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**PROJECT PLAN**

**Project name:** Solar energy calculator

**Group number:** 2

**Date:** 2016-12-04

**Course:** Software Engineering 2: Project Teamwork (DVA313)

**Academy:** Innovation, design and technology

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# 1. Introduction

We are going to do a project for the client named Bengt Stridh from the Future Energy Center research specialization at Mälardalen University. The client and his colleagues has in a previous project developed detailed models that are used to analyze investment decisions for photovoltaic (PV) plants in Sweden. Our task in this project is to develop a web-based tool to support different stakeholders, such as private persons and companies. The users should in a straightforward fashion be able to determine what investments in solar energy that are suitable for them, based on a number of default parameters that can be adjusted by the user. The photovoltaic market has been growing strongly during the last years. However, the general knowledge of PV among potential investors is still low and therefore they could miss out on for example financial and environmental benefits. Because of this there is a strong need for a user friendly tool to calculate both production cost and profitability for PV investments in Sweden.

# 2. Project Organization

Here you can read about the project group, organization, communication, planned effort per member for each week in the project, deliverables, deadlines, milestones, activities and quality assurance.

## 2.1 Project group

In Table 1 below, you can find information (i.e. name, email, roles and responsibilities) about all of the project members. The roles or responsibilities might change during the project, for example if a person is more suitable for a particular role or responsibility. All of the project members will also help out the other project members with their roles or responsibilities if necessary.

|  |  |  |
| --- | --- | --- |
| **Name** | **Email** | **Roles/Responsibilities** |
| Lukas Hamacek | lhamacek@outlook.de | Project manager |
| Aliya Hussain | syeda.aliya.hussain@gmail.com | Documentation and presentation |
| Charlie Höglund | c.hoglund@live.se | Trello manager |
| Jonathan Larsson | jonathan-larsson@outlook.com | Configuration manager (SVN/Github) |
| Sebastian Lindgren | sebbestune@icloud.com | Client contact |
| Avalika Podduturu Reddy | avalika12@gmail.com | Report overseer and designer |

**Table 1 –** Information about all of the project members.

## 2.2 Organization and communication

Every Monday during this course we will have a project meeting with the external steering group in the university’s facilities. In addition to that we will have at least one internal project meeting per week, either physically in the university’s facilities or non-physically over for example the communication service called Slack. We will also make sure to have a small internal project meeting before the meeting with the external steering group on Mondays, which will allow us to go through all of the material to be presented to the steering group. The number of internal project meetings may differ from week to week depending on whether we actually need more meetings or not. As mentioned before the forms of contact will either be physical (i.e. in the university’s facilities) or non-physical (i.e. over communication services like Slack or email). We will also use the collaboration tool called Trello, to follow the progress of the current week’s activities and plan activities for the upcoming week. When using Trello, you get a graphical board which allows you to see what activities that are available, what activities that are being worked on, what activities that have been finished, who is working on what activities, and how much time effort that has been used for the activities. Each project member will report their own worked hours per week by entering the necessary data in an Excel file (i.e. a specific file for each project member) available on the Github repository. All of the results such as documentation and code will be reported by committing/uploading them to the Github repository, which allows both the project members and the steering group to access them. All of the project members will be able to commit results to the Github repository, but sometimes it might be required to have internal discussions with some particular project members before merging for example your code with theirs.

## 2.3 Planned effort per member for each week in the project

This project course is on 7.5 hp and 50% pace, which corresponds to approximately 20 work hours per week for each project member. Then there is approximately a total of 8 work weeks, since there will be a few days of absence among the project members during the Christmas holidays, the last week of the course will not be a full week etcetera. Therefore, each project member should have a total effort of approximately 160 hours in the end (i.e. 20 hours \* 8 weeks = 160 hours). However, the project members may choose for themselves how to divide their total of 160 hours throughout the weeks as long as the internal and external deadlines are fulfilled.

## 2.4 Deliverables, deadlines, milestones and activities

Here you can find both external and internal deliverables, deadlines, milestones and activities in the project. You can also see when they are planned and how much effort that they will require.

### 2.4.1 External

In Table 2 you can see the external deliverables, and in Table 3 you can see the external project meetings and presentations.

|  |  |  |
| --- | --- | --- |
| **Deliverable** | **Deadline** | **Total effort in hours** |
| Project plan | Nov 17 | 35 |
| Design description (1st version) | Dec 1 | 30 |
| Product (1st version) | Dec 1 | 100 |
| Design description (final version) | Jan 12 | 60 |
| Product (final version) | Jan 12 | 200 |
| Project report | Jan 12 | 200 |

**Table 2 –** The external deliverables with their deadlines and time efforts.

|  |
| --- |
| **Meetings with the steering group (25 min effort each, total effort: ~3 hours/member):**  Project meeting - Nov 9  Project meeting - Nov 14  Project meeting - Nov 21  Project meeting - Nov 28  Project meeting - Dec 5  Project meeting - Dec 12  Project meeting - Dec 19  **Presentations (2 h 45 min effort each, total effort: ~8,25 hours/member):**  Project plan and requirements - Nov 23  Preliminary design and implementation - Dec 7  Final presentation - Jan 11 |

**Table 3 –** The external project meetings and presentations with their planned dates and time efforts.

### 2.4.2 Internal

In Table 4, 5 and 6 you can see some of the internal activities in the project.

|  |  |  |
| --- | --- | --- |
| **Activity** | **Deadline** | **Total effort in hours** |
| Learn how to use Github/Git (i.e. the project members who need it) | Nov 16 | 10 |
| Learn how to use Trello | Nov 16 | 15 |
| Build and present a lightweight website layout for the client | Nov 22 | 30 |
| Learn/relearn the necessary web skills (e.g. php, ajax, javascript etc.) | Nov 28 | 120 |

**Table 4 –** The internally general activities with their deadlines and time efforts.

|  |  |  |
| --- | --- | --- |
| **Activity** | **Deadline** | **Total effort in hours** |
| Review of the project plan | Nov 17 | 6 |
| Review of the design description (1st version) | Dec 1 | 6 |
| User test of the 1st product version | Dec 1 | 6 |
| Review of the product (1st version) | Dec 1 | 6 |
| Review of the design description (final version) | Jan 12 | 10 |
| User test of the final product version | Jan 12 | 10 |
| Review of the product (final version) | Jan 12 | 15 |
| Review of the project report | Jan 12 | 15 |

**Table 5 –** The internal review activities with their deadlines and time efforts.

|  |  |  |
| --- | --- | --- |
| **Activity** | **Deadline** | **Total effort in hours** |
| Prepare for the “project plan and requirements” presentation | Nov 23 | 15 |
| Prepare for the “preliminary design and implementation” presentation | Dec 7 | 15 |
| Prepare for the “final presentation” | Jan 11 | 20 |

**Table 6 –** The internal preparation activities with their deadlines and time efforts.

## 2.5 Quality assurance

Firstly, we have the quality assurance of the documentation deliverables such as the project plan, design description, project report and so on. Before reporting the specific documentation deliverable, we plan to have an activity where at least one project member read through the documentation again while looking for grammatical, layout or logical mistakes etcetera. Secondly we have the quality assurance of the implementation deliverables such as the finished code and graphical user interface (i.e. the final product). To make sure that the graphical user interface is for example user-friendly, then we can let both the client and other external people (e.g. students on the school) do a user test, where they can try it out and share valuable feedback. To assure the quality of the different units (i.e. functionalities/features) of the system we will start with doing unit testing, which will be done as soon as each unit is implemented. Then we will do an integration test to assure that all of the different units of the system works together as expected. Finally, we will test the complete system by letting both the client and other external people try it out, which will allow us to see if the system works as expected in a real life scenario.

# 3. Description of the system to be developed

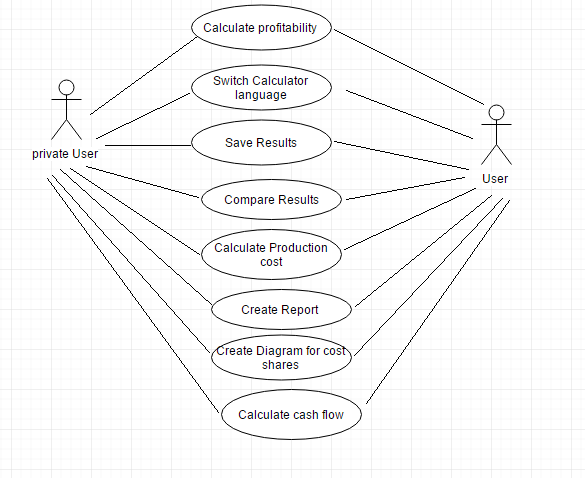
## 3.1 High level description of the domain and the problem

A preliminary specification has been provided by the client. The purpose of the calculator is simply to calculate the production cost and profitability for photovoltaic installations in Sweden. Its intended users are both private persons and other users (e.g. companies, property owners). The problem is that very few users have enough knowledge about PV and that there are a lot of necessary parameters to be inputted for the calculations. However, the solution for this problem is by using default parameters (i.e. different for private and other persons), min and max values, guiding texts etcetera. The web-tool should also preferably have the following functionality: Save used input values from one session to another, switch between Swedish and English language, compare the calculated values for two sets of input parameters. The web-tool’s output should be production cost, profitability, cash flow, diagrams (i.e. with present values, cost shares and income shares). There should also be a possibility to make a report file that could be printed with input and output values. An important feature of the web calculator is to keep it up to date with legalizations, prices of electricity, prices of electricity certificates etcetera. Therefore, it should be easy to update guiding texts, default values, as well as suggested minimum and maximum values. If possible the updates of the system should be made by uploading an Excel file containing the updated values.

## 3.2 Description of the existing systems

The system that is currently being used is in the form of an Excel file, in which the user has to enter the necessary parameters inside cells and then some built-in functions calculate the result. Our own web application will at least use the same functionalities as the ones in this already existing system, but bring it to the web. This new system will benefit from the dynamical nature of web applications, hopefully enable a more user friendly environment, and also make the photovoltaic investment calculator accessible to a larger audience. In other words, the already existing system will not be extended, but instead give us knowledge about the functional basis on which our web application will be built upon.

## 3.3 High-level description of the desired functionality



**Figure 1-** This is a use-case diagram that captures the desired functionality. The actor “private user” is for the private persons, and the actor “user” is for the other persons (e.g. companies).

# 4. Initial project backlog

|  |  |
| --- | --- |
| **Backlog requirements** | **Planning Poker (0, 1, 2, 3, 5, 8, 13, 20, 40, 80, 100)** |
| Create Bootstrap design/layout | 80 |
| Create first database structure (ERM-Model) | 13 |
| Create function that user can register and login/logout | 40 |
| Create function for user to save and show calculated values | 20 |
| Create admin account | 8 |
| Create function to update values as admin | 20 |
| Create the UI for the calculator (form) | 13 |
| Implement the formula function | 80 |
| Create function for automatic creating PDF/Excel output file | 40 |
| Create function for sending the output file per email | 8 |
| Add help text for parameters | 2 |
| Create function to switch between English and Swedish | 13 |
| Create function to compare two sets of input parameters as a user | 13 |
| Create output (Cash Flow, Diagrams, …) | 40 |