User Requirements Specifications

Energy Grid System

Electrify

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Author	The Development team[1]

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Version history

Version	Date	Author(s)	Changes	State
0.1	16/02/2022	Dmitrii	Creating the document	WIP
1.0	23/02/2022	The Development Team	First version of URS	Done

Distribution

Version	Date	Receivers

Table of Contents

1. Introduction

1.1. Document Purpose

In the document, the specification of the user requirements for the Energy Grid System project for Infiniot is presented. The purpose of this document is to serve as a baseline and the primary source of input for the development team while the project is in its development stages and as an overview of the acceptance criteria for the project once the development is finalized and the project enters deployment stages. This document is intended to be read by all parties involved in the development of the Energy Grid System for Infiniot.

1.2. Document Overview

In Section 2, a brief background to the project and the involved parties is given. This includes the main problem description and an initial project goal. The scope of the project is also defined here.
In Section 3, the stakeholders of this project are presented, and the main target user base is analyzed, and that analysis is presented also. This Section will serve as a brief overview of the parties involved in the development, as well as a baseline for keeping the target users in mind.
In Section 4, all of the User Requirements, both functional and non-functional, for this project are defined, divided by their connection to either the Web Application, the Mobile Application or the Monitoring Tool, and their priority is presented using the standard MoSCoW table.
In Section 5, the assumptions and constraints related to the User Requirements from Section 4 are presented and elaborated on.
In Section 6, the wireframes created for the Web application, Monitoring tool and the Mobile application are showcased, and a brief explanation about each of them is given.

2. Background

With the current Dutch energy sector, the electricity supply monitoring is limited to only between providers and consumers, which includes only the commercial electricity. The growth of self-produced electricity (renewable electricity) brings the question on how to avoid both under-capacity or over-capacity of an electrical grid, which are linked with additional costs.
Infiniot is a software consulting Dutch company for grid operators, trying to find a solution for this problem.

In order to avoid blackouts or overloads, Dutch energy providers, as well as consumers, should be in constant connection between each other. This way simulations can be run, which will help providers to set up the electrical grids in advance and predict the future market. The predictions made will be based on the user data, which they will be provided with, as well as certain factors that are most often easily predictable, such as weather conditions, location, timestamp in year/day/hour, etc.
Being a user, the priority of the information differs. People should be aware of their electricity usage and how much this would cost them, as well as their production (if there is any). Users can also benefit from a certain simulation, as they will be notified in advance of an estimated price and consumption, which will help them plan ahead.

Infiniot asked our group to create software solutions for avoiding the problems caused by an overload and underload, as well as keeping users and providers informed with estimates and current usage of the system.
Both of those problems can be solved by making a connection between the consumer and producer with the help of a web application for energy companies and mobile application for all the users.
Due to the simulations that will be run, a monitor app will be useful, that will give an overview of the load created on the device.
The main focus of our group will be in the provinces of Noord-Brabant, Limburg, Gelderland and Zeeland.

2.1. Scope

Inside scope:	Outside scope:
Web application - providing utility companies with a tool which can show various energy-related statistics, information about the energy grids in the company's region and forecast future energy usage and consumption. Regional map with all the power grids. Present data in the form of diagrams and charts. View historical data as well as predicted data using our prediction model. Different types of data can be viewed, such as monthly, weekly, daily and hourly values. Possibility to generate a PDF report for each given hour/day/month/year. Possibility for an admin to switch to the Monitoring Application straight from the Web Application.	Manual for the application will not be provided.
Monitoring tool - providing technical support. Collects, stores, and analyzes data and metadata necessary for troubleshooting and optimizing performance. Tracks - Error rates, CPU usage, Response times, Request rates, Uptime, Number of instances.	There will be no training provided to use the application.
Mobile application - informing the consumer about the current usage of energy in the household and alerting if there is a chance of potential overload. Provide in depth information about the consumption, costs, production and earnings of energy in the form of graphs. Predict future consumption, costs, production and earnings of energy taking certain variables into account, such as weather, season, price, time, past usage, etc. User-friendly design. Not overwhelming the user with complicated information.	Bugs found after the final phase will not be fixed unless an extra contract is added.
Source code of all applications	Design changes after the final phase will not be done by the development team unless an extra contract is added.

3. Stakeholder and User Analysis

Stakeholders in this project will be the people representing Infiniot, the company assigning our group to it - Gertjan Schouten,as a product owner, and Kenneth Ruys and Ton Smets, as clients. As users of our project, there will be 3 groups - consumers, providers (electrical companies) and technical support. Each one of those groups will have a different and specific application for them. Users will gain access to a mobile application, providers will be able to see a web-application and technical support will be responsible for using a monitoring tool. Each application's user requirements can be found on the next page.

4. User Requirements

4.1. Functional Requirements

Web Application

ID	Name	Priority (MoSCoW)
WB-FR-01	Company should be able to see the energy consumption of a specific region.	M
WB-FR-02	Company should see the predicted energy usage for a specific timeframe.	M
WB-FR-03	Company should be able to see information about the grids in the area.	M
WB-FR-04	Company should be able to see how much energy is produced by each different source of electricity.	M
WB-FR-05	Company should be able to access and view historical data about energy usage and prices.	M
WB-FR-06	Company should be able to manage accounts of employees.	M
WB-FR-07	Employees should be able to login into the application using their account credentials.	M
WB-FR-08	Employees should be able to change the password of their account.	M
WB-FR-09	Employees should be able to choose between English and Dutch language.	M
WB-FR-10	Company should be able to simulate price fluctuations of energy.	S
WB-FR-11	Company should be able to see the daily production rate of each grid.	C
WB-FR-12	Company should be able to generate reports for a specific timeframe.	C

Mobile Application

ID	Name	Priority (MoSCoW)
MA-FR-01	Consumers should be able to get an estimate of their monthly energy usage.	M
MA-FR-02	Consumers should be able to receive notifications about price changes of energy.	M
MA-FR-03	Consumers should be able to receive notifications about energy spikes.	M
MA-FR-04	Consumers should be able to get historical data about the energy price and the energy usage of their household.	M
MA-FR-05	Consumers should be able to create an account in the system.	M

MA-FR-06	Consumers should be able to login into the application using their account credentials.	M
MA-FR-07	Consumers should be able to manage the credentials of their account.	M
MA-FR-08	Consumers should be able to get an estimate of their energy production.	C
MA-FR-09	Consumers should be able to get live data about the energy price and the energy usage of their household.	C
MA-FR-10	Consumers should be able to view predicted energy production, energy consumption and energy price.	C

Monitoring Tool

ID	Name	Priority (MoSCoW)
MT-FR-01	Technicians should know the status of the system's services.	M
MT-FR-02	Technicians should be able to receive the alerts about certain services or metrics.	M
MT-FR-03	Technicians should be able to check the current system load.	M
MT-FR-04	Technicians should have all the data in a structured and well visualized way.	M
MT-FR-05	Technicians should be able to change the password of their account.	M
MT-FR-06	Technicians should be able to access the logs of the application.	S
MT-FR-07	Technicians should be able to know real-time status of external APIs.	S
MT-FR-08	Technicians should receive notifications about application crashes.	C
MT-FR-09	Technicians should be able to monitor real-time request traffic.	C

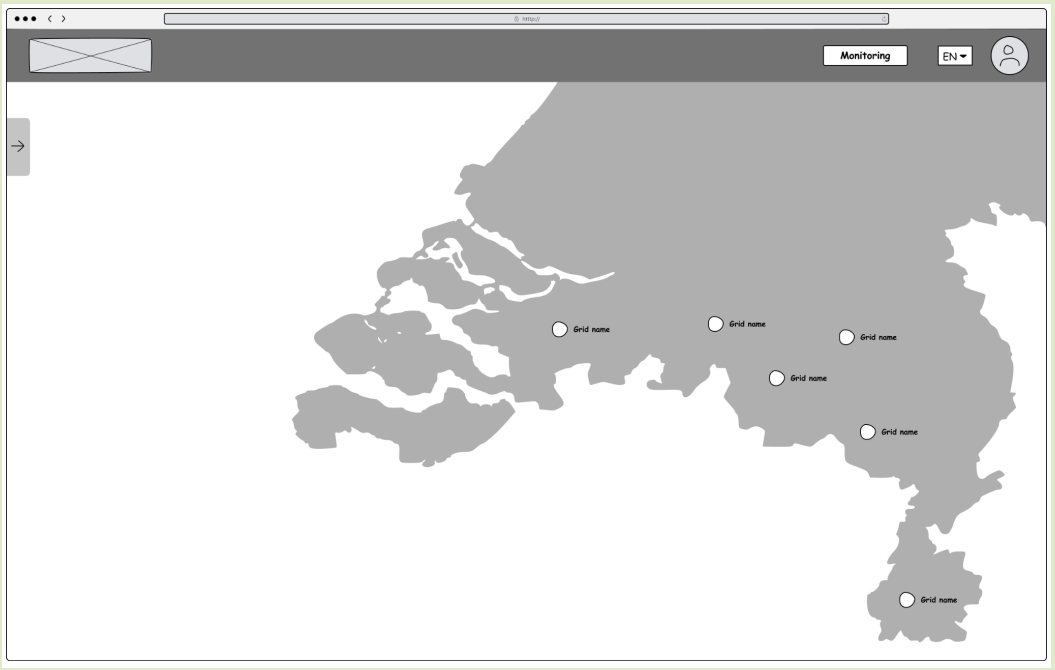
4.2. Non-Functional Requirements

ID	Name	Priority (MoSCoW)
N-FR-01	The project should be scalable for the client to increase the size of operations in the future.	M
N-FR-02	The software should be optimized, i.e. run smoothly and well.	M
N-FR-03	The system is going to implement and use multiple security measures.	M
N-FR-04	The system is going to be easy to test and tests will be conducted multiple times throughout the development process.	M
N-FR-05	The code should follow the regulation standards, i.e. written following best practices.	M
N-FR-06	The system should be available all the time.	M
N-FR-07	The data stored is going to be maintained to be accurate and consistent.	S
N-FR-08	The system is going to be accessible and easy to understand to everyone.	S

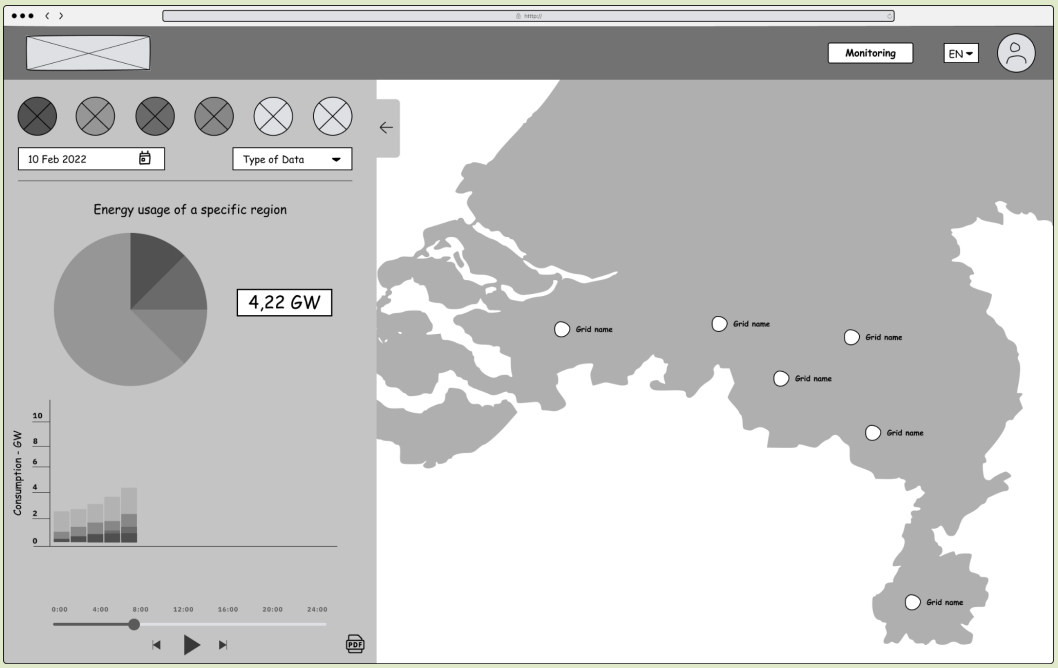
N-FR-09	The system is going to have the ability to integrate additional components.	C
N-FR-10	Documentation about the system and its innerworkings.	W

5. Website Wireframes

Web application



Map screen - has a map of the South of the Netherlands. The user can see the information for each grid in the region by selecting it on the map.

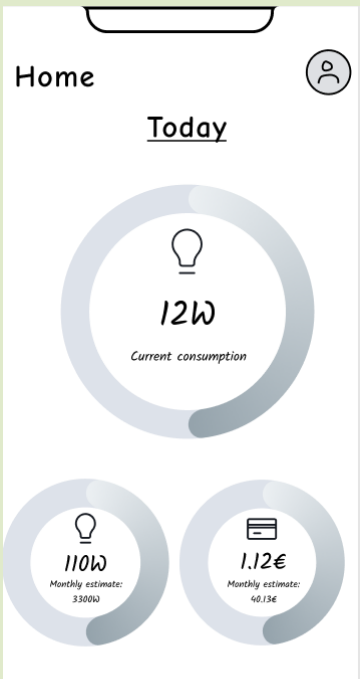


Opened menu - has a timeline slider to select different timeframes. The user can enable and disable different energy sources. The user can view information about the selected grid.

Monitoring application

Dashboard - Provides the user with data about a selected service that is part of the system. The data is presented by graphs and charts. It can be filtered by timeframe and service.

Mobile application



Dashboard - Provides the user with data about their electricity usage and energy production. The user can also see the price of energy and how much much it would cost them for a specific timeframe.