

SOLACLOUD SOLAR CRM: An Effective and Optimized Project Management CRM For Solar Industry

BY

Md. Rakib Rizan

ID: 221-15-5312

This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering.

Supervised By

Md. Sadekur Rahman

Assistant Professor

Department of CSE

Daffodil International University

Co-supervised By

Raja Tariqul Hasan Tusher

Assistant Professor

Department of CSE

Daffodil International University



DAFFODIL INTERNATIONAL UNIVERSITY

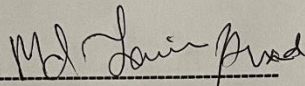
DHAKA, BANGLADESH

13 January, 2025

APPROVAL

This Project titled “**SOLACLOUD SOLAR CRM : An Effective and Optimized Project Management CRM for Solar Industry**”, submitted by Md Rakib Rizan, ID No: 221-15-5312 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on **13 January, 2025**.

BOARD OF EXAMINERS



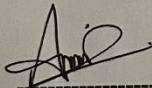
Dr. Md. Taimur Ahad
Associate Professor & Associate Head
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

Chairman



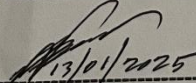
Mr. Saiful Islam
Assistant Professor
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

Internal Examiner



Mr. Amir Sohel
Senior Lecturer
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

Internal Examiner


13/01/2025

Nazibur Rahman
Technical Lead - Database Administrator
Telenor - Grameen Phone Account

External Examiner

DECLARATION

I hereby declare that, this project has been done by me under the supervision of **Md. Sadekur Rahman, Assistant Professor, Department of CSE Daffodil International University**. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

Supervised by:

Sadekur Rahman 29.12.24

Md. Sadekur Rahman
Assistant Professor
Department of CSE
Daffodil International University

Co-Supervised by:

Raja Tariqul Hasan Tusher
Assistant Professor
Department of CSE
Daffodil International University

Submitted by:

Rakib Rizan 28-12-24

Md. Rakib Rizan
ID: 221-15-5312
Department of CSE
Daffodil International University

ACKNOWLEDGEMENT

I express my heartiest thanks and appreciation to omnipotent God for His celestial gift makes me conceivable to finish the last year venture effectively.

I might want to thank my honorable project Supervisor **Md. Sadekur Rahman**, for his warm help, profitable recommendation and ceaseless support drive me to proceed. Significant Knowledge and unmistakable interest of my supervisor in the field of "WEB Development" to carry out this project. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts and correcting them at all stage have made it possible to complete this project.

We would like to express our heartiest gratitude to **Dr. Sheak Rashed Haider Noori, Professor and Head, Department of CSE**, for his kind help to finish our project and also to other faculty member and the staff of CSE department of Daffodil International University.

We would like to thank our entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

Finally, we must acknowledge with due respect the constant support and patience of our parents.

ABSTRACT

As the demand for renewable energy grows globally, the solar industry has become a cornerstone of sustainable development. However, managing solar energy operations, customer relationships, and project workflows remains a significant challenge for many companies. This is where Solacloud Solar CRM comes into play. Designed to address the unique needs of the solar energy sector, the proposed system is a comprehensive, web-based platform that operates within a centralized network. It streamlines customer interactions, project management, and business operations for solar companies worldwide. The system offers features such as real-time updates, project creation, invoice and payment management, and seamless integration with third-party tools. It also caters to various stakeholders, including administrators, sales teams, technical staff, project managers, and call center agents, by providing a unified solution for collaboration and communication. The system supports multi-language functionality, customizable workflows, and data-driven analytics to enhance decision-making and operational efficiency. Additionally, end-users benefit from transparent communication, service tracking, and personalized support. The development of the system employs modern technologies, including React JS for the front-end and PHP with the Laravel framework for the back-end. MySQL serves as the database solution, ensuring a robust and scalable architecture. Inspired by the Systems Analysis and Design Methodology (SSADM), the project emphasizes user-friendliness, scalability, and adaptability. Future plans include incorporating advanced features like online payment options, automated notifications via email, and expanded integration capabilities. By addressing the core challenges of the solar industry, The system empowers businesses to optimize operations, improve customer satisfaction, and contribute to the global transition toward renewable energy solutions.

TABLE OF CONTENTS

CONTENTS	PAGE
Approval	i
Declaration	ii
Acknowledgments	iii
Abstract	iv
CHAPTER	
CHAPTER 1: INTRODUCTION	1-5
1.1 Introduction	1
1.2 Project Motivation	1
1.3 Objective of The Project	2
1.4 Expected Outcome	4
1.5 Project Management and Finance	4
1.6 Report Layout	5
CHAPTER 2: BACKGROUND	6-9
2.1 Terminologies	6
2.2 Related work	6
2.3 Comparative Analysis Summary	6
2.4 Scope of the Problem	8
2.5 Challenges	9
CHAPTER 3: REQUIREMENT SPECIFICATION	10-15
3.1 Iterative Model	10

3.2 Requirement Collection and Analysis	11
3.3 Use Case Modeling and Description	14
3.4 Entity relationship model and Diagram	15
CHAPTER 4: APPLICATION DESIGN AND SPECIFICATION	16-33
4.1 Front-end Design	16
4.2 Back End Design	16
4.3 Interaction Design and User Experience (UX)	20
4.4 Implementation Requirement	50
CHAPTER 5: IMPLEMENTATION AND TESTING	52-60
5.1 Implementation of Database	52
5.2 Testing Implementation	60
5.3 Test Result and Report	61
CHAPTER 6: IMPACT ON SOCIETY, ENVIRONMENT AND SUSTAINABILITY	62
6.1 Impact on Society	62
6.2 Impact on Environment	62
6.3 Ethical Aspects	62
6.4 Sustainability Plan	63
CHAPTER 7: CONCLUSION & FUTURE SCOPE	64
7.1 Conclusion	64
7.2 Scope of further development	64
REFERENCES	65

LIST OF FIGURES

FIGURE	PAGE
Figure 3.1 Iterative Model	10
Figure 3.2 Use Case	14
Figure 3.3 Entity relationship Diagram	14
Figure 4.1 Authentication Page	20
Figure 4.2 Dashboard	20
Figure 4.3 Contact details page	21
Figure 4.4 Salary information input page	22
Figure 4.5 Device information	22
Figure 4.6 Start and exit date	22
Figure 4.7 All active employees list	23
Figure 4.8 Team information	23
Figure 4.9 Create team	24
Figure 4.10 Chat	24
Figure 4.11 New chat	24
Figure 4.12 All projects list	25
Figure 4.13 create project form	25
Figure 4.14 Project details	26
Figure 4.15 Roof planner	27
Figure 4.16 Offer management	27
Figure 4.17 Order management	28
Figure 4.18 Sourcing Management	29
Figure 4.19 Installer and Technician	30
Figure 4.20 Accounting	30
Figure 4.21 Completion Updates	31
Figure 4.22 All Completed Project	31
Figure 4.23 All Complain in table and chart with statistics	32
Figure 4.24 New complain	32
Figure 4.25 All Tickets	33
Figure 4.26 Create Ticket	33

Figure 4.27 All offers	34
Figure 4.28 All orders screen	34
Figure 4.29 All Customers	35
Figure 4.30 Inside of customer	35
Figure 4.31 All call center information	36
Figure 4.32 Call center create	36
Figure 4.33 Call center edit	36
Figure 4.34 List of all additional product	37
Figure 4.35 Add additional product	37
Figure 4.36 Edit additional products	38
Figure 4.37 List of all modules	38
Figure 4.38 Create module	39
Figure 4.39 Edit module	39
Figure 4.40 List of all memory	40
Figure 4.41 Create memory	40
Figure 4.42 Edit memory	40
Figure 4.43 Calendar View	41
Figure 4.44 Selected project details from calendar	42
Figure 4.45 All warehouse list	42
Figure 4.46 Warehouse create	43
Figure 4.47 Storage area of inside the warehouse	43
Figure 4.48 Edit of warehouse	43
Figure 4.49 Edit of storage are	44
Figure 4.50 List of all invoices	44
Figure 4.51 Create invoice	45
Figure 4.52 Edit invoice	45
Figure 4.53 List of all open invoices	46
Figure 4.54 List of all incoming invoices	46
Figure 4.55 Posting New Invoice	47
Figure 4.56 List of all payment receipt	47
Figure 4.57 Add payment	48
Figure 4.58 List of Bills	48
Figure 4.59 Add new bill	48

Figure 4.60 List of all supplier	49
Figure 4.61 Add new supplier	49
Figure 4.62 List of all purchases	50
Figure 4.63 New Purchase entry	50

LIST OF TABLES

TABLE	PAGE
Table 2.1 Summary of the review of exiting systems	07
Table 2.2 Time Scheduling	09
Table 5.1 Table User	52
Table 5.2 Tables Roles	52
Table 5.3 Tables Employees	53
Table 5.4 Tables Call centers	54
Table 5.5 Tables Team members	55
Table 5.6 Tables Teams	55
Table 5.7 Tables Team heads	55
Table 5.8 Tables Team manager	56
Table 5.9 Tables Customers	56
Table 5.10 Tables Projects	57
Table 5.11 Tables Quotation	58
Table 5.12 Tables Orders	59
	59

CHAPTER 1

Introduction

1.1 Introduction

The demand for renewable and sustainable energy sources is more important than ever as the world's energy landscape changes. Due to its abundance and environmental friendliness, solar energy has become a key component in combating climate change and lowering dependency on fossil fuels. However, due to the solar industry's explosive growth, businesses all over the world are facing particular difficulties in tracking projects, maintaining smooth operations, and managing client relationships. These difficulties call for the creation of specialized instruments to satisfy the unique requirements of this ever-changing industry.

I have created **Solacloud Solar CRM** a cutting-edge Customer Relationship Management (CRM) system created specifically for solar energy enterprises worldwide, in response to these needs. The system offers a single platform that streamlines client contacts, streamlines project execution, and reduces the complexity of managing solar business operations. In addition to supporting the larger global goal of renewable energy adoption, this system seeks to equip solar enterprises with the resources they need to prosper in a market that is becoming more and more competitive.

Numerous parties in the solar energy ecosystem stand to gain from the proposed system solution. Administrators of solar companies will find it extremely helpful for data organization and increasing operational effectiveness. In order to increase conversions, sales and marketing teams can use the platform to track leads and interact with clients in an efficient manner. Field specialists and project managers benefit from an organized method of overseeing and carrying out projects, guaranteeing prompt and excellent installations. Above all, end users—like clients looking for solar energy solutions—will benefit from better service delivery, open communication, and individualized assistance. The system fosters cooperation, effectiveness, and satisfaction for all stakeholders by attending to the demands of these groups.

1.2 Project motivation

The system was developed as a result of a thorough comprehension of the difficulties that solar energy firms encounter on a daily basis. Many organizations face challenges with fragmented

workflows, inconsistent communication channels, and ineffective data management systems, even with the solar industry's impressive expansion. The flexibility and functionality needed to meet the unique requirements of solar companies—such as monitoring installation progress, controlling energy output metrics, or managing financing alternatives specific to renewable energy projects—are frequently absent from generic CRM solutions on the market.

Apart from operational inefficiencies, solar enterprises sometimes struggle to establish enduring and solid client connections. Customer satisfaction can be hampered and confidence damaged by poor communication, a lack of personalized care, and updates that are delayed. Furthermore, companies may be unable to recognize development prospects or take proactive measures to overcome certain obstacles if they lack data-driven insights.

The idea behind the system was to close these gaps by providing a solution that blends cutting-edge technology with a thorough comprehension of the particular needs of the solar business. The system hopes to improve customer experiences, expedite operations, and allow businesses to grow efficiently while making a positive impact on the environment by providing solar firms with a specialized CRM platform.

1.3 Objectives of this project

To meet the various needs of solar energy enterprises, the proposed project was created with a well-defined set of goals.

These goals are:

- **Simplify Business Operations:** Create a consolidated, user-friendly platform to effectively handle customer data, project schedules, and operational workflows, lowering administrative workloads and raising overall output.
- **Improve Customer Relationships:** Establish trust and loyalty by giving customers the means to engage in meaningful interactions, such as real-time service tracking, tailored messaging, and quick response to questions.
- **Enhance Project Management:** Give solar enterprises the tools they need to precisely plan, carry out, and oversee projects, guaranteeing on-time completion, resource efficiency, and adherence to quality standards.

- **Enable Data-Driven Insights:** Provide businesses with actionable insights by integrating strong analytics and reporting capabilities. This will assist them in monitoring performance, spotting patterns, and formulating strategic decisions.
- **Promote Global Scalability:** Build the CRM with features like multilingual support, currency adaptability, and local regulatory compliance to meet the demands of solar enterprises operating in various geographic locations.
- **Promote Seamless Integration:** To create a unified and effective ecosystem, make sure the CRM interacts easily with third-party tools and platforms, such as marketing automation tools, energy monitoring systems, and financial management software.
- **Encourage Renewable Energy Goals:** Help solar companies grow and encourage more people to use solar energy solutions, supporting international initiatives to tackle climate change and advance sustainable development.
- **Improve Team Collaboration:** Offer tools that facilitate efficient coordination between call center employees, project managers, and technical teams. Communication and teamwork will be streamlined by tools like collaborative task management, real-time updates, and shared dashboards.
- **Enhance client Support:** Give call center representatives access to comprehensive client profiles, automated ticketing platforms, and real-time information so they can respond to questions quickly and raise customer satisfaction.
- **Simplify Financial Processes:** To guarantee a seamless financial workflow, incorporate features for creating and maintaining invoices, monitoring payments, and creating precise quotes.
- **Efficient Order and Project Creation:** With capabilities like automated workflows and status tracking, businesses can effectively manage the whole order lifecycle, from original quotation to project creation and execution.
- **Give Real-Time Updates:** Make certain that all parties involved, including clients and internal groups, are informed of project developments, service plans, and system modifications.

1.4 Expected Outcome

- **Enhanced Accessibility:** Users, including solar companies and customers, may readily access project details, quotations, bills, and get updates through the web platform.
- **Streamlined Operations:** By managing customer data, project schedules, and workflows effectively, administrators and team members can minimize manual labor.
- **Improved Customer Satisfaction:** Clients will benefit from easy communication, fast project updates, and timely question answering.
- **Effective Resource Management:** By automating order processing, ticketing, and invoicing management, solar enterprises may save time and money.
- **Simplifying Collaboration:** Technical teams, project managers, and call center employees will be able to work together more effectively thanks to real-time updates and consolidated dashboards.

1.5 Project management and finance

I am the only one involved in this project, and my careful preparation and commitment have led to the successful development of the system. I first considered a number of options for my capstone project, but I had trouble deciding on just one. Significant operational inefficiencies in solar enterprises were noted by me throughout my investigation, including the absence of a centralized platform for managing financial procedures, project updates, and customer connections. This disparity motivated me to develop a solution specifically suited to the solar industry's particular needs.

I came up with this project idea after talking with my supervisor and researching industry need. In order to solve these problems, the system was created, providing a single platform to improve client experiences and expedite processes. My boss gave me constant direction, which made sure the project complied with industry requirements and successfully handled practical difficulties.

The project's cost component mostly consisted of time spent on research and execution, as well as personal investments in software tools and resources needed for development. This project demonstrates my dedication to provide a workable solution that satisfies the needs of administrators and users in the solar sector.

1.6 Report Layout

A system report layout typically includes a title page, introduction, main body of text and supporting figures, tables, and graphs. The introduction may provide the purpose of the report, and the main body may contain an overview of the SolaCloud Solar CRM system and its components, a description of any problems or issues, an assessment of the system's performance and/or effectiveness, and a summary of the findings and recommendations. Supporting figures, tables, and graphs are used to illustrate and support the main body of text. The report should also include an appendix or addendum section if necessary to provide additional information and to present detailed data.

CHAPTER 2

Background

2.1 Introduction

A web-based tool called Solacloud Solar CRM was created to help solar enterprises run more efficiently. Users can use the platform capabilities to handle client interactions, project updates, and business operations by logging in with their own credentials. These users include administrators, project managers, sales teams, and customers. For all parties involved, the system guarantees security, effectiveness, and user-friendliness.

2.2 Related Work

To handle customer relationship management procedures for solar energy systems, there are several online programs accessible. Some of these are employed in the solar business to streamline operational workflows, manage solar projects, and track consumer questions. A few of them are named.

Sunbase Solar CRM: Sunbase all-in-one solar software suite includes a CRM for effective customer relationship management for Solar Businesses [1].

Solar CRM: Solar crm software to track leads, manage site surveys, photos, documents, create proposals, with 100% customizable workflows [2].

Scoop Solar CRM: Scoop is a mobile project management solution for renewable energy specialists to streamline installations and maintenance. The Scoop platform collects, organizes, and streamlines solar data, documents, and workflows and the solar app provides your team with access to this information while in the field, at the office, and anywhere in between [3].

Spotio Solar CRM: SPOTIO is the best solar CRM for field sales teams in the solar & energy industry - increasing revenue by 23% and boosting productivity by 46% [4].

2.3 Comparative Studies

A complete and easy-to-use platform for managing and operating solar projects is provided by the Solacloud Solar CRM. It combines essential elements like procurement tracking, offer and order management, project deadlines, and real-time updates into a single, seamless system,

which sets it apart from competing options.

Administrators, staff members, and teams can all manage tasks effectively, keep an eye on solar panel deployments, and create PDF offers and bills with role-based access. Cutting-edge technologies like chat platforms, notification management, and a calendar for job monitoring guarantee efficient teamwork and prompt replies. A comparison of different features along with our propose app is shown in table 2.1.

Table 2.1: Summary of the examination of current systems

Features	Sunbase Solar CRM	Solar CRM	Scoop Solar CRM	Spotio Solar CRM	SolaCloud Solar CRM
User Registration	Yes	Yes	Yes	Yes	Yes
Admin Registration	Yes	Yes	Yes	Yes	Yes
Customer Management	Yes	Yes	Yes	Yes	Yes
Call center	No	No	Yes	No	Yes
Project	Yes	Yes	Yes	Yes	Yes
Offer	Yes	Yes	No	Yes	Yes
Order	Yes	Yes	Yes	Yes	Yes
Invoice	Yes	Yes	Yes	Yes	Yes
Payment	No	No	No	No	Yes
Warehouse	No	No	No	No	Yes
Calendar	No	Yes	No	Yes	Yes
Chat	No	No	No	No	Yes
Real Time Email	No	No	No	No	Yes

2.4 Scope of the Problem

The scope of the problem for the proposed system is to provide a user-friendly, efficient, and cost-effective solution for managing solar company operations worldwide. The platform should enable solar companies to streamline their operations by offering tools for project management, customer relationship management (CRM), invoice generation, and payment processing. It must allow technical teams, project managers, and customer service staff to collaborate effectively while providing real-time updates and analytics.

The system should offer the following features:

- **Project Management Tools:** To plan, track, and manage solar installation projects efficiently.
- **CRM Capabilities:** To maintain customer data, communication logs, and relationship history.
- **Integrated Payment Gateway:** To process payments and generate invoices seamlessly.
- **Real-Time Updates:** To provide users with up-to-date information about project progress, quotations, and schedules.
- **System Integration:** To connect with existing systems such as accounting software or third-party platforms for enhanced functionality.

The scope of the system addresses challenges such as:

- Inefficient manual processes leading to errors and delays.
- Difficulty in tracking project progress and managing resources.
- Limited communication channels causing customer dissatisfaction.
- Lack of centralized data for informed decision-making.

By addressing these issues, the proposed system aims to enhance operational efficiency, reduce costs, and improve customer satisfaction. Additionally, the system provides scalability to accommodate the growing needs of solar companies and offers analytical tools for strategic planning and decision-making.

2.4.1 Scheduling of Time

Table 2.2 displays my project's scheduling of time.

Table 2.2: Scheduling of time

Planning	2 Weeks
Design And Analysis	4 Weeks
Coding	12 Months
Evaluation and Application	4 Months
Total	17 Month 2 Week

2.5 Challenges

With the Solacloud Solar CRM platform, users may obtain the services they want, including project management, invoice generation, and real-time updates. However, there are certain difficulties in making sure these services are user-friendly and effective for every user. Our main objective is to make our system more user-friendly, especially for solar enterprises and their technical teams, project managers, and administrative personnel. Careful planning and execution are necessary to ensure smooth navigation and accessibility for a variety of stakeholders.

Handling user inquiries is a major task. Although users are able to submit queries or help requests, only administrators with permission can reply. Sustaining user pleasure and confidence requires administrators to respond promptly and accurately. This feature necessitates strong user management and notification systems and adds complexity to the system design.

Integrating a payment gateway and guaranteeing safe, error-free transactions present additional difficulties. The platform becomes much more sophisticated when real-time project tracking, quotation management, and dynamic scheduling are included. Additionally, in order to meet the expanding demands of multinational solar enterprises, scalability is a critical consideration that calls for a design that facilitates substantial data handling and analytics.

CHAPTER 3

Requirement Specification

3.1 Iterative Model

The Development Life Cycle's phases are essential to the success of any project. These phases—planning, analysis, design, implementation, and maintenance—help guarantee that the system runs well, fulfills user needs, and achieves its intended goals. The Iterative Model takes a cyclical approach, stressing continuous improvement and progressive development, in contrast to the Waterfall model's strict and linear advancement.

A system may be developed progressively using the Iterative Model, which enables developers to improve functionality and performance by building upon earlier iterations. Every iteration moves through the steps of analysis, design, implementation, and testing as part of a mini-SDLC. Until the system satisfies the necessary requirements and quality standards, this procedure is repeated.

An iterative model diagram is shown in picture 3.2 below.

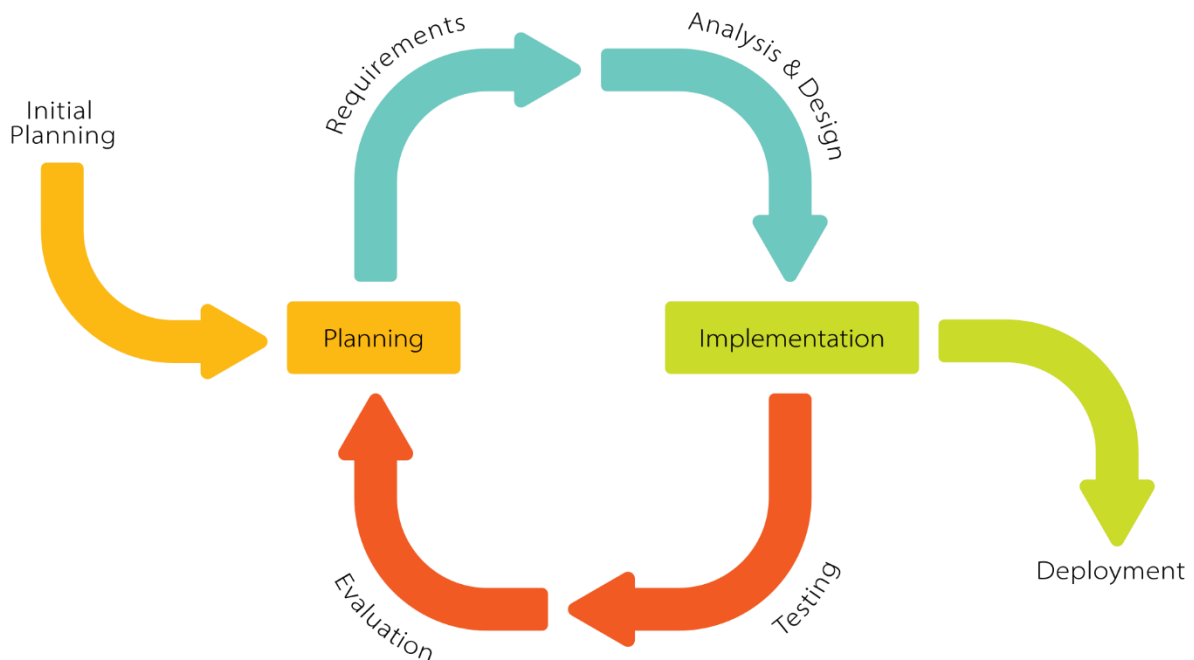


Figure 3.2 The Iterative Model

3.2 Requirement Collection and Analysis

The goal of the requirement analysis phase is to specify the Solar CRM System functional and non-functional needs while making sure they are in accordance with stakeholder expectations and business goals. This phase, which emphasizes scalability, practicality, and clarity, acts as a development roadmap.

The system design is supported by a well-organized feasibility analysis that assesses the system operational, legal, economic, technological, and scheduling viability. Potential risks are mitigated, possibilities are optimized, and the resources needed for effective implementation are recognized thanks to the study.

3.2.1 Functional Requirements

The fundamental features of the Solar CRM system are specified by the functional requirements. To facilitate understanding and implementation, these needs have been divided into modules.

1. Role management and user authentication
 - **Objective:** Secure access control for several user roles is the goal.
 - **Features:**
 - Include encrypted password storage and role-based authentication.
 - Admin, HR Manager, Project Manager, Employee, and Technician are among the roles.
 - Management of user profiles for changing private data
2. Employee and Team Management
 - **Objective:** Effectively manage the organizational structure.
 - **Features:**
 - Data entry (name, designation, contact) during employee onboarding.
 - HR creates teams and assigns team leaders.
 - Access based on roles for team management tasks.
3. Project Lifecycle Management
 - **Objective:** Comprehensive project monitoring and administration.
 - **Features:**
 - Workflows for creating, updating, and deleting projects.
 - Arranging projects according to team assignments, due dates, and status.

- Project event timeline visualization (e.g., creation, offer placing, order changes).
 - Notifications of deadline modifications and project milestones.
4. Offer and Order Management
- **Objective:** Simplify the process of creating, monitoring, and documenting offers and orders.
 - **Features:**
 - Provides a template-customizable creation module.
 - Order creation is connected to the procurement and warehousing modules.
 - Automated creation of branded offer and order PDFs and emails to the customers.
 - Notifications for placing orders and approving offers.
5. Solar Panel Placement Planner
- **Objective:** Make precise solar panel installation design possible.
 - **Features:**
 - Gathering input for panel specs and roof measurements.
 - Automated design suggestions for the best location of panels.
 - Designs that may be exported for client and technical evaluation.
6. Warehouse and Procurement Management
- **Objective:** Automated procurement and real-time inventory tracking.
 - **Features:**
 - In and out inventory based on warehouse and shelf after received from supplier and sold to customer.
 - Features include low-stock notifications and warehouse stock management.
 - Requests for procurement are produced according to project requirements.
 - Integration with purchase cost accounting.
7. Financial Management (Accounting)
- **Objective:** Manage payroll, financial reporting, and invoicing.
 - **Features:**
 - Features include the ability to generate invoices connected to projects and orders.
 - Management of payroll, including computation of taxes and deductions.
 - Financial reporting dashboards for stakeholders.
8. Complaints and Ticketing System
- **Objective:** The goal of the complaints and ticketing system is to resolve customer and project-related concerns quickly.

- **Features:**
 - Features include the ability to log complaints and categorize them (high, medium, low priority, etc.).
 - The appropriate teams are assigned tickets to resolve.
 - Alerts on ticket status updates.

9. Communication and Scheduling

- **Objective:** Encourage teamwork and effective work scheduling.
- **Features:**
 - A solution for team collaboration via internal chat.
 - Integration with Full Calendar for scheduling tasks and projects.
 - Alerts for updates, communications, and new tasks.

3.2.2 Non-Functional Requirements

The system's dependability and quality are guaranteed by the non-functional criteria. Performance, scalability, security, and compliance requirements are among them.

Performance: The system must have low latency and be able to accommodate up to 1,000 concurrent users. Critical procedures should not need response times longer than two seconds.

Scalability: There shouldn't be any noticeable speed issues as the system manages more users, projects, and data.

Safety: Encrypting sensitive data while it's in transit and at rest is a necessary. The system ought to abide with data protection laws (such as the CCPA and GDPR). Data protection laws (such as the CCPA and GDPR) should be complied with by the system.

Usability: The user interface needs to accommodate several languages and be easy to use.

Availability: The system has to have disaster recovery procedures in place and have a 99.9% uptime rate.

3.3 Use Case diagram

Actors: Superadmin, admin, employee, call center, customer

An explanation of how a system responds to a request from a source other than the system itself (the user) is called a use case. A use example of the functions in a Solacloud Solar CRM is shown in Figure 3.3.

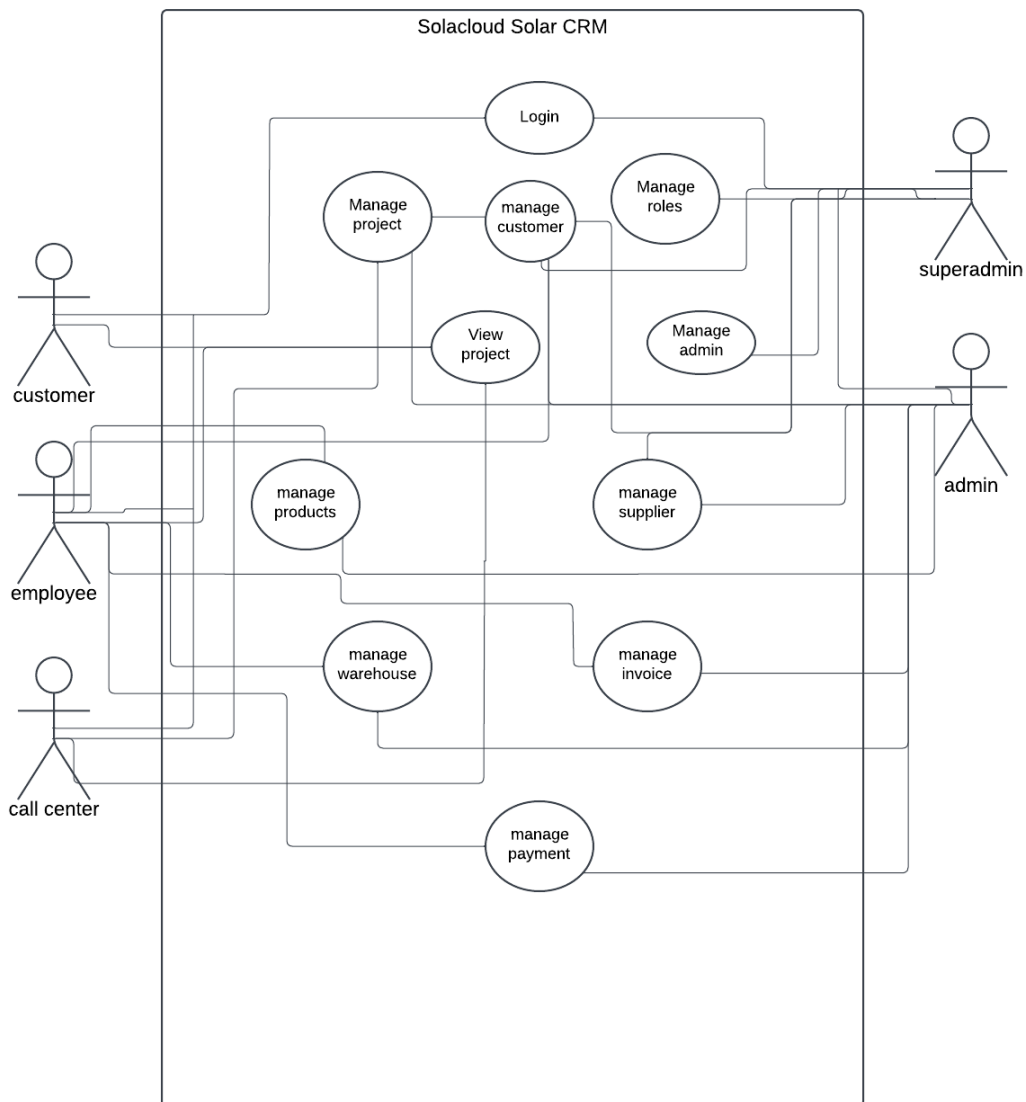


Figure 3.3 Use case diagram

3.4 Entity relationship model and Diagram

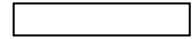
A graphic representation of entities and their connections to one another is an element relationship model. To accurately capture this current reality in a database is the primary goal of ER demonstrations. We don't really get a database representation from the ER display. It gives us a little advance that makes describing a database not too complex. Usually, an ER

display is actualized as a database. Each field in a table refers to a trait type in a basic social database, and each column speaks to one instance of a substance type.

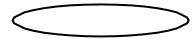
A connection between items in a relational database is established by storing the primary key of one element as a pointer, or "foreign key," in the table of another element.

Figure 3 below lists the E-R diagram's main elements.

Entity set is represented by 2 rectangles.



Ellipse, a symbol for characteristics.



Diamonds are a symbol for relational sets.



Line, which connects relationship sets to entity sets and attributes to entity sets.

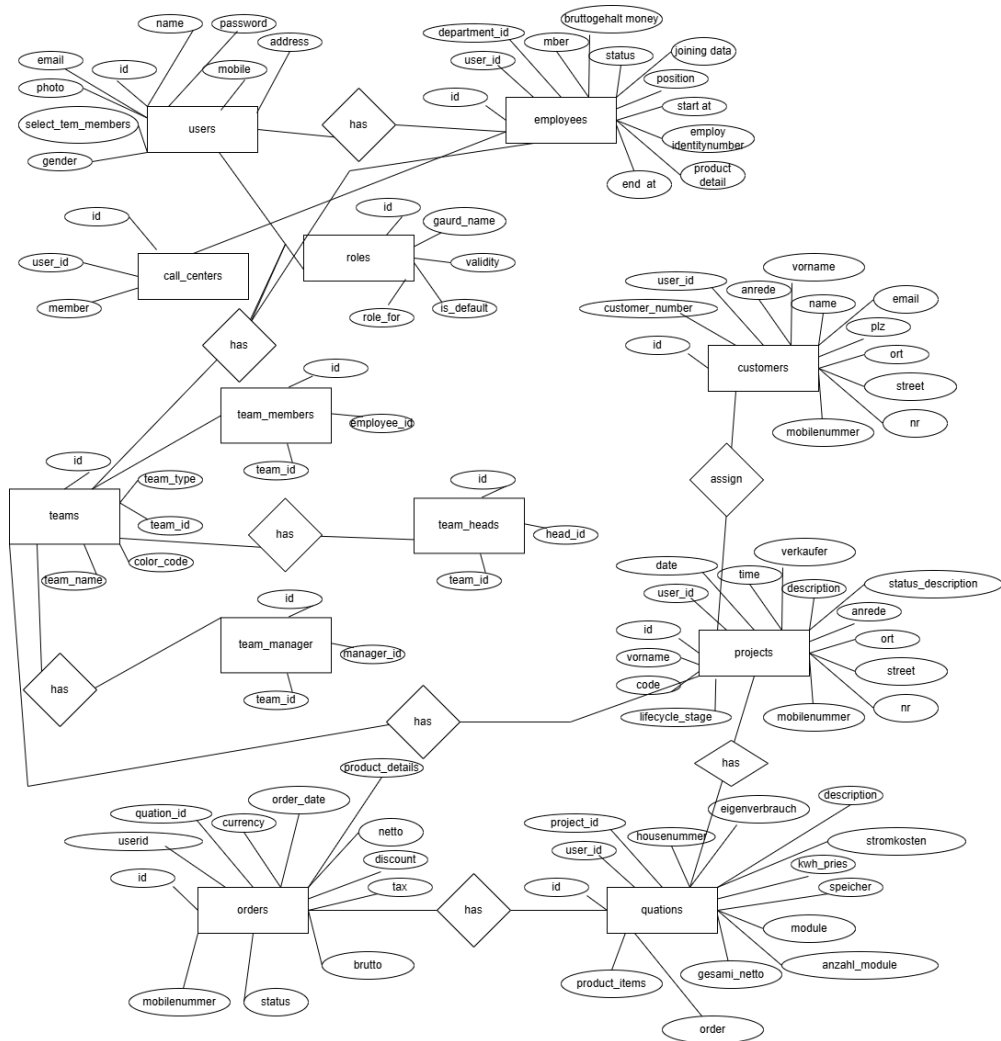


Figure 3.4 ER-Diagram

CHAPTER 4

Application Design and Specification

4.1 Front-end Design

The SolaCloud CRM Platform was created with an easy-to-use interface to streamline operational procedures and make managing solar energy projects simpler. From project development and resource allocation to financial monitoring and client interaction, this system is designed to help solar energy enterprises manage their daily operations.

Administrators, project managers, and staff can all effectively manage duties like establishing and updating projects, tracking progress using timetables, and producing automatic offers and orders with the platform. The platform allows for the easy modification of roles, teams, and project data by the system administrator.

The front-end interface is designed to be user-friendly and accessible to all parties involved, including clients and staff. Role-based access allows each user to customize functionality and ensure security according to their own responsibilities. The platform is quite effective and useful thanks to features like an interactive solar panel placement design tool, automated PDF production for offers and bills, and drag-and-drop scheduling utilizing the integrated calendar.

The system is flexible enough to be used in a variety of sectors that need financial planning, staff tracking, and project management, in addition to solar energy companies. The system seeks to facilitate cooperation, optimize workflows, and assist businesses in their endeavors to effectively provide renewable energy solutions. It is a strong tool for managing solar energy projects and more because of its adaptable design and scalable architecture.

4.2 Back-end Design

I developed this app using a number of different technologies. As follows: Framework for PHP Laravel

- PHP Laravel Framework
- PHP
- Bootstrap
- HTML5 and CSS3 (Markup language)
- JavaScript
- React JS Framework

- MySQL (Database Engine)
- Web Server
- Font Awesome for Icons

4.2.1: Laravel Framework

Laravel is a web application framework with an advanced, expressive language structure. We believe that improvement ought to be a fun, creative experience in order to be genuinely satisfying. Laravel aims to relieve the strain from progress by encouraging standard chores used in most online activities, such as checking, coordinating, sessions, and holding. Laravel aims to make the planner's improvement process amazing without compromising the usability of the application. Playful architects write the finest code. We've tried to do this by fusing frameworks developed in other languages, such Ruby on Rails, ASP.NET MVC, and Sinatra, with the simplest components of current web architectures [1].

Laravel offers vast resources that are necessary for massive, innovative applications, making it both accessible and revolutionary. Thanks to an excellent inversion of control holder, expressive movement structure, and well-planned unit testing reinforcement, you have the resources you need to create whatever application you are competent to create.

4.2.2 PHP

PHP is a powerful server-side programming language that's ideal for creating rich, dynamic websites. A PHP processor module is used by the server to process the code when a PHP script is run, producing the relevant web page. PHP and HTML work together smoothly, removing the need for separate files for managing data or server-side functionality by enabling developers to embed PHP code right into an HTML file. PHP is the perfect option for building dynamic, database-driven websites because of this integration, which streamlines the development process and increases productivity.

4.2.3 Bootstrap

Twitter programmers Mark Otto and Jacob Thornton developed Bootstrap in 2011 to solve the company's uneven development habits. Because developers frequently wrote code in different ways, cooperation and maintenance became challenging. They created a framework based on standardized HTML, CSS, and JavaScript components to address this issue, allowing programmers to write code that is efficient, consistent, and maintainable.

Originally intended as an internal tool, Bootstrap turned out to be incredibly useful and

adaptable. The business made it available as an open-source initiative after seeing its potential beyond Twitter. It rose to prominence as one of the most widely used front-end frameworks worldwide within months of its GitHub release. Web development was transformed by its responsive grid architecture, pre-made user interface elements, and integrated JavaScript plugins, which made it simple to create contemporary, flexible, and aesthetically pleasing websites. By making it easier to create responsive and mobile-first designs, Bootstrap keeps empowering developers.

4.2.4 HTML & CSS

HTML is the standard markup language used in creating Web pages and applications. Combined with JavaScript and Cascading Style Sheets, better known as CSS, it gives the backbone for World Wide Web development. A Web browser processes or interprets HTML files retrieved from a Web server or local storage to visually present them as interactive Web pages. HTML elements are the building blocks of such documents and allow them to incorporate much content, such as text, images, and multimedia, into the structure and meaning of the document. Basic elements important to this class include header, sections, lists, links, and references, which are all used to create a structured meaningful document.

CSS is a stylesheet language that accompanies HTML in dictating the presentation layer of web pages. It separates content from design by defining layout, colors, typography, and other visual aspects. CSS also has wide usage with HTML and JavaScript on the web to create visually appealing web pages, user interfaces for web applications, and adaptable designs for mobile applications. This separation of content from presentation alone has assured better maintainability and flexibility in web design, thus enabling developers to create dynamic and visually appealing user experiences.

4.2.5 DBMS

A database is an organized collection of data. It forms a basis for systematic management and organization of information for efficient retrieval and manipulation. Data included in the database can represent any aspect of the real world. In any case, the representation has to be in a form to meet some application requirements. For example, hotel room availability may be recorded in a database so as to remind the user to affect a booking based on its current status and price.

Database Management Systems, or DBMS, are elaborate software packages that interact with users, applications, and the database itself to provide features for data storage, retrieval, and

management. A DBMS thus gives a clear framework for defining, creating, manipulating, and managing databases that allow efficient storage, access, updating, and proper organization of data. It guarantees consistency, security, and availability of data; examples of such features are data integrity, concurrency control, and backup/recovery. The examples are MySQL, which I applied in my application and which generally is reliable for handling database aspects in a software system.

4.2.6 Web server

A web server is a software program that runs on a computer and deals with serving web pages by using the Hypertext Transfer Protocol. When a request is made through an HTTP client, such as a web browser, the web server processes the request and returns responses of data back to the client in a form that the client will understand, such as an HTML page, an image, or other media that makes up a web page. In other words, the web server mediates between the user and the data of the website to have its content served efficiently.

The web servers can run either on dedicated physical servers or virtual machines, and for each computer or device that is connected to the Internet, web server software needs to be installed to be able to handle incoming requests. The client-server model is a standard approach in which the client, usually a browser, requests something and the server responds. Some of the most popular web servers are Microsoft's IIS, NGINX, and Apache, with Apache the most widely used. Other notable web servers include Novell's NetWare server, Google's Web Server, and IBM's Domino servers.

XAMPP provided us with a virtual server environment which emulated the behavior of a web server on the local system for testing and development purposes. XAMPP also includes Apache and MySQL for a comprehensive server setup; hence, one can do complete development in a controlled environment.

4.2.7 Font Awesome Icons

Font Awesome is a very famous library providing scalable vector icons that can easily be customized by CSS. They can be of any size, colored, or styled in a variety of ways, including with various effects like drop shadows, which gives developers leeway in how they meld visual elements into their websites or applications. The icons are responsive and lightweight, meaning they'll work on most screen sizes without losing quality.

For business-related topics, modules, and efforts, the primary Font Awesome is currently open source and completely free. [5].

4.2.8 Interaction Design and User Experience

The input design connects the user to the information system. While output design is a process that involves creating the required reports that must be given to users in compliance with the requirements, data preparation involves developing the specifications and protocols needed to transform transaction data into a format that can be used for processing data entry. A few screenshots illustrating the input and output designs of the suggested system are included below.

4.3 Authentication Page

This is authentication for all users. Need to enter email password to authenticated. After used entered email and password and click on sign in and email not found in database then will show the error [The email address you entered isn't connected to an account], and if email is found and password doesn't match then will show error [You have entered invalid password].

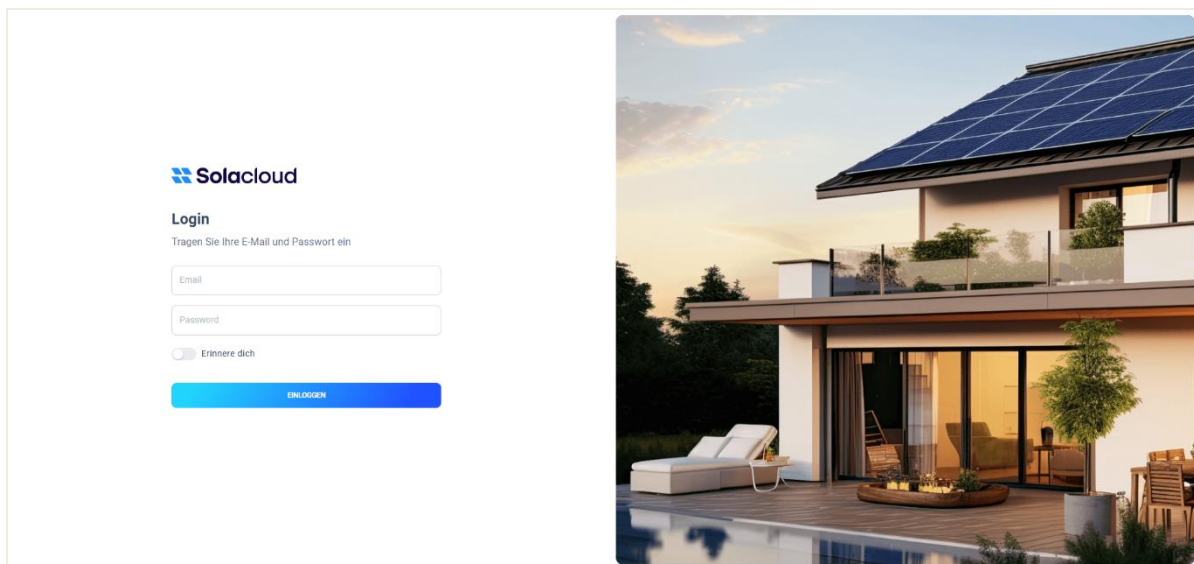


Figure 4.1: Authentication Page

4.4 Dashboard

In dashboard page left sidebar showing in left side of the page and menu on the top and menu here also search bar to search project, order, offer, users, files.

Then showing statistics like how many offers, orders, open projects, cancel. And below showing in details statistics of today, week, month and can filter based on date. Then showing evaluation in chat of offer, order, invoice, paid. And showing order and offer statistics data in chart which is yearly. Finally showing calendar in calendar will show the open projects based on date.

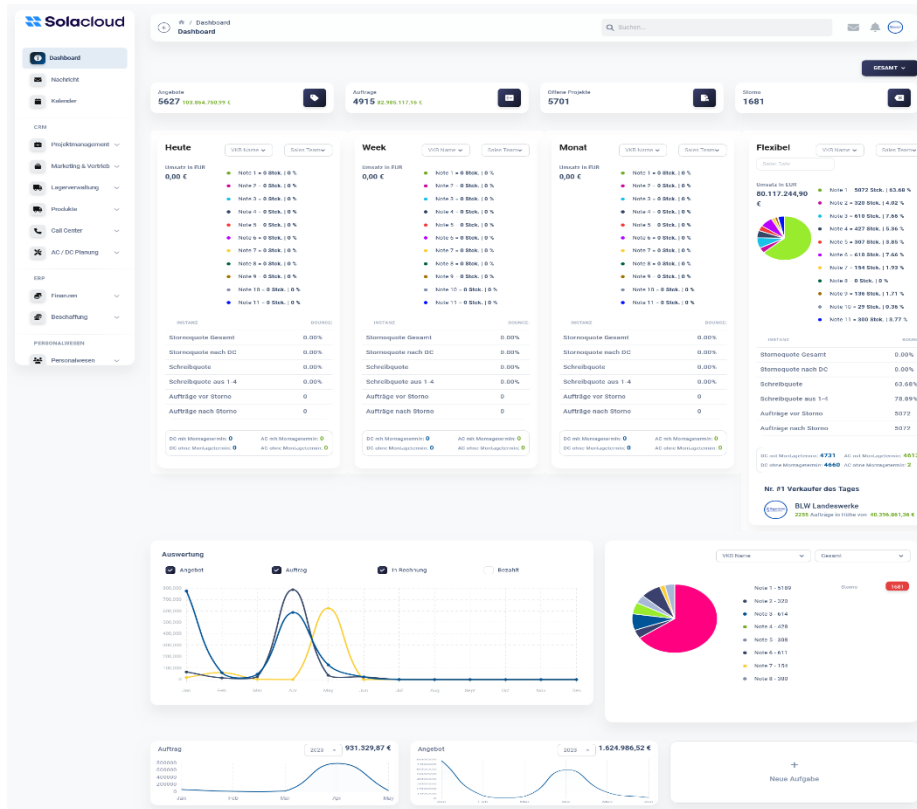


Figure 4.2: Dashboard

4.5 Employee Creation

To create employee, need to enter all required information of the employee and click on save. Need to enter contact details first then monthly salary, device information and finally start and exit date.

The 'Erstellen' page is used for creating a new employee. It features a sidebar with navigation options like 'Lagerverwaltung', 'Produkte', 'Call Center', 'AC / DC Planung', 'ESP', 'Finanzen', 'Beschaffung', 'PERSONALWESEN', 'Mitarbeiter', and 'Einstellungen'. The main form is titled 'Erstellen' and includes sections for 'Kontaktdaten' and 'Personalwesen'. The 'Kontaktdaten' section contains fields for 'Mitarbeiternummer' (100213), 'Name' (Jifon Doe), 'E-Mail' (z.B. email@gmail.com), 'Passwort', 'Rolle', 'Geburtsdatum', and 'Geburtsdatum' (mm / dd / yyyy). The 'Personalwesen' section includes 'Monatliches Gehalt', 'GeSteuerverwaltung', and 'Beginndatum/Austrittsdatum'. A 'Speichern' button is located at the bottom right.

Figure 4.3: Contact details page

Figure 4.4: Salary information input page

Figure 4.5: Device information

Figure 4.6: Start and exit date

Employees

MITARBEITER HINZUFÜGEN

IMPORTIEREN CSV EXPORTIEREN

Alle Angestellten

Aktive User Deaktive User Gesamt

Mitarbeiternummer	Name	E-Mail	Start Datum	Status	Benutzer-Rolle	Aktionen
100212	Test	test1@blwd.de		Aktiv	Area Sales Manager	[i]
100211	CB Bank	cbbank@bayerische-landeswerke...		Aktiv	Bank	[i]
100210	Resell Mitarbeiter	resell@gbhw.de		Aktiv	Resell Verkäufer	[i]
100209	Designer@solaclo... sol.de	Designer@solaclo... sol.de		Aktiv	Administrator	[i]
100206	Designer	designer@solaclo... de		Aktiv	Administrator	[i]
100205	HSD Test	hsd@bhw.de		Aktiv	Head of Sales	[i]
100204	BLW Innendienst	innendienst@gmail.com		Aktiv	BLW Innendienst	[i]
100203	Finanz Test	finanz@bhw.de		Aktiv	Finance Manager	[i]
100202	Frontoffice Test	test@frontoffice.com		Aktiv	Frontoffice Agent	[i]
100201	Test AC Techniker	acs5@gmail.com		Aktiv	AC Techniker	[i]

Anzeigen 1 zu 10 von 168 Einträgen

Figure 4.7: All active employees list

4.6 Teams

In team can add new teams to add a team need to add name of the team, select team members, set front office agent and team leader. In the team view can see team information and add team option after click on add team the add team form will be open. In add team after entered the team's name and select the area of the team then can select head of sales or manager of technician. If selected area is sales team, then will show head of sales selection and if ac or dc then will show the technician manager selection option. Then can select team leader, members and front office agent.

Teams / Sales

ADD TEAM

IMPOR CSV EXPORT CSV

All teams

Team ID	Teamname	Head of Sales	team leader	Front Office Agent	team members	actions
TM-1038	Test Want	[i]	[i]	[i]	[i]	[i]
TM-1035	Test hesd	[i]	[i]	[i]	[i]	[i]
TM-1034	Team Test 21 sept	[i]	[i]	[i]	[i]	[i]
TM-1032	Team Dummy Test	[i]	[i]	[i]	[i]	[i]
TM-1026	advertiser Kohler	[i]	[i]	[i]	[i]	[i]
TM-1025	Team BW	[i]	[i]	[i]	[i]	[i]
TM-1023	Team NRW	[i]	[i]	[i]	[i]	[i]
TM-1010	Daniel Mousavi	[i]	[i]	[i]	[i]	[i]
TM-1009	Team Herbert	[i]	[i]	[i]	[i]	[i]
TM-1008	Team Sahin	[i]	[i]	[i]	[i]	[i]

Showing 1 to 10 of 17 entries

Figure 4.8: Team information

Figure 4.9: Create team

4.7 Messaging

In the messaging any user of the system can send message to another user of the system. To start a chat need to click on new message and then search and select the user then write message and send.

Figure 4.10: Chat

Figure 4.11: New Chat

4.8 Project Management

In project management after opened the projects the projects list will show, by default all projects will be show and can see the projects list based on the status by the open tabs from right side of all projects.

To create a project, need to click on create project button. After click on create project will open the create project form by fillip all required information can create the project.

Projekt	Kunden	VKB Name	Erstellt am	Terminationdatum	Status	Statusdatum	Preis	Resale Sta.	Ort
508893	rtest test	Andre Spengler	30.05.2024	30.05.2024	1-Verkauf	01.06.2024	22.925,87 €		München
508892	Test AC Cengiz Flo	Andrej Kus	15.05.2024	15.05.2024	1-Verkauf	15.05.2024	1,00 €		München
508891	Test AC Cengiz Flo	Steffen Buch	14.05.2024	15.05.2024	1-Verkauf	14.05.2024	15.985,00 €		München
508890	Test AC Cengiz Flo	Jorn Heinrich	14.05.2024	14.05.2024	1-Verkauf	14.05.2024	2,00 €		München
508889	Test AC Cengiz Flo	Ivan Besic	14.05.2024	15.05.2024	1-Verkauf	14.05.2024	1.000,00 €		München
508888	Test AC Cengiz Flo	Herbert Manik	08.05.2024	08.05.2024	1-Verkauf	08.05.2024	20.343,87 €		München
508887	Test AC Cengiz Flo	Foti Katidis	08.05.2024	08.05.2024	1-Verkauf	08.05.2024	27.749,00 €		München
508886	Test AC Cengiz Flo	Foti Katidis	07.05.2024	07.05.2024	1-Verkauf	05.07.2024	1,00 €		München
508885	Test AC Cengiz Flo	Andre Spengler	07.05.2024	08.05.2024	1-Verkauf	07.05.2024	1,00 €		München
508884	Test Test	Alexander Krotki	07.05.2024	08.05.2024	1-Verkauf	05.07.2024	555,00 €	3-Angebot	München

Figure 4.12: All Projects List

The form contains the following fields:

- Datum:** mm / dd / yyyy
- Uhrzeit:** 08:00 - 10:00
- Verkäufer:** (dropdown menu)
- Beschreibung:** z.B. Musterstrasse 19, 80935 München
- Kunde:** (dropdown menu)
- Anrede, Vorname, Name:** (text input fields)
- Straße, Nr.:** (text input fields)
- PLZ, Ort:** (text input fields)
- Firma, E-mail Adresse:** (text input fields)
- Telefonnummer, Mobilnummer:** (text input fields)
- Entscheidungsträger:** Entscheidungsträger
- Erfahrung mit PV:** (text input field)
- Gesamtverbrauch KwH, Monatlicher Abschlag in Euro:** (text input fields)
- Stromabrechnung Vorhanden, Dachausrichtung:** (text input fields)
- Dachabdeckung, E-Mobilität:** (text input fields)
- Zeitraum (max.), Internet:** (text input fields)

Figure 4.13: Create Project Form

4.8.1 Project Details

To open a project and view the design of solar panel placement, offer, order, files, ticket, products info of the project need to click on project number from project list. After open the project a page will be open like below. Here below the top menu the users are showing which are connected with the project.

In right side two button are showing one button is for saving the update of the project after updated of planer, offer, order etc. and then showing a dropdown button after open this can move to some related page of the project.

Below showing all the information of the lead or customer. In lead details showing the stage of project. Below can add any update related of the project. In tabs have other's options where can see documents related of the project and more information.

In the right sidebar there is showing the map of the location where need to install the solar panel and below showing the project number.

In the below of the project number showing the correct status of the project and can update the project status from here. Below added email send option here will need to select that which email will send like offer, order etc. below showing project timeline.

The screenshot displays the Solacloud interface for project 508497. The left sidebar contains navigation options like Dashboard, Nachricht, Kalender, CRM, Projektmanagement, Marketing & Vertrieb, Lagerverwaltung, Produkte, Call Center, and AC/DC Planung. The main area shows project details for 'Cedric Marlow' with a 'Neukunde' status and a progress bar through stages: Neukunde, Kontaktiert, Interessiert, Qualifiziert, Angebot, and Gewinn. A right sidebar includes a map, project number (508497), status (3-Angebot), resale status (3-Angebot), and project status (Angebot, 08.09.2023).

Figure 4.14: Project Details

4.8.2 Roof Planner

In roof planner make detailed layout of the roof, identifying dimensions, slopes, orientation and potential obstruction. Utilizing the roof map where will suggests the best location for solar panels to maximize sunlight exposure and energy production. Also, will offer 3D modeling tools to visualize the proposed solar panel layout on the roof.

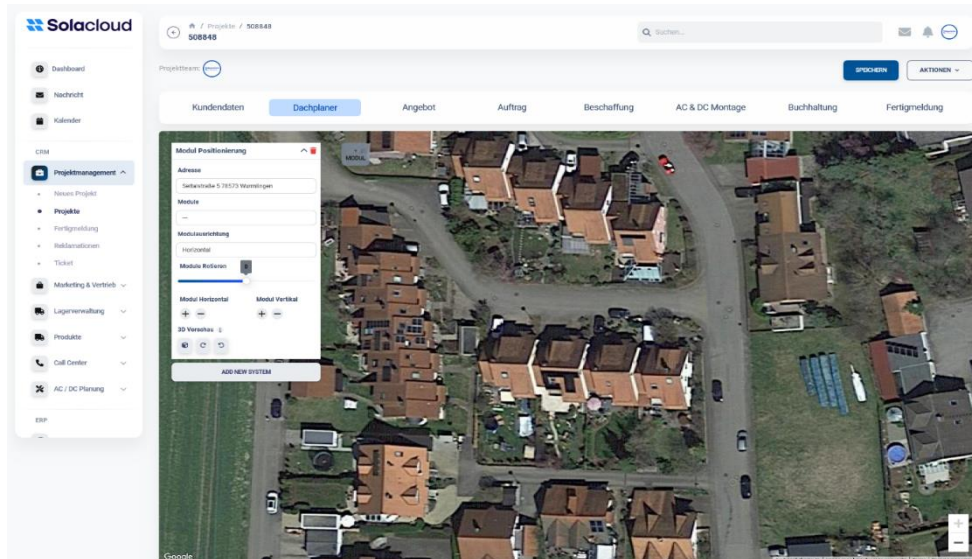


Figure 4.15: Roof planner

4.8.3 Offer Management

In offer management will add all the required information related to offer and will create offer pdf after created their will be sign option for customer and management of the company to process the offer. created the offer can update the information from here and the offer pdf can send to the customer from right side email option.

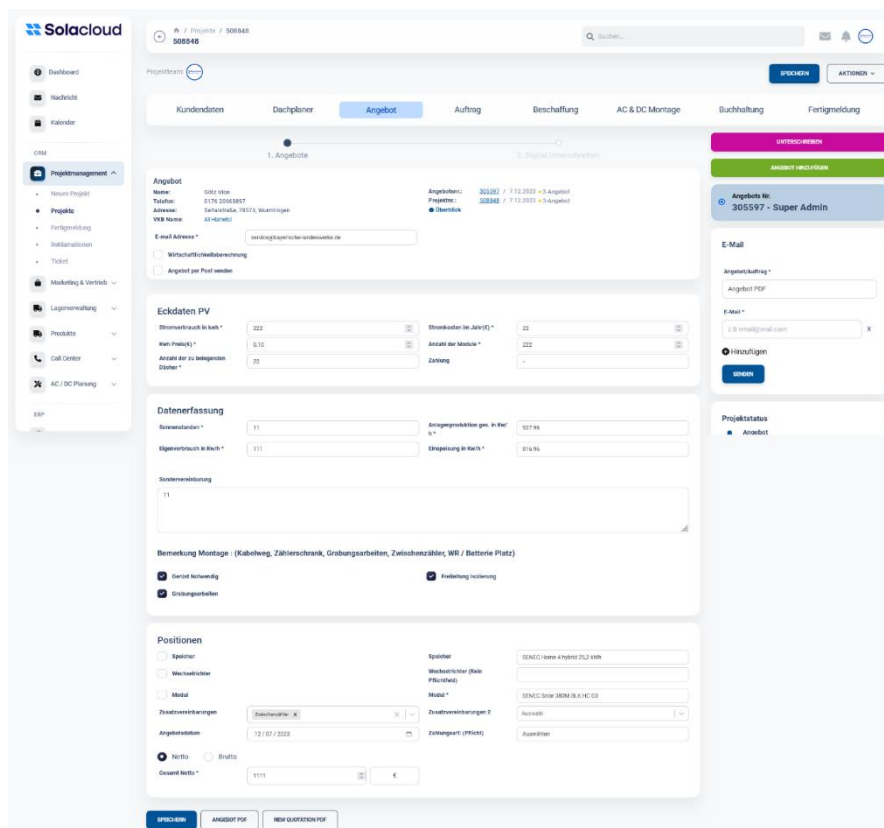


Figure 4.16: Offer management

4.8.4 Order Management

In order management will add the required information related to the order and upload the files. After created the order the pdf will created automatically and pdf can send to the customer. And to process the order will need to sign by the customer and the company management.

The screenshot displays the Solacloud order management interface. The main content area is titled 'Projektteam' and shows the order details for project 508848. The order is currently in the 'Auftrag' (Order) stage, with a progress bar indicating '1. Auftrag' and '2. Digital Unterschreiben'.

Order Details:

- Name:** Götz Irion
- Telefon:** 0176 20643897
- Adresse:** Seifenstraße, 78573, Wurmlingen
- VKB Name:** Altkemmel
- Angebot Nr.:** 305597 / 7.12.2023 • 3-Angebot
- Projekt Nr.:** 508848 / 7.12.2023 • 3-Angebot
- Überblick** (button)

Neuer Auftrag (New Order):

- Auftrag Nr.:** 305597
- Angebot:** 305597
- Währung:** EUR (€)
- Auftrag Datum:** 2024-12-26

Eckdaten PV (PV Data):

- Dachtyp:** Sonstiges
- Gesamt Bebauungsfläche in qm:** 574,42
- Dachausrichtung:** Süd
- Dacheindeckung:** Ziegel

Datenerfassung (Data Entry):

- Neigung:** 11
- Kabelführung:** Leerrohr
- Sondervereinbarung:** 11

Bemerkung Montage: (Kabelweg, Zählerschrank, Grabungsarbeiten, Zwischenzähler, WR / Batterie Platz)

- Zählerplatz frei** | **Zähleranzahl:** 11
- Zählerzusammenfassung** | **Internetanschluss** (wenn nein ist der Kunde verpflichtet einen zu machen):
- Bestandsanlage vorhanden** | **+ Zähler hinzufügen** (button)
- Welche Zähler werden ausgebaut, Zählernummer:** 11 | **Laufmeter PV-Module zu Wechselrichter (Berechnung Kabellänge):** 11
- Laufmeter Wechselrichter/Spelcher zu Zählerschrank:** 11 | **Zählerort (Stockwerk):** EG X
- Hausanschluss(HA) CRT:** EG X | **Spelcher/WR Platz:** EG X
- Abstand Dachsparren:** unter 60 cm
- Potenzialausgleich vorhanden** | **Dämmung vorhanden**
- Sturmhacken vorhanden**

Hausansicht Front (House View Front):

- Hausansicht Front 2
- Hausansicht Taufhöhe
- Hausansicht Rückseite
- Innendachansicht
- Kompletter Zählerschrank
- Zähler
- Wechselrichter-Standort
- Hausanschlusskasten
- Ziegel mit Meterstab

Gerüst notwendig

Freileitung Isolierung

Summary:

- Netto:** 1111 €
- MwSt:** 0 %
- Gesamtsumme:** 1.111,00 €

Buttons: UNTERSCHREIBEN, DC FREIGEBEN, Auftrag Nr., Ersteller, Wunschtermin Montage, E-Mail, Angebot/Auftrag, Auftrag PDF, SPEICHERN, AKTIONEN.

Figure 4.17: Order management

4.8.5 Sourcing Management

In sourcing management here will show all the products which added in the offer. And can add more products from here.

The screenshot displays the Solacloud Sourcing Management interface. The main content area shows a 'Materialliste' (Material List) table with the following data:

Product Nr.	Description	Quantity	Supplier	Abteilung	
SPC-05	SENEC.Home 4 hybrid 25,2 kWh	1	Stk./m	Senec AG	Elektromontage
WR-01	Huawei Wechselrichter SUN2000	1	Stk./m	Senec AG	Dachmontage
MDL-04	SENEC.Solar 410M HC G2	3	Stk./m	Senec AG	Dachmontage
P-100004	Hacken ABC Typ: 123	7,5	Stk./m	Senec AG	Dachmontage
P-100005	Schiene ABC Typ: 456	7,5	Stk./m	Senec AG	Elektromontage

Buttons '+ HINZUFÜGEN' and 'SPICHERN' are located below the table. The interface also includes a sidebar with navigation options (Dashboard, Nachricht, Kalender, CRM, Projektmanagement, Marketing & Vertrieb, Lagerverwaltung, Produkte, Call Center, AC / DC Planung, ERP) and a top navigation bar with tabs (Kundendaten, Dachplaner, Angebot, Auftrag, Beschaffung, AC & DC Montage, Buchhaltung, Fertigmeldung). The 'Beschaffung' tab is currently active.

Figure 4.18: Sourcing Management

4.8.6 Installer and Electrician Assembly

In the installer there will be entered the information such as products, and places or items images what the installer will need to do to complete the installation. Also, the pdf will create automatically and two sign option is there one is for customer and another for installer.

In the electrician there will enter the information which are need to fix or to do to make the system work. In the middle of the installer and Electrician here is a complain showing option of the project.

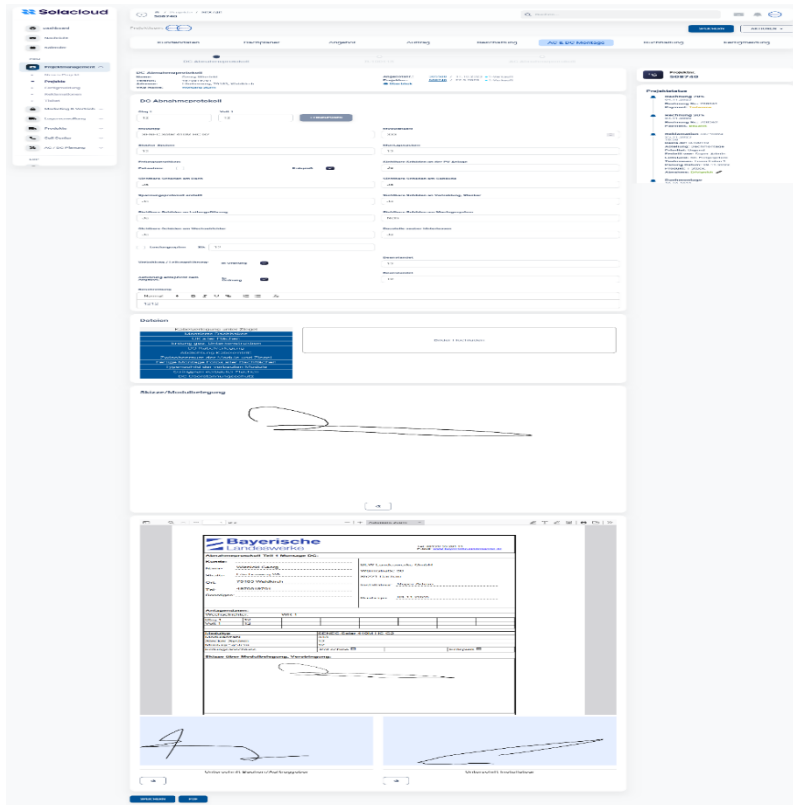


Figure 4.19: Installer and Technician

4.8.7 Accounting

In the accounting section of the project there will show all the invoices, incoming payments and incoming invoices related to the opened project. And can add the invoice, payment by click on the add invoice button and for payment need to click on add payment.

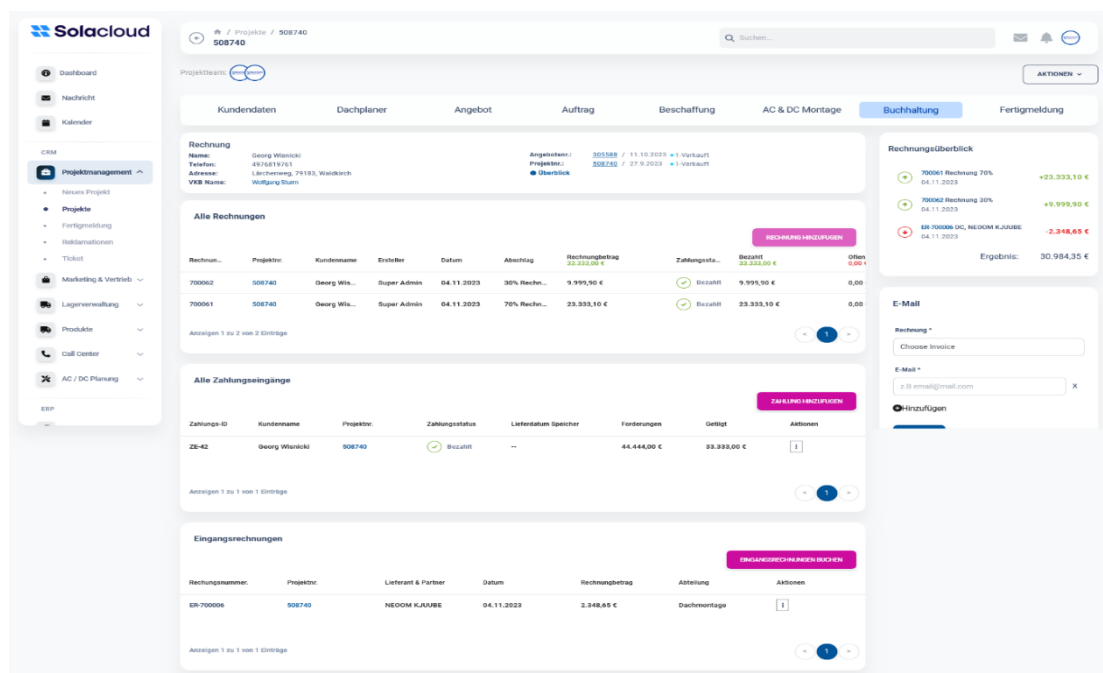


Figure 4.20: Accounting

4.8.8 Completion Updates

This will handle all updates pertaining to finished projects. There will be a section showing the previously uploaded files after the upload option for new files at the top of the screen. Before saving the entry, users can provide a date and time for each file or document upload.

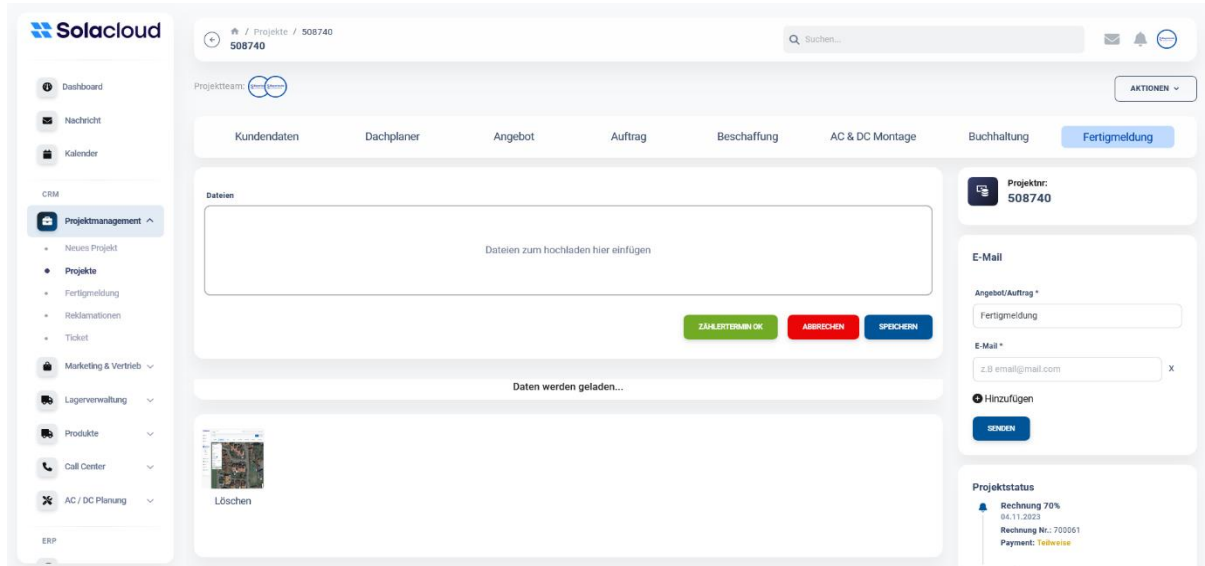


Figure 4.21: Completion Updates

4.9 Completed Projects

Here will list all the completed projects.

Projekt	Kunden	VVB Name	Erstellt am	Termindatum	Status	Preis	Ort	Projektstatus	Aktionen
508892	Test AC Ceangiz Flo	Andrej Kus	15.05.2024	15.05.2024	1-Verkauft	1,00 €	München	Dachmontage	
508889	Test AC Ceangiz Flo	Ivan Besic	14.05.2024	15.05.2024	1-Verkauft	1.000,00 €	München	Dachmontage	
508885	Test AC Ceangiz Flo	Andre Spengler	07.05.2024	08.05.2024	1-Verkauft	1,00 €	München	Dachmontage	
508881	test AC test	Andre Spengler	28.04.2024	28.04.2024	1-Verkauft	1,00 €	München	Dachmontage	
508880	Test Kunde	Andre Spengler	28.04.2024	29.04.2024	1-Verkauft	1,00 €	München	Dachmontage	
508879	Arnold Lange	Andre Spengler	26.04.2024	26.04.2024	1-Verkauft	3,00 €	Baiersbronn	Dachmontage	
508809	Ralf Zimmermann	Joias Ganglbauer	27.09.2023	27.09.2023	1-Verkauft	22.222,00 €	Dillingen/Saar	Dachmontage	
508714	Tahaarjan Güner	Dumny Rolan	20.09.2023	21.09.2023	1-Verkauft	25.000,00 €	München	Elektromontage	
508501	Reinhard Bernard	Mert Gumus	09.09.2023	11.09.2023	1-Verkauft	22.148,00 €	Eimmelshausen	Elektromontage	
505962	Jörg Volmar	Ahmet Amon	20.07.2023	20.07.2023	1-Verkauft	28.500,00 €	Mainz	Elektromontage	

Figure 4.22: All Completed Projects

4.10 Complains

To facilitate easy administration and navigation, the interface will be divided into four components. A button in top to add new complain then key complaint data, including metrics

like past-due complaints, today's complaints, open complaints, and tracked complaints, will be shown at the top in cards. A comprehensive list of complaints will be provided in a table underneath the cards, and a chart on the right will graphically depict the statistics, using dark blue for today's complaints, yellow for open complaints, and red for past-due complaints. Lastly, a thorough table with a search box and filter option for effective complaint data sorting and retrieval will be shown at the bottom.

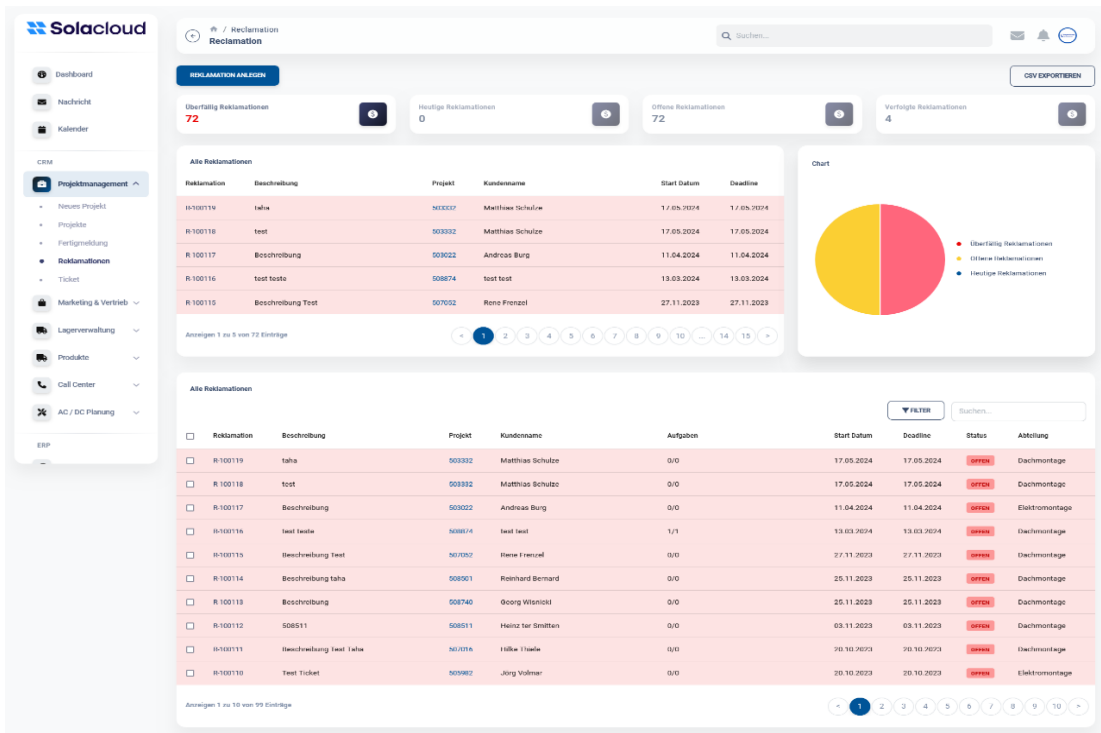


Figure 4.23: All Complain in table and chart with statistics

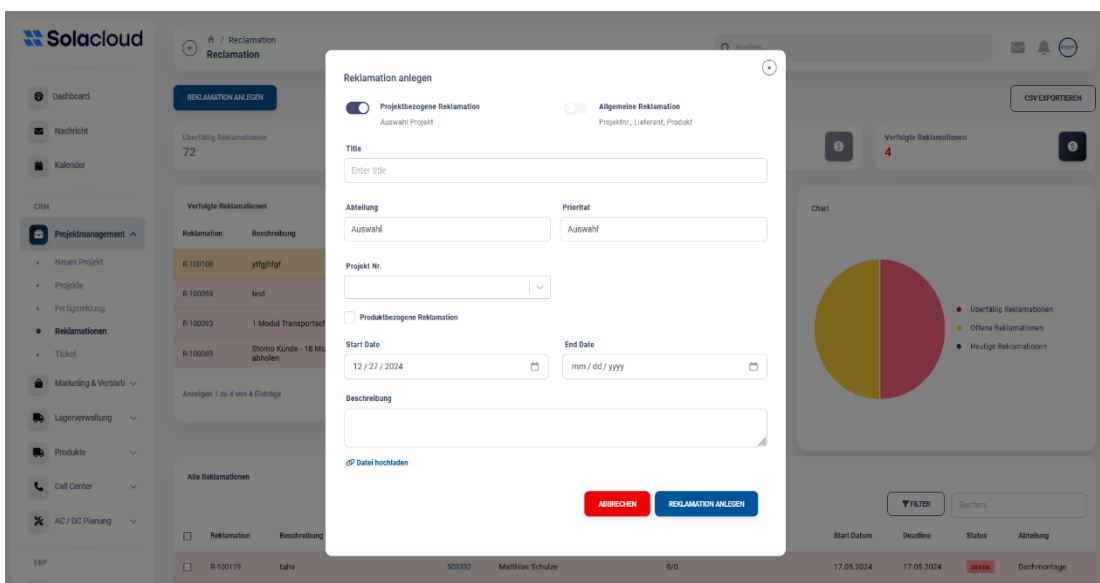


Figure 4.24: New complain

4.11 Tickets

For easy maintenance and navigation, the interface will be divided into four areas. A button in top to add new ticket then key ticket information, including metrics like past-due tickets, today's tickets, open tickets, and monitored tickets, will be shown at the top in cards. In addition to a chart on the right that graphically depicts the statistics using red for past-due tickets, yellow for open tickets, and dark blue for today's tickets a table beneath the cards will offer a comprehensive list of tickets. Lastly, a thorough table with a search box and filter option for effective ticket data sorting and retrieval will be shown at the bottom.

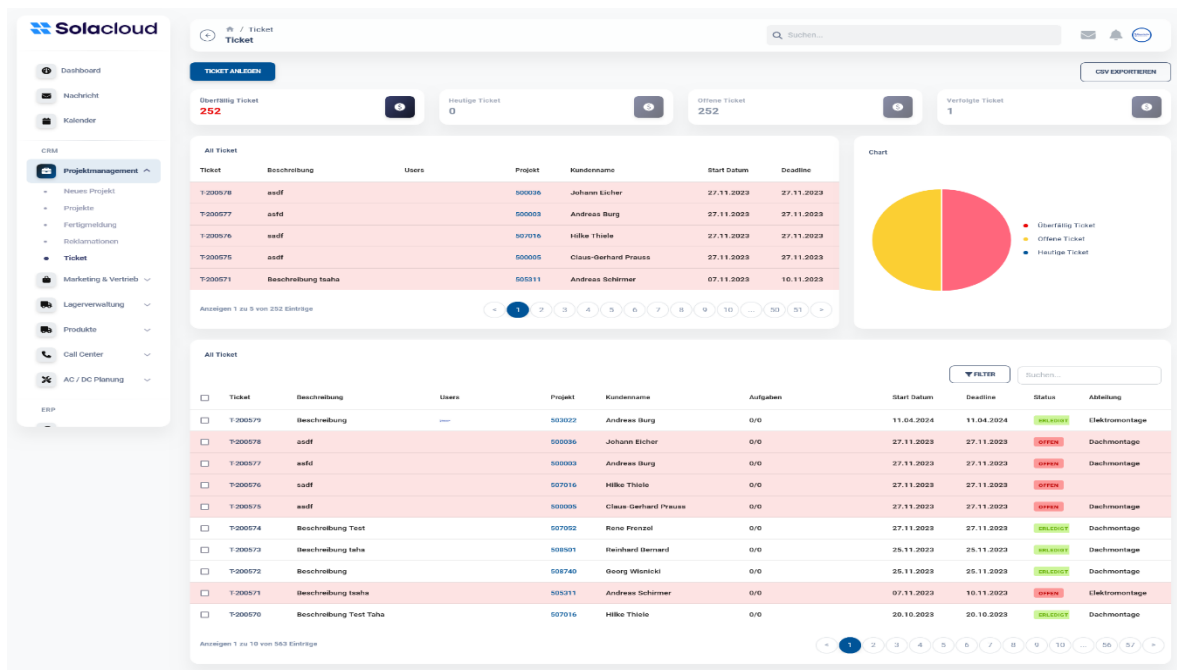


Figure 4.25: All Tickets

Figure 4.26: Create Ticket

4.12 All offer screen

In this screen will show all the offers.

ID	Verkäufer	Datum	Status	Preis	Aktionen
305628	Super Admin	01.06.2024		22.925,67 €	[i]
305627	Super Admin	15.05.2024		1,00 €	[i]
305626	Super Admin	14.05.2024		15.985,00 €	[i]
305625	Super Admin	14.05.2024		2,00 €	[i]
305624	Super Admin	14.05.2024		1.000,00 €	[i]
305623	Super Admin	08.05.2024		20.343,67 €	[i]
305622	Super Admin	08.05.2024		27.749,00 €	[i]
305621	Super Admin	07.05.2024		1,00 €	[i]
305620	Super Admin	07.05.2024		1,00 €	[i]
305619	Super Admin	07.05.2024		1,00 €	[i]

Figure 4.27: All offers

4.13 All orders

In this screen will show all the orders.

Auftrag Nr.	Kunde	Projektz.	Angebotsnr.	Angebotsdatum	Verkäufer	Auftragsdatum	Status	Statusdatum	DC Datum	Summe	Aktionen
404913	Test AC Cengiz Flo	508892	305627	15.05.2024	Andrej Kus	15.05.2024	1-Verkauft	15.05.2024		1,00 €	[i]
404912	Test AC Cengiz Flo	508891	305626	14.05.2024	Steffen Buch	14.05.2024	1-Verkauft	14.05.2024	31.05.2024	15.974,00 €	[i]
404911	Test AC Cengiz Flo	508890	305625	14.05.2024	Jorn Heinrich	14.05.2024	1-Verkauft	14.05.2024	28.05.2024	1,00 €	[i]
404910	Test AC Cengiz Flo	508889	305624	14.05.2024	Ivan Besic	14.05.2024	1-Verkauft	14.05.2024		1.000,00 €	[i]
404909	Test AC Cengiz Flo	508888	305623	08.05.2024	Herbert Manlik	08.05.2024	1-Verkauft	08.05.2024	22.05.2024	20.343,87 €	[i]
404908	Test AC Cengiz Flo	508887	305622	08.05.2024	Fotli Katlidia	08.05.2024	1-Verkauft	08.05.2024		111,00 €	[i]
404907	Test AC Cengiz Flo	508885	305620	07.05.2024	Andre Spengler	07.05.2024	1-Verkauft	07.05.2024		1,00 €	[i]
404906	Test AC A Test	508883	305616	06.05.2024	Ali Hizmetci	06.05.2024	1-Verkauft	06.05.2024		1,00 €	[i]
404905	tesst DC test	508881	305613	28.04.2024	Andre Spengler	28.04.2024	1-Verkauft	28.04.2024		1,00 €	[i]
404904	Test Kunde	508880	305612	28.04.2024	Andre Spengler	28.04.2024	1-Verkauft	28.04.2024		1,00 €	[i]

Figure 4.28: All orders screen

4.14 All Customers

Here will show all the customers data. In action have two button one is for go to inside of the customer information and another is to delete the customer.

If will go to inside of the customer information will see how many projects have of the customer. How many order, offers have of the customer and can see all the projects and attached notes.

Kundennummer	Name	Stadt	Telefon	Status	Aktionen
KD-108864	rtest rtest	München			[i]
KD-108863	Test AC Coogle Flo	München			[i]
KD-108862	Test Test	München			[i]
KD-108861	Test AC A Test	München			[i]
KD-108860	Test AC Test	München			[i]
KD-108859	testet DC test	München			[i]
KD-108858	Test Kunde	München			[i]
KD-108857	Max Mustermann	Wieshofen			[i]
KD-108856	asdf asdf	München			[i]
KD-108855	asdfas asdf	München			[i]

Figure 4.29: All Customers

test rtest
KD-108864

Create Project Ticket anlagen Notiz hinzufügen

Überblick Projekte

Kunde
Name: test rtest
Telefon:
E-Mail:
Adresse: 81547, München, Grünwalder Straße, 33

Aufträge 1
Angebote 1
Projekte 1
Gesamtumsatz 22.924,87 €

Interaktionen
Kundenbezogene Reklamationen & Tickets

Figure 4.30: Inside of customer

4.15 Call Center

In call center all the call center information will show and by click on new call center button can create new call center after fill-up all the required information. From action can delete the call center and edit the call center information.

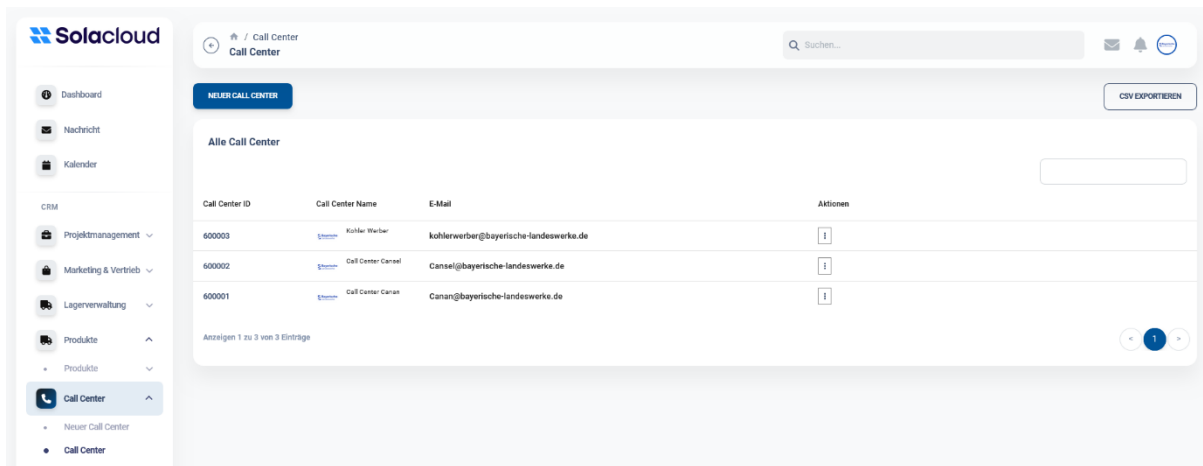


Figure 4.31: All call center information

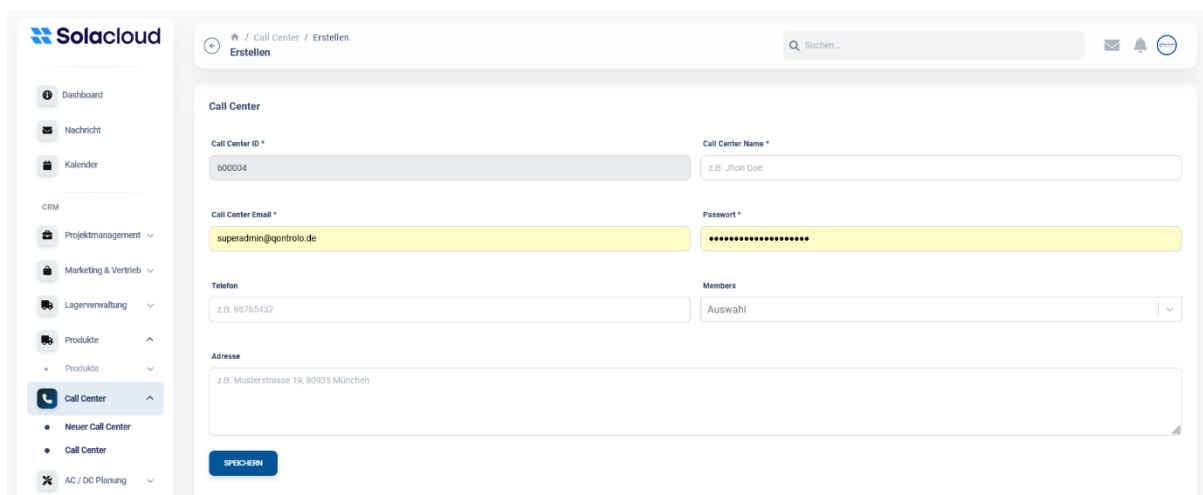


Figure 4.32: Call center create

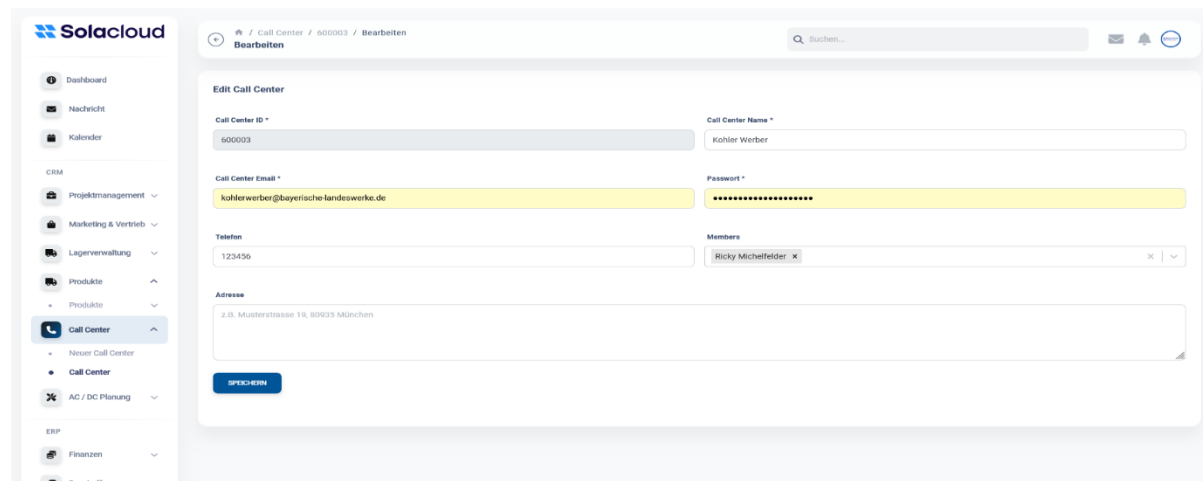


Figure 4.33: Call center edit

4.16 Additional Products

Here will list all the additional products and after click on additional products button from top left side can add products. From action can delete the product and edit the product information.

ID	Name	Status	Kategorie	Aktionen
Pr09	Neom Kjuube Light S Notstrom Umschaltbox	Aktiv	AC Produkt	[i]
Pr08	Neom Nea Notstrom Umschaltbox	Aktiv	AC Produkt	[i]
Pr07	Neom 5 Jahreslizenz	Aktiv	AC Produkt	[i]
Pr06	Neom Smart Meter	Aktiv	AC Produkt	[i]
Pr05	Neom Nea Sockel	Aktiv	AC Produkt	[i]
Pr04	Neom Nea 2,5kw Speichereinschub	Aktiv	AC Produkt	[i]
Pr03	Neom Kjuube 3,55 Speichereinschub	Aktiv	AC Produkt	[i]
Pr02	DC Dienstleistung	Aktiv	DC Produkt	[i]
Pr01	AC Montage	Aktiv	AC Produkt	[i]

Figure 4.34: List of all additional products

Produkt hinzufügen

Produktnummer * MDL-12 Produkttyp * Module

Lieferanten * Select Lieferanten

Titel *

Kurztitel *

Watt *

Markenhersteller Typ

Zelltyp Leistungstoleranz

Modulabmessung (Width) Modulabmessung (Höhe) Gewicht

Modulwirkungsgrad Max. Druckbelastung

Leistungsgarantie Produktgarantie

SPEICHERN

Figure 4.35: Add additional product

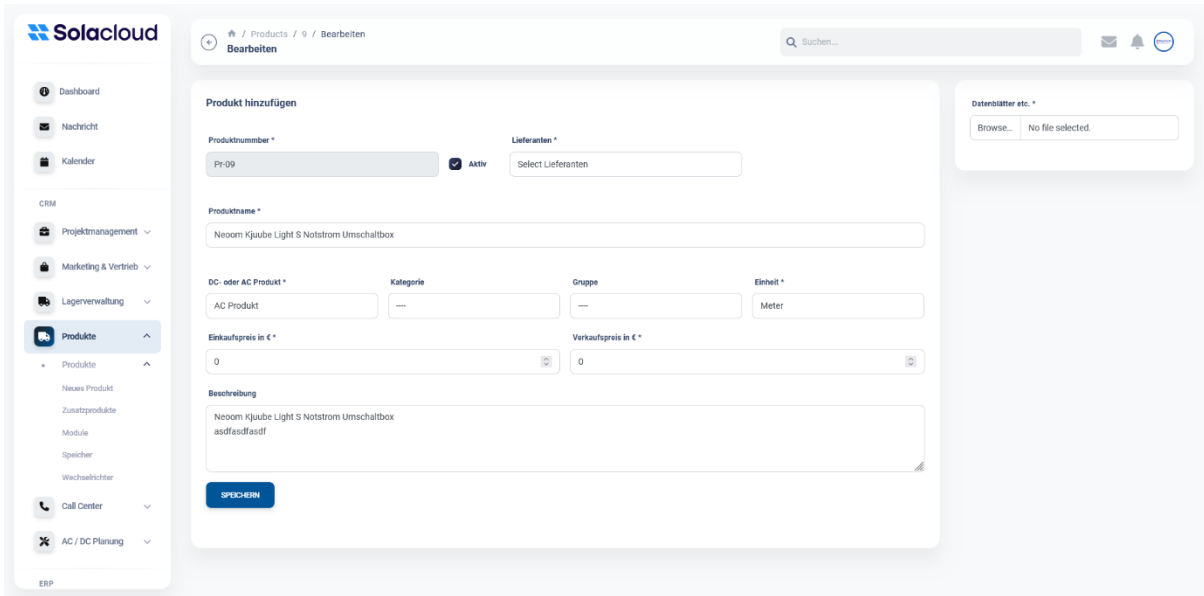


Figure 4.36: Edit additional products

4.17 Module

Here will manage the modules list of modules, add module, edit and delete module process will be from here.

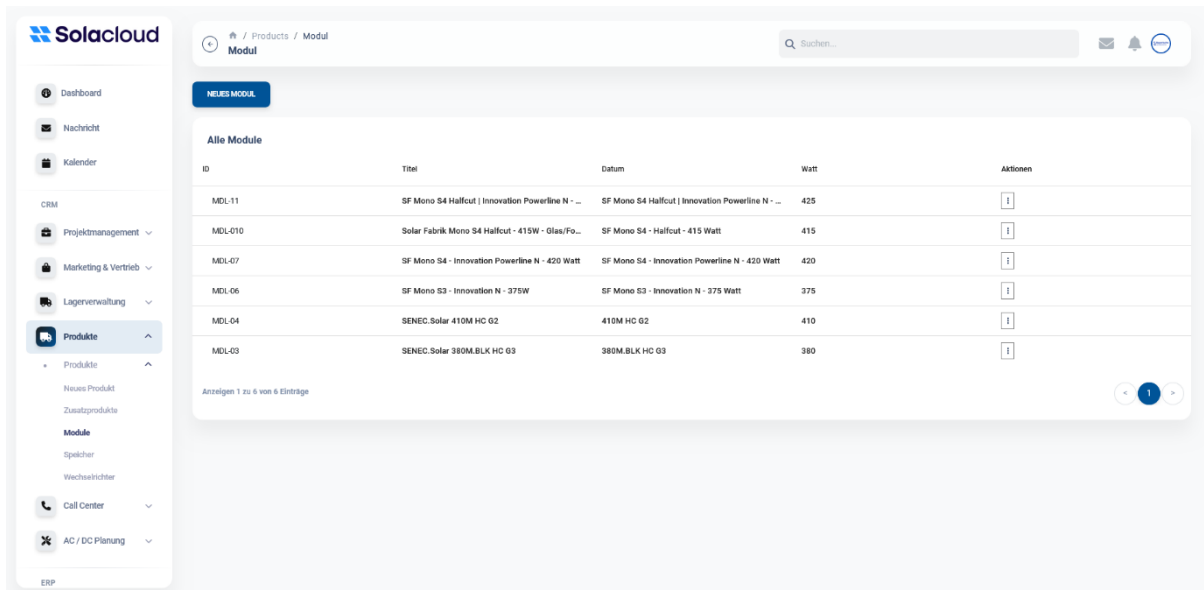


Figure 4.37: List of all modules

Erstellen

Modul hinzufügen

Nummer * MDL-12 Lieferanten * Select Lieferanten

Titel * Kurztitel * Watt *

Markenhersteller Typ Zelltyp

Leistungstoleranz Modulabmessung (Widht) Modulabmessung (Höhe) Gewicht

Modulwirkungsgrad Max. Druckbelastung Leistungsgarantie

Produktgarantie

SPEICHERN

Datenblätter etc. *
Browse... No file selected.

Figure 4.38: Create module

Bearbeiten

Modul 11

Nummer * MDL-11 Lieferanten * L-100005 - Solarfabrik

Titel * SF Mono S4 Halfcut | Innovation Powerline N - 425 Watt Kurztitel * SF Mono S4 Halfcut | Innovation Powerline N - 425 Watt Watt * 425

Markenhersteller Solar Fabrik GmbH Typ SF Mono S4 Halfcut | Innovation Powerline N - 425 Watt Zelltyp bifaziale monokristalline Halbzellen

Leistungstoleranz 0/+3 WP Modulabmessung (Widht) 1134 Modulabmessung (Höhe) 1722 Gewicht 23,7 kg

Modulwirkungsgrad 21,80 % Max. Druckbelastung 5400 Pa ≈ 550 kg/m2 Leistungsgarantie 30 Jahre

Produktgarantie 30 Jahre

SPEICHERN

Datenblätter etc. *
Browse... No file selected.

Figure 4.39: Edit module

4.18 Memory

Here can add the memory, list the all memory and from action can delete the memory and after click on edit from action can edit the memory.

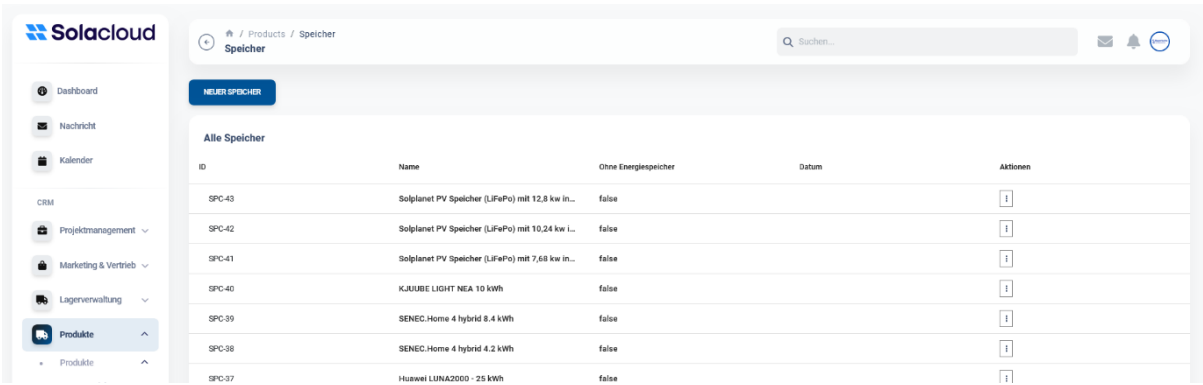


Figure 4.40: List of all memory

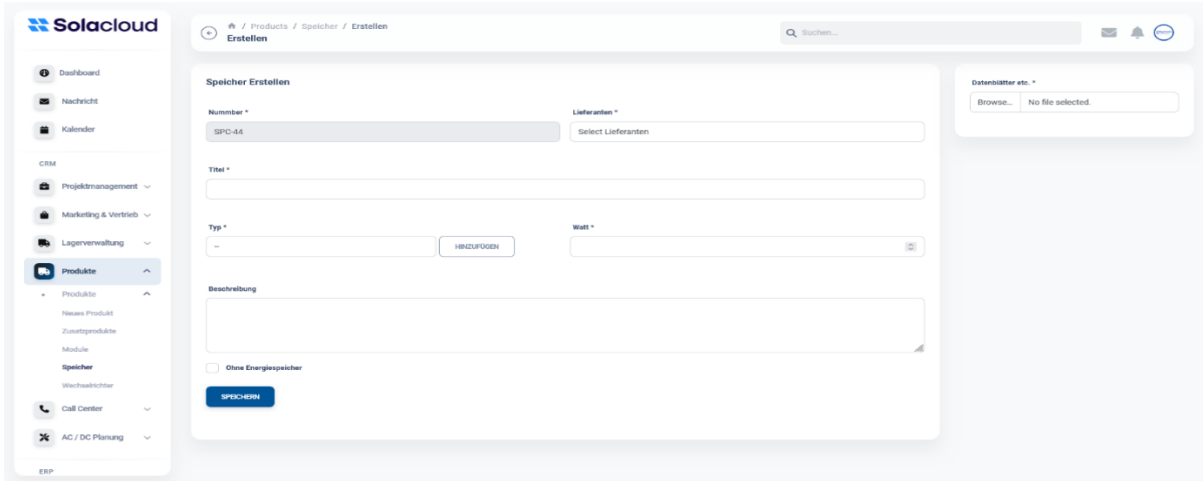


Figure 4.41: Create memory

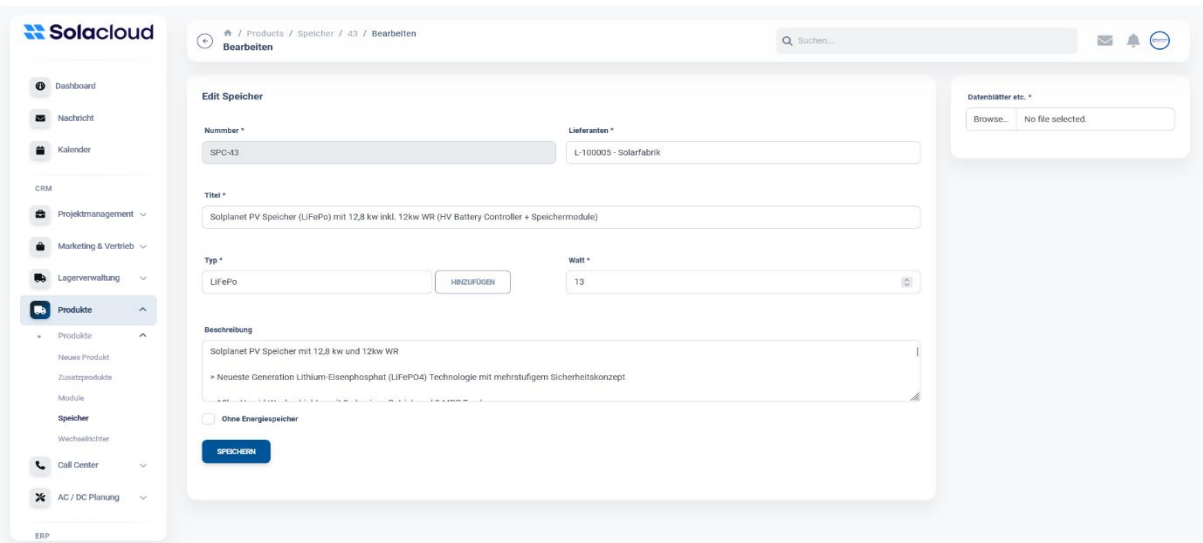


Figure 4.42: Edit memory

4.19 Calendar

In calendar will list all the projects, tasks which assigned to installer and technician admin can assign the installer and technician and when a project will create from project management the project will automatically listed. The items of the calendar can view daily, weekly, monthly and as list.

Green color marked the project is created. Blue color marked the project is assigned to installer and red color marked the project assigned to technician to solve issue. The background color based on team background color which is selected from right side.

In right side of the calendar showing the teams name when checked the team the tasks will show based on the team members which are under the selected team.

When will point any project / item on the calendar then can see in details of projects and customer, description of the project and status.

The screenshot shows the Solacloud calendar interface. The main area displays a weekly view for November 2023. The calendar grid shows tasks for each day, with colored markers indicating the status of the project (green for created, blue for assigned to installer, red for assigned to technician). The tasks are labeled with codes like KW44, KW45, KW46, KW47, KW48, and KW49. A sidebar on the left contains navigation menus for CRM, ERP, and Personalwesen. A sidebar on the right lists team members with checkboxes, including Team Andrej, Test Taha, Team Dummy, Team BW, and Teamkeller Badenw.

Figure 4.43: Calendar View

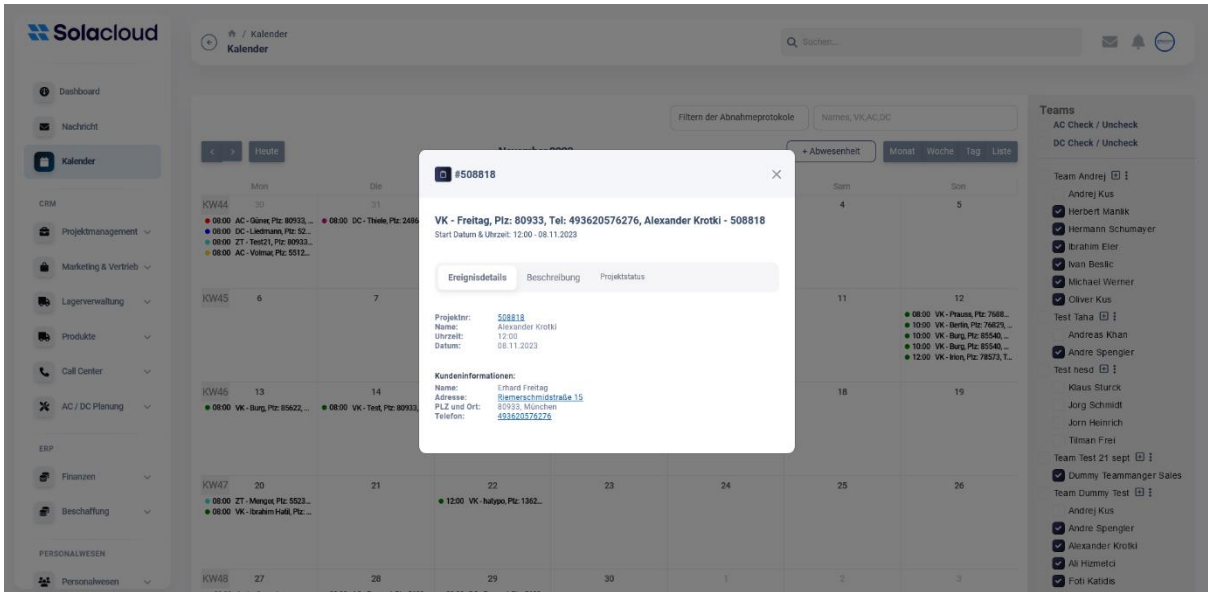


Figure 4.44: Selected project details from calendar

4.20 Warehouse Management

The list of warehouses will show here and to create a warehouse need to click on create warehouse button from top left corner.

After click on create warehouse, the form will open to enter the information to create the warehouse. Here also need to add storage area inside of the warehouse.

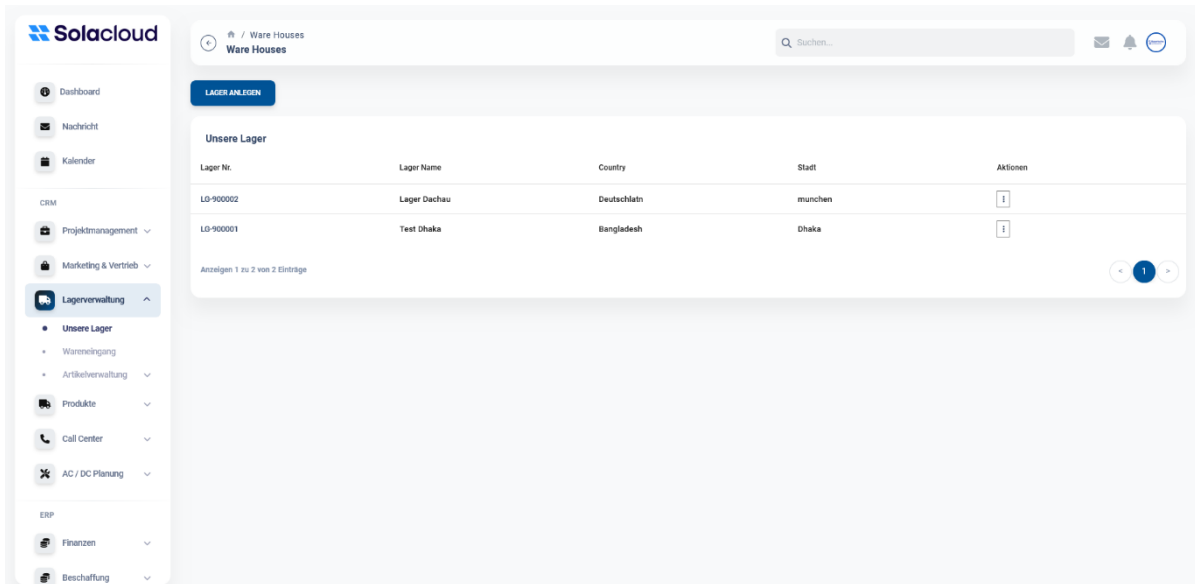


Figure 4.45: All warehouse list

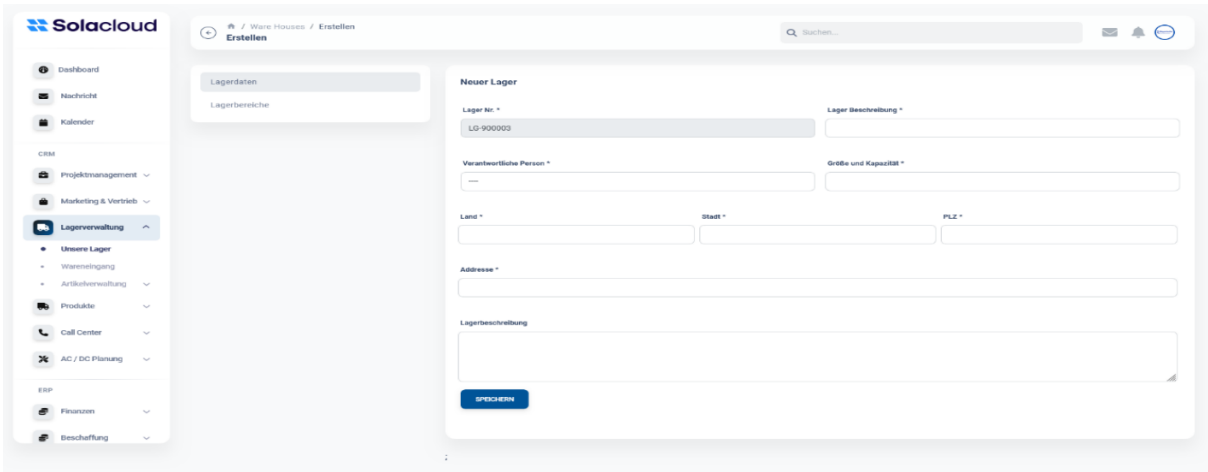


Figure 4.46: Warehouse create

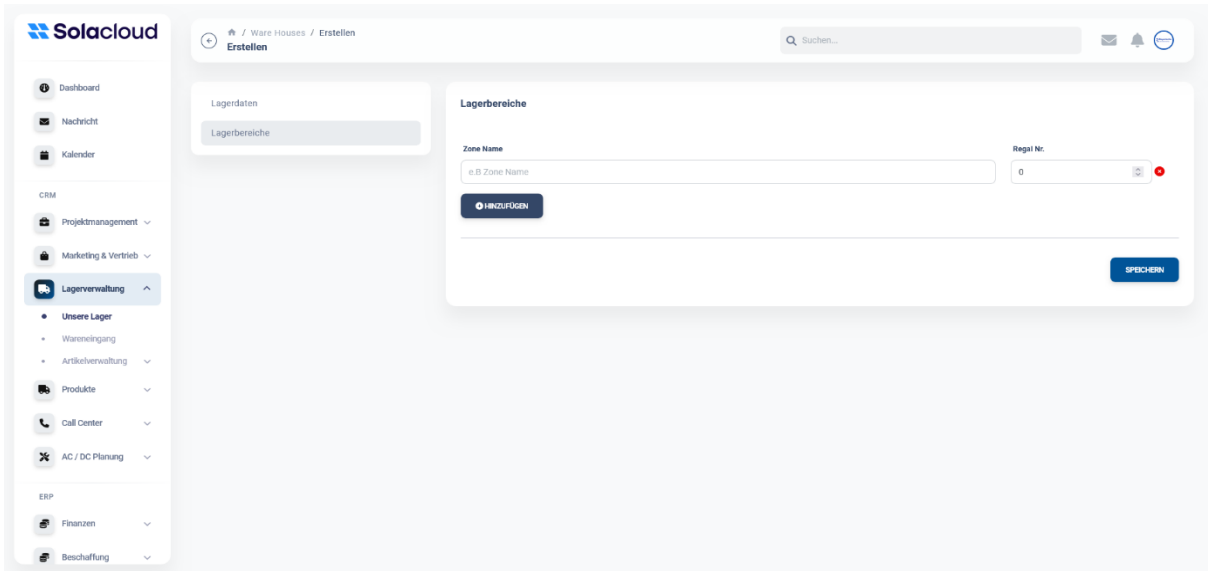


Figure 4.47: Storage area of inside the warehouse

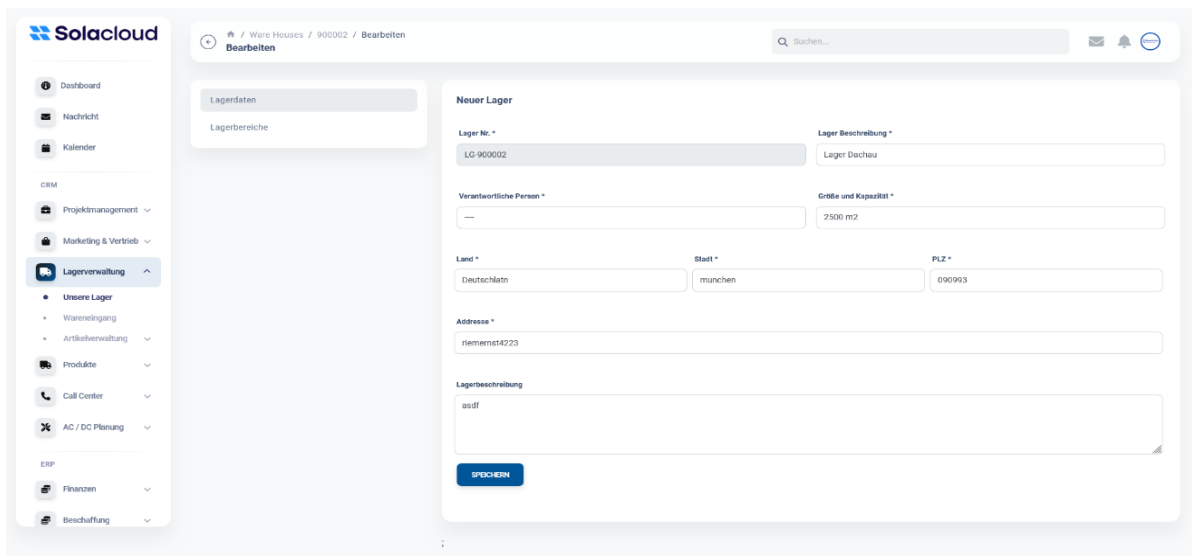


Figure 4.48: Edit of warehouse

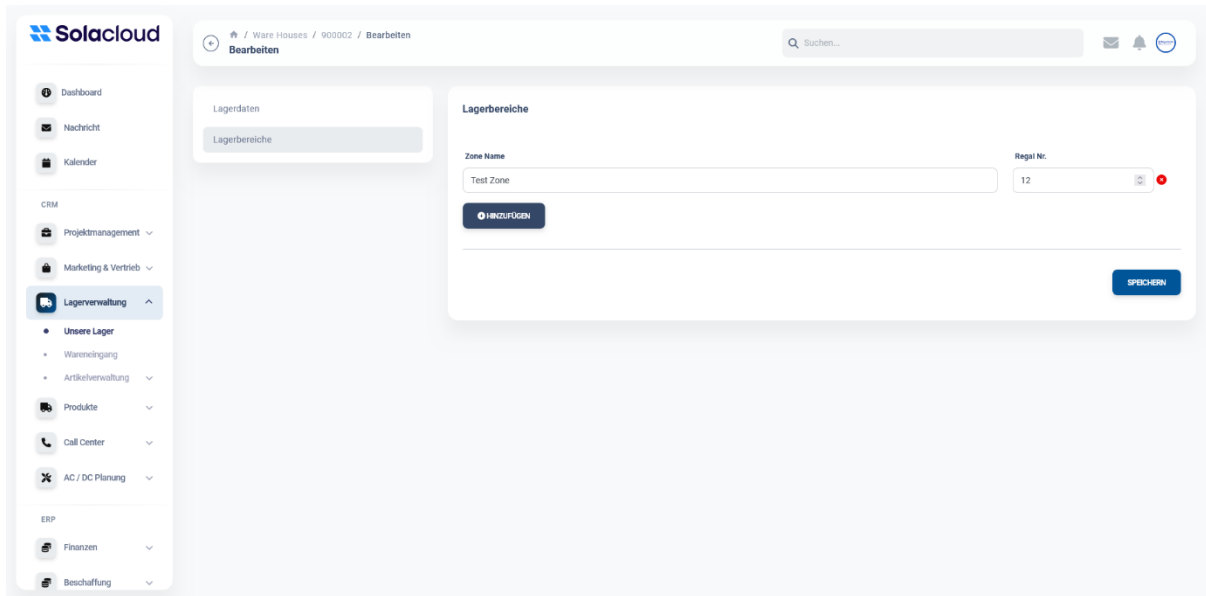


Figure 4.49: Edit of storage area

4.21 Invoice

The list of invoices will list here to create a invoice need to click on create invoice and in the list can search the invoice by over paid condition and date. Different status invoices can see from the tab first show all the invoices and can see paid, partially, open, credit, reminder due. From action can edit, delete the invoice and create invoice/create credit note for invoice.

In edit invoice can see the pdf of the invoice and can send the pdf file to the customer by email.

The screenshot shows the Solacloud interface for the 'List of all invoices'. The left sidebar contains navigation options like Projektmanagement, Marketing & Vertrieb, Lagerverwaltung, Produkte, Call Center, AC / DC Planung, and ESP. The main content area is titled 'Rechnungen' and 'Rechnungen'. A table lists all invoices with columns for Rechnung..., Projekt..., Kundenname, Ersteller, Datum, Abschlag, Rechnungsbetrag, Zahlungssta..., Bezahl..., Offener Betrag, Mahnstufe, and Aktionen. The table is filtered by 'Alle Rechnungen' and 'Bezahlit'. The table shows 15 entries with various invoice numbers, dates, and amounts.

Rechnun...	Projekt...	Kundenname	Ersteller	Datum	Abschlag	Rechnungsbetrag	Zahlungssta...	Bezahl...	Offener Betrag	Mahnstufe	Aktionen
700154	--	Solplanet G...	Super Admin	25.07.2024	100% Rech...	0,00 €	Bezahlit	0,00 €	0,00 €		[1]
700103	508992	Test AC Ce...	Super Admin	15.05.2024	30% Rech...	0,30 €	Bezahlit	0,30 €	0,00 €		[1]
700102	508992	Test AC Ce...	Super Admin	15.05.2024	70% Rech...	0,70 €	Bezahlit	0,70 €	0,00 €		[1]
700101	508991	Test AC Ce...	Super Admin	14.05.2024	30% Rech...	4.792,20 €	Bezahlit	4.792,20 €	0,00 €		[1]
700100	508991	Test AC Ce...	Super Admin	14.05.2024	70% Rech...	11.181,80 €	Bezahlit	11.181,80 €	0,00 €		[1]
700099	508990	Test AC Ce...	Super Admin	14.05.2024	30% Rech...	0,30 €	Bezahlit	0,30 €	0,00 €		[1]
700098	508990	Test AC Ce...	Super Admin	14.05.2024	70% Rech...	0,70 €	Bezahlit	0,70 €	0,00 €		[1]
700097	508989	Test AC Ce...	Super Admin	14.05.2024	30% Rech...	300,00 €	Bezahlit	300,00 €	0,00 €		[1]
700096	508989	Test AC Ce...	Super Admin	14.05.2024	70% Rech...	700,00 €	Bezahlit	700,00 €	0,00 €		[1]
700095	508988	Test AC Ce...	Super Admin	08.05.2024	30% Rech...	6.103,16 €	Bezahlit	6.103,16 €	0,00 €		[1]
700054	508988	Test AC Ce...	Super Admin	08.05.2024	70% Rech...	14.240,71 €	Bezahlit	14.240,72 €	-0,01 €		[1]
700093	508987	Test AC Ce...	Super Admin	08.05.2024	30% Rech...	33,30 €	Bezahlit	33,30 €	0,00 €		[1]
700092	508987	Test AC Ce...	Super Admin	08.05.2024	70% Rech...	77,70 €	Bezahlit	77,70 €	-0,00 €		[1]
700091	508985	Test AC Ce...	Super Admin	07.05.2024	30% Rech...	0,30 €	Bezahlit	0,30 €	0,00 €		[1]
700090	508985	Test AC Ce...	Super Admin	07.05.2024	70% Rech...	0,70 €	Bezahlit	0,70 €	0,00 €		[1]

Figure 4.50: List of all invoices

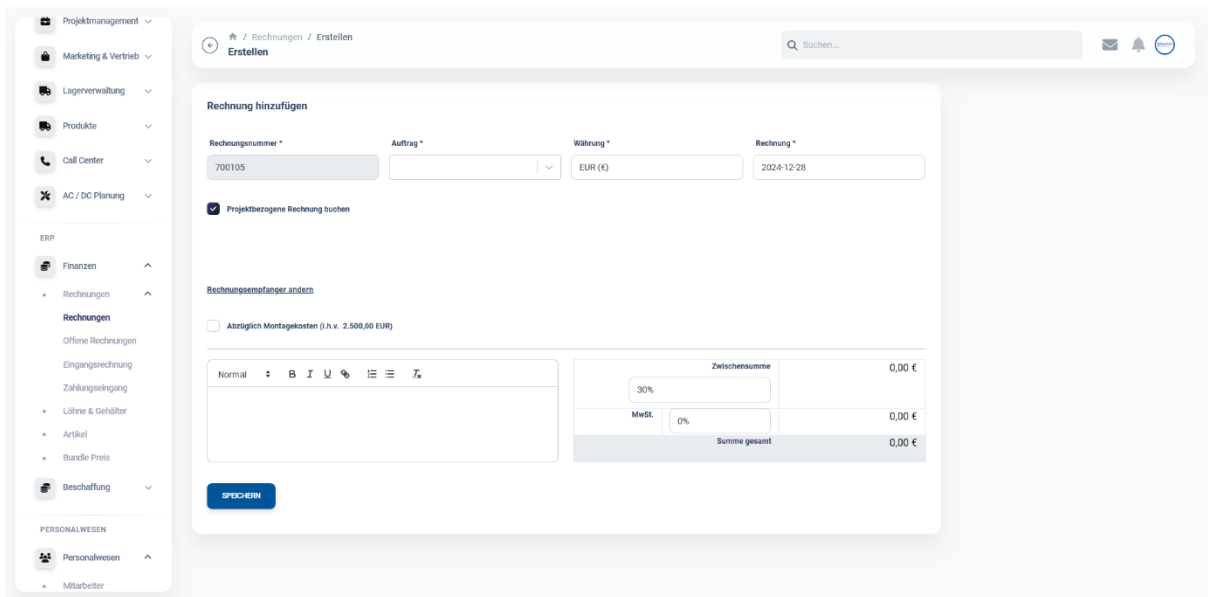


Figure 4.51: Create invoice

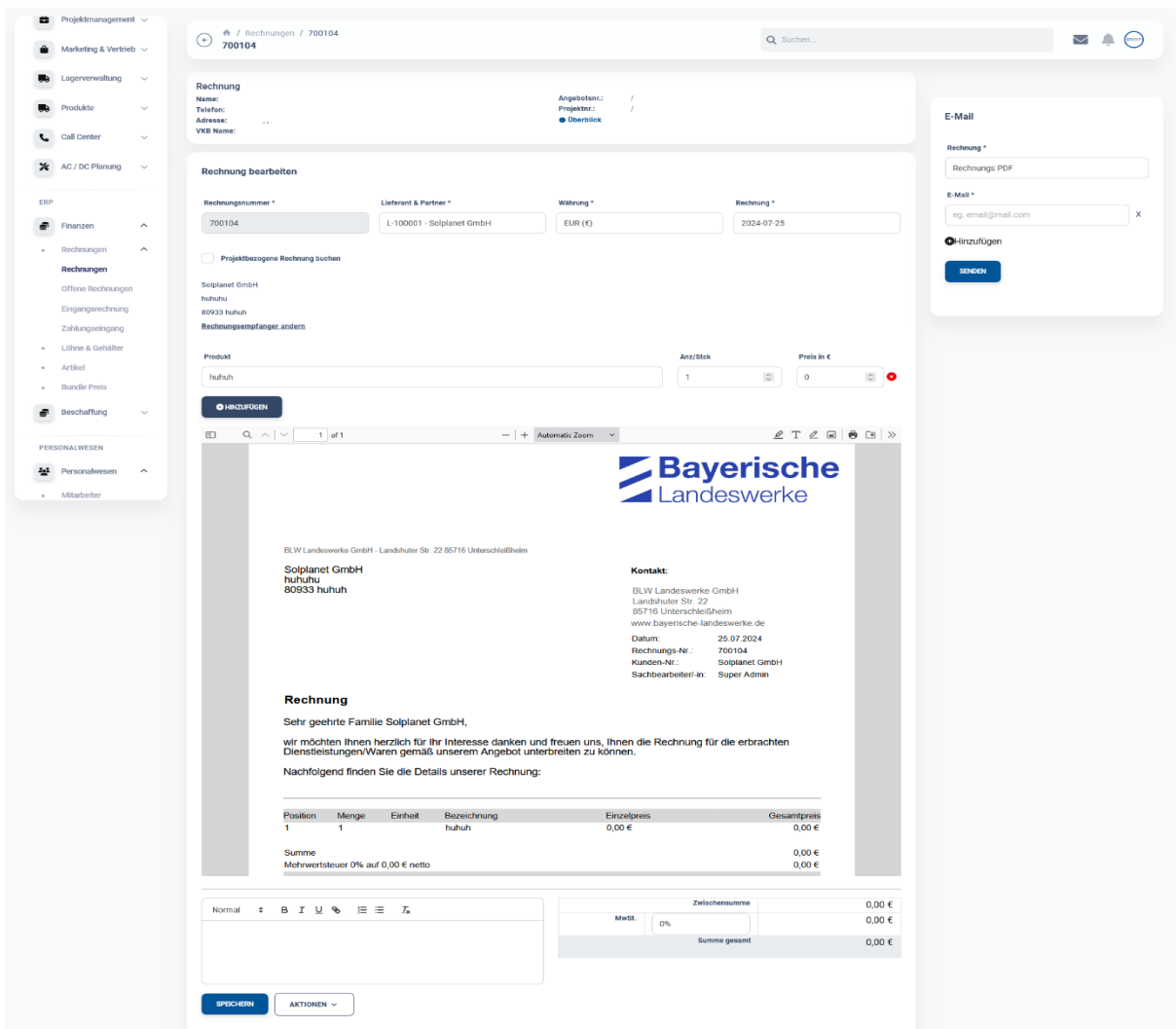


Figure 4.52: Edit invoice

4.22 Open Invoice

Here will list all the open invoices. From the top right button can filter the invoices by In total, 30% bill, 70% bill and invoice created.

The screenshot shows the 'Open Invoice' interface. The main table lists the following data:

Projektnr.	Kunde	VKB	Lieferdatum	Lieferdatum Speicher	Lieferdatum Wechselrichter	Auftrag Gesamt	Status	Erstellte Rechnungen
508892	Test AC Cengiz...	Andrej Kus	PO-100015 - 31.05.2024	31.05.2024	--	1,00 €	[Progress Bar]	[70%] [30%] [100%]
508891	Test AC Cengiz...	Steffen Buch	PO-100014 - 30.05.2024	--	31.05.2024	15.974,00 €	[Progress Bar]	[70%] [30%] [100%]
508887	Test AC Cengiz...	Foti Katidis	PO-100010 - 29.05.2024	--	--	111,00 €	[Progress Bar]	[70%] [30%] [100%]
508888	Test AC Cengiz...	Herbert Manlik	PO-100011 - 29.05.2024	29.05.2024	29.05.2024	20.343,87 €	[Progress Bar]	[70%] [30%] [100%]
508890	Test AC Cengiz...	Jorn Heinrich	PO-100013 - 27.05.2024	--	--	1,00 €	[Progress Bar]	[70%] [30%] [100%]
508889	Test AC Cengiz...	Ivan Beslic	PO-100012 - 27.05.2024	27.05.2024	--	1.000,00 €	[Progress Bar]	[70%] [30%] [100%]
508885	Test AC Cengiz...	Andre Spengler	PO-100008 - 23.05.2024	23.05.2024	--	1,00 €	[Progress Bar]	[70%] [30%] [100%]
508878	Gütz Ikon	Andre Spengler	PO-100001 - 01.05.2024	03.05.2024	08.05.2024	588.579,00 €	[Progress Bar]	[70%] [30%] [100%]
508880	Test Kunde	Andre Spengler		13.05.2024	13.05.2024	1,00 €	[Progress Bar]	[70%] [30%] [100%]
508879	Arnold Lange	Andre Spengler		29.04.2024	27.04.2024	3,00 €	[Progress Bar]	[70%] [30%] [100%]

Figure 4.53: List of all open invoices

4.23 Incoming Invoice

List of all incoming invoice will show and to post a new incoming invoice need to click on posting incoming invoice button from top left side. From action can edit the invoice and delete the invoice.

The screenshot shows the 'Incoming Invoice' interface. The main table lists the following data:

Rechnungsnummer.	Projektnr.	Lieferant & Partner	Datum	Rechnungsbetrag	Abteilung	Aktionen
ER-700008	508809	Volteure GmbH	07.11.2023	2.500,00 €	Dachmontage	[Edit] [Delete]
ER-700007	508741	Solplanet GmbH	06.11.2023	1.585,50 €	Dachmontage	[Edit] [Delete]
ER-700006	508740	NEOOM KJUUBE	04.11.2023	2.348,65 €	Dachmontage	[Edit] [Delete]
ER-700005	500111	Solarfabrik	02.11.2023	1.585,50 €	Dachmontage	[Edit] [Delete]
ER-700004	500300	Senec Solar GmbH	27.10.2023	3.699,50 €	Elektronmontage	[Edit] [Delete]
ER-700003	500009	NEOOM KJUUBE	19.10.2023	469,31 €	Dachmontage	[Edit] [Delete]
ER-700002	500007	Senec Solar GmbH	18.10.2023	11.879,62 €	Dachmontage	[Edit] [Delete]
ER-700001	508717	NEOOM KJUUBE	18.10.2023	264,25 €	Dachmontage	[Edit] [Delete]

Figure 4.54: List of all incoming invoices

Eingangsbuchung hinzufügen

Eingangsrechnungsnummer * 700009 Lieferant & Partner * - Rechnungsnummer * Eingangsrechnungsnummer Rechnungsdatum * 2024-12-28

Projektbezogene Rechnung buchen Projekte * Liefer- Abwicklungsdatum * 2024-12-28 Zahlung Erfolgt * Ja

Abteilung * Auswahl

Produkt Select Product Anz/Stück 1 Betrag in € (Amount) eg. 0,00 €

HINZUFÜGEN

Zwischensumme	0,00 €
MwSt: 19%	0,00 €
Summe gesamt	0,00 €

SPICHERN ACTION

Figure 4.55: Posting New Invoice

4.24 Receipt of Payments

The list of all payment is showing here and to add a new payment receipt need to click on Add Payment Receipt button from top left side. From action can add the payment of payment receipt.

Zahlungseingang hinzufügen GESAMT CSV EXPORTIEREN

Alle Zahlungseingänge

Zahlungs-ID	Kundenname	Projektnr.	Zahlungsstatus	Lieferdatum Speicher	Forderungen	Geltigt	Aktionen
ZE-59	Test AC Cengiz Flo	508892	Bezahlt	--	1,00 €	1,00 €	
ZE-58	Test AC Cengiz Flo	508891	Bezahlt	--	15.974,00 €	15.974,00 €	
ZE-57	Test AC Cengiz Flo	508890	Bezahlt	--	1,00 €	1,00 €	
ZE-56	Test AC Cengiz Flo	508889	Bezahlt	--	1.000,00 €	1.000,00 €	
ZE-55	Test AC Cengiz Flo	508888	Bezahlt	--	20.343,87 €	20.343,88 €	
ZE-54	Test AC Cengiz Flo	508887	Bezahlt	--	111,00 €	111,00 €	
ZE-53	Test AC Cengiz Flo	508885	Bezahlt	--	1,00 €	1,00 €	
ZE-52	Test AC A Test	508883	Bezahlt	--	1,00 €	1,00 €	
ZE-51	Gözt Irion	508878	Bezahlt	--	588.579,00 €	588.579,00 €	
ZE-50	test DC test	508881	Bezahlt	--	1,00 €	1,00 €	

Anzeigen 1 zu 10 von 55 Einträge

Figure 4.56: List of all payment receipt

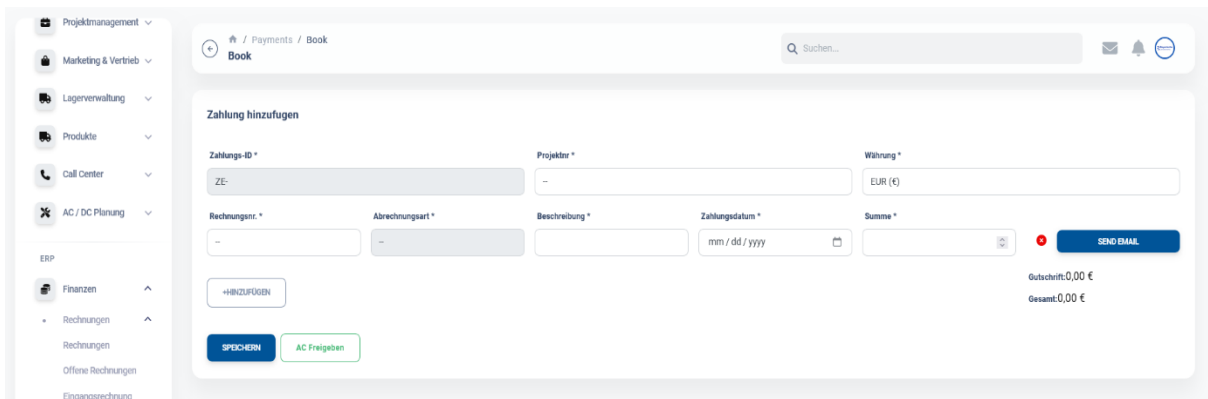


Figure 4.57: Add payment

4.26 Payrolls

List of billing is showing here and to add new billing need to click on Add Billing button from top left side. From action can edit the bill and delete.

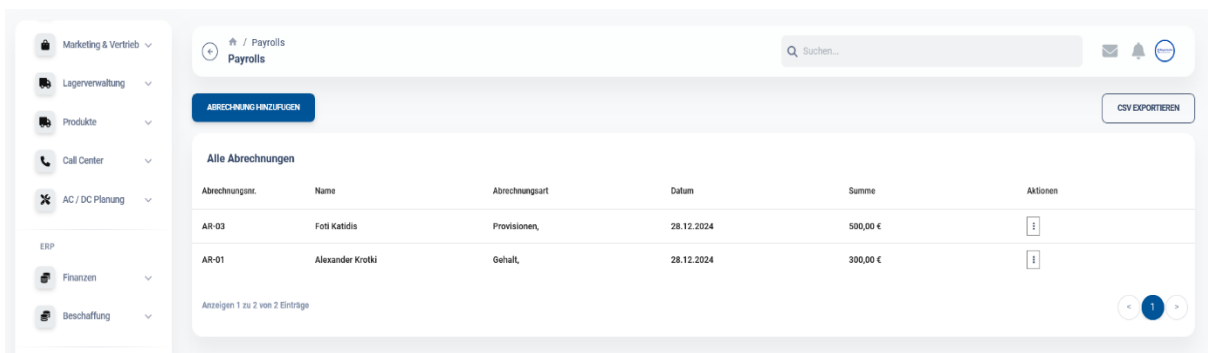


Figure 4.58: List of Bills

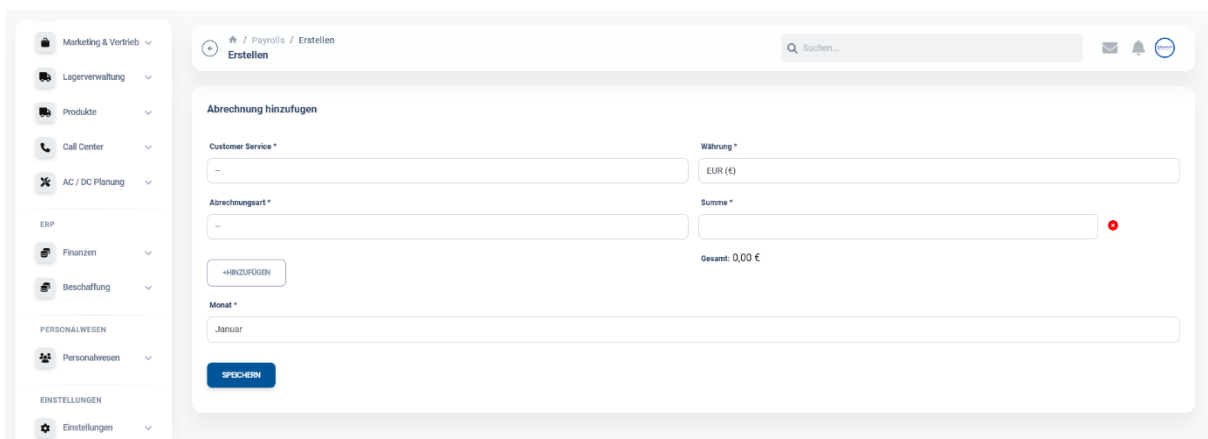


Figure 4.59: Add new bill

4.27 Supplier

List of all supplier is showing here and to add new supplier need to click on add supplier button from top left side. From action can edit the supplier and delete.

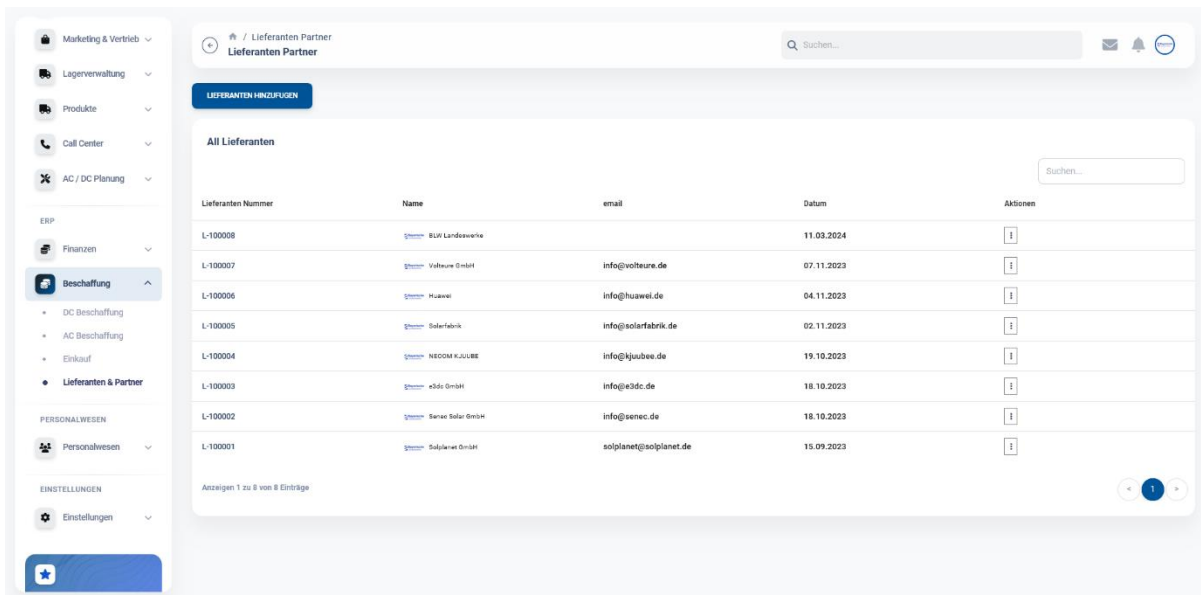


Figure 4.60: List of all supplier

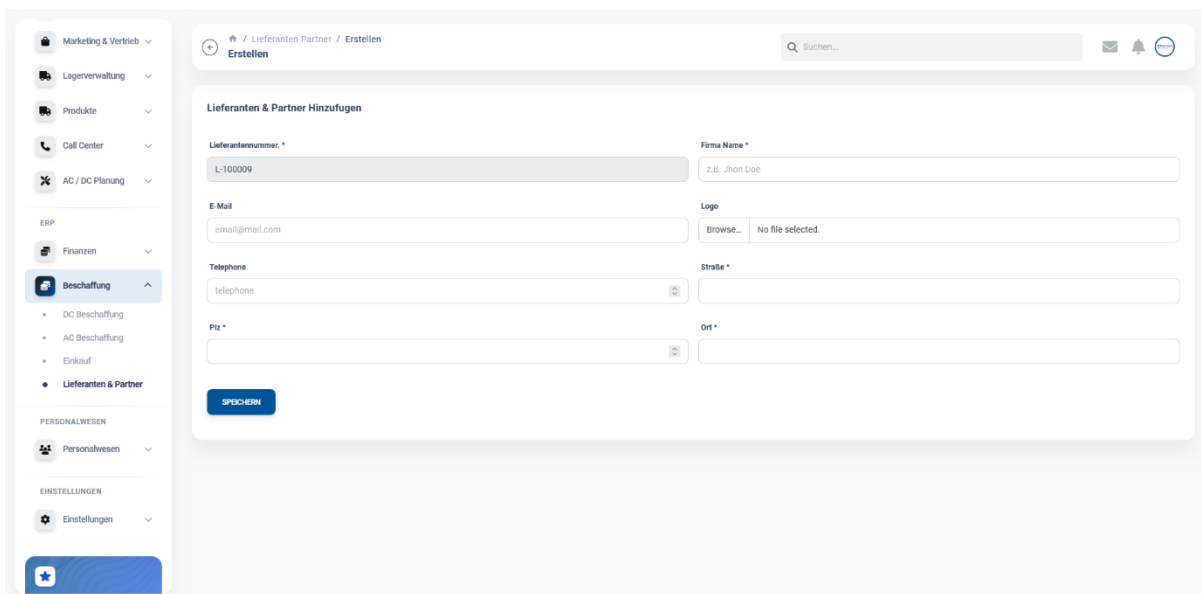


Figure 4.61: Add new supplier

4.28 Purchase/Shopping

List of all purchases is showing here will show the project and the supplier of the purchase's items. To create new purchase, need to click on new purchase button from top left side. From action can edit and delete the purchase.

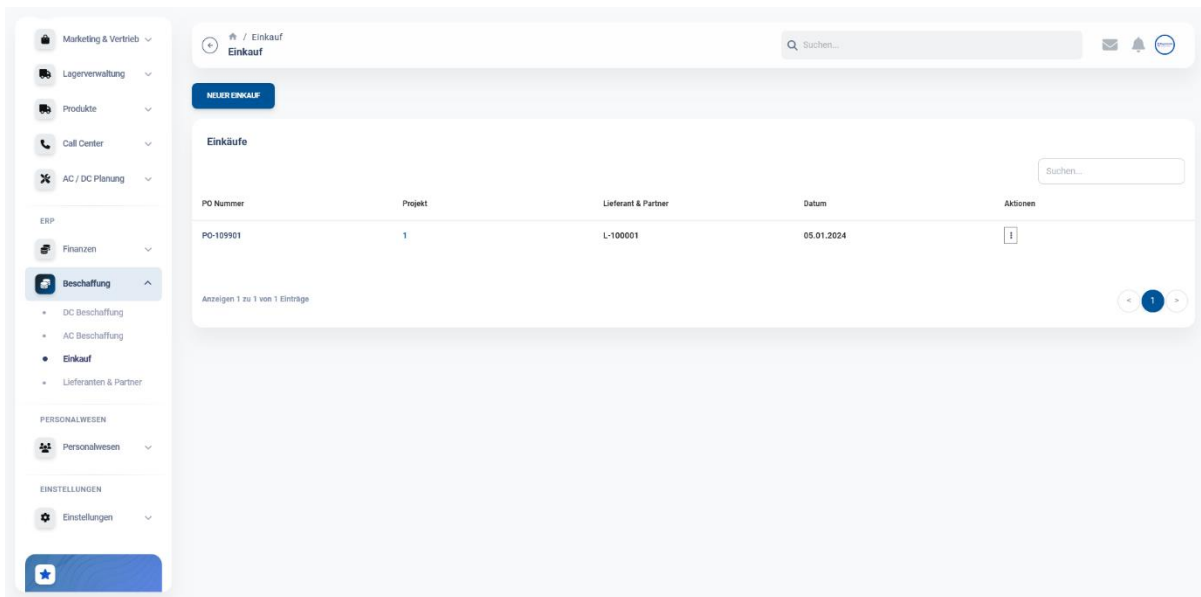


Figure 4.62: List of all purchases

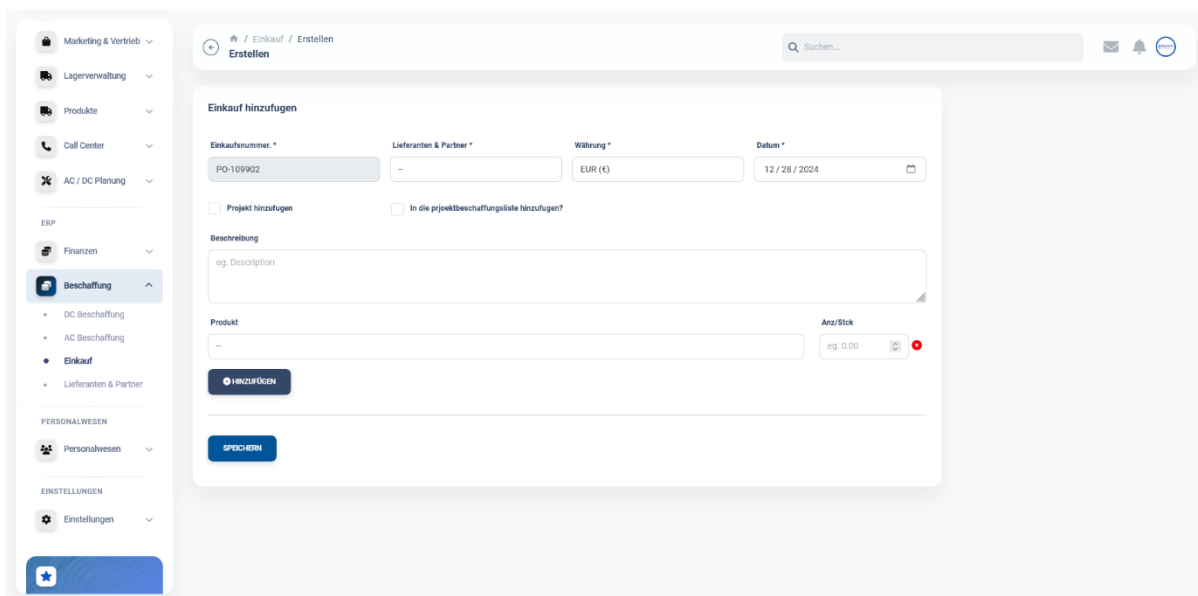


Figure 4.63: New Purchase entry

4.29 Requirements of Implementation

- Based on Windows, Section 4.4
- To run SolarCloud Solar CRM on a Microsoft Windows system, the following minimal hardware and software specifications must be met
 - Processor: Dual-core 64-bit processor
 - Memory: Minimum 8 GB RAM

- Storage: Up to 24 GB of internal storage:
 - Kony Visualizer: 4 GB
 - Android SDK: 2 GB
 - Windows SDK: 4 GB
 - BlackBerry NDK: 4 GB
 - Operating System: Windows 10, Windows 8.1 Update, Windows 8, or Windows 7
 - Network: Network interface card required
- Mac-Based Requirements, Section 4.4.
- To run SolarCloud Solar CRM on an Apple Mac system, the following minimal hardware and software specifications must be met:
 - Processor: x86-64 processor (Intel Core 2 Duo, Intel Core i3, Intel Core i5, Intel Core i7, or Xeon processor)
 - Memory: 8 GB of RAM:
 - Kony Visualizer: 4 GB
 - Storage for multiple complex projects: 10 GB
 - Additional storage required for Apple Xcode (varies depending on the features and simulators installed, and the number of earlier iOS versions supported)
 - Storage: Minimum 150 GB of internal storage
 - Operating System: Mac OS X 10.7 or later
 - Network: Network adapter card required

CHAPTER 5

Implementation and Testing

5.1 Implementation of Database

5.1 Table Users

Table 5.1: users table creation

Field Name	Data Type	PrimaryKey	DefaultValue	Description
id	int.	primary key		
name	varchar			
email	varchar			
password	varchar			
created_at	timestamp			
updated_at	timestamp			
mobile	varchar			
email_verified_at	varchar		0	
gender	varchar		null	
date_of_birth	varchar		null	
address	varchar		null	
photo	varchar		null	
selected_team_members	varchar		null	

From user table few column are mentioned here. They are; id (data type int), name (Data type Varchar) Email (varchar is the data type), password (data type varchar), Remember_token (varchar is the data type), mobile (data type Integer) where id is primary key. Existing admin information is shown in Figure 5.1.

	id	name	email	email_verified_at	password	mobile	gender	date_of_birth	address	photo
1	Super Admin	superadmin@qontrolo.de		NULL	\$2y\$10\$WzRw31IRH747a1x4wpePxTld0HGcw53EwWiaBc...	NULL	NULL	NULL	NULL	1727866002.jpg
2	Admin	admin@bliv.de		NULL	\$2y\$10\$186sNo9x1b07OFQqJT2Pe1Glv7KjHyRk9jHECC4JAD...	NULL	Male	2024-11-15	Kemptener StraÙe	NULL
7	Call Center	TÄfA1YkIye	callcenter@premiumsolaranlagen.com	NULL	\$2y\$10\$5zK0yXbk4jfpS1YJOVodOMk6chWR8bmoJFloEFJqIP...	123	NULL	NULL	Test	NULL
8	Serkan Han	serkan.han@premiumsolar.de		NULL	\$2y\$10\$.NGDN8YWVb6PQp41AKZG.ImrGKRFEb1QW2JfuBun...	null	Male	2024-03-01	test	NULL

Figure 5.1: users table

5.2 Table Roles

5.2 Roles table creation

Field Name	Data Type	Primary Key	Default Value	Description
id	int	primary key		
guard_name	varchar			
validity	varchar		null	
is_default	enum		0	
role_for	enum		0	

created_at	timestamp			
cpdated_at	timestamp			

In Roles table, there are eight columns. They are; Id (data type int), guard name varchar(255) , price varchar(255), validity, varchar(255) is default enum(), role for (data type enum), Created_at (data type Timestamp) and Updated_at (data type Timestamp), where Id is primary key. Existing role information is shown in Figure 5.2

	id	name	guard_name	price	validity	is_default	role_for	created_at	updated_at
<input type="checkbox"/> Edit Copy Delete	1	Super Admin	web	0	0	1	0	2023-02-13 19:36:08	2023-02-13 19:36:08
<input type="checkbox"/> Edit Copy Delete	2	Admin	web	0	0	1	0	2023-02-13 19:36:11	2023-02-13 19:36:11
<input type="checkbox"/> Edit Copy Delete	3	Frontoffice Agent	web	0	0	0	0	2023-02-13 19:36:14	2023-02-13 19:36:14
<input type="checkbox"/> Edit Copy Delete	4	Sales Person	web	0	0	0	0	2023-02-13 19:36:16	2023-02-13 19:36:16
<input type="checkbox"/> Edit Copy Delete	5	Call Center	web	0	0	0	0	2023-02-13 19:36:19	2023-02-13 19:36:19
<input type="checkbox"/> Edit Copy Delete	6	DC Technician	web	0	0	0	0	2023-02-13 19:36:22	2023-03-16 14:07:52

Figure 5.2: roles table.

Table 5.3: Employees.

5.3: employees table.

Field Name	Data Type	Primary Key	Default Value	Description
id	int.	primary key		employee identification
user_id	varchar			
department_id	int.			
designation_id	int.			
employee_identity_number	varchar			
joining_date	varchar			
bruttogehalt_money	varchar			
provision	varchar			
product_details	longtext			
start_date	date			
end_date	date			
status	enum			
created at	timestamp			
updated at	timestamp			

In employees table, there are thirteen columns. They are; Id (data type int), department Id (data type int), designation id (data type int), employee identity number (varchar is the data type), joining date (varchar is the data type), bruttogehalt money (varchar is the data type), provision (varchar is the data type), product details (data type longtext), start date (data type date), end date (data type date), Status (data type enum), Created at (data type Timestamp) and Updated

at (data type Timestamp), where Id is primary key. Existing employees information is shown in Figure 5.3

	id	user_id	department_id	designation_id	employee_identity_number	joining_date	created_at	updated_at	bruttogehalt_money	provision	product_details	start_date	end_date	status
<input type="checkbox"/>	100005	8	3	0	100005	2024-03-01	2024-03-01 19:56:07	2024-06-05 16:01:36	NULL	NULL	NULL	NULL	NULL	NULL
<input type="checkbox"/>	100006	9	1	0	100006	2024-03-02	2024-03-02 16:59:37	2024-09-05 13:04:34	NULL	NULL	NULL	NULL	NULL	NULL
<input type="checkbox"/>	100007	10	1	0	100007	2024-09-09	2024-03-02 17:13:10	2024-09-09 17:12:09	NULL	NULL	NULL	2024-09-09	2024-09-09	deaktivieren
<input type="checkbox"/>	100008	11	1	0	100008	2024-03-02	2024-03-02 17:18:26	2024-09-09 17:13:26	NULL	NULL	NULL	NULL	NULL	NULL
<input type="checkbox"/>	100009	12	1	0	100009	2024-09-09	2024-03-02 17:20:41	2024-09-09 17:18:09	NULL	NULL	NULL	2024-09-09	2024-09-09	deaktivieren
<input type="checkbox"/>	100010	13	1	0	100010	2024-09-09	2024-03-02 17:21:43	2024-09-09 17:22:30	NULL	NULL	NULL	2024-09-09	2024-09-09	deaktivieren

Figure 5.3: Employees table.

Table 5.4: call centers

Table 5.4: call centers table

Filed name	Data type	Primary key	Default value	description
id	Int	Primary key		
user_id	Bigint			
members	Varchar			
created_at	Timestamp			
updated_at	timestamp			

In call center able, there are five columns. They are; Id (data type int), user id (varchar is the data type), members (varchar is the data type), Created_at (data type Timestamp) and Updated_at (data type Timestamp), where Id is primary key. Existing call centers information is shown in Figure 5.4.

	id	user_id	created_at	updated_at	members
<input type="checkbox"/>	600001	7	2024-02-11 17:26:29	2024-09-03 19:25:47	21,22,23,24,25,26,27,28,29,30,32,35,36,37,38,39,40...

Figure 5.4: call center table

Table 5.5: team members

Table 5.5: team members table

Filed name	Data type	Primary key	Default value	description
id	int	primary key		
employee id	varchar			
team id	varchar			
created_at	timestamp			
updated_at	timestamp			

In call center able, there are five columns. They are; Id (data type int), employee id (varchar is the data type), team id (varchar is the data type), where Id is primary key. Existing team members information is shown in Figure 5.5.

	id	employee_id	team_id	created_at	updated_at
<input type="checkbox"/>	11 12		1003	2024-04-28 17:27:25	2024-04-28 17:27:25

Figure 5.5: team members table

Table 5.6: teams

Table 5.6: teams table

Filed name	Data type	Primary key	Default value	description
id	int	primary key		
team id	varchar			
team name	varchar			
team type	varchar			
color code	varchar			
created_at	timestamp			
updated_at	timestamp			

In call center able, there are seven columns. They are; Id (data type int), team id (varchar is the data type), team name (varchar is the data type), team type (varchar is the data type), color code (varchar is the data type), Created_at (data type Timestamp) and Updated_at (data type Timestamp), where Id is primary key. Existing teams information is shown in Figure 5.6.

	id	team_id	team_name	team_type	created_at	updated_at	color_code
<input type="checkbox"/> Edit Copy Delete	1001	TM-1001	Team Deutschland 1	sales	2024-02-11 17:24:53	2024-04-28 17:36:43	NULL
<input type="checkbox"/> Edit Copy Delete	1002	TM-1002	Team Deutschland 2	sales	2024-03-02 17:24:15	2024-04-28 17:36:54	NULL
<input type="checkbox"/> Edit Copy Delete	1003	TM-1003	Izmir CC	resell	2024-04-28 17:27:25	2024-04-28 17:27:25	NULL
<input type="checkbox"/> Edit Copy Delete	1004	TM-1004	Premium CC	resell	2024-04-28 17:27:48	2024-04-28 17:27:48	NULL

Figure 5.6: teams table

Table 5.7: team heads

Table 5.7: team head table

Filed name	Data type	Primary key	Default value	description
id	int	primary key		
team id	varchar			
head id	varchar			
created_at	timestamp			
updated_at	timestamp			

In team head able, there are five columns. They are; Id (data type int), team id (varchar is the data type), head id (varchar is the data type), Created_at (data type Timestamp) and Updated_at (data type Timestamp), where Id is primary key. Existing teams information is shown in Figure 5.7.

	id	team_id	head_id	created_at	updated_at
<input type="checkbox"/> Edit Copy Delete	4	1001	21	2024-04-28 17:36:43	2024-04-28 17:36:43

Figure 5.6: team head table

Table 5.8: team manager

Table 5.8: team manager table

Filed name	Data type	Primary key	Default value	description
id	int	primary key		
team id	varchar			
manager id	varchar			
created_at	timestamp			
updated_at	timestamp			

In team manager table, there are five columns. They are; Id (data type int), team id (varchar is the data type), manager id (varchar is the data type), Created_at (data type Timestamp) and Updated_at (data type Timestamp), where Id is primary key.

Existing teams information is shown in Figure 5.8.

	id	team_id	head_id	created_at	updated_at
	4	1001	21	2024-04-28 17:36:43	2024-04-28 17:36:43

Figure 5.8: team manager table

Table 5.9: customers

Table 5.9: customers table

Filed name	Data type	Primary key	Default value	description
id	int	primary key		
customer number	varchar			
user id	varchar			
anrede	varchar		null	
vorname	varchar		null	
name	varchar		null	
email	varchar		null	
plz	varchar		null	
ort	varchar		null	
street	varchar		null	
nr	varchar		null	
kundenstatus	varchar		null	
firma	varchar		null	
mobilnummer	varchar		null	
description	varchar		null	
status	varchar		null	
lat	varchar		null	
lng	varchar		null	
telefonnummer	varchar		null	
created_at	timestamp		null	
updated_at	timestamp		null	

In customers table, there are twenty-one columns. They are, Id (data type int), user id (varchar is the data type), anrede(varchar is the data type), vorname(varchar is the data type), name(varchar is the data type), email(varchar is the data type), plz(varchar is the data type), ort(varchar is the data type), street(varchar is the data type), nr(varchar is the data type), kundenstatus(varchar is the data type), firma(varchar is the data type), description(varchar is the data type), status(varchar is the data type), lat(varchar is the data type), lng(varchar is the data type), Created_at (data type Timestamp) and Updated_at (data type Timestamp), where Id is primary key. Existing customers information is shown in Figure 5.9.

	id	customer_number	user_id	anrede	vorname	name	email	plz	ort	street	nr	telefonnummer	created_at	updated_at	von_wo_der_kunde	kundenstatus	firma
	1	KD-100001	7	Herr	Matthias	Tober		17094	CÄ/Ämpin	Feldweg	8	03966210940	2024-09-03 21:27:33	2024-09-03 21:27:33			
	2	KD-100002	7	Herr	Viola-Bernd	Wasianski		17111	Verchen	Siedlungsweg	16	03999410384	2024-09-03 21:27:33	2024-09-03 21:27:33			
	3	KD-100003	7	Herr	lothar	barton		42899	Remscheid	Dachsweg	40	0219153661	2024-09-03 21:27:33	2024-09-03 21:27:33			

Figure 5.9: customers table

Table 5.10: projects

Table 5.10: projects table

Filed name	Data type	Primary key	Default value	description
id	int	primary key		
user id	varchar			
date	varchar			
time	varchar			
verkauer	varchar			
description	varchar			
status_description	varchar		null	
anrede	varchar		null	
vorname	varchar		null	
name	varchar		null	
plz	varchar		null	
ort	varchar		null	
street	varchar		null	
nr	varchar		null	
telefonnummer	varchar		null	
lifecycle_stage	varchar		null	
code	varchar		null	
status	varchar		null	
lat	varchar		null	
lng	varchar		null	
cancel	varchar		null	
created_at	timestamp		null	
updated_at	timestamp		null	

In projects table, there are lot's of columns but added here some important columns that is

twenty three columns. They are, Id (data type int), user id (varchar is the data type), date(varchar is the data type), time(varchar is the data type), verkaufer(varchar is the data type), description(varchar is the data type), status description(varchar is the data type), anrede(varchar is the data type), vorname(varchar is the data type), name(varchar is the data type), email(varchar is the data type), nr(varchar is the data type), lifecycyle stage(varchar is the data type), lat(varchar is the data type), lng(varchar is the data type), where Id is primary key.

Existing teams information is shown in Figure 5.10.

	id	team_id	head_id	created_at	updated_at
<input type="checkbox"/> Edit Copy Delete	4	1001	21	2024-04-28 17:36:43	2024-04-28 17:36:43

Figure 5.10: projects table

Table 5.11: quations

Table 5.11: quations table

Filed name	Data type	Primary key	Default value	description
id	int	primary key		
user id	varchar			
project id	varchar			
street	varchar			
hausnummer	varchar			
plz	varchar			
ort	varchar			
telefonnummer	varchar			
eigenverbrauch	varchar			
stromkosten	varchar			
kwh_preis	varchar			
speicher	varchar			
module	varchar			
anzahl module	varchar			
gesami netto	varchar			
gesami brutton	varchar			
order	varchar			
productitems	varchar			
created_at	timestamp			
updated_at	timestamp			

In quation table, there are lots of column but mentioned here important twenty columns. They are, Id (data type int), user id (varchar is the data type), project id(varchar is the data type), street(varchar is the data type), hausnummer(varchar is the data type), plz(varchar is the data type), ort(varchar is the data type), telefonnummer(varchar is the data type),

eigenverbrauch(varchar is the data type), stromkosten(varchar is the data type), kwh preis(varchar is the data type), speicher(varchar is the data type), module(varchar is the data type), anzahl module(varchar is the data type), gesami netto(varchar is the data type), gesami brutton(varchar is the data type), order(varchar is the data type), productitems(varchar is the data type), where Id is primary key. Existing quations information is shown in Figure 5.11.

	id	user_id	project_id	street	hausnummer	plz	ort	telefonnummer	eigenverbrauch	stromkosten	kwh_preis	speicher	modul	anzahl_module	anzahl_der_dacher	ges_dach
	300001	22	500021	WallfÄtcker Bahnweg	13	32584	LÄfÄthne	0122 1211212	6000	2160	0.36	null	null	15	1	100
	300002	36	500012	Schwarzenbrooker Weg	5	22955	Hoidorf	0 41074626	2200	880	0.40	NULL	NULL	8	1	36
	300003	31	500035	Am Weserberg	57	28832	Achim	0 42023955	2700	1100	0.41	NULL	NULL	12	1	36

Figure 5.11: quations table

Table 5.12: orders

Table 5.12: orders table

Filed name	Data type	Primary key	Default value	description
id	int	primary key		
user id	varchar			
quation id	varchar			
currency	varchar			
order date	date			
product details	longtext			
netto	double			
discount	double			
tax	double			
brutto	double			
status	varchar			
created_at	timestamp			
updated_at	timestamp			

In orders table, there are lots of columns but thirteen important columns are mentioned. They are; Id (data type int), user id (varchar is the data type), quation id(varchar is the data type), currency(varchar is the data type), order date(data type date), product details(data type longtext), netto(data type double), discount(data type double), tax(data type double), brutto(data type double), status(varchar is the data type), where Id is primary key. Existing teams information is shown in Figure 5.12.

	id	user_id	quation_id	currency	order_date	sign_date	product_details	dachansicht	dachsparren	dachgiebel	gesamtsansicht_von_haus_und_dach
	400001	1	300011	EUR	2024-09-13 00:00:00	NULL	{ "tax": 0, "items": [{"id": 0, "price": 0, "title": "..."}]}	{ "id": 155, "name": "download.jpeg", "size": 1027... }	{ "id": 156, "name": "download.jpeg", "size": 1027... }	{ "id": 157, "name": "download.jpeg", "size": 1027... }	{ "id": 158, "name": "download.jpeg", "size": 1027... }
	400002	1	300012	EUR	2024-09-13 11:03:58	NULL	{ "tax": 0, "items": [{"id": 0, "price": 0, "title": "..."}]}	{ "id": 165, "name": "download.jpeg", "size": 1027... }	{ "id": 166, "name": "download.jpeg", "size": 1027... }	{ "id": 167, "name": "download.jpeg", "size": 1027... }	{ "id": 168, "name": "download.jpeg", "size": 1027... }

Figure 5.12: orders table

5.2 Testing and Implementation

The importance of software testing is equal to that of software development. We have taken every precaution to ensure that our web-based system is easy to use and secure. Therefore, we devised certain scenarios to test our system. The findings of our testing are shown in Table 6.1 in the next section.

Table 5.9 Testing report

Table 5.9 Testing Report

Test No	Description	Test Data	Expected Outcome	Actual Outcome
01	By pressing the login button while using an elaborate email and an incorrect secret phrase	Email:rakib@gmail.com Pass: 78543	Invalid User Id and Pass Word	Pass
02	Now enrolled during enrollment check is the information mail.	rubel@gmail.com Pass:98567	This email Already Exist	Pass
03	by pressing the login button while using a compromised password, email, or both.	Email: Pass:07845	No User are Find Here	Pass
04	utilizing the login button and a password and email that are both genuine	Email:mdkamal547111@gmail.com Password:"22334455"	Direct Go to Home Page	Pass

5.3 Test Results and Reports

Both positive and negative feedback was received from users who tested the project as part of Black Box Testing. Below are some remarks.

Positive Feedback:

- i. The system has an easy-to-use UI.
- ii. The search feature is quite simple and effective.
- iii. Easy to use

Negative Feedback:

- i. It is necessary to have an offline control form.
- ii. More services should be offered,

CHAPTER 6

Impact on Society, Environment and Sustainability

6.1 Impact on Society

By improving the efficacy and efficiency of solar energy project management, the system deployment is anticipated to have a beneficial social impact. By streamlining procedures like solar panel installations, workforce management, and project monitoring, the CRM system enables businesses to provide customers with quicker, better services. As a result, communities become more aware of and receptive to solar power, which encourages the development of renewable energy alternatives. Additionally, by simplifying internal processes, the CRM may improve employee working conditions and free up companies to concentrate on offering society value-driven products.

6.2 Impact On Environment

By encouraging the use of solar energy, the system helps to maintain a sustainable environment by lowering greenhouse gas emissions and dependency on fossil fuels. The technology guarantees the effective use of resources and minimizes waste during solar panel installations and procurement by streamlining project operations. Additionally, features like online ordering, digital documentation, and offers assist cut down on paper use, which lessens the environmental impact. By promoting the extensive use of renewable energy, the system subtly aids in the shift to a cleaner and greener future.

6.3 Ethical Aspects

In order to guarantee equity, accessibility, and inclusion, the system integrates ethical standards. Important ethical factors include:

- **Accessibility:** Making sure that all users, regardless of technical skill level, can easily utilize the system, including administrators, staff, and clients.
- **Affordability:** Offering affordable options so small and medium-sized businesses may implement CRM without breaking the bank.
- **Transparency:** Making certain that every process, from project tracking to procurement, is completely verifiable and open to customers and stakeholders.
- **Equity:** is the promotion of equal chances in the distribution of resources and the guarantee that no user has disadvantages because of their socioeconomic status, gender,

or race. By abiding by these moral guidelines, the platform not only upholds social norms but also establishes a standard for conscientious technical development.

6.4 Sustainability Plan

To guarantee its long-term influence and efficacy, the system has a strong sustainability strategy. Important components consist of:

- **Investing in digital infrastructure:** can improve the system's scalability to accommodate more clientele and initiatives.
- **Encouraging Green Practices:** To lessen the negative effects of paper use on the environment, encourage online communication and document exchange.
- **Frequent Monitoring and Updates:** Putting in place a method to monitor the CRM's effectiveness, user happiness, and role in advancing sustainability objectives.
- **Ongoing Training:** Providing clients and staff with training courses to guarantee effective system use and promote a sustainable culture.

CHAPTER 7

Conclusion and Future Scope

7.1 Conclusion

A major advancement in operational efficiency and the promotion of sustainable energy solutions is the system. The CRM helps companies streamline their operations and provide better customer service by including features like role-based authentication, project management, financial tracking, and complaint resolution. Adopting this CRM guarantees that companies run sustainably and ethically while also hastening the expansion of solar energy usage. The system is in a strong position to take the lead in offering cutting-edge solutions designed to satisfy the energy demands of the future due to the rising need for renewable energy. This system's user-centric design and cutting-edge technology guarantee a smooth and effective experience for all parties involved. The system supports international initiatives to tackle climate change and promote a greener future by emphasizing automation, efficiency, and sustainability.

7.2 Scope of further development

Although the system has a solid base, there are a number of areas that might use improvement:

- **Real-Time Tracking:** Accurate task and asset tracking is made possible by integrating tracking methods for project deadlines and resource flow.
- **Online Payment Integration:** To streamline financial processes, safe online payment methods for orders and invoices are being introduced.
- **Mobile Application Development:** Creating a mobile version of the CRM to provide clients and staff access while they're on the move and improve convenience.
- **AI-Powered Insights:** Using AI technologies to evaluate data and offer practical insights to enhance decision-making and project efficiency.
- **Improved Collaboration Tools:** Adding capabilities like video conferencing and chat platforms to improve team and stakeholder communication.
- **Dashboards that are customizable:** Enabling users to add pertinent KPIs and metrics to their dashboards to improve decision-making. By concentrating on these upcoming improvements, SolaCloud will maintain its innovative edge and adjust to changing business demands, guaranteeing long-term success and influence in the renewable energy space.

References

- [1] “Sunbase” *sunbasedata.com*. [Online]. Available: <https://www.sunbasedata.com/solar/solar-crm-software>. [Accessed: September. 17, 2022]
- [2] “Solar CRM” *www.solarcrm.in* [Online]. Available: <https://solarcrm.in/> [Accessed: March. 15, 2022]
- [3] “Scoop Solar CRM” *www.scoop.solar/crm*. [Online]. Available: <https://www.scoop.solar/crm/>. [Accessed: April. 10, 2023]
- [4] “Spotio” *www.spotio.com/crm*. [Online]. Available: <https://spotio.com/solar-crm/>. [Accessed: Oct. 10, 2022]
- [5] “MUI - The React UI library for faster and easier web development.” *https://mui.com/*. [Online]. Available: <https://mui.com/>. [Accessed: Oct. 15, 2022]
- [6] “Teact Table - Lightweight and extensible data tables for React.” *https://tanstack.com/table/v7/* [Online]. Available: <https://tanstack.com/table/v7/>. [Accessed: Aug. 14, 2022]
- [7] “React Flatpickr - Useful library used to select date.” *https://github.com/haoxins/react-flatpickr* [Online]. Available: <https://github.com/haoxins/react-flatpickr> [Accessed: Nov. 14, 2022]
- [8] “React Select - A flexible and beautiful Select Input control for ReactJS with multiselect, autocomplete, async and creatable support.” *https://react-select.com/* [Online]. Available: <https://react-select.com/> [Accessed: Aug. 4, 2022]
- [9] “React Tag Input - React Tag Input is a robust, minimal and performant input field for creating multiple tags.” *https://betterstack.dev/projects/react-tag-input/* [Online]. Available: <https://betterstack.dev/projects/react-tag-input/> [Accessed: Aug. 04, 2022]
- [10] “React ChartJS 2 - Simple yet flexible React charting for designers & developers.” *http://reactchartjs.github.io/react-chartjs-2/#/* [Online]. Available: <http://reactchartjs.github.io/react-chartjs-2/#/> [Accessed: Aug. 04, 2022]
- [11] “Full Calendar - Full-sized drag & drop event calendar.” *https://fullcalendar.io/* [Online]. Available: <https://fullcalendar.io/> [Accessed: Aug. 04, 2022]
- [12] “Dropzone - An open source library that provides drag & drop file uploads with image previews.” *https://www.dropzone.dev/js/* [Online]. Available: <https://www.dropzone.dev/js/> [Accessed: Aug. 04, 2022]
- [13] “Sweet Alert -2 - A beautiful, responsive, customisable, accessible replacement for Javascript’s popup boxes” *https://sweetalert2.github.io/* [Online]. Available: <https://sweetalert2.github.io/> [Accessed: Oct. 11, 2022]
- [14] “Laravel - The PHP Framework for Web Artisans” *https://laravel.com/* [Online]. Available: <https://laravel.com/> [Accessed: Oct. 11, 2022]
- [15] “PHP - A popular general-purpose scripting language that is especially suited to web development. Fast, flexible and pragmatic, PHP powers everything from your blog to the most popular websites in the world.” *https://www.php.net/* [Online]. Available: <https://www.php.net/> [Accessed: Oct. 11, 2022]
- [16] “Javascript - Interpreted programming language” *https://developer.mozilla.org/en-US/docs/Web/JavaScript* [Online]. Available: <https://developer.mozilla.org/en-US/docs/Web/JavaScript> [Accessed: Oct. 11, 2022]
- [17] “HTML - Hypertext markup language” *https://en.wikipedia.org/wiki/HTML/* [Online]. Available: <https://en.wikipedia.org/wiki/HTML/> [Accessed: Oct. 11, 2022]

SolaCloud

ORIGINALITY REPORT

7%	9%	0%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	dspace.daffodilvarsity.edu.bd:8080 Internet Source	3%
2	123dok.com Internet Source	2%
3	Submitted to Daffodil International University Student Paper	1%
4	Submitted to Mascoutah High School Student Paper	1%

Exclude quotes On
Exclude bibliography Off

Exclude matches < 1%