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| Rolsa |
| A Digital Solution |
| Proposal |

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# A (i)

## Business context

Rolsa Technologies are a company who specialise in green energy solutions. Rolsa offers solutions include EV charging point and solar panel installation, maintenance. Rolsa aims to improve their customers’ lives by making them greener and to further their ecofriendly-ness. With this digital solution Rolsa aim to largely improve their current experience with their services and products, making the process simpler and easier. Rolsa also want to grow their possible customer base for the future.

## Newly emerging technology

### SLMs (small language models) & LLMs (large language models)

Eastgate Software, who are software development company, published a top 10 blog on emerging technologies (<https://eastgate-software.com/top-10-emerging-technologies-in-2025-according-to-mit-technology-review/>); from that they mentioned SLMs which are often overshadowed by LLMs; who’s purpose are more general such as writing cover letters and essays; SLMs to be used to chat with customers about their plans to go green. The company can offer green steel options to customers as well. Green steel uses hydrogen over fossil fuels to produce steel: lowering their carbon footprint brining a better light on the company and enlarging their revenue.

#### The Data's In: Honesty Really Does Start at the Top

### AI (artificial intelligence) imaging

From Geeks For Geeks site like a Wikipedia for software geeks, had an article published on emerging technologies (<https://www.geeksforgeeks.org/top-new-technology-trends/>); one mentioned technology would generative AI for imaging to predict how good a roof could be for solar panels, Google maps offers something similar for residents of north America; this to help push the sale of solar towards new customers.



#### AR (augmented reality)

In the same vein, AR to be used to show what installations could look like by using customer’s camaras and projecting solar panels over the proposed area; the flatpack Swedish furniture company IKEA offer a similar thing with their products. IKEA offer to the customer what their house could look like without needed an artist or the table and chairs; this has helped boost European sales for IKEA.



#### NFC (near field communication)

Geeks For Geeks also mentioned NFC. NFC is used with common day items such as bank cards and ski-passes; NFC would be used to lock EV (electric vehicle) chargers while away so that unauthorised users with EV couldn’t steal your electricity. Customers would use this while away on holiday in the Alps or on a business trip. The NFC locking and unlocking would be tied to the customer’s account on their phone for their convenience.

#### Cross-platform applications

To have an app built for IOS (iPhone operating system) or for Android have better performance than website alternatives. Cross-platform apps have become more popular but are still growing traction; they require only one code base: making it easier to maintain across multiple platforms. To build a cross-platform app only two good common frameworks; a framework being the scaffolding for an application to run a non-specific platform. Like you can’t put petrol in a diesel, you need specific languages to run on an OS, web uses JS, Android uses Java, and IOS uses swift. Where the framework comes and turns the code base into native machine code for the target it is like turning petrol into diesel. The two popular frameworks are flutter built up on the programming language dart, these apps are quick to assemble but difficult to perfect; Flutter compiles straight to native machine code. The other much more popular alternative is React native, which takes react code and compiles into native code for IOS and android, Swift and Java respectively; a new contender Linx released just last week as of writing this, it works similarly to React. Rolsa to integrate a cross-platform app and to make use of NFC locally on the device, keeping one code base ultimately.

### 5G (https://en.wikipedia.org/wiki/5G)

5G is the 5th iteration of the mobile phone network, 5G can support low delay near instant communication between devices. 5G is capable of speeds of up to 10GBits/sec, a 2-hour film downloaded in just a matter of seconds. 5G is becoming common place in towns and cities across Europe and North America. The 5G network is still compatible with 4G system currently running and it is steadily phasing them out. 5G network to be used for live tracking of smart home systems on Rolsa’s servers.

### Ruby on rails (https://rubyonrails.org/)

Ruby on rails is a Ruby full-stack framework designed for rendering front-end components and is used on the backend as middleware. It uses a series of containers to create a website and its elements. Ruby as a language has been come to known as the cool programmer’s language, rightfully so as it has some awesome syntax. Ruby on rails is however falling from popularity, leading to sticky situation where in a few years there are no Ruby on rails developers to maintain the code base.

### Laravel (https://laravel.com)

Laravel is an open-source PHP full-stack framework for web components, described as a web developer’s best friend. Laravel has been maintained over the last 2 decades and has been growing in popularity; it to be integrated later down the line in the project to keep the code maintainable and expandable.

### Django (https://www.djangoproject.com/)

Django is an open-source Python library for web pages and backend of websites and apps. Python has grown in popularity and some developers only use python, with its easy to syntax you can’t blame them. Django being built on python is not able to keep up with other languages in speed leading to fall behind in making a fast site. According to Stack Overflow, a developer forum, published an article on the most used languages (<https://survey.stackoverflow.co/2024/technology>) python sis one of the highest and fastest growing technologies as of 2024. With a popular growing language, the code base will be able to be maintained for years to come when other developers to come in.

### View (https://vuejs.org)

View is a JavaScript framework used to render webpages. With JavaScript being the second most popular language according to Stack Overflow its use on the backend was inevitable. View is designed to be easy to pick and learn, however JS is a security poor language to have on the backend. As with real-world examples are innumerable, data and security breaches it is a risk not worth taking.

### React (https://react.dev/)

React released by Meta formerly Facebook is again a JS framework; react it the most popular JS framework however it is subject to the same flaws on the security front as View. Rolsa again not to take risks here.

### TypeScript

TypeScript came in as a fix to chaotic jumble that was JavaScript, TypeScript brings in strict types, enums, object checking, and error handling. TypeScript is unable to run on websites, so it needs to be compiled to JavaScript first, requiring Node JS to be run on the machine. TS leads to more maintainability in the code base allowing other developers to work and maintain the code base.

### SASS (Syntactically awesome style sheets)

SASS has a variant SCSS (SASS’y CSS). Where CSS can become a mess when dealing with selectors and nested selectors, SASS comes in to fix that with a few extra features as well. SASS introduces functions, mixins, loops, variables, interpolation, imports, if statements, and nesting. SASS is not able to be interpreted by website so it like TS, it needs to compiled requiring node. If Node is unavailable VScode now has an extension for SASS compilation. SAAS keeps the style sheet simple; this allows for other to be able to spot bugs and maintain it over time.

### SQL (structured query language)

SQL is used for creating, updating, and querying relational tables. Relational tables use key value pairs for table entries. There are foreign and primary keys in a table; a primary key will reference to itself and is used as the primary key in fetching data from a table entry; foreign keys reference to data outside of that table. SQL despite being invented over 40 years ago is still ahead on its speed and reliability; this makes it a strong contender for most backend databases. Rolsa using SQL to store the customer data safe but not secure; that’s on the developer to encrypt the data and add a username and password on the database.

## How the digital solution could meet user needs

Rolsa want to grow their possible customer base. By being on the web, they can accesses a wider audience than a local office in a town centre; being online it would not have to worry about opening and closing times, or customer parking. Websites do unfortunately loose the human touch. Everything on the site will be easy to find, use, and navigable; as a rule of thumb any action should take no more than about 3 to 5 clicks to complete. Actions not to take longer than about 5 mins otherwise a majority of people simply won’t bother. As mentioned above the NFC would be useful to lock away an EV charger from any septic-tank neighbours, this would mean that EV chargers would pay themselves back rather than being a public socket.

The digital solution would need to fast and snappy for customers: if it takes too long, they might give up and not complete their action they set out on, and we wouldn’t want to inconvenience the users.

A chatbot would be helpful to users who need quick suggestions when consultants are not available, such as asking “will it save me money if I get solar panels and an EV charger?”, when applicable with a CTA (call to action). A sign-up button is a CTA being a thing you want the user to do.

## Regulations and bodies

Regulations and bodies found for a project need to be considered as to comply with software requirements. To not accidently come up with any illegal products or services to be listed on the site. Each body takes its own stance on what happens if don’t comply with their standards and laws, often being fines to the company.

### GDPR (general data protections regulations) (https://www.gov.uk/data-protection)

This protects people against discrimination against, race, ethnicity, political opinion, religion, genetics, biometrics, sex life, and more. As some of this data will be given to Rolsa by their customers’ it is on the company to keep all of their customers’ data secure and safe. If a user would want their data or for it to be deleted, then Rolsa would have to comply and act on their account. The main points of concern would be their name, address, email, date of birth, and their payment details. The rules on GDPR for the storage state that the data must be held in countries where it stored with the strictest laws. If the data is held in countries with looser laws, then this does not meet the GDPR requirements. If one does not comply with GDPR as to quote (https://gdpr.eu/fines/) “**These types of infringements could result in a fine of up to €20 million, or 4% of the firm’s worldwide annual revenue from the preceding financial year, whichever amount is higher**”.

### RECC (renewable energy consumer code) (https://www.recc.org.uk/)

RECC aim to provide protection for consumers and business who lease electricity, or solar panels which apply to part of Rolsa’s business. In short there isn’t much to say on them with development of a digital solution but certainly to make sure T&Cs comply with the code when writing comes to.

### Ofgem (https://www.ofgem.gov.uk/)

Ofgem are UK energy market regulators to keep it a fair place to practice on. Ofgem have been partly responsible for the UK energy price cap and to stay compliant with them would be necessary. To be in trouble with them, you would need to be operating with an improper licence if one at all. If Rolsa would like to be able to offer to its customers without being shut down by Ofgem then they would need to stay in compliance with Ofgem’s licensing terms.

### W3C (world wide web consortium) (https://www.w3.org/)

W3C are the regulators of accessibility standards on the web. To not use WCAG (web content accessibility guidelines) would make a website inaccessible to these who need screen readers, or any stakeholder of the internet. To not make your website accessible would also be not to comply with the UK’s Equality Act. When rules breakers often result in substantial fines when not changed quickly.

### EC (Electronic Directive) (https://www.legislation.gov.uk/uksi/2002/2013/contents/made)

The EC states a few business details that must be included on the website in order to comply with the regulations set out. A business must supply their registered business name, registration number, place of registration (England, Scottland, Wales, …), registered office, VAT number, membership number.

The EC also states that first visits to a website must ask weather or not the small client-side text files called cookies are to be accepted by the user as avoid the risk of fines.

# A (ii)

## Who are the current customers

### Current

Rolsa’s customers would currently exists of people requiring fitting and maintenance of solar panels, EV chargers, and smart home system. In the local area that they can provide and reach to and for. These customers will want to system that does not change too much and makes it where possible easier to use.

### Potential and new

Rolsa’s new users would be possibly widespread perhaps even nation-wide if they aren’t already. New users will want to quickly be able to find out information and possible savings and bookings.

## Requirements

The requirements are put into a table to easily been seen, listed, and run over like a checklist. The “Field” field is an area used to group the different test together. The “Priority” field is a rating of how important it is to get an MVP (minimum viable product) for this development, as this is too short of time to make a fully fledged product with all the bells and whistles it needs to have.

### Functional

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Description | Priority (high, medium, low) | Field |
| User sign up | The user is able to create a new account with Rolsa | High | Account |
| User log in | Ther user is able to log into their account with Rolsa | High | Account |
| Book consultation | The user is able to book a consultation at a specific date, type of consultation, and to where according to their address | High | Consultation |
| Change account information | The user is able to change their information attached to their account | Medium | Account |
| View and calculate carbon footprint | The user is able to see their carbon footprint attached to their account and calculate a new footprint | Medium | Carbon Footprint |
| Navigable site | The user is able to access all navigation links from the home page | High | Navigation |
| Cancel consultation | The user is able to cancel a booked consultation provided that the day is not on the day of their | Low | Consultation |
| User log out | The user is able to log out of their account | Medium | Account |
| Delete user account | The user is able to request the deletion of their account | Low | Account |
| Suggestions on how to reduce carbon footprint | Show the user how they can lower their carbon footprint with helpful links to internal resources and offer some external ones as well | Low | Carbon Footprint |
| Navigation to home | When the page loads the user should be put onto the home page | High | Home Page |
| Navigation to calculator | When the page goes to the calculator it should load, ask questions, and calculate the users carbon footprint, or ask them to sign in | Medium | Carbon Footprint |
| Little to no PHP errors | The tech stack will use PHP, on most pages should be able to load with out error > 90% of the time | Medium | Backend |

### Non-functional

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Description | Priority (high, medium, low) | Field |
| Home page with info on products | The home page should display useful and helpful information on the products and services the company offers | Medium | Home Page |
| Consistent colour scheme | The colour scheme should be same across the site with no inconsistency | High | Theme |
| Consistent fonts | Fonts and spacing should stay the same for applications across the whole site | High | Theme |
| Light & Dark modes | Offer light and dark mode colour scheme for the website | Low | Theme |
| Logo | Keep one logo for the whole site | Medium | Icon |
| Layout | Keep the same consistent layout of the site where boxes, nav links, and titles should be | High | Theme |
| Load time of under 3 sec | The load time of the website should be under 3 seconds when on localhost | High | Performance |
| Documentation | The documentation of the backend and frontend code should be comprehensive | Low | Backend |
| Easy navigation | The layout of the site should be easy to navigate and find information you are after, e.g. links should be at the top where you expect them | Medium | Theme |
| Mobile compatibility | The site retains all its features and is able to be used on mobile | Low | Accessibility |
| Tablet compatibility | The site retaining all of its features is able to be used on a tablet device | Low | Accessibility |
| Handle 100 concurrent users | The site should maintain reasonable performance over hosting 100 users | Medium | Performance |

## KPIs (Key performance indicators)

KPIs are a way to measuring performance over a period of time and predict performance. Choosing to go with a month for most as a common denominator as it isn’t too long but not too short.

### Current business

|  |  |
| --- | --- |
| KPI name | Time scale |
| Number of consultations booked | Month |
| Number of sales on EV charging stations | Month |
| Revenue from EV charging stations | Month |
| Repeat customers from EV charging | Month |
| Number of sales on solar panels | Month |
| Revenue of sales of solar panels | Month |
| Repeat customers from solar panels | Month |
| Number of up-sales on analysis of carbon footprint | Month |
| Gross profit | Month |
| Revenue | Month |

### Over development

|  |  |
| --- | --- |
| KPI name | Time scale |
| Number of lines written | Week |
| Δ% of tasks done | Week |
| Weighted Δ%:   * high ~= 3 \* low * medium ~= 2 \* low | Week |
| W3C rating as % | Week |

### Measure on launch

|  |  |
| --- | --- |
| KPI name | Time scale |
| Number of booked consultations | Month |
| Number of consultations for solar panels | Month |
| Number of consultations for smart home systems | Month |
| Number of consultations for EV charges | Month |
| Smart home systems | Month |
| Number of repeat customers in a month | Month |
| Number of visits | Day, week, month, quarter, year |
| Visits for consultations % | Month |

## Risk mitigation

|  |  |  |  |
| --- | --- | --- | --- |
| Name of the risk | Description | prevention | Risk level |
| Trojan horse | A trojan horse is a piece of software that on the outside looks harmless but, on the inside, it houses any kind of malware. To mitigate this risk. As allowing this to run on company machines could lead to an attack or data breach. | not allow anyone with access to the system run any non-approved software on their work machines | Medium |
| (D)DoS ((distributed) denial-of-service attack) | A DoS is a series of rapid requests made to the server to slow it down to a point of breaking and being unusable. As if this where to happen than Rolsa could lose out on potential customers or annoy some customers causing them to leave. | implement a proxy or firewall system | High |
| Digital onboarding | This is where the data from the backend SQL Server is leaked out into the public hand. | SQL server username and password. Putting details in an INI file. Including the INI file in the gitignore. Hashing and encrypting data. | Medium |
| Sanctions and fines | Where Rolsa are found to be-against laws domestically or internationally, as such they will then be subject to penalties. | To have third party assistance to check that Rolsa complies with all relevant legislations. | Low |
| Third party risk | If third parties gain access to any data held by the Rolsa then their access needs to be manged and watched; else risk the possibility of Digital onboarding. | To not allow third parties any access they do not need. | High |
| Supply chain risk | When contractors later down the line gain access to customer data there needs to be policies in place to ensure that they are given only what is strictly necessary or risk large data breaches and fines from GDPR. | To not allow third parties any access they do not need. | High |
| Internal rouge employees | Where an employee is to leak a customer’s data to the public hand. | To not allow first parties any access they do not need, example being not able to access data about a customer or their consultation then what applies to that consultant. | Low |
| Natural disaster | This is where the server is in a state of in operability because of a mother nature’s cruel wrath, e.g. floods, wildfires, or earthquakes. | Hot set swap available in back up. This is a server that runs in parallel with the main server in a separate geo location; when the main server goes down traffic can be redirected to the alternative server. | Low |
| Data corruption | Data corrupt is a loss of internal customer data, source code, or suppliers’ information. | RAID (Risks, Assumptions, Issues, and Dependencies) can be implemented to have disks running in parrel where the data gets written to both disks | Medium |