendly calendar will show available time slots.
* **Appointment Form**: Fields for user details (name email phone) and service preferences.
* **Confirmation**: Automatic email/SMS confirmation of the appointment.

**6. Blog/Resources**

**Purpose**: To educate and engage the users with highly valuable content.

**Features**:

* **Articles and Guides**: Posts about green energy sustainability tips and industry trends.
* **FAQs**: Answers to common questions about your services.
* **Downloadable Resources**: Brochure’s whitepapers and checklists.

**7. Contact Us**

**Purpose**: To provide users with a way to get in touch with Rolsa Technologies.

**Features**:

* **Contact Form**: Fields for name email subject and message.
* **Contact Information**: Phone number email address and physical address.
* **Map Integration**: An interactive map showing your location.

**8. Accessibility Page**

**Purpose**: To demonstrate your commitment to inclusivity.

**Features**:

* **Accessibility Statement**: A description of the steps taken to ensure the website is accessible.
* **Feedback Form**: A way for users to report accessibility issues.

**9. User Account Dashboard (Optional)**

**Purpose**: To allow registered users to manage their data and appointments.

**Features**:

* **Profile Management**: Users can update their personal information.
* **Appointment History**: A list of past and upcoming appointments.
* **Energy Usage Tracking**: Graphs and data showing their energy usage over time.

**Key Features Across All Pages**

* **Responsive Design**: The website will work seamlessly on desktops tablets and mobile devices.
* **Accessibility**: The website will comply with WCAG 2.1 standards including screen reader compatibility and keyboard navigation.
* **Security**: SSL encryption and secure data storage to protect user information.
* **Analytics**: Integration with tools like Google Analytics to track user behaviour and improve the website over time.

**Why This Solution?**

This website will:

* **Enhance Customer Experience**: Provide a seamless intuitive platform for users to explore your services and take actionable steps toward sustainability.
* **Streamline Operations**: Automate scheduling and reduce manual processes freeing up your team to focus on delivering exceptional service.
* **Strengthen Your Brand**: Position Rolsa Technologies as a forward-thinking leader in the green technology sector.
* **Drive Sustainability Goals**: Empower customers to make greener choices contributing to a more sustainable future.

#### ****Proposed System Description****

The proposed system is a **digital platform** for **Rolsa Technologies** that will help customers access information about green energy products calculate their carbon footprint and schedule consultations for solar panel installations EV charging stations and smart home systems. The system will include:

* A **website** that is accessible on both desktop and mobile devices.
* Tools for calculating and tracking carbon footprints.
* A scheduling system for any consultations and installations.
* Access to verified information about green energy products and services.

The system will address the challenges identified by Rolsa Technologies such as:

* **Lack of centralised information**: Customers will be able to easily access any information about green energy products and services.
* **Difficulty in tracking carbon footprints**: The platform will provide an easy-to-use carbon footprint calculator.
* **Inefficient scheduling**: The system will be able to streamline the process of booking consultations and installations.

#### ****What Will Be Implemented****

The system will include the following **key features such as**:

##### **Functional Features**

1. **User Registration and Authentication**:
   * Customers can create an account to manage their data and appointments.
   * Email verification will ensure secure sign-ups.
2. **Carbon Footprint Calculator**:
   * Users can input data (e.g., energy usage vehicle mileage) to calculate their carbon footprint.
   * Results will be displayed in an easy-to-understand format (e.g., graphs comparisons)
3. **Scheduling System**:
   * Customers can book consultations and installations online.
   * Integration with email/SMS for reminders and confirmations.
4. **Product Information**:
   * Dedicated pages for solar panels EV charging stations and smart home systems.
   * Detailed descriptions benefits and case studies.
5. **Accessibility Features**:
   * Keyboard navigation high-contrast themes and screen reader compatibility.
   * Compliance with WCAG 2.1 standards.

##### **Non-Functional Features**

1. **Performance**:
   * Fast response times and high throughput to handle multiple users.
   * Optimised for both desktop and mobile devices.
2. **Security**:
   * Encrypted user data and secure authentication.
   * Compliance with data protection regulations (e.g., GDPR)
3. **Reliability**:
   * 99.9% uptime with backup systems in place.
   * Error handling and recovery mechanisms.
4. **Scalability**:
   * Cloud-based infrastructure to handle increasing users and data.
5. **Usability**:
   * Minimalist design with intuitive navigation.
   * Help files and tooltips for first-time users.

#### ****What You Will Learn****

By developing this system, you will gain valuable skills and knowledge in:

* **Web Development**:
  + Front-end development using HTML CSS and JavaScript.
  + Back-end development using PHP and SQL for database management.
* **User-Centered Design**:
  + Creating intuitive and accessible interfaces.
  + Conducting user testing and incorporating feedback.
* **Data Management**:
  + Storing and retrieving user data securely.
  + Generating reports and visualisations from historical data.
* **Security and Compliance**:
  + Implementing secure authentication and encryption.
  + Ensuring compliance with legal and regulatory requirements.
* **Project Management**:
  + Breaking down the project into manageable tasks.
  + Prioritising features based on user needs and business goals.

#### ****How It Aligns with Rolsa Technologies’ Requirements****

The proposed system meets Rolsa Technologies’ specific requirements by:

* Providing a **carbon footprint calculator** to help customers track their environmental impact.
* Offering a **scheduling system** for consultations and installations.
* Ensuring compatibility with various devices (desktop tablet smartphone)
* Maintaining a **simple and clutter-free design** for easy navigation.
* Including **accessibility features** to support a wide range of users.

#### ****Key Performance Indicators (KPIs) and User Acceptance Criteria****

To measure the success of the system the following **KPIs** will be used:

* **User Engagement**: Number of active users’ frequency of logins and time spent on the platform.
* **Conversion Rate**: Percentage of users scheduling consultations or installations.
* **System Uptime**: Percentage of time the system is operational (target: 99.9%)
* **User Satisfaction**: Feedback from users on usability and features.

**User Acceptance Criteria**:

* Users can successfully register log in and access their dashboard.
* Users can calculate their carbon footprint and view results.
* Customers can schedule consultations and installations.
* The system is accessible on multiple devices and meets WCAG 2.1 standards.

# **Justification of the Proposed Solution**

Rolsa Technologies is a leading provider of green energy solutions specialising in **solar panel installation and maintenance electric vehicle (EV) charging stations** and**smart home energy management systems**. As the demand for sustainable energy solutions grows Rolsa Technologies aims to empower customers to reduce their carbon footprint and transition to renewable energy sources. However, the company has identified several challenges in its current operations and customer interactions which hinder its ability to fully meet customer needs and scale its impact.

#### ****Customer Challenges****

Based on market research conducted by Rolsa Technologies customers face the following challenges:

1. **Lack of Centralised Information**: Customers often struggle to find comprehensive up-to-date information about green energy products and services.
2. **Difficulty Tracking Carbon Footprints**: There is no easy way for customers to be able to calculate and monitor their carbon footprint.
3. **Inefficient Scheduling**: The process of booking consultations and installations is manual and time-consuming leading to lots of delays and frustration.
4. **Limited Accessibility**: The current digital platforms are not fully accessible to users with disabilities limiting inclusivity.

#### ****Customer-Suggested Features****

To address these challenges Rolsa Technologies' customers have suggested the following features for the digital solution:

* **Account Registration**: Allow customers to create accounts to manage their consultations and energy usage data.
* **Accessibility Features**: Ensure the platform is usable by a wide range of users including those with disabilities.
* **Energy Usage Tracking Tool**: Provide a tool for calculating and tracking energy usage to help customers reduce their carbon footprint.

#### ****Industry Trends and Emerging Technologies****

The energy sector is rapidly evolving with advancements in the **Internet of Things (IoT)** for smart home systems **Artificial Intelligence (AI)** for energy usage predictions and **blockchain** for secure energy transactions. These technologies present opportunities to enhance Rolsa Technologies' digital solution by:

* Integrating IoT devices to provide real-time energy usage data.
* Using AI to offer personalised energy-saving recommendations.
* Leveraging blockchain for secure and transparent energy transactions.

By addressing these challenges and incorporating customer-suggested features and emerging technologies Rolsa Technologies can strengthen its position as a leader in the green energy sector and deliver a superior customer experience.

# Decomposition of Problems

**Hierarchy Diagram**

A diagram of a company

Description automatically generated

A diagram of a company

Description automatically generated

A diagram of a website

Description automatically generated

A diagram of a company

Description automatically generated

A diagram of a website

Description automatically generated

A diagram of a company

Description automatically generated

A diagram of a graph

Description automatically generated

A diagram of a company

Description automatically generated

**A diagram of a company

Description automatically generated**

**A diagram of a company

Description automatically generated**

**A diagram of a company

Description automatically generated**

**A diagram of a company

Description automatically generated**

This **hierarchy diagram** provides a very comprehensive and structured overview of the **entire digital solution** for Rolsa Technologies. It breaks down each page such as the **Home Page, Product Information Page, Consultation and Scheduling Page, Carbon Footprint Calculator Page, Energy Usage Monitoring Page, Membership Page, User Account Page,** and**Accessibility Settings Page** into their core components. These include **GUI features** (what users are able to see and interact with) **front-end development** (how the pages are built and function) and **back-end systems** (how data is being processed, stored, and managed) This diagram was created to help Rolsa Technologies visualise the technical and functional aspects of the entire platform ensuring that all stakeholders—whether technical or non-technical—understand how the solution will work from user interaction to data storage and system integrations. The purpose of this diagram is to **streamline communication guide development** and **ensure alignment** between Rolsa's goals and the proposed solution. By mapping out the structure and flow of the entire platform the diagram serves as a **blueprint** for building a seamless user-friendly and

efficient digital experience that meets the needs of both Rolsa Technologies and its customers.

**1.Functional Requirements:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| | **Requirement** | | --- | | **Decomposition** | **Priority** | **Justification** |
| |  | | --- | | **Account Registration** | | - Design a user registration form. - Implement backend validation for user data. - Create a database to store user credentials securely. - Develop a login system with authentication (e.g., password hashing) | High | |  | | --- | | Essential for user management and enabling features like scheduling and energy tracking. | |  | |
| |  | | --- | | **Scheduling System** | | - Create a calendar/booking system. - Allow users to select available time slots. - Notify users and technicians of scheduled appointments. - Integrate with email/SMS for reminders. | High | |  | | --- | | Critical for improving customer experience and operational efficiency. | |  | |
| |  | | --- | | **Carbon Footprint Calculator** | | - Design a user-friendly interface for inputting energy usage data. - Develop algorithms to calculate carbon footprint based on user inputs. - Display results in an understandable format (e.g., graphs comparisons) | High | |  | | --- | | Aligns with Rolsa Technologies' mission to promote sustainability. | |  | |
| |  | | --- | | **Accessibility Features** | | - Ensure the solution is compatible with screen readers. - Implement keyboard navigation. - Provide alternative text for images and icons. - Use high-contrast colour schemes for visually impaired users. | High | Ensures inclusivity and compliance with WCAG 2.1 standards. |

**2. Non-Functional Requirements:**

These are the quality attributes and constraints the solution must meet.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| | **Requirement** | | --- | | | **Decomposition** | | --- | | **Priority** | **Justification** |
| **Performance** | - Optimise database queries to ensure fast response times. - Use caching mechanisms for frequently accessed data. - Ensure the solution can handle many concurrent users. | High | |  | | --- | | A fast and responsive website is critical for user satisfaction and engagement. Slow performance can lead to user frustration and loss of customers. Which can hugely affect the business negatively | |  | |
| **Security** | - Implement secure user authentication (e.g.,. two-factor authentication) - Encrypt sensitive data (e.g., user credentials energy usage data) - Regularly update software to patch vulnerabilities. | High | |  | | --- | | Security is essential to protect user data and build trust. A breach could damage Rolsa Technologies' reputation and lead to legal issues. | |  | |
| |  | | --- | | **Scalability** | | - Design the system to handle increasing numbers of users and data. - Use cloud-based services for scalable storage and computing power. - Implement load balancing for high traffic. | Medium | |  | | --- | | Scalability ensures the website can grow with the business. While not immediately critical it is important for long-term success. | |  | |
| **Usability** | - Conduct user testing to ensure the interface is intuitive. - Provide clear instructions and tooltips for complex features. - Ensure the solution is mobile-friendly | High | |  | | --- | | A user-friendly website is essential for customer satisfaction and engagement. Poor usability can lead to user abandonment. | |  | |
| |  | | --- | | **Compliance with Regulations** | | - Ensure the solution complies with GDPR for data protection. - Follow accessibility standards (e.g., WCAG 2.1) - Adhere to energy sector regulations for data handling and reporting. | High | |  | | --- | | Compliance is mandatory to avoid legal penalties and ensure inclusivity. It also builds trust with users. | |  | |
| **Reliability** | - Ensure the website has 99.9% uptime. - Implement backup systems to prevent data loss. - Regularly test the system for bugs and errors. | High | |  | | --- | | Reliability is critical for maintaining user trust and ensuring that the website is always available for customers. | |  | |
| **Maintainability** | - Use modular code for easy updates and maintenance. - Provide documentation for developers. - Implement version control (e.g.,. Git) | Medium | |  | | --- | | Maintainability ensures that the website can be updated and improved over time with minimal effort. While it is not immediately critical it is important for long-term sustainability. | |  | |
| **Accessibility** | - Ensure the website is compatible with screen readers. - Implement keyboard navigation. - Provide alternative text for images and icons. - Use high-contrast colour schemes for visually impaired users. | High | |  | | --- | | Accessibility ensures that the website can be used by all customers including those with disabilities. This is both a legal requirement and a moral obligation. | |  | |
| **Availability** | - Ensure the website is available 24/7 with minimal downtime. - Use reliable hosting services with redundancy. - Monitor uptime and performance regularly. | |  | | --- | | High | | |  | | --- | | High availability is critical for customer satisfaction and business operations. Downtime can lead to lost revenue and damage to the brand’s reputation. | |  | |
| **Interoperability** | - Ensure the website integrates with third-party tools (e.g., carbon footprint APIs calendar systems) - Use standard protocols and formats for data exchange. | Medium | Interoperability allows the website to work seamlessly with other systems enhancing functionality and user experience. |

# Risk Mitigation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Risk | Impact | Mitigation | New Impact | Owner |
| **1. Data Breach or Unauthorised Access** | High Impact-  - Loss of sensitive customer data (e.g., personal information payment details) - Damage to reputation and loss of customer trust. - Legal penalties and fines for non-compliance with data protection laws (e.g., GDPR) which can lead up to fines of £1000 and other heavy penalties which could cause the business to go into bankruptcy. | - Implementing strong encryption for data at rest and in transit. - Use multi-factor authentication (MFA) for all user accounts to ensure authentication and more security. - Regularly conduct penetration testing and vulnerability assessments. - Train employees on cybersecurity best practices. - Maintain an incident response plan for data breaches. | - Reduced likelihood of data breaches. - Improved customer trust and confidence. - Compliance with data protection regulations. | Project Manager |
| **2. System Downtime or Outages** | High Impact-  - Loss of revenue due to inability to schedule consultations or sell products. - Frustration among customers leading to potential loss of business. - Delays in project timelines and installations | - Implement a robust disaster recovery plan in case something goes wrong. - Use cloud-based infrastructure with high availability and redundancy. - Monitor system performance in real-time and set up automated alerts. - Conduct regular maintenance and updates during off-peak hours. | - Minimised downtime and improved system reliability. - Enhanced customer satisfaction due to uninterrupted service. - Increased operational efficiency | Project Manager |
| |  | | --- | | **3. Poor User Experience (UX)** | | Medium Impact  - High bounce rates and low user engagement. - Negative reviews and reduced customer retention. - Difficulty in attracting new customers due to poor reputation. | - Conduct user testing and gather feedback during development. - Optimise website performance (e.g., fast load times mobile responsiveness) - Simplify navigation and ensure intuitive design. - Regularly update content and features based on user needs. | - Improved user engagement and satisfaction. - Higher customer retention and positive reviews. - Increased conversion rates and revenue. | Project Manager |
| **4. Integration Failures with Third-Party Services** | High Impact  - Inability to process payments or schedule consultations. - Loss of critical functionality leading to customer dissatisfaction. - Increased operational costs to resolve integration issues. | - Test integrations thoroughly before deployment. - Use APIs with strong documentation and support. - Monitor third-party service status and have fallback options. - Maintain clear communication with third-party providers | - Seamless integration with third-party services. - Reliable functionality and improved customer experience. - Reduced operational costs and downtime. | Project Manager |
| **5. Inaccurate Carbon Footprint Calculations** | Medium Impact  - Misleading recommendations for customers. - Loss of credibility and trust in Rolsa's expertise. - Potential legal issues if customers act on incorrect data. | - Validate calculation algorithms with industry standards. - Regularly update data sources and formulas. - Provide disclaimers and educate users on the limitations of the tool. - Allow users to input additional data for more accurate results. | - Accurate and reliable carbon footprint calculations. - Enhanced credibility and trust in Rolsa's services. - Reduced risk of legal issues and customer dissatisfaction. | Project Manager |
| |  | | --- | | **6. High Customer Acquisition Costs** | | Medium Impact   |  | | --- | | - Reduced profitability due to high marketing expenses. - Difficulty in scaling the business. - Over-reliance on paid advertising channels. | | - Leverage customer referrals and loyalty programs. - Analyse and optimise marketing campaigns for better ROI. - Focus on retaining existing customers through excellent service. | - Lower customer acquisition costs and improved profitability. - Sustainable growth through organic channels. - Increased customer lifetime value (CLV) and brand loyalty. | Project Manager |
| **7. Regulatory Non-Compliance** | High Impact-  - Fines and penalties from regulatory bodies. - Suspension of operations until compliance is achieved. - Damage to Rolsa's reputation as a responsible business. | - Stay updated on relevant regulations (e.g., GDPR energy sector laws) - Conduct regular compliance audits. - Hire legal and compliance experts to ensure adherence. - Implement internal policies and training programs for employees. | - Full compliance with regulatory requirements. - Avoidance of fines and operational disruptions. - Enhanced reputation as a compliant and ethical business. | Project Manager |
| |  | | --- | | **8. Supply Chain Disruptions** | | Medium Impact   |  | | --- | | - Delays in product delivery and installations. - Increased costs due to sourcing alternative suppliers. - Customer dissatisfaction and potential loss of business. | | - Diversify suppliers to reduce dependency on a single source. - Maintain buffer stock of critical components. - Monitor supply chain risks and establish contingency plans. - Build strong relationships with reliable suppliers. | - Minimised disruptions and delays in product delivery. - Reduced costs and improved customer satisfaction. - Increased resilience to supply chain challenges. | Project Manager |
| |  | | --- | | **9. Lack of Skilled Workforce** | | Medium Impact  - Delays in project implementation and maintenance. - Reduced quality of service due to inexperienced staff. - Increased training costs and employee turnover. | - Invest in employee training and development programs. - Partner with educational institutions to recruit talent. - Offer competitive salaries and benefits to attract skilled professionals. - Foster a positive work culture to retain employees | - Skilled and motivated workforce. - Improved service quality and project delivery. - Reduced turnover and training costs. | Project Manager |
| **10. Cybersecurity Threats (e.g., Ransomware)** | High Impact  - Loss of access to critical systems and data. - Financial losses due to ransom payments or recovery costs. - Damage to Rolsa's reputation and customer trust. | - Implement robust endpoint protection and firewalls. - Regularly back up data and store it securely. - Train employees to recognise phishing and social engineering attacks. - Develop and test a cybersecurity incident response plan. | - Reduced risk of successful cyberattacks. - Quick recovery from incidents with minimal disruption. - Enhanced reputation as a secure and trustworthy business. | Project Manager |

# Regulatory requirements and guidelines

**1. General Data Protection Regulation (GDPR)**

**Summary**

The GDPR is an EU law designed to protect the privacy and personal data of individuals. It requires organisations to:

* Obtain explicit consent before processing personal data.
* Ensure data security and report breaches promptly.
* Allow users to access correct or delete their data.
* Demonstrate accountability through audits and documentation.

**Compliance Measures**

1. **Explicit Consent**:
   * Provide clear information about data collection and usage.
   * Obtain explicit consent before collecting or processing data.
   * Allow users to withdraw consent at any time.
2. **Data Security**:
   * Use encryption for data in transit and at rest.
   * Implement strong access controls and authentication mechanisms.
   * Conduct regular security assessments and vulnerability testing.
3. **Data Subject Rights**:
   * Provide clear information about the individuals' rights under GDPR.
   * Implement procedures for handling data subject requests (e.g., access rectification erasure)
   * Respond to requests in a timely and transparent manner.
4. **Accountability**:
   * Maintain comprehensive records of data processing activities.
   * Conduct regular compliance audits and employee training.

**Justification**

* **User Trust**: Adhering to GDPR fosters trust and confidence among users.
* **Risk Mitigation**: Strong security measures reduce the risk of data breaches.
* **Legal Compliance**: Compliance is mandatory to avoid fines and reputational damage.
* **Competitive Advantage**: Demonstrating GDPR compliance can differentiate Rolsa from competitors.

**2. Data Protection Act (DPA)**

**Summary**

The DPA is a UK law that governs how personal data is collected, used, and stored. It ensures that organisations handle personal information responsibly, securely, and fairly. Key principles include:

* Using data only for specified purposes.
* Keeping data accurate and up to date.
* Storing data securely.
* Allowing individuals to access correct or delete their data.

**Compliance Measures**

1. **Data Collection**:
   * Collect only necessary personal data for specified purposes.
   * Ensure that the data is accurate and up to date.
2. **Data Security**:
   * Use encryption and access controls to protect the data.
   * Conduct regular security assessments.
3. **Data Subject Rights**:
   * Provide clear information about individuals' rights.
   * Implement procedures for handling data subject requests.
   * Respond to requests in a timely and transparent manner.
4. **Accountability**:
   * Maintain comprehensive records of data processing activities.
   * Conduct regular compliance audits and employee training.

**Justification**

* **User Trust**: Ensures users that their personal data is being handled securely, safely and responsibly.
* **Legal Compliance**: Avoids legal penalties and fines.
* **Reputation**: Demonstrates Rolsa’s commitment to privacy and ethical data handling.

**3. Web Content Accessibility Guidelines (WCAG)**

**Summary**

WCAG provides a framework to ensure websites and digital platforms are usable by individuals with disabilities. Key principles include:

* **Perceivable**: Provide text alternatives for images and captions for videos.
* **Operable**: Ensure keyboard navigation and no time-sensitive interactions.
* **Understandable**: Use clear language and consistent layouts.
* **Robust**: Ensure compatibility with assistive technologies like screen readers.

**Compliance Measures**

1. **Perceivable**:
   * Provide text alternatives for images and captions for videos.
   * Ensure content is adaptable to different devices and screen sizes.
2. **Operable**:
   * Ensure keyboard navigation and no time-sensitive interactions.
   * Provide clear and consistent navigation.
3. **Understandable**:
   * Use clear language and consistent layouts.
   * Provide instructions and error messages that are easy to understand by the user.
4. **Robust**:
   * Ensure compatibility with the assistive technologies such as screen readers and more.
   * Conduct regular accessibility audits and user testing.

**Justification**

* **Inclusivity**: Ensures that all users including those with disabilities can access and benefit from Rolsa’s services.
* **Legal Compliance**: Meets legal accessibility requirements reducing the risk of lawsuits or penalties.
* **User Engagement**: Improves usability and engagement for all users.

**4. World Wide Web Consortium (W3C)**

**Summary**

W3C develops and promotes standards to ensure the long-term growth of the web. Key standards include HTML CSS and WCAG. Compliance ensures:

* Compatibility with different devices and browsers.
* Accessibility for all users.
* A better user experience and web innovation.

**Compliance Measures**

1. **Standards Adherence**:
   * Use correct HTML and CSS code.
   * Follow WCAG guidelines for accessibility.
2. **Testing and Updates**:
   * Regularly test and update the website to ensure compatibility and responsiveness.
   * Conduct regular accessibility audits and user testing.

**Justification**

* **Compatibility**: Ensures the website works seamlessly across devices and browsers.
* **Accessibility**: Makes the platform usable for people with disabilities.
* **User Experience**: Improves overall usability and efficiency.

**5. Copyright Law**

**Summary**

Copyright Law protects creative works granting creators exclusive rights to use, distribute and reproduce their work. Organisations should respect copyright to avoid any legal issues and ensure proper use of content.

**Compliance Measures**

1. **Content Usage**:
   * Use only original licensed or properly attributed content.
   * Avoid using any copyrighted content without permission.
2. **Record-Keeping**:
   * Maintain records of licenses and permissions.
   * Produce original content whenever possible.

**Justification**

* **Legal Compliance**: Avoids any legal issues and potential fines.
* **Intellectual Property Protection**: Protects Rolsa’s original work.
* **Reputation**: Builds trust with content creators and users.

**6. Trademark Law**

**Summary**

Trademark Law protects any brand names, logos, slogans, and other distinctive marks. It gives the owner exclusive rights to use their trademark by preventing others from using a similar mark that could confuse the consumers.

**Compliance Measures**

1. **Trademark Registration**:
   * Register Rolsa’s brand name, logo, and any other distinguishing marks.
   * Conduct any trademark searches to ensure uniqueness.
2. **Avoid Infringement**:
   * Avoid using trademarks that are already registered by other businesses.
   * Respecting existing trademarks to prevent any legal disputes.

**Justification**

* **Brand Protection**: Safeguards Rolsa’s brand identity and reputation.
* **Legal Compliance**: Avoids any legal issues and maintains overall control over intellectual property.
* **Market Recognition**: Ensures that Rolsa’s brand is very distinct and recognised.

# KPI

### ****Key Performance Indicators (KPIs) for Rolsa Technologies****

1. **User Acquisition**:
   * Achieve **1500 new users** within the first **2 months** after launch.
2. **Service Completion Rate**:
   * Ensure **90% of consultations and installations** are completed within the first **quarter** after launch.
3. **Customer Satisfaction**:
   * Maintain a **customer satisfaction score of at least 4 out of 5** within the first **6 months**.
4. **Energy Efficiency Improvement**:
   * Demonstrate that **50% of users** show a significant reduction in their carbon footprint after the first **6 months** of using the platform.
5. **Response Time**:
   * Achieve an **average response time of under 8 hours** for user support queries during the first year of operation.
6. **Platform Uptime**:
   * Maintain a **platform uptime of at least 95%** during the first year after launch.
7. **User Retention**:
   * Ensure that **70% of registered users** remain active after the first **6 months** of usage.
8. **Feedback Collection**:
   * Collect any feedback from **at least 50% of users** through post-service surveys within the first **3 months** after launch.
9. **Social Media Growth**:
   * Achieve a minimum of **1000 new followers** across all social media platforms within the first **6 months** after launch.
10. **Course Completion Rate**:
    * Ensure **80% of enrolled users** complete their selected energy efficiency courses by the end of the first year.

# UAC

**User Acceptance Criteria (UAC) for Rolsa Technologies**

**1. User Registration**

**User Story**:

* As a new user I want to register an account to access personalised energy efficiency recommendations and track my progress.

**UAC**:

* The registration form must include fields for full name email password and user type (e.g., homeowner business owner)
* The system must validate inputs (e.g., email format password strength) in real time.
* Upon successful registration the user must receive a confirmation email.
* User data must be stored securely using encryption and hashing.

**2. User Login**

**User Story**:

* As a registered user I want to log in to my account to access my dashboard and schedule consultations.

**UAC**:

* The login page must accept email/username and password.
* The system must validate any inputs and authenticate users against the database.
* Users must receive any error messages for incorrect credentials (e.g., "Incorrect password”, "User not found")
* Successful login must redirect the users to their personalised dashboard.

**3. Scheduling Consultations and Installations**

**User Story**:

* As a user I want to schedule consultations and installations for solar panels or EV charging stations.

**UAC**:

* The system must be able to display available dates and times for consultations/installations.
* Users must be able to select a preferred date time and service type.
* The system must confirm bookings and send a confirmation message (e.g., email or SMS)
* Users must be able to cancel bookings from their dashboard.

**4. Carbon Footprint Calculator**

**User Story**:

* As a user I want to calculate my carbon footprint to understand my environmental impact.

**UAC**:

* The calculator must accept inputs such as energy usage and travel habits.
* The system must validate inputs and provide real-time feedback (e.g., "Invalid input")
* The calculator must display a carbon footprint score and personalised recommendations.
* Data must be stored securely for future reference.

**5. Energy Usage Monitoring**

**User Story**:

* As a user I want to monitor my energy usage to identify areas for improvement.

**UAC**:

* The system must collect real-time and historical energy usage data from connected devices.
* The dashboard must display energy usage trends and insights.
* The system must provide energy-saving tips and alerts for unusual usage.

**6. Accessibility**

**User Story**:

* As a visually impaired user I want to navigate the platform using a screen reader.

**UAC**:

* All images must have descriptive alt text.
* Interactive elements (e.g., buttons links) must be clearly labelled.
* The platform must support keyboard navigation and meet WCAG 2.1 standards.
* A "text-to-speech" feature must be available for reading course materials.

**7. Collaborative Tools**

**User Story**:

* As a user I want to communicate with consultants and share files for feedback.

**UAC**:

* The platform must be able to support real-time messaging and file sharing.
* Users must be able to schedule and join video calls with consultants.
* A virtual whiteboard must be available for real-time collaboration during sessions.

**8. Reward System**

**User Story**:

* As a user I want to earn rewards for reducing my energy usage and attending consultations.

**UAC**:

* The system must track user activities (e.g., energy savings consultations attended)
* Users must earn points or badges based on predefined criteria.
* Notifications must be sent to users when they earn rewards.

**9. Response Time Optimisation**

**User Story**:

* As a user I want the platform to load quickly so I can access information without delays.

**UAC**:

* The platform must load pages in **under 2 seconds**.
* Caching and content delivery networks (CDNs) must be used to optimise performance.
* Loading status messages must be displayed for longer processes.

**10. Scalability**

**User Story**:

* As a user I want the platform to handle high traffic without performance issues.

**UAC**:

* The platform must support **up to 1000 concurrent users** without slowdowns.
* Load balancing must distribute traffic evenly across servers.
* Resource utilisation (e.g., CPU memory) must be monitored and optimised.

**11. Browser Compatibility**

**User Story**:

* As a user I want the platform to work seamlessly on my preferred browser.

**UAC**:

* The platform must be tested and functional on all major browsers (e.g., Chrome Firefox Safari Edge)
* Responsive design principles must ensure compatibility across devices and screen sizes.

# Summary

# **Research Task: Preparing for the Digital Solution**

#### ****Objective****

To research how digital solutions are used in the energy sector, focusing on:

1. Hardware and software usage.
2. Emerging technologies.
3. Meeting user needs.
4. Industry-specific guidelines and regulations.

### ****1. How Hardware and Software Are Used in the Energy Sector****

#### ****Hardware****

1. **Smart Meters**:
   * Devices that measure energy consumption in real-time.
   * Enable users to monitor and optimise energy usage.
   * Example: Smart electricity meters for homes and businesses.
2. **IoT Devices**:
   * Sensors and devices connected to the internet for data collection.
   * Used in smart home energy management systems (e.g., thermostats, lighting controls).
   * Example: Nest Thermostat.
3. **Solar Panels and EV Chargers**:
   * Hardware integrated with software for monitoring and control.
   * Example: Solar inverters with mobile apps for tracking energy production.

#### ****Software****

1. **Energy Management Systems (EMS)**:
   * Software platforms that analyse energy usage and provide insights.
   * Example: Platforms like **Enphase** for solar energy monitoring.
2. **Mobile and Web Applications**:
   * Provide users with access to energy data, scheduling, and carbon footprint tracking.
   * Example: Apps like **Tesla Energy** for managing solar and battery systems.
3. **Data Analytics Platforms**:
   * Use AI and machine learning to predict energy usage and optimise systems.
   * Example: Platforms like **Google Nest Renew** for energy-saving recommendations.

### ****2. Emerging Technologies in the Energy Sector****

1. **Artificial Intelligence (AI) and Machine Learning (ML)**:
   * Used for predictive analytics, energy optimisation, and personalised recommendations.
   * Example: AI algorithms that predict energy demand and adjust systems accordingly.
2. **Blockchain**:
   * Enables secure energy trading and data management.
   * Example: Peer-to-peer energy trading platforms like **Power Ledger**.
3. **Internet of Things (IoT)**:
   * Connects energy devices for real-time monitoring and control.
   * Example: Smart grids that balance energy supply and demand.
4. **Augmented Reality (AR) and Virtual Reality (VR)**:
   * Used for training, simulations, and visualising energy systems.
   * Example: AR tools for solar panel installation training.
5. **5G Connectivity**:
   * Enhances real-time data transmission for energy systems.
   * Example: Remote monitoring of EV charging stations.

### ****3. How Digital Solutions Meet User Needs****

#### ****Customer Needs****

1. **Access to Information**:
   * Users want easy access to product details, energy usage data, and carbon footprint insights.
   * Example: A dashboard showing real-time energy consumption.
2. **Convenience**:
   * Users prefer seamless scheduling, payment, and support.
   * Example: Online booking for solar panel installations.
3. **Sustainability**:
   * Users want tools to reduce their carbon footprint and adopt green energy practices.
   * Example: Carbon footprint calculators with personalised recommendations.
4. **Accessibility**:
   * Solutions must cater to users with disabilities.
   * Example: Screen reader compatibility and high-contrast interfaces.

#### ****Business Needs****

1. **Operational Efficiency**:
   * Businesses need tools to manage appointments, inventory, and customer data.
   * Example: Admin dashboards for tracking appointments and sales.
2. **Customer Engagement**:
   * Businesses want to engage users with personalised offers and notifications.
   * Example: Push notifications for new products or promotions.
3. **Scalability**:
   * Solutions must handle growing user bases and data volumes.
   * Example: Cloud-based platforms that scale with demand.

### ****4. Industry-Specific Guidelines and Regulations****

#### ****Data Protection****

1. **General Data Protection Regulation (GDPR)**:
   * Ensures user data is collected, stored, and processed securely.
   * Example: Encrypting user passwords and providing data access controls.
2. **California Consumer Privacy Act (CCPA)**:
   * Grants users rights over their personal data.
   * Example: Allowing users to request data deletion.

#### ****Accessibility****

1. **Web Content Accessibility Guidelines (WCAG 2.1)**:
   * Ensures digital solutions are accessible to users with disabilities.
   * Example: Providing alt text for images and keyboard navigation.

#### ****Energy Sector Regulations****

1. **Renewable Energy Certificates (RECs)**:
   * Certificates for generating renewable energy.
   * Example: Solar panel installations must comply with REC standards.
2. **Energy Efficiency Standards**:
   * Regulations for energy-efficient products and systems.
   * Example: ENERGY STAR certification for smart home devices.
3. **Grid Compliance**:
   * Ensures energy systems comply with local grid regulations.
   * Example: Solar inverters must meet grid connection standards.

### ****Research Notes for Appendix****

#### ****Hardware and Software Usage****

* Smart meters and IoT devices are essential for real-time energy monitoring.
* Energy management systems (EMS) and mobile apps provide users with insights and control.

#### ****Emerging Technologies****

* AI and blockchain are transforming energy optimisation and trading.
* IoT and 5G enable real-time connectivity for energy systems.

#### ****Meeting User Needs****

* Digital solutions must provide convenience, accessibility, and sustainability.
* Businesses need tools for operational efficiency and customer engagement.

#### ****Guidelines and Regulations****

* GDPR and CCPA ensure data protection and user privacy.
* WCAG 2.1 ensures accessibility for all users.
* Energy sector regulations (e.g., RECs, ENERGY STAR) ensure compliance with industry standards.

### ****Next Steps****

1. **Document Findings**:
   * Organise the research notes into a structured appendix for the proposal.
2. **Incorporate into Proposal**:
   * Use the research to justify the design and features of the proposed solution.
3. **Validate with Stakeholders**:
   * Share the research with Rolsa Technologies to ensure alignment with their goals.

### ****1. Hardware and Software in the Energy Sector****

#### ****Smart Meters and IoT Devices****

* **Smart Meters**: [UK Government - Smart Meters](https://www.gov.uk/guidance/smart-meters-how-they-work)
* **IoT in Energy**: [IoT for Energy Management](https://www.iotforall.com/iot-energy-management-solutions)

#### ****Energy Management Systems (EMS)****

* **Enphase Energy**: [Enphase Energy Monitoring](https://enphase.com/)
* **Tesla Energy**: [Tesla Energy Products](https://www.tesla.com/energy)

### ****2. Emerging Technologies in the Energy Sector****

#### ****AI and Machine Learning****

* **AI in Energy**: [AI in the Energy Sector](https://www.weforum.org/agenda/2021/03/ai-energy-sector-transformation/)
* **Google Nest Renew**: [Nest Renew](https://nest.com/renew/)

#### ****Blockchain****

* **Power Ledger**: [Power Ledger - Peer-to-Peer Energy Trading](https://www.powerledger.io/)
* **Blockchain in Energy**: [Blockchain for Energy](https://www.energy.gov/ceser/articles/blockchain-technology-energy-sector)

#### ****IoT and 5G****

* **IoT in Smart Grids**: [IoT for Smart Grids](https://www.iotworldtoday.com/2021/05/12/iot-in-smart-grids/)
* **5G in Energy**: [5G for Energy Sector](https://www.ericsson.com/en/reports-and-papers/white-papers/5g-for-energy-and-utilities)

### ****3. Meeting User Needs****

#### ****Customer-Facing Solutions****

* **Tesla App**: [Tesla Mobile App](https://www.tesla.com/support/tesla-app)
* **Octopus Energy**: [Octopus Energy App](https://octopus.energy/)

#### ****Accessibility****

* **WCAG 2.1 Guidelines**: [Web Content Accessibility Guidelines (WCAG)](https://www.w3.org/WAI/standards-guidelines/wcag/)
* **Accessible Energy Apps**: [Accessibility in Energy Apps](https://www.energy.gov/ceser/articles/accessibility-energy-apps)

### ****4. Industry-Specific Guidelines and Regulations****

#### ****Data Protection****

* **GDPR**: [General Data Protection Regulation (GDPR)](https://gdpr-info.eu/)
* **CCPA**: [California Consumer Privacy Act (CCPA)](https://oag.ca.gov/privacy/ccpa)

#### ****Energy Sector Regulations****

* **Renewable Energy Certificates (RECs)**: [RECs Overview](https://www.epa.gov/greenpower/renewable-energy-certificates-recs)
* **ENERGY STAR**: [ENERGY STAR Certification](https://www.energystar.gov/)
* **Grid Compliance**: [Grid Connection Standards](https://www.nationalgrid.com/uk/electricity/connections/standards)

### ****Additional Resources****

#### ****Research and Reports****

* **International Energy Agency (IEA)**: [IEA Reports](https://www.iea.org/)
* **World Economic Forum - Energy Transition**: [WEF Energy Transition](https://www.weforum.org/agenda/archive/energy-transition/)

#### ****Case Studies****

* **Smart Home Energy Management**: [Smart Home Energy Case Study](https://www.sciencedirect.com/topics/engineering/smart-home-energy-management-system)
* **Blockchain in Energy Trading**: [Blockchain Energy Case Study](https://www.sciencedirect.com/science/article/pii/S1364032121001233)