Task 1

I have been asked by the owner of Rolsa Technologies to develop a digital system that will:

* Provide customers with information about:
* Green energy projects currently on the market
* How to reduce their carbon footprint
* Allow customers to:
* Schedule consultations and installations
* Calculate their carbon footprint
* It should also have features that are:
* Account registrations to allow customers to manage their consultations and data
* Accessibility features to support a wide range of users
* A tool for calculating and tracking energy usage

The Purpose of the app

In context of our App, the purpose of the digital system is to serve as a comprehensive platform that helps individuals and businesses make environmentally conscious decisions by providing education, personalized tools, services, and ongoing tracking of their efforts to reduce their environmental impact. It acts as a one-stop solution for accessing green energy solutions and improving sustainability. The digital solution informs users about green energy projects available in the market, giving them knowledge about renewable energy options such as solar panels, wind energy, and other sustainable solutions. This allows users to make informed decisions about adopting greener energy sources.

Target Audience

The app would appeal to an audience aligned with sustainability, energy conservation, and those who want to be diminishing their carbon footprints. The target audience would include eco-conscious people, young adults, homeowners, businesses, and anyone making environmentally friendly decisions. Providing education, actionable tools, and services, the app offers a complete solution built around the needs of the audience.

Aims and objectives (Rolsa technologies)

The company’s aims focus on promoting sustainability, reducing carbon footprints, and providing cost-effective energy solutions to residential and commercial customers. Their objectives include increasing market penetration, improving adoption of energy-efficient technologies, and offering excellent after-sales support. Opportunities for improvement include expanding customer education, integrating technologies better, making systems more affordable, and improving the sustainability of their operations and products.

A further goal of the app might be to improve the ease of use, user interface, and integration with other smart devices which could enhance the customer experience.

Another further goal could be to improve and invest in user centred designs for smart home users and ensure the systems are easy to set up and control, even for those who are not so technically advanced.

The past years have seen the emergence of several such websites and apps, through which businesses can trace their environmental sustainability efforts. Now, digital tools are largely utilized by companies to measure and mitigate carbon footprint levels, monitor energy consumption, and assess other environmental issues such as waste management and water use. This technology now plays a central role in ensuring the transparency and accountability of corporate sustainability.

1. Energy Management Platforms:

Energy Management Platforms are important digital tools for the greening of the energy sector. Such platforms help organizations to monitor their energy use in real-time, optimize energy usage, and thus save on waste. One of the best examples is Energy Star Portfolio Manager, which is widely used in the commercial sector.

Among other capabilities, Energy Star Portfolio Manager allows users to view their energy and water usage, track emissions, and analyze these with respect to benchmarks. Combined with easy-to-read reports and insights, this helps firms make determinations about where improvement can be made. It serves as an input with energy consumption, square footage of a building, and the number of employees to compute an energy efficiency score for the building, which aids companies in tracking progress toward the achievement of the sustainability goals.

This system common limitation is its reliance on manual data entry or limited integration to other digital tools or building systems. If there has been an outdated energy meter, or some departments are not synchronized, the accuracy of the system may be jeopardized, resulting in gaps in reporting. But still, this system is one of the top in the field of monitoring energy use because it helps companies correlate directly between energy use and environment damage.

2 Carbon Footprint Calculators:

Numerous organizations have carbon footprint calculators implemented in estimation and reduction programs that will reduce their overall emissions. Carbon Trust, which is among the most popular organizations, also offers an online platform that calculates and records emissions in businesses. The Carbon Footprint Calculator provides insight into a business's carbon dioxide emission through energy use, emission from transportation, and consumption of raw materials.

It also allows those businesses to monitor their carbon footprint over time and pinpoint areas in which improvement is applicable. It might even include measuring the effect of renewable installations, such as solar or wind power, on the carbon footprint or tracking success in waste management programs.

However, like all energy management platforms, the carbon calculators are only as good as their input data. Inaccuracies in reporting, assumptions of out-of-date technology, or misestimation in the amount of energy possessed can skew the results considerably. But it is a vehicle for businesses today to put their money where their mouths are in terms of becoming more sustainable and helps them report tangible superior changes over time and direct their decarbonization efforts.

3. Sustainability tracking for Manufacturing:

Manufacturing industries need real-time digital systems that can help monitor resource usage for productivity, as well as reduction in environmental impact. Through these solutions, Siemens helps manufacturers track and optimize energy, water, and raw material performances.

For example, using the MindSphere platform, Siemens connects industrial equipment, machines, and sensors to the cloud, allowing manufacturers to access real-time information on their resources and emissions. The predictive analytics help companies determine when maintenance of the equipment will be needed as well as when the spikes on energy consumption occur, then give them a road map of operation for sustainability.

Completely integrated with all functionalities, these capabilities face the challenge of integration between legacy equipment and modern digital systems. Then only some manufacturing plants have not updated or renovated their equipment or infrastructure to facilitate them with advantages such as fully advanced digitized tracking systems. Therefore, the complete potential realization from these platforms may take longer as the manufacturing process advances on technology.

4. A fourth example of the digital systems in green energy is smart building technology that provides management and energy efficiency for commercial real estate. Johnson Controls, a global leader in smart buildings, developed the Metasys® Building Automation System, which integrates a combination of building systems (HVAC, lighting, and energy management) to optimize the energy usage of buildings.

This system has embedded sensors that collect data from the infrared building infrastructure server to monitor energy consumption, indoor air quality, and heating/cooling patterns in real-time. In addition, based on the data collected, it automatically adjusts settings to ensure the maximum comfort of living and working environments with minimum energy wastage.

An important downside of smart systems for buildings is the capital required for implementation, especially in the case of older buildings that may require significant retrofits to accommodate advanced technologies. Another issue is that the complexity of the systems leads to a steep learning curve for the staff that need to manage them.

5. Software for the Management of Renewable Energy:

Companies invest in renewable energy and need some specific platforms to trace and enhance their performance against their investment in renewables. An example of a platform from Schneider Electric is EcoStruxure™, a platform through which organizations can monitor solar, wind, and battery storage systems. The system provides real-time data about productions generated, grids interacted with, and performance metrics, with which companies can track the extent to which their renewable investments are working.

As much good as it has, renewable energy management tools must face the problem of unpredictability associated with such sources as solar and wind. There may be changes in atmospheric conditions, equipment breakdowns, and varying consumption, all of which affect production of energy and, therefore, would make any commitment to consistent results quite difficult. Although these platforms aid in producing strong answers to the renewable performance aspects, it's still one of the challenging issues that businesses must face as far as their dependence on renewable energy is concerned.

Conclusion:

In this epoch of climate change and energy crisis, many companies have found the adoption of digital solutions for tracking and reducing their environmental impact an optimum solution. For example, Energy Star Portfolio Manager; Carbon Trust’s Carbon Footprint Calculator; Siemens MindSphere; and EcoStruxure by Schneider Electric are instrumental in measuring and reducing energy use, emissions reductions, and adoption of other sustainable practices within companies. Despite the technical prowess that such platforms bring in measurement and analysis, most high-level users suffer problems regarding compromising data accuracy, legacy systems integration, as well as the unpredictability that is an intrinsic characteristic of renewable energy sources.

These digital solutions remain integrated into the sustainability strategy of any organization and will yield the data and insights that promote greener and better business practices.

**(Chat GPT for figma. Ask chat gpt how the website should work given the task brief, then ask how the flow should work and how the yflow should look like. Ask it to make test logs. Then start making the figma)**

An Empathy Map constitutes a collaborative tool utilized for gaining profound insights into the target audience or user. It serves to visualize user behavior patterns, what a user is thinking, feeling, and most importantly, in which aspects of their life they need support. This map usually comprises four sections:

1. Says: The utterances by the user.

2. Thinks: Thoughts and beliefs of the user inferred from their behavior.

3. Does: Actions and behaviors observed.

4. Feels: Emotional experiences and reactions.

In the core of the map is the reference to the user or customer persona.

An example of a user persona and how the empathy map would be used:

User Persona:

Alex, 32, urban dweller, environmentally conscious, seeks to reduce their carbon footprint and transition to green energy.

Empathy Map Quadrants:

1. Says:

• “I want to switch to solar power, but it’s expensive.”

• “I try to buy local and avoid plastic waste.”

• “I wish my community offered better recycling options.”

2. Thinks:

• “Am I doing enough to reduce my carbon footprint?”

• “Are these green products truly sustainable or just greenwashing?”

• “Switching to an electric vehicle would be great, but what about the charging infrastructure?

3. Does:

• Uses public transportation and bikes when possible.

• Participates in local clean-up initiatives.

• Researches renewable energy providers and eco-friendly products.

4. Feels:

• Empowered when making eco-friendly choices.

• Frustrated by limited access to affordable green technology.

• Anxious about climate change and the future of the planet.

Recognitions and Actions:

• Pain Points: The high costs related to renewable energy options as well as no existing infrastructure.

• Opportunities: Financial incentives or community solar programs.

• Emotional Drivers: The impact and community support.

User Engagement KPIs

User engagement may define app success, and it indicates how actively users are interacting with the app. Measures like Daily Active User (DAU) and Monthly Active User (MAU) give a picture of how often the user accesses the app. In addition, a User Retention Rate will help estimate the app's ability to keep its users excited for much longer.

It indicates that visitors spent time exploring options such as carbon footprint calculators and eco-product recommendations. Feature Adoption Rate measures the number of people making use of specific functions like energy consumption tracking or joining local green initiatives. Along with this engagement, KPI's help assess improvement areas in the user experience。

Driving Impact KPI S

In the case of green apps, the key performance indicators (KPI) are Carbon Reduction per User, which tells us how much the app reduces its emissions through the change in energy, transport, and waste behavior by a single user. Additionally, the important KPI is the Green Energy Adoption Rate, measuring the conversion of users from conventional electricity to renewables, while Waste Reduction Metrics are the figures that talk about recycling, composting, and reduction in plastics. Another would be Sustainable Purchases, which evaluate the purchase of green products and services, while Community Engagement looks into the number of participants in local green events. Thus, these are some important KPIs for assessing the app's impact on the environment.

Business Performance KPI

Besides the environmental metrics, the success of any business also depends on Cost per Acquisition, which refers to the value of acquisition per user, and Lifetime Value, which is revenue over the customer's lifetime. Partnership Growth is the measurement of the value derived from partnerships with eco-friendly brands and service providers, while Revenue from Eco-Friendly Products measures income derived through green sales.

The website will be able to be accessed from both a desktop and a mobile device and will have the following functionality:

Non-functional criteria are those that define the parameters with respect to the performance of a system, in contrast to the functional criteria which describe the behaviours and functions. To present some of the software quality attributes, we shall apply the FURPS model: this is an acronym for functionality, usability, reliability, performance, and supportability.

Usability means learning to apply a systematic method effectively. The tools we intend to use are the PYTHON, PHP, JavaScript, and SQL. Such devices will be supplemented with a user interface design that matters, keeping data availability very crisp. The programming will include a help option for troubleshooting, history tracking for users to monitor their progress, and real-time updates on what users are doing.

Reliability is defined as the ability of the system to keep functioning and recover quickly after a failure. This is essential since the platform is processing large volumes of environmental data. Any failure occurring means a risk of data loss, and thus everything will be done to ensure a lower failure rate. Whenever an issue arises, the system will detect that issue, notify the developers, and inform the users in a clear manner while resetting the platform.

Performance pertains to how fast and efficiently the system operates. Since users will be tracking their carbon footprint and environmental contributions on the platform, it shall also provide real-time updates to users on what they have achieved during that time, the amount of carbon that has been saved through eco-friendly actions, and the time taken to compute the impact of their very decisions.

Supportability concerns maintainability and easiness of modification. To allow for adaptability, the platform will be developed as a modular system. Any change or addition required would be completed without compromising the whole system, allowing for faster repairs and updates while benefiting manual effort.

From these considerations will arise a long list of detailed requirements as would further refine and optimize the platform in helping users to track and reduce their impacts.

These are some functional requirements:

User Account Management

The ability of setting up and managing personal accounts is important to users; signing up, authorizing, or recovering passwords.

Users can change their account profile, including their choice of privacy settings for environmental data.

Carbon Footprint Calculator

The app should carry a carbon calculator that can determine user activities with regard to transportation, energy use, and waste generation with respect to carbon footprint.

Users could either enter information manually or sync with other platforms such as energy meters, car apps, etc. for automatic carbon footprint tracking.

Emission Reduction Tracking

The app should allow users to log environmentally friendly activities such as taking public transport, conserving energy, recycling, or buying green products.

The app will calculate the total amount of saved carbon from the user's activities and show the user their progress through time.

Real-time Feedback and Suggestions

The app should provide real-time feedback to users on how to decrease their environmentally unfriendly impacts based on their present-day activity (e.g., energy-saving ideas, greener modes of transport, waste reduction tips).

Additionally, Users will be recommended based on their carbon footprint data.

Eco-Friendly Goals & Milestones

Organizational environmental goals can be set (e.g., reduce a specified amount of carbon emissions within a given time frame).

Progress toward these notifications will have to be relayed to the users on reaching milestones.

Environmental Impact Dashboard

The app shall display a dashboard with critical metrics like total carbon footprint, emission reductions, energy savings, and sustainable purchases over a given time period.

The environmental impact will be represented by means of graphs and charts.

Sustainable Product and Service Recommendations

The app shall tailor recommendations of eco-friendly products, eco-friendly services, and sustainable lifestyle choices to users' preferences and environmental goals.

The app may partner with green brands or eco-friendly businesses to give discounts.

Community Engagement and Challenges

The app should have social tools allowing users to connect with one another, join environmental challenges, and become participants in community-driven environmental initiatives, such as local clean-ups and tree planting events.

Users may track the collective environmental impact of their community or group.

Notifications and Alerts

The app shall send notifications regarding progress on their goals, new eco-friendly challenges, and tips on how to enhance sustainability efforts.

Alerts shall also notify users regarding updates to the system, new features, and promotions offered by eco-friendly brands.

Data Sync and Integration

The app should be able to import data from other fitness or environmental apps, wearables, or smart home devices; thus making tracking the user's carbon footprint more accurately.

Integration with third-party platforms (e.g., energy providers, transport services) to collect data that relates to energy use and travel habits.

Reporting and Exporting Data

Users must report on their environmental impact, detailing carbon savings, sustainable purchases, and general progress. Reports must be exportable as PDF files or shared via e-mail/social media.

Rewards and Incentives System

An app will reward users with points and badges for undertaking eco-tasks, meeting targets, or joining challenges. Users may redeem points for eco-friendly products, discounts, or donations to environmental causes.

Feedback and Support

The app will comprise an option for users to provide feedback, report issues, or ask general questions supported by a system integrated into the app, like a chatbot, live chat, or an FAQ section.

These are some Non-Functional requirements

Performance

The app is expected to respond very quickly (a maximum loading time of 3 seconds for any page or feature) and handle its tasks smoothly when users interact with the app at the same time, i.e. at least 10,000 active users should be supported without any performance degradation.

Data for the calculation of carbon footprint and environmental impact should be processed and displayed real-time or with minimal delays.

Scalability

The app is meant to scale with increases in user and data size (e.g., more users to track more data on the environment).

The system was designed for supporting up to 1 million active users, beyond which the performance starts degrading significantly.

Availability

The app must have an uptime value of 99.9%, implying that it is available to users almost all the time with minimal downtime for maintenance or critical updates.

Hence, users, in the case of an outage, must be informed and provided with the status and reasons for the occurrence of the problem.

Reliability

Consistency must be obtained from tracking the incidences of the users' carbon footprint and environmental impact.

System failures must provide an auto-reporting mechanism to the developers for errors, together with a fast recovery happening within 30 minutes allowing service restoration.

Security

All user data, especially personal information and environmental data, must be encrypted while being transmitted and stored according to industry-standard encryption protocols (e.g., SSL/TLS).

Strong user account protection (two alternates called strong authentication) shall find use in the app.

Processing of sensitive data, like credit card information supporting the purchase of eco-friendly products, is compliant with security standards such as PCI DSS.

Usability

The app has intuitive, easy, and user-friendly-assuredness to all technical proficiencies.

Good levels of accessibility design should allow for voice commands, high-contrast modes, and text resizing for users with disabilities.

The user interface must be responsive and optimized for the best possible experience on mobile, tablet, and desktop computers.

Maintainability

The app needs to develop with modularity and good commenting so that anybody can easily proceed with that through future updates, bug fixing, or additions of new features.

Helps minimize any existing technical debt, further introducing another level of operational ease for any developer wishing to modify or extend functionality with minimal impact on already existing features.

Interoperability

The application should run on multiple operating systems, including (but not limited to) iOS, Android, Windows, macOS, as well as on different web browsers, including Chrome, Safari, Firefox, and Edge.

Moreover, it must enable integration with third-party apps and services evidence-supported through APIs, like energy consumption tracking apps, transportation apps, and sustainability platforms.

Backup and Data Recovery

The application must create daily automatic backups of users' data to protect them from data loss in case of unforeseen system failures as regards progress and environmental data.

There should exist a clear procedure for recovering data in case of loss to ensure that the users' carbon footprint and progress records can be restored where necessary.

Localization

The application has to include support for various languages in order to fit users based in different geographical locations.

It should also be able to cater to the local applicable environmental standards and regulations as well as recommendations from a user's location.

Compliance

The application should meet all appropriate environmental provisions such as standards for carbon emission reporting and data privacy laws (like GDPR for users from Europe).

All environmentally friendly products or services recommended within the application shall comply with the relevant certifications or standards of sustainability.

Supportability

The application shall provide simple and straightforward troubleshooting or a support system for in-app user assistance (e.g, help center, FAQs, live chat).

Application functionality improvement, bug fixing, and security enhancement should require regular software updates without causing significant downtime during such updates.

Energy Efficiency

The application should be energy efficient in design and run under conditions where its users have minimized power consumption in their devices while using the application, particularly when using mobile devices.

The website should also have multiple informative links to help the user such as:

### **Environmental Education & Resources**

Green Product Recommendations & Reviews

Green Initiatives & Events

Carbon Footprint Tools & Calculators

Green Certifications & Labels

### **Government & NGO Resources**

News & Updates on Sustainability

Educational Courses & Certifications

Tips and Guides for Living Sustainably

The website should also contain accessibility issues, these are some to be considered:

Visual Impairments

Hearing Impairments

Motor Impairments

Cognitive Impairments

Screen Reader Compatibility

Mobile Accessibility

These are some of the user requirements the website would need:

User Registration and Personalization

Account Creation: Users should create an account using email, social media, or other third-party sign-in options (Google, Facebook).

Profile Setup: After sign-up, users should provide information concerning their lifestyle, including modes of transport, energy use, and waste practices, for carbon footprint calculation.

Personalized Dashboard: Users should access a personalized dashboard detailing their environmental impact, carbon footprint, etc.: energy saving and recycling.

Goal Setting: Users should be able to set personal sustainability goals, for example, a goal to reduce carbon footprints by a certain percentage or use renewable energy.

Notifications & Reminders: Users should receive notifications/reminders to help maintain sustained focus on actualizing their sustainability goals (e.g., reminder to track energy use or recycle).

2. Carbon Footprint Tracking

Carbon Footprint Calculator: Users should be able to calculate their carbon footprint, depending on different categories; transportation, energy usage, and waste.

Progress Tracker: Users should be able to track and possibly compare how much they reduced their carbon footprint over time; for example, by months or years.

Real-Time Data: This app should provide a real-time update on a user's carbon footprint based on the actual activities he/she does each time (e.g., the carbon footprint would be updated after entering energy consumption or kilometers used by car).

3. Eco-Friendly Product Recommendations

Product Listings: Eco-friendly product ideas should be available to users, including energy-efficient appliances, sustainable clothing, and goods with a low carbon footprint.

Product Reviews and Ratings: Users should be able to leave reviews of green products, which will help others to take them into consideration.

Purchase Integration: If there is a purchase option within the app, then the purchase of green products should be available right within the website or should redirect app users to trusted eco-friendly retailers.

4. Tracking Green Energy Usage

Energy Tracker: Users should be able to insert their energy use, while the website calculates the carbon impact according to their energy provider or energy sources-renewable vs. non-renewable.

Energy Saving Tips: The website should provide the user with practical tips and suggestions about lowering their energy use and the carbon footprint, e.g., through energy-efficient appliances or renewable energy resources.

5. Waste Management and Recycling

Recycling Tracker: Users should log and track how they recycle, including what materials, and the amount of recycling done every month.

Waste Reduction Tips: The website would help inform users on waste reduction tips like reducing plastic consumption, composting, and living a zero-waste life.

Community Initiatives: This section of the website should inform users about local waste management programs or events, such as community clean-ups or recycling drives, and allow users to sign up for these events.

6. Community Engagement

Local Clean-Up: Users should find and participate in local green initiatives like tree planting or community clean-up events.

Sustainability Challenges: The site could host sustainability challenges where users either compete or collaborate to reach certain eco-friendly milestones.

Forums or Social Share: Users should engage others in sustainability forums, share their success stories, ask questions, or seek advice.

7. Environmental Impact Education

Learning Resources: Users should have access to articles, videos, and educational resources that shed light on environmental issues such as climate change, deforestation, and sustainability.

News and Updates: The website should also feature updates on current global environmental issues and sustainability, including government policies, scientific discoveries, and innovations in helping the environment.

8. User Support and Assistance

Help Center/FAQ: Users should access a comprehensive help center or FAQ section to address issues of app usage or any problems they encounter.

Live Chat or Customer Support: Users should have access to live chat or email support to troubleshoot or raise issues about their account settings or any general query.

Accessibility Features: The website should provide features such as support for a screen reader, adjustable text size, and alternative text for images, making the platform accessible to users with disabilities.

9. Social Media Integration

Social Share: Users should be able to showcase their environmental achievements or milestones on social media platforms like Facebook, Twitter, or Instagram to create awareness and entice others.

Social Media as an Environmental Impact Tracker: Integration with social media platforms could allow users to track their eco-friendly actions, like sharing green initiatives they have participated in or making sustainable purchases.

10. Privacy and Security of Data

Data Protection: The website should provide users with a clear privacy policy stating how their data (including personal and carbon footprint information) will be stored, secured, and managed.

Secure Transactions: If there will be an online purchasing option on this website, the payment gateways must be secure, ensuring the protection of user's financial information using encryption methods standard to the industry.

User Control Over Data: Users must be able to control their data, including deleting or updating their profile and preferences.

11. Multi-Platform Access:

Cross-Device Access: Users across devices-mobile, tablet, and desktop-can access their accounts and track all sustainability efforts.

Mobile App Companionship: If a website has an adjacent mobile application, users should be enabled to synchronize and have a seamless experience whether on the app or on the website.

12. Sustainability Feedback

Carbon Saving Feedback: It should be possible for users to receive feedback on their progress towards sustainability goals, such as the amount of carbon they have saved or how their lifestyle choices are affecting the environment positively.

Environmental Impact Records: Users should receive detailed reports on how their activities and choices (energy consumption, transportation, waste) relate to environmental impact over time.

These user requirements aim primarily at providing a holistic, friendly, and engaging experience while enabling the user to track and reduce his environmental impact. While these features will help ensure the app is equipped for different user needs, it also includes personalized carbon footprint tracking, social engagement, and educational resources into the app.