Software Requirements Specification

for

Current See

Version 1.2

Prepared by

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Contents

Revisions

Version	Primary Author(s)	Description of Version	Date Completed
1.0	Jay Mutarevic, Kristen Morse, Bryan Yu, Branton Horsley, Nick Krause	First version--basic implementation of energy to web application	02/02/2013
1.1	Jay Mutarevic, Kristen Morse, Bryan Yu, Branton Horsley, Nick Krause	Updates based on feedback from Chandra and Stratos	02/23/2013
1.2	Jay Mutarevic, Kristen Morse, Bryan Yu, Branton Horsley, Nick Krause	Final revisions	03/07/2013

1 Introduction

CurrentSee is a platform that will allow PowWowEnergy to provide end users an interface to view their power consumption data in an easy-to-understand, visual format on their web browser. For the company's purpose, CurrentSee will also allow PowWow Energy to store data collected into a SQL database.

1.1 Document Purpose

The software requirements specification for CurrentSee is intended to provide a detailed explanation of the features and design specifications for this application. Additionally, it will serve as a tool to communicate the design plans of Team Program Cracker with PowWow Energy so that both parties may fully understand the specifications, requirements, and design of the CurrentSee project.

1.2 Product Scope

CurrentSee is a web application that is designed to allow users to easily visualize their power consumption over a period of time and potential cost savings. CurrentSee will also give the user the ability to set up alerts so that the application may notify the user when their energy consumption has passed their preset threshold. Our system will be available online and designed to be easy to use.

1.3 Intended Audience and Document Overview

This document is intended for faculty and teaching assistants for CS189A/B, Olivier Jerphagnon, our team, and anyone else interested in learning more about the CurrentSee application.

The remainder of this document provides the general product description and a technical outline for the requirements of this system. Section two will give a high level description of the project functionality and implementation details. Section three will give a more detailed description of the specific requirements for different components of the application, which include various interfaces and functional requirements.

1.4 Definitions, Acronyms, and Abbreviations

- Application Programming Interface (API): a protocol used as an interface so that software components can communicate with each other
- Django: a high-level Python Web framework
- Green Button: allows for customers to download their personal energy usage, or allows developers and third-parties to receive energy usage data from customers
- kWH: kilowatt hour (unit of energy)
- MySQL: open-source relational database management system
- Python: high-level programming language

1.5 Document Conventions

This document uses Times New Roman font throughout the entire document. Major header lines use bold, size 24 font. Subsections use bold, size 18 font. Smaller subsections use bold, size 14 font. Any part of this document that is not a header of some kind uses size 11 font. The one inch margins are maintained throughout this document as well.

1.6 References and Acknowledgements

- Django:
  https://www.djangoproject.com/
- Green Button Data:
  http://www.greenbuttondata.org/
- mySQL
  http://www.mysql.com/
- Python:
  http://www.python.org/download/releases/2.7.3/

2 Overall Description

2.1 Product Perspective

This is a new, self-contained project. Initially, there is no framework or system in place to build upon; therefore, this software will be built from the ground up. This system will consist of a backend and a frontend. In the frontend, the user will interact directly with a webpage using the interface to retrieve any and all data requested. Additionally, the frontend will be used by the users to enable any required permissions required by the electric companies of our application to access the relevant user data. In the backend, our software engine will allow us to aggregate the data, store the data, and produce results which will be of value to the users.

CurrentSee will be designed as two parts, the front and back end, that will be used by end users and PowWow Energy respectively. The front end will be a web application where the user may interact with to see a visual representation of his energy consumption. The web application will be built on top of Django+Python running on Amazon Web Services and interface with the mySQL server to store and pull relevant data.

The backend will be the mySQL server that will store and push the data that is being used by the application. The backend will be primarily used by management and third parties who have contracted with PowWow Energy to have access to the data.

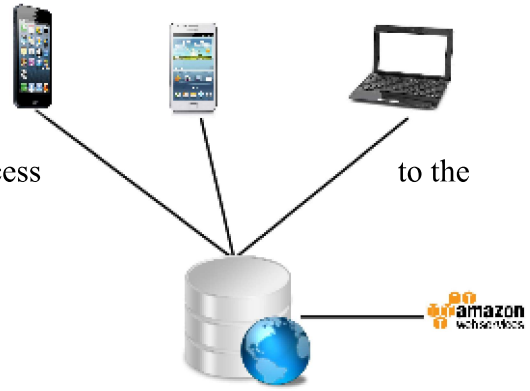

Figure 1: CurrentSee Architecture

2.2 Product Functionality

- The user will be able to access his energy or gas consumption through a simple visual interface through a web browser.
- The user must be able to upload his Green Button Data into our website
- The user must be able to authenticate with our system
- The user will be able to set alerts so that when a preset threshold value has been reached, the user will receive a notification.
- The product must be able to collect and store energy and gas data in the mySQL database
- The product must be able to provide calculations and analysis on the user's data

2.3 Users and Characteristics

The initial users of our software front end will be cost or environmentally conscious individuals who are familiar with navigating a web browser and managing a desktop, laptop, or mobile device. The user may take a moment to familiarize him/her self with the layout and interface of our web service, but should easily understand what he/she is looking at.

The users of the backend, or the mySQL database, will be PowWow Energy's management team and third parties that have contracts with PowWow Energy to have access to the data. Therefore, it is expected that these individuals have a solid foundation with mySQL databases and are capable of navigating themselves.

2.4 Operating Environment

CurrentSee will primarily act as a web service that will be supported on web browsers including Google Chrome and Firefox 18. We assume that the underlying operating system is Windows or Mac OS.
CurrentSee will be running on an Amazon Web Service server that has Django, Python 2.7, Apache, and MySQL running on it.

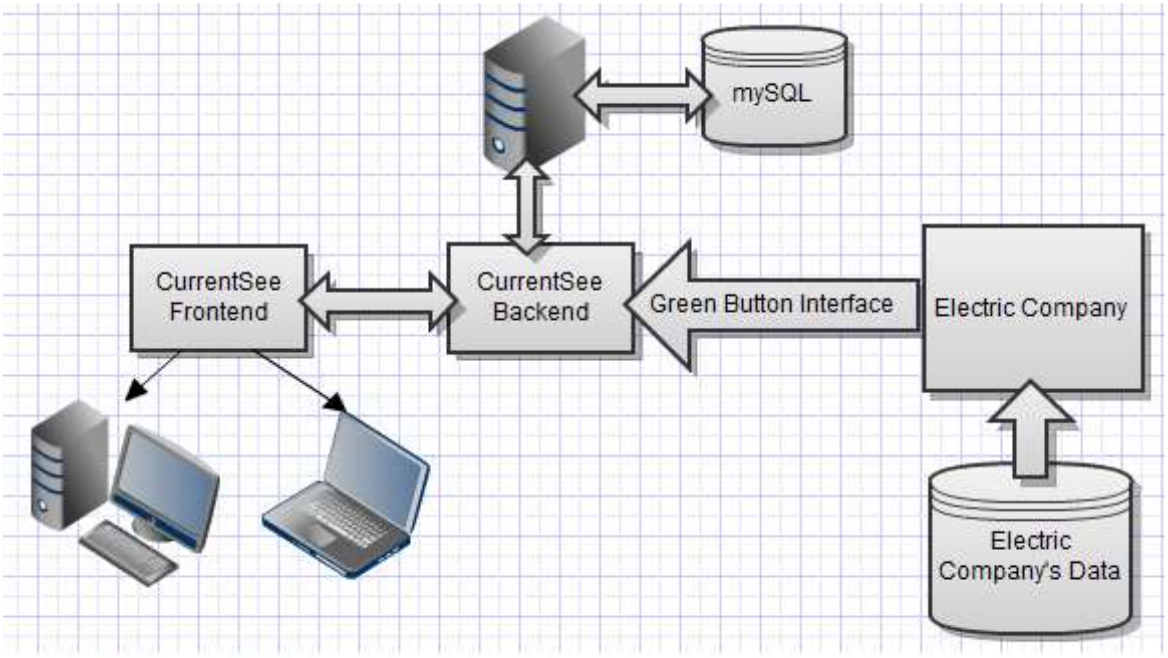

Figure 2. Operating Environment

2.5 Design and Implementation Constraints

Design:

- Language: Python with Django, HTML5, CSS3
- Database: mySQL
- Server: Amazon Web Service Servers

Constraints:

- Must run on Google Chrome and Firefox 18
- User must authenticate himself at login
- Processing requirement: as little processing as possible
- Energy companies must grant us permission to access their API
- Must use the Green Button API to access data from electric companies
- Pow Wow Energy must provide login information to Amazon Web Services

2.6 User Documentation

Online help:

- Step by step instructions on setting up accounts
- Viewing will be intuitive and self-explanatory
- Common FAQs page will be available to the user

Everything will be as simple as possible. Ideally, it will require no extra explanation. Every step for account setup and viewing options will be clearly labeled and described as the client progresses through the web page. A page containing frequently asked questions and their answers will be available.

2.7 Assumptions and Dependencies

- We assume the user has or has access to a computer or laptop
- We assume the user has an internet connection in order to navigate to the CurrentSee website and login
- We assume the user has a smart meter and is a customer with one of the power companies that support Green Button
- We depend on the correct operation between Python+Django and mySQL with the Amazon Web Servers
- We depend on Amazon Web Services to be running at all times

3 Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces

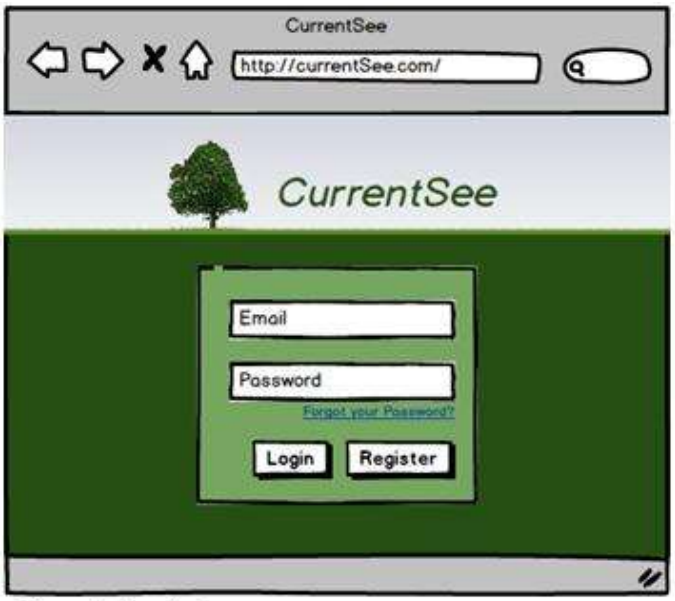

Figure 3. Login Page

Login Page

The login page will allow users to log in to their account using their username or email. The user will then be redirected to the home page upon successful login.

Figure 4. Registration Page

Registration Page

The registration page will provide a new user to create a CurrentSee account so that he or she can start using the web application. The user must enter his or her name, email, password, and power company, in order to register with the website. An error message will be displayed if the user does not enter in one of the fields or if one of the form fields is filled out incorrectly.

Home Page

The home page will allow users to view a graph of their weekly usage, total power consumption for a specified time, peak kWH usage, monthly up-to-date cost, and a rating of how well they are saving power.

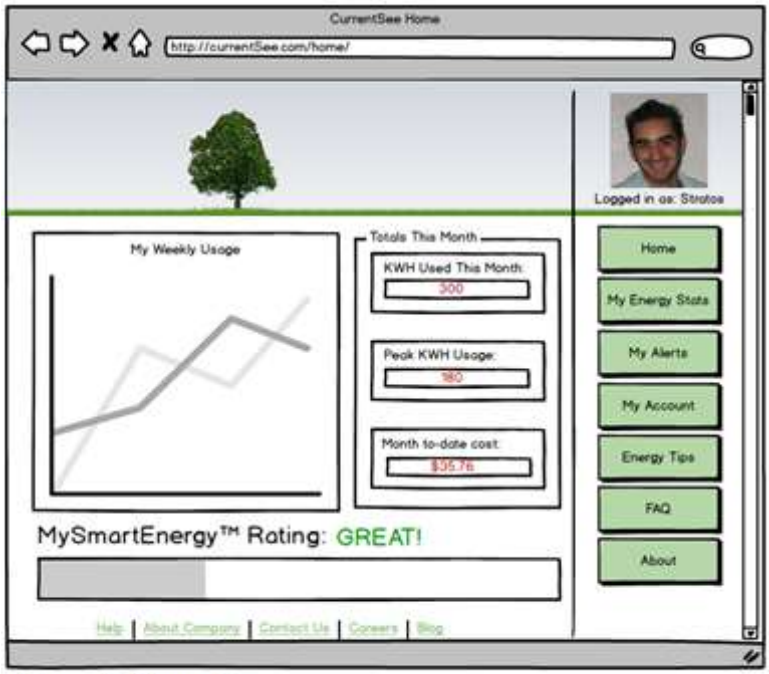

Figure 5. Home Page

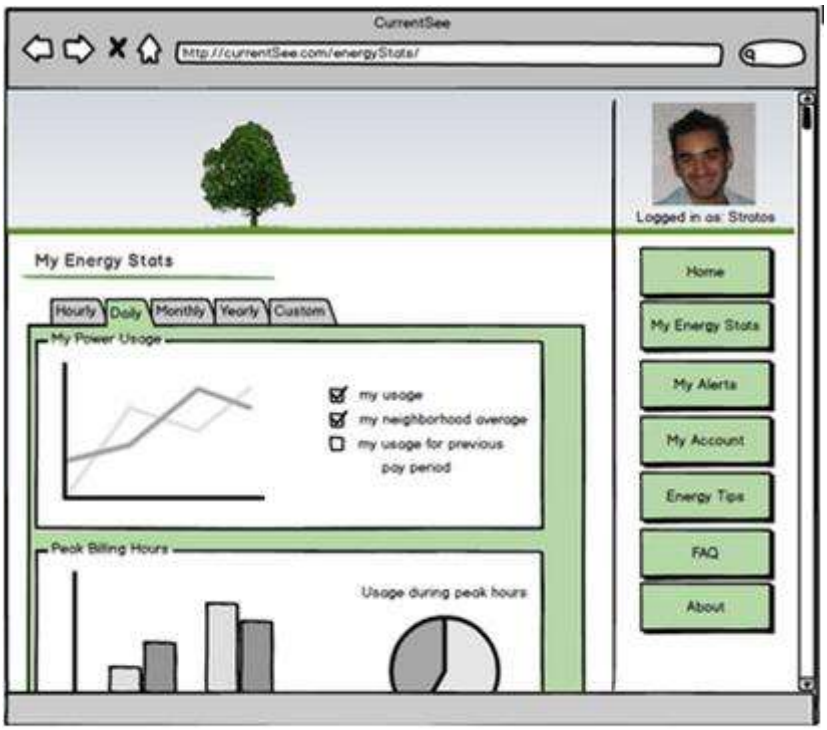

Figure 6. My Energy Stats Page

My Energy Stats Page

This page will allow users to view their energy consumption on a daily, weekly, monthly, or yearly basis. It will also give the user the option to view a graph based on comparisons with similar users or view a graph based on peak hours.

My Alerts Page

The Alert Screen will allow a user to set up either a high energy or high bill alert, choose how the alert will be sent, and set an alert value. The current energy usage will be displayed in comparison to the alert value. Also, the user will be provided the option to remove alerts.

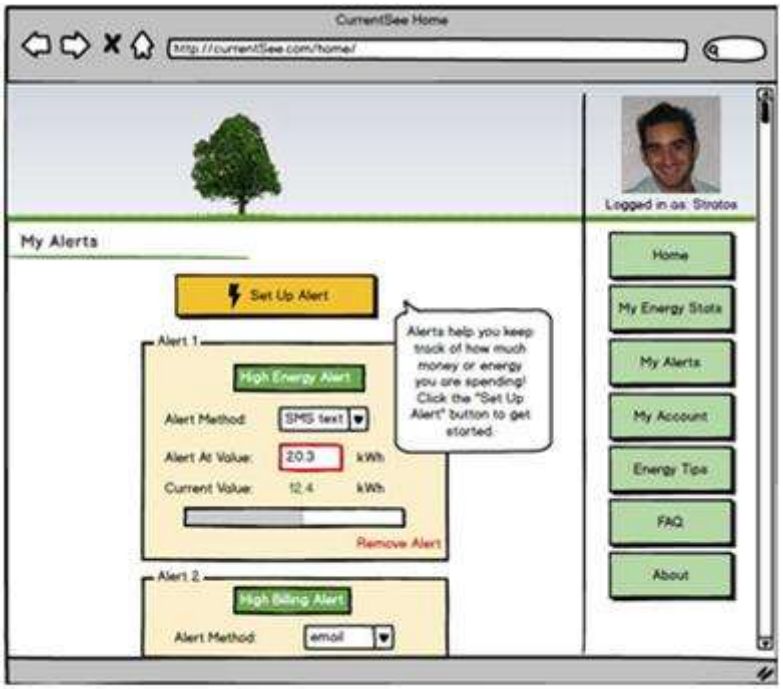

Figure 7. My Alerts Page

My Account Page

This page will allow users to upload a profile picture or change personal information.

Energy Tips Page

This page will give tips and tricks to users on how to save both energy and money.

FAQ Page

This page will provide a list of frequently asked questions that other users have asked so that most solutions to problems can be found easily by users.

About Page

This page will provide information about the company.

3.1.2 Hardware Interfaces

Laptop/Desktop:

The user may also access our software through a web browser on their desktop or laptop. Under the assumption that the user is using a traditional computing environment, the user may interact via mouse clicks and keyboard inputs.

3.1.3 Software Interfaces

- SQL Server (MySQL community edition 5.x.x) Interface
    - The SQL tables will contain all the information collected. It will be accessible by our software via the Django Interface. Data transferred include timestamps, energy usage, user and account information, etc.
- Green button data API
    - This is the electric company interface from which our software can pull green button data from.
- Windows
- Mac OS
    - Both Windows and Mac OS will interact with our web interface (via web browser) to display the data to the user via a web browser.

3.1.4 Communications Interfaces

The communication will be through a network using an encrypted format. The user will be accessing the web interface using HTTPS when accessing our software using a laptop/desktop on a web browser. The user will interact with our system through our application.

3.2 Functional Requirements

3.2.1 Storage

- The mySQL server has to be able to collect green button data sets
- The mySQL server has to be able to output data on demand
- The mySQL server has to be able to update user information

3.2.2 Web Interface

- The user must be able to interact with the software to determine the dataset he wishes to analyze
- The user must be able to log in and out of the system

3.2.3 User Stories

3.2.3a Developer User Stories

User Story 1
As a programmer, I would like to know which power provider the client is using so that I can parse the data in the correct format.
Acceptance Criteria:
Scenario 1:
Given the user does not have a CurrentSee account
And the user is registering for one
When the user inputs their information without the power provider and tries to register
Then the app will display an alert that will remind the user to input all the necessary fields that the user missed. In this case, the power provider field.
Scenario 2:
Given the user does not have a CurrentSee account
And the user is registering for one
When the user inputs their information with the power provider and tries to register
Then the app will display a message at the top that says "you have successfully created an account"

User Story 2
As a programmer, I want a system to be able to store the parsed data so I can analyze that data.
Acceptance Criteria
Scenario 1:
Given that a proper API call has been made to allow access to green button data from a power company,
When a set of utility usage data is accessed via the API
Then the utility usage data is parsed and stored in a database on the CurrentSee servers

3.2.3b Investor User Stories

User Story 3
As an investor, I want to the application to have efficient processing time so that I can spend as little money as possible.
Acceptance Criteria
Scenario 1:
Given a web server and a database server,
When a client accesses his account through our service
Then load on the Amazon web servers will be minimal

3.2.3c Client User Stories

User Story 4
As a user, I want to login to CurrentSee so that I can see my electric usage.
Acceptance Criteria :
Scenario 1:
Given the user has an electric company associated with their household
And the user has a CurrentSee account
And the user has entered their information correctly
When the user enters their CurrentSee username and password
Then the app will redirect the user to his or her homepage with a display of that user's energy consumption.
Scenario 2:
Given the user has an electric company associated with their household
And the user does not have a CurrentSee account
When the user clicks the register link
Then the app will redirect the user to a registration page

User Story 5
As a user, I want to know when I enter my credentials incorrectly so that I can try to login again or change my password if needed.
Acceptance Criteria:
Scenario 1:
Given the user has a CurrentSee account
And the user tries to login
When the user enters his or her CurrentSee username and password incorrectly
Then the application will display a red comment at the bottom of the login page that says "username or password incorrect.
And an option to send a temporary password to the user's email will be displayed

User Story 6
As a user, I want to see graphical displays of trends over time, so that I am able to visualize my power consumption.
Acceptance Criteria:
Scenario 1:
Given the user is logged into CurrentSee
And their power company's data has been associated with CurrentSee
When a user is on their 'power usage' screen
Then there will be different graphs displaying that user's power usage over days, weeks, months, and years.

User Story 7
As a user, I want to see my own power usage during peak hour times for my power company so that I can try to conserve energy during those peak billing hours.
Acceptance Criteria:
Scenario 1:
Given the user is logged into CurrentSee
And their power company's data has been associated with CurrentSee
When a user is looking at a graph of his or her power usage
Then there will be a checkbox to enable indicators on the graph
And when the checkbox is checked
Then the power company's peak hours are highlighted on the graph.
Scenario 2:

Given the user is logged into CurrentSee
And their power company's data has been associated with CurrentSee
When a user is looking at his or her total power usage
Then a graph of his or her power usage during the power company's peak hours will be shown

User Story 8

As a user, I want to see how many kWh of power I use on a daily, weekly, monthly, and yearly basis so that I can assess my power consumption and save money.

Acceptance Criteria :

Scenario 1:

Given the user has a utility company connected to their CurrentSee account
And the user is logged into their CurrentSee account
When the user is on their home screen
Then the kWh usage per day, week, month, and year will be displayed

User Story 9

As a user, I want to see graphs of my power usage vs similar users so I can make comparisons on how well I am saving power.

Acceptance Criteria:

Scenario 1:

Given the user has a CurrentSee account
And their power company's data has been associated with CurrentSee
And utility usage information is available for neighboring areas
When a graph is displayed representing their own power usage
Then there is a checkbox option to display an additional line on the graph representing power usage in neighboring areas

User story 10

As a user, I want to manage an alert system that will notify me when my bill is high or I have unusually high power usage so that I can save money.

Acceptance Criteria:

Scenario 1:

Given the user has a CurrentSee account
And the user has not set up an Alert
And the user wishes to set up an Alert for this month's bill
When the user clicks "add alert"
Then the app will redirect to the "add alert" page, allowing the user to input an amount and mode of communication (email or phone number)

Scenario 2:

Given the user has a CurrentSee account
And has set up an alert already
When the user wishes to set up an alert for this month's bill and clicks "add alert"
Then the app will display a message that states the user has already created an alert
And will ask if the user would like to overwrite that alert or add a second alert.
Then the app will redirect the user to the "add alert" page, allowing the user to input an amount and mode of communication.

User story 11

As a user, I want to view tips on how to save energy so that my next bill will be lower.

Acceptance Criteria:

Scenario 1:

Given the user has a CurrentSee account
And the user is logged in

When the user clicks the “Energy Tips” link
Then the user will be redirected to a page which lists ways to save energy

User story 12
As a user, I want to view frequently asked questions by other users so that if I need help with my account, I have the possibility to find a solution without having to wait for a response by the support team
Acceptance Criteria:
Scenario 1:
Given the user has a CurrentSee account
And the user is logged in
When the user clicks the “FAQs” link
Then the user will be redirected to a page which lists frequently asked questions

User story 13
As a user, I want to be able to view information about CurrentSee so that I can know more about the company.
Acceptance Criteria:
Scenario 1:
Given the user has a CurrentSee account
And the user is logged in
When the user clicks the “About” link
Then the user will be redirected to a page which lists information about CurrentSee and the website

User Story 14
As a user, I want to be able to be able to navigate to a settings page so that I can manage my personal information.
Acceptance Criteria:
Scenario 1:
Given the user has a CurrentSee account
And the user is logged in
When the user clicks the settings link
Then the app will redirect the user to the settings page
Scenario 2:
Given the user is logged in to his or her CurrentSee account
And the user is already on the settings page
When the user enters new personal information and clicks save
Then the app will display a message saying that “all changes have been saved.”

3.3 Product Requirements and Design (PRD) Tables

3.3.1 Priority Key

Priority	Description
Mandatory (M)	Mandatory for this release. Won't ship without this requirement.
Important (I)	Adds significant customer value. Important features are stretch targets for this release. Will not ship without this requirement unless it is ECO'ed-out.
Desirable (D)	Adds considerable customer value. Desirable features are targets of opportunity for this release.
Future (F)	This requirement has been deferred for review in a future release. It is listed for informational purposes.
External (E)	Resources external to the engineering team will satisfy this requirement.
Rejected (R)	This requirement was suggested, but rejected as not in harmony with the value proposition or positioning of the product. It will never be fulfilled.

Figure 8. Priority Key

3.3.2 Login Page

Requirement	Description	Hours	Priority	Comments
3.3.2a Username/Email Field	This field allows the user to type in a username or email	3	M	n/a
3.3.2b Password Field	This field allows the user to type in a password	3	M	n/a
3.3.2c Forgot Your Password Link	This link allows the user to receive an email with a temporary password	3	M	n/a
3.3.2d Login Button	This button allows the user to login to CurrentSee	4	M	n/a
3.3.2e Register Button	This button redirects a new user to the registration page	1	M	n/a

3.3.3 Registration Page

Requirement	Description	Hours	Priority	Comments
3.3.3a Name Field	This field allows the user to type in his or her name	2	M	n/a
3.3.3b Email Field	This field allows the user to type in his or her email	2	M	n/a
3.3.3c Password Field	This field allows the user to type in his or her desired	2	M	n/a
3.3.3d Confirm Password Field	This field requires the user to re-type his or her password	1	M	n/a
3.3.3e Power Company Selection	This field requires the user to select his or her power	2.5	M	n/a
3.3.3f Register Button	This button allows the user to register with CurrentSee	4	M	n/a

3.3.4 Home Page

Requirement	Description	Hours	Priority	Comments
3.3.4a Usage Chart	This chart displays the user's weekly power consumption	12	I	n/a
3.3.4b Monthly kWH Usage	This field displays the user's monthly usage in kWH	2	I	n/a
3.3.4c Peak kWH Usage	This field displays the user's peak kWH consumption	2	I	n/a
3.3.4d Monthly to-date Cost	This field displays the current cost of the user's bill	2	I	n/a
3.3.4e Energy Rating	This rating displays how well a user is doing compared to similar users	5	D	n/a

3.3.5 My Energy Stats

Requirement	Description	Hours	Priority	Comments
3.3.5a Hourly Chart	This chart displays the user's hourly power consumption for the	5	I	n/a
3.3.5b Weekly Chart	This chart displays the user's weekly power consumption	7	I	n/a
3.3.5c Monthly Chart	This chart displays the user's monthly power consumption	7	I	n/a
3.3.5d Yearly Chart	This chart displays the user's yearly power consumption	7	I	n/a
3.3.5e Custom Chart	This chart displays the user's power consumption during a specified time period	12	D	n/a
3.3.5f My Usage Checkbox	This checkbox will give the user the option to display his or her power consumption	1	I	n/a
3.3.5g My Neighborhood Avg Checkbox	This checkbox will give the user the option to display power consumption of neighbors	3	D	n/a
3.3.5h Previous Pay Period Checkbox	This checkbox will give the user the option to display his or her power consumption during the last billing period	1.5	D	n/a

3.3.6 My Alerts Page

Requirement	Description	Hours	Priority	Comments
3.3.6.1 Set-up Alert Button	This button will allow the user to set-up an alert	2.5	D	n/a
3.3.6.1a Alert Type Selection	This field allows the user to select the alert type	1	D	n/a
3.3.6.1b Alert Method Selection	This field allows the user to select how he or she wants to be alerted	1.5	D	n/a
3.3.6.1c Alert Method Field	This field allows the user to enter a phone number or email	1.5	D	n/a
3.3.6d Alert Value Field	This field allows the user to set the value of when an alert is triggered	1.5	D	n/a
3.3.6.2 High Energy/High Bill	Type of alert	4	D	n/a
3.3.6.2a Alert Method	This field displays the current alert method	1	D	n/a
3.3.6.2b Alert Value	This field displays the current value of when an alert is	1	D	n/a
3.3.6.2c Current Value Text	This field displays the current value of energy consumption/ cost of bill	1	D	n/a

3.3.7 Tips Page

Requirement	Description	Hours	Priority	Comments
3.3.7 Save Money During Peak Hours Link	Navigates user down to start of paragraph	0.5	F	n/a
3.3.7 Use Electricity Less By Link	Navigates user down to start of paragraph	0.5	F	n/a
3.3.7 Low Cost Electric Activities Link	Navigates user down to start of paragraph	0.5	F	n/a
3.3.7 Alternatives to Electricity Link	Navigates user down to start of paragraph	0.5	F	n/a

3.3.8 FAQ Page

Requirement	Description	Hours	Priority	Comments
3.3.8 List of FAQs	Displaysa list of frequently asked questions	1	F	n/a

3.3.9 About Page

Requirement	Description	Hours	Priority	Comments
3.3.9 About	Displays information about the company	1	F	n/a

3.3 Behaviour Requirements

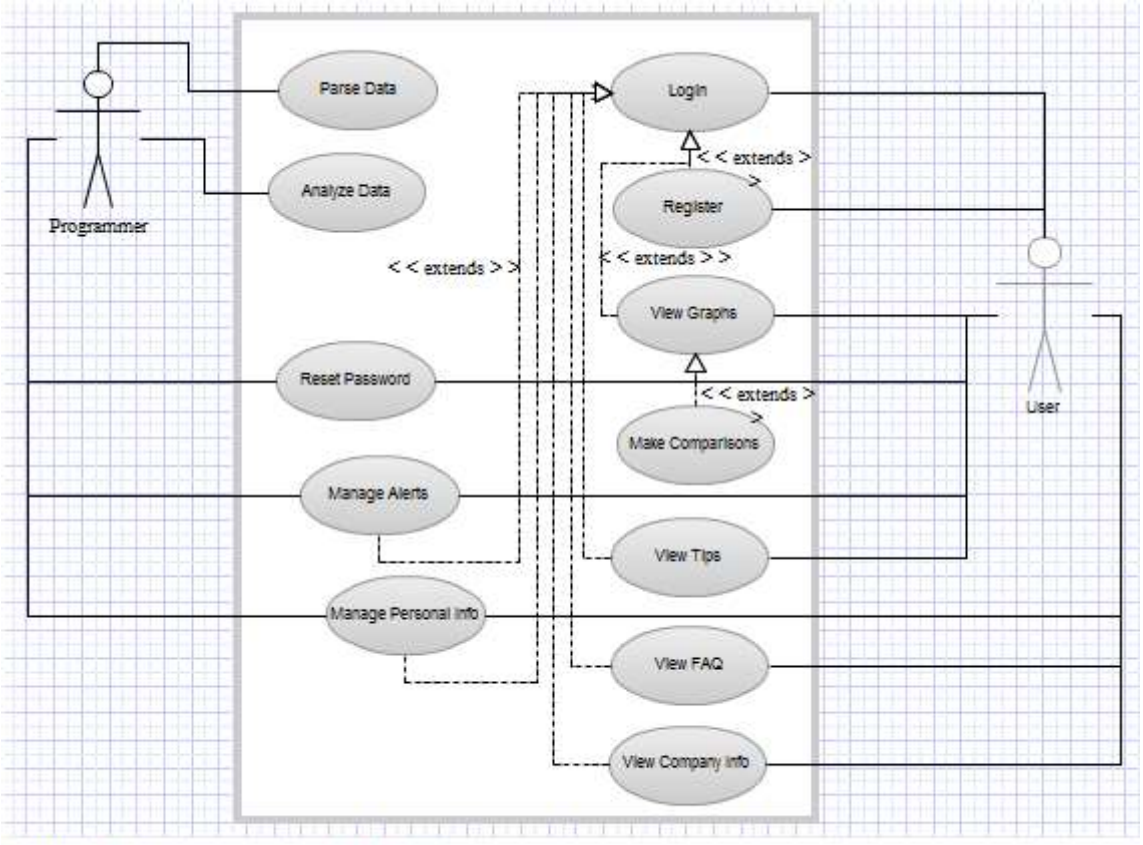

Figure 8. System use case diagram

4 Other Non-functional Requirements

4.1 Performance Requirements

- Clicking any link on the navigation bar should take less than 1 second
- Updating and saving any personal information should take less than 1 second
- Displaying a different scale on any graph should take less than 3 seconds
- Uploading a profile picture should take less than 5 seconds
- Retrieving new and updated energy data should take less than 30 seconds

4.2 Safety and Security Requirements

- The user's login information should be secure enough so that anyone except for the developers will know that user's username/email and password
- When the user types his or her password to login, it should be hidden
- The system should be secure enough so that the user's personal information will not be disclosed to unauthorized users
- The system should be secure enough to prevent the corruption of data from unauthorized users
- The system should be secure enough to protect against denial-of-service attacks

4.3 Software Quality Attributes

4.3.1 Availability

- The system must deliver services to the client when requested
- The application should be available 99.9% of the time

4.3.2 Dependability

- The application must be reliable enough so that when different users perform the same task, the expected outcome does not differ
- The application must be reliable enough so that when users perform normal functions, the system does not fail

4.3.3 Usability

- The application must be easy enough to learn so that users know how to use the product entirely on their first try
- The application must be more efficient than similar products

4.3.4 Flexibility

- The application must be flexible enough to support Google Chrome and Firefox 18 browsers
- The application must be able to support Windows and Mac OS operating systems
- The application must be flexible enough to support users with different power companies